

January 9, 2025

Pawtucket School Department 286 Main Street Pawtucket, RI 02860

#### **ADDENDUM 1**

Subject: Addendum One RFP # C2024- 010 Goff Tolman Fire Code and Sprinkler Upgrades

Addendum #1 there were no RFI's submitted.

#### Addendum #1 includes the following documents:

- 1. Pre-Bid Walk-thru 12/23/24 Sign-In Sheet
- 2. Brewster Thornton Group Architects Bid Documents which includes project scope, and associated drawings.
- 3. The RFP submittal deadline has been extended to January 16, 2025 at 1:00 P.M. \*\*Late submittals will not be considered.\*\*

#### **END OF ADDENDUM ONE**

Pawtucket School Department Goff Middle School/ Tolman High School Fire Code Upgrades

#### **ADDENDUM NUMBER 1**

#### **PARTICULARS**

- 1.01 DATE: November 25th, 2024
- 1.02 PROJECT: Fire code upgrades to the Goff Middle School/ Tolman High School
- 1.03 ARCHITECTS'S PROJECT NUMBER: 2144
- 1.04 OWNER: City of Pawtucket
- 1.05 ARCHITECT: Brewster Thornton Group Architect

#### **TO: PROSPECTIVE BIDDERS:**

- 2.01 THIS ADDENDUM FORMS A PART OF THE CONTRACT DOCUMENTS AND MODIFIES THE ORIGINAL PROCUREMENT DOCUMENTS DATED NOVEMBER 25, 2024, WITH AMENDMENTS AND ADDITIONS NOTED BELOW.
- 2.02 ACKNOWLEDGE RECEIPT OF THIS ADDENDUM IN THE SPACE PROVIDED IN THE BID FORM. FAILURE TO DO SO MAY DISQUALIFY THE BIDDER.

CHANGES TO THE PROJECT MANUAL - INTRODUCTORY REQUIREMENTS, PROCUREMENT REQUIREMENTS AND CONTRACTING REQUIREMENTS:

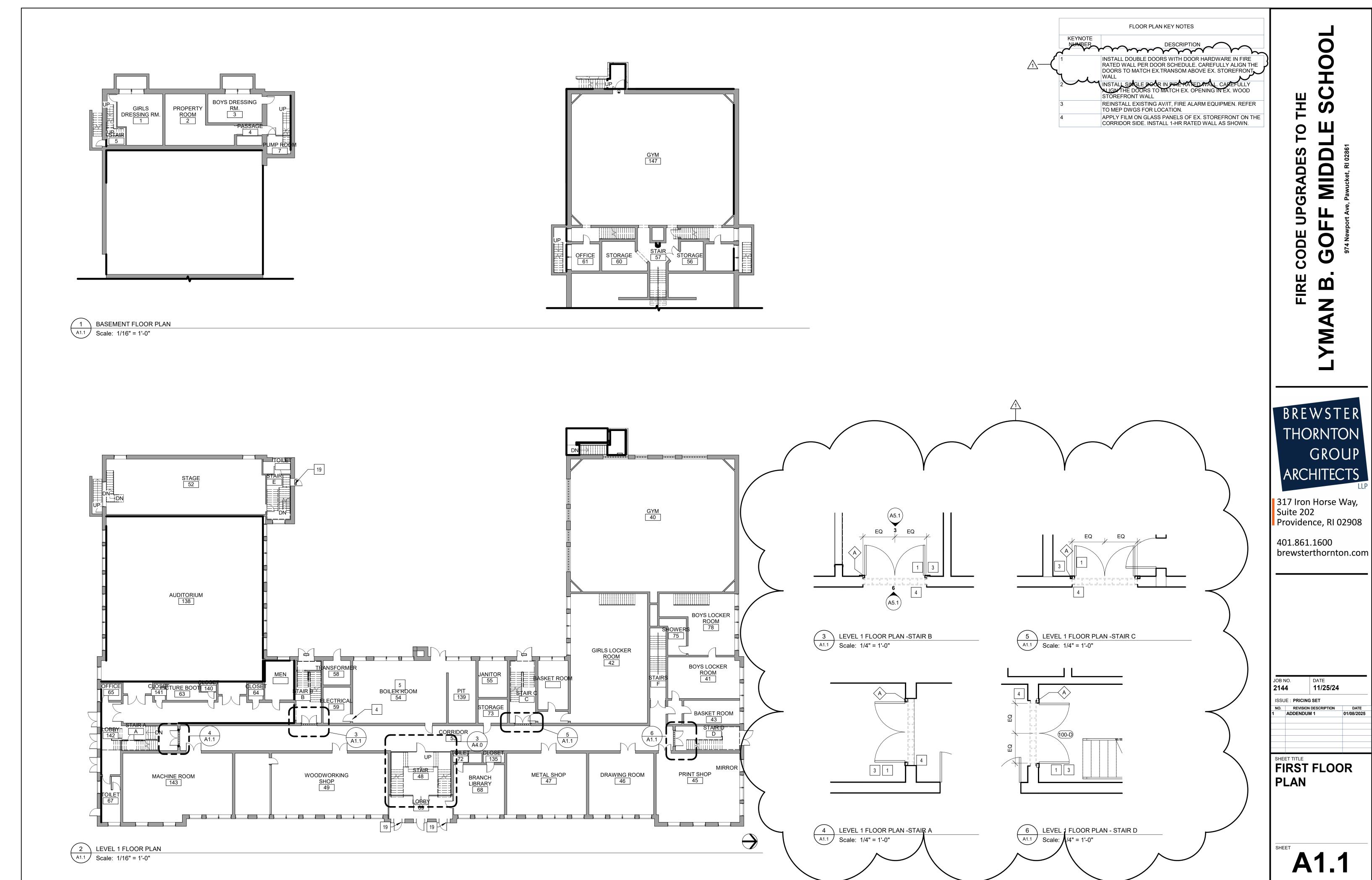
#### **ATTACHMENTS:**

- A. Drawing A1.1 First Floor Plan, revisions dated 01/08/25
- B. Drawing A5.1 Details, Door Types, Frames & Schedule, revisions dated 01/08/25
- C. Drawing 24144- E0.0 Electrical Symbol, Legend and Notes, revisions dated 01/08/2025
- D. Drawing 24144- E0.0 Electrical Symbol, Legend and Notes, revisions dated 01/08/2025
- E. Drawing 24144- E1.0 Electrical Level 1 Plans, revisions dated 01/08/2025
- F. Drawing 24144- E1.1 Electrical Level 2 Plans, revisions dated 01/08/2025
- G. Drawing 24144- E1.2 Electrical Level 3 Plans, revisions dated 01/08/2025
- H. Drawing 24144- E2.0 Electrical Specifications Sheet, revisions dated 01/08/2025
- I. Drawing 24144- E2.1 Electrical Specifications Sheet, revisions dated 01/08/2025
- J. Drawing 24144- E2.2 Electrical Specifications Sheet, revisions dated 01/08/2025
- K. Drawing 24145- E1.1 Electrical Level 1 Plans, revisions dated 01/08/2025
- L. Drawing 24145- E1.2 Electrical Level 2 Plans, revisions dated 01/08/2025
- M. Drawing 24145- E1.3 Electrical Level 3 Plans, revisions dated 01/08/2025
- N. Drawing 24145- E1.4 Electrical Level 4 Plans, revisions dated 01/08/2025
- Drawing 24145- E2.0 Electrical Specifications Sheet, revisions dated 01/08/2025
- P. Drawing 24145- E2.1 Electrical Specifications Sheet, revisions dated 01/08/2025
- Q. Drawing 24145- E2.2 Electrical Specifications Sheet, revisions dated 01/08/2025
- R. Drawing 24145- E1.0 Electrical Basement Plans, revisions dated 01/08/2025

#### **CHANGES TO DRAWINGS:**

- A. A1.1 First Floor Plan, with revision 1 dated 01/08/25 alteration to note 1 and enlarged plans details 3-6. Showing transom above.
- B. A5.1 Revised Detail 10, with revision 1 dated 01/08/25 to clarify first floor jamb does not have sidelights..
- C. 24144- E1.0 Electrical Level 1 Plans, revisions dated 01/08/2025, Floor plan 6 & 7 have alterations to Note #12 and Note #20
- D. 24145- E1.1 Electrical Level 1 Plans, revisions dated 01/08/2025 alterations to Note # 12 then Note 18-21
- E. 24145- E1.2 Electrical Level 2 Plans, revisions dated 01/08/2025 alterations to Note # 12 then Note 18-21 as well as addition of new Detail #11
- F. 24145- E1.3 Electrical Level 3 Plans, revisions dated 01/08/2025 alterations to Note # 12 then Note 18-21 as well as addition of new Detail #13
- G. 24145- E1.4 Electrical Level 4 Plans, revisions dated 01/08/2025 alterations to Note # 12 then Note 18-21

**END OF SECTION** 

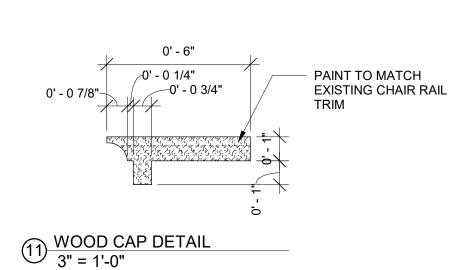


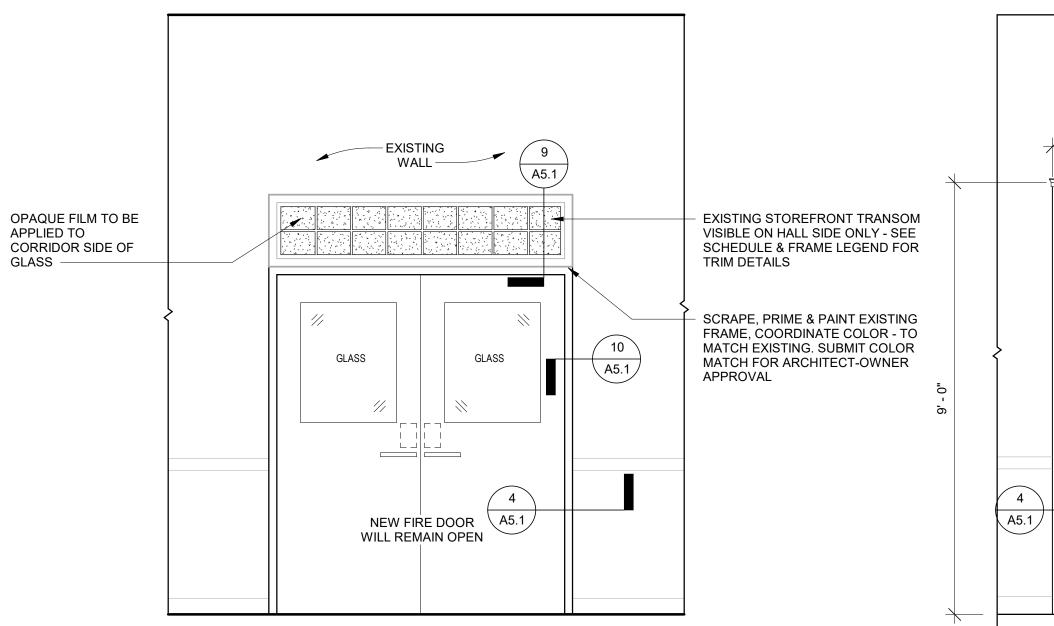


APPLIED TO

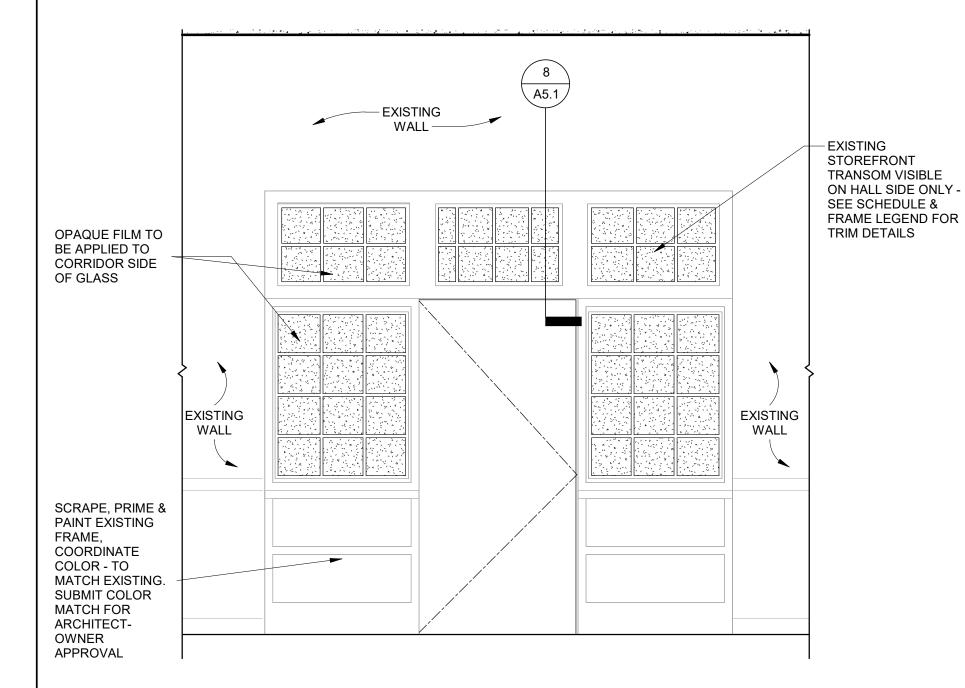
GLASS -



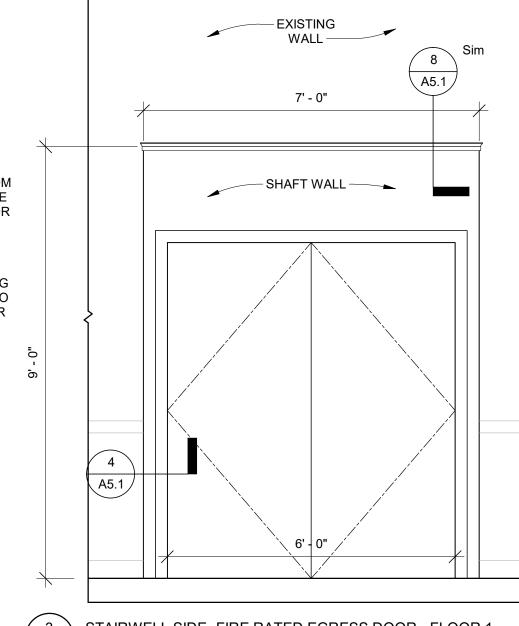






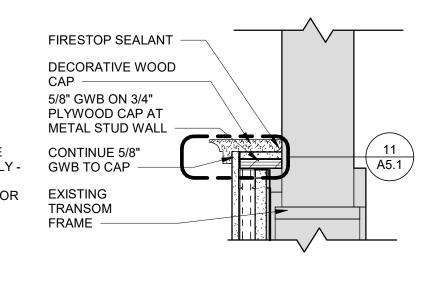


7 FIRE RATED EGRESS STAIR DOOR - FLOORS 2 & 3 Scale: 1/2" = 1'-0"

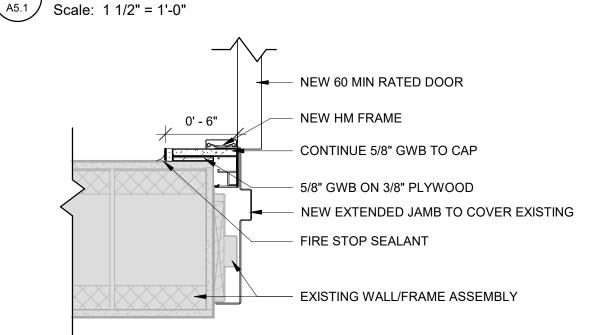


3 STAIRWELL SIDE- FIRE RATED EGRESS DOOR - FLOOR 1

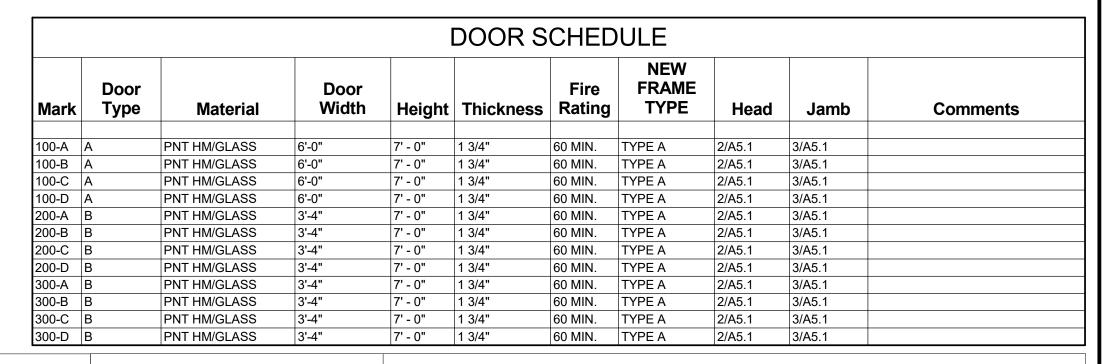
A5.1 Scale: 1/2" = 1'-0"

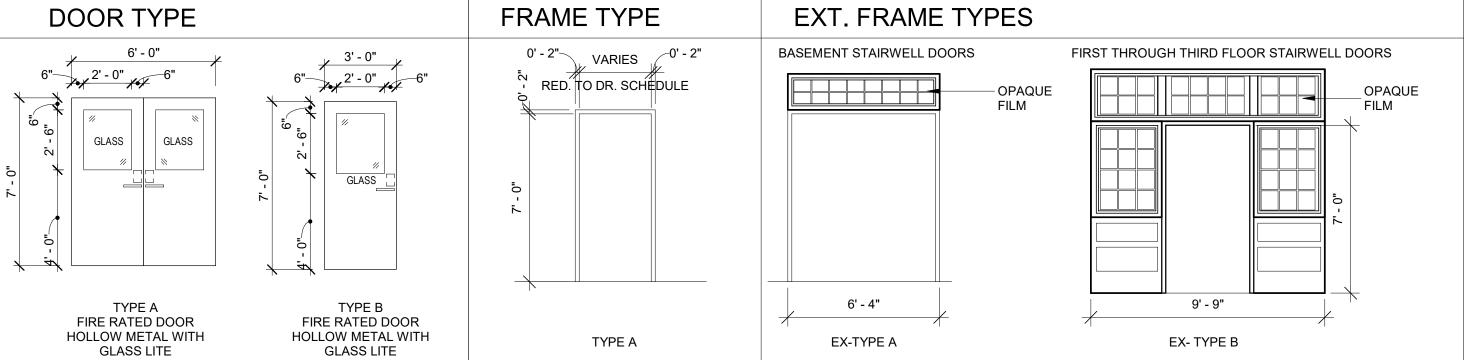


WALL TRANSTITION DETAIL @ EGRESS DOOR



4 WALL TRANSTITION DETAIL @ FIRST FLOOR DOOR JAMB Scale: 1 1/2" = 1'-0"

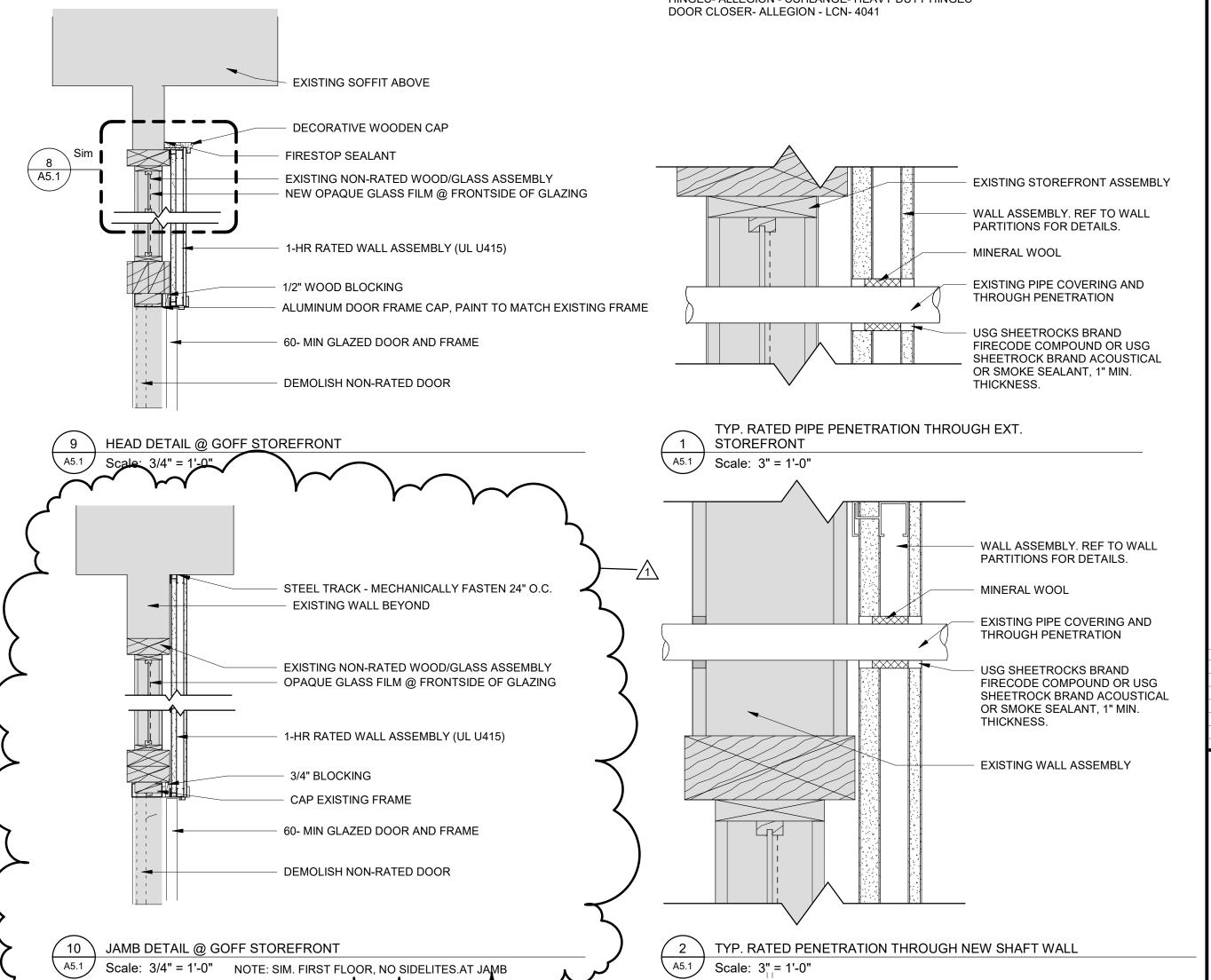




NOTE: FIELD VERIFY DOOR OPENINGS W/ EX. DOOR OPENING IN WEX. WOOD STOREFRONT



LOCKSET- ALLEGION - SCHLANGE L SERIES - CLASSROOM FUNCTION PANIC HARDWARE- ALLEGION - VON DURPIN 99 SERIES RIM EXIT DEVICE HINGES- ALLEGION - SCHLANGE- HEAVY DUTY HINGES



BREWSTER **THORNTON ARCHITECTS** 317 Iron Horse Way,

MIDD

ADE

J

CODE

FIRE

Suite 202 Providence, RI 02908

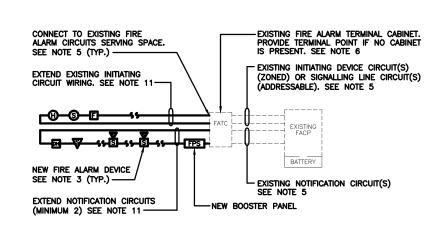
401.861.1600 brewsterthornton.com

11/25/24 2144 ISSUE : PRICING SET NO. REVISION DESCRIPTION 01/08/2025 ADDENDUM 1 DETAILS, DOOR TYPES, FRAMES, & SCHEDULE

**A5.**<sup>1</sup>

| SYMBOL  | DESCRIPTION   | ı   | NOTES   | SYMBOL                 | . DESCRIPTION   | NOTES  | SYMBOL  | DESCRIPTION  | NOTES  | SYMBOL DESCRIPTION  | NOTES  | GENERA   | L NOTES  |
|---|---|---|---|------------------------|---|--|---|--|--|---|--|--|--|
| FP W  | LIGHT   | ING FIXTURES  | S INDICATE FIXTURE TYPE.  |                        | WIRING DEVI   | CES — RECEPTACLES  20A/125V, 2P, 3W, GNDG., NEMA 5-20R SHADING OF SYMBOL THUS:   |   | BRANC  | CH CIRCUITRY  ARROW HEAD INDICATES HOME RUN  | MANUAL FIRE ALARM   | ALARM SYSTEM   | ALL CONDUITS AND EQUIPMENT   | SHALL BE INSTALLED AND GROUND IN<br>RULES AND REGULATIONS OF THE APPLICABLE  |
| <del> </del>  | MOUNTED LIGHTING<br>FIXTURE   | REFER TO FIXTURE S<br>SUBSCRIPT LOWER C<br>INDICATE SWITCH CO |   | ₽'                     | CONVENIENCE OUTLET MTD 18" AFF  | SHADING OF SYMBOL THUS:  SUBSCRIPT LOWER CASE LETTERS INDICATE SWITCH CONTROL ASSOCIATIONS   |   | APPLIANCE BRANCH<br>CIRCUITRY CONCEALED<br>ABOVE                         | CIRCUITRY TO 20A-1P CIRCUIT BREAKER<br>(UNLESS NOTED OTHERWISE)<br>NUMBER OF ARROW HEADS INDICATE<br>NUMBER OF BRANCH POLES REQUIRED                                   | F PULL STATION  SV VISUAL ONLY FIRE   | 4  | LOCAL AND NATIONAL CODES.  2. CONDUIT RUNS ARE SHOWN DIAGEN A MANNER TO PREVENT CONF   | GRAMATICALLY ONLY AND SHALL BE INSTALLED FLICTS WITH EQUIPMENT AND STRUCTURAL  |
| 10  |   | FRO <sub>1a</sub>   | FP 1a   | Φ                      | CEILING MOUNTED DUPLEX CONVENIENCE OUTLET   | SHADING OF SYMBOL THUS:  | N.  | LIGHTING AND<br>APPLIANCE BRANCH<br>CIRCUITRY CONCEALED                  | IN PANEL  CROSS MARKS INDICATE NUMBER OR NO. 12  WIRES IN 3/4" CONDUIT PLUS GROUND.  | ALARM DEVICE  COMBINATION AUDIO AND VISUAL FIRE                                     | -  | AND WALLS, EMPTY CONDUITS SI  3. CONDUITS SHALL BE TERMINATED  | SO AS TO PERMIT NEAT CONNECTIONS TO  |
| FPO <sub>10</sub>   |   |   | FP FP   | <b>₽</b> <sup>16</sup> | ISOLATED GROUND<br>DUPLEX CONVENIENCE<br>OUTLET                                   | INDICATES RECEPTACLE MTD 6" ABOVE COUNTER TO CENTER LINE OR 48" AFF UNLESS NOTED OTHERWISE. CONFIRM DEVICE MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATION PLANS AND/OR |   | LIGHTING AND<br>APPLIANCE BRANCH   | ABSENCE OF CROSSMARKS INDICATES 2#12, 1#12 GROUND HOME RUNS ARE INDICATED THUS:  | ALARM DEVICE  SZ CEILING MOUNTED  | +  | MOTORS AND OTHER EQUIPMENT.  4. NO CONDUIT SMALLER THAN 3/4 FOR POWER SHALL BE USED UN                                       | ", NOR WIRE SIZE SMALLER THAN #12 A.W.G.   |
| \'`\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\  |   | OR EMERGENCY BATTI<br>APPLICABLE, CONTRAC                     | N NIGHT/EMERGENCY CIRCUIT<br>ERY BACK UP BALLAST WHERE<br>CTOR SHALL CONFIRM LOCATION                   | •                      | WALL DOUBLE DUPLEX CONVENIENCE OUTLET   | CMR 521 9.5.6 AND 39.3.1  'WP' - INDICATES WEATHER PROOF   |   | RUN EXPOSED INDIVIDUAL RUN   | "LL2" DENOTES PANEL DESIGNATION.   | AUDIO AND VISUAL FIRE ALARM DEVICE  WALL MOUNTED FIRE ALARM SPEAKER                 | _  | REPRESENT A SUGGESTED ARRAN COMPONENTS OF ELECTRICAL EQ CONSTRUCTION MANAGER MAY E   | AND SIZE OF THE WIRES AND CONDUIT IGEMENT BASED UPON SELECTED STANDARD UIPMENT. MODIFICATIONS ACCEPTABLE TO THE SE MADE BY THE CONTRACTOR TO                       |
| FP FP   |   | PRIOR TO PURCHASE   | ICY BALLAST WITH ARCHITECT AND INSTALLATION.  SHALL BE SIMILAR TO BODINE                                |                        | WALL MTD SINGLE<br>CONVENIENCE OUTLET   | 'GFI' DENOTES SELF REGULATING GROUND FAULT INTERRUPTING TYPE RECEPTACLE ALL POWER OUTLET FACEPLATES SHALL  | 1   | TURNING UP INDIVIDUAL RUN  | "1,3,5" DENOTES CIRCUIT NO'S 1,3,5 CONTAINING 20A. 1P. CB'S IN PANELBOARD  | WALL MOUNTED FIRE ALARM SPEAKER AND   | -  | METHOD OF CONTROL MUST BE AND/OR SPECIFICATIONS.   | ALLY PURCHASED. THE BASIC SEQUENCE AND MAINTAINED AS INDICATED ON THE DRAWINGS   |
| 1a  |   | SWITCH. PROVIDE 2 L<br>APPLICABLE.                            | INTEGRAL INDICATOR LIGHT TEST AMP APPLICATION WHERE   | Ψ_                     | HOSPITAL GRADE  | BE LABELED WITH CIRCUIT NUMBER AND PANEL DESIGNATION FEEDING OUTLET  PASS & SEYMOUR 2095—HGTR OR EQUAL   |   | TURNING DOWN   | CONDUIT RUNS REQUIRING CIRCUIT BREAKER GREATER THAN 20A-1P WIRE SIZE GREATER THAN NO. 12 AND CONDUIT SIZE GREATER THAN 3/4" ARE NOTED                                  | S STROBE  WALL MOUNTED MINI-HO  | RN   | OTHERWISE NOTED. RECEPTACLES  7. ALL SURFACE MOUNTED PANELS  | '-0" above finished floor unless s shall be mounted 18" aff. and panelboards on the inside of or in other locations considered as                                  |
|   | EXTERIOR POLE<br>MOUNTED FIXTURE  | EMERGENCY FIXTURES  | R RELAY ON ALL SWITHCED   | <u> </u>               | DUPLEX CONVENIENCE<br>OUTLET  |  | ) <u>}</u>  | TURNING UP&DOWN  | NOTED THUS:  | WALL MOUNTED FIRE ALARM MINI-HORN/STRO  | <br>BE   | DAMP, SHALL BE MOUNTED SO A<br>THE ENCLOSURE AND THE WALL.   | AS TO MAINTAIN A 1/4" AIR SPACE BETWEEN  |
|   |   | HARDWARE APPLICABL<br>TYPE INTO WHICH FIX                     | E TO CEILING, WALL, AND FLOOR   | USB<br>—               | DUPLEX RECEPTACLE<br>WITH (2) USB PORTS   | HUBBELL: USB20X2 OR EQUAL<br>CONFIRM DEVICE AND FACEPLATE COLOR<br>WITH ARCHITECT  |   |  | 50A 3P<br>4 #4, 1 #8 GROUND<br>1-1/4" CONDUIT  | LOW FREQUENCY ALARM 520HZ IN ALL ROOMS  | _  | TOP CIRCUIT BREAKER OPERATIN 6'-6'.  9. LIGHTING FIXTURES SHALL BE MO  | G HANDLE TO THE FLOOR SHALL NOT EXCEED  DUNTED ACCORDING TO THE MOUNTING HEIGHT  |
|   |   | CONTRACTOR SHALL (  | INTERIOR/EXTERIOR ELEVATIONS COORDINATE AND CONFIRM TO ACHIVE COLOR AS                                  | $\blacksquare$         | PLUG LOAD (WIRELESS) CONTROLLABLE RF DUPLEX RECEPTACLE DUAL CONTROL               | LEGRAND: RF26352CDW OR EQUAL<br>CONFIRM DEVICE AND FACEPLATE COLOR<br>WITH ARCHITECT   | 4111116   | GENE!<br>BUSWAY  | RAL CIRCUITRY  | USED FOR SLEEPING  FIRE ALARM MASTER BOX  | 7  | BOTTOM OF THE LIGHTING FIXTUR  | ING. FIRE PROTECTION. AND MISCELLANEOUS  |
|   |   | CONTRACTOR SHALL I  | ECT AND OWNER/TENANT FURNISH AND SUPPLY ANY RMERS FOR ANY LOW   | •                      | PLUG LOAD (WIRELESS) CONTROLLABLE RF DUPLEX RECEPTACLE                            | LEGRAND: RF26352CHW OR EQUAL<br>CONFIRM DEVICE AND FACEPLATE COLOR<br>WITH ARCHITECT   |   |  |  | K KNOX BOX  |  | 11. ALL CONDUIT RUNS CROSSING E<br>EXPANSION AND DEFLECTION TYP<br>LOCATIONS OF EXPANSION JOINTS                             | XPANSION JOINTS SHALL HAVE EXPANSION OR<br>E FITTINGS AS REQUIRED, FOR EXACT<br>S SEE STRUCTURAL DRAWINGS.   |
|   |   |   | FURNISH AND INSTALL 0-10V<br>R LED FIXTURES   | -                      | HALF CONTROL  | FURNISH AND INSTALL PLUG LOAD POWER PACK AND WIRELESS RECEPTACLE CONTROL TRANSMITTERS  |   | CIRCUIT BREAKER BUS<br>PLUG, BREAKERS AS<br>INDICATED                    |  | ROTATING FIRE ALARM BEACON LIGHT  |  | SUFFICIENT VOLT—AMPERE CAPAC<br>ASSOCIATED WITH CONTROL OF 1<br>COIL. IT SHALL INCLUDE RELAYS                                | RANSFORMERS SHALL BE SIZED TO PROVIDE<br>ITY FOR OPERATING ALL ELECTRICAL DEVICES<br>INE MOTOR, IN ADDITION TO THE STARTER<br>S, TIMERS, MOTOR HEATERS, INDICATING |
|   | EMERGENCY LIGHTING  |   | ITERY PACKS SHALL HAVE  |                        | WALL MOUNTED  | NUMERAL WITHIN SQUARE DENOTES RECEPTACLE TYPE AS LISTED IN   |   | BUSWAY FEED/<br>LUG CONNECTION   |  | ELECTRIC BELL PROVIDE (1) DEDICATED 120V CIRCUIT                                    |  | LIGHTS, ETC.  13. CONDUIT AND WIRE (NOT SHOWN RECEPTACLES SHALL BE FURNISH CONTRACTOR AND SHALL BE:                          | ) for fixtures, switches and/or<br>Hed and installed by the electrical   |
|   | WITH BATTERY UNIT   | REMOTE HEAD CAPA<br>OTHERWISE                                 | BILITY UNLESS NOTED   | H9                     | SPECIAL PURPOSE POWER RECEPTACLE  | SCHEDULE OF NON-STANDARD RECEPTACLES CONFIRM NEMA PLUG CONFIGURATION WITH OWNER AND TENANTS REPRESENTATIVE   |   |  |  | FF FIRE FIGHTER FIRE EMERG PHONE  |  | a. 3/4" (MIN.) CONDUIT RUN 1. EXPOSED IN UNFINISHED AREAS. 2. CONCEALED ABOVE HUNG CEILING                                   | gs and in walls in finished areas.<br>Pe "Thwn/Thinn" # of wires as required.  |
| F   -   | EMERGENCY LIGHTING HEAD CEILING MOUNTED   | ALL FXIT SIGNS SHA  | ALL BE FURNISHED WITH   |                        |   | FEED POKE THRIUGH DEVICE<br>ONS TO ELECTRIFIED FURNITURE   | У-РЕ-У  | IDENTIFICATION OF<br>INDIVIDUAL RUN<br>OTHER THAN BRANCH<br>CIRCUITRY OR | PE - PRIMARY ELECTRIC<br>SE - SECONDARY ELECTRIC<br>TEL - TELEPHONE<br>TV - TELEVISION   | LOW FREQUENCY ALARM GENERATOR AND BED SHAKER IN EACH HEARIN IMPARED UNIT SIMILAR TO | G<br>O   | 14. FOR EQUIPMENT PAD CONSTRUCT  | TION DETAILS SEE STRUCTURAL DRAWINGS.<br>EATER THAN 100 LINEAR FEET SHALL BE   |
|   | EXIT SIGN   | INTERNAL, 90 MINUT<br>OTHERWISE                               | E BATTERY UNLESS NOTED  ADED QUADRANTS AND  | ₽~                     | 4" SQUARE OUTLET BOX TO OUTLETS LOCATED IN FURNITURE PARTITIONS (SEE FLOOR PLANS) |  | SECONDARY FEEDERS  CATV - CABLE TELEVISION E - EMERGENCY  SECONDARY FEEDERS |  |  | LIFETONE HL PLUG IN MODEL OR EQUAL  CEILING MOUNTED                                 | 4  |  | HALL PROVIDE LAYOUTS FOR ALL ELECTRICAL MENT OF MANUFACTURER SELECTED, SUBMIT RION.  |
|   | WALL MOUNTED<br>EXIT SIGN   | ARROWS THUS:  | <u>-</u>  |                        | WIRING DEVIC  | ES — MISCELLANEOUS  LEGRAND TELE—POWER SERIES OR EQUAL   |   | FEEDER RUN<br>CONCEALED ABOVE  | ARROW HEAD INDICATES HOME RUN TO PANEL BOARD   | CARBON MONOXIDE DETECTOR  |  | 17. PROVIDE ELECTRICAL OUTLET PLA<br>SWITCHES AND OTHER ELECTRICA<br>INTERIOR WALLS BETWEEN CONDI                            | ATE GASKET SEALS AT RECEPTACLES,<br>AL BOXES ON EXTERIOR WALLS AND ON<br>TIONED AND NON—CONDITIONED SPACES.  |
|   | CMITOLINIO /I   | CHEVERONS AS REQ  |   | PP                     | POWER POLE WITH ELEC<br>DEVICES AND PLATES  2 PIECE SURFACE MTD                   | LEGRAND OR EQUAL   |   | FEEDER RUN<br>CONCEALED BELOW  | FEEDER SIZING SHOWN ON POWER   | FACP FIRE ALARM CONTROL PANEL   | COMBINATION SMOKE DETECTOR/ CARBON MONOXIDE VISUAL ALARM FOR HEARING IMPAIRED.                       | 18. ALL ELECTRICAL TELEPHONE AND OTHER SYSTEMS CONDUITS  | HALL SUBMIT A PLAN FOR APPROVAL SHOWING<br>E, SECURITY, FIRE ALARM, COMMUNICATION<br>IN SLAB AND ABOVE CEILING ETC<br>S AND BUILDING'S STRUCTURE TO AVOID ANY      |
| S <sub>WP</sub>   | SWITCHING/L   | IGHTING/DEVIC<br>20A 120-277V AC<br>"WP" - INDICATES          | SUBSCRIPT LOWER CASE LETTERS INDICATE   | <u>P P</u>             | RACEWAY WITH 20A<br>DUPLEX RECEPTACLES<br>CONFIRM SPACING<br>WITH ARCHITECT       | UNLESS NOTED OTHERWISE, ALL RACEWAY<br>SHALL BE METAL  |   | FEEDER RUN AS PER<br>SPECIFIC NOTATION                                   |  | FAA FIRE ALARM ANNUNCIATOR PANEL  | BRK MODEL SL177 OR EQUAL  COMBINATION SMOKE DETECTOR/  | CONFLICT.  19. ALL TERMINATION LUGS SHALL B INDICATED CONDUCTORS.  | E SIZED ACCORDINGLY TO ACCOMMODATE   |
|   | SINGLE POLE SWITCH WITH PILOT LIGHT   | WEATHER PROOF   | SWITCH CONTROL ASSOCIATIONS SUBSCRIPT UPPER CASE  | Φ\-                    | 2 PIECE MULTI-CHANNEI RACEWAY WITH 20A DUPLEX RECEPTACLES                         | LEGRAND OR EQUAL UNLESS NOTED OTHERWISE, ALL RACEWAY SHALL BE METAL  |   |  | SYMBOLS  | REMOTE TEST STATION   | COMBINATION SMOKE DETECTOR/<br>VISUAL ALARM FOR HEARING<br>IMPAIRED.                                 | ALL COMMUNICATIONS EQUIPMENT   | HALL SUBMIT PLANS FOR APPROVAL SHOWING<br>FAND DEVICES THROUGHOUT THE BUILDING.<br>HALL ALSO LABEL AND IDENTIFY ALL CONDUITS<br>S.                                 |
| S2 [  | DOUBLE POLE SWITCH  | -   | LETTERS DENOTE<br>SWITCH TYPE AS<br>LISTED IN NON—<br>STANDARD SWITCHES                                 |                        | AND DATA OUTLETS<br>CONFIRM SPACING<br>WITH ARCHITECT                             |  |   | INDEX SYMBOL   | HEXAGONAL SYMBOLS CONTAINING TWO UPPER CASE LETTERS INDICATE REFERENCE TO A SCHEDULE OF SPECIAL EQUIPMENT  | HRI REMOTE INDICATOR ALARM DEVICE   | COMBINATION HEAT DETECTOR/<br>VISUAL ALARM FOR HEARING<br>IMPAIRED.                                  | FOR EXACT LOCATIONS OF ALL L   | REFLECTED CEILING PLANS AND ELEVATIONS LIGHT FIXTURES. LIGHT FIXTURES IN MECHANICAL AND  |
| S3 T  | THREE-WAY SWITCH  |   | UNLESS NOTED OTHERWISE SWITCHES SHALL BE MOUNTED  |                        | FLUSH FLOOR MOUNTED POWER/DATA CONVIENCE RECEPTACLES                              |  |   |  | HEXAGONAL SYMBOLS CONTAINING UPPER CASE LETTERS AND NUMERICALS INDICATE REFERENCE TO SCHEDULE OF MECHANICAL  | S SMOKE DETECTOR  | DETECTOR TYPE SUBSCRIPT:  L LOCAL 120V DETECTOR  WITH INTEGRAL BATTERY BACKUP                        | ELECTRICAL ROOMS WITH LAYOUT  23. ALL EXIT SIGNS SHALL BE UNSW   | OF EQUIPMENT, PIPING AND DUCTWORK.   |
| S4 F  | FOUR-WAY SWITCH   |   | 48" TO CENTER LINE AFF  |                        |   | FLOOR TRENCH APPLICATION: DEEP RECTANGULAR CAST IRON BOX   |   |  | EQUIPMENT  HEXAGONAL SYMBOLS CONTAINING NUMERICALS ONLY INDICATE REFERENCE   | HEAT DETECTOR   | R RECEIVER UNIT T TRANSMITTER UNIT D IN DUCT DETECTOR E ELEVATOR RECALL                              | 24. ALL SWITCHED LIGHT FIXTURES ( ARE TO BE WIRED WITH AN EME  25. ALL 20 AMPERE, SINGLE POLE ( SEPARATE FULL SIZE NEUTRAL C | CIRCUITS SHALL BE PROVIDED WITH A  |
| l st li   | SPRING WOUND<br>INTERVAL TIME SWITCH<br>WITHOUT HOLD  | TORK OR EQUAL<br>30 MIN MAX                                   |   |                        |   | LEGRAND EVOLUTION SERIES OR EQUAL PROVIDE 1°C FROM TEL/DATA TO 6" ABOVE ACCESSIBLE CEILING. CONTRACTOR SHALL SUPPLY ALL COVERS AND PLATES TO                         |   | GANGING CROSS  | TO AN EXPLANATION OF ELECTRICAL WORK REQUIREMENT  THE NOTED INDICATION ADJACENT TO A   | WALL MOUNTED: SMOKE DETECTOR HEAT DETECTOR CARBON MONOXIDE                          | B BEAM TYPE PHOTOELECTRIC SA SUPPLY AIR DUCT DETECTOR RA RETURN AIR DUCT DETECTOR                    | 26. CONFIRM EXACT POWER REQUIRE  | MENTS AND CONNECTION LOCATIONS FOR ALL<br>FIRE PROTECTION, HVAC AND GENERAL  |
|   | KEY SWITCH<br>LINE VOLTAGE  | LEVITON OR EQUAL  | PROVIDE 0-10V DIMMER WHERE REQUIRED FOR LED LIGHTING FIXTURES   |                        | JUN   | COMPLETE INSTALLATION CTION BOXES  |   | REFERENCE  | DEVICE DENOTES THAT THE DEVICE IS TO<br>BE GANGED IN A BOX WITH ANOTHER<br>DEVICE SIMILARLY NOTED AT THE SAME<br>LOCATION ON ANOTHER DRAWING                           | ⊢⊚ SPRINKLER SYSTEM   | CO COMBINATION SMOKE/CARBON MONOXIDE DETECTOR  MONITOR TYPE:   | (TYP).  28. CERTAIN SYMBOLS IN THE SYMBO   | AECH EQUIPMENT RATED LESS THAN 1/2HP   |
| D   | 0-10V SLIDE DIMMER  | LEVITON ILLUMATECH<br>#IP710-LF                               |   | 0                      | CEILING MOUNTED JUNCTION BOX  |  | ()  | SPECIAL MOUNTING<br>HEIGHT INDICATIONS                                   | DIMENSION NOTED IN PARENTHESIS ADJACENT TO ANY ITEM OF THE DRAWINGS INDICATES THE HEIGHT OF IT'S HORIZONTAL  | FS MONITOR TS FS WATER FLOW TS TAMPER SWITCH  | MM MONITORING MODULE   | DRAWINGS. SUCH SYMBOLS ARE MADE IN THE EVENT OF DESIGN 29. ELECTRICAL CONTRACTOR SHALL                                       | INCLUDED TO PERMIT INTERPRETATIONS TO BE   |
|   | CEILING MOUNTED   | WATT STOPPER:   | CONTRACTOR SHALL  | Ю                      | WALL MOUNTED JUNCTION BOX   |  |   | EXISTING EL  | CENTERLINE ABOVE FINISHED FLOOR ECTRICAL EQUIPMENT   | PS PS DRY ALARM PRESSURE SWITCH   | CM CONTROL MODULE  PROVIDE CONNECTION TO DOOR HARDWARE   | PENETRATES. SEE ARCHITECTURAI  30. ELECTRICAL CONTRACTOR SHALL ARE FCC COMPLIANT AND THAT                                    | L PLAN FOR RATINGS.  CONFIRM THAT ALL SUBMITTED LED DRIVERS ALL SUBMITTED LIGHTING FIXTURES ARE UL   |
| 0 8   | CORRIDOR OCCUPANCY SENSOR (80' oc)  CEILING MOUNTED   | W-2000H WATT STOPPER:   | FURNISH AND INSTALL ALL APPROPRIATE POWER PACKS, RELAYS, CABLES, CONTROL MODULES, AND                   | J                      | SURFACE MOUNTED JUNCTION BOX  |  | ETR   | EXISTING TO REMAIN   | ALL EXISTING TO REMAIN LIGHTING SHALL BE CLEANED AND RELAMPED  CONTRACTOR SHALL VERIFY THAT ALL  | DH HOLDER   | INTEGRAL HOLDERS   | LISTED.  |  |
| (S) [S  | DUAL TECHNOLOGY<br>SENSOR (1,600 sf)  | DT-300  | CONTACTORS TO COMPLETE SYSTEM INSTALLATION  SUBSCRIPT LOWER CASE LETTERS INDICATE                       | 0                      | FLUSH FLOOR MOUNTED JUNCTION BOX  |  | ×   | EXISTING EQUIPMENT<br>TO BE REMOVED                                      | EXISTING TO REMAIN ELECTRICAL DEVICES ARE OPERATIONAL & FUNCTIONAL, IF ETR DEVICES ARE NOT OPERATIONAL, IT SHALL BE REPLACED WITH A NEW DEVICE OF                      | SK FAN KEY SWITCH   | MODULE SUBSCRIPT TYPE:   | ABBR ABBREVIATIONS   | REVIATIONS   |
|   | CEILING MOUNTED<br>OCCUPANCY SENSOR<br>WHEATHERPROOF  | WATT STOPPER:<br>HB300<br>HB-L2W                              | SWITCH LEG CONTROL  CONTRACTOR SHALL COORDINATE AND   | <u>٠</u>               | JUNCTION BOX WITH FLEXIBLE CONNECTION TO EQUIPMENT                                | P - DENOTES POWER FEED<br>C - DENOTES COMMUNICATIONS FEED  | XR  | EXISTING EQUIPMENT<br>TO BE REMOVED<br>AND RELOCATED                     | THAT TYPE, ALL REPLACED DEVICES SHALL MATCH EXISTING  CONTRACTOR SHALL EXTEND AND  | OR MONITOR MODULE   | C CONTROL MODULE M MONITOR MODULE  | A/AMP AMPERE AC ALTERNATING CURRENT A/C AIR CONDITIONING   | L LENGTH LA LIGHTINING ARRESTOR LP LIGHTING PANEL LTG LIGHTING LV LOW VOLTAGE  |
|   | WALL MOUNTED<br>DUAL TECHNOLOGY<br>OCCUPANCY SENSOR   | WATT STOPPER:<br>DSW-301                                      | CONFIRM ALL SENSOR SETTING AND TIME DELAYS WITH OWNER OR TENANTS REPRESENTATIVE                         |                        | 1   | AND CONTROLS  COMPLETE INFO. FOR MOTOR IS INDICATED  | RX  | NEW LOCATION OF<br>RELOCATED EXISTING<br>EQUIPMENT                       | CONNECT EXISTING WIRING TO NEW LOCATION OF RELOCATED EQUIPMENT. CONTRACTOR SHALL REPLACE EXISTING WIRING BACK TO SOURCE IF NECESSARY IF EXISTING WIRING DOES NOT REACH |   | RCOM/ACCESS SYSTEMS  EDWARDS C200 SERIES KIT OR EQUAL  | AFF ABOVE FINISHED FLOOR AFG ABOVE FINISHED GRADE ARCH ARCHITECTURAL ATC AUTOMATIC TEMPERATURE                               | M METER  |
| غا ہے ا   | WALL MOUNTED<br>DUAL TECHNOLOGY<br>DUAL RELAY SENSOR  | WATT STOPPER:<br>DSW-302                                      | TENANS REPRESENTANCE  | 0                      | MOTOR   | BY APPLICATION OF INDEXING SYMBOLS REFERENCE TO SCHEDULE OF MECHANICAL EQUIPMENT   | RR  | REMOVE EXISTING DEVIC<br>AND REINSTALL NEW<br>DEVICE IN SAME LOCATION    | RELOCATED EQUIPMENT, CONTRACTOR  | DB PB PUSH BUTTON DOOR BELL   | CONTRACTOR SHALL PROVIDE 120V  | CONTROL ATS AUTOMATIC TRANSFER SW AUTO AUTOMATIC   |  |
| (RF) V  | CEILING MOUNTED WIRELESS RECEPTACLE TRANSMITTER   | WATT STOPPER:<br>WRC-TX SERIES                                |   |                        | MAGNETIC MOTOR STARTER COMPLETE W/ THERMAL OVERLOAD PROTECTION                    | SUBSCRIPT COMPLETE INFORMATION FOR CONTROL ITEMS IS INDICATED BY THE   | 中置  | DOTTED DENOTES EXISTING ELECTRICAL EQUIPMENT                             |  | DB C CHIME/BELL  HEARING IMPAIRED   | AT CHIME/BELL LOCATION  WHEELOCK PS11AWPW OR EQUAL   | BAT BATTERY BIS BYPASS ISOLATOR SWITCH C CONDUIT CATY CABLE TELEVISION   | MISC MISCELLANEOUS MTD MOUNTED  N NEUTRAL  |
| (%) (V  | WALL MOUNTED<br>DIMMABLE  | WATT STOPPER:<br>(0-10V) PW-311                               | FURNISH AND INSTALL<br>BALLAST COMPATIBLE   | \$                     | MANUAL MOTOR<br>STARTER (THERMAL<br>OVERLOAD SWITCH)                              | APPLICATION OF INDEXING SYMBOL REFERENCE APPLIED TO ASSOCIATED EQUIP.  |   | ,  | RGENCY CALL SYSTEMS  | PHONE STROBE  HEARING IMPAIRED  | WHEELOCK RSSG24110NW OR EQUAL  | CAB CABINET CB CIRCUIT BREAKER CCTV CLOSED CIRCUIT TELEVISI CKT CIRCUIT  | N/C NORMALLY CLOSED NEC NATIONAL ELECTRIC ON CODE  |
|   | OCCUPANCY SENSOR  CEILING MOUNTED ON/OFF DAYLIGHT   | (120/277) PW-100D<br>WATT STOPPER:                            | WITH DIMMABLE SENSOR  | [VFD]                  | VARIABLE FREQUECY DRIVE   | REFER TO HVAC<br>SCHEDULE FOR<br>MOTOR LOAD  | <u>®</u>  | NURSE CALL PATIENT PULL CHORD  |  | INTERCOM STROBE  HEARING IMPAIRED   | WHEELOCK RSSG24110NW OR EQUAL  | CKI CIRCUIT CL CENTIMETER CM CENTIMETER CLG CEILING CO COMPANY   | NEMA NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION NIC NOT IN CONTRACT NL NIGHT LIGHTING CKT   |
| 5   | SELF POWERED TRANSFER RELAY   | ILC TR SERIES OR EQUAL  | CONTRACTOR SHALL FURNISH AND INSTALL ALL RELAYS   | СР                     | CONTROL PANEL<br>(MECHANICAL EQUIP)   | HORSEPOWER SIZE  FURNISHED AND INSTALLED BY OTHERS. WIRED BY THE ELECTRICAL CONTRACTOR   | (NC)  | NURSE CALL<br>PATIENT DOME LIGHT   |  | DOORBELL STROBE  PROXIMITY CARD READER  |  | COL COLUMN C/T CURRENT TRANSFORMER CW COOL WHITE   | N/O NORMALLY OPEN NO NUMBER  OC ON CENTER  |
|   | 7 DAY ASTRONOMICAL  | TORK OR EQUAL   | AND MODULES TO COMPLETE SYSTEM INSTALLATION  CONTRACTOR SHALL   |                        |   | I<br>ITION EQUIPMENT   | NC  | NURSE CALL<br>DUTY STAFF STATION   |  | CR FROMMITT CARD READER   | SHALL FURNISH AND INSTALL BACKBOX AT DEVICE LOCATION AND 1" CONDUIT ABOVE NEAREST ACCESSIBLE CEILING | DET DETAIL DIA DIAMETER DISC DISCONNECT DN DOWN  | O/C OVERCURRENT OL OVERLOAD  PB PULL BOX   |
| TC F  | PROGRAMMABLE<br>TIME CLOCK  |   | COORDINATE AND CONFIRM PROGRAMMING SCHEDULE WITH OWNER  CONTRACTOR SHALL                                | -                      | SURFACE MOUNTED PANEL   |  | NCAP  | NURSE CALL<br>ANNUNCIATOR PANEL  |  | DC DOOR CONTACT   | -  | DP DISTRIBUTION PANEL DPDT DOUBLE POLE DOUBLE THROW DPST DOUBLE POLE SINGLE  | PH PHASE PNL PANEL PP PUMP PRI PRIMARY   |
|   | LOW VOLTAGE<br>1, 3, AND 4 WAY<br>MOMENTARY SWITCH  | WATT STOPPER:<br>DCC2 SERIES<br>OR EQUAL                      | CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY POWER PACKS, RELAYS, CABLES, CONTROL MODULES, WRING, |                        | FLUSH MOUNTED PANEL   |  | <u></u>   | EMERGENCY CALL<br>PULL CORD  |  | ES ELECTRIC DOOR STRIKE   |  | THROW DT DUST TIGHT DWG DRAWING  | PYI PRIMARY P/T POTENTIAL TRANSFORMER PVC POLYVINYL CHLORIDE PWR POWER   |
|   | LIGHTING CONTROL<br>RELAY PANEL   | WATT STOPPER:<br>LP8 SERIES<br>OR EQUAL                       | CONIROL MODULES, WIRING,<br>AND CONTACTORS TO<br>COMPLETE SYSTEM<br>INSTALLATION                        | TVSS                   | SURGE SUPPRESSION   | PROVIDE PER SPECIFICATIONS   | Œ   | EMERGENCY CALL<br>DOME LIGHT   |  | LA LOCAL DOOR ALARM   |  | EA EACH EC ELECTRICAL CONTRACTOR EL ELEVATION ELEC ELECTRIC  | RECEPT RECEPTACLE REC RECESSED   |
|   | GUEST ROOM<br>CARD KEY SWITCH   | WATT STOPPER:<br>HS SERIES<br>OR EQUAL                        | ]   | T                      | TRANSFORMER   | SEE ELECTRICAL PLANS FOR KVA RATING  | EC  | EMERGENCY CALL<br>REMOTE STATION   | 1  | HMD WALL MOUNTED MOTION DETECTOR  | _  | ELEV ELEVATOR ES ENERGY SAVING EX EXISTING   | RPA RELAY PANEL  SEC SECONDARY SP SPARE  |
|   |   | MUNICATION S  |   | <b>M</b>               | METER SOCKET<br>AND METER   | METER SOCKET PROVIDED BY CONTRACTOR PROVIDED BY LOCAL UTILITY CO.  | ECCP  | EMERGENCY CALL<br>COMMUNICATION PANEL                                    | -  | CEILING MOUNTED MOTION DETECTOR  CEILING MOUNTED PUBLIC                             |  | FDR FEEDER FLR FLOOR FLUO FLUORESCENT  | SPECS SPECIFICATIONS SPKLR SPRINKLER SW SWITCH   |
| MHNC  | MODULAR HOME NETWORK<br>CENTER PROVIDE (1)<br>DEDICATED 120V CIRCUIT<br>AND DUPLEX RECEPTACLE | 47606-AHT, 476TL-   | WORKING CENTER SHALL BE LEVITON<br>F12, 476TM-EX5, 47690-462, AND<br>15-30W ENCLOSURE OR EQUAL WITH     | M M                    | CHECK METER   | E-MON/D-MON CLASS 2000 OR EQUAL. MATCH BUILDING STANDARD   | AED   | AUTOMATIC EXTERNAL DEFIBRILLATOR   | PROVIDE DEDICATED 120V POWER CONNECTION. CONFIRM LOCATION AND QUANTITY WITH APCHITECT AND TENANT REPRESENTATIVE  | SP) ADDRESS SPEAKER   | _  | GEN GENERATOR GFI GROUND FAULT INTERRUF GFP GROUND FAULT PROTECTO  | TEL TELEPHONE<br>OR TV TELEVISION  |
|   | WALL MOUNTED<br>DATA OUTLET   |   | LET BOX WITH 1"C, PULL STRING<br>JSHING TO ABOVE ACCESSIBLE   |                        | OVERCURRENT AND/OR SWITCHING DEVICE   | COMPLETE INFORMATION FOR DEVICES IS INDICATED BY APPLICATION OF TAG  |   | AREA OF RES  | ARCHITECT AND TENANT REPRESENTATIVE SCUE/REFUGE SYSTEM   | TELEVISION CAMERA   | _  | GND GROUND  HC HUNG CEILING HGT HEIGHT   | TVSS TRANSIENT VOLTAGE SURGE SUPPRESSION TYP TYPICAL U.N.O. UNLESS NOTED OTHERWISE   |
|   | WALL MOUNTED<br>COMBINATION   | P - DENOTES PL  |   |                        | "WP" - INDICATES WEATHER PROOF  | SYMBOLS  30   INDICATES UNFUSED SWITCH   | ARCU  | VANDAL RESISTANT<br>AREA OF RESCUE<br>MAIN CONTROL PANEL                 | CORNELL: CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY POWER  | HC PUSH BUTTON  SECURITY CONTROL  | OOMEDIATES SILVE STATES  | HIGH HEIGHT<br>HID HIGH INTENSITY DISCHARGE<br>LAMP<br>HOH HORSE POWER   |  |
|   | TEL/DATA OUTLET WALL MOUNTED TEL OUTLET   |   | OWER FEED  IODULAR FURNITURE BEZEL  ODATA OUTLETS BY OTHERS   |                        |   | 30 – FRAME SIZE  30 – FRAME SIZE  15 – INDICATES FUSED SWITCH 30 – FRAME SIZE  | ARA   | AREA OF RESCUE<br>INDICATOR LIGHT WITH<br>BATTERY BACKUP                 | CORNELL: SN-B SERIES OR EQUAL PROVIDE 120V POWER   | SCP SECURITY CONTROL PANEL INTRUSION ALARM  | CONTRACTOR SHALL PROVIDE 120V AT ALL MAIN SYSTEM PANEL LOCATIONS                                     | HPS HIGH PRESSURE SODIUM HVAC HEATING, VENTILATION AN AIR CONDITIONING HZ HZ HERTZ   | VFD VARIABLE FREQUENCY   |
|   | FIRE RATED FURNITUR   |   |   |                        |   | 15 – FUSE SIZE  15 – FUSE SIZE  INDICATES ENCLOSED CIRCUIT BREAKER   | RB  | VANDAL RESISTANT<br>AREA OF RESCUE<br>CALL STATION                       | CORNELL: 4201B/V SERIES OR EQUAL  PROVIDE 120V POWER AT EACH DEVICE CONFIRM ARCU ZONE QUANTITY WITH RB   | MAIN VIDEO INTERCOM   | REFER TO SPECIFICATIONS  | HV HIGH VOLTAGE IN INCHES INCAND INCANDESCENT  | W WATT ON WIRE W/ WITH WP WEATHERPROOF   |
| FOR TEL/DATA CONNECTIONS TO ELECTRIFIED FURNITURE  4" SQUARE OUTLET BOX WITH 1 1/2" GROMMETTED HOLE COVERPLATE FOR TEL/DATA CONNECTION TO |   |   |   |                        |   |  | STATION QUANTITIES<br>ON FLOOR PLANS  | INTP PANEL   |  | JB JUNCTION BOX KV KILOVOLT KVA KILOVOLT-AMPERES KW KILOWATT                        |  |  |  |
|   | WALL MOUNTED  | 4"x4" SQUARE O  | OUTLET BOX WITH 1" CONDUIT  |                        | WALL MOUNTED  | SAFETY TECHNOLOGY INTERNATIONAL  |   |  | CORNELL:<br>B-5248A WITH BATTERY<br>OR P-512243A WITH  | IS TALK/ACCESS  |  |  |  |
|   | CABLE TV OUTLET   | STUBBED 6" ABO  | OVE ACCESSIBLE CEILING<br>FOR MOUNTING HEIGHT   | H                      | EMERGENCY POWER OFF BUTTON WITH SHIELD  | OR EQUAL   |   |  | LIFE SAFETY CIRCUIT<br>OR EQUAL  | VC VOLUME CONTROL   |  |  |  |

MOUNTING HEIGHTS GENERAL NOTES 8'-6" PROVIDE PENDANT
WHERE HUNG CEILING OR
STRUCTURE EXCEEDS
8'-6" A.F.F. all conduits and equipment shall be installed and ground in accordance with the latest rules and regulations of the applicable local and national codes. CONDUIT RUNS ARE SHOWN DIAGRAMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH EQUIPMENT AND STRUCTURAL CONDITIONS. EXPOSED CONDUITS SHALL BE INSTALLED PARRALEL TO BEAMS AND WALLS. EMPTY CONDUITS SHALL HAVE NYLON PULL LINE. CONDUITS SHALL BE TERMINATED SO AS TO PERMIT NEAT CONNECTIONS TO MOTORS AND OTHER EQUIPMENT. ---FIRE ALARM AUDIO/VISUAL SIGNAL MULTIPLE AVAILABLE CONFIGURATIONS INDICATED SEE NOTE #5,7 NO CONDUIT SMALLER THAN 3/4", NOR WIRE SIZE SMALLER THAN #12 A.W.G. FOR POWER SHALL BE USED UNLESS OTHERWISE NOTED. 4'-6" | ---- | - | 4'-0" ----FIRE ALARM PULL STATION SWITCHES SHALL BE MOUNTED 4'-0" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. RECEPTACLES SHALL BE MOUNTED 18" AFF. ALL SURFACE MOUNTED PANELS AND PANELBOARDS ON THE INSIDE OF EXTERIOR WALLS ABOVE GRADE OR IN OTHER LOCATIONS CONSIDERED AS DAMP, SHALL BE MOUNTED SO AS TO MAINTAIN A  $1/4^\circ$  AIR SPACE BETWEEN THE ENCLOSURE AND THE WALL. --- COMMUNICATION OUTLETS . ALL PANELBOARDS SHALL BE MOUNTED SO THAT THE DISTANCE FROM THE TOP CIRCUIT BREAKER OPERATING HANDLE TO THE FLOOR SHALL NOT EXCEED  $6^{\circ}-6^{\circ}$ . FINISHED FLOOR LIGHTING FIXTURES SHALL BE MOUNTED ACCORDING TO THE MOUNTING HEIGH GIVEN ON THE DRAWINGS, WITH THE DISTANCE BEING MEASURED FROM THE BOTTOM OF THE LIGHTING FIXTURE TO THE FINISHED FLOOR. FOR LOCATION OF HVAC, PLUMBING, FIRE PROTECTION, AND MISCELLANEOUS EQUIPMENT SEE RESPECTIVE TRADE DRAWINGS. 1.) ALL MOUNTING HEIGHTS SHALL BE MEASURED FROM FINISHED FLOOR TO CENTERLINE OF DEVICE EXCEPT EXIT SIGNS . ALL CONDUIT RUNS CROSSING EXPANSION JOINTS SHALL HAVE EXPANSION OF EXPANSION AND DEFLECTION TYPE FITTINGS AS REQUIRED. FOR EXACT LOCATIONS OF EXPANSION JOINTS SEE STRUCTURAL DRAWINGS. 2.) DEVICES SHALL BE INSTALLED ON A COMMON VERTICAL CENTERLINE WHEREVER POSSIBLE. 2. ALL MOTOR STARTER CONTROL TRANSFORMERS SHALL BE SIZED TO PROVIDE SUFFICIENT VOLT-AMPERE CAPACITY FOR OPERATING ALL ELECTRICAL DEVICES ASSOCIATED WITH CONTROL OF THE MOTOR, IN ADDITION TO THE STARTER COIL. IT SHALL INCLUDE RELAYS, TIMERS, MOTOR HEATERS, INDICATING LIGHTS, ETC. 3.) ALL DEVICES SHALL BE INSTALLED AT MOUNTING HEIGHTS AS INDICATED ON THIS DETAIL UNLESS OTHERWISE NOTED. 4.) REFER TO THE ARCHITECTS ELEVATION DETAILS FOR EXACT HEIGHT AND LENGTH OF SURFACE RACEWAYS. S. CONDUIT AND WIRE (NOT SHOWN) FOR FIXTURES, SWITCHES AND/OR RECEPTACLES SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AND SHALL BE:
3/4" (MIN.) CONDUIT RUN
EXPOSED IN UNFINISHED AREAS.
CONCEALED ABOVE HUNG CEILINGS AND IN WALLS IN FINISHED AREAS.
NO.12 (MIN.) Cu WIRE (MIN.) TYPE "THWN/THNN" # OF WIRES AS REQUIRED. 5.) WALL MOUNTED VISUAL APPLIANCE THE ENTIRE LENS OF A/V SIGNAL OR VISUAL-ONLY SIGNAL IS NOT LESS THAN 80" AND NOT GREATER THAN 96" A.F.F. CONTRACTOR SHALL CONTACT ENGINEER IF PERFORMANCE BASED ALTERNATIVE (NFPA 72 7.5.4.5) IS REQUIRED DUE TO CEILING HEIGHTS. . FOR EQUIPMENT PAD CONSTRUCTION DETAILS SEE STRUCTURAL DRAWINGS. S.) ALL LOAD CENTERS LOCATED WITHIN GROUP I & GROUP II UNITS SHALL BE MOUNTED WITH BREAKER A MAXIMUM OF 54" A.F.F. AND 18" FROM INTERIOR CORNER. 5. ALL 120V BRANCH CIRCUITS GREATER THAN 100 LINEAR FEET SHALL BE #10AWG MIN. . THE ELECTRICAL CONTRACTOR SHALL PROVIDE LAYOUTS FOR ALL ELECTRICAL ROOMS BASED ON ACTUAL EQUIPMENT OF MANUFACTURER SELECTED, SUBMIT FOR REVIEW PRIOR TO INSTALLATION. 7.) ALL WALL MOUNTED AUDIBLE NOTIFICATION APPLIANCES SHALL HAVE THEIR TOPS ABOVE THE FINISHED FLOORS AT HEIGHTS OF NOT LESS THAN 90" (7'6") AND BELOW THE FINISHED CEILINGS AT DISTANCES NOT LESS THAN 6".



- ALL WIRING SHALL BE IN ACCORDANCE WITH INSTALLED SYSTEM MANUFACTURER'S REQUIREMENTS AND SHALL BE IN EMT CONDUIT UNLESS USE OF MC CABLE IS APPROVED BY THE BUILDING OWNER'S REPRESENTATIVE. JUNCTION BOXES AND CONDUIT COUPLINGS SHALL BE PAINTED RED. MC CABLE ARMOR, IF ALLOWED SHALL BE RED.
- RISER DIAGRAM IS DIAGRAMMATIC, REFER TO FLOOR PLANS FOR EXACT QUANTITIES AND LOCATIONS OF EQUIPMENT. 3. FIRE ALARM DEVICES SHALL MATCH EXISTING TYPE, MANUFACTURER AND STYLE AND BE LISTED FOR USE WITH THE EXISTING SYSTEM. NEW DEVICES WITH STROBES SHALL MEET ADA AND NFPA DEVILIPEMENTS.
- 4. TEST SYSTEM PER NFPA 72 AND LOCAL AUTHORITIES REQUIREMENTS. OWNER'S FIRE ALARM SERVICE CONTRACTOR SHALL PERFORM ALL REQUIRED TESTING. THE COST FOR THIS WORK SHALL BE INCORPORATED INTO ELECTRICAL CONTRACTOR'S BID.
- 5. COORDINATE EXISTING SYSTEM WIRING CLASS AND STYLE WITH OWNER'S REPRESENTATIVE AND FIRE ALARM SERVICE CONTRACTOR. MATCH EXISTING WIRING STANDARDS UNLESS OTHERWISE DIRECTED.
- 6. ALL WIRING CONNECTIONS SHALL BE MADE ON TERMINAL BLOCKS. NO SPLICING IS ALLOWED.
- COORDINATE RESIZING AND REPLACEMENT OF ANY END-OF-LINE RESISITORS (IF APPLICABLE) WITH OWNER'S FIRE ALARM SERVICE CONTRACTOR. 8. ALL NECESSARY PROGRAMMING SHALL BE PERFORMED BY OWNER'S FIRE ALARM SERVICE CONTRACTOR. THE COST FOR THIS WORK SHALL BE INCORPORATED INTO ELECTRICAL CONTRACTOR'S BID.
- 9. FURNISH ALL REQUIRED COMPONENTS, CARDS, MODULES, RELAYS, CONTACTS AND WIRING IN MAIN FACP OR SUB-PANEL SERVING THE AREA OF WORK TO ACCOMODATE RENOVATION WORK. ALL WORK IN THESE PANELS SHALL BE PERFORMED BY OWNER'S FIRE ALARM SERVICE CONTRACTOR. THE COST FOR THIS WORK SHALL BE INCORPORATED INTO ELECTRICAL CONTRACTOR'S BID.
- PROVIDE ADDITIONAL NAC EXTENSION PANELS AND/OR POWER SUPPLIES IF EXISTING SYSTEM BATTERY CAPACITY IS INSUFFICIENT FOR ADDED LOADS.
- 11. PROVIDE DUAL NOTIFICATION CIRCUITS WHERE REQUIRED BY CODE OR LOCAL AUTHORITY HAVING JURISDICTION.
- 12. NOTIFICATION CIRCUITS SHALL BE SYNCHRONIZED.

- 13. PER NFPA 72 SECTION 5.7.1.11 SMOKE DETECTORS SHALL NOT BE INSTALLED UNTIL AFTER THE CONSTRUCTION CLEAN UP OR ALL TRADES IS COMPLETE AND FINAL.
- 14. COMBINATION SMOKE/CO DETECTORS SHALL EMPLOY BOTH SIMULATED VOICE AND TONE ALARM FEATURES WHICH CLEARLY DISTINGUISHES BETWEEN CARBON MONOXIDE AND SMOKE NOTIFICATION, IN ACCORDANCE WITH NFPA 720.5.3.4 AND 527 CMR 31.00. 15. CONTRACTOR SHALL TEST AND CONFIRM THAT EXISTING FIRE ALARM SYSTEM HAS CAPACITY TO ACCOMMODATE NEW BUILDING 4 FIRE ALARM DEVICES. IF NECESSARY, CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY POWER BOOSTER PANELS, NODE PANELS, AND OR TRANSPONDER PANELS TO ACCOMMODATE NEW DEVICES TO INTERFACE WITH EXISTING FIRE ALARM SYSTEM

Scale: None

Fire Alarm Riser Diagram

24114 11.25.24 ISSUE: RIDE REVIEW NO. REVISION DESCRIPTION DATE

SHEET TITLE ELECTRICAL SYMBOL LEGEND AND **NOTES** 

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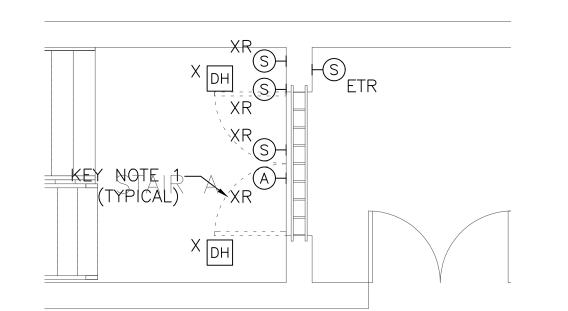
SHEET Pawtucket, RI 02860

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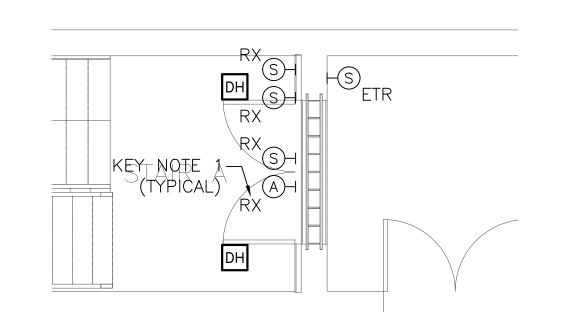
BREWSTER **THORNTON** GROUP ARCHITECTS

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401.861.1600 brewsterthornton.com



Ist FI Existing Stair A Scale: 1/4"=1'-0"



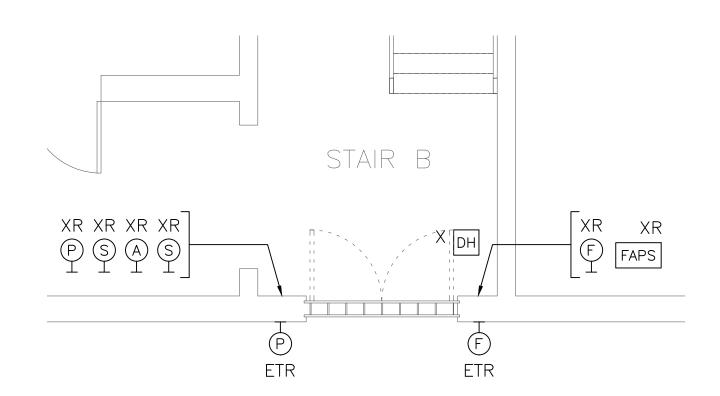
Ist El Proposed Stair A Scale: 1/4"=1'-0"

## ELECTRICAL DEVICE KEY:

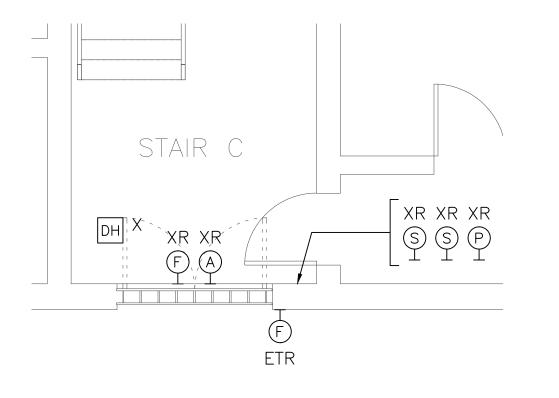
- AUDIO LOW VOLTAGE DEVICE, JUNCTION BOX RACEWAY. SEE KEY NOTE 1
- FIRE ALARM JUNCTION BOX, LB, RACEWAY
- 120V POWER JUNCTION BOX, LB, RACEWAY
- SECURITY LOW VOLTAGE DEVICE, JUNCTION BOX RACEWAY. SEE KEY NOTE 1
- DH FIRE ALARM DOOR HOLD DEVICE
- FAPS FIRE ALARM POWER SUPPLY
- BUILDING SYSTEM CONTROL PANEL, JUNCTION BOX, RACEWAY. SEE KEY NOTE 1
- EB DUAL HEAD EMERGENCY FIXTURE

## KEY NOTES:

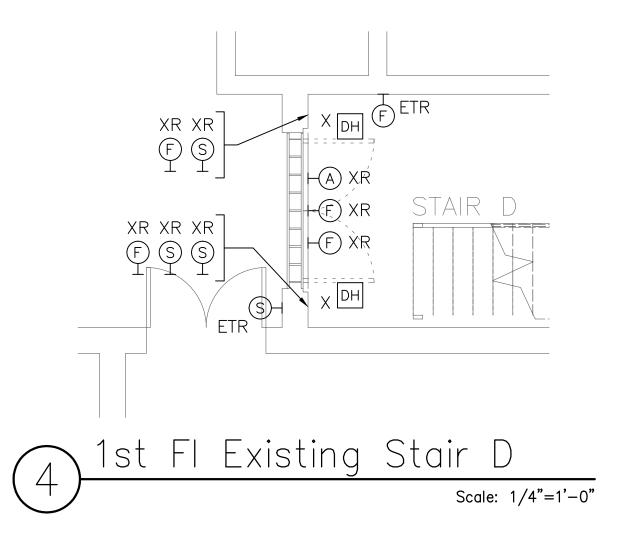
1. CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL RELOCATED BUILDING SYSTEM, LOW VOLTAGE DEVICES AND RACEWAY WITH ARCHITECT. CONFIRM ROUTING OF EXTENDED RACEWAY WITH ARCHITECT. LOW VOLTAGE SHOWN ON ELECTRICAL PLANS FOR REFERNCE ONLY.

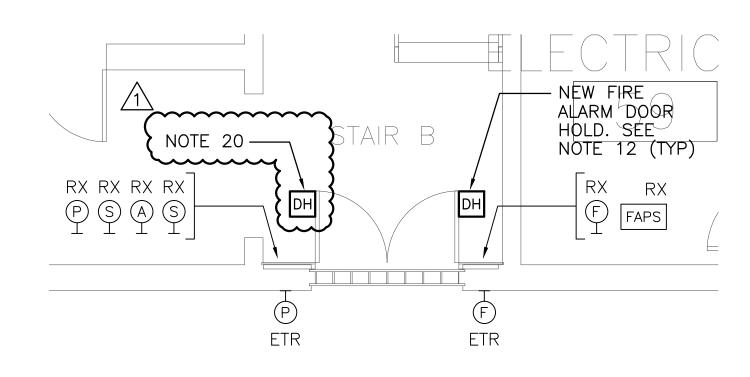


Existing Stair B Scale: 1/4"=1'-0"

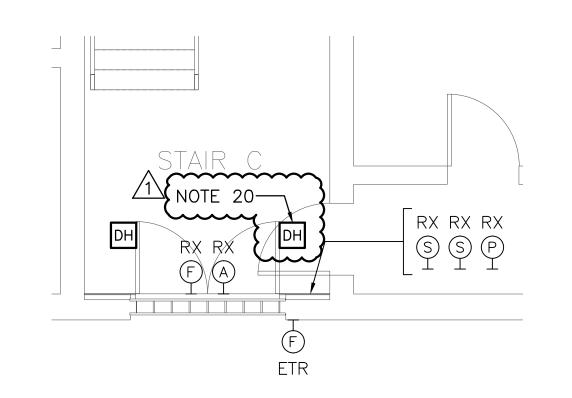


Existing Stair C Scale: 1/4"=1'-0"

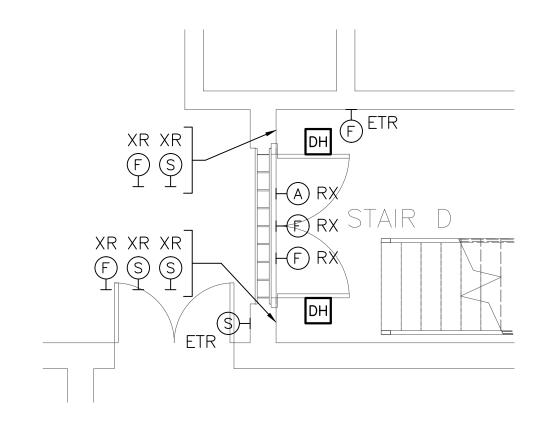




Proposed Stair B Scale: 1/4"=1'-0"



Proposed Stair C Scale: 1/4"=1'-0'

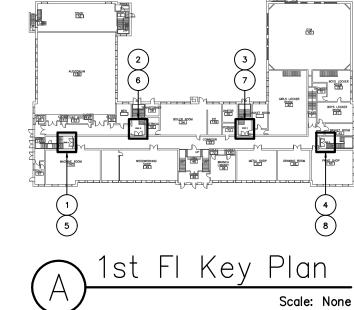


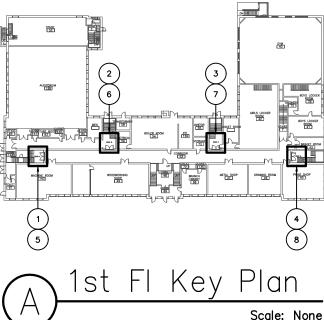
Proposed Stair D Scale: 1/4"=1'-0"

## **ELECTRICAL NOTES:**

- 1. LIMIT OF SCOPE LINE INDICATES THE APPROXIMATE AREA OF RENOVATION THAT ELECTRICAL SYSTEMS MAY BE RELOCATED OR REMOVED. SCOPE OF DEMOLITION SHOWN ON PLANS ARE PARTIAL ONLY FOR THE CONTRACTORS CONVENIENCE AND NOT INTENDED TO SHOW ALL EXISTING CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS TO INCLUDE ALL NECESSARY WORK TO MODIFY AND EXTEND EXISTING SYSTEMS, WIRING, ETC. AS REQUIRED TO ACCOMMODATE THE NEW ARCHITECTURAL FLOOR PLAN.
- 2. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY NECESSARY RE-FEEDING OF EQUIPMENT OR DEVICES TO MAINTAIN CIRCUIT CONTINUITY OF EXISTING EQUIPMENT REMAINING.
- 3. ELECTRICAL CONTRACTOR SHALL MAINTAIN INTEGRITY OF FIRE ALARM WIRING SO NOTIFICATION DEVICES OUTSIDE SCOPE OF WORK REMAIN ACTIVE DURING RENOVATION.
- 4. ALL EXISTING DEVICES AND EQUIPMENT TO BE REMOVED DISCONNECT, REMOVE, AND DISPOSE ALL RACEWAY AND WIRING BACK TO ASSOCIATED PANEL.
- 5. COORDINATE SHUT DOWN OF BASE BUILDING ELECTRICAL AND FIRE ALARM SYSTEMS WITH SCHOOL FACILITIES. 6. DISCONNECT, MAKE SAFE, AND REMOVE ALL TEMPORARY AND ABANDONED WIRE WITHIN THE LIMIT OF WORK.
- 7. ELECTRICAL CONTRACTOR SHALL RELOCATE ANY AND ALL EXISTING ELECTRICAL DEVICES AND RACEWAY WITHIN AREA OF RENOVATION. CONFIRM AND COORDINATE RENOVATION SCOPE WITH ARCHITECT. EXTEND AND CONNECT EXISTING WIRING AND RACEWAY TO NEW LOCATION OF RELOCATED EQUIPMENT. CONTRACTOR SHALL EVALUATE CONDITION OF EXISTING WIRING AND RACEWAY AND REPLACE BACK TO SOURCE IF NECESSARY. CONTRACTOR SHALL REPLACE EXISTING WIRING, BACK TO SOURCE, IF EXISTING EXTENDED WIRING DOES NOT REACH
- LOCATION OF RELOCATED EQUIPMENT. 8. ELECTRICAL CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL LOW VOLTAGE DEVICES AND ROUTING OF LOW VOLTAGE RACEWAY WITH ARCHITECT.
- 9. ALL NEW EQUIPMENT SHALL MATCH BASE BUILDING STANDARDS AND SPECIFICATIONS, UNLESS NOTED OTHERWISE. ALL NEW EQUIPMENT SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM.
- 10. ALL POWER DEVICE FACEPLATES, COVERS, AND DISCONNECTS SHALL BE LABELED WITH CIRCUIT NUMBER AND PANEL DESIGNATION.
- 11. ALL SURFACE MOUNTED INTERIOR CONDUIT SHALL BE EMT (ELECTRIC METAL TUBING) CONFIRM ROUTING OF ALL SURFACE MOUNTED RACEWAY WITH ARCHITECT. ~~~~~~~~~<u>/ </u>
- 12. CONTRACTOR SHALL WIRE NEW DOOR HOLDS FROM EXISTING POWER SOURCE CURRENTLY SERVING EXISTING DOOR HOLDS. IF REQUIRED, CONTRACTOR SHALL FURNISH AND INSTALL MODULES AND RELAYS TO INTEGRATE NEW DOOR HOLDS WITH EXISTING FIRE ALARM SYSTEM.
- 13. ALL NEW EQUIPMENT SHALL MATCH BASE BUILDING STANDARDS AND SPECIFICATIONS, UNLESS NOTED OTHERWISE. ALL NEW EQUIPMENT SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM.

- 14. FIRE ALARM DEVICES AND COMPONENTS SHALL BE NEW AND WIRED BACK TO THE EXISTING FIRE ALARM CONTROL PANEL. CONTRACTOR TO PROVIDE ALL REQUIRED DEVICES AND EQUIPMENT NECESSARY TO EXPAND EXISTING SYSTEM. CONTRACTOR TO ENSURE ALL NEW DEVICES AND RELATED EQUIPMENT ARE COMPATIBLE WITH THE EXISTING SYSTEM. CONTRACTOR TO MATCH EXISTING DEVICE MOUNTING HEIGHTS WITHIN ADA REQUIREMENTS. WHERE EXISTING HEIGHTS DO NOT MEET CURRENT ADA REQUIREMENTS MOUNT NEW, RELOCATED AND REINSTALLED DEVICES AT HEIGHTS LISTED IN MTG HEIGHT DETAIL ON DRAWING EO. ALL FIRE ALARM STROBES TO BE SYNCHRONIZED WITH EXISTING BLDG STROBES. CONTRACTOR SHALL REPLACE ALL EXISTING FIRE ALARM DEVICES IF THEY ARE NOT SYNCHRONIZABLE. PROVIDE A COMPLETE TEST OF THE ENTIRE FIRE ALARM SYSTEM UPON COMPLETION OF THE INSTALLATION THE SYSTEM SHALL MEET ALL REQUIREMENTS OF THE NFPA AND LOCAL CODES. COORDINATE EXACT REQUIREMENTS WITH LOCAL FIRE DEPARTMENT PRIOR TO WORK BEING PERFORMED.
- 15. CONTRACTOR SHALL PROVIDE AN NFPA 241 IMPAIRMENT PLAN TO THE AHJ & OWNER FOR REVIEW AND APPROVAL BEFORE COMMENCEMENT OF WORK.
- 16. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ANY AND ALL NEW FIRE ALARM MODULES, RELAYS AND ASSOCIATED EQUIPMENT TO ADD NEW FIRE ALARM DEVICES TO THE EXISTING SYSTEM.
- 17. CONTRACTOR SHALL FURNISH AND INSTALL FIRE RATED SEALANT FOR ALL CONDUITS PENETRATING NEW FIRE RATED STAIRWELLS.
- 18. CONTRACTOR SHALL REMOVE PAINTERS PLASTIC AND TAPE COVERING EXISTING SMOKE DETECTOR.
- 19. ELECTRICAL CONTRACTOR SHALL RELOCATE EXISTING 120/208V POWER PANEL. EXTEND AND CONNECT EXISTING WIRING AND RACEWAY TO NEW LOCATION OF RELOCATED PANEL. CONTRACTOR SHALL EVALUATE CONDITION OF EXISTING WIRING AND RACEWAY AND REPLACE BACK TO SOURCE IF NECESSARY. CONTRACTOR SHALL REPLACE EXISTING WIRING, BACK TO SOURCE, IF EXISTING EXTENDED WIRING DOES NOT REACH LOCATION OF RELOCATED EQUIPMENT.
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11.25.24 ISSUE: RIDE REVIEW

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Suite 202

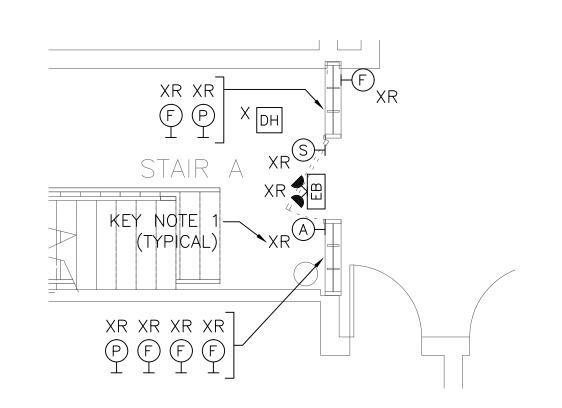
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GROUP

 NO.
 REVISION DESCRIPTION
 DATE

 1
 Addendum #1
 01/08/25

SHEET TITLE **ELECTRICAL** 



FI Existing Stair A Scale: 1/4"=1'-0"

NEW FIRE — ALARM DOOR HOLD. SEE NOTE 12 (TYP) KEY NOTE 1— (TYPICAL)

2nd Fl Proposed Stair A Scale: 1/4"=1'-0"

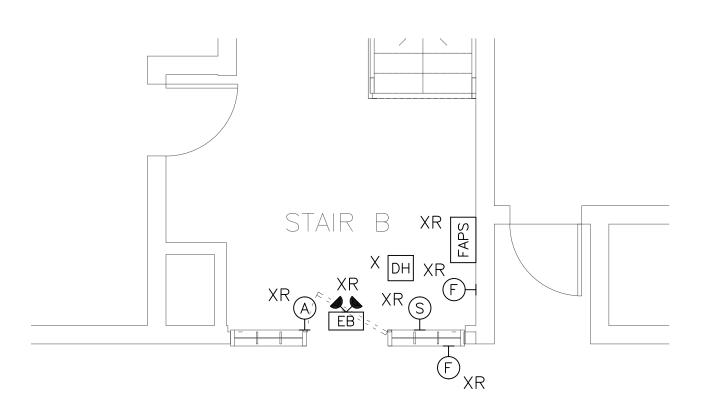
## ELECTRICAL DEVICE KEY:

RX RX RX RX
PFFF

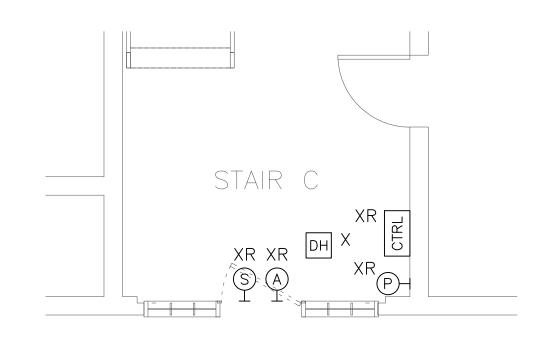
- AUDIO LOW VOLTAGE DEVICE, JUNCTION BOX RACEWAY. SEE KEY NOTE 1
- F FIRE ALARM JUNCTION BOX, LB, RACEWAY
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- BUILDING SYSTEM CONTROL PANEL, JUNCTION BOX, RACEWAY. SEE KEY NOTE 1
- EB DUAL HEAD EMERGENCY FIXTURE

## KEY NOTES:

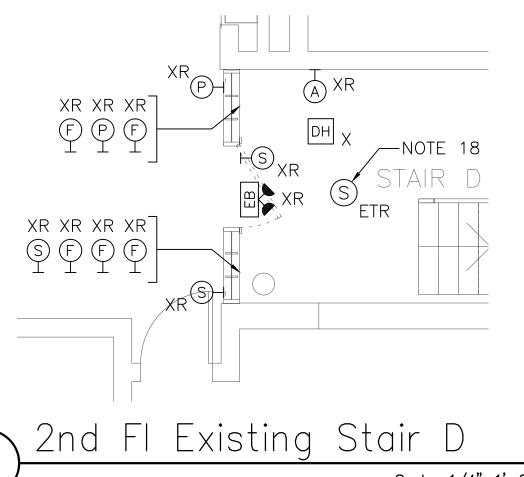
1. CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL RELOCATED BUILDING SYSTEM, LOW VOLTAGE DEVICES AND RACEWAY WITH ARCHITECT. CONFIRM ROUTING OF EXTENDED RACEWAY WITH ARCHITECT. LOW VOLTAGE SHOWN ON ELECTRICAL PLANS FOR REFERNCE ONLY.



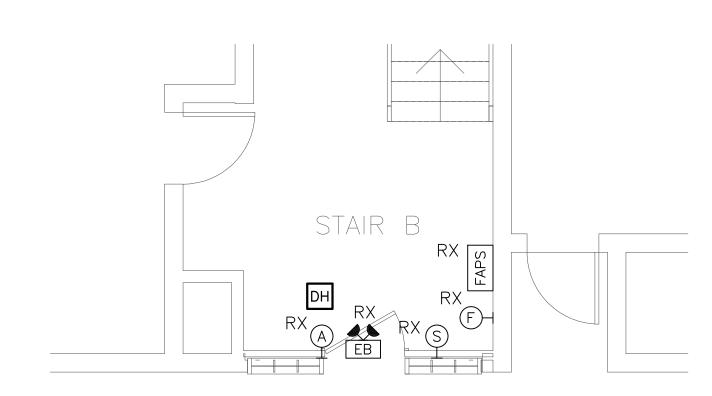




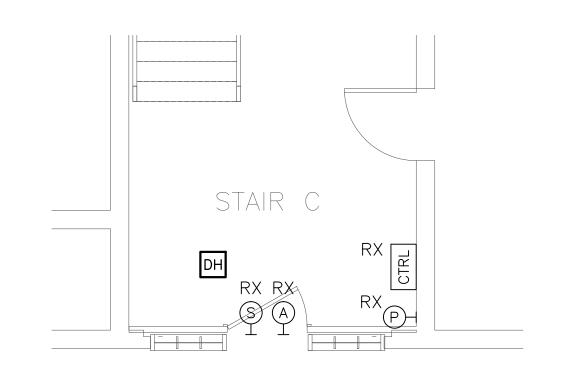




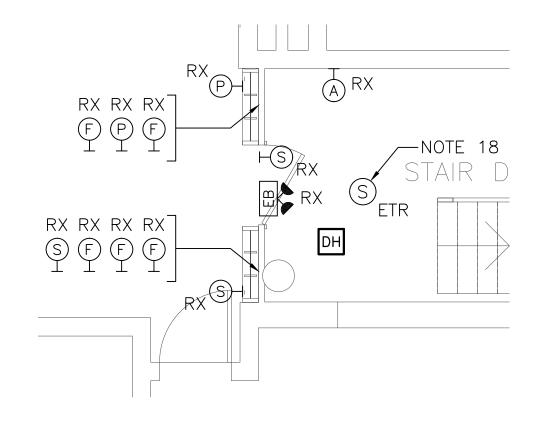
Scale: 1/4"=1'-0"









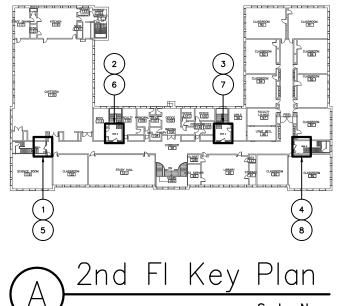


2nd Fl Proposed Stair D Scale: 1/4"=1'-0"

# **ELECTRICAL NOTES:**

- 1. LIMIT OF SCOPE LINE INDICATES THE APPROXIMATE AREA OF RENOVATION THAT ELECTRICAL SYSTEMS MAY BE RELOCATED OR REMOVED. SCOPE OF DEMOLITION SHOWN ON PLANS ARE PARTIAL ONLY FOR THE CONTRACTORS CONVENIENCE AND NOT INTENDED TO SHOW ALL EXISTING CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS TO INCLUDE ALL NECESSARY WORK TO MODIFY AND EXTEND EXISTING SYSTEMS, WIRING, ETC. AS REQUIRED TO ACCOMMODATE THE NEW ARCHITECTURAL FLOOR PLAN.
- 2. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY NECESSARY RE-FEEDING OF EQUIPMENT OR DEVICES TO MAINTAIN CIRCUIT CONTINUITY OF EXISTING EQUIPMENT REMAINING.
- 3. ELECTRICAL CONTRACTOR SHALL MAINTAIN INTEGRITY OF FIRE ALARM WIRING SO NOTIFICATION DEVICES OUTSIDE SCOPE OF WORK REMAIN ACTIVE DURING RENOVATION.
- 4. ALL EXISTING DEVICES AND EQUIPMENT TO BE REMOVED DISCONNECT, REMOVE, AND DISPOSE ALL RACEWAY AND WIRING BACK TO ASSOCIATED PANEL.
- 5. COORDINATE SHUT DOWN OF BASE BUILDING ELECTRICAL AND FIRE ALARM SYSTEMS WITH SCHOOL FACILITIES.
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Providence, RI 02908

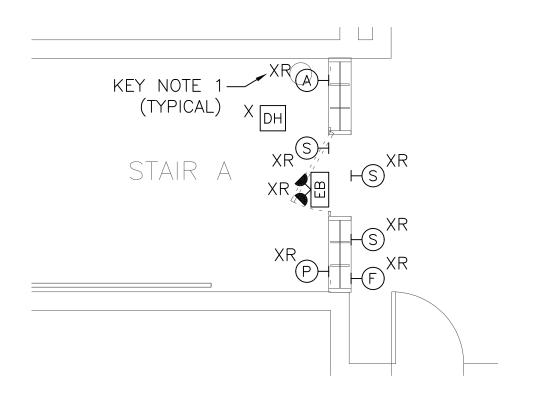
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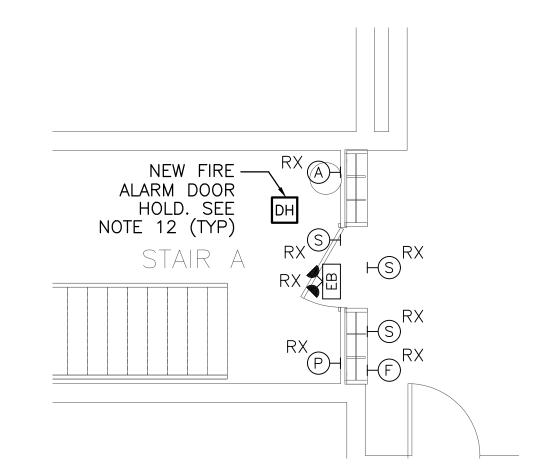
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GROUP

SHEET TITLE **ELECTRICAL** LEVEL 2 **PLANS** 



3rd FI Existing Stair A



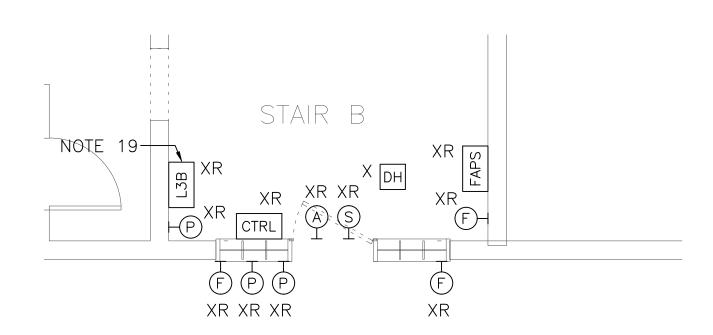
3rd Fl Proposed Stair A Scale: 1/4"=1'-0"

## ELECTRICAL DEVICE KEY:

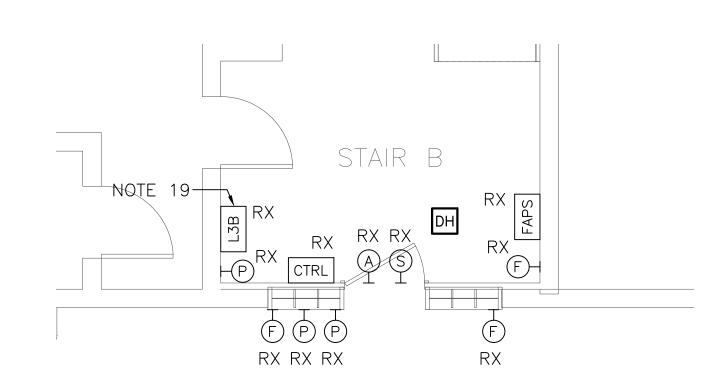
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- FIRE ALARM JUNCTION BOX, LB, RACEWAY
- 120V POWER JUNCTION BOX, LB, RACEWAY
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- DH FIRE ALARM DOOR HOLD DEVICE
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- EB DUAL HEAD EMERGENCY FIXTURE

## KEY NOTES:

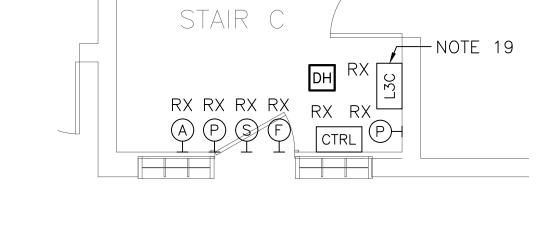
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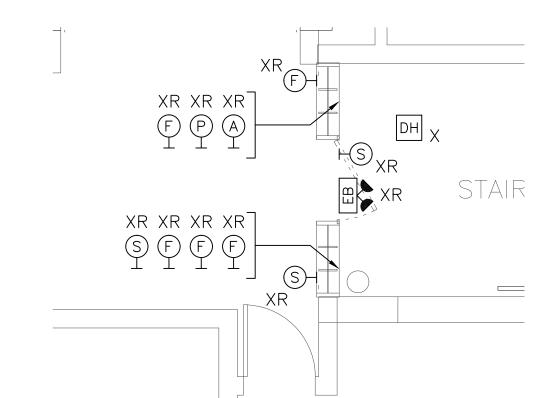




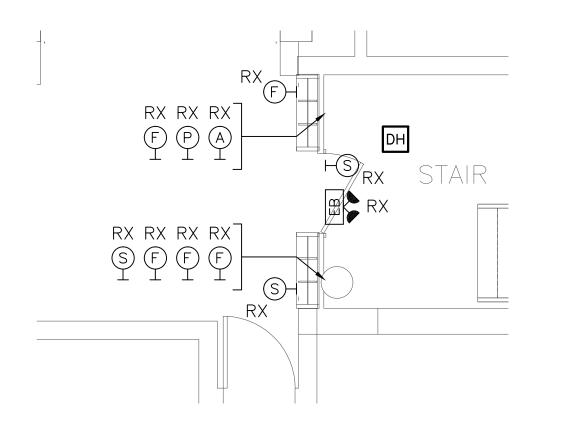
3rd Fl Existing Stair C

STAIR C





Existing Stair D Scale: 1/4"=1'-0"



3rd Fl Proposed Stair D Scale: 1/4"=1'-0"

## **ELECTRICAL NOTES:**

LOCATION OF RELOCATED EQUIPMENT.

- 1. LIMIT OF SCOPE LINE INDICATES THE APPROXIMATE AREA OF RENOVATION THAT ELECTRICAL SYSTEMS MAY BE RELOCATED OR REMOVED. SCOPE OF DEMOLITION SHOWN ON PLANS ARE PARTIAL ONLY FOR THE CONTRACTORS CONVENIENCE AND NOT INTENDED TO SHOW ALL EXISTING CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS TO INCLUDE ALL NECESSARY WORK TO MODIFY AND EXTEND EXISTING SYSTEMS, WIRING, ETC. AS REQUIRED TO ACCOMMODATE THE NEW ARCHITECTURAL FLOOR PLAN.
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LEVEL 3 **PLANS** 

里 **P** UPGRADE MIDD GOFF CODE FIRE  $\mathbf{M}$ 

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401.861.1600 brewsterthornton.com

11.25.24 ISSUE: RIDE REVIEW

NO. REVISION DESCRIPTION DATE

SHEET TITLE **ELECTRICAL** 

- A. ALL OF THE CONTRACT DOCUMENTS, INCLUDING GENERAL AND SUPPLEMENTARY
  CONDITIONS AND DIVISIONS 1 GENERAL REQUIREMENTS, APPLY TO THE WORK OF THIS
- B. EXAMINE ALL DRAWINGS AND ALL OTHER SECTIONS OF THE SPECIFICATIONS FOR REQUIREMENTS AFFECTING THE WORK OF THIS SECTION.

A. PROVIDE ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT FOR THE INSTALLATION OF THE COMPLETE AND FULLY OPERATIONAL ELECTRICAL SYSTEM AS SHOWN ON THE DRAWINGS

- B. THE WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING: PRIMARY SERVICE INCLUDING CONDUIT RISER, RACEWAYS, RIGID STEEL SWEEPS, AND CONCRETE PAD PER LOCAL POWER COMPANY REQUIREMENTS.
- PRIMARY AND SECONDARY DUCT BANK INCLUDING CONDUIT SPACERS, CONCRETE, STEEL REINFORCING AS REQUIRED AND MARKER TAPE 6" BELOW GRADE. 3. CONCRETE PAD, GROUNDING, REINFORCING, FOR LOCAL POWER COMPANY FURNISHED PAD MOUNTED TRANSFORMER.
- 4. TRENCHING, BACKFILLING, SOD OR HYDRO SEEDING. (COORDINATE WITH GENERAL
- 5. SECONDARY ELECTRIC SERVICE INCLUDING SECONDARY SERVICE ENTRANCE RACEWAYS, CABLES, CONDUIT BUSHINGS AND GROUNDING. 6. FREE STANDING SWITCHBOARD INCLUDING VERTICAL PULL SECTION, MAIN CIRCUIT BREAKER, CURRENT TRANSFORMER COMPARTMENT WITH UTILITY METE
- AMMETER, AMMETER SWITCH, VOLTMETER, VOLTMETER SWITCH, P/T'S AND C/T'S FFFDER CUBICLE WITH FFFDER BREAKERS. FEEDERS, BRANCH CIRCUIT WIRING AND RACEWAYS.
- 8. CONDUIT, WIRE, BOXES, FITTINGS, HANGERS AND SUPPORTS 9. SWITCHES, RECEPTACLES, SPECIAL PURPOSE OUTLETS AND WALL PLATES. 10. SAFETY DISCONNECTS SWITCHES, NON-FUSED AND FUSED WITH FUSES.
- 11. LIGHTING SYSTEM INCLUDING LAMPS, LENSES, BALLASTS, DEVICES, CONTROLS AND 12. MOTOR CONNECTIONS AND CONTROLS.
- 13. SURGE PROTECTIVE DEVICES SHALL BE PROVIDED PER NEC 700.8 TO ENSURE RELIABILITY OF CRITICAL EMERGENCY SYSTEMS SUCH AS EMERGENCY LIGHTING PANELS, EMERGENCY COMMUNICATION SYSTEMS, FIRE CONTROL SYSTEMS, ELEVATORS USED FOR EVACUATIONS 14. SYSTEM GROUNDING.
- 15. POWER CONNECTIONS TO ALL PLUMBING, MECHANICAL, AND ALL OTHER EQUIPMENT 16. NAMEPLATES ON ALL MAJOR ELECTRICAL EQUIPMENT AND COMPONENTS. 17. UNDERGROUND FIRE ALARM SERVICE WITH IMSA FIRE ALARM CABLE PER LOCAL
- FIRE ALARM CRITERIA. 18. ADDRESSABLE FIRE ALARM SYSTEM, ANALOG SMOKE AND HEAT DEVICES
- MONITORING MODULES, WIRE, RACEWAY, 24V D.C. STROBES, CONTROL PANEL WITH BUILT-IN AND REMOTE KDU DISPLAY(S) COORDINATION, SUPERVISION ON, AND FINAL CONNECTION BY FIRE ALARM TESTING AGENCY OF RECORD.
- 21. TEMPORARY LIGHT, POWER AND PANEL FOR USE DURING CONSTRUCTION.
- 22. DATA, COMPUTER AND TELEPHONE DUPLEX BOXES WITH PULL STRING TO 23. SEAL PENETRATIONS BETWEEN FOUNDATION FLOORS AND WALLS WITH FIRE RETARDANT MATERIAL.
- 24. SEAL ALL CABLES AND CONDUITS FOR WATER/MOISTURE PENETRATION USING OZ GEDNEY PRODUCTS. REFER TO RACEWAYS SECTION FOR DETAIL.
- 26. INTERIOR SECONDARY DISTRIBUTION SYSTEMS INCLUDING MAIN SWITCHBOARD, CURRENT LIMITER CABINET, DRY TYPE INDOOR TRANSFORMERS, ALL DISTRIBUTION PANELBOARDS, MOTOR CONTROLS, MAGNETIC STARTERS, OVERCURRENT AND SWITCHING DEVICES, PANELBOARDS, RACEWAYS, CABLES, WIRING, JUNCTION AND PULL BOXES, WIREWAYS, AND ALL OTHER COMPONENTS REQUIRED FOR COMPLETE
- ELECTRICAL DISTRIBUTION SYSTEM 27. AN ADDRESSABLE FIRE ALARM SYSTEM COMPLETE WITH ALL DEVICES AND WIRING INCLUDING MUNICIPAL CONNECTIONS 28. TESTING OF ALL ELECTRICAL SYSTEMS
- 29. ACCESS PANELS (FURNISH ONLY) 30. COORDINATION BETWEEN ELECTRICAL AND OTHER TRADES.
- 31. POWER WIRING FOR ELEVATORS AND ASSOCIATED EQUIPMENT 32. LIGHTING CONTROL AND DIMMING SYSTEM. 33. INTERCOM SYSTEM COMPLETE WITH WIRING COMPONENTS AND PROGRAMMING
- DRAWINGS, COMPLETE, LEAVING READY AN ELECTRICAL SYSTEM IN PERFECT OPERATING CONDITION.

- A. AS USED IN THIS SECTION, PROVIDE MEANS FURNISH AND INSTALL AND POS MEANS PROVIDED UNDER OTHER SECTIONS.
- B. AS USED IN THE DRAWINGS AND SPECIFICATIONS FOR ELECTRICAL WORK, CERTAIN NON\_TECHNICAL WORDS SHALL BE UNDERSTOOD TO HAVE SPECIFIC MEANINGS AS FOLLOWS REGARDLESS OF INDICATIONS TO THE CONTRARY IN THE GENERAL CONDITIONS OR
- FURNISH PURCHASE AND DELIVER TO THE PROJECT SITE COMPLETE WITH EVERY PURCHASING SHALL INCLUDE PAYMENT OF ALL SALES TAXES AND OTHER SURCHARGES AS MAY BE REQUIRED TO ASSURE THAT PURCHASED ITEMS
- INSTALL UNLOAD AT THE DELIVERY POINT AT THE SITE AND PERFORM EVERY OPERATION NECESSARY TO ESTABLISH SECURE MOUNTING AND CORRECT OPERATION AT
- NEW MANUFACTURED WITHIN THE PAST TWO YEARS AND NEVER BEFORE USED. C. EXCEPT WHERE MODIFIED BY A SPECIFIC NOTATION TO THE CONTRARY, IT SHALL BE UNDERSTOOD THAT THE INDICATION AND/OR DESCRIPTION OF ANY ELECTRICAL ITEM IN THE DRAWINGS OR SPECIFICATIONS FOR ELECTRICAL WORK CARRIES WITH IT THE INSTRUCTION TO FURNISH, INSTALL AND CONNECT THE ITEM AS PART OF THE ELECTRICAL
- WORK, REGARDLESS OF WHETHER OR NOT THIS INSTRUCTION IS EXPLICITLY STATED. D. IT SHALL BE UNDERSTOOD THAT THE SPECIFICATIONS AND DRAWINGS FOR ELECTRICAL WORK ARE COMPLIMENTARY AND ARE TO BE TAKEN TOGETHER FOR A COMPLETE INTERPRETATION OF THE FLECTRICAL WORK EXCEPT THAT INDICATIONS ON THE DRAWINGS
- SPECIFICATIONS WHERE THEY CONFLICT WITH SAME. 1.4 WORK BY OTHERS
- A. THE FOLLOWING IS RELATED WORK SPECIFIED ELSEWHERE: 1. HVAC EQUIPMENT INCLUDING PROVIDING INDIVIDUAL MOTOR STARTERS,
- ADJUSTABLE FREQUENCY DRIVES, CONTROL WIRING, VARIABLE SPEED SWITCHES
- 2. TELEPHONE/COMPUTER/DATA ALONG WITH WIRING, DEVICES AND FINAL TERMINATIONS BY OWNERS' COMMUNICATIONS VENDOR
- 3. TEMPERATURE CONTROL WIRING BY HVAC CONTRACTOR. 4. CHARGES FOR POWER CONSUMED BY THE TEMPORARY LIGHT AND POWER
- SYSTEM FOR CONSTRUCTION WILL BE PAID BY THE GENERAL CONTRACTOR. 5. ACCESS PANELS, WHERE REQUIRED, ARE FURNISHED BY THE GENERAL
- CONTRACTOR AND COORDINATED WITH THIS SECTION. 6. ALL DUCT SMOKE DETECTORS SHALL BE SUPPLIED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR, WIRED TO THE FIRE ALARM SYSTEM BY THE ELECTRICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL INCLUDE REMOTE TEST PANELS.
- 1.5 CODES, PERMITS & STANDARDS
- A. PROVIDE ALL PERMITS AND LICENSES. OBTAIN AND PAY ALL CERTIFICATES OF INSPECTION AS REQUIRED BY REGULATORY AGENCIES AND SUBMIT FOR APPROVAL.
- B. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND DESIGNED, CONSTRUCTED, INSTALLED AND TESTED IN ACCORDANCE WITH THE SPECIFICATION AND THE FOLLOWING STANDARDS
- 1. MASSACHUSETTS ELECTRICAL CODE (MEC). 2. NATIONAL ELECTRICAL CODE (NEC)
- 3. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) 4. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
- UNDERWRITERS LABORATORY (UL) 6. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
- 7. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA 8. AMERICANS WITH DISABILITIES ACT (ADA)
- 9. NATIONAL ELECTRIC SAFETY CODE (NESC) 10. NEC ARTICLE 110 - FLASH PROTECTION 11. MASSACHUSETTS BUILDING CODE
- 12. INTERNATIONAL BUILDING CODE (IBC)

## 1.6 PROTECTION AND CLEANING

- A. ALL ELECTRICAL EQUIPMENT AND DEVICES IN THE EXISTING BUILDING IN WHICH THE ELECTRICAL WORK IS TO BE DONE UNDER CONTRACT, SHALL BE PROTECTED FROM SCRATCHES, PAINT, CEMENT, ETC. UNTIL THE WORK IS COMPLETED.
- B. WHERE ELECTRICAL EQUIPMENT AND/OR DEVICES ARE INDICATED TO BE ABANDONED DELIVERED TO STORAGE ON SITE AT A LOCATION DESIGNATED BY THE OWNER.
- C. EXPOSED SURFACES OF ELECTRICAL EQUIPMENT & LIGHTING FIXTURES SHALL BE CLEANED
- D. ALL DEBRIS AND MATERIAL RESULTING FROM ELECTRICAL WORK SHALL BE REMOVED FROM WORKSPACE SHALL BE LEFT CLEAN AS ELECTRICAL WORK IS COMPLETED.
- E. DAMAGES TO COVERS AND TRIMS OF ELECTRICAL EQUIPMENT SHALL BE REPAIRED AND PAINTED WITH TOUCH-UP PAINT SUPPLIED BY THE EQUIPMENT MANUFACTURER TO THE SATISFACTION OF THE OWNER'S DESIGNATED REPRESENTATIVE OR THE ARCHITECT OR THE EQUIPMENT SHALL BE REPLACED WITH NEW.

#### 1.7 INTERPRETATION OF PLANS

A. ALL WORK SHOWN ON THE PLANS IS INTENDED TO BE APPROXIMATELY CORRECT TO SCALE BUT FIGURED DIMENSIONS AND DETAILED DRAWINGS ARE TO BE FOLLOWED IN EVERY CASE. THE DRAWINGS SHALL BE TAKEN AS DIAGRAMMATIC. RACEWAYS, WIRING AND GENERAL METHODS OF ROUTING ARE SHOWN BUT IS NOT INTENDED TO SHOW EVERY OFFSET AND FITTING NOR EVERY STRUCTURAL DIFFICULTY THAT MAY BE ENCOUNTERED. TO CARRY OUT THE TRUE INTENT AND PURPOSES OF THE PLANS, SUPPLY AND INSTALL AL DMPONENTS NECESSARY TO PROVIDE COMPLETE WORKING SYSTEMS, READY FOR USE WITH NO ADDITIONAL COST TO THE OWNER.

#### 1.8 SHOP DRAWINGS

- 1. SHOP DRAWINGS ARE INFORMATION PREPARED BY THE CONTRACTOR T ILLUSTRATE PORTIONS OF THE WORK IN MORE DETAIL THAN SHOWN IN THE
- COORDINATION DRAWINGS ARE DETAILED, LARGE—SCALE LAYOUT SHOP DRAWINGS SHOWING HVAC, ELECTRICAL, PLUMBING AND FIRE PROTECTION WORK SUPERIMPOSED IN ORDER TO IDENTIFY CONFLICTS AND ENSURE INTER—COORDINATION OF MECHANICAL, ELECTRICAL, ARCHITECTURAL, STRUCTURAL AND OTHER WORK
- 1. SHOP DRAWINGS SHALL BE SUBMITTED ACCORDING TO SPECIFICATION SECTION ONE COVER SHEET FOR MULTIPLE PRODUCTS, WHETHER OR NOT SUPPLIED BY ONE MANUFACTURER OR VENDOR.
- 1. REVIEW SUBMITTAL PACKAGES FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS AND THEN SUBMIT TO ARCHITECT FOR REVIEW.

C. SUBMITTAL PROCEDURES AND FORMAT

- 2. PROVIDE ADDITIONAL COPIES OF REVIEWED SHOP DRAWINGS AS REQUIRED FOR
- 3. SHOP DRAWINGS SHOWING LAYOUTS OF SYSTEMS SHALL CONTAIN SUFFICIENT PLANS, ELEVATIONS, SECTIONS, DETAILS AND SCHEMATICS TO DESCRIBE WORK CLEARLY. THEY SHALL BE 1/4? = 1/1 -0? SCALE UNLESS SPECIFIED OTHERWISE. SHEET METAL SHOP DRAWINGS SHALL BE 3/8? = 1' -0 AND SHALL INDICATE WORK OF OTHER SECTIONS WHERE INTERFERENCES ARE POSSIBLE. PROVIDE LARGER SCALE DETAILS AS NECESSARY. SHEET METAL DRAWINGS SHALL SHOW ELEMENTS OF ARCHITECTS REFLECTED CEILING PLAN, EXPOSED DUCTWORK, WALLS AND PARTITIONS, DIFFUSERS, REGISTERS, GRILLES, FIRE DAMPERS, SLEEVES AND OTHER ASPECTS OF CONSTRUCTION AS NECESSARY FOR COORDINATION.
- ALL FIREWALLS AND SMOKE PARTIONS MUST BE HIGHLIGHTED ON THE SHEET METAL DRAWINGS FOR APPROPRIATE COORDINATION.
- 5. SHOP DRAWINGS SHOWING MANUFACTURER'S PRODUCT DATA SHALL CONTAIN DETAILED DIMENSIONAL DRAWINGS, ACCURATE AND COMPLETE DESCRIPTION OF CONSTRUCTION MATERIALS. MANUFACTURER'S PUBLISHED PERFORMANCE CHARACTERISTICS AND CAPACITY RATINGS (PERFORMANCE DATA, ALONE, IS NOT ACCEPTABLE), ELECTRICAL REQUIREMENTS AND WIRING DIAGRAMS. DRAWINGS SHALL CLEARLY INDICATE LOCATION (TERMINAL BLOCK OR WIRE NUMBER), VOLTAGE AND FUNCTION FOR ALL FIELD TERMINATIONS, AND OTHER INFORMATION NECESSARY TO DEMONSTRATE COMPLIANCE WITH ALL REQUIREMENTS OF CONTRACT DOCUMENTS.

#### D. ACCEPTABLE MANUFACTURERS

- 1. ALTERNATE MANUFACTURERS ARE ACCEPTABLE ONLY IF, AS A MINIMUM, THEY: A. MEET ALL PERFORMANCE CRITERIA LISTED IN THE SCHEDULES AND OUTLINED IN THE SPECIFICATION.
- B. HAVE IDENTICAL OPERATING CHARACTERISTICS TO THOSE CALLED FOR IN
- C. FIT WITHIN THE AVAILABLE SPACE IT WAS DESIGNED FOR, INCLUDING SPACE FOR MAINTENANCE AND COMPONENT REMOVAL, WITH NO MODIFICATION TO EITHER SPACE OR THE PRODUCT. CLEARANCES TO WALLS,
- EILINGS AND OTHER EQUIPMENT SHALL BE AT LEAST EQUAL TO THOSE D. FOR ROOFTOP MOUNTED EQUIPMENT AND FOR EQUIPMENT MOUNTED IN AREAS WHERE STRUCTURAL MATTERS ARE A CONSIDERATION, THE PRODUCTS
- MUST HAVE A WEIGHT NO GREATER THAN THE PRODUCT LISTED IN THE E. PRODUCTS MUST ADHERE TO ALL ARCHITECTURAL CONSIDERATION INCLUDING, BUT NOT LIMITED TO: BEING OF THE SAME COLOR AS THE PRODUCT SCHEDULED OR SPECIFIED, FITTING WITHIN ARCHITECTURAL ENCLOSURES AND DETAILS, AND FOR DIFFUSERS, LIGHTING AND PLUMBING FIXTURES—BEING THE SAME SIZE AND OF THE SAME PHYSICAL APPEARANCE AS SCHEDULE OR SPECIFIED PRODUCTS.

- FROM CONTRACT DOCUMENTS SHALL BE REQUESTED INDIVIDUALLY IN WRITING WHETHER DEVIATIONS RESULT FROM FIELD CONDITIONS, STANDARD SHOP PRACTICE, OR OTHER CAUSE. SUBMIT LETTER WITH TRANSMITTAL OF SHOP DRAWINGS, WHICH FLAGS THE DEVIATION TO THE ATTENTION OF THE ARCHITECT.
- 2. WITHOUT LETTERS FLAGGING THE DEVIATION TO THE ARCHITECT, IT IS POSSIBLE THAT THE ARCHITECT MAY NOT NOTICE SUCH DEVIATION OR MAY NOT REALIZE ITS RAMIFICATIONS. THEREFORE, IF SUCH LETTERS ARE NOT SUBMITTED TO THE HARMLESS FOR ANY AND ALL ADVERSE CONSEQUENCES RESULTING FROM THE DEVIATIONS BEING IMPLEMENTED. THIS SHALL APPLY REGARDLESS OF WHETHER THE ARCHITECT HAS REVIEWED OR APPROVED SHOP DRAWINGS CONTAINING THE DEVIATION, AND WILL BE STRICTLY ENFORCED.

#### 3. APPROVAL OF PROPOSED DEVIATIONS, IF ANY, WILL BE MADE AT THE DISCRETION OF THE ARCHITECT. F. RESPONSIBILITY

- 1. INTENT OF SUBMITTAL REVIEW IS TO CHECK FOR CAPACITY, RATING, AND CERTAIN CONSTRUCTION FEATURES. CONTRACTOR SHALL ENSURE THAT WORK MEETS REQUIREMENTS OF CONTRACT DOCUMENTS REGARDING INFORMATION THAT PERTAINS TO FABRICATION PROCESSES OR MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES OF CONSTRUCTION: AND FOR COORDINATION O WORK OF THIS AND OTHER SECTIONS. WORK SHALL COMPLY WITH SUBMITTALS
  MARKED ?REVIEWED? TO EXTENT THAT THEY AGREE WITH CONTRACT DOCUMENTS. SUBMITTAL REVIEW SHALL NOT DIMINISH RESPONSIBILITY UNDER THIS CONTRACT FOR DIMENSIONAL COORDINATION, QUANTITIES, INSTALLATION, WIRING, SUPPORTS AND ACCESS FOR SERVICE, NOR SHOP DRAWING ERRORS OR DEVIATIONS FROM REQUIREMENTS OF CONTRACT DOCUMENTS. THE ARCHITECT'S NOTING OF SOME ERRORS WHILE OVERLOOKING OTHERS WILL NOT EXCUSE THE CONTRACTOR FROM PROCEEDING IN ERROR, CONTRACT DOCUMENTS REQUIREMENTS ARE NOT LIMITED, WAIVED NOR SUPERSEDED IN ANY WAY BY REVIEW.
- INFORM SUBCONTRACTORS, MANUFACURERS, SUPPLIERS, ETC. OF SCOPE AND LIMITED NATURE OF REVIEW PROCESS AND ENFORCE COMPLIANCE WITH CONTRACT DOCUMENTS.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL DRAWINGS AND SPECIFICATIONS THOROUGHLY DURING BID PROCESS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER/ARCHITECT VIA RFI (REQUEST FOR INFORMATION) IF ANY PROCESS SHALL DISQUALIFY THE CONTRACTOR FOR CLAIMING ANY ADDITIONAL
- SHOP DRAWINGS FOR ENTIRE DISTRIBUTION SYSTEM WILL NOT BE SUBMITTED UNTIL AFTER THE COMPLETION OF THE SHORT CIRCUIT STUDY. EQUIPMENT AIC RATING SHALL MATCH WITH THE RESULTS OF THE STUDY. SERIES RATING OF DEVICES WILL NOT BE ACCEPTED.
- G. SCHEDULE: INCORPORATE SHOP DRAWING REVIEW PERIOD INTO CONSTRUCTION SCHEDULE SO THAT WORK IS NOT DELAYED. CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR DELAYS CAUSED BY NOT INCORPORATING THE FOLLOWING SHOP DRAWING REVIEW TIME REQUIREMENTS INTO HIS PROJECT SCHEDULE. WORKING DAYS LISTED REFERENCE THE TIME IN THE ENGINEER'S OFFICE, IT DOES NOT INCLUDE TRANSMITTAL TIME FOR REVIEW EACH TIME SHOP DRAWING IS SUBMITTED OR
- H. LIST OF PROPOSED EQUIPMENT AND MATERIALS
- WITHIN FOUR WEEKS AFTER AWARD OF CONTRACT AND BEFORE ORDERING MATERIALS OR EQUIPMENT, SUBMIT COMPLETE LIST OF PROPOSED MATERIALS AND EQUIPMENT AND INDICATE MANUFACTURER'S NAMES AND ADDRESSES. NO CONSIDERATION WILL BE GIVEN TO PARTIAL LISTS SUBMITTED OUT OF SEQUENCE.
- I. SUBMIT SHOP DRAWINGS IN PDF FORMAT AND ELECTRONICALLY FOR THE FOLLOWING: 1. PANELBOARDS
- 2. LOAD CENTERS 3. CIRCUIT BREAKERS AND ENCLOSURES
- 4. SWITCHBOARD 5. DISCONNECT SWITCHES
- 6. CONDUIT, WIRE, FEEDERS, CABLES AND BRANCH CIRCUIT WIRING 7. MANUAL MOTOR STARTERS
- 8. WIRE WAYS, OUTLET BOXES, COVERS 9. SWITCHES, RECEPTACLES, SPECIAL PURPOSE DEVICES AND PLATES
- 10. LIGHTING FIXTURES AND LAMPS
- 11. FIRE ALARM SYSTEM (ADDRESSABLE) 12. APARTMENT ENTRY SYSTEM
- 13. SHORT-CIRCUIT ANALYSIS 14. PROTECTIVE DEVICE TIME CURRENT COORDINATION ANALYSIS 15. ARC FLASH HAZARD ANALYSIS.
- 1.9 SUBMITTAL DOCUMENTATION REQUIREMENTS A. FURNISH DOCUMENTATION ASSOCIATED WITH THIS BID PROPOSAL AND CONTRACT
  - INCLUDING SUBMITTALS, SHOP DRAWINGS, O&M MANUALS, AND TEST REPORTS AS FOLLOWS. THESE REQUIREMENTS ARE IN ADDITION TO SUBMITTAL REQUIREMENTS STATED ELSEWHERE AND SHALL NOT DEPRIVE THE OWNER OF RIGHTS UNDER OTHER
  - PROVISIONS OF THE CONTRACT DOCUMENTS. 1. SUBMIT SIX (6) HARD COPIES OF DOCUMENTATION FOR REVIEW.
- 2. SUBMIT DOCUMENTS IN PORTABLE DOCUMENT FORMAT (PDF). SUBMIT DOCUMENTS IN AUTOCAD – LATEST VERSION FOR DRAWINGS AND MICROSOFT WORD (LATEST VERSION) FOR TEXT FORMAT WHEN REQUESTED

- B. PROVIDE A COMPLIANCE REVIEW OF EACH SECTION OF THE SPECIFICATIONS, DRAWINGS AND ADDENDA. THE COMPLIANCE REVIEW SHALL BE A PARAGRAPH—BY—PARAGRAPH REVIEW OF THE SPECIFICATIONS WITH THE FOLLOWING INFORMATION; ?C?, ?D? OR ?E? MARKED IN THE MARGIN OF THE ORIGINAL SPECIFICATIONS AND ANY SUBSEQUENT
- 1. ?C?: COMPLY WITH NO EXCEPTIONS. ?D?: COMPLY WITH DEVIATIONS. FOR EACH AND EVERY DEVIATION, PROVIDE A NUMBERED FOOTNOTE WITH REASONS FOR THE PROPOSED DEVIATION AND HOW THE INTENT OF THE SPECIFICATION CAN BE SATISFIED. 3. ?E?: EXCEPTION, DO NOT COMPLY. FOR EACH AND EVERY EXCEPTION, PROVIDE

A NUMBERED FOOTNOTE WITH REASONS AND POSSIBLE ALTERNATIVES.

- C. UNLESS A DEVIATION OR EXCEPTION IS SPECIFICALLY NOTED IN THE COMPLIANCE REVIEW, IT IS ASSUMED THAT THE BIDDER IS IN COMPLETE COMPLIANCE WITH THE PLANS AND SPECIFICATIONS. DEVIATIONS OR EXCEPTIONS TAKEN IN COVER LETTERS, SUBSIDIARY DOCUMENTS, BY OMISSION OR BY CONTRADICTION DO NOT RELEASE THE BIDDER FROM BEING IN COMPLETE COMPLIANCE, UNLESS THE EXCEPTION OR DEVIATION HAS BEEN SPECIFICALLY NOTED IN THE COMPLIANCE REVIEW. BIDDERS MAY SUBMIT THE LATEST STATE—OF—THE—ART COMPONENTS AND THEIR STANDARD CONTROL COMPONENTS IN LIEU OF THE SPECIFIED ITEMS. THE A/E AND OWNER WILL
- A. WORK UNDER THIS SECTION INCLUDES NEW WORK AND WORK ON EXISTING SYSTEMS WITHIN EXISTING BUILDING. PERFORM SUCH WORK SO AS NOT TO INTERFERE WITH THE OWNERS OPERATION. WHERE WORK NECESSITATES INTERRUPTION OF SERVICE(S), SCHEDULE OUTAGES WITH THE OWNER AND ENGINEER AND PERFORM THE WORK AT
- A. FOR THE DURATION OF THE CONTRACT THE ELECTRICAL CONTRACTOR SHALL MAINTAIN A COMPLETE SET OF CONTRACT DRAWINGS. ALL COMPLETED WORK AND ALL DEVIATIONS FROM THE CONTRACT DOCUMENTS SHALL BE RECORDED CLEARLY AND ACCURATELY. RECORD DRAWINGS SHALL BE TURNED OVER TO THE OWNER UPON COMPLETION OF THE
- B. ELECTRONIC FILES ARE AVAILABLE TO FACILITATE THE PREPARATION OF RECORD DRAWIN THESE FILES ARE SOLELY FOR USE OF THE ELECTRICAL CONTRACTOR AND MAY NOT BE A FULL REPRESENTATION OF THE SCOPE OF WORK, THESE FILES ARE AVAILABLE FROM WOZNY/BARBAR & ASSOCIATES, INC. AT A COST OF \$50.00 PER DRAWING FILE.

1.12 COORDINATION

- A. IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO COORDINATE WITH ALL OTHER TRADES AND PARTIES TO AVOID CONFLICTS. NO ADDITIONAL CHARGES WILL BE APPROVED DUE TO LACK OF COORDINATION OR FIELD VERIFICATION OF THE
- 1.13 TEMPORARY FACILITIES
- A. THE ELECTRICAL CONTRACTOR SHALL PROVIDE, AT HIS OWN EXPENSE, HIS OWN FIELD OFFICE. FURNISH ALL TOOLS, EQUIPMENT, SCAFFOLDING AND TEMPORARY CONSTRUCTION
- B. ALL SCAFFOLDING AND OTHER TEMPORARY CONSTRUCTION SHALL BE RIGIDLY BUILT IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIREMENTS, AND SHALL BE REMOVED FROM THE PREMISES UPON COMPLETION OF THE WORK.
- C. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL TRANSFORMERS, PLYWOOD, PANEL BOARDS, WIRING AND OTHER ELECTRICAL EQUIPMENT TO SUPPORT THE NEEDS OF TEMPORARY LIGHT AND POWER. UTILIZE NEW SERVICE ENTRANCE CONDUITS FOR TEMPORARY POWER REQUIREMENTS WHERE PRACTICAL.
- D. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE GENERAL CONTRACTOR, THE UTILITY COMPANY AND INCLUDE ALL COSTS ASSOCIATED WITH THE INSTALLATION OF TELEPHONES FOR THE CONSTRUCTION PERIOD. INCLUDE TELEPHONE SERVICE FOR ALL

#### 1.14 COORDINATION DRAWINGS

- SHALL PREPARE COORDINATION DRAWINGS SHOWING THE SIZE AND LOCATION OF ELECTRICAL EQUIPMENT AND CONDUIT RUNS AND OTHER EQUIPMENT RELATED TO THE ELECTRICAL WORK.
- B. COORDINATION DRAWINGS ARE FOR THE GENERAL CONTRACTOR'S AND THE ENGINEER'S USE DURING CONSTRUCTION AND SHALL NOT BE CONSTRUED AS REPLACING ANY SHOP, AS BUILT OR RECORD DRAWINGS REQUIRED ELSEWHERE IN THIS CONTRACT DOCUMENT.

#### 1.15 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

- A. INSTRUCT TO THE OWNER'S SATISFACTION SUCH PERSONS AS THE OWNER DESIGNATES IN THE PROPER OPERATION AND MAINTENANCE OF THE SYSTEMS AND THEIR PARTS.
- C. OPERATING INSTRUCTIONS SHALL BE SPECIFIC FOR EACH SYSTEM AND SHALL INCLUDE
- D. FOR MAINTENANCE PURPOSES, PROVIDE SHOP DRAWINGS, PARTS LISTS, SPECIFICATIONS AND MANUFACTURER'S MAINTENANCE BULLETINS FOR EACH PIECE OF EQUIPMENT. E. PROVIDE NAME, ADDRESS AND TELEPHONE NUMBER OF THE MANUFACTURER'S REPRESENTATIVE AND SERVICE COMPANY FOR EACH PIECE OF EQUIPMENT SO THAT

B. FURNISH OPERATING AND MAINTENANCE MANUALS AND FORWARD SAME TO THE

## SERVICE OR SPARE PARTS CAN BE READILY OBTAINED.

- A. THE ENTIRE WORK INSTALLED IN THIS SPECIFICATION AND AS SHOWN ON THE DRAWINGS SHALL BE CONSTRUCTED AND FINISHED IN EVERY RESPECT IN A WORKMANLIKE AND COMPLETE MANNER. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO INSTALL COMPLETE SYSTEMS. ALL SUCH PARTS AS REQUIRED COMPLETING THE SYSTEMS IN ACCORDANCE WITH THE BEST TRADE PRACTICE AND THE SATISFACTION OF THE
- B. OBTAIN DETAILED INFORMATION FROM THE MANUFACTURERS OF APPARATUS AS TO THE PROPER METHOD OF INSTALLING AND CONNECTING EQUIPMENT. OBTAIN ALL INFORMATION FROM THE GENERAL CONTRACTOR AND OTHER SUBCONTRACTORS, WHICH MAY BE NECESSARY TO FACILITATE WORK AND THE COMPLETION OF THE WHOLE
- C. REMOVE DAILY, ALL RUBBISH AND DEBRIS AND ALL REFUSE FROM WORKMEN'S LUNCHES AND AT COMPLETION REMOVE ALL HIS SURPLUS MATERIALS, AND LEAVE IN CLEAN CONDITION ACCEPTABLE TO THE OWNER'S ENGINEER.
- 1.17 PROTECTION A. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK AND EQUIPMENT UNTIL FINALLY INSPECTED, TESTED AND ACCEPTED. CAREFULLY STORE MATERIALS AND EQUIPMENT, WHICH ARE NOT IMMEDIATELY INSTALLED AFTER DELIVERY TO SITE.
- 1.18 EXAMINATION OF SITE AND CONTRACT DOCUMENTS
- A. BEFORE SUBMITTING PRICES OR BEGINNING WORK, THOROUGHLY MAKE AN EXAMINATION OF THE SITE. B. NO CLAIM FOR EXTRA COMPENSATION WILL BE RECOGNIZED IF DIFFICULTIES ARE ENCOUNTERED WHICH AN EXAMINATION OF SITE CONDITIONS PRIOR TO EXECUTING
- C. THESE SPECIFICATIONS ALONG WITH CONTRACT DOCUMENTS DESCRIBE THE ELECTRICAL SYSTEMS. THE ELECTRICAL CONTRACTOR IS REQUIRED TO PROVIDE COMPLETE AND OPERATING SYSTEMS FOR ALL EQUIPMENT MENTIONED.

PARTICULAR TYPES OF OWNER'S EQUIPMENT MENTIONED SHALL BE FURNISHED AND

D. ELECTRICAL EQUIPMENT REQUIRED FOR THE SUCCESSFUL OPERATION OF ANY OF THE

- E. BE RESPONSIBLE FOR ALL MATERIALS DELIVERED TO THE SITE IN CONNECTION WITH THE WORK AND PAY ALL CHARGES FOR CARTAGE, SCAFFOLDS, PLANKING, RIGGING AND ERECTING. TAKE EVERY PRECAUTION NECESSARY TO PROTECT EQUIPMENT AND INSTALLATION IN ADDITION TO PLUGGING AND PROTECTING OPEN ENDS OF ALL PIPES, OUTLET BOXES, PANEL BOXES, AND JUNCTION BOXES. ALL EQUIPMENT SHALL BE STORED IN A CLEAN DRY PLACE TO PRESERVE THE QUALITY OF MATERIAL BEING USED EQUIPMENT AND/OR MATERIALS DAMAGED DURING CONSTRUCTION SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER. ANY SCAFFOLDING OVER 8'-0" IN HEIGHT WILL
- F. ALL MATERIALS AND EQUIPMENT REQUIRED BY THIS SPECIFICATION SHALL BE NEW, CLEAN AND FREE FROM DEFECTS AT THE TIME OF INSTALLATION. THE MANUFACTURER AND UNDERWRITER'S LABEL SHALL APPEAR ON ALL MATERIAL AND EQUIPMENT UNLESS

## 1.19 SUBSTITUTION OF MATERIALS OR EQUIPMENT

BE SUPPLIED BY THE GENERAL CONTRACTOR

CONTRACT WOULD HAVE REVEALED.

- A. IF THE ELECTRICAL CONTRACTOR WISHES TO USE MATERIALS OR EQUIPMENT OTHER THAN THOSE SPECIFICALLY DESIGNATED HEREIN, AS BEING EQUAL TO THOSE SO SPECIFICALLY DESIGNATED: BEFORE PURCHASING AND/OR FABRICATION, HE SHALL SUBMIT THE PROPOSED SUBSTITUTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE . CONDITIONS, AND THE DECISION OF WHETHER OR NOT IT IS EQUAL TO THAT SPECIFIED SHALL BE DETERMINED BY THE OWNER.
- B. UNLESS REQUESTS FOR SUBSTITUTION ARE MADE IN ACCORDANCE WITH THE ABOVE INSTRUCTIONS AND THE INSTRUCTIONS OF THE GENERAL CONDITIONS, SUPPORTED BY SUFFICIENT PROOF OF EQUALITY, THE SUCCESSFUL CONTRACTOR WILL BE REQUIRED TO FURNISH SPECIFICALLY NAMED ITEMS DESIGNATED UNDER THE BASE BID
- C. IF THE APPARATUS OR MATERIALS SUBSTITUTED FOR THOSE SPECIFIED NECESSITATE CHANGES OR ADDITIONAL CONNECTIONS, PIPING SUPPORTS OR CONSTRUCTION: SAME SHALL BE PROVIDED AND THE ELECTRICAL CONTRACTOR SHALL ASSUME THE COST AND THE ENTIRE RESPONSIBILITY THERETO.

- D. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE HVAC, PLUMBING AND FIRE PROTECTION CONTRACTORS WITH REGARD TO FEEDER, RACEWAY, AND CIRCUIT BREAKER AND DISCONNECT SWITCH SIZES. IF A SUBSTITUTION OF HVAC, PLUMBING AND FIRE PROTECTION FOUIPMENT IS PROPOSED BY A SUBCONTRACTOR, IT SHALL BECOME THE RESPONSIBILITY OF THAT SUBCONTRACTOR TO COORDINATE WITH THE ELECTRICAL CONTRACTOR ANY AND ALL CHANGES WITH REGARD TO FEEDER, RACEWAY, AND CIRCUIT Breaker and disconnect switch sizes. The Shop drawings shall clearly indicate WHAT CHANGES ARE REQUIRED AND ANY ADDITIONAL COSTS ASSOCIATED WITH THIS CHANGE. IF COORDINATION DOES NOT OCCUR, THE SUBCONTRACTOR PROPOSING THE CHANGE SHALL BE RESPONSIBLE FOR ALL COSTS THAT OCCUR DUE TO THE SUBSTITUTION.
- E. WHENEVER THE CONTRACTOR SECURES APPROVAL FOR CHANGING ANY ITEMS AND SUCH CHANGE INVOLVES A CORRESPONDING CHANGE OR ADJUSTMENT IN ANY ADJACENT OR RELATED ITEM, THE RESPONSIBILITY FOR MAKING THE REQUIRED CHANGE, OR SEEING ADJUSTMENTS SHALL BE PAID FOR BY THE CONTRACTOR UNLESS IT IS OTHERWISE AGREED, IN WRITING, AT THE TIME THE CHANGE IS APPROVED, THE ACCEPTANCE OF AN CHANGE WILL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR FROM FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS.

## 1.20 FIELD MEASUREMENTS

- A. THE ELECTRICAL CONTRACTOR (EC) SHALL VERIFY, IN THE FIELD, ALL MEASUREMENTS, SITE CONDITIONS NECESSARY FOR HIS WORK AND SHALL ASSUME RESPONSIBILITY FOR THEIR ACCURACY. NO ADDITIONAL COMPENSATION WILL BE ALLOWED AFTER THE BIDS HAVE BEEN ACCEPTED.
- 1.21 PERMITS, LAWS, ORDINANCES & CODES A. THE ELECTRICAL CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS, AND PAY ALL TAXES, FEES AND OTHER COSTS IN CONNECTION WITH HIS WORK; FILE ALL NECESSARY PLANS, PREPARE ALL NECESSARY DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS OF STATE AUTHORITIES, ALL LOCAL, TOWN, CITY OR COUNTY DEPARTMENTS
- B. THE ELECTRICAL CONTRACTOR SHALL INCLUDE IN THE WORK, WITHOUT EXTRA COST TO THE OWNER, ANY LABOR, MATERIALS, SERVICES, APPARATUS, DRAWINGS IN ADDITION TO THE DRAWINGS PREPARED BY THE PROJECT ENGINEER AND DOCUMENTS, IN ORDER TO COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES AND REGULATIONS WHETHER OR NOT SHOWN ON THE DRAWINGS AND/OR SPECIFIED.

#### 1.22 VISIT TO PREMISES

1.23 CLEANING UP

- A. THIS CONTRACTOR SHALL VISIT THE PREMISES BEFORE SUBMITTING HIS PROPOSAL AND MAKE HIS OWN APPRAISAL OF THE DIFFICULTIES AND CONDITIONS THAT WILL BE ENCOUNTERED DURING THE WORK. NO ADDITIONAL CHARGES WILL BE ALLOWED FOR WORK REQUIRED DUE TO EXISTING CONDITIONS TO MAKE THE INSTALLATION CONFORM TO
- A. THE ELECTRICAL CONTRACTOR SHALL, AT THE COMPLETION OF THE WORK, CLEAN, POLISH AND/OR WASH ALL EXPOSED ITEMS OF MATERIAL, EQUIPMENT AND FIXTURES IN HIS CONTRACT SO AS TO LEAVE SUCH ITEMS BRIGHT AND CLEAN. SPECIAL ATTENTION BEING GIVEN TO INTERIORS AND EXTERIORS OF ALL PANELS, ELECTRICAL EQUIPMENT, AND
- B. ALL PAINTED METAL SURFACES WHICH HAVE BEEN SCRATCHED, DENTED OR MARRED SHALL BE REPAINTED BY THE ELECTRICAL CONTRACTOR. 1.24 DAMAGE TO OTHER WORK
- A. EACH CONTRACTOR SHALL BE HELD RESPONSIBLE FOR AND SHALL PAY FOR ALL DAMAGE TO OTHER WORK CAUSED BY HIS WORK OR WORKMEN. B. REPAIRING OF SUCH DAMAGE SHALL BE DONE BY THE GENERAL CONTRACTOR OF CONTRACTORS WHO INSTALLED THE WORK AND SO DIRECTED BY THE OWNER'S ENGINEER

- A. ATTENTION IS DIRECTED TO PROVISIONS OF THE GENERAL CONDITIONS AND SPECIAL CONDITIONS REGARDING GUARANTEES AND WARRANTIES FOR WORK UNDER THIS
- B. ELECTRICAL CONTRACTOR'S GUARANTEES SHALL BE THE SAME AS THE GENERAL
- C. ALL MATERIAL, ITEMS OF EQUIPMENT AND WORKMANSHIP FURNISHED UNDER THIS SECTION SHALL CARRY FOR THIS STANDARD WARRANTY AGAINST ALL DEFECTS IN MATERIAL AND WORKMANSHIP. ANY FAULT DUE TO DEFECTIVE OR IMPROPER MATERIAL, EQUIPMENT, WORKMANSHIP OR DESIGN WHICH MAY DEVELOP SHALL BE MADE GOOD, FORTHWITH, BY AND AT THE EXPENSE OF THE ELECTRICAL CONTRACTOR, INCLUDING ALL OTHER DAMAGE DONE TO AREAS, MATERIALS AND OTHER SYSTEMS RESULTING FROM
- D. ELECTRICAL CONTRACTOR SHALL GUARANTEE THAT ALL ELEMENTS OF THE SYSTEMS ARE OF SUFFICIENT CAPACITY TO MEET THE SPECIFIED PERFORMANCE REQUIREMENTS AS SET
- E. UPON RECEIPT OF NOTICE FROM THE OWNER OF FAILURE OF ANY PART OF THE SYSTEM OR EQUIPMENT DURING THE GUARANTEE PERIOD, THE AFFECTED PART OR PARTS SHALI BE REPLACED BY THE ELECTRICAL CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

# F. FURNISH, BEFORE THE FINAL PAYMENT IS MADE, A WRITTEN GUARANTEE COVERING THE ABOVE REQUIREMENTS.

- 1.26 INSTALLATION REQUIREMENTS A. THE ARRANGEMENT OF ALL ELECTRICAL WORK SHOWN ON THE DRAWINGS IS DIAGRAMMATIC ONLY AND INDICATES THE MINIMUM REQUIREMENTS OF THE WORK. CONDITIONS AT THE BUILDING INCLUDING ACTUAL MEASUREMENTS SHALL DETERMINE THE DETAILS OF THE INSTALLATION. ALL WORK SHALL BE LAID OUT AND INSTALLED SO AS TO REQUIRE THE LEAST AMOUNT OF CUTTING AND PATCHING.
- B. CHECK THE ARCHITECTURAL PLANS AND SPECIFICATIONS BEFORE ORDERING ANY MATERIAL AND EQUIPMENT. ANY DISCREPANCIES SHALL BE BROUGHT TO THE
  ATTENTION OF THE ARCHITECT FOR HIS DETERMINATION PRIOR TO PROCEEDING WITH THE
- A. TYPICAL DETAILS WHERE SHOWN ON THE DRAWINGS SHALL APPLY TO EACH AND EVERY ITEM OF THE PROJECT WHERE SUCH ITEMS ARE APPLICABLE. THEY ARE NOT REPEATED IN FULL ON THE DRAWINGS, WHICH IN MANY CASES ARE DIAGRAMMATIC ONLY, BUT WITH THE INTENTION THAT SUCH DETAILS SHALL BE INCORPORATED IN FULL. ANY ALTERNATE

#### METHOD PROPOSED FOR USE BY THE CONTRACTOR SHALL HAVE THE PRIOR APPROVAL OF THE ARCHITECT

1.27 TYPICAL DETAILS

1.28 SLEEVES, INSERTS A. FURNISH AND INSTALL ALL SLEEVES, INSERTS, ANCHOR BOLTS AND SIMILAR ITEMS TO BE SET INTO MASONRY OR CONCRETE, AS REQUIRED FOR MECHANICAL AND ELECTRICAL

## WORK, INTERNAL DIAMETER OF SLEEVE SHALL BE 2" LARGER THAN THE OUTSIDE DIAMETER OF THE PIPE OR INSULATION COVERED LINE PASSING THROUGH IT.

- 1.29 CORING, DRILLING A. CORE, CUT AND/OR DRILL ALL SMALL HOLES 4.5" DIAMETER OR LESS IN WALLS AND FLOORS REQUIRED FOR THE INSTALLATION OF SLEEVES AND SUPPORTS FOR THE ELECTRICAL WORK.
- A. INSTALL ALL WORK SUCH THAT PARTS REQUIRING PERIODIC INSPECTION, OPERATION, B. FURNISH ALL ACCESS PANELS APPROPRIATE TO PARTICULAR CONDITIONS, TO BE INSTALLED BY TRADES HAVING RESPONSIBILITY FOR THE CONSTRUCTION OF ACTUAL WALLS, FLOORS OR

## 1.31 TOOLS AND EQUIPMENT

A. PROVIDE ALL TOOLS AND EQUIPMENT REQUIRED FOR THE FABRICATION AND INSTALLATION OF THE MECHANICAL AND ELECTRICAL EQUIPMENT AT THE SITE.

A. CONTRACTORS SHALL RETAIN IN THEIR POSSESSION ALL PORTABLE AND/OR DETACHABLI

#### PARTS AND PORTIONS OF MATERIALS, DEVICES, EQUIPMENT ETC. NECESSARY FOR THE PROPER OPERATION AND MAINTENANCE OF THE MECHANICAL AND ELECTRICAL SYSTEMS UNTIL FINAL COMPLETION OF THE WORK, AT WHICH TIME THEY SHALL BE HANDED OVER TO THE OWNERS

1.32 PORTABLE AND DETACHABLE PARTS

1.33 RECORD DRAWINGS, PROJECT CLOSEOUT A. AS WORK PROGRESSES AND FOR THE DURATION OF CONTRACT, MAINTAIN A COMPLETE AND SEPARATE SET OF PRINTS OF CONTRACT DRAWINGS AT JOB SITE AT ALL TIMES. RECORD WORK COMPLETED AND ALL CHANGES FROM ORIGINAL CONTRACT DRAWINGS CLEARLY AND ACCURATELY INCLUDING WORK INSTALLED AS A MODIFICATION OR ADDITION TO THE ORIGINAL DESIGN. WORK SHALL BE UPDATED ON A WEEKLY BASIS AND SHALL BE MADE AVAILABLE FOR REVIEW BY ARCHITECT. FAILURE TO PERFORM THIS WORK SHALL BE REASON FOR WITHHOLDING REQUISITION PAYMENTS. IN ADDITION, TAKE PHOTOGRAPH OF ALL CONCEALED EQUIPMENT IN GYPSUM BOARD CEILINGS, SHAFTS, AND OTHER CONCEALED, INACCESSIBLE WORK. AT COMPLETION OF WORK, MAKE COPIES OF

PHOTOGRAPHS WITH WRITTEN EXPLANATION ON BACK. THESE SHALL BECOME PART OF

DISKETTE IN AUTOCAD? RELEASE 12 OR HIGHER FORMAT SHOWING ALL SYSTEMS AS ACTUALLY INSTALLED, INCLUDING ALL FIRE ALARM AND ELECTRICAL CIRCUITRY. THE DESIGN TRACINGS WILL BE MADE AVAILABLE FOR THE ELECTRICAL CONTRACTOR'S COPYING, AT HIS EXPENSE, INTO MYLAR REPRODUCIBLES TO SERVE AS BACKGROUNDS FOR THE DRAWINGS. THE QUANTITY OF DESIGN TRACINGS WHICH ARE MADE AVAILABLE SHALL IN NO WAY BE INTERPRETED AS SETTING A LIMIT TO THE NUMBER OF DRAWINGS NECESSARY TO SHOW THE REQUIRED INFORMATION. THE ELECTRICAL CONTRACTOR'S PROFESSIONAL DRAFTSPERSON SHALL TRANSFER CHANGES TO MYLARS; SUBMIT MYLARS AND THREE SETS OF PRINTS TO ARCHITECT FOR COMMENTS AS TO COMPLIANCE WITH THIS SECTION.

C. THE ARCHITECT WILL NOT CERTIFY THE ACCURACY OF THE RECORD DRAWINGS. THIS IS SOLE

B. AT COMPLETION OF WORK PREPARE A COMPLETE SET OF RECORD DRAWINGS ON

SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR

- D. THIS TRADE SHALL SUBMIT THE RECORD SET FOR APPROVAL BY THE FIRE AND BUILDING DEPARTMENTS IN A FORM ACCEPTABLE TO THE DEPARTMENTS, WHEN REQUIRED BY
- E. DRAWINGS SHALL SHOW RECORD CONDITION OF DETAILS, SECTIONS, RISER DIAGRAMS, CONTROL CHANGES AND CORRECTIONS TO SCHEDULES. SCHEDULES SHALL SHOW ACTUAL MANUFACTURER AND MAKE AND MODEL NUMBERS OF FINAL EQUIPMENT INSTALLATION.
- F. REFER TO SECTION 01770 CLOSEOUT PROCEDURES AND 01782 RECORD DOCUMENTS AND OWNER TRAINING.

## 1.34 OPERATING, INSTRUCTIONS AND MAINTENANCE MANUALS

- A. REFER TO SECTION 01770  $\_$  CONTRACT CLOSEOUT FOR SUBMITTAL PROCEDURES PERTAINING TO OPERATING AND MAINTENANCE MANUALS.
- B. EACH COPY OF THE APPROVED OPERATING AND MAINTENANCE MANUAL SHALL CONTAIN COPIES OF APPROVED SHOP DRAWINGS, EQUIPMENT LITERATURE, CUTS, BULLETINS, DETAILS, EQUIPMENT AND ENGINEERING DATA SHEETS AND TYPEWRITTEN INSTRUCTIONS RELATIVE TO THE CARE AND MAINTENANCE FOR THE OPERATION OF THE EQUIPMEN PROPERLY INDEXED. EACH MANUAL SHALL HAVE THE FOLLOWING MINIMUM CONTENTS:

#### 1. TABLE OF CONTENTS

2. INTRODUCTION A. EXPLANATION OF MANUAL AND ITS PURPOSE AND USE. B. DESCRIPTION OF THE ELECTRICAL SYSTEMS. C. SAFETY PRECAUTIONS NECESSARY FOR EQUIPMENT D. ILLUSTRATIONS, SCHEMATICS AND DIAGRAMS.

## E. INSTALLATION DRAWING.

- A. MAINTENANCE AND LUBRICATING INSTRUCTIONS. B. REPLACEMENT CHARTS.
- C. TROUBLE SHOOTING CHARTS FOR EQUIPMENT COMPONENTS D. TESTING INSTRUCTIONS FOR EACH TYPICAL COMPONENT. E. TWO TYPED SETS OF INSTRUCTIONS FOR ORDERING SPARE PARTS. EACH SET SHALL INCLUDE NAME, PRICE, TELEPHONE NUMBER AND ADDRESS OF

#### 4. MANUFACTURER'S LITERATURE

WHERE THEY MAY BE OBTAINED.

A. THE EQUIPMENT FOR WHICH SHOP DRAWINGS HAVE BEEN SUBMITTED

#### 1.35 SERVICE CHARACTERISTICS

- A. SECONDARY BUILDING VOLTAGE LOW LEVEL: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HZ
- B. ALL EQUIPMENT AND WIRING SHALL BE SUITABLE FOR THE APPLIED VOLTAGE.
- A. THE REQUIREMENTS OF THE STATE BUILDING CODE AND LOCAL REGULATIONS ESTABLISH THE MINIMUM ACCEPTABLE QUALITY OF WORKMANSHIP AND MATERIALS, AND ALL WORK SHALL CONFORM THERETO UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED OR SPECIFIED HEREIN.
- B. ALL WORK SHALL COMPLY WITH THE LATEST EDITIONS OF THE CODES AS REFERENCED C. FOLLOW MANUFACTURER'S DIRECTIONS FOR ARTICLES FURNISHED, IN ADDITION TO DIRECTIONS SHOWN ON DRAWINGS OR SPECIFIED HEREIN.
- D. PROTECT ALL WORK, MATERIALS, AND EQUIPMENT FROM DAMAGE DURING PROCESS OF WORK. REPLACE ALL DAMAGED OR DEFECTIVE WORK, MATERIALS AND EQUIPMENT WITHOUT ADDITIONAL COST TO OWNER.

# E. ALL EQUIPMENT AND MATERIALS FOR PERMANENT INSTALLATION SHALL BE THE PRODUCTS OF RECOGNIZED MANUFACTURERS AND SHALL BE NEW.

- F. EQUIPMENT AND MATERIALS SHALL
- 1. WHERE NORMALLY SUBJECT TO UNDERWRITERS LABORATORY INC. LISTING OR LABELING SERVICES, BE SO LISTED OR LABELED. 2. BE WITHOUT BLEMISH OR DEFECT. 3. NOT BE USED FOR TEMPORARY LIGHT AND POWER PURPOSES. 4. BE IN ACCORDANCE WITH THE LATEST APPLICABLE NEMA STANDARDS.
- CONTINGENT UPON HAVING THE PRODUCTS EXAMINED, TESTED AND CERTIFIED BY UNDERWRITERS OR OTHER RECOGNIZED TESTING LABORATORY, THE PRODUCT SHALL BE SO EXAMINED, TESTED AND CERTIFIED.

HAVING JURISDICTION OVER THE WORK. WHERE SUCH ACCEPTANCE IS

G. EXCEPT FOR CONDUIT, CONDUIT FITTINGS, OUTLET BOXES, WIRE AND CABLE, ALL ITEMS OF EQUIPMENT OR MATERIAL OF ONE GENERIC TYPE SHALL BE THE PRODUCT OF ONE

PLACEMENT IN THE PROJECT.

ELECTRICAL WORK, THE ELECTRICAL WORK SHALL INCLUDE: 1. THE COORDINATION OF THEIR DELIVERY.

H. FOR ITEMS WHICH ARE TO BE INSTALLED BUT NOT PURCHASED AS PART OF THE

- 2. THEIR UNLOADING FROM DELIVERY TRUCKS DRIVEN INTO ANY POINT ON THE PROPERTY LINE AT GRADE LEVEL. 3. THEIR SAFE HANDLING AND FIELD STORAGE UP TO THE TIME OF PERMANENT
- 4. THE CORRECTION OF ANY DAMAGE, DEFACEMENT OR CORROSION TO WHICH THEY MAY HAVE BEEN SUBJECTED. REPLACEMENT IF NECESSARY SHALL BE COORDINATED WITH CONTRACTOR WHO ORIGINALLY PURCHASED THE ITEM.
- 5. THEIR FIELD MAKE\_UP AND INTERNAL WIRING AS MAY BE NECESSARY FOR THEIR PROPER OPERATION. 6. THEIR MOUNTING IN PLACE INCLUDING THE PURCHASE AND INSTALLATION OF ALL DUNNAGE, SUPPORTING MEMBERS, AND FASTENINGS NECESSARY TO ADAPT THEM TO ARCHITECTURAL AND STRUCTURAL CONDITIONS.
- INSTALLATION OF ALL TERMINATION JUNCTION BOXES NECESSARY TO ADAPT AND CONNECT THEM TO THIS WIRING. INCLUDED ALSO SHALL BE THE PURCHASE AND INSTALLATION OF ANY SUBSTITUTE LUGS OR OTHER WIRING TERMINATIONS AS MA BE NECESSARY TO ADAPT THEIR TERMINALS TO THE BUILDING WIRING AS CALLED FOR AND TO THE CONNECTION METHODS SET FORTH IN THESE SPECIFICATIONS. . ITEMS WHICH ARE TO BE INSTALLED BUT NOT PURCHASED AS PART OF THE ELECTRIC WORK SHALL BE CAREFULLY EXAMINED UPON DELIVERY TO THE PROJECT. CLAIMS THAT ANY OF THESE ITEMS HAVE BEEN RECEIVED IN SUCH CONDITION THAT THEIR

INSTALLATION WILL REQUIRE PROCEDURES BEYOND THE REASONABLE SCOPE OF THE

7. THEIR CONNECTION TO BUILDING WIRING INCLUDING THE PURCHASE AND

#### ELECTRIC WORK WILL BE CONSIDERED ONLY IF PRESENTED IN WRITING WITHIN ONE WEEK OF THE DATE OF DELIVERY TO THE PROJECT OF THE ITEMS IN QUESTION. THE ELECTRIC WORK INCLUDES ALL PROCEDURES, REGARDLESS OF HOW EXTENSIVE, NECESSARY TO PUT INTO SATISFACTORY OPERATION, ALL ITEMS FOR WHICH NO CLAIMS HAVE BEEN SUBMITTED AS OUTLINED ABOVE.

1.37 DELIVERY, STORAGE AND HANDLING A. ALL MATERIALS FOR THE WORK OF THIS SECTION SHALL BE DELIVERED, STORED AND HANDLED SO AS TO PRECLUDE DAMAGE OF ANY NATURE. MANUFACTURED MATERIALS
SHALL BE DELIVERED AND STORED IN THEIR ORIGINAL CONTAINERS, PLAINLY MARKED WITH THE PRODUCTS' AND MANUFACTURER'S NAME. MATERIALS IN BROKEN CONTAINERS OR IN PACKAGES SHOWING WATERMARKS OR OTHER EVIDENCE OF DAMAGE, SHALL NOT BE

#### USED AND SHALL BE REMOVED FROM THE SITE. 1.38 TEMPORARY POWER AND LIGHTING

A. THE ELECTRICAL SUBCONTRACTOR SHALL FURNISH AND INSTALL FEEDERS OF SUFFICIENT SIZE FROM THE UTILITY COMPANY'S POWER LINES FOR THE ELECTRIC LIGHT AND POWER REQUIREMENTS FOR THE BUILDING WHILE UNDER CONSTRUCTION AND UNTIL THE PERMANENT FEEDERS AND RELATED EQUIPMENT HAVE BEEN INSTALLED AND ARE IN OPERATION. TEMPORARY LIGHTING SHALL BE BASED ON A MINIMUM OF PROVIDING AT LEAST ONE 100 WATT INCANDESCENT LAMP FOR EACH 1,000 SQUARE FEET OF FLOOR AREA. SUFFICIENT WIRING, LAMPS, AND OUTLETS SHALL BE INSTALLED TO INSURE PROPER LIGHTING IN ALL ROOMS, SPACE, STAIRWELLS, AND CORRIDORS. MINIMUM SIZED LAMP USED SHALL BE 100 WATT. WHERE HIGHER LIGHTING INTENSITIES ARE REQUIRED BY FEDERAL OR STATE STANDARDS OF LAWS OR OTHERWISE SPECIFIED, THE ABOVE

SPECIFIED WATTAGE SHALL BE INCREASED TO PROVIDE THESE INCREASED INTENSITIES.

- B. ALL NECESSARY TRANSFORMERS, METERS, CABLES, PANELBOARDS, SWITCHES, TEMPORARY LAMP REPLACEMENTS AND ACCESSORIES REQUIRED FOR THE TEMPORARY IGHT AND POWER INSTALLATION SHALL BE PROVIDED BY THE ELECTRICAL
- C. THE ELECTRICAL SUBCONTRACTOR SHALL PROVIDE AND MAINTAIN ON EACH FLOOR OF THE BUILDING, A FEEDER OR FEEDERS OF SUFFICIENT CAPACITY FOR THE REQUIREMENTS OF THE ENTIRE FLOOR AND HE SHALL PROVIDE A SUFFICIENT NUMBER OF OUTLETS, LOCATED AT CONVENIENT POINTS, SO THAT EXTENSION CORDS OF NOT OVER 50 FT. IN LENGTH WILL REACH ALL WORK REQUIRING TEMPORARY LIGHT OR POWER.
  - D. THE ELECTRICAL SUBCONTRACTOR SHALL INSTALL AND MAINTAIN THE WIRING AND ACCESSORIES FOR THE OFFICES OF THE GENERAL CONTRACTOR AND THE CLERK OF THE WORKS AS SPECIFIED IN THE CONTRACT FORM. E. ALL TEMPORARY ELECTRICAL WORK SHALL MEET THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE ARTICLE 305 TEMPORARY WIRING, THE LOCAL UTILITY COMPANY, AND Tel: (781) 826-4144

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SHEET TITLE **ELECTRICAL SPECIFICATIONS** SHEET

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I. PROVIDE ALL TEMPORARY LIGHTING AND POWER REQUIRED ABOVE DURING THE NORMAL WORKING HOURS OF THE PROJECT OR A TOTAL OF TEN (10) HOURS PER NORMAL WORKING DAY; SATURDAYS, SUNDAYS AND LEGAL HOLIDAYS ARE EXCLUDED. THE TEN HOURS PER DAY SHALL INCLUDE MANNING THE TEMPORARY POWER AND LIGHTING 2 HOUR BEFORE AND 2 HOUR AFTER A NORMAL EIGHT (8) HOUR WORKING DAY. IN ADDITION TO THE ABOVE, PROVIDE AND MAINTAIN, TO THE SATISFACTION OF THE LOCAL AUTHORITIES HAVING JURISDICTION. ALL TEMPORARY LIGHTING AND POWER THAT MAY BE REQUIRED FOR SAFETY PURPOSES. THE ELECTRICAL SUBCONTRACTOR WILL BE COMPENSATE THE GENERAL CONTRACTOR FOR ANY ADDITIONAL STANDBY TIME, MATERIALS OR EQUIPMENT REQUIRED BY THE GENERAL CONTRACTOR OR OTHER SUBCONTRACTORS

1.39 STAGING AND SCAFFOLDING

A. PROVIDE STAGING AND SCAFFOLDING FOR ALL THE WORK OF THIS SECTION COMPLYING

A. FURNISH EXTRA MATERIALS DESCRIBED IN FOLLOWING PRODUCT SPECIFICATION SECTIONS THAT MATCH PRODUCTS INSTALLED, ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE, AND ARE IDENTIFIED WITH LABELS CLEARLY DESCRIBING CONTENTS. PART 2 - PRODUCTS

A. ALL MATERIALS AND EQUIPMENT NECESSARY TO MAKE THE INSTALLATION COMPLETE IN EVERY DETAIL SHALL BE FURNISHED AND INSTALLED UNDER THIS CONTRACT WHETHER OR NOT SPECIFICALLY SPECIFIED HEREIN. ALL MATERIALS AND EQUIPMENT SHALL BE NEW. HE ELECTRICAL CONTRACTOR SHALL INCLUDE ALL WIRING FOR MECHANICAL. PLUM AND FIRE PROTECTION SYSTEMS, WIRING PROTECTION SYSTEMS AND WIRING FOR ALL EQUIPMENT SPECIFIED.

B. IT IS THE INTENT OF THE SPECIFICATIONS THAT ONE MANUFACTURER BE SELECTED, NOT A COMBINATION, FOR ANY PARTICULAR SYSTEM. FOR EXAMPLE, ALL WIRE OF ONE MANUFACTURER, ALL SWITCHES OF ONE MANUFACTURER, ETC., EXCEPT SPECIFIC MATERIAL CLASSIFICATIONS IN WHICH DELIVERY TIME BECOMES A PROBLEM TH WNER'S ENGINEER MAY; GIVE SPECIFIC EXEMPTION FROM THE REQUIREMENTS C. WHERE MATERIALS, EQUIPMENT, APPARATUS OR OTHER PRODUCTS ARE SPECIFIED BY MANUFACTURER, BRAND NAME, TYPE OR CATALOG NUMBER, SUCH DESIGNATION IS TO

2.6 PULL BOXES, WIREWAYS, AND CHANNELS

A. PULL BOXES SHALL BE CODE GAUGE GALVANIZED STEEL WITH SCREW COVERS TO MATCH PULL BOXES AND WIRE WAYS SHALL BE AS REQUIRED BY NEC AND/OR JOB CONDITIONS WITH STEEL BARRIERS SEPARATING SYSTEMS.

B. WIRE WAYS SHALL BE GALVANIZED STEEL, MANUFACTURED STANDARD SECTIONS AND FITTINGS, WITH COMBINATION HINGED AND SCREW COVERS. C. STEEL CHANNEL SUPPORTS SHALL BE MINIMUM 1-5/8 INCH MOLD STRIP WITH MIN

A. ELECTRIC METALLIC TUBING (EMT) SHALL BE ELECTRO GALVANIZED OR SHERADIZED STEEL.

CORP., WHEATLAND TUBE COMPANY OR EQUAL. B. FLEXIBLE METAL CONDUIT SHALL BE GALVANIZED STEEL WITH SEPARATE COPPE GROUNDING CONDUCTOR. LIQUID—TIGHT FLEXIBLE METAL CONDUIT SHALL BE SIMILAR, BUT WITH EXTRUDED MOISTURE AND OIL PROOF OUTER JACKET OF POLYVINYL CHLORIDE PLASTIC. FLEXIBLE METAL CONDUIT LESS THAN 6-FEET LONG MAY BE USED TO CONNECT ALL LIGHTING FIXTURES. MOTORS AND OTHER EQUIPMENT MAY BE CONNECTED IN LENGTH; NOT EXCEEDING 18 INCHES. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE USED FOR ALL MECHANICAL EQUIPMENT OR OTHER ROTATING EQUIPMENT SUBJECTED TO

C. PVC SCHEDULE 40 CONDUIT SHALL BE USED FOR ALL UNDERGROUND WIRING. USE GALVANIZED STEEL SWEEPS AND STUB-UPS. D. COUPLINGS AND CONNECTORS FOR ELECTRICAL METALLIC TUBING SHALL BE GALVANIZED

E. STEEL SUPPORT RODS OR SUPPORT BOLTS FOR CONDUITS SHALL BE 1/8" DIAMETER FOR EACH INCH OR FRACTION THEREOF OF DIAMETER OF CONDUIT SIZE, BUT NO ROD OR BOLT F. CONDUIT ENDS SHALL BE CUT SQUARE AND REAMED TO REMOVE BURRS AND SHARP EDGES. OFFSETS AND BENDS FOR CHANGES IN ELEVATION OF EXPOSED CONDUIT RUNS

SHALL BE MADE AT WALLS OR BEAMS AND NOT IN OPEN SPACES BETWEEN WALLS OR
BEAMS. CONDUITS SHALL BE ROUTED SO AS NOT TO INTERFERE WITH THE OPERATION OR
MAINTENANCE OF ANY EQUIPMENT. THE ENTIRE JOB SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER, AS APPROVED BY THE ENGINEER. STEEL SUPPORTS OR RACKS SHALL BE GALVANIZED STEEL CHANNEL AND FITTINGS, UNISTRUT, KINDORF, HUSKY PRODUCTS COMPANY, OR EQUAL G. CONDUITS SHALL BE ROUTED IN THE FIELD SO AS TO BE COORDINATED WITH THE BUILDING STRUCTURE. EXPOSED CONDUIT SHALL BE RUN IN STRAIGHT LINES PARALLEL TO

WALLS, BEAMS AND COLUMNS AND WITH RIGHT ANGLE BENDS AND THREADED CONDUI H. CONDUITS PENETRATING THE BUILDING SHALL BE SEALED WITH SEALING BUSHINGS AND SHALL BE PROVIDED WITH PRESSURE DISCS, LOCKING COLLAR, SEALING RING ETC. SIMILAR TO OZ GEDNEY TYPE CSRE CSRL CSRC ETC. SEALING DESIGN SHALL BE SEGMENTAL OZ-GEDNEY CRC. FR. HRK. HRE. HPE. KR. GRK. GRE. GPE (WHICHEVER IS APPROPRIATE). THE SEALING COMPOUND SHALL BE DOZSEAL SEALING INSULATING COMPOUND AS MANUFACTURED BY OZ-GEDNEY. CONDUITS AND CABLES SHALL BE

2.9 WIRE AND CABLE

A. ALUMINUM 1. WIRE AND CABLE LARGER THAN #6 AWG, UTILIZED AS FEEDERS SHALL BE PROVIDE SINGLE CONDUCTOR WIRE AND CABLE WITH 600V INSULATION. WIRE SIZE #4 AWG AND LARGER SHALL BE STRANDED. CONDUCTORS SHALL BE ALUMAFLEX ALUMINUM ALLOY COMPACT STRANDED, INSULATED WITH HEAT AND

SEALED COMPLETELY TO PREVENT WATER, MOISTURE PENETRATION.

IOISTURE RESISTANT PVC, JACKETED WITH ABRASION, MOISTURE, GASOLINE AND OIL RESISTANT NYLON. 3. WIRE AND CABLE SHALL BE TYPE THHN-THWN-2 BUILDING WIRE, 600V

ATED FOR 75 DEGREES C. IN WET LOCATIONS AND 90 DEGREES C. IN DRY 4. FLEXIBLE METAL CLAD CABLE TYPE MC WITH GREEN EQUIPMENT GROUND SHALL BE USED FOR APARTMENT FEEDERS WHERE INDICATED. MC CABLE SHALL BE MANUFACTURED BY SOUTHWIRE AFC OR EQUAL.

5. TYPE SE CABLE, STYLE R, SHALL BE USED FOR APARTMENT FEEDERS WHERE INDICATED. INSTALLATION SHALL COMPLY WITH THE MASSACHUSETTS ELECTRICAL

6. WIRE AND CABLE SHALL BE MANUFACTURED BY SOUTHWIRE, GENERAL CABLE 7. SERVICE ENTRANCE CABLE - TYPE SER A. SUMMARY

1) THIS SPECIFICATION DESCRIBES SERVICE ENTRANCE CABLE, TYPE SER EMPLOYING THREE INDIVIDUAL TYPE THHN/THWN-2 CIRCUIT CONDUCTORS AND A STRANDED UNINSULATED GROUNDING CONDUCTOR SUITABLE FOR OPERATING AT A MAXIMUM CONDUCTOR TEMPERATURE OF 75°C AND AT A POTENTIAL OF 600 VOLTS. TYPE SER CABLE SHALL BE LISTED AND MARKED FOR USE IN CABLE TRAY AND COMPLY WITH UL 854, 1685 AND 1581 VERTICAL TRAY FLAME TESTS FOR USE AS AN INTERIOR EXPOSED FEEDER CABLE FOR DWELLING UNIT LOAD CENTERS. INSTALLATION SHALL ALSO COMPLY

WITH THE MASSACHUSETTS ELECTRIC CODE ARTICLES 338 AND 334. 2) DESIGN IS BASED ON ESSEX TO ESTABLISH STANDARDS OF QUALITY FOR MATERIALS AND PERFORMANCE. ACCEPTABLE ALTERNATE MANUFACTURERS ARE SOUTHWIRE AND GENERAL CABLE.

3) APPLICABLE SPECIFICATIONS A) THE FOLLOWING SPECIFICATIONS FROM A PART OF THIS SPECIFICATION TO THE EXTENT SPECIFIED HERE IN:

UNDERWRITERS LABORATORIES STANDARD 44 FOR RUBBER-INSULATED WIRES AND CABLES.

2) MASSACHUSETTS ELECTRICAL CODE ARTICLE 338. 4) CONDUCTORS A) THE INSULATED AND UNINSULATED CONDUCTORS SHALL BE

STRANDED UNCOATED COPPER PER UL STANDARD 83. 5) SEPARATOR

A) A SUITABLE SEPARATOR OVER THE CONDUCTOR MAY BE USED AT THE OPTION OF THE MANUFACTURER 6) INSULATION

A) EACH INSULATED CIRCUIT CONDUCTOR SHALL BE A TYPE THHN/THWN-2 CONDUCTOR COMPLYING WITH THE REQUIREMENTS OF UL STANDARD 44 FOR PHYSICAL AND ELECTRICAL PROPERTIES AND INSULATION THICKNESSES 7) ASSEMBLY

A) THREE TYPE THHN/THWN, CROSSLINKED-POLYETHYLENE-INSULATED COLOR CODED CROSSLINKED—POLYEINYLENE—INSULAIED COLOR CODED
CONDUCTORS SHALL BE TWISTED WITH A SUITABLE LAY, FILLERS
AS REQUIRED, AND A STRANDED UNINSULATED COPPER
GROUNDING CONDUCTOR IN ONE INTERSTICE. THE
ASSEMBLED CONDUCTORS SHALL BE BOUND WITH A GLASS
FEMILIED TO TAKE CONTENDED. THE CONTENDED BY HE CONTENDED BY HE CONTENDED. SEA REINFORCED TAPE COVERING AS REQUIRED BY UL STANDARD 854

 A) THE ASSEMBLED CONDUCTORS SHALL BE COMPLETELY ENCLOSED IN A PVC PROTECTIVE SHEATH COMPLYING WITH THE PHYSICAL REQUIREMENTS OF UL. 9) IDENTIFICATION

8) SHEATH

A) THE CABLE SHALL BE IDENTIFIED BY SURFACE MARKING INDICATING MANUFACTURER'S IDENTIFICATION, NUMBER AND SIZE OF INSULATED AND UNINSULATED CONDUCTORS, TYPE OF INDIVIDUAL CONDUCTORS, VOLTAGE RATING, UL SYMBOL, FLAME TEST/TRAY USE AND CABLE TYPE. 10) TESTS

A) THE COMPLETED CABLE SHALL BE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF UL STANDARD 854 FOR TYPE E

A) THE CABLE SHALL BEAR UNDERWRITERS LABORATORIES TYPE SE LABEL

A) THE CABLE SHALL BE RUN HORIZONTALLY ON A FLOOR ONLY AND NOT PASS THROUGH A RATED FLOOR ASSEMBLY.

 PROVIDE SINGLE CONDUCTOR WIRE AND CABLE WITH 600V INSULATION. WIRE SIZE #8 AWG AND LARGER SHALL BE STRANDED. WIRE OF SIZE SMALLER THAN #8 AWG SHALL BE SOLID. CONDUCTORS SHALL BE SOFT DRAWN COPPER WITH CONDUCTIVITY OF NOT LESS THAN 98% OF ANSI STANDARD FOR ANNEALED 3. WIRE AND CABLE SHALL BE TYPE THWN-THHN BUILDING WIRE, 600V, RATED FOR 75 DEGREES C. IN WET LOCATIONS AND 90 DEGREES C. IN DRY LOCATIONS.

4. FLEXIBLE METAL CLAD CABLE TYPE MC WITH GREEN EQUIPMENT GROUND MAY ALLOWED BY CODE. MC CABLE SHALL BE MANUFACTURED BY AFC OR EQUAL. 2.11 WIRING DEVICES

A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS,
MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED IN THE WORK INCLUDED, BUT NOT LIMITED, TO THE FOLLOWING:

1. WIRING DEVICES: A. PASS AND SEYMOUR/LEGRAND B. BRYANT ELECTRIC C. COOPER INDUSTRIES

E. LEVITON B. DUPLEX RECEPTACLES SHALL BE COMMERCIAL GRADE RATED FOR 125 VOLTS, 15 OR 20 AMPERES WHERE LOCATED TOTALLY WITHIN AN APARTMENT, CONDOMINIUM OR TOWNHOUSE AND APPROVED BY ARCHITECT/ENGINEER/OWNER RECEPTACLES SHALL HAVE WIRE BUNDLING CLAMPS ON ALL TERMINALS INCLUDING GROUND; TERMINAL SCREWS SHALL BE #10. A FULL WRAP—AROUND STEEL BRIDGE STRAP SHALL BE PROVIDED WITH LOCKING FINGER TABS TO SECURE THE FACE.

C. DUPLEX RECEPTACLES WITH GROUND FAULT CIRCUIT INTERRUPTER CHARACTERISTICS SHALL BE RATED FOR 125 VOLTS, 20 AMPERES WITH 20 AMPERE FEED THROUGH AMPERES UNLESS OTHERWISE INDICATED ON CONTRACT DRAWINGS, AND SHALL CONFORM TO THE REVISED 2003 UL 943 STANDARD. ALL RECEPTACLES SHALL HAVE ?SAFELOCK? PROTECTION THAT WILL DISCONNECT POWER TO THE RECEPTACLE IF CRITICAL COMPONENTS ARE DAMAGED AND GROUND FAULT PROTECTION IS LOST. ALL RECEPTACLES SHALL HAVE ?TRIP INDICATOR? LIGHT TO IDENTIFY A TRIPPED CONDITION OUTLETS, UTILITY VAULT, IN WET AREAS, ETC. SHALL BE GROUND FAULT TYPE WHETHE NDICATED ON THE DRAWINGS OR NOT. PROVIDE WEATHERPROOF WHILE-IN-USE COVERS

1. PASS & SEYMOUR: 2094 2. COOPER: XGF20 3. LEVITON: 8898

1. PASS & SEYMOUR

D. TOGGLE SWITCHES SHALL BE FULL SIZED, HEAVY DUTY AC TYPE RATED FOR 120/277 VOLTS, 20 AMPERES AND COMPLY WITH DECORA STYLE BY LEVITON. MOUNTING STRAP SHALL BE ONE-PIECE NICKEL PLATED STEEL WITH INTEGRAL GROUND. TERM SHALL EXTERNAL SCREW-PRESSURE PLATE BACK AND SIDE WIRED TO ACCEPT # 14 - #10 AWG WIRE. CONTACTS SHALL BE SILVER ALLOY.

E. DIMMERS SWITCHES: MODULAR FULL WAVE SOLID-STATE UNITS WITH INTEGRAL, QUIET ON/OFF SWITCHES WITH AUDIBLE AND ELECTROMAGNETIC NOISE FILTERS. 1. WATTAGE RATING EXCEEDS CONNECTED LOAD BY 30% MINIMUM EXCEPT AS OTHERWISE INDICATED.

2. CONTROL: CONTINUOUSLY ADJUSTABLE SLIDE, TOGGLE OR ROTARY KNOB. SINGLE POLE OR 3-WAY SWITCH TO SUIT CONNECTIONS. 3. INCANDESCENT LAMP DIMMERS: MODULAR DIMMER SWITCHES FOR INCANDESCENT FIXTURES; SWITCH POLES AND WATTAGE AS OTHERWISE INDICATED, 120 VOLT. 60 HERTZ, WITH CONTINUOUSLY ADJUSTABLE ROTARY KNOB EQUIPPED WITH ELECTROMAGNETIC FILTER TO ELIMINATE NOISE, RF AND TV

4. FLUORESCENT LAMP DIMMERS: MODULAR DIMMER SWITCHES COMPATIBLE WITH DIMMER BALLASTS. TRIM POTENTIOMETER ADJUSTS LOW END DIMMINO DIMMER BALLAST COMBINATION IS CAPABLE OF CONSISTENT DIMMING TO A MAXIMUM OF 10 % OF FULL BRIGHTNESS.

F. ALL WIRING DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH NEC ARTICLE 210. 2.12 WIRING DEVICE PLATES A. ALL NORMAL POWER WIRING DEVICE PLATES SHALL BE HIGH IMPACT STAINLESS STEEL: 1. PASS & SEYMOUR: TP SERIES (3/16 ? WIDER/LONGER THAN

STANDARD SIZE; CAPTIVE SCREWS FOR SINGLE GANG

B. DEVICE PLATE SCREWS SHALL BE OF THE SAME COLOR FINISH AS THE DEVICE PLATE. 2.13 OUTLET BOXES AND ACCESSORIES

A. PROVIDE GALVANIZED SHEET STEEL OUTLET BOXES FOR ALL OUTLETS UNLESS OTHERWISE NOTED B. FIXTURE OUTLET BOXES SHALL HAVE 3/8" SOLID MALE FIXTURE STUDS AND AUXILIARY FIXTURE STEMS SHALL BE SUPPORTED FROM 3/8" MALE FIXTURE STUDS.

C. ALL OUTLET BOXES FOR CONCEALED WORK SHALL BE GALVANIZED, STAMPED STEEL; THOSE FOR FIXTURES, FURNISHED WITH A FIXTURE STUD. D. OUTLET BOXES SHALL BE OF SIZE AND TYPE TO ACCOMMODATE (1) STRUCTURA CONDITIONS; (2) SIZE AND NUMBER OF RACEWAYS, CONDUCTORS OR CABLES ENTERING AND (3) DEVICES OR FIXTURES FOR WHICH REQUIRED.

E. INSTALL BLANK PLATES ON ALL OUTLET BOXES. IN WHICH NO APPARATUS IS INSTALLED. WHICH DO NOT INTEGRALLY PROVIDE A COVER FOR THE BOX. SERIES RATING OF DEVICES WILL NOT BE ACCEPTED.

F. SPECIAL CARE SHALL BE TAKEN TO SET ALL BOXES CORRECTLY SQUARE AND TRUE WITH G. ELECTRICAL NON-METALLIC TUBING (ENT), FITTINGS, BOXES AND SUPPORT HARDWARE CAN BE USED WHEN ALLOWED BY CODE AND APPROVED BY OWNER.

H. BOXES 1. BOXES USED WITHED ENT SHALL BE LISTED AND/OR CERTIFIED. 2. NON-METALLIC MUD BOXES SHALL BE AVAILABLE

A. MUD BOXES WITH TWO 1?, FOUR 1/2? AND SIX PORTS SHALL BE AVAILABLE B. MUD BOXES WITH QUICK CONNECT PORTS SHALL BE MOLDED OUT OF POLYCARBONATE C. MUD BOXES WITH REMOVABLE BACK SHALL BE AVAILABLE D. MUD BOX TYPES SHALL INCLUDE;

1) CEILING BOX LISTED FOR FIXTURE SUPPORT UP TO 50 LBS. AND CEILING FAN SUPPORT UP TO 35 LBS. 2) ONE GANG

3) TWO GANG 4) 4 SQUARE 2.16 NAMEPLATES

A. NAMEPLATES CONSISTING OF BLACK PLASTIC WITH WHITE CENTER. LETTERING TO RF 1/4" SCREWS SHALL BE PROVIDED FOR THE FOLLOWING EQUIPMENT: 1. ALL PANEL BOARDS AND DISTRIBUTION EQUIPMENT.

TERMINAL CABINETS. 3. JUNCTION BOXES LARGER THAN 4-11/16".

2.17 DISCONNECT SWITCHES A. ALL SAFETY SWITCHES SHALL BE NEMA TYPE HD AND UNDERWRITERS' LABORATORIES LISTED B. ALL SWITCHES SHALL HAVE SWITCH BLADES WHICH ARE FULLY VISIBLE IN OF OFF POSITION WITH THE DOOR OPEN. ALL CURRENT CARRYING PARTS SHALL BE PLATED THROUGH ELECTROLYTIC PROCESSED TO RESIST CORROSION AND PROMOTE COOL OPERATION. C. SWITCHES SHALL BE QUICK-MAKE AND QUICK-BREAK SUCH THAT, DURING NORMAL OPERATION OF THE SWITCH, THE OPERATION OF THE CONTACTS SHALL BE NOT CAPABLI

OF BEING RESTRAINED BY THE OPERATING HANDLE AFTER THE CLOSING OR OPENING ACTION OF THE CONTACTS HAS STARTED. THE HANDLE AND MECHANISM SHALL BE AN INTEGRAL PART OF THE BOX, NOT THE COVER, WITH POSITIVE PADLOCKING PROVISIONS IN D. SWITCHES SHALL BE FURNISHED IN NEMA 1 GENERAL PURPOSE ENCLOSURES UNLESS NEMA 3R (RAINTIGHT) OR NEMA 4 AS REQUIRED BY ENVIRONMENT. ENCLOSURES SHALL BE OF CODE GAUGE (UL 98) SHEET STEEL (NEMA 1) OR CODE GAUGE

E. SWITCHES SHALL BE HORSEPOWER RATED FOR 600 VOLTS AC AND ALL SWITCHES SHALL BE FUSED TYPE WITH DUAL ELEMENT FUSES. F. SAFETY SWITCHES SHALL BE SQUARE D CLASS 3130 OR APPROVED EQUAL AS MANUFACTURED BY GENERAL ELECTRIC OR CUTLER HAMMER

2.18 FUSES A. FUSES SHALL BE NON-RENEWABLE TYPE, UL CLASS J UP TO 600 AMP, AND CLASS L OVER 600 AMP. FUSES SHALL BE CURRENT LIMITING TYPE WITH A MINIMUM INTERRUPTING RATING OF 200,000 RMS AMP. B. FUSES SHALL NOT BE USED IN ANY SWITCHBOARDS OR PANEL BOARDS UNLESS ADEQUATE

A.C. RATED CIRCUIT BREAKERS ARE NOT AVAILABLE. C. FUSES SHALL BE MANUFACTURED BY BUSSMAN, GOULD SHAWMUT, LITTLE FUSE OR EQUAL 2.19 SWITCHBOARD A. MANUFACTURERS

1. SQUARE D COMPANY 2. GENERAL ELECTRIC

3. SIEMENS 4. CUTLER HAMMER

PROTECTIVE DEVICES.

B. SHOP DRAWINGS: FOR EACH SWITCHBOARD, PANELBOARD AND RELATED EQUIPMENT. 1. DIMENSIONED PLANS, ELEVATIONS, SECTIONS, AND DETAILS, INCLUDING REQUIRED CLEARANCES AND SERVICE SPACE AROUND EQUIPMENT, INCLUDE LECTRIC ROOM LAYOUT THAT INDICATE ALL CODE REQUIRED WORKING LEARANCES. SHOW TABULATIONS OF INSTALLED DEVICES, EQUIPMENT

FEATURES, AND RATINGS. INCLUDE THE FOLLOWING: A. ENCLOSURE TYPES AND DETAILS FOR TYPES OTHER THAN NEMA 250, TYPE 1 B. BUS CONFIGURATION, CURRENT, AND VOLTAGE RATINGS. C. SHORT-CIRCUIT CURRENT RATING OF SWITCHBOARDS AND OVERCURRENT

D. DESCRIPTIVE DOCUMENTATION OF OPTIONAL BARRIERS SPECIFIED FOR ELECTRICAL INSULATION AND ISOLATION.

E. UTILITY COMPANY'S METERING PROVISIONS WITH INDICATION OF APPROVAL BY UTILITY COMPANY.

F. UL LISTING FOR SERIES RATING OF INSTALLED DEVICES. G. FEATURES, CHARACTERISTICS, RATINGS, AND FACTORY SETTINGS OF INDIVIDUAL OVERCURRENT PROTECTIVE DEVICES AND AUXILIARY COMPONENTS

2.21 GROUNDING REQUIREMENTS

A. GROUND ALL SYSTEMS AND EQUIPMENT IN ACCORDANCE WITH BEST INDUSTRY PRACTICE, THE REQUIREMENTS OF NFPA 70.

B. THE GROUND BUS OF THE MAIN SWITCHBOARD SHALL BE CONNECTED TO THE MAIN GROUNDING ELECTRODE SPECIFIED BELOW BY MEANS OF INSULATED CONDUCTORS RUN C. THE MAIN GROUNDING ELECTRODE SHALL BE AN ACCESSIBLE POINT ON THE NEARES METALLIC MAIN WATER SERVICE PIPE. CONNECTION SHALL BE MADE ON THE STREET SIDE OF THE MAIN VALVE UTILIZING A GROUND CLAMP OF A TYPE SPECIFICALLY MANUFACTURED FOR THE PURPOSE. BONDING JUMPERS SHALL BE PROVIDED AROUND

THE WATER METERS AND AROUND INSULATING JOINTS AND/OR SECTIONS. D. ESTABLISH A GROUND BONDING CONNECTION FROM THE EFFECTIVELY GROUNDED STRUCTURAL BUILDING STEEL TO EACH COLD WATER MAINS ENTERING THE BUILDING EACH BONDING CONNECTION SHALL CONSIST OF INSULATED CONDUCTORS RUN IN CONDUIT

E. THE WATER PIPE GROUND SHALL BE SUPPLEMENTED BY AN ADDITIONAL ELECTRODE CONSISTING OF (3) BURIED 3/4" DIAMETER BY 10'\_0" LONG COPPERWELD GROUND RODS SPACED 10'\_0" APART, AND PROVIDED IN SUFFICIENT QUANTITY SO AS TO HAVE INDEPENDENT CERTIFICATION CONFIRMING THIS. ESTABLISH A BONDING CONNECTION FROM THE ELECTRODE CONSISTING OF GREEN INSULATED CONDUCTORS RUN IN CONDUCT BONDING JUMPERS.

F. PROVIDE GROUNDING BONDS BETWEEN ALL METALLIC CONDUITS OF THE LIGHT AND POWER SYSTEM WHICH ENTER AND LEAVE CABLE CHAMBERS OR OTHER NON\_METALLIC CABLE PULLING AND SPLICING BOXES. ACCOMPLISH THIS BY EQUIPPING THE CONDUITS WITH BUSHINGS OF THE GROUNDING TYPE INDIVIDUALLY CROSS CONNECTED. G. BOND METALLIC CONDUITS CONTAINING GROUNDING ELECTRODE CONDUCTORS AND MAIN BONDING CONDUCTORS TO THE GROUND BUS SERVICE ENCLOSURE AND/OR GROUNDIN ELECTRODE AT BOTH ENDS OF EACH RUN UTILIZING GROUNDING BUSHINGS AND JUMPERS H. ALL QUALIFY CONCRETE-ENCASED GROUNDING ELECTRODES SHALL BE CONNECTED TO THI

GROUNDING SYSTEM OF THE BUILDING IN ACCORDANCE WITH THE REQUIREMENTS OF NEC I. PROVIDE GROUNDING BONDS FOR ALL METALLIC CONDUITS OF THE LIGHT AND POWER SYSTEM WHICH TERMINATE IN PITS BELOW EQUIPMENT FOR WHICH A GROUND BUS IS SPECIFIED. ACCOMPLISH THIS BY EQUIPPING THE CONDUITS WITH BUSHINGS OF THE GROUNDING TYPE CONNECTED INDIVIDUALLY TO THE GROUND BUS.

J. PROVIDE SUPPLEMENTARY GROUND BONDING WHERE METALLIC CONDUITS TERMINATE AT METAL CLAD EQUIPMENT (OR AT THE METAL PULL BOX OF EQUIPMENT) FOR WHICH A GROUND BUS IS SPECIFIED. ACCOMPLISH THIS BY EQUIPPING THE CONDUITS WITH BUSHINGS OF THE GROUNDING TYPE CONNECTED INDIVIDUALLY BY MEANS OF JUMPERS TO THE GROUND BUS. EXCLUDE THE JUMPERS WHERE DIRECTED. THIS EXCLUSION WILL BE REQUIRED WHERE AN ISOLATED GROUND FOR ELECTRONIC EQUIPMENT IS TO BE MAINTAINED K. EACH GROUNDING TYPE BUSHING SHALL HAVE THE MAXIMUM GROUND WIRE

ACCOMMODATION AVAILABLE IN STANDARD MANUFACTURE FOR THE PARTICULAR CONDUIT SIZE. CONNECTION TO BUSHING SHALL BE WITH WIRE OF THIS MAXIMUM SIZE. .. BONDING CONDUCTORS ON THE LOAD SIDE OF THE SERVICE DEVICE AND EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED IN RELATION TO THE FUSES OR TRIP SIZE OF THE  $\mbox{\scriptsize M.}$  THE CENTRAL EQUIPMENT FOR THE FIRE PROTECTIVE ALARM SYSTEM AND TELEPHONE SYSTEM SHALL HAVE ITS GROUNDING TERMINAL CONNECTED TO THE GROUNDING ELECTRODE BY MEANS OF A NO. 6 GREEN CODED INSULATED CONDUCTOR, RUN IN 3/4" CONDUIT. UTILIZE A GROUND CLAMP OF A TYPE SPECIFICALLY MANUFACTURED FOR THE PURPOSE

N. PROVIDE GROUNDING BONDS FOR ALL METAL PARTS, INCLUDING ALL METAL PARTS OF THE ELECTRICAL EQUIPMENT ASSOCIATED WITH THE WATER-CIRCULATING SYSTEM OF THE POOL, ALL METAL PARTS OF THE POOL STRUCTURE, AND ALL FIXED METAL PARTS, WHICH INCLUDE CONDUIT AND PIPING, METAL DOOR FRAMES, AND METAL WINDOW FRAMES WITHIN 5 FEET OF THE INSIDE WALLS OF THE POOL AND NOT SEPARATED BY A PERMANENT BARRIER. ALL POOL GROUNDING SHALL BE IN ACCORDANCE WITH ARTICLE 680 OF THE NEC, STATE CODE OR LOCAL CODE, WHICHEVER IS THE MORE STRINGEN

A. THE INSULATION OR COVERING OF EACH WIRE OR CABLE SHALL BE COLOR CODED SO AS TO PROVIDE FOR CIRCUIT IDENTIFICATION AS SPECIFIED BELOW:

120/208 V CIRCUITS PHASE CIRCUITS BLACK A

BLUE C

2.25 CARTRIDGE FUSES

WHITE NEUTRAL GREEN EQUIPMENT GROUND

B. COLOR CODING SHALL BE ACHIEVED BY ONE OF THE FOLLOWING METHODS:

1. THE INSULATION OR COVERING SHALL BE CODED DURING MANUFACTURE BY USE OF ONE OF THE FOLLOWING METHODS: A. COLORED COMPOUNDS.

2. IN SIZES AND INSULATION TYPES WHERE FACTORY APPLIED COLORS ARE NOT AVAILABLE, WIRES AND CABLES SHALL BE COLOR CODED BY THE APPLICATION COLORED PLASTIC TAPES IN OVERLAPPING TURNS AT ALL TERMINAL POINTS, AND IN ALL BOXES IN WHICH SPLICES ARE MADE. C. THE SAME COLORED CABLE SHALL BE CONNECTED TO THE SAME PHASE THROUGHOUT D. IN GENERAL, BUILDING LOAD CENTERS AND PANELBOARDS SHALL BE PHASED "A". "B".

LEFT TO RIGHT. THE NEUTRAL, ALTHOUGH IT MAY BE IN DIFFERENT LOCATIONS FOR DIFFERENT EQUIPMENT, SHALL BE IDENTIFIED. 2.23 MOLDED CASE CIRCUIT BREAKERS A. MOLDED CASE TYPE CIRCUIT BREAKERS SHALL CONSIST OF MANUALLY OPERATED QUICK\_MAKE QUICK\_BREAK MECHANICALLY TRIP FREE OPERATING MECHANISMS FOR SIMULTANEOUS OPERATION OF ALL POLES, WITH CONTACTS, ARC INTERRUPTERS AND TRIP ELEMENTS FOR EACH POLE, ALL ENCLOSED IN MOLDED PHENOLIC PLASTIC CASES. 1. THEIR TRIPPING UNITS SHALL BE OF THE "THERMAL MAGNETIC" TYPE HAVING

> ELEMENTS FOR SHORT CIRCUIT PROTECTION. 2. THEY SHALL BE MANUALLY OPERABLE BY MEANS OF TOGGLE TYPE OPERATING HAVING "TRIPPED" POSITION MIDWAY BETWEEN THE "ON\_OFF?

> 3. THEY SHALL EACH BE CONTAINED IN AN INDIVIDUAL CASE ENCLOSING ONLY THE NUMBER OF POLES REQUIRED FOR THE PARTICULAR BREAKER. 4 ALL PANELS AND INDIVIDUALLY MOUNTED CIRCUIT RREAKERS SHALL HAVE SHORT

CIRCUIT RATINGS EXCEEDING THE AVAILABLE SHORT CIRCUIT OR THE VALUES INDICATED IN THE POWER SYSTEM STUDIES IN THIS SECTION BY A FACTOR OF 1.2 A. 240V CLASS PANELS/BREAKERS 1) 10 KAIC WHERE SHOWN FED BY A 150 KVA OR LESS TRANSFORMER

2) 22 KAIC WHERE SHOWN FED BY A 300 KVA OR LESS TRANSFORMER 5. THEY SHALL BE OF THE "BOLTED\_IN" TYPE. 6. WHERE NECESSARY, TO ACCOMMODATE OTHER REQUIREMENTS, THEIR FRAME SIZES SHALL BE INCREASED TO CONFORM TO SUCH REQUIREMENTS, FRAME SIZES BEING INDICATED ONLY AS A REFERENCE TO THE MINIMUM ACCEPTABLE INTERRUPTING RATINGS NOTED ABOVE. 7. WHERE SINGLE POLE IN TRIP SIZES 20 AMPS OR LESS, THEY SHALL BE RATED FOR

8. THEY SHALL BE EQUIPPED WITH 5 MILLIAMP SENSITIVITY GROUND FAULT INTERRUPTING FEATURES WHERE SO INDICATED. B. THEY SHALL BE MANUFACTURED BY SQUARE D, CUTLER HAMMER, OR GENERAL ELECTRIC

A. CARTRIDGE FUSES SHALL BE AS FOLLOWS: 1. PROVIDE A COMPLETE SET OF FUSES FOR EACH ITEM OF FUSIBLE TYPE QUIPMENT. FUSIBLE EQUIPMENT FURNISHED BY OTHER CONTRACTORS WILL BE COMPLETE WITH FUSES. 2. SECONDARY SYSTEM FUSES. RATED AT 600 VOLTS OR LESS. SHALL BE UL LISTED

AND CONSTRUCTED IN CONFORMANCE WITH THE APPLICABLE STANDARDS SET FORTH BY NEMA AND ANSI. ALL FUSES OF A PARTICULAR CLASS SHALL BE OF SAME MANUFACTURER. 3. REGARDLESS OF ACTUAL FAULT CURRENT, THEY SHALL, AT FULL RECOVERY VOLTAGE, BE CAPABLE OF SAFELY INTERRUPTING FAULT CURRENTS OF 200,000 AMPERES RMS SYMMETRICAL OR 340,000 AMPERES RMS ASYMMETRICAL, DELIVERABLE

AT THE LINE SIDE OF THE FUSE. 4. CIRCUITS 0-600 AMPERES SHALL BE PROTECTED BY THE EQUAL OF BUSSMAN LOW PEAK" CURRENT LIMITING FUSES, LPN-RK (250 VOLTS), LPS-RK (600 VOLTS), UL CLASS RK-1.

5. FUSES SHALL BE SUITABLE FOR APPLICATION TO FUSE GAPS WHICH REJECT OTHER TYPES OF FUSING. 6. SUPPLY 10 PER CENT SPARE FUSES OF EACH SIZE AND TYPE 60 AMPS AND LESS. B. CARTRIDGE FUSES SHALL BE MANUFACTURED BY BUSSMAN, GOULD, OR EFCO. 2.26 MOTOR CONTROLS

A. MOTOR CONTROLS - MANUAL AND MAGNETIC 1. INDIVIDUALLY MOUNTED MAGNETIC STARTERS SHALL BE ACROSS—THE—LINE TYPE WITH THERMAL OVERLOAD ON EACH PHASE, SINGLE SPEED, TWO SPEED, OR REDUCED VOLTAGE START AS INDICATED. CHECK EXACT TYPE OF TWO SPEED OR PART WINDING MOTORS TO BE FURNISHED BY OTHER CONTRACTORS, AND PROVIDE

2. STARTERS SHALL BE OF THE REPLACEABLE CONTACT DOUBLE BREAK TYPE, OF SIZE AND TYPE REQUIRED FOR PARTICULAR MOTOR HORSEPOWER AND VOLTAGE. MINIMUM SIZE STARTER TO BE SIZE 1. A. STARTERS SHALL HAVE OL RESET BUTTON, GREEN PILOT LIGHT TO INDICATE "ON", AND "HAND-OFF-AUTO" SWITCH IN COVER. PILOT LIGHTS SHALL BE PUSH-TO-TEST TYPE. B. PROVIDE PROPER RATING OF THERMAL OVERLOADS. REPLACE ANY OVERLOADS FOUND TO BE OF AN INCORRECT RATING. PROVIDE A SPARE SET

OF THREE THERMAL OVERLOADS FOR EACH STARTER. C. PROVIDE FOUR (4) SETS OF AUXILIARY CONTACTS OF CONVERTIBLE TYPE N.O. TO N.C. FOR EACH STARTER. D. MOTOR STARTERS INSTALLED IN DRY LOCATIONS SHALL HAVE NEMA I ENCLOSURES. THOSE IN WET LOCATIONS SHALL HAVE NEMA IV ENCLOSURES 3. MANUAL MOTOR STARTERS SHALL HAVE PILOT LIGHTS AND SHALL BE FURNISHED WITH THERMAL OVERLOADS ON EACH PHASE.

B. MOTORS: EACH MOTOR SHALL HAVE DISCONNECT SWITCH AND STARTER PROVIDED UNDER THIS SECTION. STARTERS WHICH ARE A PART OF "FACTORY ASSEMBLED" CONTROL PANEL WILL BE PROVIDED UNDER SECTION SUPPLYING EQUIPMENT TO BE CONTROLLED BUT CONNECTED UNDER THIS SECTION.

1. PROVIDE MOTOR TERMINAL BOXES FOR EACH MOTOR NOT FURNISHED WITH SAME C. DISCONNECT SWITCHES

1. DISCONNECT (SAFETY) SWITCHES SHALL CONFORM TO INDUSTRIAL STANDARDS OF NEMA, BE UL LISTED AND SHALL BE HEAVY DUTY TYPE, QUICK—MAKE, QUICK—BREAK TYPE WITH INTERLOCKING COVER MECHANISM AND PROVISIONS FOR PADLOCKING SWITCH HANDLE IN "OFF" POSITION. THREE POLE TOGGLE SWITCHES ARE NOT ACCEPTABLE AS SUBSTITUTE FOR DISCONNECT SWITCHES. 2. DISCONNECT SWITCHES SHALL BE OF FUSED OR UNFUSED TYPE AS INDICATED WITH NUMBER OF DISCONNECTING POLES INDICATED. THE GROUNDED CONDUCTOR SHALL NOT BE SWITCHED. SWITCHES SHALL BE FOR USE WITH CURRENT LIMITING FUSES WITH REJECTION TYPE FUSE CLIPS AND THOSE SHALL BE

3. ENCLOSURES SHALL BE OF PROPER NEMA TYPE FOR THE INTENDED LOCATION AND SHALL BE PHOSPHATE COATED OR EQUIVALENT CODE GAUGE GALVANIZED SHEET STEEL WITH GRAY BAKED ENAMEL FINISH. 4. ACCEPTABLE MANUFACTURERS:

A. GENERAL ELECTRIC B. CUTLER HAMMER C. SQUARE D

D. COMBINATION STARTER 1. PROVIDE COMBINATION STARTERS WHERE INDICATED ON THE PLANS.

E. MOTOR CONTROL CIRCUITRY

1. EXCEPT AS NOTED BELOW, SELECT MATERIALS EXACTLY AS SPECIFIED FOR FEEDERS. UTILIZE NO. 12 AWG THWN CONDUCTORS THROUGHOUT MINIMUM. 2. MOTOR CONTROL CIRCUIT WIRES MAY BE RUN IN THE SAME CONDUIT AS THE WIRES OF MOTOR POWER CIRCUITS; HOWEVER, EXCLUDE MOTOR CONTROL WIRES FROM ENCLOSURES (OTHER THAN MOTOR STARTER ENCLOSURES) WHICH CONTAIN POWER CIRCUIT OVERCURRENT PROTECTION AND SWITCHING DEVICES; ALSO FROM PULL BOXES AND JUNCTION BOXES CONTAINING THE WIRES OF MAIN AND SUBMAIN FEFDERS LITHURE AUXILIARY PULL BOXES TO SEPARATE MOTOR CONTROL ENTER THE ITEMS FROM WHICH MOTOR CONTROL WIRES ARE EXCLUDED. 3. PRIOR TO INSTALLING ANY MOTOR CONTROL CIRCUITRY FOR A PARTICULAR MOTOR.

NOTIFY THE ARCHITECT OF ANY DEVIATIONS BETWEEN THE CONTROL CIRCUITRY
REQUIREMENTS OF THE TRADE SUPPLYING THE MOTOR AND THE INDICATED ELECTRICAL

2.27 LIGHTING FIXTURES A. FURNISH ALL LABOR, MATERIALS AND EQUIPMENT REQUIRED FOR A COMPLETE INSTALLATION OF LIGHTING EQUIPMENT SPECIFIED.

B. THIS CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR THE SAFE HANDLING OF ALL LIGHTING FIXTURES, WHICH ARE FURNISHED UNDER THIS SECTION AND OTHER ACCESSORIES AND LAMPS, UNTIL THE FINAL INSPECTION HAS BEEN MADE BY THE

C. SPECIAL FITTINGS AND MATERIALS THAT MAY BE REQUIRED TO SUPPORT FIXTURES SHALL BE SUPPLIED AS WELL AS SUPPORTS OR GROUNDS REQUIRED SECURING SURFACE OR PENDANT MOUNTED FIXTURES ON SUSPENDED CEILINGS UNLESS OTHERWISE NOTED. WHERE DUCTWORK, PIPES, TYPE OF BUILDING CONSTRUCTION MATERIALS AND STRUCTURAL FRAMING MEMBERS PROVIDE OBSTRUCTIONS OR DIFFICULT SUPPORT MEANS. HANGER RODS SHALL BE USED IN ASSOCIATION WITH HORIZONTAL SECTIONS OF STEEL SUPPORT CHANNELS IN A MANNER APPROVED BY THE OWNER'S ENGINEER. STEEL SUPPORT CHANNELS SHALL BE UNISTRUT, KINDORF, HUSKY PRODUCTS CO., OR EQUAL DETERMINED ON THE JOB, BY THE OWNER'S ENGINEER. D. BALLASTS FOR FLUORESCENT FIXTURES SHALL BE HIGH POWER FACTOR ENERGY SAVINGS.

ELECTRONIC TYPE. MULTIPLE LAMP BALLASTS SHALL BE USED WHENEVER POSSIBLE.
BALLASTS SHALL BE OF HIGH POWER FACTOR TYPE. THE PROPER BALLAST SHALL BE FURNISHED AND INSTALLED FOR ALL LIGHTING FIXTURES NORMALLY DESIGNED FOR DPERATION WITH BALLASTS, WHETHER OR NOT SUCH BALLASTS ARE SPECIFICALLY ITEMIZED ON THE FIXTURE SCHEDULE. E. FURNISH AND INSTALL A COMPLETE SET OF NEW LAMPS FOR ALL FIXTURES. LAMPS USED DURING THE CONSTRUCTION PERIOD SHALL BE REMOVED AND REPLACED WITH NEW LAMPS. ALL FLUORESCENT LAMPS TO BE WARM WHITE OR APPROVED EQUAL. LAMPS

SHALL BE OSRAM / SYLVANIA. F. FIXTURES, PART OR PARTS THEREOF (INCLUDING LAMPS) DETERMINED TO BE DEFECTIVE UPON COMPLETION OF THE ELECTRICAL INSTALLATION SHALL BE REPLACED BY THE ELECTRICAL CONTRACTOR FREE OF CHARGE.

G. IN ADDITION TO FIXTURE SUPPORTS, SURFACE MOUNTED LIGHTING FIXTURES SHALL BE SECURED TO THE SURFACE TO WHICH THEY MOUNT AT A MINIMUM TO TWO POINTS ON EACH 4 FOOT LENGTH OF FIXTURE HOUSING, AS APPROVED, TO PREVENT ROTATION OR MOVEMENT OF THE FIXTURE OUT OF ITS SQUARE AND LEVEL POSITION OF ALIGNMENT. H. THIS CONTRACTOR SHALL INCLUDE ALL FIXTURES, WIRING, HANGING, UNCRATING, CONNECTING UP AND MAKING READY FOR OPERATION. THIS CONTRACTOR SHALL INCLUDE THE COST OF FURNISHING AND INSTALLING ALL LAMPS FOR ALL FIXTURES UNDER THIS CONTRACT. ALL T-8 TUBES FOR INSTANT-START FIXTURES SHALL BE GENERAL ELECTRIC, PHILLIPS, OSRAM / SYLVANIA OR EQUAL. ALL LAMPS SHALL BE U.L. APPROVED.

I. ALL FLUORESCENT FIXTURES INSTALLED IN SUSPENDED CEILINGS SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE BY CHAINS AT EITHER END OF FIXTURE. J. ALL FIXTURES INSTALLED IN INSULATED CEILINGS SHALL BE IC RATED. COORDINATE WITH K. ALL FIXTURES INSTALLED IN RATED CEILINGS SHALL BE ONE OR TWO HOUR RATED. COORDINATE WITH THE ARCHITECTS REFLECTED CEILING PLANS FOR CEILING RATING.

L. ALL LIGHTING FIXTURES SHALL BE INDIVIDUALLY SUPPORTED FROM THE STRUCTURAL SLAB OR STRUCTURAL BUILDING MEMBER. FIXTURES WILL NOT BE PERMITTED TO BE IN ACCORDANCE WITH SEISMIC REQUIREMENTS OUTLINED IN MASSACHUSETTS STATE BUILDING CODE SIXTH EDITION M. HEARING IMPAIRED DOOR LIGHT 1. UNIT DOOR LIGHTS: AUDIBLE/VISUAL SIGNALING DEVICE WITH HORN/STROBE

HALL PUSH BUTTON STATION, AND TRANSFORMER. MINIMUM 85DB TONE AT 10 FEET AND A HIGH INTENSITY 11.7 CANDELA VISUAL SIGNAL. PUSH BUTTON ILLUMINATED A. ROOM ANNUNCIATOR MANUFACTURER/MODEL - EDWARDS 7005-G5. N. HEARING IMPAIRED PHONE LIGHT 1. UNIT PHONE LIGHTS: AUDIBLE/VISUAL SIGNALING DEVICE WITH HORN/STROBE. FEET AND A HIGH INTENSITY 11.7 CANDELA VISUAL SIGNAL. PUSH BUTTON -

A. ROOM ANNUNCIATOR MANUFACTURER/MODEL - EDWARDS B-KHD-1000-PF 2.28 OCCUPANCY SENSORS

A. WORK INCLUDED CONTRACTOR'S WORK TO INCLUDE ALL LABOR, MATERIALS, TOOLS, APPLIANCES, CONTROL HARDWARE, SENSOR, WIRE, JUNCTION BOXES AND EQUIPMENT NECESSARY FOR AND INCIDENTAL TO THE DELIVERY, INSTALLATION AND FURNISHING. OF A COMPLETELY OPERATIONAL OCCUPANCY SENSOR LIGHTING CONTROL SYSTEM. 2. CONTRACTOR/SUPPLIER SHALL EXAMINE ALL GENERAL SPECIFICATION PROVISIONS AND DRAWINGS FOR RELATED ELECTRICAL WORK REQUIRED AS WORK UNDER

WIRING, CONDUIT, FIXTURES, HVAC SYSTEMS AND BUILDING MANAGEMENT B. EQUIPMENT QUALIFICATION 1. PRODUCTS SUPPLIED SHALL BE FROM A SINGLE MANUFACTURER THAT HAS BEEN CONTINUOUSLY INVOLVED IN THE MANUFACTURING OF OCCUPANCY SENSORS FOR A MINIMUM OF FIVE (5) YEARS. MIXING OF MANUFACTURERS SHALL NOT BE ALLOWED 2. ALL COMPONENTS SHALL BE U.L. LISTED. OFFER A FIVE (5) YEAR WARRANTY AND MEET ALL STATE AND LOCAL APPLICABLE CODE REQUIREMENTS.

MANUFACTURING FACILITY AND SHALL HAVE A DEFECT RATE OF LESS THAN 1/3 OF 1%

3. CONTRACTOR SHALL COORDINATE ALL WORK DESCRIBED IN THIS SECTION WITH ALL

OTHER APPLICABLE PLANS AND SPECIFICATIONS. INCLUDING BUT NOT LIMITED TO

4. WALL SWITCH PRODUCTS MUST BE CAPABLE OF WITHSTANDING THE EFFECTS OF C. SYSTEM DESCRIPTION 1. THE OBJECTIVE OF THIS SECTION IS TO ENSURE THE PROPER INSTALLATION OF THE

3. PRODUCTS SHALL BE MANUFACTURED BY AN ISO 9002 CERTIFIED

OCCUPANCY SENSOR BASED LIGHTING CONTROL SYSTEM SO THAT LIGHTING IS URNED OFF AUTOMATICALLY AFTER REASONABLE TIME DELAY WHEN A ROOM OR AREA IS VACATED BY THE LAST PERSON TO OCCUPY SAID ROOM OR AREA. 2. THE OCCUPANCY SENSOR BASED LIGHTING CONTROL SHALL ACCOMMODATE ALL CONDITIONS OF SPACE UTILIZATION AND ALL IRREGULAR WORK HOURS AND HABITS. 3. CONTRACTOR SHALL WARRANT ALL EQUIPMENT FURNISHED IN ACCORDANCE TO THIS SPECIFICATION TO BE UNDAMAGED, FREE OF DEFECTS IN MATERIALS AND WORKMANSHIP, AND IN CONFORMANCE WITH THE SPECIFICATIONS, THE SUPPLIER'S OBLIGATION SHALL INCLUDE REPAIR OR REPLACEMENT, AND TESTING

WITHOUT CHARGE TO THE OWNER, ALL OR ANY PARTS OF EQUIPMENT WHICH ARE

FOUND TO BE DAMAGED. DEFECTIVE OR NON-CONFORMING AND RETURNED TO

THE SUPPLIER. THE WARRANTY SHALL COMMENCE UPON THE OWNER'S

ACCEPTANCE OF THE PROJECT. WARRANTY ON LABOR SHALL BE FOR A MINIMUM

1. MANUFACTURER SHALL SUBSTANTIATE CONFORMANCE TO THIS SPECIFICATION BY SUPPLYING THE NECESSARY DOCUMENTS. PERFORMANCE DATA AND WIRING DIAGRAMS. ANY DEVIATIONS TO THIS SPECIFICATION MUST BE CLEARLY STATED

BY LETTER AND SUBMITTED. 2. SUBMIT A LIGHTING PLAN CLEARLY MARKED BY MANUFACTURER SHOWING PROPER PRODUCT, LOCATION AND ORIENTATION OF EACH SENSOR. 3. SUBMIT ANY INTERCONNECTION DIAGRAMS PER MAJOR SUBSYSTEM SHOWING

4. SUBMIT STANDARD CATALOG LITERATURE, WHICH INCLUDES PERFORMANCE

SPECIFICATIONS INDICATING COMPLIANCE TO THE SPECIFICATION

5. CATALOG SHEETS MUST CLEARLY STATE ANY LOAD RESTRICTIONS WHEN USED WITH ELECTRONIC BALLASTS. E. SYSTEM OPERATION 1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAKE ALL PROPER ADJUSTMENTS TO ASSURE OWNER'S SATISFACTION WITH THE OCCUPANCY SYSTEM. UNLESS SPECIFIED OTHERWISE, THE CONTRACTOR SHALL SET ALL TIME DELAYS TO NO LESS THAN 15 (FIFTEEN) MINUTES. OR;

A. FACTORY COMMISSIONING 1) IT SHALL BE THE MANUFACTURER'S RESPONSIBILITY TO VERIFY ALL PROPER ADJUSTMENTS AND TRAIN OWNER'S PERSONNEL TO ENSURE OWNER'S SATISFACTION WITH THE OCCUPANCY SYSTEM. THIS SERVICE IS PROVIDED AT AN ADDITIONAL COST

F. ACCEPTABLE MANUFACTURERS

SPECIFICATIONS INCLUDED HEREIN.

1. THE WATT STOPPER OR PRE-APPROVED EQUAL: FOR PRE-APPROVAL, PRO ALL THE INFORMATION LISTED UNDER SECTION 1.04A AND 1.04D A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO INITIAL BID DATE. 2. THE LISTING OF ANY MANUFACTURER AS "ACCEPTABLE" DOES NOT IMPLY AUTOMATIC APPROVAL. IT IS THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO ENSURE THAT ANY PRICE QUOTATIONS RECEIVED AND UBMITTALS MADE ARE FOR SENSORS, WHICH MEET OR EXCEED THE

G. PRODUCTS 1. ALL PRODUCTS SHALL BE WATT STOPPER PRODUCT NUMBERS:

W-500A, W-1000A, W-2000A, W-2000H, WPIR, DT-200, DT-205, DT-300, DT-305, DT-355, CX-100, CX-105, CI-200, CI-205, WT600, WT-05, WT1105, WT200, WT-2205, WT-2250, HB-100, HB-150

B. WALL SENSORS: WI-200, WI-300, WS-200, WA-200, WA-300, WD-170, WD-180, WD-270, WD-280, WN-100 C. POWER AND SLAVE PACKS:

B120E-P, B277E-P, A120E-P, A277E-P, A120C-P, A277C-P, C120E-P, C277E-P, S120/277-P, AT-120, AT-277, BZ-100 D. LOW TEMPERATURE: CB-100 OUTDOOR SENSORS: EW, EN SERIES. E. INTELISWITCH: TS-400, TS-400-24, AS-100, AS-110

F. DAYLIGHTING CONTROLS: LCO, LCD, LCE, LS-100, LS-301.

2. WALL SWITCH SENSORS SHALL UTILIZE PASSIVE INFRARED SENSING TECHNOLOGY ONLY TO DETECT MOTION. 3. WALL SWITCH SENSORS SHALL BE CAPABLE OF DETECTION OF OCCUPANCY AT DESKTOP LEVEL UP TO 300 SQUARE FEET, AND GROSS MOTION UP TO 1000

4. WALL SWITCH SENSORS SHALL ACCOMMODATE LOADS FROM 0 TO 800 WATTS AT 120 VOLTS; 0 TO 1200 WATTS AT 277 VOLTS AND SHALL HAVE 180? COVERAGE

 WALL SWITCH PRODUCTS SHALL UTILIZE ZERO CROSSING CIRCUITRY, WHICH INCREASES RELAY LIFE, PROTECTS FROM THE EFFECTS OF INRUSH CURRENT, AND INCREASES SENSOR'S LONGEVITY. 6. WALL SWITCH SENSORS SHALL HAVE NO LEAKAGE CURRENT TO LOAD. IN MANUAL OR IN AUTO/OFF MODE FOR SAFETY PURPOSES AND SHALL HAVE VOLTAGE DROP PROTECTION.

OPTION TO CONVERT SENSOR OPERATION FROM AUTOMATIC-ON TO MANUAL-ON 8. WHERE SPECIFIED, VANDAL RESISTANT WALL SWITCH SENSORS SHALL UTILIZE A HARD LENS WITH A MINIMUM 1.0MM THICKNESS. PRODUCTS UTILIZING A SOFT LENS WILL NOT BE CONSIDERED. 9. PASSIVE INFRARED SENSORS SHALL UTILIZE PULSE COUNT PROCESSING AND DIGITAL SIGNATURE ANALYSIS TO RESPOND ONLY TO THOSE SIGNALS CAUSED BY HUMAN MOTION

10. PASSIVE INFRARED SENSORS SHALL UTILIZE MIXED SIGNAL ASIC WHICH PROVIDES (ELECTRICAL NOISE ON THE LINE), SUPERIOR PERFORMANCE, AND GREATER RELIABILITY 11. PASSIVE INFRARED SENSORS SHALL HAVE A MULTIPLE SEGMENTED LODIF FRESNEL LENS, IN A MULTIPLE—TIER CONFIGURATION, WITH GROOVES—IN TO ELIMINATE DUST

7. WHERE SPECIFIED, WALL SWITCH SENSORS SHALL PROVIDE A FIELD SELECTABLE

AND RESIDUE BUILD-UP. 12. WHERE SPECIFIED. PASSIVE INFRARED AND DUAL TECHNOLOGY SENSORS SHAL OFFER DAYLIGHTING FOOT-CANDLE ADJUSTMENT CONTROL AND BE ABLE TO ACCOMMODATE DUAL LEVEL LIGHTING.

13. DUAL TECHNOLOGY SENSORS SHALL BE CORNER OR RECESSED MOUNTED TO AVOID DETECTION OUTSIDE THE CONTROLLED AREA WHEN DOORS ARE LEFT OPEN. SENSORS SHALL HAVE ?AUTO ON? OR ?MANUAL ON? FEATURE. 14. DUAL TECHNOLOGY SENSORS SHALL CONSIST OF PASSIVE INFRARED AND ULTRASONIO TECHNOLOGIES FOR OCCUPANCY DETECTION. PRODUCTS THAT REACT TO NOISE OR AMBIENT SOUND SHALL NOT BE CONSIDERED.

15. ULTRASONIC SENSORS SHALL UTILIZE ADVANCED SIGNAL PROCESSING TO ADJUST

THE DETECTION THRESHOLD DYNAMICALLY TO COMPENSATE FOR CONSTANTLY

CHANGING LEVELS OF ACTIVITY AND AIRFLOW THROUGHOUT CONTROLLED SPACE. 16. ULTRASONIC OPERATING FREQUENCY SHALL BE CRYSTAL CONTROLLED TO WITHIN PLUS OR MINUS 0.005% TOLERANCE TO ASSURE RELIABLE PERFORMANCE AND ELIMINATE SENSOR CROSS-TALK. SENSORS USING MULTIPLE FREQUENCIES ARE 17. ALL SENSORS SHALL BE CAPABLE OF OPERATING NORMALLY WITH ELECTRONIC

18. COVERAGE OF SENSORS SHALL REMAIN CONSTANT AFTER SENSITIVITY CONTROL HABEEN SET. NO AUTOMATIC REDUCTION SHALL OCCUR IN COVERAGE DUE TO THE CYCLING OF AIR CONDITIONER OR HEATING FANS. 19. ALL SENSORS SHALL HAVE READILY ACCESSIBLE, USER ADJUSTABLE SETTINGS FOR TIME DELAY AND SENSITIVITY. SETTINGS SHALL BE LOCATED ON THE SENSOR (NOT THE CONTROL UNIT) AND SHALL BE RECESSED TO LIMIT TAMPERING.

20. IN THE EVENT OF FAILURE, A BYPASS MANUAL OVERRIDE SHALL BE PROVIDED ON

BALLASTS, PL LAMP SYSTEMS AND RATED MOTOR LOADS.

EACH SENSOR. WHEN BYPASS IS UTILIZED, LIGHTING SHALL BE FROVIDED OF CONSTANTLY OR CONTROL SHALL DIVERT TO A WALL SWITCH UNTIL SENSOR IS REPLACED. THIS CONTROL SHALL BE RECESSED TO PREVENT TAMPERING. 21. ALL SENSORS SHALL PROVIDE AN LED AS A VISUAL MEANS OF INDICATION AT A TIMES TO VERIFY THAT MOTION IS BEING DETECTED DURING BOTH TESTING AND NORMAL OPERATION.

22. WHERE SPECIFIED, SENSOR SHALL HAVE AN INTERNAL ADDITIONAL ISOLATED RELAY WITH NORMALLY OPEN, NORMALLY CLOSED AND COMMON OUTPUTS FOR USE WITH HVAC CONTROL, DATA LOGGING AND OTHER CONTROL OPTIONS. SENSOR ITILIZING SEPARATE COMPONENTS OR SPECIALLY MODIFIED UNITS TO ACHIEVE THIS FUNCTION ARE NOT ACCEPTABLE.

23. ALL SENSORS SHALL HAVE UL RATED, 94V-0 PLASTIC ENCLOSURES. H. CIRCUIT CONTROL HARDWARE - CU 1. CONTROL UNITS - FOR EASE OF MOUNTING, INSTALLATION AND FUTURE SERVICE. CONTROL UNIT(S) SHALL BE ABLE TO EXTERNALLY MOUNT THROUGH A 1/2" KNOCK-OUT ON A STANDARD ELECTRICAL ENCLOSURE AND BE AN INTEGRATED, SELF-CONTAINED UNIT CONSISTING INTERNALLY OF AN ISOLATED LOAD SWITCHING CONTROL RELAY AND A TRANSFORMER TO PROVIDE LOW-VOLTAGE POWER. CONTROL

UNIT SHALL PROVIDE POWER TO A MINIMUM OF TWO (2) SENSORS. 2. RELAY CONTACTS SHALL HAVE RATINGS OF: A. 13A - 120 VAC TUNGSTEN

RELAYS SHALL BE #14 AWG.

B. 20A - 120 VAC BALLAST C. 20A – 277 VAC BALLAST 3. CONTROL WIRING BETWEEN SENSORS AND CONTROLS UNITS SHALL BE CLASS II, 18-24 AWG, STRANDED U.L. CLASSIFIED, PVC INSULATED OR TEFLON JACKETED CABLE SUITABLE FOR USE IN PLENUMS, WHERE APPLICABLE. 4. MINIMUM ACCEPTABLE WIRE GAUGE FROM THE CIRCUIT CONTROL HARDWARE

I. INSTALLATION 1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND AIM SENSORY IN THE CORRECT LOCATION REQUIRED FOR COMPLETE AND PROPER VOLUMETRIC COVERAGE WITHIN THE RANGE OF COVERAGE(S) OF CONTROLLED AREAS PER THE MANUFACTURER'S RECOMMENDATIONS. ROOMS SHALL HAVE NINETY (90) TO ONE HUNDRED (100) PERCENT COVERAGE TO COMPLETELY COVER THE CONTROLLED AREA TO ACCOMMODATE ALL OCCUPANCY HABITS OF SINGLE OR MULTIPLE OCCUPANTS AT ANY LOCATION WITHIN THE ROOM(S). THE LOCATIONS AND QUANTITIES OF SENSORS SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE ONLY THE ROOMS, WHICH ARE TO BE PROVIDED WITH SENSORS.
THE CONTRACTOR SHALL PROVIDE ADDITIONAL SENSORS IF REQUIRED TO PROPERLY AND COMPLETELY COVER THE RESPECTIVE ROOM. POWER/SWITCH PACKS MAY OR MAY NOT BE INDICATED ON THE DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND INSTALL ALL POWER/SWITCH PACKS REQUIRED TO MAKE THE SYSTEM FULLY OPERATIONAL. LOCATIONS OF POWER/SWITCH PACKS MAY BE DETERMINED IN THE FIELD BY THE CONTRACTOR UNLESS SPECIFIED OTHERWISE, BUT MUST BE READILY ACCESSIBLE FOR FUTURE SERVICING. USUALLY A MINIMUM OF ONE (1) POWER/SWITCH PACK IS REQUIRED PER CIRCUIT AND/OR AREA OF CONTROL. HOWEVER, IN SOME CASES ADDITIONAL POWER/SWITCH PACKS MAY BE REQUIRED. CONTACT MANUFACTURER FOR FINAL DETERMINATION OF POWER/SWITCH PACKS REQUIRED FOR THIS PROJECT.

2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE A PRE-INSTALLATION MEETING WITH THE MANUFACTURER'S FACTORY AUTHORIZED REPRESENTATIVE, AT THE OWNER'S FACILITY, TO VERIFY PLACEMENT OF SENSORS AND INSTALLATION 3. PROPER JUDGMENT MUST BE EXERCISED IN EXECUTING THE INSTALLATION SO AS TO ENSURE THE BEST POSSIBLE INSTALLATION IN THE AVAILABLE SPACE AND TO OVERCOME LOCAL DIFFICULTIES DUE TO SPACE LIMITATIONS OR INTERFERENCE O

STRUCTURAL COMPONENTS. THE CONTRACTOR SHALL ALSO PROVIDE, AT THE OWNER'S FACILITY, THE TRAINING NECESSARY TO FAMILIARIZE THE OWNER'S

PERSONNEL WITH THE OPERATION, USE, ADJUSTMENT, AND PROBLEM SOLVING DIAGNOSIS OF THE OCCUPANCY SENSING DEVICES AND SYSTEMS. J. FACTORY COMMISSIONING

OF THE WORK.

1. UPON COMPLETION OF THE INSTALLATION, THE SYSTEM SHALL BE COMPLETELY COMMISSIONED BY THE MANUFACTURER'S FACTORY AUTHORIZED TECHNICIAN WHO WILL VERIFY ALL ADJUSTMENTS AND SENSOR PLACEMENT TO ENSURE A TROUBLE—FREE OCCUPANCY—BASED LIGHTING CONTROL SYSTEM. THIS SERVICE IS PROVIDED AT AN ADDITIONAL COST. 2. THE ELECTRICAL CONTRACTOR SHALL PROVIDE BOTH THE MANUFACTURER AND THE ELECTRICAL ENGINEER WITH 15 WORKING DAYS WRITTEN NOTICE OF THE SCHEDULED COMMISSIONING DATE. UPON COMPLETION OF THE SYSTEM FINE—TUNING THE FACTORY AUTHORIZED TECHNICIAN SHALL PROVIDE THE PROPER TRAINING TO THE OWNER'S PERSONNEL IN THE ADJUSTMENT AND MAINTENANCE

OF THE SENSORS. THE CONTRACTOR SHALL PROVIDE ALL LIFTS AND/OR LADDERS AND ONE TECHNICIAN TO ASSIST IN THE COMMISSIONING. PRIOR TO COMMISSIONING, HE CONTRACTOR SHALL VERIFY THAT ALL SENSORS AND ASSOCIATED POWER SUPPLIES/RELAYS ARE INSTALLED AND ALL WIRING PROPERLY TERMINATED 3. THE SYSTEM MUST BE COMPLETELY OPERATIONAL AND ALL TIME DELAYS ADJUSTED PER THE SPECIFICATION

COMPLETION OF THE COMMISSIONING, PROVIDE A WRITTEN REPORT TO THE ELECTRICAL CONTRACTOR AND THE ELECTRICAL ENGINEER INDICATING COMPLETION

5. THIS REPORT SHALL ALSO INDICATE ANY CORRECTIVE ACTIONS REQUIRED ON THE PART OF THE ELECTRICAL CONTRACTOR TO THE SYSTEM. 2.29 ACCESS PANELS A. ACCESS PANELS SHALL BE PROVIDE FOR ALL ELECTRICAL EQUIPMENT WHICH REQUIRES

4. THE MANUFACTURER'S FACTORY AUTHORIZED TECHNICIAN SHALL. UPON

ACCESS BY; MASSACHUSETTS ELECTRIC CODE ABOVE HUNG CEILINGS OR BEHIND WALLS WHICH ARE CONSTRUCTED OF MATERIALS OF THE TYPE WHICH ARE NOT READILY B. ACCESS PANELS SHALL BE FURNISHED BY THE GENERAL CONTRACTOR AND INSTALLED BY BREWSTER

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ISSUF : RIDE REVIEW

SHEET TITLE **ELECTRICAL SPECIFICATIONS** SHEET

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PROGRAMMING SHALL BE PROVIDE UNTIL ACCEPTABLE TO THE LOCAL FIRE

3. OCCUPANT NOTIFICATION SHALL CONSIST OF A CODE 3 TEMPORAL EVACUATION SIGNAL AND VISUAL (STROBE) SIGNALING. 4. EACH INITIATING DEVICE SHALL HAVE FULL ANALOG FEATURES AND CAPABILITIES, WHEREBY INDIVIDUAL SENSORS WILL PROVIDE REAL—TIME ENVIRONMENTAL MONITORING, WITH AUTOMATIC AND MANUAL SENSITIVITY ADJUSTMENT AND ALARM VERIFICATION FEATURES. EACH DEVICE SHALL IDENTIFY ITS EXACT LOCATION E AND CONDITION, AND SHALL OPERATE AS DESCRIBED ELSEWHERE IN THESE

5. WORK IN THIS SECTION AS SHOWN OR SPECIFIED SHALL BE IN ACCORDANCE WITH 6. PROVIDE AUTOMATIC AND MANUAL, CLOSED CIRCUIT, MULTIPLEX FIRE ALARM COMMUNICATIONS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, TO BE WIRED, CONNECTED AND LEFT IN FIRST CLASS OPERATING CONDITION 7. SHOP DRAWINGS, TECHNICAL INSTALLATION SUPPORT, TESTING, AND ADJUSTMENT OF THE SYSTEM SHALL BE DONE UNDER THE DIRECT SUPERVISION OF THE SYSTEM SUPPLIER USING NICET-CERTIFIED (LEVEL 2 MINIMUM) FIELD PERSONNEL ACTORY TRAINED TECHNICIANS SHALL DEMONSTRATE THE SYSTEM TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE AND MAKE ALL ADDITIONAL

8. PROVIDE EQUIPMENT MANUFACTURED BY SIMPLEXGRINNELL OR EQUAL. THIS CONSTITUTES THE QUALITY AND PERFORMANCE CHARACTERISTICS OF THE EQUIPMENT AND SYSTEM TO BE FURNISHED. A. EQUIVALENT PRODUCT MANUFACTURED BY FCI, EST OR NOTIFIER MAY BE

ADJUSTMENTS TO THE SYSTEM OPERATION AS REQUIRED BY THE OWNER'S

CONSIDERED AN ACCEPTABLE ALTERNATE. B. ANY ALTERNATES. EXCEPTIONS. OR SUBSTITUTIONS TO THE SPECIFIED EQUIPMENT AND SYSTEM OPERATION SHALL BE DISCLOSED IN WRITING PRIOR TO BID. ANY COST SAVINGS SHALL BE DEMONSTRATED, AND A LINE—BY—LINE DESCRIPTION OF DEVIATION FROM THE PROJECT SPECIFICATIONS SHALL BE PRESENTED AT THE TIME OF BID. FAILURE TO COMPLY WITH THIS REQUIREMENT SHALL RESULT IN IMMEDIATE PROVAL WITHOUT COMMEN

C. IF THE CONTRACTOR CHOOSES AN ALTERNATE MANUFACTURER, NO MORE THAN TWO (2) EQUIPMENT SUBMITTALS SHALL BE REVIEWED. IF THE EQUIPMENT IS NOT APPROVED UPON REVIEW OF THE SECOND SUBMITTAL, THE CONTRACTOR SHALL PROVIDE THE SPECIFIED MANUFACTURER 9. THE SYSTEM DESIGN AND INSTALLATION SHALL CONFORM TO THE FOLLOWING STANDARDS A. ALL EQUIPMENT SHALL BE UL LISTED FOR ITS INTENDED PURPOSE, INCLUDING UL 864 (UOJZ, UOXX, UUKL AND UOQY), 268, 464 AND 1971

B. NFPA STANDARDS 70, 72, 90A, 92A, AND 101. C. INTERNATIONAL BUILDING CODE - LATEST EDITION. D. CURRENT STATE BUILDING CODE AND APPLICABLE FIRE SAFETY REGULATIONS

E. THE AMERICANS WITH DISABILITIES ACT (ADA). F. ALL LEGAL REQUIREMENTS OF THE LOCAL AUTHORITIES HAVING JURISDICTION. 10. SUBMIT SIX (6) COMPLETE SETS OF SHOP DRAWING SUBMITTALS TO INCLUDE:

A. COMPLETE POINT TO POINT RISER DIAGRAM SHOWING ALL FOUIPMENT DEVICES SHALL BE SHOWN WITH DEVICE ADDRESS NUMBERS AND ANY SETTINGS AND CANDELA RATING. B. SCALED DRAWINGS OF EACH SYSTEM PANEL SHOWING INTERNAL MODULE PLACEMENT, FIELD TERMINATIONS AND SPARE CAPACITY ALLOWANCE

C. A COMPLETE, ITEMIZED BILL OF MATERIALS WITH QUANTITIES,

DESCRIPTIONS AND CROSS-REFERENCE INFORMATION. D. ORIGINAL CATALOG DATA SHEETS FOR ALL ITEMS TO ASSURE COMPLIANCE WITH THESE SPECIFICATIONS. THIS EQUIPMENT SHALL BE SUBJECT TO APPROVAL, AND NO EQUIPMENT SHALL BE ORDERED WITHOUT PRIOR

E. FLOOR PLANS SHOWING ALL DEVICES AND EQUIPMENT TO BE INSTALLED. FLOOR PLANS SHALL DEPICT ALL EQUIPMENT AND DEVICES. DEVICES SHALL BE SHOWN WITH CORRESPONDING FIELD SETTINGS THAT SHALL BE MADE AS WELL AS CORRESPONDING CIRCUIT AND DEVICE DESIGNATIONS. FIELD SETTINGS SHALL INCLUDE THE DEVICE ADDRESS, CANDELA RATING AND/OR SPEAKER-TAP SETTING AS APPLICABLE, EACH DEVICE SHALL BE SHOWN CORRESPONDING CIRCUIT IDENTIFIER AND DEVICE NUMBER. F. PROVIDE CALCULATIONS TO SUPPORT THE SIZE OF STANDBY BATTERIE

NOTIFICATION CIRCUITS, AMPLIFIERS AND POWER SUPPLIES SUBMITTED SYSTEM CALCULATIONS SHALL BE PRESENTED IN ACCORDANCE WITH NFPA 72 RECOMMENDED PRACTICES AS FOLLOWS: 1) CALCULATIONS SHALL DEMONSTRATE WIRE SIZE AND ESTIMATED

2) VISUAL NOTIFICATION CIRCUITS SHALL BE BASED UPON 20VD STARTING VOLTAGE AND UTILIZE A NOMINAL 18V CURRENT DRAW

RATING FOR EACH APPLIANCE 3) VISUAL CIRCUITS SHALL BE DESIGNED FOR A MAXIMUM 4 VOLT DROP 4) SPEAKER CIRCUITS SHALL BE DESIGNED FOR A MAXIMUM 3DBA LOSS G. SUBMITTAL SHALL BE SUBMITTED TO THE LOCAL FIRE INSPECTION AND H. PROVIDE A COPY OF THE ORIGINAL EQUIPMENT MANUFACTURER'S

CONFIRMATION THAT THE EQUIPMENT SUPPLIER WILL PROVIDE ON\_SITE PROJECT MANAGEMENT AND SUPERVISION DURING SYSTEM INSTALLATION, AND PERFORM SYSTEM TESTING AND INSTRUCTION, LEAD SYSTEM J. AN OUTLINE OF THE VENDOR'S ACCEPTANCE AND TEST PROCEDURES,

DOCUMENTATION OF THEIR QUALIFICATIONS SHALL BE PRESENTED AS REQUESTED INCLUDING A COPY OF THE SUPPLIER'S STANDARD COMMISSIONING REPORT CHECKLIST. 11. CONFORM TO ALL UL AND NEPA STANDARDS FOR TESTING AND PROVIDE A RECORD OF COMPLETION OF THE COMPLETED INSTALLATION. THE RECORD OF COMPLETION SHALL BE COMPLETED BY PROPERLY LICENSED, AND

FACTORY-TRAINED REPRESENTATIVES OF A UL APPROVED TESTING COMPANY. 12. PROVIDE COPIES OF OPERATING & MAINTENANCE MANUALS WITH THE REQUEST FOR FINAL INSPECTION. O & M MANUALS SHALL INCLUDE THE FOLLOWING: A. ALL OF THE INFORMATION SUBMITTED IN THE SHOP DRAWINGS. B. AS-BUILT DOCUMENTATION WHICH INCORPORATES ALL MODIFICATIONS TO THE SYSTEM, WHETHER MADE AS A FIELD CHANGE OR BY A CHANGE ORDER C. INCLUDE A COPY OF THE FINAL TEST REPORT, RECORD OF COMPLETION AND TEST/SUPPORT CONTRACTS AS REQUIRED HEREIN.

B. SEQUENCE OF OPERATION 1. THE OPERATION OF A MANUAL STATION OR ACTIVATION OF ANY AUTOMATIC ALARM INITIATING DEVICE (SYSTEM SMOKE, SYSTEM HEAT DETECTOR, WATERFLOW) SHALL INITIATE A SYSTEM-WIDE RESPONSE AS FOLLOWS: A. INITIATE THE TRANSMISSION OF THE ALARM TO THE MUNICIPAL FIRE

> MUNICIPAL REPORTING SYSTEM AND DIGITAL ALARM COMMUNICATOR/TRANSMITTER (DAC/T) CONNECTION TO AN APPROVED CENTRAL MONITORING STATION. B. SOUND A CODE 3 TEMPORAL EVACUATION SIGNAL OVER ALL AUDIO CIRCUITS

C. FLASH ALL VISUAL SIGNALS THROUGHOUT THE BUILDING. VISUAL NOTIFICATION SHALL BE SYNCHRONOUS IN ACCORDANCE WITH NFPA 72 GUIDELINES AND UL 1971.

D. FLASH AN ALARM LED AND SOUND AN AUDIBLE SIGNAL AT THE FACP AND REMOTE ANNUNCIATOR. UPON ACKNOWLEDGMENT, THE ALARM LED SHALL LIGHT STEADILY AND THE AUDIBLE SHALL SILENCE, SUBSEQUENT ALARMS SHALL RELINITIATE THIS SEQUENCE CTION TO THE E. UPON ALARM INITIATION BY AN ELECATOR LOBBY SMOKE DETECTOR OR OTHER DESIGNATED RECALL DEVICE, RECALL ALL ELEVATORS THAT SERVE THE FLOOR OF INITIALIZATION TO THE MAIN EGRESS LEVEL. IF THE ALARM INITIATES ON THE MAIN EGRESS LEVEL, RETURN THE ELEVATOR TO THE ALTERNATE FLOOR AS DIRECTED BY THE LOCAL AUTHORITY HAVING JURISDICTION

F. VISUALLY INDICATE THE ALARM INITIATING DEVICE TYPE AND LOCATION VIA THE LCD DISPLAY LOCATED AT THE FACP AND AT ANY REMOTE SYSTEM

G. AUTOMATICALLY SHUT DOWN AFFECTED SUPPLY AND RETURN FANS. AND CONTROL HVAC EQUIPMENT TO INITIATE SMOKE CONTROL FUNCTIONS AS REQUIRED, MANUAL OVERRIDE CONTROLS AND PROGRAMMABLE RELAY INTERFACE MODULES SHALL SERVE TO INTEGRATE THE FIRE ALARM SYSTEM TO THE BUILDING AUTOMATION SYSTEM. H. OPERATE PRIORITIZED OUTPUTS TO RELEASE ALL MAGNETICALLY HELD SMOKE DOORS AND MAGNETICALLY LOCKED DOORS THROUGHOUT THE BUILDING I. ACTIVATE THE EXTERIOR WEATHERPROOF BEACON.

2. SPRINKLER TAMPER SWITCHES OR OTHER DEVICE PROGRAMMED FOR SUPERVISORY REPORTING SHALL AUTOMATICALLY CAUSE THE FOLLOWING TO OCCUR: A. INITIATE THE TRANSMISSION OF THE EVENT TO THE MUNICIPAL FIRE

STATION OR CENTRAL STATION B. FLASH A SUPERVISORY LED AND SOUND AN AUDIBLE SIGNAL AT THE FACP AND REMOTE ANNUNCIATOR. UPON ACKNOWLEDGMENT, THE LED SHALL LIGHT STEADILY AND THE AUDIBLE SHALL SILENCE. SUBSEQUENT EVENTS HALL RE\_INITIATE THIS SEQUENCE.

C. VISUALLY INDICATE THE INITIATING DEVICE TYPE AND LOCATION VIA THE LCD DISPLAY LOCATED AT THE FACP AND AT ANY REMOTE SYSTEM ANNUNCIATOR

C. GENERAL REQUIREMENTS 1. THE FIRE ALARM SYSTEM SHALL BE DESIGNED AND UL AND FM APPROVED FOR FIRE, AUDIO EVACUATION AND SECURITY APPLICATIONS, THE SYSTEM OPERATIONAL CHARACTERISTICS SHALL BE STORED IN NON\_VOLATILE EEPROM
MEMORY, SHALL BE FIELD PROGRAMMABABI ARBROMEABMEANS, BESNIGHEDITEMBLE

THE SYSTEM SHALL SUPPORT ANALOG SENSING TECHNIQUES TO MONITOR INDIVIDUAL DEVICES WHICH ENABLES THE USER TO SET SENSITIVITY PARAMETERS. ALL INPUTS SHALL BE SUBJECT TO MULTI\_LEVEL ALARM VERIFICATION. THE SYSTEM SHALL BE CAPABLE OF REPORTING THE STATUS AND SENSITIVITY OF EACH DEVICE AND VECTORING THIS INFORMATION TO A PRINTER. THE SYSTEM SHALL UTOMATICALLY IDENTIFY ANY DETECTOR WHICH BECOMES DIRTY (MAINTENANCE ALERT), PRIOR TO FALSE ALARMING.

LOSS OF PRIMARY POWER, BATTERIES SHALL SUPPORT [60] HOURS OF I SUPERVISORY OPERATION FOLLOWED BY [5] MINUTES OF ALARM. 4. THE SYSTEM SHALL BE CAPABLE OF NINE LEVELS OF ALARM PRIORITIZATION, AND ALLOW CONTROL—BY—EVENT SEQUENCES TO INCLUDE IN EXCESS OF 2500 CROSS ZONED, STEPPING, TIME CONTROLLED AND/OR LOGIC STATEMENT INPUTS

(BOOLEAN CONTROL EVENTS).

3. THE SYSTEM SHALL BE SUPPORTED BY STANDBY BATTERIES. IN THE EVENT OF A

5. ALL EQUIPMENT SHALL BE NEW AND UNUSED. ALL COMPONENTS AND SYSTEMS SHALL BE DESIGNED FOR UNINTERRUPTED DUTY. ALL EQUIPMENT, MATERIALS AND ACCESSORIES COVERED BY THESE REQUIREMENTS SHALL BE PROVIDED BY A RECOGNIZED AS COMPATIBLE BY BOTH MANUFACTURERS. 6. ALL CONTROL EQUIPMENT MUST HAVE TRANSIENT PROTECTION DEVICES TO COMPLY WITH UL 864 REQUIREMENTS.

A. ISOLATED LOOP CIRCUIT PROTECTOR (ILCP): FURNISH AND INSTALL AN ISOLATED LOOP CIRCUIT PROTECTION DEVICE ON ALL FIRE ALARM CIRCUITS WHICH EXTEND REYOND THE BUILDING BY FITHER AFRIAL LINDERGROUND OR OTHER METHODS (WALKWAYS, BRIDGES OR OTHER ABOVE GROUND CONNECTORS B. THE ILCP SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE POINT AT

WHICH THE CIRCUITS LEAVE OR ENTER THE BUILDING. THE GROUNDING OF 28 FEET AND CONNECTED TO A UNIFIED GROUND PER THE NEC CIRCUITING GUIDELINES, EACH INITIATING DEVICE AND INDICATING CIRCUIT SHAL BE ELECTRONICALLY SUPERVISED AND INDIVIDUALLY ADDRESSABLE. ALL WIRING

A. INDIVIDUAL ZONE ADDRESSABLE MODULES SHALL BE USED TO MONITOR WATER FLOW, TAMPER, AND STATUS CONDITIONS FROM ANY RELATED SYSTEMS OR CONVENTIONAL DEVICES. B. ZONE ADDRESSABLE CONTROL MODULES OR RELAYS SHALL PROVIDE AUXILIARY CONTROL FUNCTIONS SEPARATE OUTGOING AND RETURN PATI MUST BE INSTALLED IN ACCORDANCE WITH NFPA 72 (2002 ED.) 6.4.2.2.2

C. ADDRESSABLE LOOP WIRING (SIGNALING LINE CIRCUITS) SHALL SUPPORT ALL DEVICES SHOWN AND ALLOW FOR A MINIMUM OF 25% SPARE CAPACITY. AND BE WIRED IN A CLASS A, STYLE 6 FASHION, WITH FAULT ISOLATION AS DESCRIBED ELSEWHERE IN THESE SPECIFICATIONS. D. AS A MINIMUM, POWER SUPPLIES AND NOTIFICATION APPLIANCE CIRCUITS SHALL OPERATE ALL DEVICES SHOWN PLUS 25% SPARE CAPACITY, AND BE WIRED IN A CLASS A, STYLE Z FASHION.

1. FIRE ALARM NETWORK CONTROL PANEL A. PROVIDE AND INSTALL SIMPLEX 4100U SERIES FIRE ALARM CONTROL SYSTEM. THE SYSTEM SHALL CONSIST OF THE REQUIRED FIRE ALARM CONTROL OR TRANSPONDER PANELS, EACH SIZED TO SUPPORT 500 ANALOG DETECTORS, EXPANDABLE TO 2500. THE SYSTEM SHALL SUPPOR PEER-TO-PEER NETWORK COMMUNICATIONS CONSISTING OF UP TO 99

NODES. EACH NETWORK PANEL SHALL PROVIDE THE FOLLOWING FUNCTIONS: 1) MONITOR ALL INITIATING DEVICES. REPORT THE EVENT TO THE FIRE LOCATION, CAPTURE ELEVATORS, CONDUCT SMOKE CONTROL SIGNALING AND CONTROL SEQUENCES AS DESCRIBED HEREIN. 2) CONDUCT OFF-SITE OR MUNICIPAL REPORTING AS DESCRIBED HEREIN

3) INITIATING DEVICES SHALL RESPOND WITH THEIR CONDITION CONTROL RELAYS SHALL BE INDIVIDUALLY ADDRESSABLE BY THE SYSTEM TO RESPOND AUTOMATICALLY IN THE EVENT OF AN ALARM OF RELATED SENSORS, MANUAL OVERRIDE OF CONTROL RELAYS SHALL

BE INDIVIDUALLY ADDRESSABLE BY THE OPERATOR. B. CONTROL CONFIGURATION: ALL FIRE ALARM CONTROL PORTIONS OF THE ENCLOSURES. ALL PANEL INITIATING AND CONTROL STATUS INDICATORS SHA E VISIBLE THROUGH A CLEAR LEXAN WINDOW. ACCESS TO THE CONTROL AUTHORIZED PERSONNEL, EACH PANEL SHALL INCORPORATE AN OPERATOR INTERFACE, CPU, ADDRESSABLE LOOP INTERFACE CARDS, SYSTEM POW SUPPLIES AND BATTERIES TO PERFORM THE SYSTEM OPERATION AS DESCRIBED HEREIN.

C. PRIMARY OPERATOR CONTROL: THE FACE SHALL PROVIDE AN OPERATOR NTERFACE MODULE CONSISTING OF A 80 CHARACTER BACKLIT LCD DISPLAY TO PRESENT ALL SYSTEM ALARM. TROUBLE AND SUPERVISORY CONDITIONS. IND SHALL PROVIDE CONTROL SWITCHES FOR STATUS MESSAGE SCROLLING VENT ACKNOWLEDGMENT, SYSTEM RESET AND ALARM SILENCE, AS WELL S PROGRAM FUNCTION SWITCHES, 3 PROGRAMMABLE STATUS LEDS AND 5 ADDITIONAL USER-PROGRAMMABLE FUNCTION SWITCHES. THE DISPL SHALL HAVE LEDS TO INDICATE POWER ON, FIRE ALARM, PRIORITY 2 ALARM, SUPERVISORY, TROUBLE AND ALARM SILENCED STATUS. D. ADDRESSABLE LOOP INTERFACE: PROVIDE AN IDNET ADDRESSABLE LOOP

CARD SHALL SUPPORT FOUR ISOLATED CIRCUIT LOOPS (QUAD ISOLATOR) DIGITAL COMMUNICATIONS WITH UP TO 250 ADDRESSABLE FIELD DETECTORS, AND TOTAL WIRING DISTANCES UP TO 10,000 FT E. AUXILIARY CONTROL / ANNUNCIATION: PROVIDE THE REQUIRED AUXILIARY SWITCH AND LED MODULES FOR DISCREET LED ANNUNCIATION, ZONE DISCONNECT, HVAC OVERRIDE, OR RELATED MONITORING AND CONTROL FUNCTIONS INTEGRAL TO THE PRIMARY FACP, AS A MINIMUM, PROVIDE [64] DISCREET, PROGRAMMABLE AUXILLARY SWITCHES WITH CORRESPONDING STATUS LEDS AND [24] HOA SWITCHES WITH STATUS FOR AUXILIARY CONTROL FUNCTIONS. THESE ARE INTENDED FOR USE THE FIRE DEPARTMENT DURING AN EVENT OR BY AUTHORIZED PERSONNEL DURING TESTING PERIODS. KEYPAD ENTERED COMMANDS FOR

INTERFACE CARD FOR EACH ADDRESSABLE SIGNALING LINE CIRCUIT. EAC

THESE FUNCTIONS SHALL NOT BE AN ACCEPTABLE SUBSTITUTE. F. SYSTEM POWER SUPPLIES: INTEGRAL SYSTEM POWER SUPPLIES SHAL PROVIDE 24VDC OPERATING AND EMERGENCY POWER TO EACH SYSTEM PANEL (18 AMPS MINIMUM). IT IS THE DESIGN INTENT THAT ALL SYSTEM POWER SUPPLIES BE DERIVED FROM NETWORK PANELS, AND EACH POWER SUPPLY MODULE SHALL HAVE DEDICATED NAC OUTPUTS AND A CHARGING CIRCUIT THAT WILL SUPPORT UP TO 110AH BATTERIES. FIELD—LOCATED ADDRESSABLE NAC MODULES OR REMOTE AUXILIARY POWER SUPPLIES WILL NOT BE ALLOWED, EXCEPT WHERE SPECIFICALL SHOWN ON THE CONTRACT DRAWINGS. THE FOLLOWING SYSTEM POWER SUPPLY ANALOG VALUES SHALL BE AVAILABLE FOR VIEWING THROUGH THE

PRIMARY OPERATOR INTERFACE DISPLAY: 1) BATTERY VOLTAGE 2) BATTERY CHARGER VOLTAGE AND CURRENT DRAW 3) MAIN OUTPUT VOLTAGE AND CURRENT DRAW 4) INDIVIDUAL NAC CURRENT DRAW

G. DIGITAL ALARM COMMUNICATOR/TRANSMITTER (DAC/T): AN INTEGRAL DAC/T SHALL BE PROVIDED FOR POINT REPORTING OF SYSTEM SERIAL DAC/ I SMALL BE PROVIDED FOR FOR EVENTS TO A CENTRAL MONITORING STATION.

2. INTELLIGENT SYSTEM DEVICES: PROVIDE INTELLIGENT ANALOG DEVICES WHERE SHOWN AND REQUIRED, ALL DEVICES SHALL UTILIZE RED LED INDICATOR WHICH WILL FLASH TO DENOTE NORMAL ACTIVE COMMUNICATION AND LIGHT STEADILY TO DENOTE AN ALARM CONDITION. DEVICES SHALL BE INTERCHANGEABLE WITH TWIST\_LOCK BASES, WHICH WILL SUPPORT A REMOTE LED OUTPUT, FAULT ISOLATION CIRCUITRY, AUXILIARY RELAY CONTACT, OR A SOUNDER BASE WITH INTEGRAL PROGRAMMABLE PIEZO HORN. DEVICES SHALL SUPPORT PHYSICAL ADDRESS SETTING INTEGRAL TO THE DEVICE BASE. DEVICES WHICH REQUIRE MING TOOLS TO SET OPERATING PARAMETERS OR EXTRAC DEVICE HISTORY DATA WILL NOT BE ALLOWED.

A. MULTI-SENSING SMOKE DETECTOR: PROVIDE MULTI-SENSING ANALOG MOLIT-SENSING SMOKE DETECTOR: PROVIDE MOLIT-SENSING ANALOG
SMOKE DETECTORS (4098-9754) WHERE SHOWN AND REQUIRED.
MULTI-SENSING DETECTORS SHALL EMPLOY PHOTOELECTRIC AND THERMAL
SENSING PRINCIPLES, AND SHALL BE CAPABLE OF BEING PROGRAMMED TO
OPERATE IN A DISTINCT FASHION DEPENDING UPON WHETHER THE
THERMAL OR PHOTOELECTRIC LEVENT HAS DESPONDED. THERMAL OR PHOTOELECTRIC ELEMENT HAS RESPONDED.

B. PHOTOELECTRIC SMOKE DETECTOR: PROVIDE ANALOG PHOTOELECTRIC SMOKE DETECTORS (MODEL 4098-9714) WHERE SHOWN AND REQUIRED C. ANALOG HEAT DETECTORS: PROVIDE ANALOG HEAT DETECTORS (MODEL 4098-9733). ANALOG HEAT DETECTORS SHALL BE FIELD SELECTABLE FOR FIXED TEMPERATURE RATING OF 135 OR 155 DEGREES, OR A RATE OF RIS OPERATION OF 15 OR 20 DEGREES/MINUTE OPERATION. HEAT DETECTORS SHALL ALSO BE PROGRAMMABLE FOR LOW TEMPERATURE WARNING. WHERE OTHERWISE REQUIRED, PROVIDE CONVENTIONAL FIXED
TEMPERATURE OR WEATHERPROOF HEAT DETECTORS IN LIEU OF ANALOG HEAT DETECTORS. CONVENTIONAL DEVICES SHALL BE INDIVIDUALLY ADDRESSABLE VIA AN INTELLIGENT ADDRESSABLE MODULE WHICH SHALL BE INSTALLED IN A HEATED, VENTILATED LOCATION.

D. ANALOG DUCT SMOKE DETECTOR: PROVIDE ANALOG PHOTOELECTRIC DUCTS WHERE SHOWN AND REQUIRED. EACH DETECTOR SHALL BE SUPPLIED WITH DUCT-MOUNT HOUSING, REMOTE INDICATOR/TEST STATION (4098-9834) AND SAMPLING TUBES SIZED ACCORDING TO DUCT WIDTH. PROVIDE THE REQUIRED PROGRAMMABLE AUXILIARY RELAY OUTPUTS OR ADDRESSABLE RELAY CONTROL MODULES WITH EACH DETECTOR IN ORDER TO ACCOMPLISH THE REQUIRED HVAC CONTROL AND OVERRIDE FUNCTIONS.

E. MANUAL PULL STATIONS: PROVIDE ADDRESSABLE MANUAL STATIONS (4099-9003 SERIES) WHERE SHOWN. THE STATION SHALL BE DOUBLE ACTION TYPE WITH SCREW TERMINALS, TOGGLE SWITCH, AND INTEGRAL ADDRESSABLE ELECTRONICS. THE STATION SHALL BE CONSTRUCTED OF RED LEXAN WITH WHITE RAISED LETTERS AND A KEY RESET SWITCH. THE STATION SHALL BE KEYED ALIKE TO THE FACP. WHERE AMBIENT CONDITIONS PRECLUDE THE USE OF ADDRESSABLE DEVICES, CONVENTIONAL WEATHERPROOF PULL STATIONS SHALL BE USED. CONVENTIONAL DEVICES SHALL BE INDIVIDUALLY ADDRESSABLE VIA AN INTELLIGENT ADDRESSABLE MODULE WHICH SHALL BE INSTALLED IN AN APPROPRIATELY HEATED, VENTILATED LOCATION.

F. MONITOR MODULE: PROVIDE INDIVIDUAL ADDRESSABLE MODULES FOR SUPERVISED INPUT POINTS (MODEL 4090 SERIES) TO MONITOR RELATED SYSTEMS OR INTEGRATE CONVENTIONAL INITIATING DEVICES ONTO THE IDNET ADDRESSABLE LOOP. G. CONTROL MODULE: PROVIDE RELAY INDIVIDUAL ADDRESSABLE MODULES (RELAY IAM) TO PROVIDE SUPERVISED OUTPUTS AND CONTROL CONVENTIONAL DEVICES (INDICATING CIRCUITS, AHUS, DOOR HOLDERS, ETC.) VIA THE IDNET ADDRESSABLE LOOP. RIAMS SHALL PROVIDE A SUPERVISED OUTPUT RATED FOR 2 AMPS @ 24VDC OR .5 AMPS A

120VAC, AND CORRESPONDING SUPERVISED CONTACT INPUT POINT

H. ISOLATION MODULES: PROVIDE ZONE ADDRESSABLE ISOLATOR MODULES. TO PROTECT SIGNALING LINE CIRCUIT INTEGRITY IN THE EVENT OF A WIRING FAULT, TO ENSURE STYLE 6 WIRING CONVENTIONS. PROVIDE A MINIMUM OF ONE ISOLATION MODULE PER FLOOR OR EVACUATION ZONE, OR ONE PER

RESIDENTIAL UNIT SMOKE DETECTORS: PROVIDE PHOTOELECTRIC SMOKE DETECTORS (4098-9714) IN RESIDENTIAL UNITS WHERE SHOWN AND REQUIRED. DETECTORS SHALL BE LOCATED IN THE CENTER OF EACH ROOM OR OTHERWISE PLACED IN COMPLIANCE WITH NFPA 72 GUIDELINES, EACH DEVICE SHALL UTILIZE A PROGRAMMABLE SOUNDER BASE FOR LOCAL AN GENERAL ALARM EVACUATION. IN THE EVENT OF SMOKE DETECTION, ALL SOUNDER BASES AND VISUAL SIGNALS SERVING THE PARTICULAR LIVING UN ACTIVATE LOCALLY, WITH SUPERVISORY ANNUNCIATION AT THE FACP AND REMOTE ANNUNCIATORS

3. PRIMARY NOTIFICATION APPLIANCES: PROVIDE AUDIBLE AND VISUAL NOTIFICATION APPLIANCES WHERE SHOWN AND REQUIRED. FLUSH—MOUNTED COMBINATION DEVICES SHALL BE PROVIDED WITH SURFACE MOUNT OR STANDALONE VISUAL APPLIANCES WHERE OTHERWISE REQUIRED. THE CONTRACTOR SHALL PROVIDE SURFACE MOUNT BACKBOXES AS NEEDED AND ALTERNATE OUTDOOR—RATED APPLIANCES WHERE AMBIENT CONDITIONS DICTATE. SPECIFIC AUDIBLE AND VISUAL CHARACTERISTICS SHALL BE AS FOLLOWS: A. VISUAL SIGNALS: FURNISH AND INSTALL SYNCHRONIZED XENON STRORES IN COMPLIANCE WITH NFPA 72 AND UL 1971. STROBES SHALL HAVE AN FFFECTIVE INTENSITY RATING OF 15 CANDELA IN CORRIDORS AND OTHER

AREAS UP TO 20' X 20', 75 CANDELA IN AREAS UP TO 40' X 40' AND 110 CANDELA IN AREAS UP TO 50' X 50' OR IN SLEEPING AREAS. B. AUDIBLE SIGNALS: PROVIDE AUDIBLE TEMPORAL CODE 3 HORNS WHICH PRODUCE A MINIMUM SOUND OUTPUT OF 75DBA, OR 15DBA ABOVI AMBIENT; WHICHEVER IS GREATER, @ 10 FT. (MINIMUM OPERATING VOLTAGE C. LOW FREQUENCY 520 HZ MINI HORNS WILL BE PROVIDED IN THE BEDROOMS/SLEEPING AREA

4. SYSTEM ACCESSORIES A. MUNICIPAL CONNECTION: PROVIDE A LOCAL ENERGY MASTERBOX INSTALLED, TESTED, AND COMMISSIONED FOR MUNICIPAL REPORTING AS REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION. B. SPRINKLER SYSTEM DEVICES: THE ELECTRICAL CONTRACTOR SHALI COORDINATE THE FOLLOWING TO ENSURE THAT THE REQUIRED INSTALLATION AND WIRING OF ALL WATERFLOW AND TAMPER SWITCHES IS ACCOMPLISHE SPRINKLER SYSTEM. EACH DEVICE SHALL BE MONITORED AS A SEPARATE

1) WATERFLOW SHALL ACTIVATE THE ALARM SEQUENCE. 2) TAMPER SWITCHES SHALL ACTIVATE AN ALARM CONDITION 3) TERMINAL CABINETS: PROVIDE FIRE ALARM TERMINAL CABINETS WHERE NECESSARY, THE CABINETS, WHICH SHALL HAVE A REMOVABLE HINGED COVER WITH KEY LOCK AND RED FINISH ARE INTENDED TO HOUSE ANALOG/ADDRESSABLE MODULES AND FACILITATE FIELD WIRING JUNCTIONS.

C. REMOTE ALARM INDICATORS: PROVIDE REMOTE LED INDICATORS FOR SENSORS LOCATED BEHIND LOCKED DOORS, PROVIDE A PERMANENT LABE ON EACH INDICATOR IDENTIFYING THE DEVICE TYPE AND ACTUAL LOCATION D. EXTERIOR STROBE: PROVIDE A FLASHING WEATHERPROOF STROBE WITH A MINIMUM 150,000 CANDLEPOWER OUTPUT WHERE SHOWN. THE STROBE SHALL BE PROPERLY INSTALLED ON A WEATHERPROOF BACKBOX E. PROVIDE A REMOTE COMMAND CENTER LCD ANNUNCIATOR (MODEL 4100-1292). EACH LCD ANNUNCIATOR SHALL PROVIDE A 160 CHARACTER LCD DISPLAY WITH MESSAGE SCROLLING BUTTONS SILENCE SYSTEM RESET) AND 4 PROGRAMMABLE CUSTOM CONTROL

ASSIGNMENTS AND BUFFERING. F. REMOTE POWER SUPPLIES: WHERE THE POWER REQUIREMENTS EXCEED THAT WHICH IS SUPPLIED BY THE FACP, PROVIDE DISTRIBUTED 8 OR 9 SUPPLIES SHALL BE SUPERVISED FOR GROUND FAULT, LOSS OF AC POWER AND BATTERY FAIL, AND EACH NOTIFICATION CIRCUIT SERVED SHALL BE INDIVIDUALLY SUPERVISED.

SWITCHES, AND SHALL SUPPORT CUSTOM MESSAGE ROUTING,

G. INTERNET COMMUNICATIONS CARD: PROVIDE A DEDICATED FIRE PANEL INTERNET INTERFACE (FPII) CARD INTEGRAL TO THE MAIN FACP. THE FPII CARD SHALL BE A SIMPLEXGRINNELL SAFELINC MODULE OR APPROVED EQUAL, THE FPII WILL HAVE A BUILT-IN E-MAIL FEATURE TO GENERATE NOTIFICATION OF ANY OR ALL SYSTEM EVENTS VIA INTERNET EMAIL, PAGER, CELL PHONES OR PERSONAL DIGITAL ASSISTANT (PDA) USING SIMPLE MAIL TRANSFER PROTOCOL (SMTP). THROUGH THE FPII, AUTHORIZED USERS WILL ALSO BE PROVIDED WITH SECURE ACCESS TO SYSTEM STATUS CONDITIONS
EVENT HISTORY LOGS AND REPORTS VIA INTERNET EXPLORER VERSION 5.0 OR HIGHER, USING TCP/IP COMMUNICATIONS. H. MOTORIZED FIRE/SMOKE DAMPER CONTROL: PROVIDE 120V

CONNECTION FROM LOCAL 120V PANEL TO MOTORIZED FIRE DAMPER. THE FIRE ALARM SYSTEM SHALL PROVIDE A PROGRAMMABLE CONTROL RELAY OUTPUT TO INITIATE DAMPER CONTROL WITH CORRESPONDING INPUT ADDRESSABLE MODULE FEEDBACK POINT(S) FOR EACH DAMPER. DEVICE GUARDS: PROVIDE CLEAR LEXAN (2009 SERIES) COVERS OVER WHICH SHALL SOUND WHEN LIFTED, AND SHALL BE POWERED FROM A DEDICATED 9 VOLT BATTERY

J. DOOR HOLDERS: PROVIDE 24VDC OR 120VAC MAGNETIC DOOR HOLDERS AS SHOWN AND REQUIRED. 24VDC DOOR HOLDERS SHALL BE POWERED BY SYSTEM POWER, BUT ARE NOT REQUIRED TO OPERATE UNDER STANDB' K. KEY REPOSITORY: PROVIDE AN APPROVED EQUAL KEY REPOSITOR WHERE SHOWN AND IN ACCORDANCE WITH LOCAL REQUIREMENTS

1. INSTALLATION SHALL BE SUPERVISED AND TESTED BY THE SYSTEM SUPPLIER. THE WORK SHALL BE PERFORMED BY SKILLED TECHNICIANS UNDER THE DIRECTION OF EXPERIENCED ENGINEERS, ALL OF WHOM ARE PROPERLY TRAINED AND QUALIFIED.

MANUFACTURED BY EMERGENCY ACCESS SYSTEMS.

1. ALL WIRING FOR THE SYSTEM SHALL BE IN ACCORDANCE WITH ARTICLES 760, 725, AND 800 OF THE NATIONAL ELECTRICAL CODE AND LOCAL ELECTRICAL CODES. 2. PROVIDE COMPLETE WIRING AND CONDUIT BETWEEN ALL EQUIPMENT, ALL WIRING SPLICES AND TRANSPOSING OR CHANGING OF COLORS SHALL NOT BE

3. ALL JUNCTION BOXES SHALL BE PAINTED RED AND LABELED AS 'FIRE ALARM SYSTEM' WITH DECAL OR APPROVED MARKINGS 4. FIRE ALARM CONTROL SYSTEMS AND EQUIPMENT SHALL BE CONNECTED TO SEPARATE DEDICATED BRANCH CIRCUITS, SIZED AS REQUIRED FOR PROPER SERVICE. CIRCUITS SHALL BE LABELED 'FIRE ALARM'.

5. PROVIDE PYROTENAX CIC 2 HOUR-RATED CABLE (OR APPROVED EQUAL) FOR ALL COMMUNICATION CIRCUITS WHICH SERVE MULTIPLE FLOORS OR EVACUATION COMMUNICATION CIRCUITS WHICH SERVE MULTIFLE FLOORS OR EVALUATION ZONES UNTIL THEY ENTER THE AREA SERVED IN ACCORDANCE WITH NFPA 72. THE CABLE SHALL BE INSTALLED IN CONDUIT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, WITH OUTGOING AND RETURN LOOPS PHYSICALLY SEPARATED IN ACCORDANCE WITH APPLICABLE CODE.

1. THE CONTRACTOR SHALL CARRY IN HIS BID A UNIT PRICE TO FURNISH AND INSTALL ADDITIONAL FIRE ALARM APPLIANCES AS REQUIRED BY THE LOCAL AUTHORITY
HAVING JURISDICTION DURING THE FINAL INSPECTORS WALK-THRU. BID SHALL INCLUDE ALL ASSOCIATED WIRING AND PROGRAMMING AS REQUIRED. 2. ANY UNUSED DEVICES SHALL BE TURNED OVER TO THE OWNER OR A CREDIT SHALL

3. PROVIDE THE FOLLOWING QUANTITY AND TYPE AS INDICATED: A. (2) SYSTEM SMOKE DETECTOR (HEADS)

B. (2) LOCAL SMOKE DETECTORS C. (2) SYSTEM HEAT DETECTORS

D. (1) DUCT SMOKE DETECTORS E. (1) REMOTE TEST STATIONS F. (1) REMOTE ALARM INDICATORS

G. (6) AUDIO/VISUAL APPLIANCES H. (2) VISUAL APPLIANCES I. (1) PULL STATIONS

J. (2) MONITOR MODULE K. (2) RELAY IAM / CONTROL MODULE H. FINAL TEST / WARRANTY

1. THE SYSTEM SHALL BE FULLY TESTED BY A UL CERTIFIED TESTING COMPANY, IN ACCORDANCE WITH UL GUIDELINES AND NFPA STANDARDS. 2. A COPY OF THE FINAL TEST REPORT AND RECORD OF COMPLETION SHALL BE SUBMITTED INDICATING PROPER FUNCTIONING OF THE SYSTEM AND CONFORMANCE TO THE SPECIFICATIONS. THE TEST SHALL BE PERFORMED BY UL CERTIFIED AND FACTORY TRAINED QUALIFIED TECHNICIANS. EACH AND EVER' DEVICE SHALL BE TESTED, AND STANDALONE OPERATION OF REMOTE PANELS SHALL BE VERIFIED. FINAL TESTING SHALL BE PERFORMED BY THE SAME

COMPANY THAT SHALL HOLD AND EXECUTE THE TEST AND INSPECTION CONTRACT 3. THE MANUFACTURER SHALL GUARANTEE ALL SYSTEM EQUIPMENT FOR A MINIMUM OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE. 4. THE CONTRACTOR SHALL GUARANTEE ALL RACEWAYS AND WIRING TO BE FREE FROM INHERENT MECHANICAL OR ELECTRICAL DEFECTS FOR ONE (1) YEAR FROM THI DATE OF FINAL ACCEPTANCE OF THE SYSTEM.

. FIRE ALARM SUPPORT CONTRACTS 1. EACH CONTRACTOR SHALL INCLUDE AS PART OF THEIR BASE BID THE COST OF AN ANNUAL TEST AND INSPECTION CONTRACT AS DESCRIBED HEREIN. 2. THE TEST AND INSPECTION CONTRACT SHALL PROVIDE FOR PERIODIC TESTS ACCORDING TO UL. NFPA AND APPLICABLE LOCAL REQUIREMENTS FOR THE DURATION OF THE ORIGINAL MANUFACTURER'S WARRANTY PERIOD. THE CONTRACT SHALL INCLUDE TESTING AND RECALIBRATION OF EACH SYSTEM DETECTOR FOLLOWING THE FIRST YEAR OF OPERATION AS WELL AS SUBSEQUENT CLEANING AND CALIBRATION TESTING IN ACCORDANCE WITH NFPA 72 REQUIREMENTS

3. UPON EXPIRATION OF THE WARRANTY PERIOD AND INITIAL TEST AND INSPECTION CONTRACT, THE CONTRACT SHALL BE RENEWABLE BY THE BUILDING OWNER. 4. EACH CONTRACTOR SHALL ALSO INCLUDE AS PART OF THE BASE BID THE COST OF A ONE YEAR CENTRAL STATION MONITORING CONTRACT. THE CONTRACT SHALL BE HELD WITH A UL-LISTED AND LOCALLY-APPROVED CENTRAL STATION MONITORING COMPANY, AND SHALL BE RENEWABLE BY THE OWNER UPON ITS EXPIRATION

1. THE CONTRACTOR SHALL PROVIDE THE SERVICES OF THE MANUFACTURER'S REPRESENTATIVE FOR A PERIOD OF 4 HOURS, DURING NORMAL BUSINESS HOURS, TO INSTRUCT THE OWNER'S DESIGNATED PERSONNEL AND FIRE DEPARTMENT RESPONSE TEAMS ON THE OPERATION OF THE SYSTEM.

3.1 SPECIAL COORDINATION INSTRUCTIONS A. COORDINATION WITH THE WORK OF OTHER TRADES IS REFERRED TO WITHIN VARIOUS PARTS OF THIS SECTION OF THE SPECIFICATIONS. THE FOLLOWING SPECIAL INSTRUCTIONS SHALL ALSO BE CAREFULLY NOTED: 1. LOCATIONS AND MOUNTING HEIGHT OF ALL WALL OUTLETS AND LIGHTING FIXTURES

SHALL BE AS SPECIFIED ON THE ELECTRICAL AND ARCHITECTURAL DRAWINGS. 2. ALL FEEDER, BRANCH CIRCUIT OR AUXILIARY SYSTEM WIRING PASSING THROUGH PULL BOXES AND/OR BEING MADE UP IN PANEL BOARDS SHALL BE PROPERLY GROUPED, BOUND AND TIED TOGETHER IN A NEAT AND ORDERLY MANNER IN KEEPING WITH THE HIGHEST STANDARDS OF THE TRADE, WITH PLASTIC CABLE TIES. 3. ALL DUPLEX CONVENIENCE AND POWER RECEPTACLES SHALL BE MOUNTED

4. ALL MISCELLANEOUS HARDWARE AND SUPPORT ACCESSORIES, INCLUDING SUPPORT RODS, HANGERS, NUTS, BOLTS, SCREWS AND OTHER SUCH ITEMS SHALL BE OF A GALVANIZED OR CADMIUM PLATED FINISH, OR OF OTHER APPROVED RUST-INHIBITING COATINGS. IN HAZARDOUS LOCATIONS NEAR THE OCEAN ALL MARINE AREA HARDWARE SHALL BE PVC COATED STAINLESS STEEL TO PREVEN BOTH SIDES OF EXISTING OR NEW BUILDING EXPANSION JOINTS. 5. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL MATERIALS. EQUIPMENT AND

VERTICALLY WITH THE GROUNDING POST TO THE BOTTOM AS THE OUTLET IS

NSHIP TO PROVIDE FOR ADEQUATE PROTECTION OF ALI EQUIPMENT DURING THE COURSE OF CONSTRUCTION OF THE PROJECT. 6. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL APPROVED DETAILS FOR ALL INSULATION AT TERMINAL CONNECTION POINTS FOR ALL ELECTRICAL CONDUCTIN MATERIALS, SUCH AS TRANSFORMER TERMINALS, TERMINAL STUDS, AND AT ANY OTHER SPECIAL LOCATIONS AS DIRECTED BY THE ENGINEER AND CONFIRMED BY

7. THE ELECTRICAL CONTRACTOR SHALL PROVIDE GFI RATED AND WEATHERPROOF RATED EQUIPMENT IN DAMP OR WET LOCATIONS. 8. COORDINATION WITH LOCAL UTILITY COMPANIES WITH THE LOCAL UTILITY CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND FILE ALL REQUIRED

APPLICATIONS AND MEET ALL UTILITY COMPANY REQUIREMENTS. 3.2 COOPERATION AND WORK PROGRESS A. THE ELECTRICAL WORK SHALL BE CARRIED ON UNDER THE USUAL CONSTRUCTION CONDITIONS, IN CONJUNCTION WITH ALL OTHER WORK AT THE SITE. THE ELECTRICAL CONTRACTOR SHALL COOPERATE WITH THE ENGINEER AND ALL CONTRACTORS AND EQUIPMENT SUPPLIERS WORKING ON THE SITE COORDINATE THE WORK AND PROCEED IN A MANNER SO AS NOT TO DELAY THE PROGRESS OF THE PROJECT. B. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE THE EXACT

MOUNTING ARRANGEMENT AND LOCATION OF EQUIPMENT INDICATED ON THE DRAWINGS TO ALLOW FOR PROPER SPACE REQUIREMENTS FOR EQUIPMENT ACCESS, OPERATION AND MAINTENANCE. C. IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO COORDINATE THE DELIVERY OF ELECTRICAL EQUIPMENT TO THE PROJECT PRIOR TO THE TIME OF INSTALLATION OR EQUIPMENT.

3.3 INSTALLATION OF WIRING & CONDUIT A. IN GENERAL ALL CONDUITS SHALL BE RUN CONCEALED UNLESS OTHERWISE INDICATED TO

B. EXPOSED CONDUITS SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO THE WALLS OF THE BUILDING AND ALL BENDS SHALL BE MADE WITH STANDARD CONDUIT ELLS OR CONDUITS BENT TO, NOT LESS THAN, THE SAME RADIUS. HORIZONTAL RUNS OF EXPOSED CONDUITS SHALL BE CLOSE TO CEILING BEAMS, PASSING OVER WATER OR OTHER PIPING WHERE POSSIBLE AND SHALL BE SUPPORTED BY PIPE STRAPS OR BY OTHER APPROVED MEANS NOT MORE THAN 5' APART. INSTALLATION OF EXPOSED CONDUITS IN FINISHED AREAS O THE BUILDING SHALL BE CHECKED WITH THE ENGINEERS FOR LAYOUT BEFORE NSTALLATION TO CONFORM TO THE PATTERN OF THE STRUCTURAL MEMBERS. AND WHEN COMPLETED, IS TO PRESENT THE MOST OBTRUSIVE APPEARANCE POSSIBLE, NO EXPOSED CONDUITS WILL BE PERMITTED ON WALLS OR PARTITIONS IN PUBLIC AREAS. C. IN NO PLACE SHALL A CONDUIT BE RUN WITHIN 3" OF HOT WATER PIPES OR APPLIANCES

EXCEPT WHERE CROSSING IS UNAVOIDABLE AND IN THAT CASE, THE CONDUIT SHALL BE KEPT AT LEAST 1" FROM COVERING OR PIPE CROSSED. D. CONDUITS SHALL BE SUPPORTED ON APPROVED GALVANIZED WALL BRACKETS, CEIL TRAPEZE, STRAP HANGERS OR PIPE STRAPS, SECURED BY MEANS OF TOGGLE BOLTS ON HOLLOW MASONRY UNITS OR EXPANSION BOLTS IN CONCRETE OR BRICK. E. IN GENERAL, NO SPLICES OR JOINTS WILL BE PERMITTED IN EITHER FEEDER OR BRANCHES

XCEPT AT OUTLETS OR ACCESSIBLE JUNCTION BOXES. NO SPLICES SHALL BE MADE IN SECURITY OR FIRE ALARM SYSTEMS. F. ALL SPLICES IN WIRE #8 AWG AND SMALLER SHALL BE STANDARD PIGTAIL, MADE MECHANICALLY TIGHT AND INSULATED WITH PROPER THICKNESS OF INSULATING TAPE LOCK) OR IDEAL WIRE NUTS SHALL BE USED, SUBJECT TO THE LOCAL WIRE INSPECTOR

G. WIRE #6 AND LARGER SHALL BE CONNECTED TO PANELS AND APPARATUS BY MEANS OF THE TO AND LARGER SHALL BE CONNECTED ID PANELS AND AFFARATOS BY MEANS CAPPROVED LUGS OR CONNECTORS. CONNECTORS SHALL BE SOLDER LESS TYPE, SUFFICIENTLY LARGE TO ENCLOSE ALL STRANDS OF THE CONDUCTOR AND SECURELY H. PROVIDE (3) 1-INCH CONDUITS FROM EACH ELECTRICAL PANEL UP TO THE NEAREST

LAY-IN CEILING AREA. 3.4 INSTALLATION OF UNDERGROUND CONDUITS A. THE SIZE AND NUMBER OF CONDUITS SHALL BE AS INDICATED ON THE DRAWINGS. B. THE ENTIRE LENGTH OF DUCT BANK SHALL BE EXCAVATED AND GRADED BEFORE ANY

C. THE DUCT BANK SHALL BE SET ON UNDISTURBED EARTH. D. THE CONDUIT SHALL BE INSTALLED SO THAT THE TOP IS A MINIMUM OF 36 INCHES BELOW FINISHED GRADE. E. CHANGES IN DIRECTION SHALL BE MADE BY LONG SWEEP BENDS. MINIMUM RADIUS SHALL BE 25 FEET EXCEPT THAT AT THE END OF A RUN WITHIN 10 FEET OF TERMINATION, MANUFACTURED BENDS MAY BE USED HAVING A MINIMUM RADIUS OF 36 INCHES.

F CONDUIT BASE AND INTERMEDIATE SPACERS SHALL BE INSTALLED A MAXIMUM OF 5 FEET ON CENTERS. SPACERS SHALL NOT BE PLACED ONE ABOVE THE OTHER BUT SHALL BE STAGGERED A MINIMUM OF 6 INCHES. G. ALL CONDUIT JOINTS SHALL BE MADE WATERTIGHT BY MEANS OF A SEALING COMPOUND BEFORE THE COUPLING IS INSTALLED. JOINTS IN CONDUITS SHALL BE STAGGERED.
MINIMUM SPACE BETWEEN JOINTS IN ADJACENT CONDUITS SHALL BE 6 INCHES.

H. WHEN THE REQUIRED NUMBERS OF CONDUITS HAVE BEEN INSTALLED. SECURELY TIE THE ASSEMBLY TOGETHER AT DISTANCES NOT EXCEEDING 7 FEET. TIE SHALL CONSIST OF THREE TURNS OF NO. 18 IRON WIRE. . WHERE CONDUIT IS ENCASED, THE DUCT ENVELOPE SHALL BE OF MONOLITHIC 1. POURING OF CONCRETE SHALL BE CONTINUOUS THROUGHOUT THE LENGTH OF CONSTRUCTION. THE END OF THE POUR SHALL BE INTERLOCKED OR SLOPED. IF

THE INSTALLATION IS HALTED, THE ENDS OF THE CONDUIT SHALL BE PLUGGED 2. CONCRETE SHALL NOT BE POURED UNTIL THE CONDUIT INSTALLATION HAS BEEN INSPECTED AND APPROVED. J. AFTER THE INSTALLATION IS COMPLETED, EACH CONDUIT SHALL BE CLEANED AND IDENTIFIED. A STANDARD FLEXIBLE MANDREL AND STIFF BRISTLE BRUSH SHALL BE PULLED THROUGH EACH CONDUIT. THE MANDREL SHALL BE NOT LESS THAN 12" LONG AND THE

DIAMETER APPROXIMATELY 1/4" LESS THAN THE CONDUIT. K. INSTALL APPROXIMATELY 12" BELOW THE TOP OF THE TRENCH ABOVE EACH CONDUIT OR IN COLOR WITH BLACK LETTERS READING ?BURIED ELECTRIC LINES.? 3.5 ELECTRICAL INSTALLATION FOR ELEVATORS A. ELECTRICAL CONTRACTOR SHALL PROVIDE ELEVATORS AND ESCALATORS WITH ELECTRICAL

POWER AND AUXILIARY SERVICES GENERALLY AS DESCRIBED AND AS AMENDED BY THE ELEVATOR CONTRACT SHOP DRAWINGS AND SPECIFICATIONS. PRIOR TO INSTALLATION, ELECTRICAL CONTRACTOR SHALL COORDINATE WORK WITH ELEVATOR CONTRACTOR. B. FEEDER BREAKERS FOR ALL ELEVATORS SHALL BE SHUNT TRIP, UNLESS INSTALLED IN MASSACHUSETTS. PROVIDE WIRING AND INTERFACE WITH FIRE ALARM AND SPRINKLER SYSTEM TO SHUNT TRIP ELEVATOR FEEDER BREAKER AS REQUIRED BY CODE. WHERE SHUNT TRIP IS NOT USED, PROVIDE JUNCTION BOX IN ELEVATOR MACHINE ROOM MARKED ?ELEVATOR SHUNT TRIP FOR FUTURE USE? AND DISABLE SHUNT TRIP BREAKER C. PROVIDE POWER DISCONNECT FOR EACH ELEVATOR WITH IDENTIFYING NAMEPLATE, LOCKING CAPABILITY, TWO NO AUXILIARY CONTACTS AND FUSES SIZED PER FLEVATOR

SHOP DRAWINGS. LOCATE ON LATCH SIDE OF ELEVATOR DOOR OR AS DIRECTED BY THE ELEVATOR CONTRACTOR. D. PROVIDE THE FOLLOWING AUXILIARY SERVICES TO THE ELEVATOR PIT. ELEVATOR SHAFT AND ELEVATOR MACHINE ROOM FOR EACH ELEVATOR. LOCATE AND IEDVINITY ALL SERVICES AS DIRECTED BY THE ELEVATOR SHOP DRAWING OR ELEVATOR CONTRACTOR. 1. CAB LIGHTING: PROVIDE LOCKABLE DISCONNECT AND SINGLE CIRCUIT.

2. CAB TELEPHONE: JUNCTION BOX WITH 1? CONDUIT TO LOCAL TELEPHONE 3. CAB SECURITY: JUNCTION BOX WITH 1? CONDUIT TO LOCAL SECURITY

4. CAB FIRE ALARM: COMPRISING OF JUNCTION BOX WITH WIRING FOR AUDIO/VISUAL ALARM FIREMAN'S PHONE. PROVIDE DEVICES AS REQUIRED. 5. ALL CIRCUITS FOR ELEVATORS SHALL BE CONNECTED TO EMERGENCY SERVICE AND NSTALLED IN MINERAL INSULATED CABLE 2-HOUR FIRE RATED ENCLOSURE, IF

EMERGENCY SERVICE IS AVAILABLE. 6. CONTROL AND SIGNAL SYSTEMS: PROVIDE SEPARATE 120/208V, 1-PHASE, 30 AMPERE CIRCUIT TO LOCKABLE DISCONNECT FOR MULTIPLE ELEVATOR BANK 7. PROVIDE FIRE ALARM JUNCTION BOX AND WIRING FOR FIRE ALARM ELEVATOR RECALL AND GENERAL ALARM. ELEVATOR RECALL SHALL BE PROVIDED FROM SMOKE DETECTORS PROVIDED IN ELEVATOR LOBBIES, MACHINE ROOM, AND TOP OF

8. PROVIDE 20 AMPERE DEDICATED GFI RECEPTACLE WITHIN EACH ELEVATOR 9. ELEVATOR PIT SHALL BE PROVIDED WITH VAPOR-TIGHT LIGHTING FIXTURE WITH POLYCARBONATE LENS SWITCHED FROM ENTRANCE OF ELEVATOR PIT. PROVIDE 20 AMPERE DEDICATED GFI RECEPTACLE IN EACH ELEVATOR PIT. DO NOT WIRE LIGHT FIXTURE ON GFI CIRCUIT. WHERE PROVIDED, CONNECT SUMP PUMP IN

ELEVATOR PIT WITH DEDICATED CIRCUIT.

10. INTERCOM SYSTEM: PROVIDE 120V, 20 AMPERE CIRCUIT.

3.6 SPLICES AND TERMINATIONS

A. MAKE SPLICES AND TERMINATIONS EQUIVALENT ELECTRICALLY AND MECHANICALLY TO CONDUCTOR INSULATION B. MAKE SPLICES IN BRANCH CIRCUIT WIRING WITH SOLDER LESS, SCREW-ON CONNECTORS IDEAL, SCOTCHLOCK, T&B OR EQUAL, RATED 600V OF SIZE AND TYPE REQUIRED BY MANUFACTURER'S RECOMMENDATION, WITH TEMPERATURE RATINGS EQUAL TO THOSE OF CABLE INSULATION. INSULATE SPLICES WITH INTEGRAL COVERS OR WITH PLASTIC

RUBBER OR FRICTION TAPE, PERMACAL OR EQUAL TO MAINTAIN INTEGRITY OF CABLE

C. MAKE SPLICES AND TERMINATIONS TO CONDUCTORS #8 AND LARGER WITH CORROSION-RESISTANT, HIGH CONDUCTIVITY, PRESSURE INDENT, HEX SCREW OR BOLT CLAMP CONNECTIONS. WITH OR WITHOUT TONGUES, DESIGNATED SPECIFICALLY FOR INTENDED SERVICE. CONNECTORS FOR CABLES 250 KCMIL AND LARGER SHALL HAVE TWO CLAMPING ELEMENTS OR COMPRESSION INDENTS. TERMINALS FOR BUS CONNECTIONS SHALL HAVE TWO BOLTHOLES. SPLIT BOLT CONNECTORS, BURNDY OR EQUAL SHALL BE ACCEPTABLE FOR ALL SPLICES OF CONDUCTORS #8 AND LARGER. D. MAKE SPLICES AT MOTOR JUNCTION BOXES WITH PRESSURE INDENT CONNECTORS OR SPLIT-BOLT CONNECTORS AS SPECIFIED HEREIN.

E. PROVIDE STANDARD BOLT-ON LUGS WITH ALLEN OF CAP SCREWS TO ATTACH COPPER WIRE AND CABLE TO DISCONNECT SWITCHES AND OTHER ELECTRICAL EQUIPMENT. F. ALL TERMINATIONS SHALL BE PROPERLY TORQUED AS PER MANUFACTURER'S REQUIREMENTS. TOOLS MUST BE CALIBRATED AND BE CERTIFIED

A. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL FITTINGS, CLAMPS, CONDUITS AND WIRE OF PROPER SIZE TO MAKE GROUND CONNECTIONS BETWEEN ALL APPARATUS AND CONDUIT AND THE WATER PIPING AS REQUIRED BY THE LATEST EDITION OF THE MASSACHUSETTS ELECTRICAL CODE. GROUND WIRES SHALL BE RUN IN RIGID CONDUIT OF SIZE REQUIRED BY THE NATIONAL ELECTRICAL CODE. B. THE EQUIPMENT AND MATERIALS REQUIRED UNDER THIS SECTION ARE INCLUDED UNDER

C. GROUND ALL SYSTEMS AND EQUIPMENT IN ACCORDANCE WITH THE BEST INDUSTRY PRACTICE. SIZE ALL CONDUCTORS PER THE LATEST ADDITION OF THE NEC. D. THE GROUND BUS OF THE MAIN DISTRIBUTION SWITCHBOARD AND GENERATOR OUTPUT PANEL BOARD SHALL BE CONNECTED TO THE MAIN GROUNDING ELECTRODE SPECIFIED BELOW BY MEANS OF INSULATED CONDUCTORS RUN IN THREADED STEEL CONDUIT. E. THE MAIN GROUNDING ELECTRODE SHALL BE AN ACCESSIBLE POINT ON THE NEAREST METALLIC MAIN WATER SERVICE PIPE. CONNECTION SHALL BE MADE ON THE STREET SIDE OF THE MAIN VALVE UTILIZING EXOTHERMIC WELDING. BONDING JUMPERS SHAL

BE PROVIDED AROUND THE WATER METERS (IF PROVIDED) AND AROUND INSULATING JOINTS AND/OR SECTIONS. F. THE WATER PIPE GROUND SHALL BE SUPPLEMENTED BY AN ADDITIONAL "MADE" ELECTRODE CONSISTING OF BURIED 1" DIAMETER BY 10'-0" LONG COPPER WELD GROUND RODS SPACE 6'-O" MINIMUM APART, AND PROVIDED IN SUFFICIENT QUANTIT SO AS TO HAVE A MEASURED RESISTANCE TO GROUND OF NOT MORE THAN 25 OHMS. ESTABLISH A BONDING CONNECTION FROM THE "MADE" ELECTRODE CONSISTING OF GREEN INSULATED CONDUCTORS RUN IN THREADED STEEL CONDUIT TO THE COLD WATER

G. ESTABLISH TWO GROUND-BONDING CONNECTIONS FROM STRUCTURAL BUILDING STEEL FROM TWO DIFFERENT LOCATIONS TO THE COLD WATER MAINS ENTERING THE BUILDING H. PROVIDE SUPPLEMENTARY GROUND BONDING WHERE METALLIC CONDUITS TERMINATE AT METAL CLAD EQUIPMENT (OR AT THE METAL PULL BOX OF EQUIPMENT) FOR WHICH A GROUND BUS IS SPECIFIED. ACCOMPLISH THIS BY EQUIPPING THE CONDUITS WITH BUSHINGS OF THE GROUNDING TYPE CONNECTED INDIVIDUALLY BY MEANS OF JUMPERS TO THE GROUND BUS. EXCLUDED THE JUMPERS WHERE DIRECTED. THIS EXCLUSION WILL BE REQUIRED WHERE AN ISOLATED GROUND FOR ELECTRONIC EQUIPMENT IS TO BE

. THE CENTRAL EQUIPMENT FOR THE FIRE PROTECTION ALARM SYSTEM SHALL HAVE ITS GROUNDING TERMINAL CONNECTED TO THE NEAREST METALLIC COLD WATER MAIN BY MEANS OF A #6 GREEN CODED INSULATED CONDUCTOR, RUN IN 3/4" THREADED METALLIC CONDUIT. UTILIZE A GROUND CLAMP OF A TYPE SPECIFICALLY MANUFACTURED FOR THE PURPOSE.

J. FOR EACH FEEDER OR RUN OF LIGHTING AND APPLIANCE BRANCH CIRCUITRY INCLUDE THE INDICATED QUANTITIES OF CONDUCTORS DO NOT INCLUDE THE GROUND WIRES. K. CONDUCTORS UTILIZED FOR GROUNDING AND BONDING SHALL HAVE TYPE OF INSULATION. COMPARABLE TO THE PHASE CONDUCTORS, COLOR CODED GREEN. 3.8 TEMPERATURE CONTROL WIRING

B. ALL FLECTRIC WIRING AND WIRING CONNECTIONS REQUIRED FOR THE INSTALLATION OF THE EMPERATURE CONTROL SYSTEM SHALL BE PROVIDED BY THE TEMPERATURE CONTROL C. ELECTRICAL CONTRACTOR SHALL PROVIDE 120 VOLT CONTROL POWER TO ALL TEMPERATURE 3.9 SLEEVES, INSERTS AND SUPPORTS

A. THE TEMPERATURE CONTROL SYSTEM SHALL BE INSTALLED BY THE HEATING AND AIR

CONDITIONING CONTRACTOR.

A. FURNISH AND INSTALL ALL INSERTS, CONDUIT HANGERS, ANCHORS AND STEEL SUPPORTS NECESSARY FOR THE SUPPORT AND INSTALLATION OF ALL ELECTRICAL EQUIPMENT. B. WHERE OPENINGS ARE REQUIRED IN WALLS AND FLOORS FOR THE PASSING OF RACEWAYS THE ELECTRICAL CONTRACTOR SHALL FURNISH THE GENERAL CONTRACTOR WITH THE NECESSARY INFORMATION REGARDING DIMENSIONS AND LOCATIONS SO THAT HE MAY INSTALL SUITABLE CONCRETE STOPS TO PROVIDE THESE OPENINGS. SUCH OPENINGS SHALL BE BY THE GENERAL CONTRACTOR IN SUCH A MANNER SO AS TO INTERFERE WITH THE FIREPROOF INTEGRITY OF THE BUILDING.

317 Iron Horse Way, C. THE ELECTRICAL CONTRACTOR WILL BE HELD RESPONSIBLE FOR THE LOCATION OF THE Suite 202 AND/OR SET IN PLACE BY HIM. IN THE EVENT THAT FAILURE TO DO SO REQUIRED CUTTING AND PATCHING OF FINISHED WORK, SUCH WORK SHALL BE DONE AT THE ELECTRICAL CONTRACTOR'S EXPENSE BY THE GENERAL CONTRACTOR. Providence, RI 02908

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SHEET TITLE **ELECTRICAL SPECIFICATIONS** 

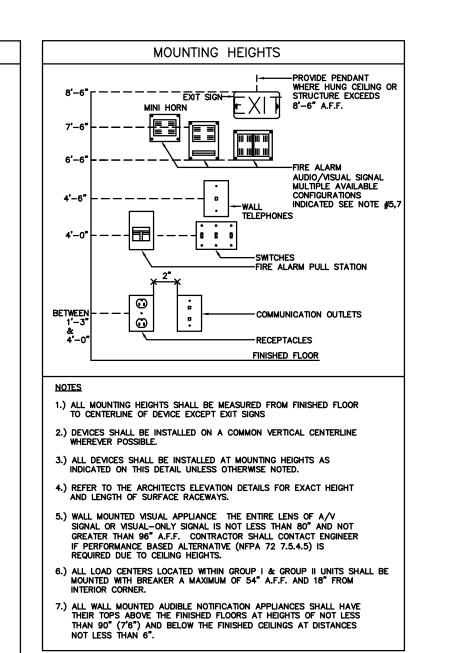
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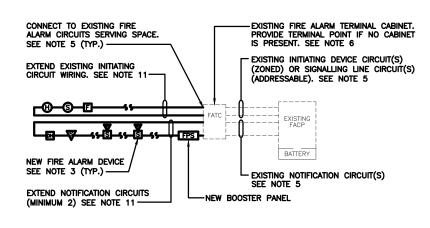


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| MBOL  | DESCRIPTION LIGHT   | ING FIXTURES   | OTES  | SYMBOL   | DESCRIPTION WIRING DEVICE   | NOTES  DES - RECEPTACLES   | SYMBOL  | DESCRIPTION BRANC  | NOTES TH CIRCUITRY  | SYMBOL   | DESCRIPTION<br>FIRE AL   | NOTES ARM SYSTEM  | GENERAL NOTES  |
|---|---|--|---|--|---|--|---|--|---|--|--|---|--|
| P   | WALL OR CEILING<br>MOUNTED LIGHTING<br>FIXTURE  |  | S INDICATE FIXTURE TYPE. CHEDULE FOR MANUFACTURER   | Ф¹   | WALL DUPLEX<br>CONVENIENCE OUTLET<br>MTD 18" AFF  | 20A/125V, 2P, 3W, GNDG., NEMA 5-20R<br>SHADING OF SYMBOL THUS:<br>SUBSCRIPT LOWER CASE LETTERS INDICATE                          | - 1 × 1/  | LIGHTING AND<br>APPLIANCE BRANCH<br>CIRCUITRY CONCEALED  | ARROW HEAD INDICATES HOME RUN<br>CIRCUITRY TO 20A-1P CIRCUIT BREAKER<br>(UNLESS NOTED OTHERWISE)  | F  | MANUAL FIRE ALARM<br>PULL STATION  |   | ALL CONDUITS AND EQUIPMENT SHALL BE INSTALLED AND GROUND IN ACCORDANCE WITH THE LATEST RULES AND REGULATIONS OF THE APPLICABLE LOCAL AND NATIONAL CODES.   |
| 1a<br>FP<br>1a  |   | INDICATE SWITCH CON  | ITROL ASSOCIATIONS  | Φ  | CEILING MOUNTED DUPLEX CONVENIENCE OUTLET   | SWITCH CONTROL ASSOCIATIONS SHADING OF SYMBOL THUS:  |   | ABOVE  | NUMBER OF ARROW HEADS INDICATE NUMBER OF BRANCH POLES REQUIRED IN PANEL CROSS MARKS INDICATE NUMBER OR NO. 12   | জ  | VISUAL ONLY FIRE<br>ALARM DEVICE   |   | 2. CONDUIT RUNS ARE SHOWN DIAGRAMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH EQUIPMENT AND STRUCTURAL CONDITIONS. EXPOSED CONDUITS SHALL BE INSTALLED PARRALEL TO BEAMS AND WALLS. EMPTY CONDUITS SHALL HAVE NYLON PULL LINE.                   |
| [.<br>]   |   | SHADING OF FIXTURES THUS:  |   |  | ISOLATED GROUND DUPLEX CONVENIENCE  | III INDICATES RECEPTACLE MTD 6" ABOVE COUNTER TO CENTER LINE OR 48" AFF UNLESS NOTED OTHERWISE, CONFIRM DEVICE MOUNTING HEIGHT   |   | APPLIANCE BRANCH<br>CIRCUITRY CONCEALED<br>BELOW   | WIRES IN 3/4" CONDUIT PLUS GROUND. ABSENCE OF CROSSMARKS INDICATES 2#12, 1#12 GROUND  | F  | COMBINATION AUDIO<br>AND VISUAL FIRE<br>ALARM DEVICE   |   | CONDUITS SHALL BE TERMINATED SO AS TO PERMIT NEAT CONNECTIONS TO MOTORS AND OTHER EQUIPMENT.  4. NO CONDUIT SMALLER THAN 3/4", NOR WIRE SIZE SMALLER THAN ≱12 A.W.G.   |
| 오 <mark>'</mark> '  | INDICATES FIXTURE ON NIGHT/EMERGENCY CIRCUIT OR EMERGENCY BATTERY BACK UP BALLAST WHERE   |  |   | WALL DOUBLE DUPLEX CONVENIENCE OUTLET  | WITH ARCHITECTURAL ELEVATION PLANS AND/OR<br>CMR 521 9.5.6 AND 39.3.1                                       | $\perp$  | LIGHTING AND<br>APPLIANCE BRANCH<br>RUN EXPOSED       | HOME RUNS ARE INDICATED THUS:  LL2 - 1, 3, 5   | F c   | CEILING MOUNTED AUDIO AND VISUAL FIRE ALARM DEVICE             |  | FOR POWER SHALL BE USED UNLESS OTHERWISE NOTED.  5. THE WIRING DIAGRAMS, QUANTITY AND SIZE OF THE WIRES AND CONDUIT REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS OF ELECTRICAL EQUIPMENT. MODIFICATIONS ACCEPTABLE TO THE                      |  |
| P<br>   | APPLICABLE, CONTRACTOR SHALL CONFIRM LOCATION   |  | #   | WALL MTD SINGLE  | 'WP' — INDICATES WEATHER PROOF 'GFI' DENOTES SELF REGULATING GROUND FAULT INTERRUPTING TYPE RECEPTACLE      |  | INDIVIDUAL RUN<br>TURNING UP                          | "LL2" DENOTES PANEL DESIGNATION. "1,3,5" DENOTES CIRCUIT NO'S 1,3,5 CONTAINING 20A. 1P. CB'S IN PANELBOARD | S   | WALL MOUNTED FIRE ALARM SPEAKER  WALL MOUNTED FIRE             |  | CONSTRUCTION MANAGER MAY BE MADE BY THE CONTRACTOR TO ACCOMMODATE EQUIPMENT ACTUALLY PURCHASED. THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS.   |  |
| P   | EMERGENCY BALLAST SHALL BE SIMILAR TO BODINE B30ST OR B30 WITH INTEGRAL INDICATOR LIGHT TEST SWITCH. PROVIDE 2 LAMP APPLICATION WHERE APPLICABLE. |  | Ψ   | CONVENIENCE OUTLET   | ALL POWER OUTLET FACEPLATES SHALL<br>BE LABELED WITH CIRCUIT NUMBER AND<br>PANEL DESIGNATION FEEDING OUTLET |  | INDIVIDUAL RUN<br>TURNING DOWN                        | CONDUIT RUNS REQUIRING CIRCUIT BREAKER GREATER THAN 20A-1P WIRE SIZE GREATER THAN NO. 12 AND CONDUIT       | <u>s</u>  | ALARM SPEAKER AND<br>STROBE  WALL MOUNTED MINI-HORN            |  | 6. SWITCHES SHALL BE MOUNTED 4'O" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. RECEPTACLES SHALL BE MOUNTED 18" AFF.  7. ALL SURFACE MOUNTED PANELS AND PANELBOARDS ON THE INSIDE OF  |  |
| -0  | EXTERIOR POLE MOUNTED FIXTURE  CONTRACTOR SHALL FURNISH AND INSTALL EMERGENCY TRANSFER RELAY ON ALL SWITHCED EMERGENCY FIXTURES                   |  | #   | HOSPITAL GRADE<br>DUPLEX CONVENIENCE<br>OUTLET                                       | PASS & SEYMOUR 2095-HGTR OR EQUAL   |  | INDIVIDUAL RUN<br>TURNING UP&DOWN                     | SIZE GREATER THAN 3/4" ARE NOTED NOTED THUS:   | <b>M S</b>  | WALL MOUNTED FIRE  |  | EXTERIOR WALLS ABOVE GRADE OR IN OTHER LOCATIONS CONSIDERED AS DAMP, SHALL BE MOUNTED SO AS TO MAINTAIN A 1/4" AIR SPACE BETWEEN THE ENCLOSURE AND THE WALL.  |  |
|   | CONTRACTOR SHALL PROVIDE ALL MOUNTING HARDWARE APPLICABLE TO CEILING, WALL, AND FLOOR TYPE INTO WHICH FIXTURE IS INSTALLED                        |  | USB P   | DUPLEX RECEPTACLE<br>WITH (2) USB PORTS  | HUBBELL: USB20X2 OR EQUAL<br>CONFIRM DEVICE AND FACEPLATE COLOR<br>WITH ARCHITECT                           |  |   | 50A 3P<br>4 #4, 1 #8 GROUND<br>1-1/4" CONDUIT  | M<br>F  | ALARM MINI-HORN/STROBE  LOW FREQUENCY ALARM 520HZ IN ALL ROOMS |  | 8. ALL PANELBOARDS SHALL BE MOUNTED SO THAT THE DISTANCE FROM THE TOP CIRCUIT BREAKER OPERATING HANDLE TO THE FLOOR SHALL NOT EXCEED 6'-6".  9. LIGHTING FIXTURES SHALL BE MOUNTED ACCORDING TO THE MOUNTING HEIGHT   |  |
| CONTRACTOR SHALL COORDINATE MOUNTING HEIGHT WITH ARCHITECTURAL INTERIOR/EXTERIOR ELEVATIONS  CONTRACTOR SHALL COORDINATE AND CONFIRM K RATING OF LAMPS TO ACHIVE COLOR AS |   | Φ  | PLUG LOAD (WIRELESS) CONTROLLABLE RF DUPLEX RECEPTACLE  | LEGRAND: RF26352CDW OR EQUAL<br>CONFIRM DEVICE AND FACEPLATE COLOR<br>WITH ARCHITECT |   |  | RAL CIRCUITRY   | 食  | USED FOR SLEEPING  FIRE ALARM MASTER BOX  |  | GIVEN ON THE DRAWINGS, WITH THE DISTANCE BEING MEASURED FROM THE BOTTOM OF THE LIGHTING FIXTURE TO THE FINISHED FLOOR.  10. FOR LOCATION OF HVAC, PLUMBING, FIRE PROTECTION, AND MISCELLANEOUS |   |  |
|   | DESIRED PER ARCHITECT AND OWNER/TENANT  CONTRACTOR SHALL FURNISH AND SUPPLY ANY STEP DOWN TRANSFORMERS FOR ANY LOW                                |  | •   | DUAL CONTROL  PLUG LOAD (WIRELESS)  CONTROLLABLE RF                                  | LEGRAND: RF26352CHW OR EQUAL<br>CONFIRM DEVICE AND FACEPLATE COLOR  | \$ <b>1111</b>   | BUSWAY  |  | K   | KNOX BOX   |  | EQUIPMENT SEE RESPECTIVE TRADE DRAWINGS.  11. ALL CONDUIT RUNS CROSSING EXPANSION JOINTS SHALL HAVE EXPANSION OR EXPANSION AND DEFLECTION TYPE TITTINGS AS REQUIRED. FOR EXACT LOCATIONS OF EXPANSION JOINTS SEE STRUCTURAL DRAWINGS.                                       |  |
|   | VOLTAGE LIGHTING  CONTRACTOR SHALL FURNISH AND INSTALL 0-10V DIMMING BALLAST FOR LED FIXTURES   |  |   | DUPLEX RECEPTACLE HALF CONTROL   | WITH ARCHITECT FURNISH AND INSTALL PLUG LOAD POWER PACK AND WIRELESS RECEPTACLE CONTROL TRANSMITTERS        |  | CIRCUIT BREAKER BUS<br>PLUG, BREAKERS AS<br>INDICATED |  | H®  | ROTATING FIRE ALARM<br>BEACON LIGHT                            |  | 12. ALL MOTOR STARTER CONTROL TRANSFORMERS SHALL BE SIZED TO PROVIDE SUFFICIENT VOLT—AMPERE CAPACITY FOR OPERATING ALL ELECTRICAL DEVICES ASSOCIATED WITH CONTROL OF THE MOTOR, IN ADDITION TO THE STARTER COIL. IT SHALL INCLUDE RELAYS, TIMERS, MOTOR HEATERS, INDICATING |  |
| 4.  | EMERGENCY LIGHTING  |  | TERY PACKS SHALL HAVE   | H  | WALL MOUNTED  | NUMERAL WITHIN SQUARE DENOTES RECEPTACLE TYPE AS LISTED IN   |   | BUSWAY FEED/   |   | <u></u>  | ELECTRIC BELL PROVIDE (1) DEDICATED 120V CIRCUIT   |   | LIGHTS, ETC.  13. CONDUIT AND WIRE (NOT SHOWN) FOR FIXTURES, SWITCHES AND/OR RECEPTACLES SHALL BE: CONTRACTOR AND SHALL BE:  |
| EB .  | DUAL REMOTE   | REMOTE HEAD CAPAE<br>OTHERWISE   | BILITY UNLESS NOTED   | H9   | SPECIAL PURPOSE<br>POWER RECEPTACLE   | SCHEDULE OF NON-STANDARD RECEPTACLES CONFIRM NEMA PLUG CONFIGURATION WITH OWNER AND TENANTS REPRESENTATIVE                       | '   |  | DF  | FF<br>▼  | FIRE FIGHTER FIRE EMERG PHONE  |   | a. 3/4" (MIN.) CONDUIT RUN  1. EXPOSED IN UNFINISHED AREAS. 2. CONCEALED ABOVE HUNG CEILINGS AND IN WALLS IN FINISHED AREAS. b. NO.12 (MIN.) CU WIRE (MIN.) TYPE "THWN/THNN"   # OF WIRES AS REQUIRED.   |
| 7   | EMERGENCY LIGHTING HEAD  CEILING MOUNTED  |  | LL BE FURNISHED WITH  |  | FOR POWER CONNECTION  | FEED POKE THRIUGH DEVICE<br>ONS TO ELECTRIFIED FURNITURE   | ۶-PE-γ Ì  | IDENTIFICATION OF<br>INDIVIDUAL RUN<br>OTHER THAN BRANCH<br>CIRCUITRY OR<br>SECONDARY FEEDERS              | PE - PRIMARY ELECTRIC SE - SECONDARY ELECTRIC TEL - TELEPHONE TV - TELEVISION CATY CAPIE TELEVISION   | BS   | LOW FREQUENCY ALARM GENERATOR AND BED SHAKER IN EACH HEARING IMPARED UNIT SIMILAR TO LIFETONE HL PLUG IN   |   | 14. FOR EQUIPMENT PAD CONSTRUCTION DETAILS SEE STRUCTURAL DRAWINGS.  15. ALL 120V BRANCH CIRCUITS GREATER THAN 100 LINEAR FEET SHALL BE #10AWG MIN.  |
| ⊗   | EXIT SIGN   | OTHERWISE  APPLICATION OF SHAI   | E BATTERY UNLESS NOTED  DED QUADRANTS AND   | HP>  | 4" SQUARE OUTLET BO<br>IN FURNITURE PARTITIO  | X TO OUTLETS LOCATED<br>NS (SEE FLOOR PLANS)   |   |  | CATY - CABLE TELEVISION<br>E - EMERGENCY  ARY FEEDERS   | <br>   | MODEL OR EQUAL  CEILING MOUNTED CARBON MONOXIDE  |   | 16. THE ELECTRICAL CONTRACTOR SHALL PROVIDE LAYOUTS FOR ALL ELECTRICAL ROOMS BASED ON ACTUAL EQUIPMENT OF MANUFACTURER SELECTED, SUBMIT FOR REVIEW PRIOR TO INSTALLATION.  |
| ₩   | WALL MOUNTED<br>EXIT SIGN   | ARROWS THUS:   | pipsettown  |  | 2 CHANNEL PWR/DATA  | ES — MISCELLANEOUS  LEGRAND TELE-POWER SERIES OR EQUAL   |   | FEEDER RUN<br>CONCEALED ABOVE  | ARROW HEAD INDICATES HOME RUN TO PANEL BOARD  |  | DETECTOR   |   | 17. PROVIDE ELECTRICAL OUTLET PLATE GASKET SEALS AT RECEPTACLES, SWITCHES AND OTHER ELECTRICAL BOXES ON EXTERIOR WALLS AND ON INTERIOR WALLS BETWEEN CONDITIONED AND NON-CONDITIONED SPACES.   |
|   | SWITCHING / LI  | CHEVERONS AS REQUISED FA   |   | PP   | POWER POLE WITH ELEC<br>DEVICES AND PLATES  2 PIECE SURFACE MTD   | LEGRAND OR EQUAL   |   | FEEDER RUN<br>CONCEALED BELOW  | FEEDER SIZING SHOWN ON POWER RISER DIAGRAM  | FACP   | FIRE ALARM<br>CONTROL PANEL  | COMBINATION SMOKE DETECTOR/CARBON MONOXIDE VISUAL ALARM FOR HEARING IMPAIRED.   | 18. THE ELECTRICAL CONTRACTOR SHALL SUBMIT A PLAN FOR APPROVAL SHOWING 18. ALL ELECTRICAL TELEPHONE, SECURITY, FIRE ALARM, COMMUNICATION AND OTHER SYSTEMS CONDUITS IN SLAB AND ABOVE CEILING ETC COORDINATE WITH OTHER TRADES AND BUILDING'S STRUCTURE TO AVOID ANY CONFLICT. |
| s <sub>wP</sub>   | SINGLE POLE SWITCH  | 20A 120-277V AC "WP" - INDICATES   | SUBSCRIPT LOWER CASE LETTERS INDICATE SWITCH CONTROL  |  | RACEWAY WITH 20A<br>DUPLEX RECEPTACLES<br>CONFIRM SPACING<br>WITH ARCHITECT                                 | UNLESS NOTED OTHERWISE, ALL RACEWAY SHALL BE METAL   |   | FEEDER RUN AS PER<br>SPECIFIC NOTATION   |   | FAA  | FIRE ALARM<br>ANNUNCIATOR PANEL  | BRK MODEL SL177 OR EQUAL  COMBINATION SMOKE DETECTOR/ VISUAL ALARM FOR HEARING  | 19. ALL TERMINATION LUGS SHALL BE SIZED ACCORDINGLY TO ACCOMMODATE INDICATED CONDUCTORS.   |
| SP  | SINGLE POLE SWITCH<br>WITH PILOT LIGHT  | - WEATHER PROOF  | ASSOCIATIONS SUBSCRIPT UPPER CASE LETTERS DENOTE  | <b>₽</b> √ <b>₽</b>  | 2 PIECE MULTI-CHANNEL<br>RACEWAY WITH 20A<br>DUPLEX RECEPTACLES<br>AND DATA OUTLETS                         | LEGRAND OR EQUAL UNLESS NOTED OTHERWISE, ALL RACEWAY SHALL BE METAL  | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \                 |  | SYMBOLS   | RTS  | REMOTE TEST<br>STATION   | (S) IMPAIRED.   | 20. THE ELECTRICAL CONTRACTOR SHALL SUBMIT PLANS FOR APPROVAL SHOWING ALL COMMUNICATIONS EQUIPMENT AND DEVICES THROUGHOUT THE BUILDING. THE ELECTRICAL CONTRACTOR SHALL ALSO LABEL AND IDENTIFY ALL CONDUITS THAT SERVE DIFFERENT SYSTEMS.                                     |
| S2  | DOUBLE POLE SWITCH  |  | SWITCH TYPE AS<br>LISTED IN NON-<br>STANDARD SWITCHES   |  | CONFIRM SPACING WITH ARCHITECT FLUSH FLOOR MOUNTED  | POKE THRU APPLICATION:   |   | INDEX SYMBOL   | HEXAGONAL SYMBOLS CONTAINING TWO UPPER CASE LETTERS INDICATE REFERENCE TO A SCHEDULE OF SPECIAL EQUIPMENT   | ⊦®   | REMOTE INDICATOR ALARM DEVICE  | VISUAL ALARM FOR HEARING MIMPAIRED.   | 21. REFER TO THE ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS     FOR EXACT LOCATIONS OF ALL LIGHT FIXTURES.  22. COORDINATE LOCATIONS OF ALL LIGHT FIXTURES IN MECHANICAL AND ELECTRICAL ROOMS WITH LAYOUT OF EQUIPMENT, PIPING AND DUCTWORK.                         |
| S3  | THREE-WAY SWITCH  |  | UNLESS NOTED OTHERWISE SWITCHES SHALL BE MOUNTED 48" TO CENTER LINE AFF                               |  | POWER/DATA CONVIENCE<br>RECEPTACLES   | 2 HOUR RATED. LEGRAND RC SERIES OR EQUAL. COORDINATE FINAL POWER AND TEL/DATA TERMAINTIONS WITH TENANT                           |   |  | HEXAGONAL SYMBOLS CONTAINING UPPER CASE LETTERS AND NUMERICALS INDICATE REFERENCE TO SCHEDULE OF MECHANICAL EQUIPMENT   | <u>\$</u>  | SMOKE DETECTOR  HEAT DETECTOR  | DETECTOR TYPE SUBSCRIPT:  L LOCAL 120V DETECTOR WITH INTEGRAL BATTERY BACKUP R RECEIVER UNIT  | 23. ALL EXIT SIGNS SHALL BE UNSWITCHED.  24. ALL SWITCHED LIGHT FIXTURES CIRCUITED TO A NORMAL/EMERGENCY CIRCUIT   |
| S4  | FOUR-WAY SWITCH  SPRING WOUND   | TORK OR EQUAL  | 10 10 02.112.1 2.12 1.11  |  |   | FLOOR TRENCH APPLICATION:  DEEP RECTANGULAR CAST IRON BOX LEGRAND EVOLUTION SERIES OR EQUAL                                      |   |  | HEXAGONAL SYMBOLS CONTAINING<br>NUMERICALS ONLY INDICATE REFERENCE<br>TO AN EXPLANATION OF ELECTRICAL   | θ  | WALL MOUNTED:  | T TRANSMITTER UNIT D IN DUCT DETECTOR E ELEVATOR RECALL   | ARE TO BE WIRED WITH AN EMERGENCY BY—PASS RELAY.  25. ALL 20 AMPERE, SINGLE POLE CIRCUITS SHALL BE PROVIDED WITH A SEPARATE FULL SIZE NEUTRAL CONDUCTOR.   |
| ST  | INTERVAL TIME SWITCH<br>WITHOUT HOLD  | 30 MIN MAX   | PROVIDE 0-10V DIMMER  |  |   | PROVIDE 1°C FROM TEL/DATA TO 6° ABOVE ACCESSIBLE CEILING. CONTRACTOR SHALL SUPPLY ALL COVERS AND PLATES TO COMPLETE INSTALLATION |   | GANGING CROSS<br>REFERENCE   | WORK REQUIREMENT  THE NOTED INDICATION ADJACENT TO A DEVICE DENOTES THAT THE DEVICE IS TO   | HH (4)   | SMOKE DETECTOR HEAT DETECTOR CARBON MONOXIDE   | B BEAM TYPE PHOTOELECTRIC SA SUPPLY AIR DUCT DETECTOR RA RETURN AIR DUCT DETECTOR CO COMBINATION SMOKE/CARBON   | 26. CONFIRM EXACT POWER REQUIREMENTS AND CONNECTION LOCATIONS FOR ALL EQUIPMENT WITH THE PLUMBING, FIRE PROTECTION, HVAC AND GENERAL CONTRACTOR.  27. PROVIDE AN SOU KIT FOR ALL MECH EQUIPMENT RATED LESS THAN 1/2HP  |
| KS  | LINE VOLTAGE  | ELVIION ON ENOME   | WHERE REQUIRED FOR<br>LED LIGHTING FIXTURES   |  |   | TOTION BOXES   |   |  | BE GANGED IN A BOX WITH ANOTHER DEVICE SIMILARLY NOTED AT THE SAME LOCATION ON ANOTHER DRAWING  | <u>+⊚</u>  | SPRINKLER SYSTEM MONITOR   | MONOXIDE DETECTOR  MONITOR TYPE:  | (TYP).  28. CERTAIN SYMBOLS IN THE SYMBOL LIST DO NOT APPEAR ELSEWHERE IN THE DRAWNOS. SUCH SYMBOLS ARE INCLUDED TO PERMIT INTERPRETATIONS TO BE   |
| D   | 0-10V SLIDE DIMMER  | LEVITON ILLUMATECH<br>#IP710-LF  |   | 0  | CEILING MOUNTED JUNCTION BOX  |  |   | SPECIAL MOUNTING<br>HEIGHT INDICATIONS   | DIMENSION NOTED IN PARENTHESIS ADJACENT TO ANY ITEM OF THE DRAWINGS INDICATES THE HEIGHT OF IT'S HORIZONTAL CENTERLINE ABOVE FINISHED FLOOR                     | TS   | FS WATER FLOW TS TAMPER SWITCH PS DRY ALARM  | MM MONITORING MODULE  CM CONTROL MODULE   | MADE IN THE EVENT OF DESIGN CHANGES.  29. ELECTRICAL CONTRACTOR SHALL MAINTAIN RATING OF ANY CEILING, WALL, FLOOR OR ANY BUILDING STRUCTURE THAT ANY ELECTRICAL SYSTEM PENETRATES. SEE ARCHITECTURAL PLAN FOR RATINGS.   |
| (S)   | CEILING MOUNTED CORRIDOR OCCUPANCY SENSOR (80' oc)  | WATT STOPPER:<br>W-2000H   | CONTRACTOR SHALL FURNISH AND INSTALL ALL APPROPRIATE POWER  | Ю  | WALL MOUNTED<br>JUNCTION BOX  |  |   | EXISTING EL  | ECTRICAL EQUIPMENT  | PS   | PRESSURE SWITCH  MAGNETIC DOOR HOLDER  | PROVIDE CONNECTION TO DOOR HARDWARE INTEGRAL HOLDERS  | 30. ELECTRICAL CONTRACTOR SHALL CONFIRM THAT ALL SUBMITTED LED DRIVERS ARE FCC COMPLIANT AND THAT ALL SUBMITTED LIGHTING FIXTURES ARE UL LISTED.   |
| (S) 2   | CEILING MOUNTED DUAL TECHNOLOGY   | WATT STOPPER:<br>DT-300  | PACKS, RELAYS, CABLES,<br>CONTROL MODULES, AND<br>CONTACTORS TO COMPLETE<br>SYSTEM INSTALLATION       | J  | SURFACE MOUNTED JUNCTION BOX  |  | ETR   | EXISTING EQUIPMENT   | ALL EXISTING TO REMAIN LIGHTING SHALL BE CLEANED AND RELAMPED  CONTRACTOR SHALL VERIFY THAT ALL EXISTING TO REMAIN ELECTRICAL DEVICES                           | SK   | SMOKE EXHAUST<br>FAN KEY SWITCH  |   | ADDDELWATIONS  |
|   | SENSOR (1,600 sf)  CEILING MOUNTED  OCCUPANCY SENSOR  | WATT STOPPER:<br>HB300   | SUBSCRIPT LOWER CASE<br>LETTERS INDICATE<br>SWITCH LEG CONTROL  | <b>O</b>   | FLUSH FLOOR MOUNTED JUNCTION BOX  JUNCTION BOX WITH   | P - DENOTES POWER FEED   | E   | TO BE REMOVED  EXISTING EQUIPMENT  | ARE OPERATIONAL & FUNCTIONAL IF ETR DEVICES ARE NOT OPERATIONAL, IT SHALL BE REPLACED WITH A NEW DEVICE OF THAT TYPE. ALL REPLACED DEVICES SHALL MATCH EXISTING |  | ADDRESSABLE CONTROL<br>OR MONITOR MODULE   | MODULE SUBSCRIPT TYPE: C CONTROL MODULE   | ABBREVIATIONS  ABBR ABBREVIATIONS L LENGTH A/AMP AMPERE LA LIGHTNING ARRESTOR  |
| (83)  | WALL MOUNTED  | HB-L2W WATT STOPPER:   | CONTRACTOR SHALL<br>COORDINATE AND<br>CONFIRM ALL SENSOR  | <b>O</b>   | FLEXIBLE CONNECTION TO EQUIPMENT  | C - DENOTES COMMUNICATIONS FEED  | A .   | TO BE REMOVED AND RELOCATED  NEW LOCATION OF RELOCATED EXISTING  | CONTRACTOR SHALL EXTEND AND CONNECT EXISTING WIRING TO NEW LOCATION OF RELOCATED EQUIPMENT.   |  | SECURITY/INTERC  | M MONITOR MODULE COM/ACCESS SYSTEMS   | AC ALTERNATING CURRENT LP LIGHTING PANEL A/C AIR CONDITIONING LTG LIGHTING AFF ABOVE FINISHED FLOOR LV LOW VOLTAGE AFG ABOVE FINISHED GRADE  |
| <u>(s)</u>  | DUAL TECHNOLOGY<br>OCCUPANCY SENSOR<br>WALL MOUNTED   | DSW-301 WATT STOPPER:  | SETTING AND TIME DELAYS WITH OWNER OR TENANTS REPRESENTATIVE  |  | MOTORS  | AND CONTROLS  COMPLETE INFO. FOR MOTOR IS INDICATED BY APPLICATION OF INDEXING SYMBOLS   | F   | RELOCATED EXISTING EQUIPMENT  REMOVE EXISTING DEVICE AND REINSTALL NEW                                     | CONTRACTOR SHALL REPLACE EXISTING WIRING BACK TO SOURCE IF NECESSARY IF EXISTING WIRING DOES NOT REACH RELOCATED EQUIPMENT. CONTRACTOR                          | DB <sub>PB</sub>   | ILLUMINATED DOOR BELL<br>PUSH BUTTON   | EDWARDS C200 SERIES KIT OR EQUAL  | ARCH ARCHITECTURAL M METER ATC AUTOMATIC TEMPERATURE MM MILLIMETER CONTROL MCB MAIN CIRCUIT BREAKER ATS AUTOMATIC TRANSFER SWITCH MEC MASS ELECTRIC COMPANY  |
| ©s)_ab  | DUAL TECHNOLOGY<br>DUAL RELAY SENSOR  | DSW-302  |   |  | MAGNETIC MOTOR  | REFERENCE TO SCHEDULE OF MECHANICAL EQUIPMENT  SUBSCRIPT COMPLETE INFORMATION  |   | DEVICE IN SAME LOCATION  DOTTED DENOTES EXISTING ELECTRICAL  | SHALL EVALUATE CONDITION OF EXISTING WIRING AND REPLACE IF NECESSARY.   | DBC  | DOOR BELL<br>CHIME/BELL  | CONTRACTOR SHALL PROVIDE 120V<br>AT CHIME/BELL LOCATION   | AUTO AUTOMATIC MECH MECHANICAL MFR MANUFACTURER MLO MAIN LUG ONLY BIS BYPASS ISOLATOR SWITCH MISC MISCELLANEOUS  |
| (F)   | CEILING MOUNTED<br>WIRELESS RECEPTACLE<br>TRANSMITTER   | WATT STOPPER:<br>WRC-TX SERIES   |   |  | STARTER COMPLETE W/ THERMAL OVERLOAD PROTECTION MANUAL MOTOR  | INDICATES NEMA SIZE FOR CONTROL ITEMS IS INDICATED BY THE APPLICATION OF INDEXING SYMBOL   |   | EQUIPMENT  |   | $\nabla$   | HEARING IMPAIRED PHONE STROBE  | WHEELOCK PS11AWPW OR EQUAL  | C CONDUIT CATV CABLE TELEVISION N NEUTRAL CAB CABINET N/C NORMALLY CLOSED  |
| H@B   | WALL MOUNTED<br>DIMMABLE<br>OCCUPANCY SENSOR  | WATT STOPPER:<br>(0-10V) PW-311<br>(120/277) PW-100D   | FURNISH AND INSTALL<br>BALLAST COMPATIBLE<br>WITH DIMMABLE SENSOR                                     | \$   | STARTER (THERMAL<br>OVERLOAD SWITCH)  | REFERENCE APPLIED TO ASSOCIATED EQUIP.  REFER TO HVAC  |   | NURSE / EME<br>NURSE CALL<br>PATIENT PULL CHORD  | RGENCY CALL SYSTEMS   | ₹  | HEARING IMPAIRED INTERCOM STROBE   | WHEELOCK RSSG24110NW OR EQUAL   | CB CIRCUIT BREAKER NEC NATIONAL ELECTRIC CCTV CLOSED CIRCUIT TELEVISION CODE CKT CIRCUIT NEMA NATIONAL ELECTRICAL CL CENTERLINE MANUFACTURERS CM CENTINETER  |
| (SS)  | CEILING MOUNTED<br>ON/OFF DAYLIGHT<br>HARVEST SENSOR  | WATT STOPPER:<br>LS-102  |   | [VFD]  | VARIABLE FREQUECY<br>DRIVE  | SCHEDULE FOR<br>MOTOR LOAD<br>HORSEPOWER SIZE  | Y   | NURSE CALL PATIENT DOME LIGHT  |   | ₹  | HEARING IMPAIRED<br>DOORBELL STROBE  | WHEELOCK RSSG24110NW OR EQUAL   | CM CENTIMETER ASSOCIATION CLG CEILING NIC NOT IN CONTRACT CO COMPANY NL NIGHT LIGHTING CKT COL COLUMN N/O NORMALLY OPEN  |
| TR  | SELF POWERED<br>TRANSFER RELAY  | ILC TR SERIES<br>OR EQUAL  | CONTRACTOR SHALL FURNISH<br>AND INSTALL ALL RELAYS<br>AND MODULES TO COMPLETE<br>SYSTEM INSTALLATION  | СР   | CONTROL PANEL<br>(MECHANICAL EQUIP)   | FURNISHED AND INSTALLED BY OTHERS. WIRED BY THE ELECTRICAL CONTRACTOR  |   | NURSE CALL DUTY STAFF STATION  |   | CR   | PROXIMITY CARD READER  | UNLESS NOTED OTHERWISE, CONTRACTOR<br>SHALL FURNISH AND INSTALL BACKBOX<br>AT DEVICE LOCATION AND 1" CONDUIT  | C/T CURRENT TRANSFORMER NO NUMBER CW COOL WHITE OC ON CENTER DET DETAIL O/C OVERCURRENT DIA DIAMETER   |
| το  | 7 DAY ASTRONOMICAL<br>PROGRAMMABLE<br>TIME CLOCK  | TORK OR EQUAL  | CONTRACTOR SHALL COORDINATE AND CONFIRM PROGRAMMING SCHEDULE  | _  | DISTRIBU SURFACE MOUNTED PANEL  | TION EQUIPMENT   |   | NURSE CALL<br>ANNUNCIATOR PANEL  |   | КР   | KEY PAD  | ABOVE NEAREST ACCESSIBLE CEILING  | DIA DIAMETER OL OVERLOAD DISC DISCONNECT DN DOWN PB PULL BOX DP DISTRIBUTION PANEL PH PHASE DPDT DOUBLE POLE DOUBLE PNL PANEL  |
|   | LOW VOLTAGE<br>1, 3, AND 4 WAY  | WATT STOPPER:<br>DCC2 SERIES   | WITH OWNER  CONTRACTOR SHALL FURNISH AND INSTALL  |  | FLUSH MOUNTED PANEL   |  |   | EMERGENCY CALL   |   | DC   | DOOR CONTACT  ELECTRIC DOOR STRIKE   |   | DPDT DOUBLE POLE DOUBLE PNL PANEL THROW PP PUMP DPST DOUBLE POLE SINGLE PRI PRIMARY THROW P/T POTENTIAL TRANSFORMER DT DUST TIGHT  |
| CRP   | LIGHTING CONTROL RELAY PANEL  | OR EQUAL  WATT STOPPER: LP8 SERIES   | ALL NECESSARY POWER PACKS, RELAYS, CABLES, CONTROL MODULES, WIRING, AND CONTACTORS TO COMPLETE SYSTEM | TVSSI  | SURGE SUPPRESSION   | PROVIDE PER SPECIFICATIONS   | I   | PULL CORD  EMERGENCY CALL  |   | ES   | LOCAL DOOR ALARM   |   | DWG DRAWING PVC POLYVINYL CHLORIDE  EA EACH EC ELECTRICAL CONTRACTOR  PCCEPT PCCEPTACLE  |
|   | GUEST ROOM  | OR EQUAL  WATT STOPPER: HS SERIES  | COMPLETE SYSTEM<br>INSTALLATION   | TVSS   | TRANSFORMER   | SEE ELECTRICAL PLANS FOR KVA RATING  |   | DOME LIGHT  EMERGENCY CALL   |   | HMD  | WALL MOUNTED<br>MOTION DETECTOR  |   | EL ELEVATION REC RECESSED ELEC ELECTRIC RPA RELAY PANEL ES ENERGY SAVING   |
| MS  | TELECOM   | MUNICATION S   | YSTEMS  |  | METER SOCKET  | METER SOCKET PROVIDED BY CONTRACTOR  |   | REMOTE STATION  EMERGENCY CALL   |   | (A)  | CEILING MOUNTED MOTION DETECTOR  |   | EX EXISTING SEC SECONDARY  FOR FEEDER SP SPARE  FLR FLOOR SPECS SPECIFICATIONS  FLU FLOORSCENT SPKLR SPRINKLER   |
| MHNC  | MODULAR HOME NETWORK CENTER PROVIDE (1) DEDICATED 120V CIRCUIT  | MODULAR HOME NETW<br>47606-AHT, 476TL-T<br>47605-4CS IN 49605  | VORKING CENTER SHALL BE LEVITON<br>12, 476TM-EX5, 47690-462, AND<br>5-30W ENCLOSURE OR EQUAL WITH     | M  | AND METER  CHECK METER  | PROVIDED BY LOCAL UTILITY CO.  E-MON/D-MON CLASS 2000 OR EQUAL.  |   | AUTOMATIC EXTERNAL   | PROVIDE DEDICATED 120V POWER CONNECTION.  | (SP)   | CEILING MOUNTED PUBLIC ADDRESS SPEAKER   |   | FLUO FLUORESCENT SPRINKLER SW SWITCH  GEN GENERATOR GFI GROUND FAULT INTERRUPTER TB TERMINAL BOARD TEL TELEPHONE   |
|   | AND DUPLEX RECEPTACLE WALL MOUNTED  | 120V CIRCUIT.  4"x4" SQUARE OUTLE  | ET BOX WITH 1"C, PULL STRING  | M  |   | MATCH BUILDING STANDARD  |   | DEFIBRILLATOR POWER CONNECTION   | CONFIRM LOCATION AND QUANTITY WITH ARCHITECT AND TENANT REPRESENTATIVE  | CCTV △   | CLOSED CIRCUIT<br>TELEVISION CAMERA  |   | GFP GROUND FAULT PROTECTOR TV TELEVISION GND GROUND TVSS TRANSIENT VOLTAGE SURGE SUPPRESSION TVP TYPICAL   |
| $\frac{\nabla}{-}$  | WALL MOUNTED  | CEILING  | SHING TO ABOVE ACCESSIBLE   |  | OVERCURRENT AND/OR<br>SWITCHING DEVICE<br>"WP" — INDICATES  | COMPLETE INFORMATION FOR DEVICES IS INDICATED BY APPLICATION OF TAG SYMBOLS  |   | AREA OF RES  | COUE/REFUGE SYSTEM  CORNELL: CONTRACTOR SHALL A-4204 SERIES FURNISH AND INSTALL   | нс   | HANDICAP ACCESS<br>PUSH BUTTON   |   | HGT HEIGHT U.N.O. UNLESS NOTED OTHERWISE HID HIGH INTENSITY DISCHARGE V VOLTS LAMP VA VOLT AMPERAGE  |
| <u> </u>  | COMBINATION TEL/DATA OUTLET WALL MOUNTED  |  | WER FEED<br>ODULAR FURNITURE BEZEL  |  | WEATHER PROOF   | 30 INDICATES UNFUSED SWITCH 30 - FRAME SIZE  | ARA]  | MAIN CONTROL PANEL  AREA OF RESCUE  NDICATOR LIGHT WITH  | OR EQUAL  CORNELL: SWITCHES TO COMPLETE SN-B SERIES SYSTEM.   | SCP  | SECURITY CONTROL<br>PANEL  | CONTRACTOR SHALL PROVIDE 120V<br>AT ALL MAIN SYSTEM PANEL LOCATIONS   | HO HIGH OUTPUT VAC VACUUM HP HORSE POWER VENT VENTILATING HPS HIGH PRESSURE SODIUM VFD VARIABLE FREQUENCY HVAC HEATING, VENTILATION AND DRIVE HVAC HEATING, VENTILATION AND VALUE VAPOR TICHT  |
| ▼   | TEL OUTLET  |  | DATA OUTLETS BY OTHERS  |  |   | INDICATES FUSED SWITCH  30 - FRAME SIZE  15 - FUSE SIZE  ICLI INDICATES ENCLOSED   |   | VANDAL RESISTANT<br>AREA OF RESCUE   | OR EQUAL  PROVIDE 120V POWER  AT EACH DEVICE  | IAP  | INTRUSION ALARM<br>PANEL   |   | AIR CONDITIONING VT VAPOR TIGHT HZ HERTZ HV HIGH VOLTAGE W WATT ON WIRE IN INCHES W/ WITH WE WEATHERDROOF  |
|   | FOR TEL/DATA CONNE  | ED FURNITURE FEED POKE THROUGH DEVICE //DATA CONNECTIONS TO ELECTRIFIED FURNITURE  |   |  |   | CIRCUIT BREAKER  |   | CALL STATION   | OR EQUAL CONFIRM ARCU ZONE QUANTITY WITH RB STATION QUANTITIES ON FLOOR PLANS   | INTP   | MAIN VIDEO INTERCOM<br>PANEL   | REFER TO SPECIFICATIONS   | INCAND INCANDESCENT WP WEATHERPROOF  JB JUNCTION BOX KV KILOVOLT KVA KILOVOLT—AMPERES  |
| <b>T</b> ~  | HOLE COVERPLATE FO  | " SQUARE OUTLET BOX WITH 1 1/2" GROMMETTED OLE COVERPLATE FOR TEL/DATA CONNECTION TO LECTRIFIED FURNITURE PARTITIONS, MOUNTED 8" AFF |   |  |   |  |   |  | POWER PACK: CORNELL: B-5248A WITH BATTERY   | ıs   | VIDEO INTERCOM STATION TALK/ACCESS   |   | KVA KILOVOLT-AMPERES KW KILOWATT   |
| Ÿ   | WALL MOUNTED<br>CABLE TV OUTLET   | STUBBED 6" ABO   | JTLET BOX WITH 1" CONDUIT<br>VE ACCESSIBLE CEILING<br>FOR MOUNTING HEIGHT                             | н  | WALL MOUNTED<br>EMERGENCY POWER<br>OFF BUTTON WITH SHIELD   | SAFETY TECHNOLOGY INTERNATIONAL OR EQUAL   |   |  | OR P-512243A WITH UFE SAFETY CIRCUIT OR EQUAL   | vc   | INTERCOM SPEAKER<br>VOLUME CONTROL   |   |  |
|   | <u> </u>  |  |   |  | <u>i</u>  |  |   |  |   |  | i  |   |  |





- ALL WIRING SHALL BE IN ACCORDANCE WITH INSTALLED SYSTEM MANUFACTURER'S REQUIREMENTS AND SHALL BE IN EMT CONDUIT UNLESS USE OF MC CABLE IS APPROVED BY THE BUILDING OWNER'S REPRESENTATIVE. JUNCTION BOXES AND CONDUIT COUPLINGS SHALL BE PAINTED RED. MC CABLE ARMOR, IF ALLOWED SHALL BE RED.
- 2. RISER DIAGRAM IS DIAGRAMMATIC, REFER TO FLOOR PLANS FOR EXACT QUANTITIES AND LOCATIONS OF EQUIPMENT.
- 3. FIRE ALARM DEVICES SHALL MATCH EXISTING TYPE, MANUFACTURER AND STYLE AND BE LISTED FOR USE WITH THE EXISTING SYSTEM. NEW DEVICES WITH STROBES SHALL MEET ADA AND NFPA
- 4. TEST SYSTEM PER NFPA 72 AND LOCAL AUTHORITIES REQUIREMENTS. OWNER'S FIRE ALARM SERVICE CONTRACTOR SHALL PERFORM ALL REQUIRED TESTING. THE COST FOR THIS WORK SHALL BE INCORPORATED INTO ELECTRICAL CONTRACTOR'S BID.
- COORDINATE EXISTING SYSTEM WIRING CLASS AND STYLE WITH OWNER'S REPRESENTATIVE AND FIRE ALARM SERVICE CONTRACTOR. MATCH EXISTING WIRING STANDARDS UNLESS OTHERWISE DIRECTED.
- 6. ALL WIRING CONNECTIONS SHALL BE MADE ON TERMINAL BLOCKS. NO SPLICING IS ALLOWED. COORDINATE RESIZING AND REPLACEMENT OF ANY END-OF-LINE RESISITORS (IF APPLICABLE) WITH OWNER'S FIRE ALARM SERVICE CONTRACTOR.
- 8. ALL NECESSARY PROGRAMMING SHALL BE PERFORMED BY OWNER'S FIRE ALARM SERVICE CONTRACTOR. THE COST FOR THIS WORK SHALL BE INCORPORATED INTO ELECTRICAL CONTRACTOR'S BID.
- 9. FURNISH ALL REQUIRED COMPONENTS, CARDS, MODULES, RELAYS, CONTACTS AND WIRING IN MAIN FACP OR SUB-PANEL SERVING THE AREA OF WORK TO ACCOMODATE RENOVATION WORK. ALL WORK IN THESE PANELS SHALL BE PERFORMED BY OWNER'S FIRE ALARM SERVICE CONTRACTOR. THE COST FOR THIS WORK SHALL BE INCORPORATED INTO ELECTRICAL CONTRACTOR'S BID.
- 10. PROVIDE ADDITIONAL NAC EXTENSION PANELS AND/OR POWER SUPPLIES IF EXISTING SYSTEM BATTERY CAPACITY IS INSUFFICIENT FOR ADDED LOADS.
- 11. PROVIDE DUAL NOTIFICATION CIRCUITS WHERE REQUIRED BY CODE OR LOCAL AUTHORITY HAVING JURISDICTION.
- 12. NOTIFICATION CIRCUITS SHALL BE SYNCHRONIZED.
- 13. PER NFPA 72 SECTION 5.7.1.11 SMOKE DETECTORS SHALL NOT BE INSTALLED UNTIL AFTER THE CONSTRUCTION CLEAN UP OR ALL TRADES IS COMPLETE AND FINAL.
- 14. COMBINATION SMOKE/CO DETECTORS SHALL EMPLOY BOTH SIMULATED VOICE AND TONE ALARM FEATURES WHICH CLEARLY DISTINGUISHES BETWEEN CARBON MONOXIDE AND SMOKE NOTIFICATION, IN ACCORDANCE WITH NFPA 720.5.3.4 AND 527 CMR 31.00. 15. CONTRACTOR SHALL TEST AND CONFIRM THAT EXISTING FIRE ALARM SYSTEM HAS CAPACITY TO ACCOMMODATE NEW BUILDING 4 FIRE ALARM DEVICES. IF NECESSARY, CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY POWER BOOSTER PANELS, NODE PANELS, AND OR TRANSPONDER PANELS TO ACCOMMODATE NEW DEVICES TO INTERFACE WITH EXISTING FIRE ALARM SYSTEM

Fire Alarm Riser Diagram

Scale: None

BREWSTER THORNTON GROUP **ARCHITECTS** 

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FIRE

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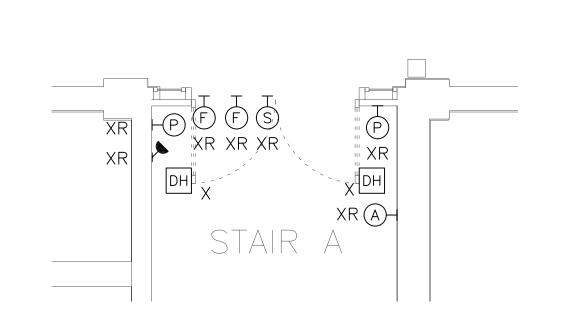
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SHEET TITLE ELECTRICAL SYMBOL LEGEND AND

NOTES Wozny/Barbar & Associates, Inc. 1076 Washington Street 161 Exchange Street

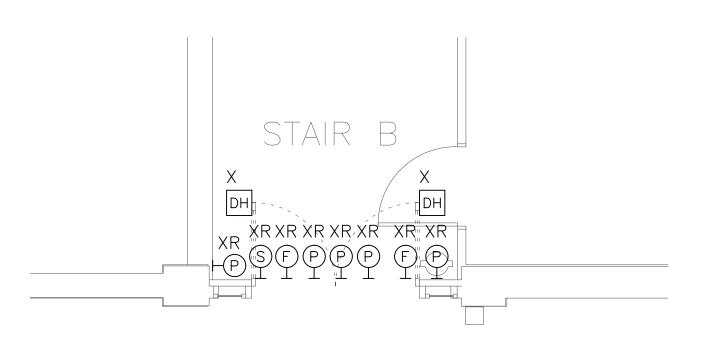
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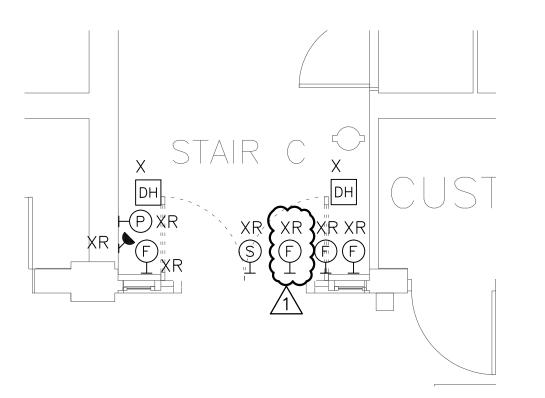


Bsmt FI Existing Stair A

Scale: 1/4"=1'-0

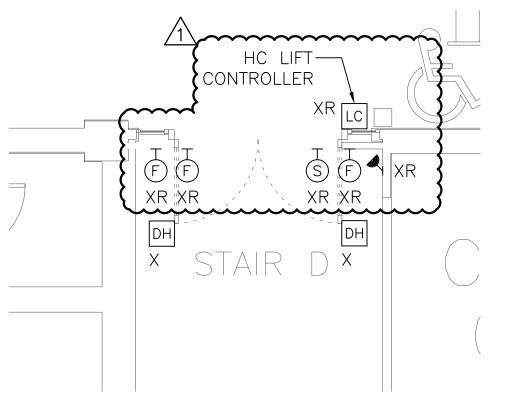


2) Bsmt Fl Existing Stair B
Scale: 1/4"=1'-0



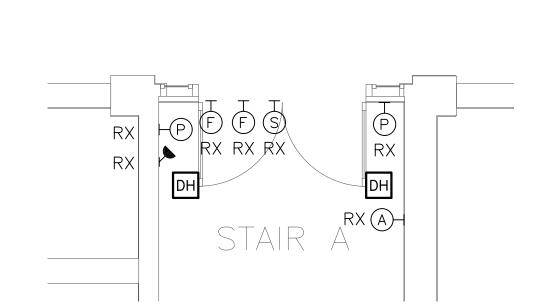
Bsmt FI Existing Stair C

Scale: 1/4"=1'-



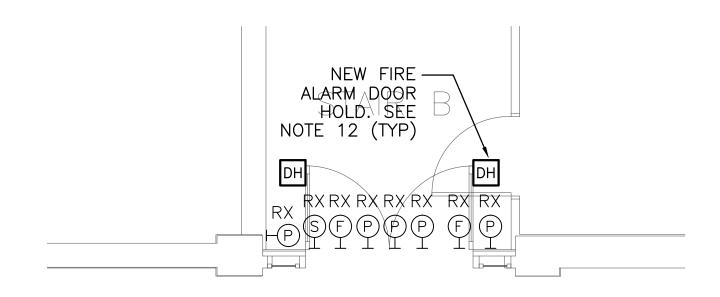
Bsmt FI Existing Stair D

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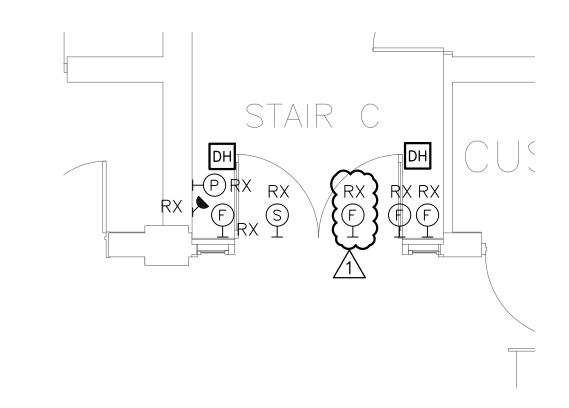
5 Bsmt Fl Proposed Stair A

Scale: 1/4"=1"-0"

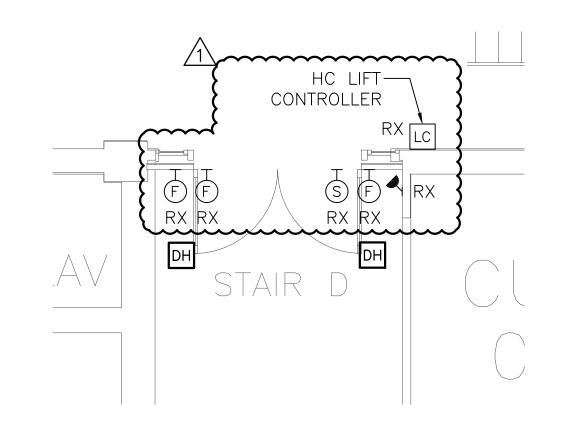


Bsmt Fl Proposed Stair B

Scale: 1/4"=1'-0"



Bsmt Fl Proposed Stair C
Scale: 1/4"=1'-0"



Bsmt Fl Proposed Stair D

Scale: 1/4"=1'-0"

## ELECTRICAL DEVICE KEY:

- A AUDIO LOW VOLTAGE DEVICE, JUNCTION BOX AND RACEWAY. SEE KEY NOTE 1
- F FIRE ALARM JUNCTION BOX, LB, & RACEWAY
- 120V POWER JUNCTION BOX, LB, & RACEWAY
- S SECURITY LOW VOLTAGE DEVICE, JUNCTION BOX AND RACEWAY. SEE KEY NOTE 1
- DH FIRE ALARM DOOR HOLD DEVICE
- FAPS FIRE ALARM POWER SUPPLY
- CTRL BUILDING SYSTEM CONTROL PANEL, JUNCTION BOX, RACEWAY. SEE KEY NOTE 1
- FCGCP NEW FIRE ALARM CURTAIN GROUP CONTROL PANEL. SEE ELECTRICAL NOTE 18

## ▶ **♣** SURFACE MOUNTED EMERGENCY FIXTURE

## KEY NOTES:

 CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL RELOCATED BUILDING SYSTEMS, LOW VOLTAGE DEVICES AND RACEWAY WITH ARCHITECT. CONFIRM ROUTING OF EXTENDED RACEWAY WITH ARCHITECT. LOW VOLTAGE SHOWN ON ELECTRICAL PLANS FOR REFERNCE ONLY.

# ELECTRICAL NOTES:

- 1. LIMIT OF SCOPE LINE INDICATES THE APPROXIMATE AREA OF RENOVATION THAT ELECTRICAL SYSTEMS MAY BE RELOCATED OR REMOVED. SCOPE OF DEMOLITION SHOWN ON PLANS ARE PARTIAL ONLY FOR THE CONTRACTORS CONVENIENCE AND NOT INTENDED TO SHOW ALL EXISTING CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS TO INCLUDE ALL NECESSARY WORK TO MODIFY AND EXTEND EXISTING SYSTEMS, WIRING, ETC. AS REQUIRED TO ACCOMMODATE THE NEW ARCHITECTURAL FLOOR PLAN.
- 2. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY NECESSARY RE-FEEDING OF EQUIPMENT OR DEVICES TO MAINTAIN CIRCUIT CONTINUITY OF EXISTING EQUIPMENT REMAINING.
- 3. ELECTRICAL CONTRACTOR SHALL MAINTAIN INTEGRITY OF FIRE ALARM WIRING SO NOTIFICATION DEVICES OUTSIDE SCOPE OF WORK REMAIN ACTIVE DURING RENOVATION.
- 4. ALL EXISTING DEVICES AND EQUIPMENT TO BE REMOVED DISCONNECT, REMOVE, AND DISPOSE ALL RACEWAY AND WIRING BACK TO ASSOCIATED PANEL.
- COORDINATE SHUT DOWN OF BASE BUILDING ELECTRICAL AND FIRE ALARM SYSTEMS WITH SCHOOL FACILITIES.
   DISCONNECT, MAKE SAFE, AND REMOVE ALL TEMPORARY AND ABANDONED WIRE WITHIN THE LIMIT OF WORK.
- DISCONNECT, MAKE SAFE, AND REMOVE ALL TEMPORARY AND ABANDONED WIRE WITHIN THE LIMIT OF WORK.
   ELECTRICAL CONTRACTOR SHALL RELOCATE ANY AND ALL EXISTING ELECTRICAL DEVICES AND RACEWAY WITHIN AREA OF RENOVATION. CONFIRM AND COORDINATE RENOVATION SCOPE WITH ARCHITECT. EXTEND AND CONNECT EXISTING WIRING AND RACEWAY TO NEW LOCATION OF RELOCATED EQUIPMENT. CONTRACTOR SHALL EVALUATE

CONDITION OF EXISTING WIRING AND RACEWAY AND REPLACE BACK TO SOURCE IF NECESSARY. CONTRACTOR

LOCATION OF RELOCATED EQUIPMENT.

8. ELECTRICAL CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL LOW VOLTAGE DEVICES AND ROUTING OF LOW VOLTAGE RACEWAY WITH ARCHITECT.

SHALL REPLACE EXISTING WIRING, BACK TO SOURCE, IF EXISTING EXTENDED WIRING DOES NOT REACH

- 9. ALL NEW EQUIPMENT SHALL MATCH BASE BUILDING STANDARDS AND SPECIFICATIONS, UNLESS NOTED OTHERWISE. ALL NEW EQUIPMENT SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM.
- 10. ALL POWER DEVICE FACEPLATES, COVERS, AND DISCONNECTS SHALL BE LABELED WITH CIRCUIT NUMBER AND PANEL DESIGNATION.

11. ALL SURFACE MOUNTED INTERIOR CONDUIT SHALL BE EMT (ELECTRIC METAL TUBING) CONFIRM ROUTING

- OF ALL SURFACE MOUNTED RACEWAY WITH ARCHITECT.

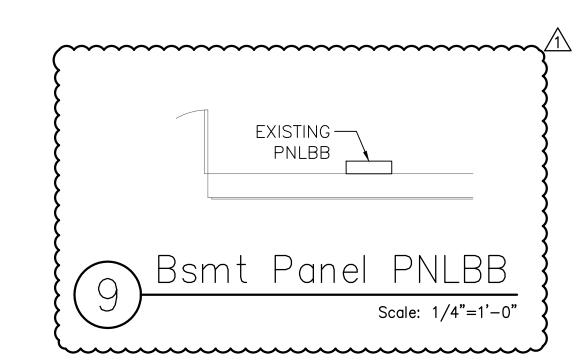
  12. CONTRACTOR SHALL WIRE NEW DOOR HOLDS FROM EXISTING POWER SOURCE CURRENTLY SERVING EXISTING DOOR HOLDS. IF REQUIRED, CONTRACTOR SHALL FURNISH AND INSTALL MODULES AND RELAYS TO
- 13. ALL NEW EQUIPMENT SHALL MATCH BASE BUILDING STANDARDS AND SPECIFICATIONS, UNLESS NOTED OTHERWISE. ALL NEW EQUIPMENT SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM.

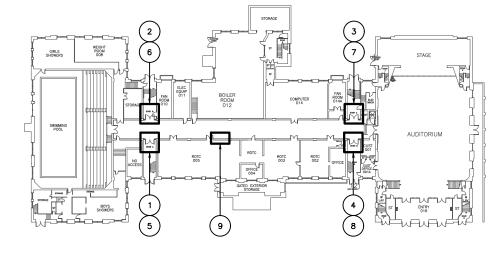
INTEGRATE NEW DOOR HOLDS WITH EXISTING FIRE ALARM SYSTEM.

- 14. FIRE ALARM DEVICES AND COMPONENTS SHALL BE NEW AND WIRED BACK TO THE EXISTING FIRE ALARM CONTROL PANEL. CONTRACTOR TO PROVIDE ALL REQUIRED DEVICES AND EQUIPMENT NECESSARY TO EXPAND EXISTING SYSTEM. CONTRACTOR TO ENSURE ALL NEW DEVICES AND RELATED EQUIPMENT ARE COMPATIBLE WITH THE EXISTING SYSTEM. CONTRACTOR TO MATCH EXISTING DEVICE MOUNTING HEIGHTS WITHIN ADA REQUIREMENTS. WHERE EXISTING HEIGHTS DO NOT MEET CURRENT ADA REQUIREMENTS MOUNT NEW, RELOCATED AND REINSTALLED DEVICES AT HEIGHTS LISTED IN MTG HEIGHT DETAIL ON DRAWING EO. ALL FIRE ALARM STROBES TO BE SYNCHRONIZED WITH EXISTING BLDG STROBES. CONTRACTOR SHALL REPLACE ALL EXISTING FIRE ALARM DEVICES IF THEY ARE NOT SYNCHRONIZABLE. PROVIDE A COMPLETE TEST OF THE ENTIRE FIRE ALARM SYSTEM UPON COMPLETION OF THE INSTALLATION THE SYSTEM SHALL MEET ALL REQUIREMENTS OF THE NFPA AND LOCAL CODES. COORDINATE EXACT REQUIREMENTS WITH LOCAL FIRE DEPARTMENT PRIOR TO WORK BEING PERFORMED.
- 15. CONTRACTOR SHALL PROVIDE AN NFPA 241 IMPAIRMENT PLAN TO THE AHJ & OWNER FOR REVIEW AND APPROVAL BEFORE COMMENCEMENT OF WORK.
- 16. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ANY AND ALL NEW FIRE ALARM MODULES, RELAYS AND ASSOCIATED EQUIPMENT TO ADD NEW FIRE ALARM DEVICES TO THE EXISTING SYSTEM.
- 17. CONTRACTOR SHALL FURNISH AND INSTALL FIRE RATED SEALANT FOR ALL CONDUITS PENETRATING

NEW FIRE RATED STAIRWELLS.

- 18. ELECTRICAL CONTRACTOR SHALL WIRE NEW FIRE CURTAIN GROUP CONTROL PANEL TO EXISTING 120/208V CORRIDOR PANEL PNL4B. CONTRACTOR SHALL FURNISH AND INSTALL (1) NEW 20A/1P BREAKER WITHIN WITHIN PANEL TO POWER NEW CONTROL PANEL. BREAKER SHALL BE COMPAITABLE WITH EXISTING PANEL. CONTRACTOR SHALL FURNISH AND INSTALL (2) 4—CORE, 14 AWG STRANDED CONDUCTORS FROM GCP PANEL TO NEW CURTAIN. CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY FIRE ALARM MODULES, RELAYS, INITIATING DEVICES, SMOKE DETECTORS FOR NEW CURTAIN TO INTEGRATE WITH EXISTING TOLMAN SCHOOL FIRE ALARM CONTROL SYSTEM. CONFIRM GCP LOCATION AND OPTIONS WITH ARCHITECT.
- 19. ELECTRICAL CONTRACTOR SHALL WIRE NEW FIRE CURTAIN GROUP CONTROL PANEL TO EXISTING 120/208V CORRIDOR PANEL PNL3B. CONTRACTOR SHALL FURNISH AND INSTALL (1) NEW 20A/1P BREAKER WITHIN WITHIN PANEL TO POWER NEW CONTROL PANEL. BREAKER SHALL BE COMPAITABLE WITH EXISTING PANEL. CONTRACTOR SHALL FURNISH AND INSTALL (2) 4—CORE, 14 AWG STRANDED CONDUCTORS FROM GCP PANEL TO NEW CURTAIN. CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY FIRE ALARM MODULES, RELAYS, INITIATING DEVICES, SMOKE DETECTORS FOR NEW CURTAIN TO INTEGRATE WITH EXISTING TOLMAN SCHOOL FIRE ALARM CONTROL SYSTEM. CONFIRM GCP LOCATION AND OPTIONS WITH ARCHITECT.
- 20. ELECTRICAL CONTRACTOR SHALL WIRE NEW FIRE CURTAIN GROUP CONTROL PANEL TO EXISTING 120/208V CORRIDOR PANEL PNL2B. CONTRACTOR SHALL FURNISH AND INSTALL (1) NEW 20A/1P BREAKER WITHIN WITHIN PANEL TO POWER NEW CONTROL PANEL. BREAKER SHALL BE COMPAITABLE WITH EXISTING PANEL. CONTRACTOR SHALL FURNISH AND INSTALL (2) 4—CORE, 14 AWG STRANDED CONDUCTORS FROM GCP PANEL TO NEW CURTAIN. CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY FIRE ALARM MODULES, RELAYS, INITIATING DEVICES, SMOKE DETECTORS FOR NEW CURTAIN TO INTEGRATE WITH EXISTING TOLMAN SCHOOL FIRE ALARM CONTROL SYSTEM. CONFIRM GCP LOCATION AND OPTIONS WITH ARCHITECT.
- 21. ELECTRICAL CONTRACTOR SHALL CONFIRM SPARE SPACE AND CAPACITY WITHIN EXISTING PANELS PNLBB, PNL2B, PNL3B, AND PNL4B. ELECTRICAL NOTES ARE BASED ON ENGINEERS VISUAL OBSERVATIONS ONLY. PANELS APPEAR TO HAVE SPARE SPACES. IF REQUIRED, CONTRACTOR SHALL UTILIZE SPARE SPACES WITHIN EXISTING PANEL PNLBB TO FEED NEW SMOKE CURTAIN CONTROL PANELS ON FLOORS 2, 3, AND FOOR.





A Basement Key Plan

Scale: None

Wozny/Barbar & Associates, Inc.
C O N S U L T I N G E N G I N E E R S

1076 Washington Street
Hanover, MA 02339
Tel: (781) 826-4144
Fax: (781) 924-5792
www.wbaengineers.com

JOB NO. DATE
24115 11.25.24

ISSUE: RIDE REVIEW

 NO.
 REVISION DESCRIPTION
 DATE

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 Addendum #1
 01/08/25

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**UPGRADE** 

CODE

FIRE

AM

BREWSTER

THORNTON

**ARCHITECTS** 

317 Iron Horse Way,

Providence, RI 02908

brewsterthornton.com

Suite 202

401.861.1600

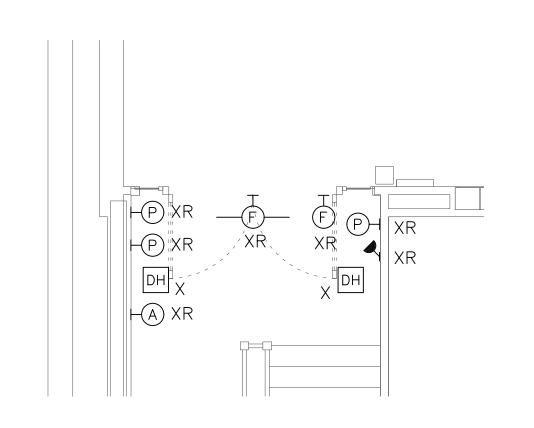
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SHEET TITLE

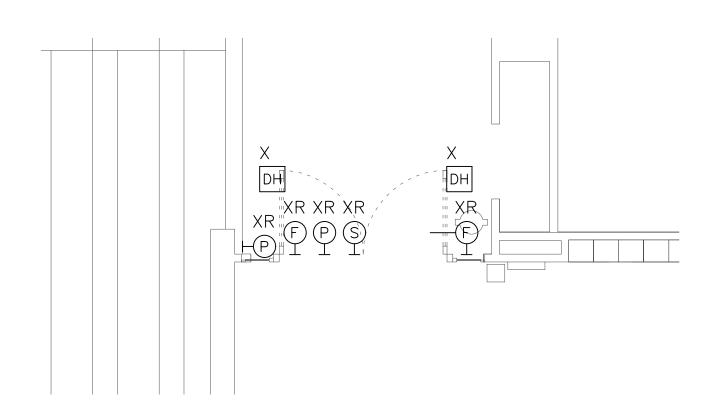
ELECTRICAL

BASEMENT
PLANS

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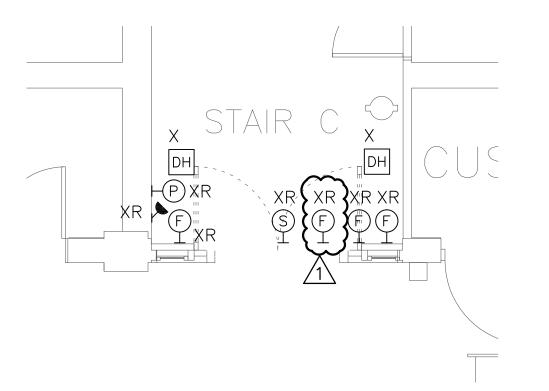


1st FI Existing Stair A
Scale: 1/4"=1'-0



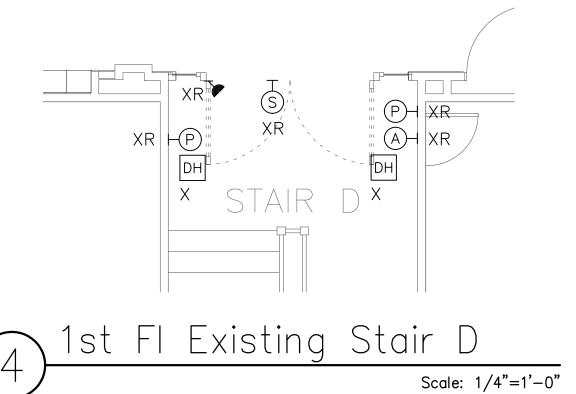
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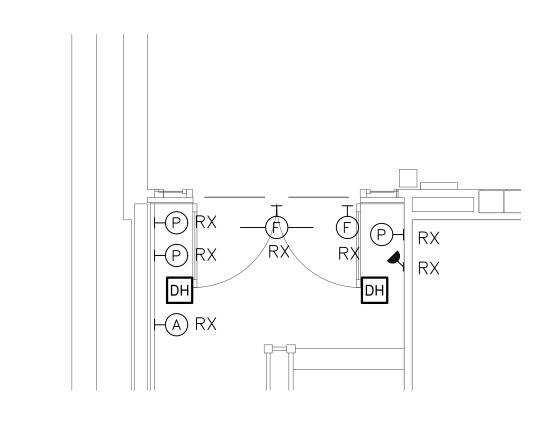
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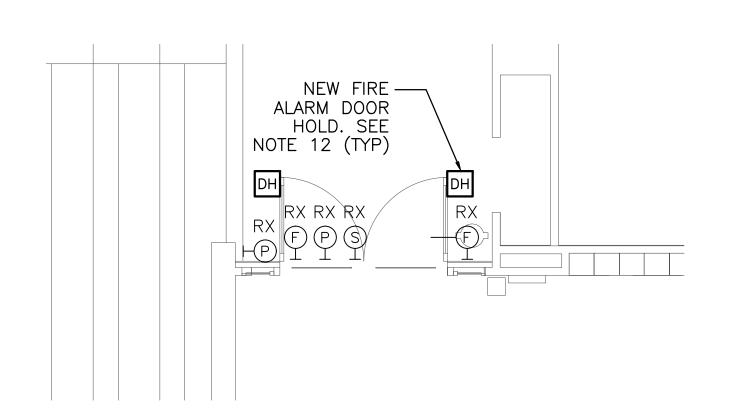
3 1st FI Existing Stair C

Scale: 1/4"=1'-0'



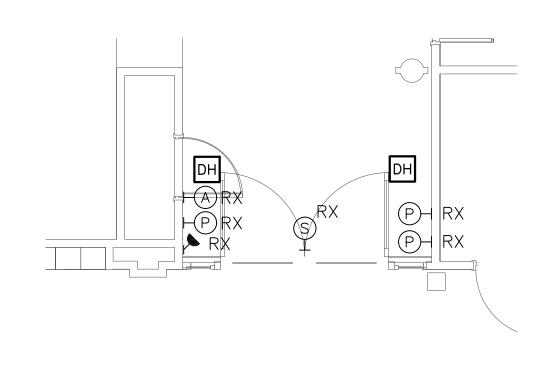


5 1st FI Proposed Stair A
Scale: 1/4"=1'-0"

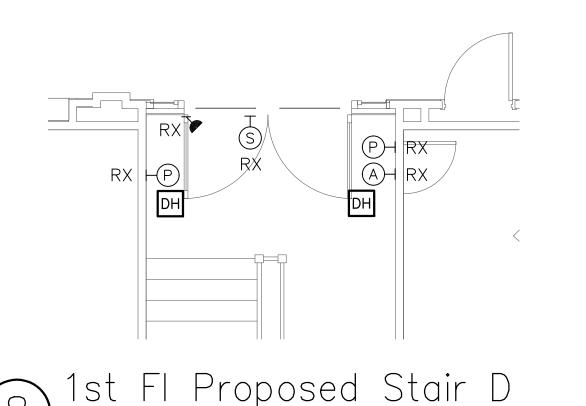


6 1st FI Proposed Stair B

Scale: 1/4"=1'-0"



7 1st FI Proposed Stair C
Scale: 1/4"=1'-0"



ELECTRICAL DEVICE KEY:

- A AUDIO LOW VOLTAGE DEVICE, JUNCTION BOX AND RACEWAY. SEE KEY NOTE 1
- F FIRE ALARM JUNCTION BOX, LB, & RACEWAY
- P 120V POWER JUNCTION BOX, LB, & RACEWAY
- S SECURITY LOW VOLTAGE DEVICE, JUNCTION BOX AND RACEWAY. SEE KEY NOTE 1
- DH FIRE ALARM DOOR HOLD DEVICE
- FAPS FIRE ALARM POWER SUPPLY
- CTRL BUILDING SYSTEM CONTROL PANEL, JUNCTION BOX, RACEWAY. SEE KEY NOTE 1
- FCGCP NEW FIRE ALARM CURTAIN GROUP CONTROL PANEL. SEE ELECTRICAL NOTE 18

▶ ♣ SURFACE MOUNTED EMERGENCY FIXTURE

## KEY NOTES:

 CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL RELOCATED BUILDING SYSTEMS, LOW VOLTAGE DEVICES AND RACEWAY WITH ARCHITECT. CONFIRM ROUTING OF EXTENDED RACEWAY WITH ARCHITECT. LOW VOLTAGE SHOWN ON ELECTRICAL PLANS FOR REFERNCE ONLY.

# ELECTRICAL NOTES:

- 1. LIMIT OF SCOPE LINE INDICATES THE APPROXIMATE AREA OF RENOVATION THAT ELECTRICAL SYSTEMS MAY BE RELOCATED OR REMOVED. SCOPE OF DEMOLITION SHOWN ON PLANS ARE PARTIAL ONLY FOR THE CONTRACTORS CONVENIENCE AND NOT INTENDED TO SHOW ALL EXISTING CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS TO INCLUDE ALL NECESSARY WORK TO MODIFY AND EXTEND EXISTING SYSTEMS, WIRING, ETC. AS REQUIRED TO ACCOMMODATE THE NEW ARCHITECTURAL FLOOR PLAN.
- 2. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY NECESSARY RE-FEEDING OF EQUIPMENT OR DEVICES TO MAINTAIN CIRCUIT CONTINUITY OF EXISTING EQUIPMENT REMAINING.
- 3. ELECTRICAL CONTRACTOR SHALL MAINTAIN INTEGRITY OF FIRE ALARM WIRING SO NOTIFICATION DEVICES OUTSIDE SCOPE OF WORK REMAIN ACTIVE DURING RENOVATION.
- 4. ALL EXISTING DEVICES AND EQUIPMENT TO BE REMOVED DISCONNECT, REMOVE, AND DISPOSE ALL RACEWAY AND WIRING BACK TO ASSOCIATED PANEL.
- 5. COORDINATE SHUT DOWN OF BASE BUILDING ELECTRICAL AND FIRE ALARM SYSTEMS WITH SCHOOL FACILITIES.
- 6. DISCONNECT, MAKE SAFE, AND REMOVE ALL TEMPORARY AND ABANDONED WIRE WITHIN THE LIMIT OF WORK.

  7. ELECTRICAL CONTRACTOR SHALL RELOCATE ANY AND ALL EXISTING ELECTRICAL DEVICES AND RACEWAY WITHIN

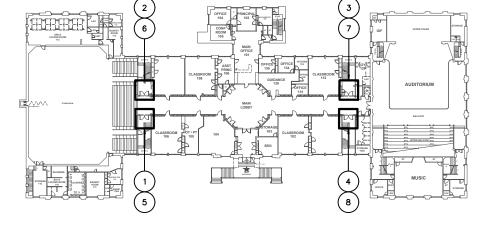
AREA OF RENOVATION. CONFIRM AND COORDINATE RENOVATION SCOPE WITH ARCHITECT. EXTEND AND CONNECT

EXISTING WIRING AND RACEWAY TO NEW LOCATION OF RELOCATED EQUIPMENT. CONTRACTOR SHALL EVALUATE

- CONDITION OF EXISTING WIRING AND RACEWAY AND REPLACE BACK TO SOURCE IF NECESSARY. CONTRACTOR SHALL REPLACE EXISTING WIRING, BACK TO SOURCE, IF EXISTING EXTENDED WIRING DOES NOT REACH LOCATION OF RELOCATED EQUIPMENT.

  8. ELECTRICAL CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL LOW VOLTAGE DEVICES
- 8. ELECTRICAL CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL LOW VOLTAGE DEVICES AND ROUTING OF LOW VOLTAGE RACEWAY WITH ARCHITECT.
- 9. ALL NEW EQUIPMENT SHALL MATCH BASE BUILDING STANDARDS AND SPECIFICATIONS, UNLESS NOTED OTHERWISE. ALL NEW EQUIPMENT SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM.
- 10. ALL POWER DEVICE FACEPLATES, COVERS, AND DISCONNECTS SHALL BE LABELED WITH CIRCUIT NUMBER AND PANEL DESIGNATION.
- 11. ALL SURFACE MOUNTED INTERIOR CONDUIT SHALL BE EMT (ELECTRIC METAL TUBING) CONFIRM ROUTING OF ALL SURFACE MOUNTED RACEWAY WITH ARCHITECT.
- 12. CONTRACTOR SHALL WIRE NEW DOOR HOLDS FROM EXISTING POWER SOURCE CURRENTLY SERVING EXISTING DOOR HOLDS. IF REQUIRED, CONTRACTOR SHALL FURNISH AND INSTALL MODULES AND RELAYS TO INTEGRATE NEW DOOR HOLDS WITH EXISTING FIRE ALARM SYSTEM.
- 13. ALL NEW EQUIPMENT SHALL MATCH BASE BUILDING STANDARDS AND SPECIFICATIONS, UNLESS NOTED OTHERWISE. ALL NEW EQUIPMENT SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM.

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- 15. CONTRACTOR SHALL PROVIDE AN NFPA 241 IMPAIRMENT PLAN TO THE AHJ & OWNER FOR REVIEW AND APPROVAL BEFORE COMMENCEMENT OF WORK.
- 16. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ANY AND ALL NEW FIRE ALARM MODULES, RELAYS AND ASSOCIATED EQUIPMENT TO ADD NEW FIRE ALARM DEVICES TO THE EXISTING SYSTEM.
- 17. CONTRACTOR SHALL FURNISH AND INSTALL FIRE RATED SEALANT FOR ALL CONDUITS PENETRATING NEW FIRE RATED STAIRWELLS.
- 18. ELECTRICAL CONTRACTOR SHALL WIRE NEW FIRE CURTAIN GROUP CONTROL PANEL TO EXISTING 120/208V CORRIDOR PANEL PNL4B. CONTRACTOR SHALL FURNISH AND INSTALL (1) NEW 20A/1P BREAKER WITHIN WITHIN PANEL TO POWER NEW CONTROL PANEL. BREAKER SHALL BE COMPAITABLE WITH EXISTING PANEL. CONTRACTOR SHALL FURNISH AND INSTALL (2) 4—CORE, 14 AWG STRANDED CONDUCTORS FROM GCP PANEL TO NEW CURTAIN. CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY FIRE ALARM MODULES, RELAYS, INITIATING DEVICES, SMOKE DETECTORS FOR NEW CURTAIN TO INTEGRATE WITH EXISTING TOLMAN SCHOOL FIRE ALARM CONTROL SYSTEM. CONFIRM GCP LOCATION AND OPTIONS WITH ARCHITECT.
- 19. ELECTRICAL CONTRACTOR SHALL WIRE NEW FIRE CURTAIN GROUP CONTROL PANEL TO EXISTING 120/208V CORRIDOR PANEL PNL3B. CONTRACTOR SHALL FURNISH AND INSTALL (1) NEW 20A/1P BREAKER WITHIN WITHIN PANEL TO POWER NEW CONTROL PANEL. BREAKER SHALL BE COMPAITABLE WITH EXISTING PANEL. CONTRACTOR SHALL FURNISH AND INSTALL (2) 4-CORE, 14 AWG STRANDED CONDUCTORS FROM GCP PANEL TO NEW CURTAIN. CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY FIRE ALARM MODULES, RELAYS, INITIATING DEVICES, SMOKE DETECTORS FOR NEW CURTAIN TO INTEGRATE WITH EXISTING TOLMAN SCHOOL FIRE ALARM CONTROL SYSTEM. CONFIRM GCP LOCATION AND OPTIONS WITH ARCHITECT.
- 20. ELECTRICAL CONTRACTOR SHALL WIRE NEW FIRE CURTAIN GROUP CONTROL PANEL TO EXISTING 120/208V CORRIDOR PANEL PNL2B. CONTRACTOR SHALL FURNISH AND INSTALL (1) NEW 20A/1P BREAKER WITHIN WITHIN PANEL TO POWER NEW CONTROL PANEL. BREAKER SHALL BE COMPAITABLE WITH EXISTING PANEL. CONTRACTOR SHALL FURNISH AND INSTALL (2) 4—CORE, 14 AWG STRANDED CONDUCTORS FROM GCP PANEL TO NEW CURTAIN. CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY FIRE ALARM MODULES, RELAYS, INITIATING DEVICES, SMOKE DETECTORS FOR NEW CURTAIN TO INTEGRATE WITH EXISTING TOLMAN SCHOOL FIRE ALARM CONTROL SYSTEM. CONFIRM GCP LOCATION AND OPTIONS WITH ARCHITECT.
- 21. ELECTRICAL CONTRACTOR SHALL CONFIRM SPARE SPACE AND CAPACITY WITHIN EXISTING PANELS PNLBB, PNL2B, PNL3B, AND PNL4B. ELECTRICAL NOTES ARE BASED ON ENGINEERS VISUAL OBSERVATIONS ONLY. PANELS APPEAR TO HAVE SPARE SPACES. IF REQUIRED, CONTRACTOR SHALL UTILIZE SPARE SPACES WITHIN EXISTING PANEL PNLBB TO FEED NEW SMOKE CURTAIN CONTROL PANELS ON FLOORS 2, 3, AND FOOR.



Scale: 1/4"=1'-0"

(A) 1st Floor Key Plan



NO. REVISION DESCRIPTION

1 Addendum #1

SHEET TITLE

ELECTRICAL

1 of FLOOP

ISSUE: RIDE REVIEW

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**UPGRADE** 

CODE

FIRE

BREWSTER

THORNTON

**ARCHITECTS** 

317 Iron Horse Way,

Providence, RI 02908

brewsterthornton.com

11.25.24

Suite 202

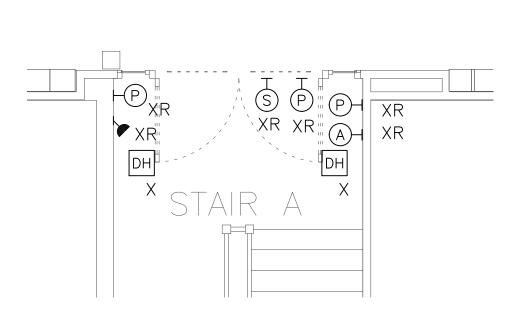
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GROUP

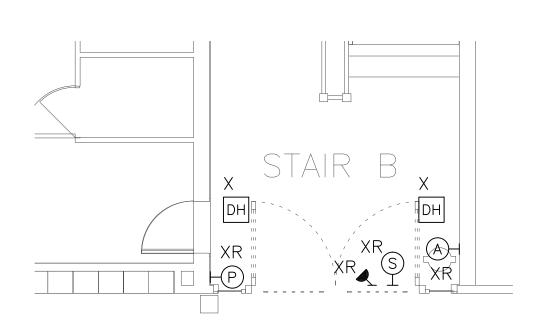
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SHEET

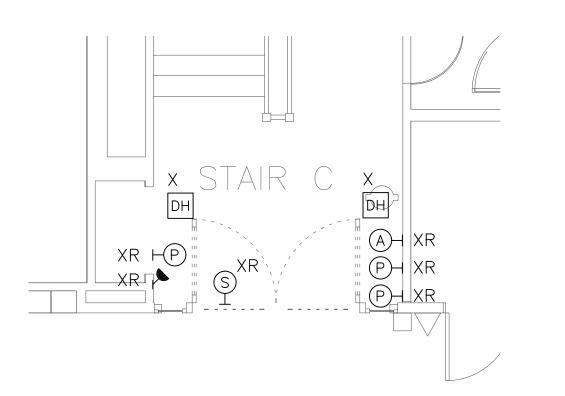
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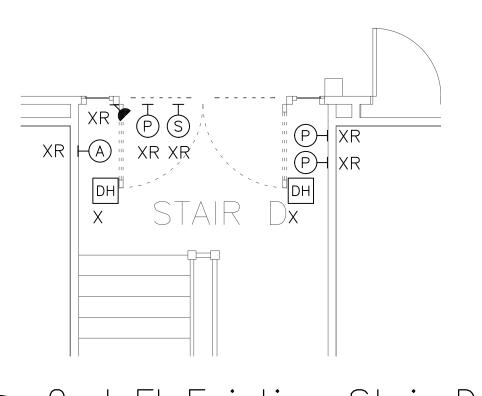








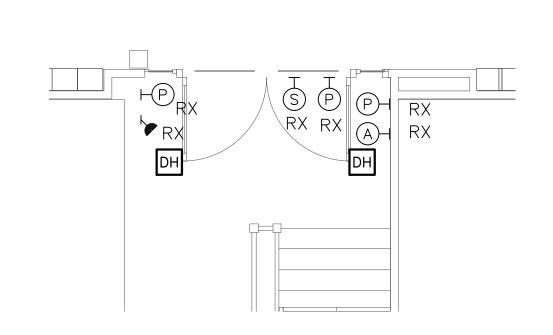
2nd Fl Existing Stair C



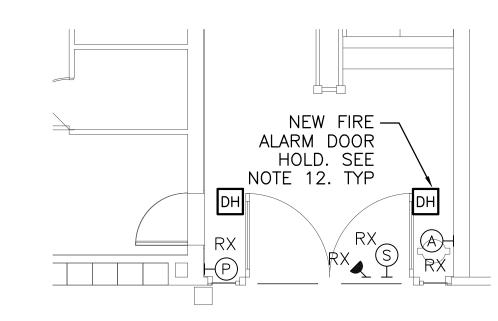
2nd Fl Existing Stair D



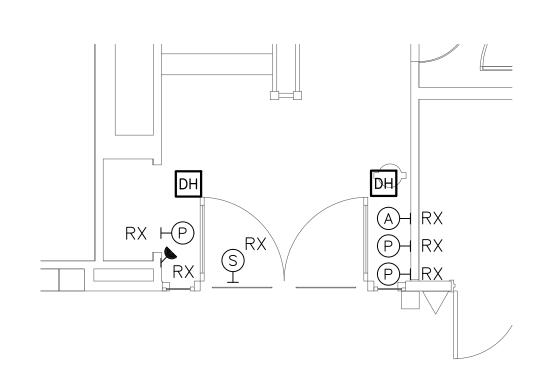






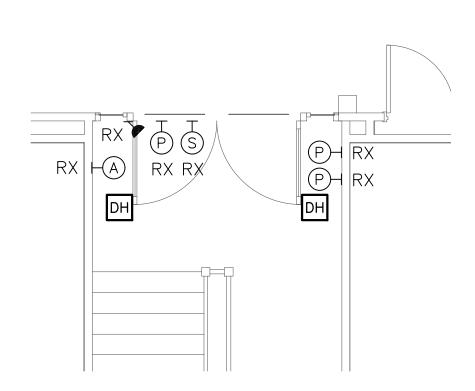


FI New Stair B Scale: 1/4"=1'-0"

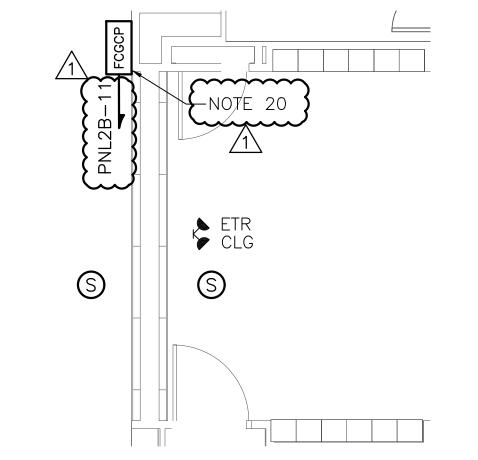


2nd Fl New Stair C Scale: 1/4"=1'-0"

NEW FIRE RATED STAIRWELLS.



2nd Fl New Stair D Scale: 1/4"=1'-0"



2nd Fl New Corr Scale: 1/4"=1'-0"

317 Iron Horse Way, Suite 202 Providence, RI 02908 401.861.1600

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THORNTON

**ARCHITECTS** 

brewsterthornton.com

GROUP

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**UPGRADE** 

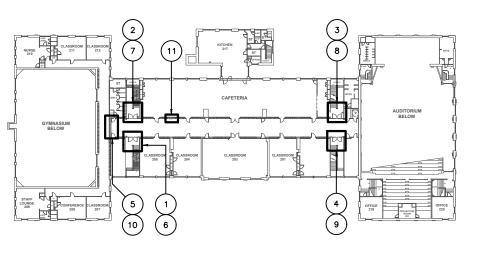
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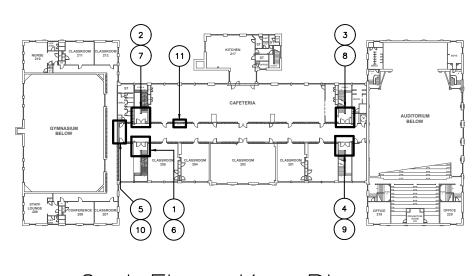
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## ELECTRICAL DEVICE KEY:

- AUDIO LOW VOLTAGE DEVICE, JUNCTION BOX AND RACEWAY. SEE KEY NOTE 1
- (F) FIRE ALARM JUNCTION BOX, LB, & RACEWAY
- 120V POWER JUNCTION BOX, LB, & RACEWAY
- SECURITY LOW VOLTAGE DEVICE, JUNCTION BOX
- AND RACEWAY. SEE KEY NOTE 1
- DH FIRE ALARM DOOR HOLD DEVICE
- FAPS FIRE ALARM POWER SUPPLY
- BUILDING SYSTEM CONTROL PANEL, JUNCTION BOX, RACEWAY. SEE KEY NOTE 1
- FCGCP NEW FIRE ALARM CONTAIN STATE 18 NEW FIRE ALARM CURTAIN GROUP CONTROL

## ▶ **♣** SURFACE MOUNTED EMERGENCY FIXTURE

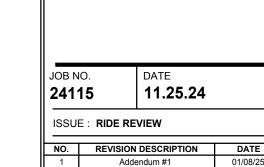
## KEY NOTES:

1. CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL RELOCATED BUILDING SYSTEMS, LOW VOLTAGE DEVICES AND RACEWAY WITH ARCHITECT. CONFIRM ROUTING OF EXTENDED RACEWAY WITH ARCHITECT. LOW VOLTAGE SHOWN ON ELECTRICAL PLANS FOR REFERNCE ONLY.

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- 5. COORDINATE SHUT DOWN OF BASE BUILDING ELECTRICAL AND FIRE ALARM SYSTEMS WITH SCHOOL FACILITIES. 6. DISCONNECT, MAKE SAFE, AND REMOVE ALL TEMPORARY AND ABANDONED WIRE WITHIN THE LIMIT OF WORK.
- 7. ELECTRICAL CONTRACTOR SHALL RELOCATE ANY AND ALL EXISTING ELECTRICAL DEVICES AND RACEWAY WITHIN AREA OF RENOVATION. CONFIRM AND COORDINATE RENOVATION SCOPE WITH ARCHITECT. EXTEND AND CONNECT EXISTING WIRING AND RACEWAY TO NEW LOCATION OF RELOCATED EQUIPMENT. CONTRACTOR SHALL EVALUATE CONDITION OF EXISTING WIRING AND RACEWAY AND REPLACE BACK TO SOURCE IF NECESSARY. CONTRACTOR SHALL REPLACE EXISTING WIRING, BACK TO SOURCE, IF EXISTING EXTENDED WIRING DOES NOT REACH
- LOCATION OF RELOCATED EQUIPMENT. 8. ELECTRICAL CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL LOW VOLTAGE DEVICES AND ROUTING OF LOW VOLTAGE RACEWAY WITH ARCHITECT.
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- 15. CONTRACTOR SHALL PROVIDE AN NFPA 241 IMPAIRMENT PLAN TO THE AHJ & OWNER FOR REVIEW AND APPROVAL BEFORE COMMENCEMENT OF WORK.
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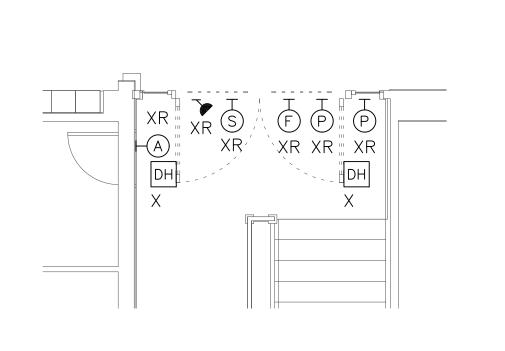
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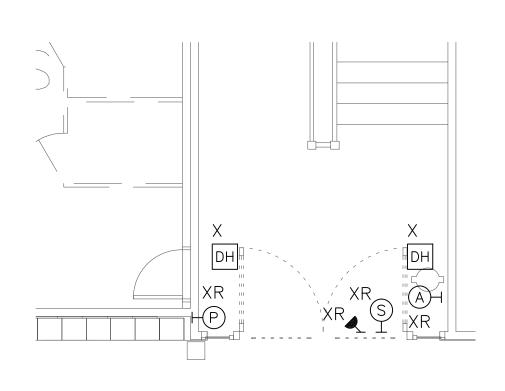
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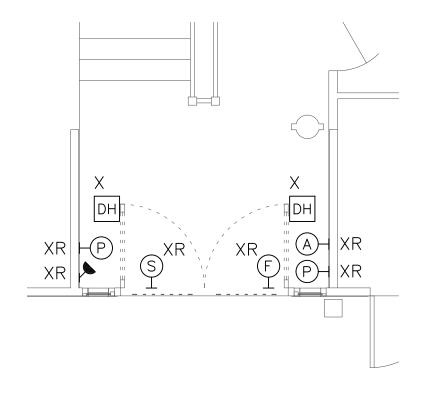
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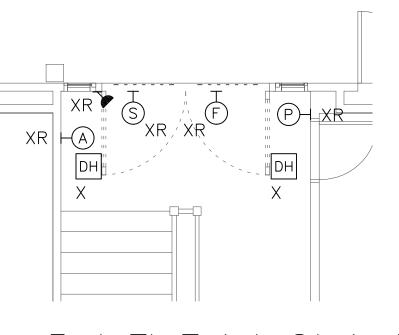
Addendum #1

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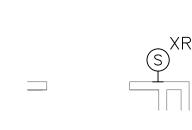












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**UPGRADE** 

FIRE CODE

TOLM,

A

BREWSTER

THORNTON

**ARCHITECTS** 

317 Iron Horse Way,

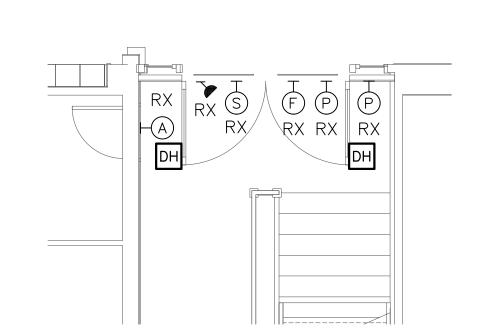
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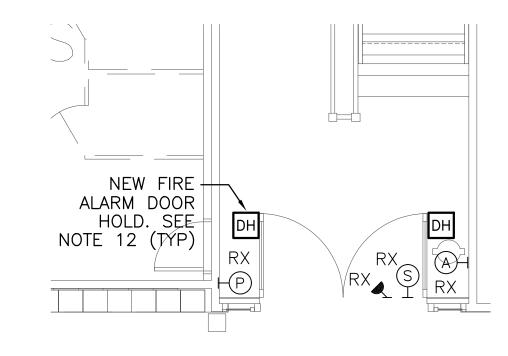
brewsterthornton.com

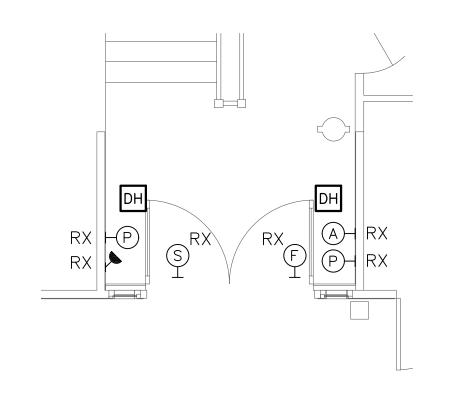
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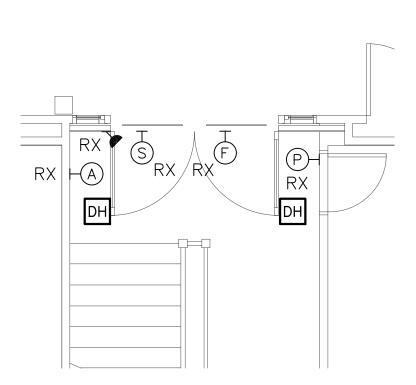
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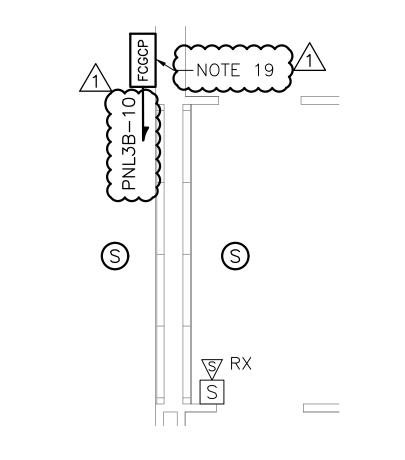
GROUP

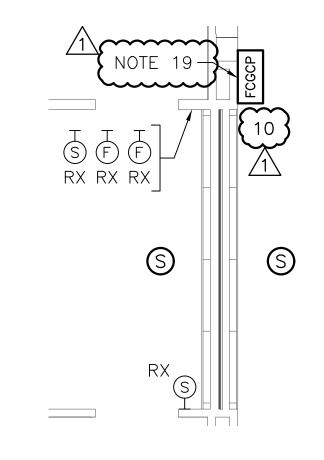
























# ELECTRICAL DEVICE KEY:

- AUDIO LOW VOLTAGE DEVICE, JUNCTION BOX AND RACEWAY. SEE KEY NOTE 1
- (F) FIRE ALARM JUNCTION BOX, LB, & RACEWAY
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- FCGCP PANEL. SEE ELECTRICAL NOTE 18 NEW FIRE ALARM CURTAIN GROUP CONTROL

## ▶ **♣** SURFACE MOUNTED EMERGENCY FIXTURE

## KEY NOTES:

1. CONTRACTOR SHALL CONFIRM AND COORDINATE FINAL LOCATION OF ALL RELOCATED BUILDING SYSTEMS, LOW VOLTAGE DEVICES AND RACEWAY WITH ARCHITECT. CONFIRM ROUTING OF EXTENDED RACEWAY WITH ARCHITECT. LOW VOLTAGE SHOWN ON ELECTRICAL PLANS FOR REFERNCE ONLY.

# **ELECTRICAL NOTES:**

- 1. LIMIT OF SCOPE LINE INDICATES THE APPROXIMATE AREA OF RENOVATION THAT ELECTRICAL SYSTEMS MAY BE RELOCATED OR REMOVED. SCOPE OF DEMOLITION SHOWN ON PLANS ARE PARTIAL ONLY FOR THE CONTRACTORS CONVENIENCE AND NOT INTENDED TO SHOW ALL EXISTING CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS TO INCLUDE ALL NECESSARY WORK TO MODIFY AND EXTEND EXISTING SYSTEMS, WIRING, ETC. AS REQUIRED TO ACCOMMODATE THE NEW ARCHITECTURAL FLOOR PLAN.
- 2. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY NECESSARY RE-FEEDING OF EQUIPMENT OR DEVICES TO MAINTAIN CIRCUIT CONTINUITY OF EXISTING EQUIPMENT REMAINING.
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- 5. COORDINATE SHUT DOWN OF BASE BUILDING ELECTRICAL AND FIRE ALARM SYSTEMS WITH SCHOOL FACILITIES.
- 6. DISCONNECT, MAKE SAFE, AND REMOVE ALL TEMPORARY AND ABANDONED WIRE WITHIN THE LIMIT OF WORK. 7. ELECTRICAL CONTRACTOR SHALL RELOCATE ANY AND ALL EXISTING ELECTRICAL DEVICES AND RACEWAY WITHIN AREA OF RENOVATION. CONFIRM AND COORDINATE RENOVATION SCOPE WITH ARCHITECT. EXTEND AND CONNECT

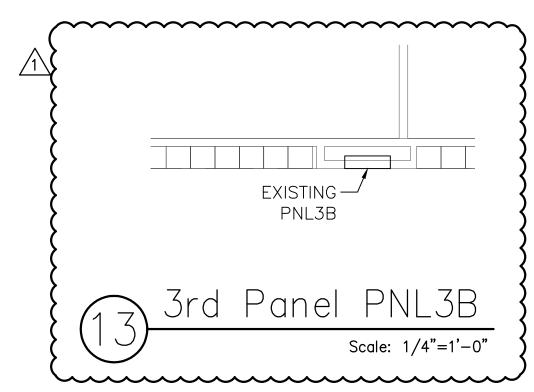
EXISTING WIRING AND RACEWAY TO NEW LOCATION OF RELOCATED EQUIPMENT. CONTRACTOR SHALL EVALUATE

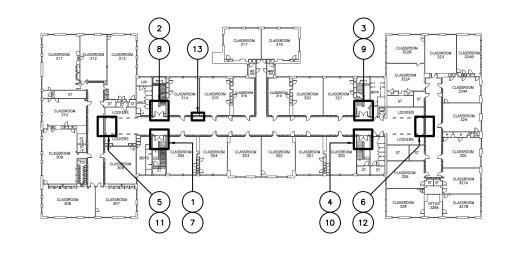
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Scale: None

Wozny/Barbar & Associates, Inc. 1076 Washington Street 161 Exchange Stree Hanover, MA 02339 3rd Floor Tel: (781) 826-4144 Pawtucket, RI 0286 Fax: (781) 924-5792 www.wbaengineers.com

SHEET TITLE **ELECTRICAL** 

3rd FLOOR

**PLANS** 

11.25.24

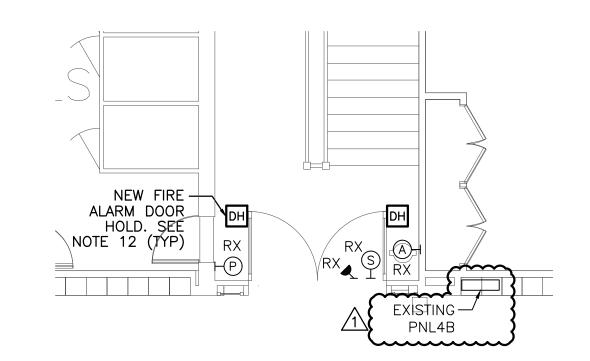
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Addendum #1

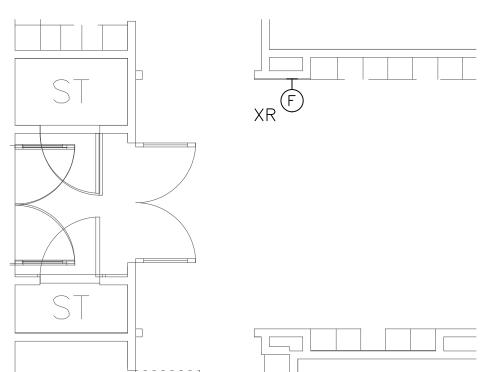
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ISSUE: RIDE REVIEW

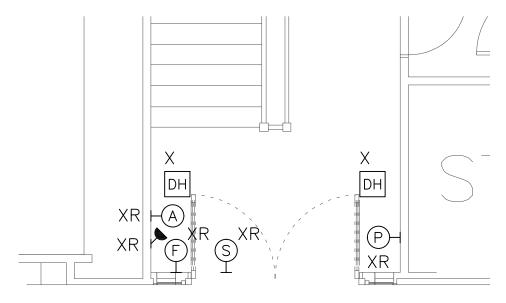
4th Fl Existing Stair B



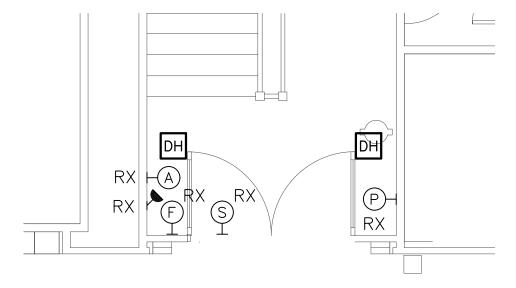
Proposed Stair B Scale: 1/4"=1'-0"



4th FI Existing Corridor



Existing Stair C Scale: 1/4"=1'-0"



4th Fl Proposed Stair C Scale: 1/4"=1'-0'

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## ▶ ◆ SURFACE MOUNTED EMERGENCY FIXTURE

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Proposed

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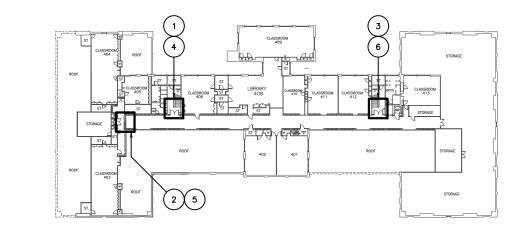
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Fax: (781) 924-5792 www.wbaengineers.com Addendum #1

11.25.24

NO. REVISION DESCRIPTION DATE

SHEET TITLE **ELECTRICAL** 4th FLOOR **PLANS** 

24115

ISSUE: RIDE REVIEW

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**UPGRADE** 

CODE

FIRE

BREWSTER

THORNTON

**ARCHITECTS** 

317 Iron Horse Way,

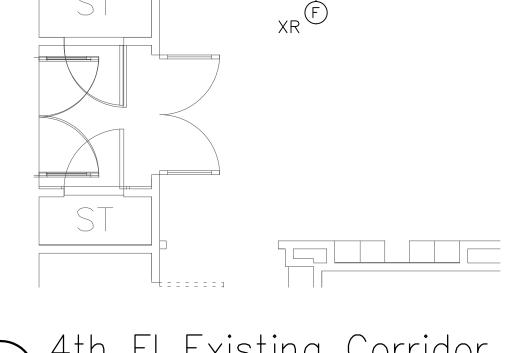
Providence, RI 02908

brewsterthornton.com

Suite 202

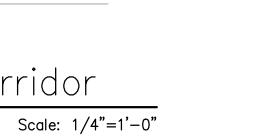
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GROUP

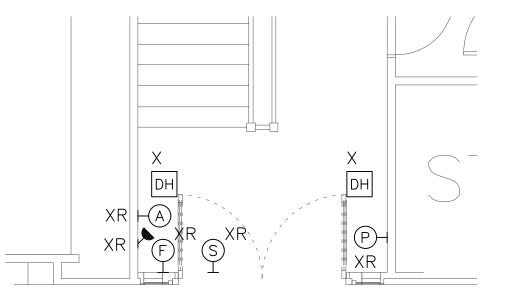




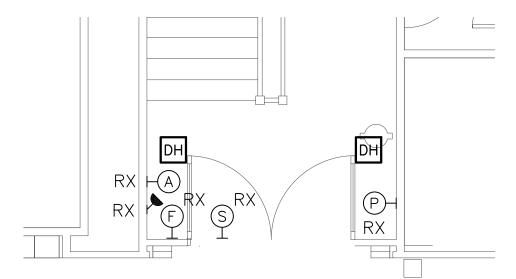
F<sub>RX</sub>



Scale: 1/4"=1'-0"







B. EXAMINE ALL DRAWINGS AND ALL OTHER SECTIONS OF THE SPECIFICATIONS FOR REQUIREMENTS AFFECTING THE WORK OF THIS SECTION.

A. PROVIDE ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT FOR THE INSTALLATION OF THE COMPLETE AND FULLY OPERATIONAL ELECTRICAL SYSTEM AS SHOWN ON THE DRAWINGS

B. THE WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

 PRIMARY SERVICE INCLUDING CONDUIT RISER, RACEWAYS, RIGID STEEL SWEEPS, AND CONCRETE PAD PER LOCAL POWER COMPANY REQUIREMENTS. PRIMARY AND SECONDARY DUCT BANK INCLUDING CONDUIT SPACERS, CONCRETE, STEEL REINFORCING AS REQUIRED AND MARKER TAPE 6" BELOW GRADE.

3. CONCRETE PAD, GROUNDING, REINFORCING, FOR LOCAL POWER COMPANY FURNISHED PAD MOUNTED TRANSFORMER. 4. TRENCHING, BACKFILLING, SOD OR HYDRO SEEDING. (COORDINATE WITH GENERAL

5. SECONDARY ELECTRIC SERVICE INCLUDING SECONDARY SERVICE ENTRANCE RACEWAYS, CABLES, CONDUIT BUSHINGS AND GROUNDING.

6. FREE STANDING SWITCHBOARD INCLUDING VERTICAL PULL SECTION, MAIN CIRCUIT BREAKER, CURRENT TRANSFORMER COMPARTMENT WITH UTILITY METE AMMETER, AMMETER SWITCH, VOLTMETER, VOLTMETER SWITCH, P/T'S AND

C/T'S FFFDER CUBICLE WITH FFFDER BREAKERS. FEEDERS, BRANCH CIRCUIT WIRING AND RACEWAYS. 8. CONDUIT, WIRE, BOXES, FITTINGS, HANGERS AND SUPPORTS 9. SWITCHES, RECEPTACLES, SPECIAL PURPOSE OUTLETS AND WALL PLATES.

10. SAFETY DISCONNECTS SWITCHES, NON-FUSED AND FUSED WITH FUSES. 11. LIGHTING SYSTEM INCLUDING LAMPS, LENSES, BALLASTS, DEVICES, CONTROLS AND 12. MOTOR CONNECTIONS AND CONTROLS.

13. SURGE PROTECTIVE DEVICES SHALL BE PROVIDED PER NEC 700.8 TO ENSURE RELIABILITY OF CRITICAL EMERGENCY SYSTEMS SUCH AS EMERGENCY LIGHTING PANELS, EMERGENCY COMMUNICATION SYSTEMS, FIRE CONTROL SYSTEMS, ELEVATORS USED FOR EVACUATIONS

14. SYSTEM GROUNDING. 15. POWER CONNECTIONS TO ALL PLUMBING, MECHANICAL, AND ALL OTHER EQUIPMENT 16. NAMEPLATES ON ALL MAJOR ELECTRICAL EQUIPMENT AND COMPONENTS. 17. UNDERGROUND FIRE ALARM SERVICE WITH IMSA FIRE ALARM CABLE PER LOCAL

FIRE ALARM CRITERIA. 18. ADDRESSABLE FIRE ALARM SYSTEM, ANALOG SMOKE AND HEAT DEVICES MONITORING MODULES, WIRE, RACEWAY, 24V D.C. STROBES, CONTROL PANEL

WITH BUILT-IN AND REMOTE KDU DISPLAY(S) COORDINATION, SUPERVISION ON, AND FINAL CONNECTION BY FIRE ALARM TESTING AGENCY OF RECORD.

21. TEMPORARY LIGHT, POWER AND PANEL FOR USE DURING CONSTRUCTION. 22. DATA, COMPUTER AND TELEPHONE DUPLEX BOXES WITH PULL STRING TO

23. SEAL PENETRATIONS BETWEEN FOUNDATION FLOORS AND WALLS WITH FIRE RETARDANT MATERIAL.

24. SEAL ALL CABLES AND CONDUITS FOR WATER/MOISTURE PENETRATION USING OZ GEDNEY PRODUCTS. REFER TO RACEWAYS SECTION FOR DETAIL. 26. INTERIOR SECONDARY DISTRIBUTION SYSTEMS INCLUDING MAIN SWITCHBOARD, CURRENT LIMITER CABINET, DRY TYPE INDOOR TRANSFORMERS, ALL DISTRIBUTION PANELBOARDS, MOTOR CONTROLS, MAGNETIC STARTERS, OVERCURRENT AND

SWITCHING DEVICES, PANELBOARDS, RACEWAYS, CABLES, WIRING, JUNCTION AND PULL BOXES, WIREWAYS, AND ALL OTHER COMPONENTS REQUIRED FOR COMPLETE ELECTRICAL DISTRIBUTION SYSTEM 27. AN ADDRESSABLE FIRE ALARM SYSTEM COMPLETE WITH ALL DEVICES AND WIRING INCLUDING MUNICIPAL CONNECTIONS 28. TESTING OF ALL ELECTRICAL SYSTEMS

29. ACCESS PANELS (FURNISH ONLY) 30. COORDINATION BETWEEN ELECTRICAL AND OTHER TRADES.

31. POWER WIRING FOR ELEVATORS AND ASSOCIATED EQUIPMENT 32. LIGHTING CONTROL AND DIMMING SYSTEM.

33. INTERCOM SYSTEM COMPLETE WITH WIRING COMPONENTS AND PROGRAMMING DRAWINGS, COMPLETE, LEAVING READY AN ELECTRICAL SYSTEM IN PERFECT OPERATING CONDITION.

A. AS USED IN THIS SECTION, PROVIDE MEANS FURNISH AND INSTALL AND POS MEANS PROVIDED UNDER OTHER SECTIONS.

B. AS USED IN THE DRAWINGS AND SPECIFICATIONS FOR ELECTRICAL WORK, CERTAIN NON\_TECHNICAL WORDS SHALL BE UNDERSTOOD TO HAVE SPECIFIC MEANINGS AS FOLLOWS REGARDLESS OF INDICATIONS TO THE CONTRARY IN THE GENERAL CONDITIONS OR

FURNISH PURCHASE AND DELIVER TO THE PROJECT SITE COMPLETE WITH EVERY PURCHASING SHALL INCLUDE PAYMENT OF ALL SALES TAXES AND OTHER SURCHARGES AS MAY BE REQUIRED TO ASSURE THAT PURCHASED ITEMS

INSTALL UNLOAD AT THE DELIVERY POINT AT THE SITE AND PERFORM EVERY OPERATION NECESSARY TO ESTABLISH SECURE MOUNTING AND CORRECT OPERATION AT THE PROPER LOCATION IN THE PROJECT, ALL AS PART OF THIS WORK

UNDERSTOOD THAT THE INDICATION AND/OR DESCRIPTION OF ANY ELECTRICAL ITEM IN THE DRAWINGS OR SPECIFICATIONS FOR ELECTRICAL WORK CARRIES WITH IT THE INSTRUCTION TO FURNISH, INSTALL AND CONNECT THE ITEM AS PART OF THE ELECTRICAL

NEW MANUFACTURED WITHIN THE PAST TWO YEARS AND NEVER BEFORE USED. C. EXCEPT WHERE MODIFIED BY A SPECIFIC NOTATION TO THE CONTRARY, IT SHALL BE

WORK, REGARDLESS OF WHETHER OR NOT THIS INSTRUCTION IS EXPLICITLY STATED. D. IT SHALL BE UNDERSTOOD THAT THE SPECIFICATIONS AND DRAWINGS FOR ELECTRICAL WORK ARE COMPLIMENTARY AND ARE TO BE TAKEN TOGETHER FOR A COMPLETE INTERPRETATION OF THE FLECTRICAL WORK EXCEPT THAT INDICATIONS ON THE DRAWINGS

SPECIFICATIONS WHERE THEY CONFLICT WITH SAME. 1.4 WORK BY OTHERS

A. THE FOLLOWING IS RELATED WORK SPECIFIED ELSEWHERE: 1. HVAC EQUIPMENT INCLUDING PROVIDING INDIVIDUAL MOTOR STARTERS, ADJUSTABLE FREQUENCY DRIVES, CONTROL WIRING, VARIABLE SPEED SWITCHES

2. TELEPHONE/COMPUTER/DATA ALONG WITH WIRING, DEVICES AND FINAL TERMINATIONS BY OWNERS' COMMUNICATIONS VENDOR

3. TEMPERATURE CONTROL WIRING BY HVAC CONTRACTOR. 4. CHARGES FOR POWER CONSUMED BY THE TEMPORARY LIGHT AND POWER

SYSTEM FOR CONSTRUCTION WILL BE PAID BY THE GENERAL CONTRACTOR. 5. ACCESS PANELS, WHERE REQUIRED, ARE FURNISHED BY THE GENERAL

CONTRACTOR AND COORDINATED WITH THIS SECTION. 6. ALL DUCT SMOKE DETECTORS SHALL BE SUPPLIED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR, WIRED TO THE FIRE ALARM SYSTEM BY THE ELECTRICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL INCLUDE REMOTE TEST PANELS.

1.5 CODES, PERMITS & STANDARDS

A. PROVIDE ALL PERMITS AND LICENSES. OBTAIN AND PAY ALL CERTIFICATES OF INSPECTION AS REQUIRED BY REGULATORY AGENCIES AND SUBMIT FOR APPROVAL.

B. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND DESIGNED, CONSTRUCTED, INSTALLED AND TESTED IN ACCORDANCE WITH THE SPECIFICATION AND THE FOLLOWING STANDARDS

1. MASSACHUSETTS ELECTRICAL CODE (MEC).

2. NATIONAL ELECTRICAL CODE (NEC) 3. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) 4. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

UNDERWRITERS LABORATORY (UL) 6. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

7. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA 8. AMERICANS WITH DISABILITIES ACT (ADA) 9. NATIONAL ELECTRIC SAFETY CODE (NESC)

10. NEC ARTICLE 110 - FLASH PROTECTION 11. MASSACHUSETTS BUILDING CODE 12. INTERNATIONAL BUILDING CODE (IBC)

## 1.6 PROTECTION AND CLEANING

A. ALL ELECTRICAL EQUIPMENT AND DEVICES IN THE EXISTING BUILDING IN WHICH THE ELECTRICAL WORK IS TO BE DONE UNDER CONTRACT, SHALL BE PROTECTED FROM SCRATCHES, PAINT, CEMENT, ETC. UNTIL THE WORK IS COMPLETED.

B. WHERE ELECTRICAL EQUIPMENT AND/OR DEVICES ARE INDICATED TO BE ABANDONED

DELIVERED TO STORAGE ON SITE AT A LOCATION DESIGNATED BY THE OWNER. C. EXPOSED SURFACES OF ELECTRICAL EQUIPMENT & LIGHTING FIXTURES SHALL BE CLEANED

D. ALL DEBRIS AND MATERIAL RESULTING FROM ELECTRICAL WORK SHALL BE REMOVED FROM

WORKSPACE SHALL BE LEFT CLEAN AS ELECTRICAL WORK IS COMPLETED.

 SUBMIT DOCUMENTS IN AUTOCAD – LATEST VERSION FOR DRAWINGS AND MICROSOFT WORD (LATEST VERSION) FOR TEXT FORMAT WHEN REQUESTED E. DAMAGES TO COVERS AND TRIMS OF ELECTRICAL EQUIPMENT SHALL BE REPAIRED AND PAINTED WITH TOUCH-UP PAINT SUPPLIED BY THE EQUIPMENT MANUFACTURER TO THE SATISFACTION OF THE OWNER'S DESIGNATED REPRESENTATIVE OR THE ARCHITECT OR THE EQUIPMENT SHALL BE REPLACED WITH NEW.

#### 1.7 INTERPRETATION OF PLANS

A. ALL WORK SHOWN ON THE PLANS IS INTENDED TO BE APPROXIMATELY CORRECT TO SCALE BUT FIGURED DIMENSIONS AND DETAILED DRAWINGS ARE TO BE FOLLOWED IN EVERY CASE. THE DRAWINGS SHALL BE TAKEN AS DIAGRAMMATIC. RACEWAYS, WIRING AND GENERAL METHODS OF ROUTING ARE SHOWN BUT IS NOT INTENDED TO SHOW EVERY OFFSET AND FITTING NOR EVERY STRUCTURAL DIFFICULTY THAT MAY BE ENCOUNTERED. TO CARRY OUT THE TRUE INTENT AND PURPOSES OF THE PLANS, SUPPLY AND INSTALL AL DMPONENTS NECESSARY TO PROVIDE COMPLETE WORKING SYSTEMS, READY FOR USE WITH NO ADDITIONAL COST TO THE OWNER.

#### 1.8 SHOP DRAWINGS

1. SHOP DRAWINGS ARE INFORMATION PREPARED BY THE CONTRACTOR T ILLUSTRATE PORTIONS OF THE WORK IN MORE DETAIL THAN SHOWN IN THE

2. COORDINATION DRAWINGS ARE DETAILED, LARGE-SCALE LAYOUT SHOP DRAWINGS SHOWING HVAC, ELECTRICAL, PLUMBING AND FIRE PROTECTION WORK SUPERIMPOSED IN ORDER TO IDENTIFY CONFLICTS AND ENSURE INTER-COORDINATION OF MECHANICAL, ELECTRICAL, ARCHITECTURAL, STRUCTURAL AND OTHER WORK

1. SHOP DRAWINGS SHALL BE SUBMITTED ACCORDING TO SPECIFICATION SECTION ONE COVER SHEET FOR MULTIPLE PRODUCTS, WHETHER OR NOT SUPPLIED BY ONE MANUFACTURER OR VENDOR.

1. REVIEW SUBMITTAL PACKAGES FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS AND THEN SUBMIT TO ARCHITECT FOR REVIEW.

C. SUBMITTAL PROCEDURES AND FORMAT

2. PROVIDE ADDITIONAL COPIES OF REVIEWED SHOP DRAWINGS AS REQUIRED FOR

3. SHOP DRAWINGS SHOWING LAYOUTS OF SYSTEMS SHALL CONTAIN SUFFICIENT PLANS, ELEVATIONS, SECTIONS, DETAILS AND SCHEMATICS TO DESCRIBE WORK CLEARLY. THEY SHALL BE 1/4? = 1/1 -0? SCALE UNLESS SPECIFIED OTHERWISE. SHEET METAL SHOP DRAWINGS SHALL BE 3/8? = 1' -0 AND SHALL INDICATE WORK OF OTHER SECTIONS WHERE INTERFERENCES ARE POSSIBLE. PROVIDE LARGER SCALE DETAILS AS NECESSARY. SHEET METAL DRAWINGS SHALL SHOW ELEMENTS OF ARCHITECTS REFLECTED CEILING PLAN, EXPOSED DUCTWORK, WALLS AND PARTITIONS, DIFFUSERS, REGISTERS, GRILLES, FIRE DAMPERS, SLEEVES AND OTHER ASPECTS OF CONSTRUCTION AS NECESSARY FOR COORDINATION.

ALL FIREWALLS AND SMOKE PARTIONS MUST BE HIGHLIGHTED ON THE SHEET METAL DRAWINGS FOR APPROPRIATE COORDINATION.

5. SHOP DRAWINGS SHOWING MANUFACTURER'S PRODUCT DATA SHALL CONTAIN DETAILED DIMENSIONAL DRAWINGS, ACCURATE AND COMPLETE DESCRIPTION OF CONSTRUCTION MATERIALS. MANUFACTURER'S PUBLISHED PERFORMANCE CHARACTERISTICS AND CAPACITY RATINGS (PERFORMANCE DATA, ALONE, IS NOT ACCEPTABLE), ELECTRICAL REQUIREMENTS AND WIRING DIAGRAMS. DRAWINGS SHALL CLEARLY INDICATE LOCATION (TERMINAL BLOCK OR WIRE NUMBER), VOLTAGE AND FUNCTION FOR ALL FIELD TERMINATIONS, AND OTHER INFORMATION NECESSARY TO DEMONSTRATE COMPLIANCE WITH ALL REQUIREMENTS OF CONTRACT DOCUMENTS.

#### D. ACCEPTABLE MANUFACTURERS

1. ALTERNATE MANUFACTURERS ARE ACCEPTABLE ONLY IF, AS A MINIMUM, THEY: A. MEET ALL PERFORMANCE CRITERIA LISTED IN THE SCHEDULES AND OUTLINED IN THE SPECIFICATION.

B. HAVE IDENTICAL OPERATING CHARACTERISTICS TO THOSE CALLED FOR IN

C. FIT WITHIN THE AVAILABLE SPACE IT WAS DESIGNED FOR, INCLUDING SPACE FOR MAINTENANCE AND COMPONENT REMOVAL, WITH NO MODIFICATION TO EITHER SPACE OR THE PRODUCT. CLEARANCES TO WALLS, EILINGS AND OTHER EQUIPMENT SHALL BE AT LEAST EQUAL TO THOSE D. FOR ROOFTOP MOUNTED EQUIPMENT AND FOR EQUIPMENT MOUNTED IN AREAS WHERE STRUCTURAL MATTERS ARE A CONSIDERATION, THE PRODUCTS

MUST HAVE A WEIGHT NO GREATER THAN THE PRODUCT LISTED IN THE E. PRODUCTS MUST ADHERE TO ALL ARCHITECTURAL CONSIDERATION INCLUDING, BUT NOT LIMITED TO: BEING OF THE SAME COLOR AS THE PRODUCT SCHEDULED OR SPECIFIED, FITTING WITHIN ARCHITECTURAL ENCLOSURES AND DETAILS, AND FOR DIFFUSERS, LIGHTING AND PLUMBING

FIXTURES—BEING THE SAME SIZE AND OF THE SAME PHYSICAL APPEARANCE AS SCHEDULE OR SPECIFIED PRODUCTS.

FROM CONTRACT DOCUMENTS SHALL BE REQUESTED INDIVIDUALLY IN WRITING WHETHER DEVIATIONS RESULT FROM FIELD CONDITIONS, STANDARD SHOP PRACTICE, OR OTHER CAUSE. SUBMIT LETTER WITH TRANSMITTAL OF SHOP

2. WITHOUT LETTERS FLAGGING THE DEVIATION TO THE ARCHITECT, IT IS POSSIBLE THAT THE ARCHITECT MAY NOT NOTICE SUCH DEVIATION OR MAY NOT REALIZE ITS RAMIFICATIONS. THEREFORE, IF SUCH LETTERS ARE NOT SUBMITTED TO THE HARMLESS FOR ANY AND ALL ADVERSE CONSEQUENCES RESULTING FROM THE DEVIATIONS BEING IMPLEMENTED. THIS SHALL APPLY REGARDLESS OF WHETHER THE ARCHITECT HAS REVIEWED OR APPROVED SHOP DRAWINGS CONTAINING THE DEVIATION, AND WILL BE STRICTLY ENFORCED.

DRAWINGS, WHICH FLAGS THE DEVIATION TO THE ATTENTION OF THE ARCHITECT.

#### 3. APPROVAL OF PROPOSED DEVIATIONS, IF ANY, WILL BE MADE AT THE DISCRETION OF THE ARCHITECT. F. RESPONSIBILITY

1. INTENT OF SUBMITTAL REVIEW IS TO CHECK FOR CAPACITY, RATING, AND CERTAIN CONSTRUCTION FEATURES. CONTRACTOR SHALL ENSURE THAT WORK MEETS REQUIREMENTS OF CONTRACT DOCUMENTS REGARDING INFORMATION THAT PERTAINS TO FABRICATION PROCESSES OR MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES OF CONSTRUCTION: AND FOR COORDINATION O WORK OF THIS AND OTHER SECTIONS. WORK SHALL COMPLY WITH SUBMITTALS
MARKED ?REVIEWED? TO EXTENT THAT THEY AGREE WITH CONTRACT DOCUMENTS. SUBMITTAL REVIEW SHALL NOT DIMINISH RESPONSIBILITY UNDER THIS CONTRACT FOR DIMENSIONAL COORDINATION, QUANTITIES, INSTALLATION, WIRING, SUPPORTS AND ACCESS FOR SERVICE, NOR SHOP DRAWING ERRORS OR DEVIATIONS FROM REQUIREMENTS OF CONTRACT DOCUMENTS. THE ARCHITECT'S NOTING OF SOME ERRORS WHILE OVERLOOKING OTHERS WILL NOT EXCUSE THE CONTRACTOR FROM PROCEEDING IN ERROR, CONTRACT DOCUMENTS REQUIREMENTS ARE NOT LIMITED, WAIVED NOR SUPERSEDED IN ANY WAY BY REVIEW.

INFORM SUBCONTRACTORS, MANUFACURERS, SUPPLIERS, ETC. OF SCOPE AND LIMITED NATURE OF REVIEW PROCESS AND ENFORCE COMPLIANCE WITH CONTRACT DOCUMENTS.

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL DRAWINGS AND SPECIFICATIONS THOROUGHLY DURING BID PROCESS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER/ARCHITECT VIA RFI (REQUEST FOR INFORMATION) IF ANY PROCESS SHALL DISQUALIFY THE CONTRACTOR FOR CLAIMING ANY ADDITIONAL

SHOP DRAWINGS FOR ENTIRE DISTRIBUTION SYSTEM WILL NOT BE SUBMITTED UNTIL AFTER THE COMPLETION OF THE SHORT CIRCUIT STUDY. EQUIPMENT AIC RATING SHALL MATCH WITH THE

RESULTS OF THE STUDY. SERIES RATING OF DEVICES WILL NOT BE ACCEPTED. G. SCHEDULE: INCORPORATE SHOP DRAWING REVIEW PERIOD INTO CONSTRUCTION SCHEDULE SO THAT WORK IS NOT DELAYED. CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR DELAYS CAUSED BY NOT INCORPORATING THE FOLLOWING SHOP DRAWING REVIEW TIME REQUIREMENTS INTO HIS PROJECT SCHEDULE. WORKING DAYS LISTED REFERENCE THE TIME IN THE ENGINEER'S OFFICE, IT DOES NOT INCLUDE TRANSMITTAL TIME FOR REVIEW EACH TIME SHOP DRAWING IS SUBMITTED OR

H. LIST OF PROPOSED EQUIPMENT AND MATERIALS

 WITHIN FOUR WEEKS AFTER AWARD OF CONTRACT AND BEFORE ORDERING MATERIALS OR EQUIPMENT, SUBMIT COMPLETE LIST OF PROPOSED MATERIALS AND EQUIPMENT AND INDICATE MANUFACTURER'S NAMES AND ADDRESSES. NO CONSIDERATION WILL BE GIVEN TO PARTIAL LISTS SUBMITTED OUT OF SEQUENCE.

I. SUBMIT SHOP DRAWINGS IN PDF FORMAT AND ELECTRONICALLY FOR THE FOLLOWING: 1. PANELBOARDS

2. LOAD CENTERS

3. CIRCUIT BREAKERS AND ENCLOSURES 4. SWITCHBOARD

5. DISCONNECT SWITCHES

6. CONDUIT, WIRE, FEEDERS, CABLES AND BRANCH CIRCUIT WIRING 7. MANUAL MOTOR STARTERS

8. WIRE WAYS, OUTLET BOXES, COVERS 9. SWITCHES, RECEPTACLES, SPECIAL PURPOSE DEVICES AND PLATES

10. LIGHTING FIXTURES AND LAMPS

11. FIRE ALARM SYSTEM (ADDRESSABLE) 12. APARTMENT ENTRY SYSTEM

13. SHORT-CIRCUIT ANALYSIS 14. PROTECTIVE DEVICE TIME CURRENT COORDINATION ANALYSIS 15. ARC FLASH HAZARD ANALYSIS.

1.9 SUBMITTAL DOCUMENTATION REQUIREMENTS

A. FURNISH DOCUMENTATION ASSOCIATED WITH THIS BID PROPOSAL AND CONTRACT INCLUDING SUBMITTALS, SHOP DRAWINGS, O&M MANUALS, AND TEST REPORTS AS FOLLOWS. THESE REQUIREMENTS ARE IN ADDITION TO SUBMITTAL REQUIREMENTS STATED ELSEWHERE AND SHALL NOT DEPRIVE THE OWNER OF RIGHTS UNDER OTHER

PROVISIONS OF THE CONTRACT DOCUMENTS. 1. SUBMIT SIX (6) HARD COPIES OF DOCUMENTATION FOR REVIEW. 2. SUBMIT DOCUMENTS IN PORTABLE DOCUMENT FORMAT (PDF).

B. PROVIDE A COMPLIANCE REVIEW OF EACH SECTION OF THE SPECIFICATIONS, DRAWINGS AND ADDENDA. THE COMPLIANCE REVIEW SHALL BE A PARAGRAPH—BY—PARAGRAPH REVIEW OF THE SPECIFICATIONS WITH THE FOLLOWING INFORMATION; ?C?, ?D? OR ?E? MARKED IN THE MARGIN OF THE ORIGINAL SPECIFICATIONS AND ANY SUBSEQUENT

1. ?C?: COMPLY WITH NO EXCEPTIONS. ?D?: COMPLY WITH DEVIATIONS. FOR EACH AND EVERY DEVIATION, PROVIDE A NUMBERED FOOTNOTE WITH REASONS FOR THE PROPOSED DEVIATION AND HOW THE INTENT OF THE SPECIFICATION CAN BE SATISFIED.

3. ?E?: EXCEPTION, DO NOT COMPLY. FOR EACH AND EVERY EXCEPTION, PROVIDE A NUMBERED FOOTNOTE WITH REASONS AND POSSIBLE ALTERNATIVES. C. UNLESS A DEVIATION OR EXCEPTION IS SPECIFICALLY NOTED IN THE COMPLIANCE REVIEW. IT IS ASSUMED THAT THE BIDDER IS IN COMPLETE COMPLIANCE WITH THE PLANS AND SPECIFICATIONS. DEVIATIONS OR EXCEPTIONS TAKEN IN COVER LETTERS, SUBSIDIARY DOCUMENTS, BY OMISSION OR BY CONTRADICTION DO NOT RELEASE THE BIDDER FROM BEING IN COMPLETE COMPLIANCE, UNLESS THE EXCEPTION OR DEVIATION HAS BEEN SPECIFICALLY NOTED IN THE COMPLIANCE REVIEW. BIDDERS MAY SUBMIT THE LATEST STATE—OF—THE—ART COMPONENTS AND THEIR STANDARD CONTROL COMPONENTS IN LIEU OF THE SPECIFIED ITEMS. THE A/E AND OWNER WILL

A. WORK UNDER THIS SECTION INCLUDES NEW WORK AND WORK ON EXISTING SYSTEMS WITHIN EXISTING BUILDING. PERFORM SUCH WORK SO AS NOT TO INTERFERE WITH THE OWNERS OPERATION. WHERE WORK NECESSITATES INTERRUPTION OF SERVICE(S), SCHEDULE OUTAGES WITH THE OWNER AND ENGINEER AND PERFORM THE WORK AT

A. FOR THE DURATION OF THE CONTRACT THE ELECTRICAL CONTRACTOR SHALL MAINTAIN A COMPLETE SET OF CONTRACT DRAWINGS. ALL COMPLETED WORK AND ALL DEVIATIONS FROM THE CONTRACT DOCUMENTS SHALL BE RECORDED CLEARLY AND ACCURATELY. RECORD DRAWINGS SHALL BE TURNED OVER TO THE OWNER UPON COMPLETION OF THE

B. ELECTRONIC FILES ARE AVAILABLE TO FACILITATE THE PREPARATION OF RECORD DRAWIN THESE FILES ARE SOLELY FOR USE OF THE ELECTRICAL CONTRACTOR AND MAY NOT BE A FULL REPRESENTATION OF THE SCOPE OF WORK, THESE FILES ARE AVAILABLE FROM WOZNY/BARBAR & ASSOCIATES, INC. AT A COST OF \$50.00 PER DRAWING FILE.

#### 1.12 COORDINATION

A. IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO COORDINATE WITH ALL OTHER TRADES AND PARTIES TO AVOID CONFLICTS. NO ADDITIONAL CHARGES WILL BE APPROVED DUE TO LACK OF COORDINATION OR FIELD VERIFICATION OF THE

#### 1.13 TEMPORARY FACILITIES

A. THE ELECTRICAL CONTRACTOR SHALL PROVIDE, AT HIS OWN EXPENSE, HIS OWN FIELD OFFICE. FURNISH ALL TOOLS, EQUIPMENT, SCAFFOLDING AND TEMPORARY CONSTRUCTION

B. ALL SCAFFOLDING AND OTHER TEMPORARY CONSTRUCTION SHALL BE RIGIDLY BUILT IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIREMENTS, AND SHALL BE REMOVED FROM THE PREMISES UPON COMPLETION OF THE WORK.

C. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL TRANSFORMERS, PLYWOOD, PANEL BOARDS, WIRING AND OTHER ELECTRICAL EQUIPMENT TO SUPPORT THE NEEDS OF TEMPORARY LIGHT AND POWER. UTILIZE NEW SERVICE ENTRANCE CONDUITS FOR

TEMPORARY POWER REQUIREMENTS WHERE PRACTICAL. D. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE GENERAL CONTRACTOR, THE UTILITY COMPANY AND INCLUDE ALL COSTS ASSOCIATED WITH THE INSTALLATION OF TELEPHONES FOR THE CONSTRUCTION PERIOD. INCLUDE TELEPHONE SERVICE FOR ALL

#### 1.14 COORDINATION DRAWINGS

SHALL PREPARE COORDINATION DRAWINGS SHOWING THE SIZE AND LOCATION OF ELECTRICAL EQUIPMENT AND CONDUIT RUNS AND OTHER EQUIPMENT RELATED TO THE ELECTRICAL WORK.

B. COORDINATION DRAWINGS ARE FOR THE GENERAL CONTRACTOR'S AND THE ENGINEER'S USE DURING CONSTRUCTION AND SHALL NOT BE CONSTRUED AS REPLACING ANY SHOP, AS BUILT OR RECORD DRAWINGS REQUIRED ELSEWHERE IN THIS CONTRACT DOCUMENT.

#### 1.15 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. INSTRUCT TO THE OWNER'S SATISFACTION SUCH PERSONS AS THE OWNER DESIGNATES IN THE PROPER OPERATION AND MAINTENANCE OF THE SYSTEMS AND THEIR PARTS.

B. FURNISH OPERATING AND MAINTENANCE MANUALS AND FORWARD SAME TO THE

C. OPERATING INSTRUCTIONS SHALL BE SPECIFIC FOR EACH SYSTEM AND SHALL INCLUDE

D. FOR MAINTENANCE PURPOSES, PROVIDE SHOP DRAWINGS, PARTS LISTS, SPECIFICATIONS AND MANUFACTURER'S MAINTENANCE BULLETINS FOR EACH PIECE OF EQUIPMENT.

E. PROVIDE NAME, ADDRESS AND TELEPHONE NUMBER OF THE MANUFACTURER'S REPRESENTATIVE AND SERVICE COMPANY FOR EACH PIECE OF EQUIPMENT SO THAT SERVICE OR SPARE PARTS CAN BE READILY OBTAINED.

A. THE ENTIRE WORK INSTALLED IN THIS SPECIFICATION AND AS SHOWN ON THE DRAWINGS SHALL BE CONSTRUCTED AND FINISHED IN EVERY RESPECT IN A WORKMANLIKE AND COMPLETE MANNER. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO INSTALL COMPLETE SYSTEMS. ALL SUCH PARTS AS REQUIRED COMPLETING THE SYSTEMS IN ACCORDANCE WITH THE BEST TRADE PRACTICE AND THE SATISFACTION OF THE

B. OBTAIN DETAILED INFORMATION FROM THE MANUFACTURERS OF APPARATUS AS TO THE PROPER METHOD OF INSTALLING AND CONNECTING EQUIPMENT. OBTAIN ALL INFORMATION FROM THE GENERAL CONTRACTOR AND OTHER SUBCONTRACTORS, WHICH MAY BE NECESSARY TO FACILITATE WORK AND THE COMPLETION OF THE WHOLE

C. REMOVE DAILY, ALL RUBBISH AND DEBRIS AND ALL REFUSE FROM WORKMEN'S LUNCHES AND AT COMPLETION REMOVE ALL HIS SURPLUS MATERIALS, AND LEAVE IN CLEAN CONDITION ACCEPTABLE TO THE OWNER'S ENGINEER.

1.17 PROTECTION A. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK AND EQUIPMENT UNTIL FINALLY

INSPECTED, TESTED AND ACCEPTED. CAREFULLY STORE MATERIALS AND EQUIPMENT, WHICH ARE NOT IMMEDIATELY INSTALLED AFTER DELIVERY TO SITE. 1.18 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

A. BEFORE SUBMITTING PRICES OR BEGINNING WORK, THOROUGHLY MAKE AN EXAMINATION OF THE SITE. B. NO CLAIM FOR EXTRA COMPENSATION WILL BE RECOGNIZED IF DIFFICULTIES ARE ENCOUNTERED WHICH AN EXAMINATION OF SITE CONDITIONS PRIOR TO EXECUTING

D. ELECTRICAL EQUIPMENT REQUIRED FOR THE SUCCESSFUL OPERATION OF ANY OF THE

CONTRACT WOULD HAVE REVEALED. C. THESE SPECIFICATIONS ALONG WITH CONTRACT DOCUMENTS DESCRIBE THE ELECTRICAL SYSTEMS. THE ELECTRICAL CONTRACTOR IS REQUIRED TO PROVIDE COMPLETE AND OPERATING SYSTEMS FOR ALL EQUIPMENT MENTIONED.

PARTICULAR TYPES OF OWNER'S EQUIPMENT MENTIONED SHALL BE FURNISHED AND E. BE RESPONSIBLE FOR ALL MATERIALS DELIVERED TO THE SITE IN CONNECTION WITH THE WORK AND PAY ALL CHARGES FOR CARTAGE, SCAFFOLDS, PLANKING, RIGGING AND ERECTING. TAKE EVERY PRECAUTION NECESSARY TO PROTECT EQUIPMENT AND INSTALLATION IN ADDITION TO PLUGGING AND PROTECTING OPEN ENDS OF ALL PIPES, OUTLET BOXES, PANEL BOXES, AND JUNCTION BOXES. ALL EQUIPMENT SHALL BE STORED IN A CLEAN DRY PLACE TO PRESERVE THE QUALITY OF MATERIAL BEING USED EQUIPMENT AND/OR MATERIALS DAMAGED DURING CONSTRUCTION SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER. ANY SCAFFOLDING OVER 8'-0" IN HEIGHT WILL

F. ALL MATERIALS AND EQUIPMENT REQUIRED BY THIS SPECIFICATION SHALL BE NEW, CLEAN AND FREE FROM DEFECTS AT THE TIME OF INSTALLATION. THE MANUFACTURER AND UNDERWRITER'S LABEL SHALL APPEAR ON ALL MATERIAL AND EQUIPMENT UNLESS

## 1.19 SUBSTITUTION OF MATERIALS OR EQUIPMENT

BE SUPPLIED BY THE GENERAL CONTRACTOR

A. IF THE ELECTRICAL CONTRACTOR WISHES TO USE MATERIALS OR EQUIPMENT OTHER THAN THOSE SPECIFICALLY DESIGNATED HEREIN, AS BEING EQUAL TO THOSE SO SPECIFICALLY DESIGNATED: BEFORE PURCHASING AND/OR FABRICATION, HE SHALL SUBMIT THE PROPOSED SUBSTITUTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE . CONDITIONS, AND THE DECISION OF WHETHER OR NOT IT IS EQUAL TO THAT SPECIFIED SHALL BE DETERMINED BY THE OWNER.

B. UNLESS REQUESTS FOR SUBSTITUTION ARE MADE IN ACCORDANCE WITH THE ABOVE INSTRUCTIONS AND THE INSTRUCTIONS OF THE GENERAL CONDITIONS, SUPPORTED BY SUFFICIENT PROOF OF EQUALITY, THE SUCCESSFUL CONTRACTOR WILL BE REQUIRED TO FURNISH SPECIFICALLY NAMED ITEMS DESIGNATED UNDER THE BASE BID

SHALL BE PROVIDED AND THE ELECTRICAL CONTRACTOR SHALL ASSUME THE COST AND THE ENTIRE RESPONSIBILITY THERETO.

C. IF THE APPARATUS OR MATERIALS SUBSTITUTED FOR THOSE SPECIFIED NECESSITATE CHANGES OR ADDITIONAL CONNECTIONS, PIPING SUPPORTS OR CONSTRUCTION: SAME

D. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE HVAC, PLUMBING AND FIRE PROTECTION CONTRACTORS WITH REGARD TO FEEDER, RACEWAY, AND CIRCUIT BREAKER AND DISCONNECT SWITCH SIZES. IF A SUBSTITUTION OF HVAC, PLUMBING AND FIRE PROTECTION FOUIPMENT IS PROPOSED BY A SUBCONTRACTOR, IT SHALL BECOME THE RESPONSIBILITY OF THAT SUBCONTRACTOR TO COORDINATE WITH THE ELECTRICAL CONTRACTOR ANY AND ALL CHANGES WITH REGARD TO FEEDER, RACEWAY, AND CIRCUIT Breaker and disconnect switch sizes. The Shop drawings shall clearly indicate WHAT CHANGES ARE REQUIRED AND ANY ADDITIONAL COSTS ASSOCIATED WITH THIS CHANGE. IF COORDINATION DOES NOT OCCUR, THE SUBCONTRACTOR PROPOSING THE

E. WHENEVER THE CONTRACTOR SECURES APPROVAL FOR CHANGING ANY ITEMS AND SUCH CHANGE INVOLVES A CORRESPONDING CHANGE OR ADJUSTMENT IN ANY ADJACENT OR RELATED ITEM, THE RESPONSIBILITY FOR MAKING THE REQUIRED CHANGE, OR SEEING ADJUSTMENTS SHALL BE PAID FOR BY THE CONTRACTOR UNLESS IT IS OTHERWISE AGREED, IN WRITING, AT THE TIME THE CHANGE IS APPROVED, THE ACCEPTANCE OF AN CHANGE WILL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR FROM FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS.

CHANGE SHALL BE RESPONSIBLE FOR ALL COSTS THAT OCCUR DUE TO THE SUBSTITUTION.

#### 1.20 FIELD MEASUREMENTS

A. THE ELECTRICAL CONTRACTOR (EC) SHALL VERIFY, IN THE FIELD, ALL MEASUREMENTS, SITE CONDITIONS NECESSARY FOR HIS WORK AND SHALL ASSUME RESPONSIBILITY FOR THEIR ACCURACY. NO ADDITIONAL COMPENSATION WILL BE ALLOWED AFTER THE BIDS HAVE BEEN ACCEPTED.

1.21 PERMITS, LAWS, ORDINANCES & CODES A. THE ELECTRICAL CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS, AND PAY ALL TAXES, FEES AND OTHER COSTS IN CONNECTION WITH HIS WORK; FILE ALL NECESSARY PLANS, PREPARE ALL NECESSARY DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS OF STATE AUTHORITIES, ALL LOCAL, TOWN, CITY OR COUNTY DEPARTMENTS

B. THE ELECTRICAL CONTRACTOR SHALL INCLUDE IN THE WORK, WITHOUT EXTRA COST TO THE OWNER, ANY LABOR, MATERIALS, SERVICES, APPARATUS, DRAWINGS IN ADDITION TO THE DRAWINGS PREPARED BY THE PROJECT ENGINEER AND DOCUMENTS, IN ORDER TO COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES AND REGULATIONS WHETHER OR NOT SHOWN ON THE DRAWINGS AND/OR SPECIFIED.

#### 1.22 VISIT TO PREMISES

A. THIS CONTRACTOR SHALL VISIT THE PREMISES BEFORE SUBMITTING HIS PROPOSAL AND MAKE HIS OWN APPRAISAL OF THE DIFFICULTIES AND CONDITIONS THAT WILL BE ENCOUNTERED DURING THE WORK. NO ADDITIONAL CHARGES WILL BE ALLOWED FOR WORK REQUIRED DUE TO EXISTING CONDITIONS TO MAKE THE INSTALLATION CONFORM TO 1.23 CLEANING UP

A. THE ELECTRICAL CONTRACTOR SHALL, AT THE COMPLETION OF THE WORK, CLEAN, POLISH AND/OR WASH ALL EXPOSED ITEMS OF MATERIAL, EQUIPMENT AND FIXTURES IN HIS CONTRACT SO AS TO LEAVE SUCH ITEMS BRIGHT AND CLEAN. SPECIAL ATTENTION BEING GIVEN TO INTERIORS AND EXTERIORS OF ALL PANELS, ELECTRICAL EQUIPMENT, AND

1.24 DAMAGE TO OTHER WORK A. EACH CONTRACTOR SHALL BE HELD RESPONSIBLE FOR AND SHALL PAY FOR ALL DAMAGE TO

B. ALL PAINTED METAL SURFACES WHICH HAVE BEEN SCRATCHED, DENTED OR MARRED SHALL BE REPAINTED BY THE ELECTRICAL CONTRACTOR.

OTHER WORK CAUSED BY HIS WORK OR WORKMEN. B. REPAIRING OF SUCH DAMAGE SHALL BE DONE BY THE GENERAL CONTRACTOR OF CONTRACTORS WHO INSTALLED THE WORK AND SO DIRECTED BY THE OWNER'S ENGINEER

A. ATTENTION IS DIRECTED TO PROVISIONS OF THE GENERAL CONDITIONS AND SPECIAL CONDITIONS REGARDING GUARANTEES AND WARRANTIES FOR WORK UNDER THIS

B. ELECTRICAL CONTRACTOR'S GUARANTEES SHALL BE THE SAME AS THE GENERAL

C. ALL MATERIAL, ITEMS OF EQUIPMENT AND WORKMANSHIP FURNISHED UNDER THIS SECTION SHALL CARRY FOR THIS STANDARD WARRANTY AGAINST ALL DEFECTS IN MATERIAL AND WORKMANSHIP. ANY FAULT DUE TO DEFECTIVE OR IMPROPER MATERIAL, EQUIPMENT, WORKMANSHIP OR DESIGN WHICH MAY DEVELOP SHALL BE MADE GOOD, FORTHWITH, BY AND AT THE EXPENSE OF THE ELECTRICAL CONTRACTOR, INCLUDING ALL OTHER DAMAGE DONE TO AREAS, MATERIALS AND OTHER SYSTEMS RESULTING FROM

D. ELECTRICAL CONTRACTOR SHALL GUARANTEE THAT ALL ELEMENTS OF THE SYSTEMS ARE OF SUFFICIENT CAPACITY TO MEET THE SPECIFIED PERFORMANCE REQUIREMENTS AS SET

E. UPON RECEIPT OF NOTICE FROM THE OWNER OF FAILURE OF ANY PART OF THE SYSTEM

OR EQUIPMENT DURING THE GUARANTEE PERIOD, THE AFFECTED PART OR PARTS SHALI BE REPLACED BY THE ELECTRICAL CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. F. FURNISH, BEFORE THE FINAL PAYMENT IS MADE, A WRITTEN GUARANTEE COVERING THE ABOVE REQUIREMENTS.

## 1.26 INSTALLATION REQUIREMENTS

A. THE ARRANGEMENT OF ALL ELECTRICAL WORK SHOWN ON THE DRAWINGS IS DIAGRAMMATIC ONLY AND INDICATES THE MINIMUM REQUIREMENTS OF THE WORK. CONDITIONS AT THE BUILDING INCLUDING ACTUAL MEASUREMENTS SHALL DETERMINE THE DETAILS OF THE INSTALLATION. ALL WORK SHALL BE LAID OUT AND INSTALLED SO AS TO REQUIRE THE LEAST AMOUNT OF CUTTING AND PATCHING.

B. CHECK THE ARCHITECTURAL PLANS AND SPECIFICATIONS BEFORE ORDERING ANY MATERIAL AND EQUIPMENT. ANY DISCREPANCIES SHALL BE BROUGHT TO THE
ATTENTION OF THE ARCHITECT FOR HIS DETERMINATION PRIOR TO PROCEEDING WITH THE

A. TYPICAL DETAILS WHERE SHOWN ON THE DRAWINGS SHALL APPLY TO EACH AND EVERY ITEM OF THE PROJECT WHERE SUCH ITEMS ARE APPLICABLE. THEY ARE NOT REPEATED

#### IN FULL ON THE DRAWINGS, WHICH IN MANY CASES ARE DIAGRAMMATIC ONLY, BUT WITH THE INTENTION THAT SUCH DETAILS SHALL BE INCORPORATED IN FULL. ANY ALTERNATE METHOD PROPOSED FOR USE BY THE CONTRACTOR SHALL HAVE THE PRIOR APPROVAL OF THE ARCHITECT

1.27 TYPICAL DETAILS

1.28 SLEEVES, INSERTS A. FURNISH AND INSTALL ALL SLEEVES, INSERTS, ANCHOR BOLTS AND SIMILAR ITEMS TO BE SET INTO MASONRY OR CONCRETE, AS REQUIRED FOR MECHANICAL AND ELECTRICAL

## WORK, INTERNAL DIAMETER OF SLEEVE SHALL BE 2" LARGER THAN THE OUTSIDE DIAMETER OF THE PIPE OR INSULATION COVERED LINE PASSING THROUGH IT.

1.29 CORING, DRILLING A. CORE, CUT AND/OR DRILL ALL SMALL HOLES 4.5" DIAMETER OR LESS IN WALLS AND FLOORS REQUIRED FOR THE INSTALLATION OF SLEEVES AND SUPPORTS FOR THE ELECTRICAL WORK.

A. INSTALL ALL WORK SUCH THAT PARTS REQUIRING PERIODIC INSPECTION, OPERATION, B. FURNISH ALL ACCESS PANELS APPROPRIATE TO PARTICULAR CONDITIONS, TO BE INSTALLED BY TRADES HAVING RESPONSIBILITY FOR THE CONSTRUCTION OF ACTUAL WALLS, FLOORS OR

## 1.31 TOOLS AND EQUIPMENT

A. PROVIDE ALL TOOLS AND EQUIPMENT REQUIRED FOR THE FABRICATION AND INSTALLATION OF THE MECHANICAL AND ELECTRICAL EQUIPMENT AT THE SITE. 1.32 PORTABLE AND DETACHABLE PARTS

A. CONTRACTORS SHALL RETAIN IN THEIR POSSESSION ALL PORTABLE AND/OR DETACHABLI

PARTS AND PORTIONS OF MATERIALS, DEVICES, EQUIPMENT ETC. NECESSARY FOR THE PROPER OPERATION AND MAINTENANCE OF THE MECHANICAL AND ELECTRICAL SYSTEMS

#### UNTIL FINAL COMPLETION OF THE WORK, AT WHICH TIME THEY SHALL BE HANDED OVER TO THE OWNERS

1.33 RECORD DRAWINGS, PROJECT CLOSEOUT A. AS WORK PROGRESSES AND FOR THE DURATION OF CONTRACT, MAINTAIN A COMPLETE AND SEPARATE SET OF PRINTS OF CONTRACT DRAWINGS AT JOB SITE AT ALL TIMES. RECORD WORK COMPLETED AND ALL CHANGES FROM ORIGINAL CONTRACT DRAWINGS CLEARLY AND ACCURATELY INCLUDING WORK INSTALLED AS A MODIFICATION OR ADDITION TO THE ORIGINAL DESIGN. WORK SHALL BE UPDATED ON A WEEKLY BASIS AND SHALL BE MADE AVAILABLE FOR REVIEW BY ARCHITECT. FAILURE TO PERFORM THIS WORK SHALL BE REASON FOR WITHHOLDING REQUISITION PAYMENTS. IN ADDITION, TAKE PHOTOGRAPH OF ALL CONCEALED EQUIPMENT IN GYPSUM BOARD CEILINGS, SHAFTS, AND OTHER CONCEALED, INACCESSIBLE WORK. AT COMPLETION OF WORK, MAKE COPIES OF PHOTOGRAPHS WITH WRITTEN EXPLANATION ON BACK. THESE SHALL BECOME PART OF

B. AT COMPLETION OF WORK PREPARE A COMPLETE SET OF RECORD DRAWINGS ON DISKETTE IN AUTOCAD? RELEASE 12 OR HIGHER FORMAT SHOWING ALL SYSTEMS AS ACTUALLY INSTALLED, INCLUDING ALL FIRE ALARM AND ELECTRICAL CIRCUITRY. THE DESIGN TRACINGS WILL BE MADE AVAILABLE FOR THE ELECTRICAL CONTRACTOR'S COPYING, AT HIS EXPENSE, INTO MYLAR REPRODUCIBLES TO SERVE AS BACKGROUNDS FOR THE DRAWINGS. THE QUANTITY OF DESIGN TRACINGS WHICH ARE MADE AVAILABLE SHALL IN NO WAY BE INTERPRETED AS SETTING A LIMIT TO THE NUMBER OF DRAWINGS NECESSARY TO SHOW THE REQUIRED INFORMATION. THE ELECTRICAL CONTRACTOR'S PROFESSIONAL DRAFTSPERSON SHALL TRANSFER CHANGES TO MYLARS; SUBMIT MYLARS AND THREE SETS OF PRINTS TO ARCHITECT FOR COMMENTS AS TO COMPLIANCE WITH THIS SECTION. C. THE ARCHITECT WILL NOT CERTIFY THE ACCURACY OF THE RECORD DRAWINGS. THIS IS SOLE

SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR

D. THIS TRADE SHALL SUBMIT THE RECORD SET FOR APPROVAL BY THE FIRE AND BUILDING DEPARTMENTS IN A FORM ACCEPTABLE TO THE DEPARTMENTS, WHEN REQUIRED BY

E. DRAWINGS SHALL SHOW RECORD CONDITION OF DETAILS, SECTIONS, RISER DIAGRAMS, CONTROL CHANGES AND CORRECTIONS TO SCHEDULES. SCHEDULES SHALL SHOW ACTUAL MANUFACTURER AND MAKE AND MODEL NUMBERS OF FINAL EQUIPMENT INSTALLATION.

F. REFER TO SECTION 01770 - CLOSEOUT PROCEDURES AND 01782 - RECORD DOCUMENTS AND OWNER TRAINING.

PERTAINING TO OPERATING AND MAINTENANCE MANUALS.

1.34 OPERATING, INSTRUCTIONS AND MAINTENANCE MANUALS A. REFER TO SECTION 01770  $\_$  CONTRACT CLOSEOUT FOR SUBMITTAL PROCEDURES

B. EACH COPY OF THE APPROVED OPERATING AND MAINTENANCE MANUAL SHALL CONTAIN COPIES OF APPROVED SHOP DRAWINGS, EQUIPMENT LITERATURE, CUTS, BULLETINS, DETAILS, EQUIPMENT AND ENGINEERING DATA SHEETS AND TYPEWRITTEN INSTRUCTIONS RELATIVE TO THE CARE AND MAINTENANCE FOR THE OPERATION OF THE EQUIPMEN PROPERLY INDEXED. EACH MANUAL SHALL HAVE THE FOLLOWING MINIMUM CONTENTS:

#### 1. TABLE OF CONTENTS

2. INTRODUCTION A. EXPLANATION OF MANUAL AND ITS PURPOSE AND USE. B. DESCRIPTION OF THE ELECTRICAL SYSTEMS. C. SAFETY PRECAUTIONS NECESSARY FOR EQUIPMENT D. ILLUSTRATIONS, SCHEMATICS AND DIAGRAMS.

E. INSTALLATION DRAWING.

A. MAINTENANCE AND LUBRICATING INSTRUCTIONS. B. REPLACEMENT CHARTS. C. TROUBLE SHOOTING CHARTS FOR EQUIPMENT COMPONENTS

D. TESTING INSTRUCTIONS FOR EACH TYPICAL COMPONENT. E. TWO TYPED SETS OF INSTRUCTIONS FOR ORDERING SPARE PARTS. EACH SET SHALL INCLUDE NAME, PRICE, TELEPHONE NUMBER AND ADDRESS OF WHERE THEY MAY BE OBTAINED.

#### 4. MANUFACTURER'S LITERATURE

A. THE EQUIPMENT FOR WHICH SHOP DRAWINGS HAVE BEEN SUBMITTED

#### 1.35 SERVICE CHARACTERISTICS

A. SECONDARY BUILDING VOLTAGE - LOW LEVEL: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HZ B. ALL EQUIPMENT AND WIRING SHALL BE SUITABLE FOR THE APPLIED VOLTAGE.

A. THE REQUIREMENTS OF THE STATE BUILDING CODE AND LOCAL REGULATIONS ESTABLISH THE MINIMUM ACCEPTABLE QUALITY OF WORKMANSHIP AND MATERIALS, AND ALL WORK SHALL CONFORM THERETO UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED OR SPECIFIED HEREIN.

B. ALL WORK SHALL COMPLY WITH THE LATEST EDITIONS OF THE CODES AS REFERENCED

D. PROTECT ALL WORK, MATERIALS, AND EQUIPMENT FROM DAMAGE DURING PROCESS OF WORK. REPLACE ALL DAMAGED OR DEFECTIVE WORK, MATERIALS AND EQUIPMENT WITHOUT ADDITIONAL COST TO OWNER.

C. FOLLOW MANUFACTURER'S DIRECTIONS FOR ARTICLES FURNISHED, IN ADDITION TO DIRECTIONS SHOWN ON DRAWINGS OR SPECIFIED HEREIN.

# E. ALL EQUIPMENT AND MATERIALS FOR PERMANENT INSTALLATION SHALL BE THE PRODUCTS OF RECOGNIZED MANUFACTURERS AND SHALL BE NEW.

3. NOT BE USED FOR TEMPORARY LIGHT AND POWER PURPOSES.

SHALL BE SO EXAMINED, TESTED AND CERTIFIED.

F. EQUIPMENT AND MATERIALS SHALL 1. WHERE NORMALLY SUBJECT TO UNDERWRITERS LABORATORY INC. LISTING OR LABELING SERVICES, BE SO LISTED OR LABELED.

HAVING JURISDICTION OVER THE WORK. WHERE SUCH ACCEPTANCE IS CONTINGENT UPON HAVING THE PRODUCTS EXAMINED, TESTED AND CERTIFIED BY UNDERWRITERS OR OTHER RECOGNIZED TESTING LABORATORY, THE PRODUCT

4. BE IN ACCORDANCE WITH THE LATEST APPLICABLE NEMA STANDARDS.

G. EXCEPT FOR CONDUIT, CONDUIT FITTINGS, OUTLET BOXES, WIRE AND CABLE, ALL ITEMS OF EQUIPMENT OR MATERIAL OF ONE GENERIC TYPE SHALL BE THE PRODUCT OF ONE

H. FOR ITEMS WHICH ARE TO BE INSTALLED BUT NOT PURCHASED AS PART OF THE ELECTRICAL WORK, THE ELECTRICAL WORK SHALL INCLUDE:

PROPERTY LINE AT GRADE LEVEL.

2. BE WITHOUT BLEMISH OR DEFECT.

1. THE COORDINATION OF THEIR DELIVERY. 2. THEIR UNLOADING FROM DELIVERY TRUCKS DRIVEN INTO ANY POINT ON THE

3. THEIR SAFE HANDLING AND FIELD STORAGE UP TO THE TIME OF PERMANENT PLACEMENT IN THE PROJECT.

4. THE CORRECTION OF ANY DAMAGE, DEFACEMENT OR CORROSION TO WHICH THEY MAY HAVE BEEN SUBJECTED. REPLACEMENT IF NECESSARY SHALL BE COORDINATED WITH CONTRACTOR WHO ORIGINALLY PURCHASED THE ITEM. 5. THEIR FIELD MAKE\_UP AND INTERNAL WIRING AS MAY BE NECESSARY FOR THEIR PROPER OPERATION.

6. THEIR MOUNTING IN PLACE INCLUDING THE PURCHASE AND INSTALLATION OF ALL DUNNAGE, SUPPORTING MEMBERS, AND FASTENINGS NECESSARY TO ADAPT THEM TO ARCHITECTURAL AND STRUCTURAL CONDITIONS. 7. THEIR CONNECTION TO BUILDING WIRING INCLUDING THE PURCHASE AND

INSTALLATION OF ALL TERMINATION JUNCTION BOXES NECESSARY TO ADAPT AND CONNECT THEM TO THIS WIRING. INCLUDED ALSO SHALL BE THE PURCHASE AND

INSTALLATION OF ANY SUBSTITUTE LUGS OR OTHER WIRING TERMINATIONS AS MA BE NECESSARY TO ADAPT THEIR TERMINALS TO THE BUILDING WIRING AS CALLED FOR AND TO THE CONNECTION METHODS SET FORTH IN THESE SPECIFICATIONS. . ITEMS WHICH ARE TO BE INSTALLED BUT NOT PURCHASED AS PART OF THE ELECTRIC WORK SHALL BE CAREFULLY EXAMINED UPON DELIVERY TO THE PROJECT. CLAIMS THAT ANY OF THESE ITEMS HAVE BEEN RECEIVED IN SUCH CONDITION THAT THEIR INSTALLATION WILL REQUIRE PROCEDURES BEYOND THE REASONABLE SCOPE OF THE ELECTRIC WORK WILL BE CONSIDERED ONLY IF PRESENTED IN WRITING WITHIN ONE WEEK OF THE DATE OF DELIVERY TO THE PROJECT OF THE ITEMS IN QUESTION. THE ELECTRIC

WORK INCLUDES ALL PROCEDURES, REGARDLESS OF HOW EXTENSIVE, NECESSARY TO PUT

HANDLED SO AS TO PRECLUDE DAMAGE OF ANY NATURE. MANUFACTURED MATERIALS
SHALL BE DELIVERED AND STORED IN THEIR ORIGINAL CONTAINERS, PLAINLY MARKED WITH

INTO SATISFACTORY OPERATION, ALL ITEMS FOR WHICH NO CLAIMS HAVE BEEN SUBMITTED AS OUTLINED ABOVE.

A. ALL MATERIALS FOR THE WORK OF THIS SECTION SHALL BE DELIVERED, STORED AND

## 1.37 DELIVERY, STORAGE AND HANDLING

THE PRODUCTS' AND MANUFACTURER'S NAME. MATERIALS IN BROKEN CONTAINERS OR IN PACKAGES SHOWING WATERMARKS OR OTHER EVIDENCE OF DAMAGE, SHALL NOT BE USED AND SHALL BE REMOVED FROM THE SITE. 1.38 TEMPORARY POWER AND LIGHTING A. THE ELECTRICAL SUBCONTRACTOR SHALL FURNISH AND INSTALL FEEDERS OF SUFFICIENT SIZE FROM THE UTILITY COMPANY'S POWER LINES FOR THE ELECTRIC LIGHT AND POWER REQUIREMENTS FOR THE BUILDING WHILE UNDER CONSTRUCTION AND UNTIL THE PERMANENT FEEDERS AND RELATED EQUIPMENT HAVE BEEN INSTALLED AND ARE IN

OPERATION. TEMPORARY LIGHTING SHALL BE BASED ON A MINIMUM OF PROVIDING AT LEAST ONE 100 WATT INCANDESCENT LAMP FOR EACH 1,000 SQUARE FEET OF FLOOR AREA. SUFFICIENT WIRING, LAMPS, AND OUTLETS SHALL BE INSTALLED TO INSURE PROPER

LIGHTING IN ALL ROOMS, SPACE, STAIRWELLS, AND CORRIDORS. MINIMUM SIZED LAMP USED SHALL BE 100 WATT. WHERE HIGHER LIGHTING INTENSITIES ARE REQUIRED BY FEDERAL OR STATE STANDARDS OF LAWS OR OTHERWISE SPECIFIED, THE ABOVE

SPECIFIED WATTAGE SHALL BE INCREASED TO PROVIDE THESE INCREASED INTENSITIES. B. ALL NECESSARY TRANSFORMERS, METERS, CABLES, PANELBOARDS, SWITCHES, TEMPORARY LAMP REPLACEMENTS AND ACCESSORIES REQUIRED FOR THE TEMPORARY

IGHT AND POWER INSTALLATION SHALL BE PROVIDED BY THE ELECTRICAL

C. THE ELECTRICAL SUBCONTRACTOR SHALL PROVIDE AND MAINTAIN ON EACH FLOOR OF THE BUILDING, A FEEDER OR FEEDERS OF SUFFICIENT CAPACITY FOR THE REQUIREMENTS OF THE ENTIRE FLOOR AND HE SHALL PROVIDE A SUFFICIENT NUMBER OF OUTLETS, LOCATED AT CONVENIENT POINTS, SO THAT EXTENSION CORDS OF NOT OVER 50 FT. IN LENGTH WILL

REACH ALL WORK REQUIRING TEMPORARY LIGHT OR POWER. D. THE ELECTRICAL SUBCONTRACTOR SHALL INSTALL AND MAINTAIN THE WIRING AND ACCESSORIES FOR THE OFFICES OF THE GENERAL CONTRACTOR AND THE CLERK OF THE WORKS AS SPECIFIED IN THE CONTRACT FORM. E. ALL TEMPORARY ELECTRICAL WORK SHALL MEET THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE ARTICLE 305 TEMPORARY WIRING, THE LOCAL UTILITY COMPANY, AND Tel: (781) 826-4144 0 G

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SHEET

I. PROVIDE ALL TEMPORARY LIGHTING AND POWER REQUIRED ABOVE DURING THE NORMAL WORKING HOURS OF THE PROJECT OR A TOTAL OF TEN (10) HOURS PER NORMAL WORKING DAY; SATURDAYS, SUNDAYS AND LEGAL HOLIDAYS ARE EXCLUDED. THE TEN HOURS PER DAY SHALL INCLUDE MANNING THE TEMPORARY POWER AND LIGHTING 2 HOUR BEFORE AND 2 HOUR AFTER A NORMAL EIGHT (8) HOUR WORKING DAY. IN ADDITION TO THE ABOVE, PROVIDE AND MAINTAIN, TO THE SATISFACTION OF THE LOCAL AUTHORITIES HAVING JURISDICTION. ALL TEMPORARY LIGHTING AND POWER THAT MAY BE REQUIRED FOR SAFETY PURPOSES. THE ELECTRICAL SUBCONTRACTOR WILL BE COMPENSATE THE GENERAL CONTRACTOR FOR ANY ADDITIONAL STANDBY TIME, MATERIALS OR EQUIPMENT REQUIRED BY THE GENERAL CONTRACTOR OR OTHER SUBCONTRACTORS

1.39 STAGING AND SCAFFOLDING A. PROVIDE STAGING AND SCAFFOLDING FOR ALL THE WORK OF THIS SECTION COMPLYING

1.40 EXTRA MATERIALS

A. FURNISH EXTRA MATERIALS DESCRIBED IN FOLLOWING PRODUCT SPECIFICATION SECTIONS THAT MATCH PRODUCTS INSTALLED, ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE, AND ARE IDENTIFIED WITH LABELS CLEARLY DESCRIBING CONTENTS. PART 2 - PRODUCTS

A. ALL MATERIALS AND EQUIPMENT NECESSARY TO MAKE THE INSTALLATION COMPLETE IN EVERY DETAIL SHALL BE FURNISHED AND INSTALLED UNDER THIS CONTRACT WHETHER OR NOT SPECIFICALLY SPECIFIED HEREIN. ALL MATERIALS AND EQUIPMENT SHALL BE NEW. HE ELECTRICAL CONTRACTOR SHALL INCLUDE ALL WIRING FOR MECHANICAL. PLUM AND FIRE PROTECTION SYSTEMS, WIRING PROTECTION SYSTEMS AND WIRING FOR ALL EQUIPMENT SPECIFIED.

COMBINATION, FOR ANY PARTICULAR SYSTEM. FOR EXAMPLE, ALL WIRE OF ONE MANUFACTURER, ALL SWITCHES OF ONE MANUFACTURER, ETC., EXCEPT SPECIFIC MATERIAL CLASSIFICATIONS IN WHICH DELIVERY TIME BECOMES A PROBLEM TH WNER'S ENGINEER MAY; GIVE SPECIFIC EXEMPTION FROM THE REQUIREMENTS C. WHERE MATERIALS, EQUIPMENT, APPARATUS OR OTHER PRODUCTS ARE SPECIFIED BY MANUFACTURER, BRAND NAME, TYPE OR CATALOG NUMBER, SUCH DESIGNATION IS TO

B. IT IS THE INTENT OF THE SPECIFICATIONS THAT ONE MANUFACTURER BE SELECTED, NOT A

2.6 PULL BOXES, WIREWAYS, AND CHANNELS

A. PULL BOXES SHALL BE CODE GAUGE GALVANIZED STEEL WITH SCREW COVERS TO MATCH PULL BOXES AND WIRE WAYS SHALL BE AS REQUIRED BY NEC AND/OR JOB CONDITIONS WITH STEEL BARRIERS SEPARATING SYSTEMS.

B. WIRE WAYS SHALL BE GALVANIZED STEEL, MANUFACTURED STANDARD SECTIONS AND FITTINGS, WITH COMBINATION HINGED AND SCREW COVERS. C. STEEL CHANNEL SUPPORTS SHALL BE MINIMUM 1-5/8 INCH MOLD STRIP WITH MIN

A. ELECTRIC METALLIC TUBING (EMT) SHALL BE ELECTRO GALVANIZED OR SHERADIZED STEEL.

CORP., WHEATLAND TUBE COMPANY OR EQUAL. B. FLEXIBLE METAL CONDUIT SHALL BE GALVANIZED STEEL WITH SEPARATE COPPE GROUNDING CONDUCTOR. LIQUID—TIGHT FLEXIBLE METAL CONDUIT SHALL BE SIMILAR, BUT WITH EXTRUDED MOISTURE AND OIL PROOF OUTER JACKET OF POLYVINYL CHLORIDE PLASTIC. FLEXIBLE METAL CONDUIT LESS THAN 6-FEET LONG MAY BE USED TO CONNECT ALL LIGHTING FIXTURES. MOTORS AND OTHER EQUIPMENT MAY BE CONNECTED IN LENGTH; NOT EXCEEDING 18 INCHES. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE USED FOR ALL MECHANICAL EQUIPMENT OR OTHER ROTATING EQUIPMENT SUBJECTED TO

C. PVC SCHEDULE 40 CONDUIT SHALL BE USED FOR ALL UNDERGROUND WIRING. USE GALVANIZED STEEL SWEEPS AND STUB-UPS. D. COUPLINGS AND CONNECTORS FOR ELECTRICAL METALLIC TUBING SHALL BE GALVANIZED

E. STEEL SUPPORT RODS OR SUPPORT BOLTS FOR CONDUITS SHALL BE 1/8" DIAMETER FOR EACH INCH OR FRACTION THEREOF OF DIAMETER OF CONDUIT SIZE, BUT NO ROD OR BOLT F. CONDUIT ENDS SHALL BE CUT SQUARE AND REAMED TO REMOVE BURRS AND SHARP

EDGES. OFFSETS AND BENDS FOR CHANGES IN ELEVATION OF EXPOSED CONDUIT RUNS SHALL BE MADE AT WALLS OR BEAMS AND NOT IN OPEN SPACES BETWEEN WALLS OR
BEAMS. CONDUITS SHALL BE ROUTED SO AS NOT TO INTERFERE WITH THE OPERATION OR
MAINTENANCE OF ANY EQUIPMENT. THE ENTIRE JOB SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER, AS APPROVED BY THE ENGINEER. STEEL SUPPORTS OR RACKS SHALL BE GALVANIZED STEEL CHANNEL AND FITTINGS, UNISTRUT, KINDORF, HUSKY PRODUCTS COMPANY, OR EQUAL

G. CONDUITS SHALL BE ROUTED IN THE FIELD SO AS TO BE COORDINATED WITH THE BUILDING STRUCTURE. EXPOSED CONDUIT SHALL BE RUN IN STRAIGHT LINES PARALLEL TO WALLS, BEAMS AND COLUMNS AND WITH RIGHT ANGLE BENDS AND THREADED CONDUI H. CONDUITS PENETRATING THE BUILDING SHALL BE SEALED WITH SEALING BUSHINGS AND SHALL BE PROVIDED WITH PRESSURE DISCS, LOCKING COLLAR, SEALING RING ETC. SIMILAR TO OZ GEDNEY TYPE CSRE CSRL CSRC ETC. SEALING DESIGN SHALL BE SEGMENTAL

OZ-GEDNEY CRC. FR. HRK. HRE. HPE. KR. GRK. GRE. GPE (WHICHEVER IS APPROPRIATE). THE SEALING COMPOUND SHALL BE DOZSEAL SEALING INSULATING COMPOUND AS MANUFACTURED BY OZ-GEDNEY. CONDUITS AND CABLES SHALL BE SEALED COMPLETELY TO PREVENT WATER, MOISTURE PENETRATION.

2.9 WIRE AND CABLE

A. ALUMINUM 1. WIRE AND CABLE LARGER THAN #6 AWG, UTILIZED AS FEEDERS SHALL BE PROVIDE SINGLE CONDUCTOR WIRE AND CABLE WITH 600V INSULATION. WIRE SIZE #4 AWG AND LARGER SHALL BE STRANDED. CONDUCTORS SHALL BE ALUMAFLEX ALUMINUM ALLOY COMPACT STRANDED, INSULATED WITH HEAT AND

IOISTURE RESISTANT PVC, JACKETED WITH ABRASION, MOISTURE, GASOLINE AND OIL RESISTANT NYLON. 3. WIRE AND CABLE SHALL BE TYPE THHN-THWN-2 BUILDING WIRE, 600V

ATED FOR 75 DEGREES C. IN WET LOCATIONS AND 90 DEGREES C. IN DRY 4. FLEXIBLE METAL CLAD CABLE TYPE MC WITH GREEN EQUIPMENT GROUND SHALL

BE USED FOR APARTMENT FEEDERS WHERE INDICATED. MC CABLE SHALL BE MANUFACTURED BY SOUTHWIRE AFC OR EQUAL. 5. TYPE SE CABLE, STYLE R, SHALL BE USED FOR APARTMENT FEEDERS WHERE INDICATED. INSTALLATION SHALL COMPLY WITH THE MASSACHUSETTS ELECTRICAL

6. WIRE AND CABLE SHALL BE MANUFACTURED BY SOUTHWIRE, GENERAL CABLE 7. SERVICE ENTRANCE CABLE - TYPE SER

A. SUMMARY 1) THIS SPECIFICATION DESCRIBES SERVICE ENTRANCE CABLE, TYPE SER EMPLOYING THREE INDIVIDUAL TYPE THHN/THWN-2 CIRCUIT CONDUCTORS AND A STRANDED UNINSULATED GROUNDING CONDUCTOR SUITABLE FOR OPERATING AT A MAXIMUM CONDUCTOR TEMPERATURE OF 75°C AND AT A POTENTIAL OF 600 VOLTS. TYPE SER CABLE SHALL BE LISTED AND MARKED FOR USE IN CABLE TRAY AND COMPLY WITH UL 854, 1685 AND 1581 VERTICAL TRAY FLAME TESTS FOR USE AS AN INTERIOR EXPOSED FEEDER CABLE FOR DWELLING UNIT LOAD CENTERS. INSTALLATION SHALL ALSO COMPLY WITH THE MASSACHUSETTS ELECTRIC CODE ARTICLES 338 AND 334.

2) DESIGN IS BASED ON ESSEX TO ESTABLISH STANDARDS OF QUALITY FOR MATERIALS AND PERFORMANCE. ACCEPTABLE ALTERNATE MANUFACTURERS ARE SOUTHWIRE AND GENERAL CABLE. 3) APPLICABLE SPECIFICATIONS

A) THE FOLLOWING SPECIFICATIONS FROM A PART OF THIS SPECIFICATION TO THE EXTENT SPECIFIED HERE IN: UNDERWRITERS LABORATORIES STANDARD 44 FOR RUBBER-INSULATED WIRES AND CABLES.

2) MASSACHUSETTS ELECTRICAL CODE ARTICLE 338. 4) CONDUCTORS A) THE INSULATED AND UNINSULATED CONDUCTORS SHALL BE STRANDED UNCOATED COPPER PER UL STANDARD 83.

5) SEPARATOR A) A SUITABLE SEPARATOR OVER THE CONDUCTOR MAY BE

USED AT THE OPTION OF THE MANUFACTURER 6) INSULATION A) EACH INSULATED CIRCUIT CONDUCTOR SHALL BE A TYPE

THHN/THWN-2 CONDUCTOR COMPLYING WITH THE REQUIREMENTS OF UL STANDARD 44 FOR PHYSICAL AND ELECTRICAL PROPERTIES AND INSULATION THICKNESSES 7) ASSEMBLY A) THREE TYPE THHN/THWN, CROSSLINKED-POLYETHYLENE-INSULATED COLOR CODED

CROSSLINKED—POLYEINYLENE—INSULAIED COLOR CODED
CONDUCTORS SHALL BE TWISTED WITH A SUITABLE LAY, FILLERS
AS REQUIRED, AND A STRANDED UNINSULATED COPPER
GROUNDING CONDUCTOR IN ONE INTERSTICE. THE
ASSEMBLED CONDUCTORS SHALL BE BOUND WITH A GLASS
FEMILIED TO TAKE CONTENDED. THE CONTENDED BY HE CONTENDED BY HE CONTENDED. SEA REINFORCED TAPE COVERING AS REQUIRED BY UL STANDARD 854 8) SHEATH

 A) THE ASSEMBLED CONDUCTORS SHALL BE COMPLETELY ENCLOSED IN A PVC PROTECTIVE SHEATH COMPLYING WITH THE PHYSICAL REQUIREMENTS OF UL. 9) IDENTIFICATION

A) THE CABLE SHALL BE IDENTIFIED BY SURFACE MARKING INDICATING MANUFACTURER'S IDENTIFICATION, NUMBER AND SIZE OF INSULATED AND UNINSULATED CONDUCTORS, TYPE OF INDIVIDUAL CONDUCTORS, VOLTAGE RATING, UL SYMBOL, FLAME TEST/TRAY USE AND CABLE TYPE. 10) TESTS

A) THE COMPLETED CABLE SHALL BE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF UL STANDARD 854 FOR TYPE E

2.11 WIRING DEVICES

A) THE CABLE SHALL BEAR UNDERWRITERS LABORATORIES TYPE SE LABEL

A) THE CABLE SHALL BE RUN HORIZONTALLY ON A FLOOR ONLY AND NOT PASS THROUGH A RATED FLOOR ASSEMBLY.

 PROVIDE SINGLE CONDUCTOR WIRE AND CABLE WITH 600V INSULATION. WIRE SIZE #8 AWG AND LARGER SHALL BE STRANDED. WIRE OF SIZE SMALLER THAN #8 AWG SHALL BE SOLID. CONDUCTORS SHALL BE SOFT DRAWN COPPER WITH CONDUCTIVITY OF NOT LESS THAN 98% OF ANSI STANDARD FOR ANNEALED

3. WIRE AND CABLE SHALL BE TYPE THWN-THHN BUILDING WIRE, 600V, RATED FOR 75 DEGREES C. IN WET LOCATIONS AND 90 DEGREES C. IN DRY LOCATIONS. 4. FLEXIBLE METAL CLAD CABLE TYPE MC WITH GREEN EQUIPMENT GROUND MAY ALLOWED BY CODE. MC CABLE SHALL BE MANUFACTURED BY AFC OR EQUAL.

A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED IN THE WORK INCLUDED, BUT NOT LIMITED, TO THE FOLLOWING:

1. WIRING DEVICES: A. PASS AND SEYMOUR/LEGRAND B. BRYANT ELECTRIC C. COOPER INDUSTRIES

E. LEVITON B. DUPLEX RECEPTACLES SHALL BE COMMERCIAL GRADE RATED FOR 125 VOLTS, 15 OR 20 AMPERES WHERE LOCATED TOTALLY WITHIN AN APARTMENT, CONDOMINIUM OR TOWNHOUSE AND APPROVED BY ARCHITECT/ENGINEER/OWNER RECEPTACLES SHALL HAVE WIRE BUNDLING CLAMPS ON ALL TERMINALS INCLUDING GROUND; TERMINAL SCREWS SHALL BE #10. A FULL WRAP—AROUND STEEL BRIDGE STRAP SHALL BE PROVIDED WITH LOCKING FINGER TABS TO SECURE THE FACE.

C. DUPLEX RECEPTACLES WITH GROUND FAULT CIRCUIT INTERRUPTER CHARACTERISTICS SHALL BE RATED FOR 125 VOLTS, 20 AMPERES WITH 20 AMPERE FEED THROUGH AMPERES UNLESS OTHERWISE INDICATED ON CONTRACT DRAWINGS, AND SHALL CONFORM TO THE REVISED 2003 UL 943 STANDARD. ALL RECEPTACLES SHALL HAVE ?SAFELOCK? PROTECTION THAT WILL DISCONNECT POWER TO THE RECEPTACLE IF CRITICAL COMPONENTS ARE DAMAGED AND GROUND FAULT PROTECTION IS LOST. ALL RECEPTACLES SHALL HAVE ?TRIP INDICATOR? LIGHT TO IDENTIFY A TRIPPED CONDITION OUTLETS, UTILITY VAULT, IN WET AREAS, ETC. SHALL BE GROUND FAULT TYPE WHETHE NDICATED ON THE DRAWINGS OR NOT. PROVIDE WEATHERPROOF WHILE-IN-USE COVERS

1. PASS & SEYMOUR: 2094 2. COOPER: XGF20 3. LEVITON: 8898

1. PASS & SEYMOUR

D. TOGGLE SWITCHES SHALL BE FULL SIZED, HEAVY DUTY AC TYPE RATED FOR 120/277 VOLTS, 20 AMPERES AND COMPLY WITH DECORA STYLE BY LEVITON. MOUNTING STRAP SHALL BE ONE-PIECE NICKEL PLATED STEEL WITH INTEGRAL GROUND. TERM SHALL EXTERNAL SCREW-PRESSURE PLATE BACK AND SIDE WIRED TO ACCEPT # 14 - #10 AWG WIRE. CONTACTS SHALL BE SILVER ALLOY.

E. DIMMERS SWITCHES: MODULAR FULL WAVE SOLID-STATE UNITS WITH INTEGRAL, QUIET ON/OFF SWITCHES WITH AUDIBLE AND ELECTROMAGNETIC NOISE FILTERS. 1. WATTAGE RATING EXCEEDS CONNECTED LOAD BY 30% MINIMUM EXCEPT AS OTHERWISE INDICATED.

2. CONTROL: CONTINUOUSLY ADJUSTABLE SLIDE, TOGGLE OR ROTARY KNOB. SINGLE POLE OR 3-WAY SWITCH TO SUIT CONNECTIONS. 3. INCANDESCENT LAMP DIMMERS: MODULAR DIMMER SWITCHES FOR INCANDESCENT FIXTURES; SWITCH POLES AND WATTAGE AS OTHERWISE INDICATED. 120 VOLT. 60 HERTZ, WITH CONTINUOUSLY ADJUSTABLE ROTARY KNOB

EQUIPPED WITH ELECTROMAGNETIC FILTER TO ELIMINATE NOISE, RF AND TV 4. FLUORESCENT LAMP DIMMERS: MODULAR DIMMER SWITCHES COMPATIBLE WITH DIMMER BALLASTS. TRIM POTENTIOMETER ADJUSTS LOW END DIMMINO DIMMER BALLAST COMBINATION IS CAPABLE OF CONSISTENT DIMMING TO A MAXIMUM OF 10 % OF FULL BRIGHTNESS.

F. ALL WIRING DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH NEC ARTICLE 210. 2.12 WIRING DEVICE PLATES A. ALL NORMAL POWER WIRING DEVICE PLATES SHALL BE HIGH IMPACT STAINLESS STEEL: 1. PASS & SEYMOUR: TP SERIES (3/16 ? WIDER/LONGER THAN

STANDARD SIZE; CAPTIVE SCREWS FOR SINGLE GANG

B. DEVICE PLATE SCREWS SHALL BE OF THE SAME COLOR FINISH AS THE DEVICE PLATE. 2.13 OUTLET BOXES AND ACCESSORIES

A. PROVIDE GALVANIZED SHEET STEEL OUTLET BOXES FOR ALL OUTLETS UNLESS OTHERWISE NOTED B. FIXTURE OUTLET BOXES SHALL HAVE 3/8" SOLID MALE FIXTURE STUDS AND AUXILIARY

FIXTURE STEMS SHALL BE SUPPORTED FROM 3/8" MALE FIXTURE STUDS. C. ALL OUTLET BOXES FOR CONCEALED WORK SHALL BE GALVANIZED, STAMPED STEEL; THOSE FOR FIXTURES, FURNISHED WITH A FIXTURE STUD. D. OUTLET BOXES SHALL BE OF SIZE AND TYPE TO ACCOMMODATE (1) STRUCTURA CONDITIONS; (2) SIZE AND NUMBER OF RACEWAYS, CONDUCTORS OR CABLES ENTERING

E. INSTALL BLANK PLATES ON ALL OUTLET BOXES. IN WHICH NO APPARATUS IS INSTALLED. WHICH DO NOT INTEGRALLY PROVIDE A COVER FOR THE BOX. SERIES RATING OF DEVICES WILL NOT BE ACCEPTED. F. SPECIAL CARE SHALL BE TAKEN TO SET ALL BOXES CORRECTLY SQUARE AND TRUE WITH

AND (3) DEVICES OR FIXTURES FOR WHICH REQUIRED.

G. ELECTRICAL NON-METALLIC TUBING (ENT), FITTINGS, BOXES AND SUPPORT HARDWARE CAN BE USED WHEN ALLOWED BY CODE AND APPROVED BY OWNER. H. BOXES

1. BOXES USED WITHED ENT SHALL BE LISTED AND/OR CERTIFIED. 2. NON-METALLIC MUD BOXES SHALL BE AVAILABLE A. MUD BOXES WITH TWO 1?, FOUR 1/2? AND SIX PORTS SHALL BE AVAILABLE B. MUD BOXES WITH QUICK CONNECT PORTS SHALL BE MOLDED OUT OF POLYCARBONATE

C. MUD BOXES WITH REMOVABLE BACK SHALL BE AVAILABLE D. MUD BOX TYPES SHALL INCLUDE; 1) CEILING BOX LISTED FOR FIXTURE SUPPORT UP TO 50 LBS. AND CEILING FAN SUPPORT UP TO 35 LBS.

2) ONE GANG 3) TWO GANG 4) 4 SQUARE 2.16 NAMEPLATES

A. NAMEPLATES CONSISTING OF BLACK PLASTIC WITH WHITE CENTER. LETTERING TO RF 1/4" SCREWS SHALL BE PROVIDED FOR THE FOLLOWING EQUIPMENT: 1. ALL PANEL BOARDS AND DISTRIBUTION EQUIPMENT.

TERMINAL CABINETS. 3. JUNCTION BOXES LARGER THAN 4-11/16".

2.17 DISCONNECT SWITCHES A. ALL SAFETY SWITCHES SHALL BE NEMA TYPE HD AND UNDERWRITERS' LABORATORIES LISTED B. ALL SWITCHES SHALL HAVE SWITCH BLADES WHICH ARE FULLY VISIBLE IN OF OFF POSITION WITH THE DOOR OPEN. ALL CURRENT CARRYING PARTS SHALL BE PLATED THROUGH ELECTROLYTIC PROCESSED TO RESIST CORROSION AND PROMOTE COOL OPERATION. C. SWITCHES SHALL BE QUICK-MAKE AND QUICK-BREAK SUCH THAT, DURING NORMAL

OPERATION OF THE SWITCH, THE OPERATION OF THE CONTACTS SHALL BE NOT CAPABLI OF BEING RESTRAINED BY THE OPERATING HANDLE AFTER THE CLOSING OR OPENING ACTION OF THE CONTACTS HAS STARTED. THE HANDLE AND MECHANISM SHALL BE AN INTEGRAL PART OF THE BOX, NOT THE COVER, WITH POSITIVE PADLOCKING PROVISIONS IN D. SWITCHES SHALL BE FURNISHED IN NEMA 1 GENERAL PURPOSE ENCLOSURES UNLESS NEMA 3R (RAINTIGHT) OR NEMA 4 AS REQUIRED BY ENVIRONMENT. ENCLOSURES

SHALL BE OF CODE GAUGE (UL 98) SHEET STEEL (NEMA 1) OR CODE GAUGE E. SWITCHES SHALL BE HORSEPOWER RATED FOR 600 VOLTS AC AND ALL SWITCHES SHALL BE FUSED TYPE WITH DUAL ELEMENT FUSES. F. SAFETY SWITCHES SHALL BE SQUARE D CLASS 3130 OR APPROVED EQUAL AS MANUFACTURED BY GENERAL ELECTRIC OR CUTLER HAMMER

2.18 FUSES A. FUSES SHALL BE NON-RENEWABLE TYPE, UL CLASS J UP TO 600 AMP, AND CLASS L OVER 600 AMP. FUSES SHALL BE CURRENT LIMITING TYPE WITH A MINIMUM INTERRUPTING RATING OF 200,000 RMS AMP. B. FUSES SHALL NOT BE USED IN ANY SWITCHBOARDS OR PANEL BOARDS UNLESS ADEQUATE

A.C. RATED CIRCUIT BREAKERS ARE NOT AVAILABLE. C. FUSES SHALL BE MANUFACTURED BY BUSSMAN, GOULD SHAWMUT, LITTLE FUSE OR EQUAL 2.19 SWITCHBOARD A. MANUFACTURERS

1. SQUARE D COMPANY 2. GENERAL ELECTRIC 3. SIEMENS

PROTECTIVE DEVICES.

4. CUTLER HAMMER B. SHOP DRAWINGS: FOR EACH SWITCHBOARD, PANELBOARD AND RELATED EQUIPMENT. 1. DIMENSIONED PLANS, ELEVATIONS, SECTIONS, AND DETAILS, INCLUDING REQUIRED CLEARANCES AND SERVICE SPACE AROUND EQUIPMENT, INCLUDE ELECTRIC ROOM LAYOUT THAT INDICATE ALL CODE REQUIRED WORKING CLEARANCES. SHOW TABULATIONS OF INSTALLED DEVICES, EQUIPMENT

FEATURES, AND RATINGS. INCLUDE THE FOLLOWING: A. ENCLOSURE TYPES AND DETAILS FOR TYPES OTHER THAN NEMA 250, TYPE 1 B. BUS CONFIGURATION, CURRENT, AND VOLTAGE RATINGS. C. SHORT-CIRCUIT CURRENT RATING OF SWITCHBOARDS AND OVERCURRENT

D. DESCRIPTIVE DOCUMENTATION OF OPTIONAL BARRIERS SPECIFIED FOR ELECTRICAL INSULATION AND ISOLATION.

E. UTILITY COMPANY'S METERING PROVISIONS WITH INDICATION OF APPROVAL BY UTILITY COMPANY.

F. UL LISTING FOR SERIES RATING OF INSTALLED DEVICES. G. FEATURES, CHARACTERISTICS, RATINGS, AND FACTORY SETTINGS OF INDIVIDUAL OVERCURRENT PROTECTIVE DEVICES AND AUXILIARY COMPONENTS

2.21 GROUNDING REQUIREMENTS

A. GROUND ALL SYSTEMS AND EQUIPMENT IN ACCORDANCE WITH BEST INDUSTRY PRACTICE, THE REQUIREMENTS OF NFPA 70. B. THE GROUND BUS OF THE MAIN SWITCHBOARD SHALL BE CONNECTED TO THE MAIN GROUNDING ELECTRODE SPECIFIED BELOW BY MEANS OF INSULATED CONDUCTORS RUN C. THE MAIN GROUNDING ELECTRODE SHALL BE AN ACCESSIBLE POINT ON THE NEARES METALLIC MAIN WATER SERVICE PIPE. CONNECTION SHALL BE MADE ON THE STREET

SIDE OF THE MAIN VALVE UTILIZING A GROUND CLAMP OF A TYPE SPECIFICALLY MANUFACTURED FOR THE PURPOSE. BONDING JUMPERS SHALL BE PROVIDED AROUND THE WATER METERS AND AROUND INSULATING JOINTS AND/OR SECTIONS. D. ESTABLISH A GROUND BONDING CONNECTION FROM THE EFFECTIVELY GROUNDED STRUCTURAL BUILDING STEEL TO EACH COLD WATER MAINS ENTERING THE BUILDING EACH BONDING CONNECTION SHALL CONSIST OF INSULATED CONDUCTORS RUN IN CONDUIT

E. THE WATER PIPE GROUND SHALL BE SUPPLEMENTED BY AN ADDITIONAL ELECTRODE CONSISTING OF (3) BURIED 3/4" DIAMETER BY 10'\_0" LONG COPPERWELD GROUND RODS SPACED 10'\_0" APART, AND PROVIDED IN SUFFICIENT QUANTITY SO AS TO HAVE EASURED RESISTANCE TO GROUND OF NOT MORE THAN 10 OHMS. PROVIDE INDEPENDENT CERTIFICATION CONFIRMING THIS. ESTABLISH A BONDING CONNECTION FROM THE ELECTRODE CONSISTING OF GREEN INSULATED CONDUCTORS RUN IN CONDUCT BONDING JUMPERS.

F. PROVIDE GROUNDING BONDS BETWEEN ALL METALLIC CONDUITS OF THE LIGHT AND POWER SYSTEM WHICH ENTER AND LEAVE CABLE CHAMBERS OR OTHER NON\_METALLIC CABLE PULLING AND SPLICING BOXES. ACCOMPLISH THIS BY EQUIPPING THE CONDUITS WITH BUSHINGS OF THE GROUNDING TYPE INDIVIDUALLY CROSS CONNECTED. G. BOND METALLIC CONDUITS CONTAINING GROUNDING ELECTRODE CONDUCTORS AND MAIN BONDING CONDUCTORS TO THE GROUND BUS SERVICE ENCLOSURE AND/OR GROUNDIN ELECTRODE AT BOTH ENDS OF EACH RUN UTILIZING GROUNDING BUSHINGS AND JUMPERS H. ALL QUALIFY CONCRETE-ENCASED GROUNDING ELECTRODES SHALL BE CONNECTED TO THI

GROUNDING SYSTEM OF THE BUILDING IN ACCORDANCE WITH THE REQUIREMENTS OF NEC . PROVIDE GROUNDING BONDS FOR ALL METALLIC CONDUITS OF THE LIGHT AND POWER SYSTEM WHICH TERMINATE IN PITS BELOW EQUIPMENT FOR WHICH A GROUND BUS IS SPECIFIED. ACCOMPLISH THIS BY EQUIPPING THE CONDUITS WITH BUSHINGS OF THE GROUNDING TYPE CONNECTED INDIVIDUALLY TO THE GROUND BUS. J. PROVIDE SUPPLEMENTARY GROUND BONDING WHERE METALLIC CONDUITS TERMINATE

AT METAL CLAD EQUIPMENT (OR AT THE METAL PULL BOX OF EQUIPMENT) FOR WHICH A GROUND BUS IS SPECIFIED. ACCOMPLISH THIS BY EQUIPPING THE CONDUITS WITH BUSHINGS OF THE GROUNDING TYPE CONNECTED INDIVIDUALLY BY MEANS OF JUMPERS TO THE GROUND BUS. EXCLUDE THE JUMPERS WHERE DIRECTED. THIS EXCLUSION WILL BE REQUIRED WHERE AN ISOLATED GROUND FOR ELECTRONIC EQUIPMENT IS TO BE MAINTAINED K. EACH GROUNDING TYPE BUSHING SHALL HAVE THE MAXIMUM GROUND WIRE ACCOMMODATION AVAILABLE IN STANDARD MANUFACTURE FOR THE PARTICULAR CONDUIT SIZE. CONNECTION TO BUSHING SHALL BE WITH WIRE OF THIS MAXIMUM SIZE.

.. BONDING CONDUCTORS ON THE LOAD SIDE OF THE SERVICE DEVICE AND EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED IN RELATION TO THE FUSES OR TRIP SIZE OF THE  $\mbox{\scriptsize M.}$  THE CENTRAL EQUIPMENT FOR THE FIRE PROTECTIVE ALARM SYSTEM AND TELEPHONE SYSTEM SHALL HAVE ITS GROUNDING TERMINAL CONNECTED TO THE GROUNDING ELECTRODE BY MEANS OF A NO. 6 GREEN CODED INSULATED CONDUCTOR, RUN IN 3/4" CONDUIT. UTILIZE A GROUND CLAMP OF A TYPE SPECIFICALLY MANUFACTURED FOR THE PURPOSE

N. PROVIDE GROUNDING BONDS FOR ALL METAL PARTS, INCLUDING ALL METAL PARTS OF THE ELECTRICAL EQUIPMENT ASSOCIATED WITH THE WATER-CIRCULATING SYSTEM OF THE POOL, ALL METAL PARTS OF THE POOL STRUCTURE, AND ALL FIXED METAL PARTS, WHICH INCLUDE CONDUIT AND PIPING, METAL DOOR FRAMES, AND METAL WINDOW FRAMES WITHIN 5 FEET OF THE INSIDE WALLS OF THE POOL AND NOT SEPARATED BY A PERMANENT BARRIER. ALL POOL GROUNDING SHALL BE IN ACCORDANCE WITH ARTICLE 680 OF THE NEC, STATE CODE OR LOCAL CODE, WHICHEVER IS THE MORE STRINGEN

A. THE INSULATION OR COVERING OF EACH WIRE OR CABLE SHALL BE COLOR CODED SO AS TO PROVIDE FOR CIRCUIT IDENTIFICATION AS SPECIFIED BELOW:

120/208 V CIRCUITS PHASE CIRCUITS BLACK A

BLUE C WHITE NEUTRAL GREEN EQUIPMENT GROUND

B. COLOR CODING SHALL BE ACHIEVED BY ONE OF THE FOLLOWING METHODS:

1. THE INSULATION OR COVERING SHALL BE CODED DURING MANUFACTURE BY USE OF ONE OF THE FOLLOWING METHODS: A. COLORED COMPOUNDS.

2. IN SIZES AND INSULATION TYPES WHERE FACTORY APPLIED COLORS ARE NOT AVAILABLE, WIRES AND CABLES SHALL BE COLOR CODED BY THE APPLICATION COLORED PLASTIC TAPES IN OVERLAPPING TURNS AT ALL TERMINAL POINTS, AND IN ALL BOXES IN WHICH SPLICES ARE MADE. C. THE SAME COLORED CABLE SHALL BE CONNECTED TO THE SAME PHASE THROUGHOUT D. IN GENERAL, BUILDING LOAD CENTERS AND PANELBOARDS SHALL BE PHASED "A". "B". LEFT TO RIGHT. THE NEUTRAL, ALTHOUGH IT MAY BE IN DIFFERENT LOCATIONS FOR

DIFFERENT EQUIPMENT, SHALL BE IDENTIFIED. 2.23 MOLDED CASE CIRCUIT BREAKERS A. MOLDED CASE TYPE CIRCUIT BREAKERS SHALL CONSIST OF MANUALLY OPERATED QUICK\_MAKE QUICK\_BREAK MECHANICALLY TRIP FREE OPERATING MECHANISMS FOR SIMULTANEOUS OPERATION OF ALL POLES, WITH CONTACTS, ARC INTERRUPTERS AND TRIP ELEMENTS FOR EACH POLE, ALL ENCLOSED IN MOLDED PHENOLIC PLASTIC CASES. 1. THEIR TRIPPING UNITS SHALL BE OF THE "THERMAL MAGNETIC" TYPE HAVING

ELEMENTS FOR SHORT CIRCUIT PROTECTION. 2. THEY SHALL BE MANUALLY OPERABLE BY MEANS OF TOGGLE TYPE OPERATING HAVING "TRIPPED" POSITION MIDWAY BETWEEN THE "ON\_OFF?

3. THEY SHALL EACH BE CONTAINED IN AN INDIVIDUAL CASE ENCLOSING ONLY THE NUMBER OF POLES REQUIRED FOR THE PARTICULAR BREAKER. 4 ALL PANELS AND INDIVIDUALLY MOUNTED CIRCUIT RREAKERS SHALL HAVE SHORT CIRCUIT RATINGS EXCEEDING THE AVAILABLE SHORT CIRCUIT OR THE VALUES INDICATED IN THE POWER SYSTEM STUDIES IN THIS SECTION BY A FACTOR OF 1.2

A. 240V CLASS PANELS/BREAKERS 1) 10 KAIC WHERE SHOWN FED BY A 150 KVA OR LESS TRANSFORMER 2) 22 KAIC WHERE SHOWN FED BY A 300 KVA OR LESS TRANSFORMER 5. THEY SHALL BE OF THE "BOLTED\_IN" TYPE.

6. WHERE NECESSARY, TO ACCOMMODATE OTHER REQUIREMENTS, THEIR FRAME SIZES SHALL BE INCREASED TO CONFORM TO SUCH REQUIREMENTS, FRAME SIZES BEING INDICATED ONLY AS A REFERENCE TO THE MINIMUM ACCEPTABLE INTERRUPTING RATINGS NOTED ABOVE. 7. WHERE SINGLE POLE IN TRIP SIZES 20 AMPS OR LESS, THEY SHALL BE RATED FOR 8. THEY SHALL BE EQUIPPED WITH 5 MILLIAMP SENSITIVITY GROUND FAULT

INTERRUPTING FEATURES WHERE SO INDICATED. B. THEY SHALL BE MANUFACTURED BY SQUARE D, CUTLER HAMMER, OR GENERAL ELECTRIC 2.25 CARTRIDGE FUSES

A. CARTRIDGE FUSES SHALL BE AS FOLLOWS: 1. PROVIDE A COMPLETE SET OF FUSES FOR EACH ITEM OF FUSIBLE TYPE QUIPMENT. FUSIBLE EQUIPMENT FURNISHED BY OTHER CONTRACTORS WILL BE COMPLETE WITH FUSES. 2. SECONDARY SYSTEM FUSES. RATED AT 600 VOLTS OR LESS. SHALL BE UL LISTED

AND CONSTRUCTED IN CONFORMANCE WITH THE APPLICABLE STANDARDS SET FORTH BY NEMA AND ANSI. ALL FUSES OF A PARTICULAR CLASS SHALL BE OF SAME MANUFACTURER. 3. REGARDLESS OF ACTUAL FAULT CURRENT, THEY SHALL, AT FULL RECOVERY VOLTAGE, BE CAPABLE OF SAFELY INTERRUPTING FAULT CURRENTS OF 200,000 AMPERES RMS SYMMETRICAL OR 340,000 AMPERES RMS ASYMMETRICAL, DELIVERABLE

AT THE LINE SIDE OF THE FUSE. 4. CIRCUITS 0-600 AMPERES SHALL BE PROTECTED BY THE EQUAL OF BUSSMAN LOW PEAK" CURRENT LIMITING FUSES, LPN-RK (250 VOLTS), LPS-RK (600 VOLTS), UL CLASS RK-1. 5. FUSES SHALL BE SUITABLE FOR APPLICATION TO FUSE GAPS WHICH REJECT OTHER

TYPES OF FUSING. 6. SUPPLY 10 PER CENT SPARE FUSES OF EACH SIZE AND TYPE 60 AMPS AND LESS. B. CARTRIDGE FUSES SHALL BE MANUFACTURED BY BUSSMAN, GOULD, OR EFCO. 2.26 MOTOR CONTROLS

A. MOTOR CONTROLS - MANUAL AND MAGNETIC 1. INDIVIDUALLY MOUNTED MAGNETIC STARTERS SHALL BE ACROSS—THE—LINE TYPE WITH THERMAL OVERLOAD ON EACH PHASE, SINGLE SPEED, TWO SPEED, OR REDUCED VOLTAGE START AS INDICATED. CHECK EXACT TYPE OF TWO SPEED OR PART WINDING MOTORS TO BE FURNISHED BY OTHER CONTRACTORS, AND PROVIDE 2. STARTERS SHALL BE OF THE REPLACEABLE CONTACT DOUBLE BREAK TYPE, OF SIZE

AND TYPE REQUIRED FOR PARTICULAR MOTOR HORSEPOWER AND VOLTAGE.

MINIMUM SIZE STARTER TO BE SIZE 1. A. STARTERS SHALL HAVE OL RESET BUTTON, GREEN PILOT LIGHT TO INDICATE "ON", AND "HAND-OFF-AUTO" SWITCH IN COVER. PILOT LIGHTS SHALL BE PUSH-TO-TEST TYPE. B. PROVIDE PROPER RATING OF THERMAL OVERLOADS. REPLACE ANY OVERLOADS FOUND TO BE OF AN INCORRECT RATING. PROVIDE A SPARE SET OF THREE THERMAL OVERLOADS FOR EACH STARTER. C. PROVIDE FOUR (4) SETS OF AUXILIARY CONTACTS OF CONVERTIBLE TYPE N.O. TO N.C. FOR EACH STARTER.

ENCLOSURES. THOSE IN WET LOCATIONS SHALL HAVE NEMA IV ENCLOSURES

D. MOTOR STARTERS INSTALLED IN DRY LOCATIONS SHALL HAVE NEMA I

3. MANUAL MOTOR STARTERS SHALL HAVE PILOT LIGHTS AND SHALL BE FURNISHED WITH THERMAL OVERLOADS ON EACH PHASE. B. MOTORS: EACH MOTOR SHALL HAVE DISCONNECT SWITCH AND STARTER PROVIDED UNDER THIS SECTION. STARTERS WHICH ARE A PART OF "FACTORY ASSEMBLED" CONTROL PANEL WILL BE PROVIDED UNDER SECTION SUPPLYING EQUIPMENT TO BE CONTROLLED

1. PROVIDE MOTOR TERMINAL BOXES FOR EACH MOTOR NOT FURNISHED WITH SAME

C. DISCONNECT SWITCHES 1. DISCONNECT (SAFETY) SWITCHES SHALL CONFORM TO INDUSTRIAL STANDARDS OF NEMA, BE UL LISTED AND SHALL BE HEAVY DUTY TYPE, QUICK—MAKE, QUICK—BREAK TYPE WITH INTERLOCKING COVER MECHANISM AND PROVISIONS FOR PADLOCKING SWITCH HANDLE IN "OFF" POSITION. THREE POLE TOGGLE SWITCHES ARE NOT ACCEPTABLE AS SUBSTITUTE FOR DISCONNECT SWITCHES. 2. DISCONNECT SWITCHES SHALL BE OF FUSED OR UNFUSED TYPE AS INDICATED WITH NUMBER OF DISCONNECTING POLES INDICATED. THE GROUNDED CONDUCTOR SHALL NOT BE SWITCHED. SWITCHES SHALL BE FOR USE WITH CURRENT LIMITING FUSES WITH REJECTION TYPE FUSE CLIPS AND THOSE SHALL BE

3. ENCLOSURES SHALL BE OF PROPER NEMA TYPE FOR THE INTENDED LOCATION AND SHALL BE PHOSPHATE COATED OR EQUIVALENT CODE GAUGE GALVANIZED SHEET STEEL WITH GRAY BAKED ENAMEL FINISH. 4. ACCEPTABLE MANUFACTURERS:

A. GENERAL ELECTRIC B. CUTLER HAMMER C. SQUARE D

BUT CONNECTED UNDER THIS SECTION.

D. COMBINATION STARTER 1. PROVIDE COMBINATION STARTERS WHERE INDICATED ON THE PLANS.

E. MOTOR CONTROL CIRCUITRY

1. EXCEPT AS NOTED BELOW, SELECT MATERIALS EXACTLY AS SPECIFIED FOR FEEDERS. UTILIZE NO. 12 AWG THWN CONDUCTORS THROUGHOUT MINIMUM. 2. MOTOR CONTROL CIRCUIT WIRES MAY BE RUN IN THE SAME CONDUIT AS THE WIRES OF MOTOR POWER CIRCUITS; HOWEVER, EXCLUDE MOTOR CONTROL WIRES FROM ENCLOSURES (OTHER THAN MOTOR STARTER ENCLOSURES) WHICH CONTAIN POWER CIRCUIT OVERCURRENT PROTECTION AND SWITCHING DEVICES; ALSO FROM PULL BOXES AND JUNCTION BOXES CONTAINING THE WIRES OF MAIN AND SUBMAIN FEFDERS LITHURE AUXILIARY PULL BOXES TO SEPARATE MOTOR CONTROL ENTER THE ITEMS FROM WHICH MOTOR CONTROL WIRES ARE EXCLUDED. 3. PRIOR TO INSTALLING ANY MOTOR CONTROL CIRCUITRY FOR A PARTICULAR MOTOR. NOTIFY THE ARCHITECT OF ANY DEVIATIONS BETWEEN THE CONTROL CIRCUITRY
REQUIREMENTS OF THE TRADE SUPPLYING THE MOTOR AND THE INDICATED ELECTRICAL

2.27 LIGHTING FIXTURES A. FURNISH ALL LABOR, MATERIALS AND EQUIPMENT REQUIRED FOR A COMPLETE INSTALLATION OF LIGHTING EQUIPMENT SPECIFIED. B. THIS CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR THE SAFE HANDLING OF ALL LIGHTING FIXTURES, WHICH ARE FURNISHED UNDER THIS SECTION AND OTHER

ACCESSORIES AND LAMPS, UNTIL THE FINAL INSPECTION HAS BEEN MADE BY THE C. SPECIAL FITTINGS AND MATERIALS THAT MAY BE REQUIRED TO SUPPORT FIXTURES SHALL BE SUPPLIED AS WELL AS SUPPORTS OR GROUNDS REQUIRED SECURING SURFACE OR PENDANT MOUNTED FIXTURES ON SUSPENDED CEILINGS UNLESS OTHERWISE NOTED. WHERE DUCTWORK, PIPES, TYPE OF BUILDING CONSTRUCTION MATERIALS AND STRUCTURAL FRAMING MEMBERS PROVIDE OBSTRUCTIONS OR DIFFICULT SUPPORT MEANS. HANGER RODS SHALL BE USED IN ASSOCIATION WITH HORIZONTAL SECTIONS OF STEEL SUPPORT CHANNELS IN A MANNER APPROVED BY THE OWNER'S ENGINEER. STEEL SUPPORT CHANNELS SHALL BE UNISTRUT, KINDORF, HUSKY PRODUCTS CO., OR EQUAL DETERMINED ON THE JOB, BY THE OWNER'S ENGINEER.

D. BALLASTS FOR FLUORESCENT FIXTURES SHALL BE HIGH POWER FACTOR ENERGY SAVINGS. ELECTRONIC TYPE. MULTIPLE LAMP BALLASTS SHALL BE USED WHENEVER POSSIBLE.
BALLASTS SHALL BE OF HIGH POWER FACTOR TYPE. THE PROPER BALLAST SHALL BE FURNISHED AND INSTALLED FOR ALL LIGHTING FIXTURES NORMALLY DESIGNED FOR DPERATION WITH BALLASTS, WHETHER OR NOT SUCH BALLASTS ARE SPECIFICALLY ITEMIZED ON THE FIXTURE SCHEDULE. E. FURNISH AND INSTALL A COMPLETE SET OF NEW LAMPS FOR ALL FIXTURES. LAMPS USED DURING THE CONSTRUCTION PERIOD SHALL BE REMOVED AND REPLACED WITH NEW LAMPS. ALL FLUORESCENT LAMPS TO BE WARM WHITE OR APPROVED EQUAL. LAMPS

SHALL BE OSRAM / SYLVANIA. F. FIXTURES, PART OR PARTS THEREOF (INCLUDING LAMPS) DETERMINED TO BE DEFECTIVE UPON COMPLETION OF THE ELECTRICAL INSTALLATION SHALL BE REPLACED BY THE ELECTRICAL CONTRACTOR FREE OF CHARGE.

G. IN ADDITION TO FIXTURE SUPPORTS, SURFACE MOUNTED LIGHTING FIXTURES SHALL BE SECURED TO THE SURFACE TO WHICH THEY MOUNT AT A MINIMUM TO TWO POINTS ON EACH 4 FOOT LENGTH OF FIXTURE HOUSING, AS APPROVED, TO PREVENT ROTATION OR MOVEMENT OF THE FIXTURE OUT OF ITS SQUARE AND LEVEL POSITION OF ALIGNMENT. H. THIS CONTRACTOR SHALL INCLUDE ALL FIXTURES, WIRING, HANGING, UNCRATING, CONNECTING UP AND MAKING READY FOR OPERATION. THIS CONTRACTOR SHALL INCLUDE

THE COST OF FURNISHING AND INSTALLING ALL LAMPS FOR ALL FIXTURES UNDER THIS CONTRACT. ALL T-8 TUBES FOR INSTANT-START FIXTURES SHALL BE GENERAL ELECTRIC, PHILLIPS, OSRAM / SYLVANIA OR EQUAL. ALL LAMPS SHALL BE U.L. APPROVED. I. ALL FLUORESCENT FIXTURES INSTALLED IN SUSPENDED CEILINGS SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE BY CHAINS AT EITHER END OF FIXTURE. J. ALL FIXTURES INSTALLED IN INSULATED CEILINGS SHALL BE IC RATED. COORDINATE WITH

K. ALL FIXTURES INSTALLED IN RATED CEILINGS SHALL BE ONE OR TWO HOUR RATED. COORDINATE WITH THE ARCHITECTS REFLECTED CEILING PLANS FOR CEILING RATING. L. ALL LIGHTING FIXTURES SHALL BE INDIVIDUALLY SUPPORTED FROM THE STRUCTURAL SLAB OR STRUCTURAL BUILDING MEMBER. FIXTURES WILL NOT BE PERMITTED TO BE IN ACCORDANCE WITH SEISMIC REQUIREMENTS OUTLINED IN MASSACHUSETTS STATE BUILDING CODE SIXTH EDITION

M. HEARING IMPAIRED DOOR LIGHT 1. UNIT DOOR LIGHTS: AUDIBLE/VISUAL SIGNALING DEVICE WITH HORN/STROBE HALL PUSH BUTTON STATION, AND TRANSFORMER. MINIMUM 85DB TONE AT 10 FEET AND A HIGH INTENSITY 11.7 CANDELA VISUAL SIGNAL. PUSH BUTTON ILLUMINATED A. ROOM ANNUNCIATOR MANUFACTURER/MODEL - EDWARDS 7005-G5.

N. HEARING IMPAIRED PHONE LIGHT 1. UNIT PHONE LIGHTS: AUDIBLE/VISUAL SIGNALING DEVICE WITH HORN/STROBE. FEET AND A HIGH INTENSITY 11.7 CANDELA VISUAL SIGNAL. PUSH BUTTON -A. ROOM ANNUNCIATOR MANUFACTURER/MODEL - EDWARDS

B-KHD-1000-PF 2.28 OCCUPANCY SENSORS A. WORK INCLUDED

 CONTRACTOR'S WORK TO INCLUDE ALL LABOR, MATERIALS, TOOLS, APPLIANCES, CONTROL HARDWARE, SENSOR, WIRE, JUNCTION BOXES AND EQUIPMENT NECESSARY FOR AND INCIDENTAL TO THE DELIVERY, INSTALLATION AND FURNISHING. OF A COMPLETELY OPERATIONAL OCCUPANCY SENSOR LIGHTING CONTROL SYSTEM. 2. CONTRACTOR/SUPPLIER SHALL EXAMINE ALL GENERAL SPECIFICATION PROVISIONS AND DRAWINGS FOR RELATED ELECTRICAL WORK REQUIRED AS WORK UNDER 3. CONTRACTOR SHALL COORDINATE ALL WORK DESCRIBED IN THIS SECTION WITH ALL

WIRING, CONDUIT, FIXTURES, HVAC SYSTEMS AND BUILDING MANAGEMENT B. EQUIPMENT QUALIFICATION 1. PRODUCTS SUPPLIED SHALL BE FROM A SINGLE MANUFACTURER THAT HAS BEEN CONTINUOUSLY INVOLVED IN THE MANUFACTURING OF OCCUPANCY SENSORS FOR A MINIMUM OF FIVE (5) YEARS. MIXING OF MANUFACTURERS SHALL NOT BE ALLOWED 2. ALL COMPONENTS SHALL BE U.L. LISTED. OFFER A FIVE (5) YEAR WARRANTY AND MEET ALL STATE AND LOCAL APPLICABLE CODE REQUIREMENTS.

MANUFACTURING FACILITY AND SHALL HAVE A DEFECT RATE OF LESS THAN 1/3 OF 1%

OTHER APPLICABLE PLANS AND SPECIFICATIONS. INCLUDING BUT NOT LIMITED TO

4. WALL SWITCH PRODUCTS MUST BE CAPABLE OF WITHSTANDING THE EFFECTS OF C. SYSTEM DESCRIPTION 1. THE OBJECTIVE OF THIS SECTION IS TO ENSURE THE PROPER INSTALLATION OF THE

3. PRODUCTS SHALL BE MANUFACTURED BY AN ISO 9002 CERTIFIED

OCCUPANCY SENSOR BASED LIGHTING CONTROL SYSTEM SO THAT LIGHTING IS URNED OFF AUTOMATICALLY AFTER REASONABLE TIME DELAY WHEN A ROOM OR AREA IS VACATED BY THE LAST PERSON TO OCCUPY SAID ROOM OR AREA. 2. THE OCCUPANCY SENSOR BASED LIGHTING CONTROL SHALL ACCOMMODATE ALL CONDITIONS OF SPACE UTILIZATION AND ALL IRREGULAR WORK HOURS AND HABITS. 3. CONTRACTOR SHALL WARRANT ALL EQUIPMENT FURNISHED IN ACCORDANCE TO THIS SPECIFICATION TO BE UNDAMAGED, FREE OF DEFECTS IN MATERIALS AND WORKMANSHIP, AND IN CONFORMANCE WITH THE SPECIFICATIONS, THE SUPPLIER'S OBLIGATION SHALL INCLUDE REPAIR OR REPLACEMENT, AND TESTING WITHOUT CHARGE TO THE OWNER, ALL OR ANY PARTS OF EQUIPMENT WHICH ARE FOUND TO BE DAMAGED. DEFECTIVE OR NON-CONFORMING AND RETURNED TO

THE SUPPLIER. THE WARRANTY SHALL COMMENCE UPON THE OWNER'S

ACCEPTANCE OF THE PROJECT. WARRANTY ON LABOR SHALL BE FOR A MINIMUM

1. MANUFACTURER SHALL SUBSTANTIATE CONFORMANCE TO THIS SPECIFICATION BY SUPPLYING THE NECESSARY DOCUMENTS. PERFORMANCE DATA AND WIRING DIAGRAMS. ANY DEVIATIONS TO THIS SPECIFICATION MUST BE CLEARLY STATED BY LETTER AND SUBMITTED.

2. SUBMIT A LIGHTING PLAN CLEARLY MARKED BY MANUFACTURER SHOWING PROPER PRODUCT, LOCATION AND ORIENTATION OF EACH SENSOR. 3. SUBMIT ANY INTERCONNECTION DIAGRAMS PER MAJOR SUBSYSTEM SHOWING 4. SUBMIT STANDARD CATALOG LITERATURE, WHICH INCLUDES PERFORMANCE SPECIFICATIONS INDICATING COMPLIANCE TO THE SPECIFICATION 5. CATALOG SHEETS MUST CLEARLY STATE ANY LOAD RESTRICTIONS WHEN USED WITH

ELECTRONIC BALLASTS.

E. SYSTEM OPERATION 1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAKE ALL PROPER ADJUSTMENTS TO ASSURE OWNER'S SATISFACTION WITH THE OCCUPANCY SYSTEM. UNLESS SPECIFIED OTHERWISE, THE CONTRACTOR SHALL SET ALL TIME DELAYS TO NO LESS THAN 15 (FIFTEEN) MINUTES. OR; A. FACTORY COMMISSIONING 1) IT SHALL BE THE MANUFACTURER'S RESPONSIBILITY TO VERIFY ALL

SERVICE IS PROVIDED AT AN ADDITIONAL COST

PROPER ADJUSTMENTS AND TRAIN OWNER'S PERSONNEL TO ENSURE OWNER'S SATISFACTION WITH THE OCCUPANCY SYSTEM. THIS

UBMITTALS MADE ARE FOR SENSORS, WHICH MEET OR EXCEED THE SPECIFICATIONS INCLUDED HEREIN. G. PRODUCTS

HB-100, HB-150

F. ACCEPTABLE MANUFACTURERS

1. ALL PRODUCTS SHALL BE WATT STOPPER PRODUCT NUMBERS: W-500A, W-1000A, W-2000A, W-2000H, WPIR, DT-200, DT-205, DT-300, DT-305, DT-355, CX-100, CX-105, CI-200, CI-205, WT600, WT-05, WT1105, WT200, WT-2205, WT-2250,

ALL THE INFORMATION LISTED UNDER SECTION 1.04A AND 1.04D A MINIMUM OF

1. THE WATT STOPPER OR PRE-APPROVED EQUAL: FOR PRE-APPROVAL, PRO

2. THE LISTING OF ANY MANUFACTURER AS "ACCEPTABLE" DOES NOT IMPLY AUTOMATIC APPROVAL. IT IS THE SOLE RESPONSIBILITY OF THE ELECTRICAL

CONTRACTOR TO ENSURE THAT ANY PRICE QUOTATIONS RECEIVED AND

TEN (10) WORKING DAYS PRIOR TO INITIAL BID DATE.

B. WALL SENSORS: WI-200, WI-300, WS-200, WA-200, WA-300, WD-170, WD-180, WD-270, WD-280, WN-100 C. POWER AND SLAVE PACKS:

B120E-P, B277E-P, A120E-P, A277E-P, A120C-P, A277C-P, C120E-P, C277E-P, S120/277-P, AT-120, AT-277, BZ-100 D. LOW TEMPERATURE: CB-100 OUTDOOR SENSORS: EW, EN SERIES E. INTELISWITCH: TS-400, TS-400-24, AS-100, AS-110

F. DAYLIGHTING CONTROLS: LCO, LCD, LCE, LS-100, LS-301.

2. WALL SWITCH SENSORS SHALL UTILIZE PASSIVE INFRARED SENSING TECHNOLOGY ONLY TO DETECT MOTION. 3. WALL SWITCH SENSORS SHALL BE CAPABLE OF DETECTION OF OCCUPANCY AT DESKTOP LEVEL UP TO 300 SQUARE FEET, AND GROSS MOTION UP TO 1000

4. WALL SWITCH SENSORS SHALL ACCOMMODATE LOADS FROM 0 TO 800 WATTS AT 120 VOLTS; 0 TO 1200 WATTS AT 277 VOLTS AND SHALL HAVE 180? COVERAGE

 WALL SWITCH PRODUCTS SHALL UTILIZE ZERO CROSSING CIRCUITRY, WHICH INCREASES RELAY LIFE, PROTECTS FROM THE EFFECTS OF INRUSH CURRENT, AND INCREASES SENSOR'S LONGEVITY. 6. WALL SWITCH SENSORS SHALL HAVE NO LEAKAGE CURRENT TO LOAD. IN MANUAL OR IN AUTO/OFF MODE FOR SAFETY PURPOSES AND SHALL HAVE VOLTAGE DROP PROTECTION. 7. WHERE SPECIFIED, WALL SWITCH SENSORS SHALL PROVIDE A FIELD SELECTABLE

OPTION TO CONVERT SENSOR OPERATION FROM AUTOMATIC-ON TO MANUAL-ON 8. WHERE SPECIFIED, VANDAL RESISTANT WALL SWITCH SENSORS SHALL UTILIZE A HARD LENS WITH A MINIMUM 1.0MM THICKNESS. PRODUCTS UTILIZING A SOFT LENS WILL NOT BE CONSIDERED. 9. PASSIVE INFRARED SENSORS SHALL UTILIZE PULSE COUNT PROCESSING AND DIGITAL SIGNATURE ANALYSIS TO RESPOND ONLY TO THOSE SIGNALS CAUSED BY HUMAN MOTION

(ELECTRICAL NOISE ON THE LINE), SUPERIOR PERFORMANCE, AND GREATER RELIABILITY 11. PASSIVE INFRARED SENSORS SHALL HAVE A MULTIPLE SEGMENTED LODIF FRESNEL LENS, IN A MULTIPLE—TIER CONFIGURATION, WITH GROOVES—IN TO ELIMINATE DUST

10. PASSIVE INFRARED SENSORS SHALL UTILIZE MIXED SIGNAL ASIC WHICH PROVIDES

AND RESIDUE BUILD-UP. 12. WHERE SPECIFIED. PASSIVE INFRARED AND DUAL TECHNOLOGY SENSORS SHAL OFFER DAYLIGHTING FOOT-CANDLE ADJUSTMENT CONTROL AND BE ABLE TO ACCOMMODATE DUAL LEVEL LIGHTING.

13. DUAL TECHNOLOGY SENSORS SHALL BE CORNER OR RECESSED MOUNTED TO AVOID DETECTION OUTSIDE THE CONTROLLED AREA WHEN DOORS ARE LEFT OPEN. SENSORS SHALL HAVE ?AUTO ON? OR ?MANUAL ON? FEATURE. 14. DUAL TECHNOLOGY SENSORS SHALL CONSIST OF PASSIVE INFRARED AND ULTRASONIO TECHNOLOGIES FOR OCCUPANCY DETECTION. PRODUCTS THAT REACT TO NOISE OR AMBIENT SOUND SHALL NOT BE CONSIDERED. 15. ULTRASONIC SENSORS SHALL UTILIZE ADVANCED SIGNAL PROCESSING TO ADJUST

THE DETECTION THRESHOLD DYNAMICALLY TO COMPENSATE FOR CONSTANTLY

CHANGING LEVELS OF ACTIVITY AND AIRFLOW THROUGHOUT CONTROLLED SPACE. 16. ULTRASONIC OPERATING FREQUENCY SHALL BE CRYSTAL CONTROLLED TO WITHIN PLUS OR MINUS 0.005% TOLERANCE TO ASSURE RELIABLE PERFORMANCE AND ELIMINATE SENSOR CROSS-TALK. SENSORS USING MULTIPLE FREQUENCIES ARE NOT ACCEPTABLE. 17. ALL SENSORS SHALL BE CAPABLE OF OPERATING NORMALLY WITH ELECTRONIC

18. COVERAGE OF SENSORS SHALL REMAIN CONSTANT AFTER SENSITIVITY CONTROL HA BEEN SET. NO AUTOMATIC REDUCTION SHALL OCCUR IN COVERAGE DUE TO THE CYCLING OF AIR CONDITIONER OR HEATING FANS. 19. ALL SENSORS SHALL HAVE READILY ACCESSIBLE, USER ADJUSTABLE SETTINGS FOR TIME DELAY AND SENSITIVITY. SETTINGS SHALL BE LOCATED ON THE SENSOR (NOT THE CONTROL UNIT) AND SHALL BE RECESSED TO LIMIT TAMPERING.

BALLASTS, PL LAMP SYSTEMS AND RATED MOTOR LOADS.

20. IN THE EVENT OF FAILURE, A BYPASS MANUAL OVERRIDE SHALL BE PROVIDED ON EACH SENSOR. WHEN BYPASS IS UTILIZED, LIGHTING SHALL REMAIN ON CONSTANTLY OR CONTROL SHALL DIVERT TO A WALL SWITCH UNTIL SENSOR IS REPLACED. THIS CONTROL SHALL BE RECESSED TO PREVENT TAMPERING. 21. ALL SENSORS SHALL PROVIDE AN LED AS A VISUAL MEANS OF INDICATION AT A TIMES TO VERIFY THAT MOTION IS BEING DETECTED DURING BOTH TESTING AND

NORMAL OPERATION. 22. WHERE SPECIFIED, SENSOR SHALL HAVE AN INTERNAL ADDITIONAL ISOLATED RELAY WITH NORMALLY OPEN, NORMALLY CLOSED AND COMMON OUTPUTS FOR USE WITH HVAC CONTROL, DATA LOGGING AND OTHER CONTROL OPTIONS. SENSOR

ITILIZING SEPARATE COMPONENTS OR SPECIALLY MODIFIED UNITS TO ACHIEVE THIS FUNCTION ARE NOT ACCEPTABLE. 23. ALL SENSORS SHALL HAVE UL RATED, 94V-0 PLASTIC ENCLOSURES. H. CIRCUIT CONTROL HARDWARE - CU

1. CONTROL UNITS - FOR EASE OF MOUNTING, INSTALLATION AND FUTURE SERVICE. CONTROL UNIT(S) SHALL BE ABLE TO EXTERNALLY MOUNT THROUGH A 1/2" KNOCK-OUT ON A STANDARD ELECTRICAL ENCLOSURE AND BE AN INTEGRATED, SELF-CONTAINED UNIT CONSISTING INTERNALLY OF AN ISOLATED LOAD SWITCHING CONTROL RELAY AND A TRANSFORMER TO PROVIDE LOW-VOLTAGE POWER. CONTROL UNIT SHALL PROVIDE POWER TO A MINIMUM OF TWO (2) SENSORS. 2. RELAY CONTACTS SHALL HAVE RATINGS OF:

A. 13A - 120 VAC TUNGSTEN B. 20A - 120 VAC BALLAST C. 20A – 277 VAC BALLAST

3. CONTROL WIRING BETWEEN SENSORS AND CONTROLS UNITS SHALL BE CLASS II, 18-24 AWG, STRANDED U.L. CLASSIFIED, PVC INSULATED OR TEFLON JACKETED CABLE SUITABLE FOR USE IN PLENUMS, WHERE APPLICABLE. 4. MINIMUM ACCEPTABLE WIRE GAUGE FROM THE CIRCUIT CONTROL HARDWARE RELAYS SHALL BE #14 AWG.

I. INSTALLATION 1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND AIM SENSORY IN THE CORRECT LOCATION REQUIRED FOR COMPLETE AND PROPER VOLUMETRIC COVERAGE WITHIN THE RANGE OF COVERAGE(S) OF CONTROLLED AREAS PER THE MANUFACTURER'S RECOMMENDATIONS. ROOMS SHALL HAVE NINETY (90) TO ONE HUNDRED (100) PERCENT COVERAGE TO COMPLETELY COVER THE CONTROLLED AREA TO ACCOMMODATE ALL OCCUPANCY HABITS OF SINGLE OR MULTIPLE OCCUPANTS AT ANY LOCATION WITHIN THE ROOM(S). THE LOCATIONS AND QUANTITIES OF SENSORS SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE ONLY THE ROOMS, WHICH ARE TO BE PROVIDED WITH SENSORS.
THE CONTRACTOR SHALL PROVIDE ADDITIONAL SENSORS IF REQUIRED TO PROPERLY AND COMPLETELY COVER THE RESPECTIVE ROOM. POWER/SWITCH PACKS MAY OR MAY NOT BE INDICATED ON THE DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND INSTALL ALL POWER/SWITCH PACKS REQUIRED TO MAKE THE SYSTEM FULLY OPERATIONAL. LOCATIONS OF POWER/SWITCH PACKS MAY BE DETERMINED IN THE FIELD BY THE CONTRACTOR UNLESS SPECIFIED OTHERWISE, BUT MUST BE READILY ACCESSIBLE FOR FUTURE SERVICING. USUALLY A MINIMUM OF ONE (1) POWER/SWITCH PACK IS REQUIRED PER CIRCUIT AND/OR AREA OF CONTROL. HOWEVER, IN SOME CASES ADDITIONAL POWER/SWITCH PACKS MAY BE REQUIRED. CONTACT MANUFACTURER FOR FINAL DETERMINATION OF POWER/SWITCH PACKS REQUIRED FOR THIS PROJECT.

2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE A PRE-INSTALLATION MEETING WITH THE MANUFACTURER'S FACTORY AUTHORIZED REPRESENTATIVE, AT THE OWNER'S FACILITY, TO VERIFY PLACEMENT OF SENSORS AND INSTALLATION 3. PROPER JUDGMENT MUST BE EXERCISED IN EXECUTING THE INSTALLATION SO AS TO ENSURE THE BEST POSSIBLE INSTALLATION IN THE AVAILABLE SPACE AND TO

OVERCOME LOCAL DIFFICULTIES DUE TO SPACE LIMITATIONS OR INTERFERENCE O

STRUCTURAL COMPONENTS. THE CONTRACTOR SHALL ALSO PROVIDE, AT THE OWNER'S FACILITY, THE TRAINING NECESSARY TO FAMILIARIZE THE OWNER'S

PERSONNEL WITH THE OPERATION, USE, ADJUSTMENT, AND PROBLEM SOLVING DIAGNOSIS OF THE OCCUPANCY SENSING DEVICES AND SYSTEMS. J. FACTORY COMMISSIONING 1. UPON COMPLETION OF THE INSTALLATION, THE SYSTEM SHALL BE COMPLETELY

OF THE WORK.

COMMISSIONED BY THE MANUFACTURER'S FACTORY AUTHORIZED TECHNICIAN WHO WILL VERIFY ALL ADJUSTMENTS AND SENSOR PLACEMENT TO ENSURE A TROUBLE—FREE OCCUPANCY—BASED LIGHTING CONTROL SYSTEM. THIS SERVICE IS PROVIDED AT AN ADDITIONAL COST. 2. THE ELECTRICAL CONTRACTOR SHALL PROVIDE BOTH THE MANUFACTURER AND THE ELECTRICAL ENGINEER WITH 15 WORKING DAYS WRITTEN NOTICE OF THE SCHEDULED COMMISSIONING DATE. UPON COMPLETION OF THE SYSTEM FINE—TUNING THE FACTORY AUTHORIZED TECHNICIAN SHALL PROVIDE THE PROPER TRAINING TO THE OWNER'S PERSONNEL IN THE ADJUSTMENT AND MAINTENANCE

OF THE SENSORS. THE CONTRACTOR SHALL PROVIDE ALL LIFTS AND/OR LADDERS AND ONE TECHNICIAN TO ASSIST IN THE COMMISSIONING. PRIOR TO COMMISSIONING, HE CONTRACTOR SHALL VERIFY THAT ALL SENSORS AND ASSOCIATED POWER SUPPLIES/RELAYS ARE INSTALLED AND ALL WIRING PROPERLY TERMINATED 3. THE SYSTEM MUST BE COMPLETELY OPERATIONAL AND ALL TIME DELAYS ADJUSTED PER THE SPECIFICATION 4. THE MANUFACTURER'S FACTORY AUTHORIZED TECHNICIAN SHALL. UPON

COMPLETION OF THE COMMISSIONING, PROVIDE A WRITTEN REPORT TO THE ELECTRICAL CONTRACTOR AND THE ELECTRICAL ENGINEER INDICATING COMPLETION

5. THIS REPORT SHALL ALSO INDICATE ANY CORRECTIVE ACTIONS REQUIRED ON THE PART OF THE ELECTRICAL CONTRACTOR TO THE SYSTEM. 2.29 ACCESS PANELS A. ACCESS PANELS SHALL BE PROVIDE FOR ALL ELECTRICAL EQUIPMENT WHICH REQUIRES

ACCESS BY; MASSACHUSETTS ELECTRIC CODE ABOVE HUNG CEILINGS OR BEHIND WALLS WHICH ARE CONSTRUCTED OF MATERIALS OF THE TYPE WHICH ARE NOT READILY B. ACCESS PANELS SHALL BE FURNISHED BY THE GENERAL CONTRACTOR AND INSTALLED BY 0 0 C

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SHEET

PROGRAMMING SHALL BE PROVIDE UNTIL ACCEPTABLE TO THE LOCAL FIRE

3. OCCUPANT NOTIFICATION SHALL CONSIST OF A CODE 3 TEMPORAL EVACUATION SIGNAL AND VISUAL (STROBE) SIGNALING.

4. EACH INITIATING DEVICE SHALL HAVE FULL ANALOG FEATURES AND CAPABILITIES, WHEREBY INDIVIDUAL SENSORS WILL PROVIDE REAL—TIME ENVIRONMENTAL MONITORING, WITH AUTOMATIC AND MANUAL SENSITIVITY ADJUSTMENT AND ALARM VERIFICATION FEATURES. EACH DEVICE SHALL IDENTIFY ITS EXACT LOCATION, TYPE AND CONDITION, AND SHALL OPERATE AS DESCRIBED ELSEWHERE IN THESE SPECIFICATIONS.

WORK IN THIS SECTION AS SHOWN OR SPECIFIED SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
 PROVIDE AUTOMATIC AND MANUAL, CLOSED CIRCUIT, MULTIPLEX FIRE ALARM COMMUNICATIONS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, TO BE WIRED, CONNECTED AND LEFT IN FIRST CLASS OPERATING CONDITION.
 SHOP DRAWINGS, TECHNICAL INSTALLATION SUPPORT, TESTING, AND ADJUSTMENT OF THE SYSTEM SHALL BE DONE UNDER THE DIRECT SUPERVISION OF THE SYSTEM SUPPLIER USING NICET—CERTIFIED (LEVEL 2 MINIMUM) FIELD PERSONNEL. FACTORY TRAINED TECHNICIANS SHALL DEMONSTRATE THE SYSTEM TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE AND MAKE ALL ADDITIONAL ADJUSTMENTS TO THE SYSTEM OPERATION AS REQUIRED BY THE OWNER'S

8. PROVIDE EQUIPMENT MANUFACTURED BY SIMPLEXGRINNELL OR EQUAL. THIS CONSTITUTES THE QUALITY AND PERFORMANCE CHARACTERISTICS OF THE EQUIPMENT AND SYSTEM TO BE FURNISHED.

A. EQUIVALENT PRODUCT MANUFACTURED BY FCI, EST OR NOTIFIER MAY BE

CONSIDERED AN ACCEPTABLE ALTERNATE.

B. ANY ALTERNATES, EXCEPTIONS, OR SUBSTITUTIONS TO THE SPECIFIED EQUIPMENT AND SYSTEM OPERATION SHALL BE DISCLOSED IN WRITING PRIOR TO BID. ANY COST SAVINGS SHALL BE DEMONSTRATED, AND A LINE—BY—LINE DESCRIPTION OF DEVIATION FROM THE PROJECT SPECIFICATIONS SHALL BE PRESENTED AT THE TIME OF BID. FAILURE TO COMPLY WITH THIS REQUIREMENT SHALL RESULT IN IMMEDIATE DISAPPROVAL WITHOUT COMMENT.

C. IF THE CONTRACTOR CHOOSES AN ALTERNATE MANUFACTURER, NO MORE
THAN TWO (2) EQUIPMENT SUBMITTALS SHALL BE REVIEWED. IF THE
EQUIPMENT IS NOT APPROVED UPON REVIEW OF THE SECOND
SUBMITTAL, THE CONTRACTOR SHALL PROVIDE THE SPECIFIED MANUFACTURER

9. THE SYSTEM DESIGN AND INSTALLATION SHALL CONFORM TO THE FOLLOWING STANDARDS
A. ALL EQUIPMENT SHALL BE UL LISTED FOR ITS INTENDED PURPOSE,
INCLUDING UL 864 (UOJZ, UOXX, UUKL AND UOQY), 268, 464 AND 1971

B. NFPA STANDARDS 70, 72, 90A, 92A, AND 101.
C. INTERNATIONAL BUILDING CODE — LATEST EDITION.
D. CURRENT STATE BUILDING CODE AND APPLICABLE FIRE SAFETY REGULATIONS
E. THE AMERICANS WITH DISABILITIES ACT (ADA).

F. ALL LEGAL REQUIREMENTS OF THE LOCAL AUTHORITIES HAVING JURISDICTION.

10. SUBMIT SIX (6) COMPLETE SETS OF SHOP DRAWING SUBMITTALS TO INCLUDE:

A. COMPLETE POINT\_TO\_POINT RISER DIAGRAM SHOWING ALL EQUIPMENT AND SIZE, TYPE AND NUMBER OF ALL CONDUCTORS AND DEVICES.

DEVICES SHALL BE SHOWN WITH DEVICE ADDRESS NUMBERS AND ANY

OTHER INTENDED FIELD DEVICE SETTINGS, INCLUDING SPEAKER TAP SETTINGS AND CANDELA RATING.

B. SCALED DRAWINGS OF EACH SYSTEM PANEL SHOWING INTERNAL MODULE PLACEMENT, FIELD TERMINATIONS AND SPARE CAPACITY ALLOWANCES.

C. A COMPLETE, ITEMIZED BILL OF MATERIALS WITH QUANTITIES,

DESCRIPTIONS AND CROSS-REFERENCE INFORMATION.

D. ORIGINAL CATALOG DATA SHEETS FOR ALL ITEMS TO ASSURE COMPLIANCE WITH THESE SPECIFICATIONS. THIS EQUIPMENT SHALL BE SUBJECT TO APPROVAL, AND NO EQUIPMENT SHALL BE ORDERED WITHOUT PRIOR APPROVAL.

E. FLOOR PLANS SHOWING ALL DEVICES AND EQUIPMENT TO BE INSTALLED.
FLOOR PLANS SHALL DEPICT ALL EQUIPMENT AND DEVICES. DEVICES SHALL
BE SHOWN WITH CORRESPONDING FIELD SETTINGS THAT SHALL BE MADE,
AS WELL AS CORRESPONDING CIRCUIT AND DEVICE DESIGNATIONS. FIELD
SETTINGS SHALL INCLUDE THE DEVICE ADDRESS, CANDELA RATING AND/OR
SPEAKER-TAP SETTING AS APPLICABLE. EACH DEVICE SHALL BE SHOWN
WITH CORRESPONDING CIRCUIT IDENTIFIER AND DEVICE NUMBER.
F. PROVIDE CALCULATIONS TO SUPPORT THE SIZE OF STANDBY BATTERIES
NOTIFICATION CIRCUITS. AMPLIFIERS AND POWER SUPPLIES SUBMITTED.

SYSTEM CALCULATIONS SHALL BE PRESENTED IN ACCORDANCE WITH NFPA 72 RECOMMENDED PRACTICES AS FOLLOWS:

1) CALCULATIONS SHALL DEMONSTRATE WIRE SIZE AND ESTIMATED

CIRCUIT LENGTH.

2) VISUAL NOTIFICATION CIRCUITS SHALL BE BASED UPON 20VDC STARTING VOLTAGE AND UTILIZE A NOMINAL 18V CURRENT DRAW

RATING FOR EACH APPLIANCE.

3) VISUAL CIRCUITS SHALL BE DESIGNED FOR A MAXIMUM 4 VOLT DROP

4) SPEAKER CIRCUITS SHALL BE DESIGNED FOR A MAXIMUM 3DBA LOSS

G. SUBMITTAL SHALL BE SUBMITTED TO THE LOCAL FIRE INSPECTION AND ALARM DIVISION FOR APPROVAL.

H. PROVIDE A COPY OF THE ORIGINAL EQUIPMENT MANUFACTURER'S WARRANTY STATEMENT.

1. CONFIRMATION THAT THE EQUIPMENT SUPPLIER WILL PROVIDE ON\_SITE PROJECT MANAGEMENT AND SUPERVISION DURING SYSTEM INSTALLATION, AND PERFORM SYSTEM TESTING AND INSTRUCTION. LEAD SYSTEM TECHNICIANS ASSIGNED TO THE PROJECT SHALL BE IDENTIFIED, AND DOCUMENTATION OF THEIR QUALIFICATIONS SHALL BE PRESENTED AS REQUESTED

J. AN OUTLINE OF THE VENDOR'S ACCEPTANCE AND TEST PROCEDURES, INCLUDING A COPY OF THE SUPPLIER'S STANDARD COMMISSIONING REPORT CHECKLIST.

11. CONFORM TO ALL UL AND NFPA STANDARDS FOR TESTING AND PROVIDE A RECORD OF COMPLETION OF THE COMPLETED INSTALLATION. THE RECORD OF COMPLETION SHALL BE COMPLETED BY PROPERLY LICENSED, AND FACTORY—TRAINED REPRESENTATIVES OF A UL APPROVED TESTING COMPANY.

FACTORY—TRAINED REPRESENTATIVES OF A UL APPROVED TESTING COMPANY.

12. PROVIDE COPIES OF OPERATING & MAINTENANCE MANUALS WITH THE REQUEST FOR FINAL INSPECTION. O & M MANUALS SHALL INCLUDE THE FOLLOWING:

A. ALL OF THE INFORMATION SUBMITTED IN THE SHOP DRAWINGS.

B. AS—BUILT DOCUMENTATION WHICH INCORPORATES ALL MODIFICATIONS TO THE SYSTEM, WHETHER MADE AS A FIELD CHANGE OR BY A CHANGE ORDER

C. INCLUDE A COPY OF THE FINAL TEST REPORT, RECORD OF COMPLETION AND TEST/SUPPORT CONTRACTS AS REQUIRED HEREIN.

B. SEQUENCE OF OPERATION

1. THE OPERATION OF A MANUAL STATION OR ACTIVATION OF ANY AUTOMATIC ALARM INITIATING DEVICE (SYSTEM SMOKE, SYSTEM HEAT DETECTOR, WATERFLOW) SHALL INITIATE A SYSTEM-WIDE RESPONSE AS FOLLOWS:

A. INITIATE THE TRANSMISSION OF THE ALARM TO THE MUNICIPAL FIRE

MUNICIPAL REPORTING SYSTEM AND DIGITAL ALARM
COMMUNICATOR/TRANSMITTER (DAC/T) CONNECTION TO AN APPROVED
CENTRAL MONITORING STATION.

B. SOUND A CODE 3 TEMPORAL EVACUATION SIGNAL OVER ALL AUDIO CIRCUITS

C. FLASH ALL VISUAL SIGNALS THROUGHOUT THE BUILDING. VISUAL NOTIFICATION SHALL BE SYNCHRONOUS IN ACCORDANCE WITH NFPA 72 GUIDELINES AND UL 1971.

D. FLASH AN ALARM LED AND SOUND AN AUDIBLE SIGNAL AT THE FACP AND REMOTE ANNUNCIATOR. UPON ACKNOWLEDGMENT, THE ALARM LED SHALL LIGHT STADDY.

D. FLASH AN ALAKM LED AND SOUND AN AUDIBLE SIGNAL AT THE FACE AND REMOTE ANNUNCIATOR. UPON ACKNOWLEDGMENT, THE ALARM LED SHALL LIGHT STEADILY AND THE AUDIBLE SHALL SILENCE. SUBSEQUENT ALARMS SHALL RE\_INITIATE THIS SEQUENCE.

E. UPON ALARM INITIATION BY AN ELEVATOR LOBBY SMOKE DETECTOR OR OTHER DESIGNATED RECALL DEVICE, RECALL ALL ELEVATORS THAT SERVE THE FLOOR OF INITIALIZATION TO THE MAIN EGRESS LEVEL. IF THE ALARM INITIATES ON THE MAIN EGRESS LEVEL, RETURN THE ELEVATOR TO THE ALTERNATE FLOOR AS DIRECTED BY THE LOCAL AUTHORITY HAVING JURISDICTION

F. VISUALLY INDICATE THE ALARM INITIATING DEVICE TYPE AND LOCATION VIA THE LCD DISPLAY LOCATED AT THE FACP AND AT ANY REMOTE SYSTEM ANNUNCIATORS.

G. AUTOMATICALLY SHUT DOWN AFFECTED SUPPLY AND RETURN FANS. AND

CONTROL HVAC EQUIPMENT TO INITIATE SMOKE CONTROL FUNCTIONS AS REQUIRED. MANUAL OVERRIDE CONTROLS AND PROGRAMMABLE RELAY INTERFACE MODULES SHALL SERVE TO INTEGRATE THE FIRE ALARM SYSTEM TO THE BUILDING AUTOMATION SYSTEM.

H. OPERATE PRIORITIZED OUTPUTS TO RELEASE ALL MAGNETICALLY HELD SMOKE DOORS AND MAGNETICALLY LOCKED DOORS THROUGHOUT THE BUILDING

I. ACTIVATE THE EXTERIOR WEATHERPROOF BEACON.

SPRINKLER TAMPER SWITCHES OR OTHER DEVICE PROGRAMMED FOR SUPERVISORY REPORTING SHALL AUTOMATICALLY CAUSE THE FOLLOWING TO OCCUR:

A. INITIATE THE TRANSMISSION OF THE EVENT TO THE MUNICIPAL FIRE STATION OR CENTRAL STATION

B. FLASH A SUPERVISORY LED AND SOUND AN AUDIBLE SIGNAL AT THE FACP AND REMOTE ANNUNCIATOR. UPON ACKNOWLEDGMENT, THE LED SHALL LIGHT STEADILY AND THE AUDIBLE SHALL SILENCE. SUBSEQUENT EVENTS SHALL RE\_INITIATE THIS SEQUENCE.

C. VISUALLY INDICATE THE INITIATING DEVICE TYPE AND LOCATION VIA THE LCD DISPLAY LOCATED AT THE FACP AND AT ANY REMOTE SYSTEM ANNUNCIATOR

C. GENERAL REQUIREMENTS

1. THE FIRE ALARM SYSTEM SHALL BE DESIGNED AND UL AND FM APPROVED FOR FIRE, AUDIO EVACUATION AND SECURITY APPLICATIONS. THE SYSTEM OPERATIONAL CHARACTERISTICS SHALL BE STORED IN NON\_VOLATILE EEPROM MEMORY, SHALL BE FIELD PROGRAMMABAN ARBRONERBMEADS, BESNIGHED LE.

2. THE SYSTEM SHALL SUPPORT ANALOG SENSING TECHNIQUES TO MONITOR INDIVIDUAL DEVICES WHICH ENABLES THE USER TO SET SENSITIVITY PARAMETERS. ALL INPUTS SHALL BE SUBJECT TO MULTI\_LEVEL ALARM VERIFICATION. THE SYSTEM SHALL BE CAPABLE OF REPORTING THE STATUS AND SENSITIVITY OF EACH DEVICE AND VECTORING THIS INFORMATION TO A PRINTER. THE SYSTEM SHALL AUTOMATICALLY IDENTIFY ANY DETECTOR WHICH BECOMES DIRTY (MAINTENANCE ALERT), PRIOR TO FALSE ALARMING.

LOSS OF PRIMARY POWER, BATTERIES SHALL SUPPORT [60] HOURS OF FULL SUPERVISORY OPERATION FOLLOWED BY [5] MINUTES OF ALARM.

4. THE SYSTEM SHALL BE CAPABLE OF NINE LEVELS OF ALARM PRIORITIZATION, AND ALLOW CONTROL—BY—EVENT SEQUENCES TO INCLUDE IN EXCESS OF 2500 CROSS ZONED, STEPPING, TIME CONTROLLED AND/OR LOGIC STATEMENT INPUTS

(BOOLEAN CONTROL EVENTS).

3. THE SYSTEM SHALL BE SUPPORTED BY STANDBY BATTERIES. IN THE EVENT OF A

ALL EQUIPMENT SHALL BE NEW AND UNUSED. ALL COMPONENTS AND SYSTEMS SHALL BE DESIGNED FOR UNINTERRUPTED DUTY. ALL EQUIPMENT, MATERIALS AND ACCESSORIES COVERED BY THESE REQUIREMENTS SHALL BE PROVIDED BY A SINGLE MANUFACTURER, OR IF PROVIDED BY DIFFERENT MANUFACTURERS RECOGNIZED AS COMPATIBLE BY BOTH MANUFACTURERS.

6. ALL CONTROL EQUIPMENT MUST HAVE TRANSIENT PROTECTION DEVICES TO COMPLY WITH UL 864 REQUIREMENTS.

A. ISOLATED LOOP CIRCUIT PROTECTOR (ILCP): FURNISH AND INSTALL AN ISOLATED LOOP CIRCUIT PROTECTION DEVICE ON ALL FIRE ALARM CIRCUITS WHICH EXTEND BEYOND THE BUILDING BY EITHER AERIAL, UNDERGROUND OR OTHER METHODS (WALKWAYS, BRIDGES OR OTHER ABOVE GROUND CONNECTORS

 B. THE ILCP SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE POINT AT

WHICH THE CIRCUITS LEAVE OR ENTER THE BUILDING. THE GROUNDING CONDUCTOR SHALL BE A NO. 12 AWG WIRE HAVING A MAXIMUM LENGTH OF 28 FEET AND CONNECTED TO A UNIFIED GROUND PER THE NEC

7. CIRCUITING GUIDELINES. EACH INITIATING DEVICE AND INDICATING CIRCUIT SHALL BE ELECTRONICALLY SUPERVISED AND INDIVIDUALLY ADDRESSABLE. ALL WIRING SHALL BE AS FOLLOWS:

A. INDIVIDUAL ZONE ADDRESSABLE MODULES SHALL BE USED TO MONITOR

WATER FLOW, TAMPER, AND STATUS CONDITIONS FROM ANY RELATED SYSTEMS OR CONVENTIONAL DEVICES.

B. ZONE ADDRESSABLE CONTROL MODULES OR RELAYS SHALL PROVIDE AUXILIARY CONTROL FUNCTIONS SEPARATE OUTGOING AND RETURN PATHS MUST BE INSTALLED IN ACCORDANCE WITH NFPA 72 (2002 ED.) 6.4.2.2.2

C. ADDRESSABLE LOOP WIRING (SIGNALING LINE CIRCUITS) SHALL SUPPORT ALL DEVICES SHOWN AND ALLOW FOR A MINIMUM OF 25% SPARE CAPACITY, AND BE WIRED IN A CLASS A, STYLE 6 FASHION, WITH FAULT ISOLATION AS DESCRIBED ELSEWHERE IN THESE SPECIFICATIONS.

D. AS A MINIMUM, POWER SUPPLIES AND NOTIFICATION APPLIANCE CIRCUITS SHALL OPERATE ALL DEVICES SHOWN PLUS 25% SPARE CAPACITY, AND BE WIRED IN A CLASS A, STYLE Z FASHION.

1. FIRE ALARM NETWORK CONTROL PANEL

A. PROVIDE AND INSTALL SIMPLEX 4100U SERIES FIRE ALARM CONTROL
SYSTEM. THE SYSTEM SHALL CONSIST OF THE REQUIRED FIRE ALARM
CONTROL OR TRANSPONDER PANELS, EACH SIZED TO SUPPORT 500 ANALOG
DETECTORS, EXPANDABLE TO 2500. THE SYSTEM SHALL SUPPORT
PEER—TO—PEER NETWORK COMMUNICATIONS CONSISTING OF UP TO 99
NODES. EACH NETWORK PANEL SHALL PROVIDE THE FOLLOWING FUNCTIONS:

 MONITOR ALL INITIATING DEVICES, REPORT THE EVENT TO THE FIRE ALARM NETWORK ANNUNCIATE THE ALARMED DEVICE AND ITS LOCATION, CAPTURE ELEVATORS, CONDUCT SMOKE CONTROL FUNCTIONS, AND INITIATE THE AUDIO/VISUAL EVACUATION SIGNALING AND CONTROL SEQUENCES AS DESCRIBED HEREIN.
 CONDUCT OFF-SITE OR MUNICIPAL REPORTING AS DESCRIBED HEREIN

3) INITIATING DEVICES SHALL RESPOND WITH THEIR CONDITION.
CONTROL RELAYS SHALL BE INDIVIDUALLY ADDRESSABLE BY THE
SYSTEM TO RESPOND AUTOMATICALLY IN THE EVENT OF AN ALARM
OF RFI ATED SENSORS. MANUAL OVERRIDE OF CONTROL RELAYS SHALI

BE INDIVIDUALLY ADDRESSABLE BY THE OPERATOR.

B. CONTROL CONFIGURATION: ALL FIRE ALARM CONTROL PORTIONS OF THE SYSTEM SHALL BE HOUSED IN RED LOCKING, SEMI\_FLUSH MOUNTED ENCLOSURES. ALL PANEL INITIATING AND CONTROL STATUS INDICATORS SHALL BE VISIBLE THROUGH A CLEAR LEXAN WINDOW. ACCESS TO THE CONTROL PANEL SHALL BE BY KEYS ISSUED TO THE FIRE DEPARTMENT AND AUTHORIZED PERSONNEL. EACH PANEL SHALL INCORPORATE AN OPERATOR INTERFACE, CPU, ADDRESSABLE LOOP INTERFACE CARDS, SYSTEM POWER SUPPLIES AND BATTERIES TO PERFORM THE SYSTEM OPERATION AS DESCRIBED HEREIN.

C. PRIMARY OPERATOR CONTROL: THE FACP SHALL PROVIDE AN OPERATOR INTERFACE MODULE CONSISTING OF A 80 CHARACTER BACKLIT LCD DISPLAY TO PRESENT ALL SYSTEM ALARM, TROUBLE AND SUPERVISORY CONDITIONS, AND SHALL PROVIDE CONTROL SWITCHES FOR STATUS MESSAGE SCROLLING, EVENT ACKNOWLEDGMENT, SYSTEM RESET AND ALARM SILENCE, AS WELL AS PROGRAM FUNCTION SWITCHES, 3 PROGRAMMABLE STATUS LEDS AND 5 ADDITIONAL USER-PROGRAMMABLE FUNCTION SWITCHES. THE DISPLAY SHALL HAVE LEDS TO INDICATE POWER ON, FIRE ALARM, PRIORITY 2 ALARM, SUPERVISORY, TROUBLE AND ALARM SILENCED STATUS.

INTERFACE CARD FOR EACH ADDRESSABLE SIGNALING LINE CIRCUIT. EACH CARD SHALL SUPPORT FOUR ISOLATED CIRCUIT LOOPS (QUAD ISOLATOR) AN DIGITAL COMMUNICATIONS WITH UP TO 250 ADDRESSABLE FIELD DETECTORS, AND TOTAL WIRING DISTANCES UP TO 10,000 FT.

E. AUXILIARY CONTROL / ANNUNCIATION: PROVIDE THE REQUIRED AUXILIARY SWITCH AND LED MODULES FOR DISCREET LED ANNUNCIATION, ZONE DISCONNECT, HVAC OVERRIDE, OR RELATED MONITORING AND CONTROL FUNCTIONS INTEGRAL TO THE PRIMARY FACP. AS A MINIMUM, PROVIDE [64] DISCREET, PROGRAMMABLE AUXILIARY SWITCHES WITH CORRESPONDING STATUS LEDS AND [24] HOA SWITCHES WITH STATUS LEDS, FOR AUXILIARY CONTROL FUNCTIONS. THESE ARE INTENDED FOR USE BY THE FIRE DEPARTMENT DURING AN EVENT OR BY AUTHORIZED PERSONNEL DURING TESTING PERIODS. KEYPAD ENTERED COMMANDS FOR

THESE FUNCTIONS SHALL NOT BE AN ACCEPTABLE SUBSTITUTE.

F. SYSTEM POWER SUPPLIES: INTEGRAL SYSTEM POWER SUPPLIES SHALL PROVIDE 24VDC OPERATING AND EMERGENCY POWER TO EACH SYSTEM PANEL (18 AMPS MINIMUM). IT IS THE DESIGN INTENT THAT ALL SYSTEM POWER SUPPLIES BE DERIVED FROM NETWORK PANELS, AND EACH POWER SUPPLY MODULE SHALL HAVE DEDICATED NAC OUTPUTS AND A CHARGING CIRCUIT THAT WILL SUPPORT UP TO 110AH BATTERIES. FIELD—LOCATED ADDRESSABLE NAC MODULES OR REMOTE AUXILIARY POWER SUPPLIES WILL NOT BE ALLOWED, EXCEPT WHERE SPECIFICALLY SHOWN ON THE CONTRACT DRAWINGS. THE FOLLOWING SYSTEM POWER SUPPLY ANALOG VALUES SHALL BE AVAILABLE FOR VIEWING THROUGH THE

1) BATTERY VOLTAGE
2) BATTERY CHARGER VOLTAGE AND CURRENT DRAW
3) MAIN OUTPUT VOLTAGE AND CURRENT DRAW
4) INDIVIDUAL NAC CURRENT DRAW

PRIMARY OPERATOR INTERFACE DISPLAY:

G. DIGITAL ALARM COMMUNICATOR/TRANSMITTER (DAC/T): AN INTEGRAL SERIAL DAC/T SHALL BE PROVIDED FOR POINT REPORTING OF SYSTEM EVENTS TO A CENTRAL MONITORING STATION.

2. INTELLIGENT SYSTEM DEVICES: PROVIDE INTELLIGENT ANALOG DEVICES WHERE SHOWN AND REQUIRED. ALL DEVICES SHALL UTILIZE RED LED INDICATOR WHICH WILL FLASH TO DENOTE NORMAL ACTIVE COMMUNICATION AND LIGHT STEADILY TO DENOTE AN ALARM CONDITION. DEVICES SHALL BE INTERCHANGEABLE WITH TWIST\_LOCK BASES, WHICH WILL SUPPORT A REMOTE LED OUTPUT, FAULT ISOLATION CIRCUITRY, AUXILIARY RELAY CONTACT, OR A SOUNDER BASE WITH INTEGRAL PROGRAMMABLE PIEZO HORN. DEVICES SHALL SUPPORT PHYSICAL ADDRESS SETTING INTEGRAL TO THE DEVICE BASE. DEVICES WHICH REQUIRE SPECIAL PROGRAMMING TOOLS TO SET OPERATING PARAMETERS OR EXTRACT DEVICE HISTORY DATA WILL NOT BE ALLOWED.

A. MULTI-SENSING SMOKE DETECTOR: PROVIDE MULTI-SENSING ANALOG SMOKE DETECTORS (4098-9754) WHERE SHOWN AND REQUIRED. MULTI-SENSING DETECTORS SHALL EMPLOY PHOTOELECTRIC AND THERMAL SENSING PRINCIPLES, AND SHALL BE CAPABLE OF BEING PROGRAMMED TO OPERATE IN A DISTINCT FASHION DEPENDING UPON WHETHER THE THERMAL OR PHOTOELECTRIC ELEMENT HAS RESPONDED.

B. PHOTOELECTRIC SMOKE DETECTOR: PROVIDE ANALOG PHOTOELECTRIC SMOKE DETECTORS (MODEL 4098-9714) WHERE SHOWN AND REQUIRED.

C. ANALOG HEAT DETECTORS: PROVIDE ANALOG HEAT DETECTORS (MODEL 4098-9733). ANALOG HEAT DETECTORS SHALL BE FIELD SELECTABLE FOR A FIXED TEMPERATURE RATING OF 135 OR 155 DEGREES, OR A RATE OF RIS OPERATION OF 15 OR 20 DEGREES/MINUTE OPERATION. HEAT DETECTORS SHALL ALSO BE PROGRAMMABLE FOR LOW TEMPERATURE WARNING. WHERE OTHERWISE REQUIRED, PROVIDE CONVENTIONAL FIXED TEMPERATURE OR WEATHERPROOF HEAT DETECTORS IN LIEU OF ANALOG HEAT DETECTORS. CONVENTIONAL DEVICES SHALL BE INDIVIDUALLY ADDRESSABLE VIA AN INTELLIGENT ADDRESSABLE MODULE WHICH SHALL BE

D. ANALOG DUCT SMOKE DETECTOR: PROVIDE ANALOG PHOTOELECTRIC DUCT-MOUNTED SMOKE DETECTORS (4098-9756) MOUNTED IN AIR DUCTS WHERE SHOWN AND REQUIRED. EACH DETECTOR SHALL BE SUPPLIED WITH DUCT-MOUNT HOUSING, REMOTE INDICATOR/TEST STATION (4098-9834) AND SAMPLING TUBES SIZED ACCORDING TO DUCT WIDTH. PROVIDE THE REQUIRED PROGRAMMABLE AUXILIARY RELAY OUTPUTS OR ADDRESSABLE RELAY CONTROL MODULES WITH EACH DETECTOR IN ORDER TO ACCOMPLISH THE REQUIRED HVAC CONTROL AND OVERRIDE FUNCTIONS.

INSTALLED IN A HEATED, VENTILATED LOCATION.

E. MANUAL PULL STATIONS: PROVIDE ADDRESSABLE MANUAL STATIONS (4099-9003 SERIES) WHERE SHOWN. THE STATION SHALL BE DOUBLE ACTION TYPE WITH SCREW TERMINALS, TOGGLE SWITCH, AND INTEGRAL ADDRESSABLE ELECTRONICS. THE STATION SHALL BE CONSTRUCTED OF RED LEXAN WITH WHITE RAISED LETTERS AND A KEY RESET SWITCH. THE STATION SHALL BE KEYED ALIKE TO THE FACP. WHERE AMBIENT CONDITIONS PRECLUDE THE USE OF ADDRESSABLE DEVICES, CONVENTIONAL WEATHERPROOF PULL STATIONS SHALL BE USED. CONVENTIONAL DEVICES SHALL BE INDIVIDUALLY ADDRESSABLE VIA AN INTELLIGENT ADDRESSABLE MODULE WHICH SHALL BE INSTALLED IN AN APPROPRIATELY HEATED, VENTILATED LOCATION.

F. MONITOR MODULE: PROVIDE INDIVIDUAL ADDRESSABLE MODULES FOR SUPERVISED INPUT POINTS (MODEL 4090 SERIES) TO MONITOR RELATED SYSTEMS OR INTEGRATE CONVENTIONAL INITIATING DEVICES ONTO THE IDNET ADDRESSABLE LOOP.

G. CONTROL MODULE: PROVIDE RELAY INDIVIDUAL ADDRESSABLE MODULES (RELAY IAM) TO PROVIDE SUPERVISED OUTPUTS AND CONTROL CONVENTIONAL DEVICES (INDICATING CIRCUITS, AHUS, DOOR HOLDERS, ETC.) VIA THE IDNET ADDRESSABLE LOOP. RIAMS SHALL PROVIDE A SUPERVISED OUTPUT RATED FOR 2 AMPS ● 24VDC OR .5 AMPS AT

120VAC, AND CORRESPONDING SUPERVISED CONTACT INPUT POINT

H. ISOLATION MODULES: PROVIDE ZONE ADDRESSABLE ISOLATOR MODULES
TO PROTECT SIGNALING LINE CIRCUIT INTEGRITY IN THE EVENT OF A WIRING
FAULT, TO ENSURE STYLE 6 WIRING CONVENTIONS. PROVIDE A MINIMUM
OF ONE ISOLATION MODULE PER FLOOR OR EVACUATION ZONE, OR ONE PER
25 DEVICES; WHICHEVER IS GREATER.

I. RESIDENTIAL UNIT SMOKE DETECTORS: PROVIDE PHOTOELECTRIC SMOKE DETECTORS (4098-9714) IN RESIDENTIAL UNITS WHERE SHOWN AND REQUIRED. DETECTORS SHALL BE LOCATED IN THE CENTER OF EACH ROOM OR OTHERWISE PLACED IN COMPLIANCE WITH NFPA 72 GUIDELINES. EACH DEVICE SHALL UTILIZE A PROGRAMMABLE SOUNDER BASE FOR LOCAL AND GENERAL ALARM EVACUATION. IN THE EVENT OF SMOKE DETECTION, ALL SOUNDER BASES AND VISUAL SIGNALS SERVING THE PARTICULAR LIVING UNIT SHALL ACTIVATE LOCALLY, WITH SUPERVISORY ANNUNCIATION AT THE FACP AND REMOTE ANNUNCIATORS

3. PRIMARY NOTIFICATION APPLIANCES: PROVIDE AUDIBLE AND VISUAL NOTIFICATION APPLIANCES WHERE SHOWN AND REQUIRED. FLUSH—MOUNTED COMBINATION DEVICES SHALL BE PROVIDED WITH SURFACE MOUNT OR STANDALONE VISUAL APPLIANCES WHERE OTHERWISE REQUIRED. THE CONTRACTOR SHALL PROVIDE SURFACE MOUNT BACKBOXES AS NEEDED AND ALTERNATE OUTDOOR—RATED APPLIANCES WHERE AMBIENT CONDITIONS DICTATE. SPECIFIC AUDIBLE AND VISUAL CHARACTERISTICS SHALL BE AS FOLLOWS:

A. VISUAL SIGNALS: FURNISH AND INSTALL SYNCHRONIZED XENON STROBES IN COMPLIANCE WITH NFPA 72 AND UL 1971. STROBES SHALL HAVE AN EFFECTURE INTENSITY RATING OF 15 CANDELA IN CORRIDORS AND OTHER

AREAS UP TO 20' X 20', 75 CANDELA IN AREAS UP TO 40' X 40' AND 110 CANDELA IN AREAS UP TO 50' X 50' OR IN SLEEPING AREAS.

B. AUDIBLE SIGNALS: PROVIDE AUDIBLE TEMPORAL CODE 3 HORNS WHICH PRODUCE A MINIMUM SOUND OUTPUT OF 75DBA, OR 15DBA ABOVE AMBIENT; WHICHEVER IS GREATER, © 10 FT. (MINIMUM OPERATING VOLTAGE C. LOW FREQUENCY 520 HZ MINI HORNS WILL BE PROVIDED IN THE BEDROOMS/SLEEPING AREA.

4. SYSTEM ACCESSORIES

A. MUNICIPAL CONNECTION: PROVIDE A LOCAL ENERGY MASTERBOX INSTALLED, TESTED, AND COMMISSIONED FOR MUNICIPAL REPORTING AS REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.

 B. SPRINKLER SYSTEM DEVICES: THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE FOLLOWING TO ENSURE THAT THE REQUIRED INSTALLATION AND WIRING OF ALL WATERFLOW AND TAMPER SWITCHES IS ACCOMPLISHED IN A MANNER THAT SHALL RESULT IN A COMPLETE OPERABLE AND TESTED SPRINKLER SYSTEM. EACH DEVICE SHALL BE MONITORED AS A SEPARATE

1) WATERFLOW SHALL ACTIVATE THE ALARM SEQUENCE.
2) TAMPER SWITCHES SHALL ACTIVATE AN ALARM CONDITION.
3) TERMINAL CABINETS: PROVIDE FIRE ALARM TERMINAL CABINETS WHERE NECESSARY. THE CABINETS, WHICH SHALL HAVE A REMOVABLE HINGED COVER WITH KEY LOCK AND RED FINISH ARE INTENDED TO HOUSE ANALOG/ADDRESSABLE MODULES AND FACILITATE FIELD WIRING JUNCTIONS.

C. REMOTE ALARM INDICATORS: PROVIDE REMOTE LED INDICATORS FOR SENSORS LOCATED BEHIND LOCKED DOORS. PROVIDE A PERMANENT LABE ON EACH INDICATOR IDENTIFYING THE DEVICE TYPE AND ACTUAL LOCATION D. EXTERIOR STROBE: PROVIDE A FLASHING WEATHERPROOF STROBE WITH A MINIMUM 150,000 CANDLEPOWER OUTPUT WHERE SHOWN. THE STROBE SHALL BE PROPERLY INSTALLED ON A WEATHERPROOF BACKBOX.

E. PROVIDE A REMOTE COMMAND CENTER LCD ANNUNCIATOR (MODEL 4100-1292). EACH LCD ANNUNCIATOR SHALL PROVIDE A 160 CHARACTER LCD DISPLAY WITH MESSAGE SCROLLING BUTTONS, KEY-ENABLED COMMON CONTROL SWITCHES (ACKNOWLEDGE, ALARM SILENCE SYSTEM RESET) AND 4 PROGRAMMABLE CUSTOM CONTROL

ASSIGNMENTS AND BUFFERING.

F. REMOTE POWER SUPPLIES: WHERE THE POWER REQUIREMENTS EXCEED THAT WHICH IS SUPPLIED BY THE FACP, PROVIDE DISTRIBUTED 8 OR 9 AMP POWER SUPPLIES (MODEL 4009 OR 4100-5125). POWER SUPPLIES SHALL BE SUPERVISED FOR GROUND FAULT, LOSS OF AC POWEI AND BATTERY FAIL, AND EACH NOTIFICATION CIRCUIT SERVED SHALL BE INDIVIDUALLY SUPERVISED.

G. INTERNET COMMUNICATIONS CARD: PROVIDE A DEDICATED FIRE PANEL

SWITCHES, AND SHALL SUPPORT CUSTOM MESSAGE ROUTING,

INTERNET INTERFACE (FPII) CARD INTEGRAL TO THE MAIN FACP. THE FPII CARD SHALL BE A SIMPLEXGRINNELL SAFELINC MODULE OR APPROVED EQUAL. THE FPII WILL HAVE A BUILT—IN E-MAIL FEATURE TO GENERATE NOTIFICATION OF ANY OR ALL SYSTEM EVENTS VIA INTERNET EMAIL, PAGER, CELL PHONES OR PERSONAL DIGITAL ASSISTANT (PDA) USING SIMPLE MAIL TRANSFER PROTOCOL (SMTP). THROUGH THE FPII, AUTHORIZED USERS WILL ALSO BE PROVIDED WITH SECURE ACCESS TO SYSTEM STATUS CONDITIONS, EVENT HISTORY LOGS AND REPORTS VIA INTERNET EXPLORER VERSION 5.0 OR HIGHER, USING TCP/IP COMMUNICATIONS.

H. MOTORIZED FIRE/SMOKE DAMPER CONTROL: PROVIDE 120V CONNECTION FROM LOCAL 120V PANEL TO MOTORIZED FIRE DAMPER. THE

FIRE ALARM SYSTEM SHALL PROVIDE A PROGRAMMABLE CONTROL RELAY OUTPUT TO INITIATE DAMPER CONTROL WITH CORRESPONDING INPUT ADDRESSABLE MODULE FEEDBACK POINT(S) FOR EACH DAMPER.

1. DEVICE GUARDS: PROVIDE CLEAR LEXAN (2099 SERIES) COVERS OVER MANUAL PULL STATIONS. EACH SHALL HAVE AN INTEGRAL AUDIBLE DEVICE WHICH SHALL SOUND WHEN LIFTED, AND SHALL BE POWERED FROM A DEDICATED 9 VOIT BATTERY.

J. DOOR HOLDERS: PROVIDE 24VDC OR 120VAC MAGNETIC DOOR HOLDERS AS SHOWN AND REQUIRED. 24VDC DOOR HOLDERS SHALL BE POWERED

AS SHOWN AND REQUIRED. 24VDC DOOR HOLDERS SHALL BE POWERED BY SYSTEM POWER, BUT ARE NOT REQUIRED TO OPERATE UNDER STANDB BATTERY.

K. KEY REPOSITORY: PROVIDE AN APPROVED EQUAL KEY REPOSITORY WHERE SHOWN AND IN ACCORDANCE WITH LOCAL REQUIREMENTS

MANUFACTURED BY EMERGENCY ACCESS SYSTEMS.

E. INSTALLATION

1. INSTALLATION SHALL BE SUPERVISED AND TESTED BY THE SYSTEM SUPPLIER. THE WORK SHALL BE PERFORMED BY SKILLED TECHNICIANS UNDER THE DIRECTION OF EXPERIENCED ENGINEERS, ALL OF WHOM ARE PROPERLY TRAINED AND QUALIFIED.

F. WIRING

1. ALL WIRING FOR THE SYSTEM SHALL BE IN ACCORDANCE WITH ARTICLES 760, 725, AND 800 OF THE NATIONAL ELECTRICAL CODE AND LOCAL ELECTRICAL CODES.

2. PROVIDE COMPLETE WIRING AND CONDUIT BETWEEN ALL EQUIPMENT. ALL DEVICES SHALL BE MOUNTED UPON AND SPLICES MADE IN UL LISTED BOXES. WIRING SPLICES AND TRANSPOSING OR CHANGING OF COLORS SHALL NOT BE PERMITTED.

3. ALL JUNCTION BOXES SHALL BE PAINTED RED AND LABELED AS 'FIRE ALARM SYSTEM' WITH DECAL OR APPROVED MARKINGS.

4. FIRE ALARM CONTROL SYSTEMS AND EQUIPMENT SHALL BE CONNECTED TO SEPARATE DEDICATED BRANCH CIRCUITS, SIZED AS REQUIRED FOR PROPER SERVICE. CIRCUITS SHALL BE LABELED 'FIRE ALARM'.

5. PROVIDE PYROTENAX CIC 2 HOUR-RATED CABLE (OR APPROVED EQUAL) FOR ALL COMMUNICATION CIRCUITS WHICH SERVE MULTIPLE FLOORS OR EVACUATION ZONES UNTIL THEY ENTER THE AREA SERVED IN ACCORDANCE WITH NFPA 72. THE CABLE SHALL BE INSTALLED IN CONDUIT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, WITH OUTGOING AND RETURN LOOPS PHYSICALLY SEPARATED IN ACCORDANCE WITH APPLICABLE CODE.

G. SPARE PARTS

1. THE CONTRACTOR SHALL CARRY IN HIS BID A UNIT PRICE TO FURNISH AND INSTALL ADDITIONAL FIRE ALARM APPLIANCES AS REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION DURING THE FINAL INSPECTORS WALK—THRU. BID SHALL INCLUDE ALL ASSOCIATED WIRING AND PROGRAMMING AS REQUIRED.

2. ANY UNUSED DEVICES SHALL BE TURNED OVER TO THE OWNER OR A CREDIT SHALL BE GIVEN AS DIRECTED BY THE OWNER.

3. PROVIDE THE FOLLOWING QUANTITY AND TYPE AS INDICATED:
A. (2) SYSTEM SMOKE DETECTOR (HEADS)
B. (2) LOCAL SMOKE DETECTORS
C. (2) SYSTEM HEAT DETECTORS

C. (2) SYSTEM HEAT DETECTORS
D. (1) DUCT SMOKE DETECTORS
E. (1) REMOTE TEST STATIONS
F. (1) REMOTE ALARM INDICATORS

F. (1) REMOTE ALARM INDICATORS
G. (6) AUDIO/VISUAL APPLIANCES
H. (2) VISUAL APPLIANCES
I. (1) PULL STATIONS

I. (1) PULL STATIONS
J. (2) MONITOR MODULE
K. (2) RELAY IAM / CONTROL MODULE

H. FINAL TEST / WARRANTY

1. THE SYSTEM SHALL BE FULLY TESTED BY A UL CERTIFIED TESTING COMPANY, IN ACCORDANCE WITH UL GUIDELINES AND NFPA STANDARDS.

2. A COPY OF THE FINAL TEST REPORT AND RECORD OF COMPLETION SHALL BE SUBMITTED INDICATING PROPER FUNCTIONING OF THE SYSTEM AND CONFORMANCE TO THE SPECIFICATIONS. THE TEST SHALL BE PERFORMED BY UL CERTIFIED AND FACTORY TRAINED QUALIFIED TECHNICIANS. EACH AND EVERY DEVICE SHALL BE TESTED, AND STANDALONE OPERATION OF REMOTE PANELS SHALL BE VERIFIED. FINAL TESTING SHALL BE PERFORMED BY THE SAME

COMPANY THAT SHALL HOLD AND EXECUTE THE TEST AND INSPECTION CONTRACT.

3. THE MANUFACTURER SHALL GUARANTEE ALL SYSTEM EQUIPMENT FOR A MINIMUM OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.

4. THE CONTRACTOR SHALL GUARANTEE ALL RACEWAYS AND WIRING TO BE FREE FROM INHERENT MECHANICAL OR ELECTRICAL DEFECTS FOR ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE SYSTEM.

1. EACH CONTRACTOR SHALL INCLUDE AS PART OF THEIR BASE BID THE COST OF AN ANNUAL TEST AND INSPECTION CONTRACT AS DESCRIBED HEREIN.
2. THE TEST AND INSPECTION CONTRACT SHALL PROVIDE FOR PERIODIC TESTS ACCORDING TO UL, NFPA AND APPLICABLE LOCAL REQUIREMENTS FOR THE DURATION OF THE ORIGINAL MANUFACTURER'S WARRANTY PERIOD. THE CONTRACT SHALL INCLUDE TESTING AND RECALIBRATION OF EACH SYSTEM DETECTOR FOLLOWING THE FIRST YEAR OF OPERATION AS WELL AS SUBSEQUENT CLEANING AND CALIBRATION TESTING IN ACCORDANCE WITH NFPA 72 REQUIREMENTS.

UPON EXPIRATION OF THE WARRANTY PERIOD AND INITIAL TEST AND INSPECTION CONTRACT, THE CONTRACT SHALL BE RENEWABLE BY THE BUILDING OWNER.

4. EACH CONTRACTOR SHALL ALSO INCLUDE AS PART OF THE BASE BID THE COST OF A ONE YEAR CENTRAL STATION MONITORING CONTRACT. THE CONTRACT SHALL BE HELD WITH A UL—LISTED AND LOCALLY—APPROVED CENTRAL STATION MONITORING COMPANY, AND SHALL BE RENEWABLE BY THE OWNER UPON ITS EXPIRATION.

J. TRAINING

 THE CONTRACTOR SHALL PROVIDE THE SERVICES OF THE MANUFACTURER'S REPRESENTATIVE FOR A PERIOD OF 4 HOURS, DURING NORMAL BUSINESS HOURS, TO INSTRUCT THE OWNER'S DESIGNATED PERSONNEL AND FIRE DEPARTMENT RESPONSE TEAMS ON THE OPERATION OF THE SYSTEM.

SHALL ALSO BE CAREFULLY NOTED:

3.1 SPECIAL COORDINATION INSTRUCTIONS

A. COORDINATION WITH THE WORK OF OTHER TRADES IS REFERRED TO WITHIN VARIOUS PARTS OF THIS SECTION OF THE SPECIFICATIONS. THE FOLLOWING SPECIAL INSTRUCTIONS

1. LOCATIONS AND MOUNTING HEIGHT OF ALL WALL OUTLETS AND LIGHTING FIXTURES SHALL BE AS SPECIFIED ON THE ELECTRICAL AND ARCHITECTURAL DRAWINGS.

2. ALL FEEDER, BRANCH CIRCUIT OR AUXILIARY SYSTEM WIRING PASSING THROUGH PULL BOXES AND/OR BEING MADE UP IN PANEL BOARDS SHALL BE PROPERLY GROUPED, BOUND AND TIED TOGETHER IN A NEAT AND ORDERLY MANNER IN KEEPING WITH THE HIGHEST STANDARDS OF THE TRADE, WITH PLASTIC CABLE TIES.

3. ALL DUPLEX CONVENIENCE AND POWER RECEPTACLES SHALL BE MOUNTED

VERTICALLY WITH THE GROUNDING POST TO THE BOTTOM AS THE OUTLET IS

VIEWED FROM THE FRONT.

4. ALL MISCELLANEOUS HARDWARE AND SUPPORT ACCESSORIES, INCLUDING SUPPORT RODS, HANGERS, NUTS, BOLTS, SCREWS AND OTHER SUCH ITEMS SHALL BE OF A GALVANIZED OR CADMIUM PLATED FINISH, OR OF OTHER APPROVED RUST—INHIBITING COATINGS. IN HAZARDOUS LOCATIONS NEAR THE OCEAN ALL MARINE AREA HARDWARE SHALL BE PVC COATED STAINLESS STEEL TO PREVENT CORROSION. CARE SHOULD BE TAKEN THAT FIXTURES SHALL NOT BE INSTALLED ON BOTH SIDES OF EXISTING OR NEW BUILDING EXPANSION JOINTS.

5. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL MATERIALS. EQUIPMENT AND

WORKMANSHIP TO PROVIDE FOR ADEQUATE PROTECTION OF ALL ELECTRICAL EQUIPMENT DURING THE COURSE OF CONSTRUCTION OF THE PROJECT.

6. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL APPROVED DETAILS FOR ALL INSULATION AT TERMINAL CONNECTION POINTS FOR ALL ELECTRICAL CONDUCTING MATERIALS, SUCH AS TRANSFORMER TERMINALS, TERMINAL STUDS, AND AT ANY OTHER SPECIAL LOCATIONS AS DIRECTED BY THE ENGINEER AND CONFIRMED BY

THE ELECTRICAL CONTRACTOR SHALL PROVIDE GFI RATED AND WEATHERPROOF
RATED EQUIPMENT IN DAMP OR WET LOCATIONS.
 COORDINATION WITH LOCAL UTILITY COMPANIES WITH THE LOCAL UTILITY
COMPANIES AND THE LOCAL FIRE DEPARTMENT IS REQUIRED. ELECTRICAL
CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND FILE ALL REQUIRED.

APPLICATIONS AND MEET ALL UTILITY COMPANY REQUIREMENTS.

3.2 COOPERATION AND WORK PROGRESS

A. THE ELECTRICAL WORK SHALL BE CARRIED ON UNDER THE USUAL CONSTRUCTION CONDITIONS, IN CONJUNCTION WITH ALL OTHER WORK AT THE SITE. THE ELECTRICAL CONTRACTOR SHALL COOPERATE WITH THE ENGINEER AND ALL CONTRACTORS AND EQUIPMENT SUPPLIERS WORKING ON THE SITE COORDINATE THE WORK AND PROCEED IN A MANNER SO AS NOT TO DELAY THE PROGRESS OF THE PROJECT.

B. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE THE EXACT

MOUNTING ARRANGEMENT AND LOCATION OF EQUIPMENT INDICATED ON THE DRAWINGS TO ALLOW FOR PROPER SPACE REQUIREMENTS FOR EQUIPMENT ACCESS, OPERATION AND MAINTENANCE.

C. IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO COORDINATE THE DELIVERY OF ELECTRICAL EQUIPMENT TO THE PROJECT PRIOR TO THE TIME OF INSTALLATION OR EQUIPMENT.

3.3 INSTALLATION OF WIRING & CONDUIT

A. IN GENERAL ALL CONDUITS SHALL BE RUN CONCEALED UNLESS OTHERWISE INDICATED TO BE RUN EXPOSED.

B. EXPOSED CONDUITS SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO THE WALLS OF THE BUILDING AND ALL BENDS SHALL BE MADE WITH STANDARD CONDUIT ELLS OR CONDUITS BENT TO, NOT LESS THAN, THE SAME RADIUS. HORIZONTAL RUNS OF EXPOSED CONDUITS SHALL BE CLOSE TO CEILING BEAMS, PASSING OVER WATER OR OTHER PIPING WHERE POSSIBLE AND SHALL BE SUPPORTED BY PIPE STRAPS OR BY OTHER APPROVED MEANS, NOT MORE THAN 5' APART. INSTALLATION OF EXPOSED CONDUITS IN FINISHED AREAS OF THE BUILDING SHALL BE CHECKED WITH THE ENGINEERS FOR LAYOUT BEFORE

COMPLETED, IS TO PRESENT THE MOST OBTRUSIVE APPEARANCE POSSIBLE. NO EXPOSED CONDUITS WILL BE PERMITTED ON WALLS OR PARTITIONS IN PUBLIC AREAS.

C. IN NO PLACE SHALL A CONDUIT BE RUN WITHIN 3" OF HOT WATER PIPES OR APPLIANCES, EXCEPT WHERE CROSSING IS UNAVOIDABLE AND IN THAT CASE, THE CONDUIT SHALL BE KEPT AT LEAST 1" FROM COVERING OR PIPE CROSSED.

D. CONDUITS SHALL BE SUPPORTED ON APPROVED GALVANIZED WALL BRACKETS, CEILING TRAPEZE, STRAP HANGERS OR PIPE STRAPS, SECURED BY MEANS OF TOGGLE BOLTS ON HOLLOW MASONRY UNITS OR EXPANSION BOLTS IN CONCRETE OR BRICK.

NSTALLATION TO CONFORM TO THE PATTERN OF THE STRUCTURAL MEMBERS. AND WHEN

E. IN GENERAL, NO SPLICES OR JOINTS WILL BE PERMITTED IN EITHER FEEDER OR BRANCHES
 EXCEPT AT OUTLETS OR ACCESSIBLE JUNCTION BOXES. NO SPLICES SHALL BE MADE IN
 SECURITY OR FIRE ALARM SYSTEMS.
 F. ALL SPLICES IN WIRE #8 AWG AND SMALLER SHALL BE STANDARD PIGTAIL, MADE

MECHANICALLY TIGHT AND INSULATED WITH PROPER THICKNESS OF INSULATING TAPE.
WIRE SPLICING NUTS AS MANUFACTURED BY: MINNESOTA MINING COMPANY (SCOTCH
LOCK) OR IDEAL WIRE NUTS SHALL BE USED, SUBJECT TO THE LOCAL WIRE INSPECTOR
G. WIRE #6 AND LARGER SHALL BE CONNECTED TO PANELS AND APPRAYATUS BY MEANS OF
APPROVED LUGS OR CONNECTORS. CONNECTORS SHALL BE SOLDER LESS TYPE,
SUFFICIENTLY LARGE TO ENCLOSE ALL STRANDS OF THE CONDUCTOR AND SECURELY
EASTENED

FASTENED.

H. PROVIDE (3) 1—INCH CONDUITS FROM EACH ELECTRICAL PANEL UP TO THE NEAREST LAY—IN CEILING AREA.

3.4 INSTALLATION OF UNDERGROUND CONDUITS

A. THE SIZE AND NUMBER OF CONDUITS SHALL BE AS INDICATED ON THE DRAWINGS.
 B. THE ENTIRE LENGTH OF DUCT BANK SHALL BE EXCAVATED AND GRADED BEFORE ANY CONDUITS ARE LAID.
 C. THE DUCT BANK SHALL BE SET ON UNDISTURBED EARTH.

D. THE CONDUIT SHALL BE INSTALLED SO THAT THE TOP IS A MINIMUM OF 36 INCHES BELOW FINISHED GRADE.

E. CHANGES IN DIRECTION SHALL BE MADE BY LONG SWEEP BENDS. MINIMUM RADIUS SHALL BE 25 FEET EXCEPT THAT AT THE END OF A RUN WITHIN 10 FEET OF TERMINATION, MANUFACTURED BENDS MAY BE USED HAVING A MINIMUM RADIUS OF 36 INCHES.

F. CONDUIT BASE AND INTERMEDIATE SPACERS SHALL BE INSTALLED A MAXIMUM OF 5 FEET ON CENTERS. SPACERS SHALL NOT BE PLACED ONE ABOVE THE OTHER BUT SHALL BE

STAGGERED A MINIMUM OF 6 INCHES.

G. ALL CONDUIT JOINTS SHALL BE MADE WATERTIGHT BY MEANS OF A SEALING COMPOUND BEFORE THE COUPLING IS INSTALLED. JOINTS IN CONDUITS SHALL BE STAGGERED. MINIMUM SPACE BETWEEN JOINTS IN ADJACENT CONDUITS SHALL BE 6 INCHES.

H. WHEN THE REQUIRED NUMBERS OF CONDUITS HAVE BEEN INSTALLED, SECURELY TIE

THE ASSEMBLY TOGETHER AT DISTANCES NOT EXCEEDING 7 FEET. TIE SHALL CONSIST OF THREE TURNS OF NO. 18 IRON WIRE.

WHERE CONDUIT IS ENCASED, THE DUCT ENVELOPE SHALL BE OF MONOLITHIC CONSTRUCTION.

1. POURING OF CONCRETE SHALL BE CONTINUOUS THROUGHOUT THE LENGTH OF CONSTRUCTION. THE END OF THE POUR SHALL BE INTERLOCKED OR SLOPED. IF THE INSTALLATION IS HALTED, THE ENDS OF THE CONDUIT SHALL BE PLUGGED.

2. CONCRETE SHALL NOT BE POURED UNTIL THE CONDUIT INSTALLATION HAS BEEN

INSPECTED AND APPROVED.

J. AFTER THE INSTALLATION IS COMPLETED, EACH CONDUIT SHALL BE CLEANED AND IDENTIFIED. A STANDARD FLEXIBLE MANDREL AND STIFF BRISTLE BRUSH SHALL BE PULLED THROUGH EACH CONDUIT. THE MANDREL SHALL BE NOT LESS THAN 12" LONG AND THE DIAMETER APPROXIMATELY 1/4" LESS THAN THE CONDUIT.

K. INSTALL APPROXIMATELY 12" BELOW THE TOP OF THE TRENCH ABOVE EACH CONDUIT OR DIRECT BURIED CABLE A 6—INCH WIDE PLASTIC WARNING TAPE. TAPE SHALL BE YELLOW

IN COLOR WITH BLACK LETTERS READING ?BURIED ELECTRIC LINES.?

3.5 ELECTRICAL INSTALLATION FOR ELEVATORS

A. ELECTRICAL CONTRACTOR SHALL PROVIDE ELEVATORS AND ESCALATORS WITH ELECTRICAL POWER AND AUXILIARY SERVICES GENERALLY AS DESCRIBED AND AS AMENDED BY THE ELEVATOR CONTRACT SHOP DRAWINGS AND SPECIFICATIONS. PRIOR TO INSTALLATION, ELECTRICAL CONTRACTOR SHALL COORDINATE WORK WITH ELEVATOR CONTRACTOR.

B. FEEDER BREAKERS FOR ALL ELEVATORS SHALL BE SHUNT TRIP, UNLESS INSTALLED IN MASSACHUSETTS. PROVIDE WIRING AND INTERFACE WITH FIRE ALARM AND SPRINKLER SYSTEM TO SHUNT TRIP ELEVATOR FEEDER BREAKER AS REQUIRED BY CODE. WHERE

B. FEEDER BREAKERS FOR ALL ELEVATORS SHALL BE SHUNT TRIP, UNLESS INSTALLED IN MASSACHUSETTS. PROVIDE WIRING AND INTERFACE WITH FIRE ALARM AND SPRINKLER SYSTEM TO SHUNT TRIP ELEVATOR FEEDER BREAKER AS REQUIRED BY CODE. WHERE SHUNT TRIP IS NOT USED, PROVIDE JUNCTION BOX IN ELEVATOR MACHINE ROOM MARKED ?ELEVATOR SHUNT TRIP FOR FUTURE USE? AND DISABLE SHUNT TRIP BREAKER C. PROVIDE POWER DISCONNECT FOR EACH ELEVATOR WITH IDENTIFYING NAMEPLATE, LOCKING CAPABILITY, TWO NO AUXILIARY CONTACTS AND FUSES SIZED PER ELEVATOR SHOP DRAWINGS. LOCATE ON LATCH SIDE OF ELEVATOR DOOR OR AS DIRECTED BY THE

ELEVATOR CONTRACTOR.

D. PROVIDE THE FOLLOWING AUXILIARY SERVICES TO THE ELEVATOR PIT, ELEVATOR SHAFT AND ELEVATOR MACHINE ROOM FOR EACH ELEVATOR. LOCATE AND IDENTIFY ALL SERVICES AS DIRECTED BY THE ELEVATOR SHOP DRAWING OR ELEVATOR CONTRACTOR.

1. CAB LIGHTING: PROVIDE LOCKABLE DISCONNECT AND SINGLE CIRCUIT.

2. CAB TELEPHONE: JUNCTION BOX WITH 1? CONDUIT TO LOCAL TELEPHONE

3. CAB SECURITY: JUNCTION BOX WITH 1? CONDUIT TO LOCAL SECURITY BACKBOARD.

4. CAB FIRE ALARM: COMPRISING OF JUNCTION BOX WITH WIRING FOR AUDIO/VISUAL ALARM FIREMAN'S PHONE. PROVIDE DEVICES AS REQUIRED.

 ALL CIRCUITS FOR ELEVATORS SHALL BE CONNECTED TO EMERGENCY SERVICE AND INSTALLED IN MINERAL INSULATED CABLE 2—HOUR FIRE RATED ENCLOSURE, IF EMERGENCY SERVICE IS AVAILABLE.
 CONTROL AND SIGNAL SYSTEMS: PROVIDE SEPARATE 120/208V, 1—PHASE, 30 AMPERE CIRCUIT TO LOCKABLE DISCONNECT FOR MULTIPLE ELEVATOR BANK CONTROLLER.

CONTROLLER.

7. PROVIDE FIRE ALARM JUNCTION BOX AND WIRING FOR FIRE ALARM ELEVATOR RECALL AND GENERAL ALARM. ELEVATOR RECALL SHALL BE PROVIDED FROM SMOKE DETECTORS PROVIDED IN ELEVATOR LOBBIES, MACHINE ROOM, AND TOP OF ELEVATOR SHAFT.

8. PROVIDE 20 AMPERE DEDICATED GFI RECEPTACLE WITHIN EACH ELEVATOR

9. ELEVATOR PIT SHALL BE PROVIDED WITH VAPOR—TIGHT LIGHTING FIXTURE WITH POLYCARBONATE LENS SWITCHED FROM ENTRANCE OF ELEVATOR PIT. PROVIDE 20 AMPERE DEDICATED GFI RECEPTACLE IN EACH ELEVATOR PIT. DO NOT WIRE LIGHT FIXTURE ON GFI CIRCUIT. WHERE PROVIDED, CONNECT SUMP PUMP IN ELEVATOR PIT WITH DEDICATED CIRCUIT.

10. INTERCOM SYSTEM: PROVIDE 120V, 20 AMPERE CIRCUIT.

3.6 SPLICES AND TERMINATIONS

A. MAKE SPLICES AND TERMINATIONS EQUIVALENT ELECTRICALLY AND MECHANICALLY TO CONDUCTOR INSULATION.
 B. MAKE SPLICES IN BRANCH CIRCUIT WIRING WITH SOLDER LESS, SCREW-ON CONNECTORS; IDEAL, SCOTCHLOCK, T&B OR EQUAL, RATED 600V OF SIZE AND TYPE REQUIRED BY MANUFACTURER'S RECOMMENDATION, WITH TEMPERATURE RATINGS EQUAL TO THOSE OF CABLE INSULATION. INSULATE SPLICES WITH INTEGRAL COVERS OR WITH PLASTIC,

RUBBER OR FRICTION TAPE, PERMACAL OR EQUAL TO MAINTAIN INTEGRITY OF CABLE INSULATION.

C. MAKE SPLICES AND TERMINATIONS TO CONDUCTORS #8 AND LARGER WITH CORROSION-RESISTANT, HIGH CONDUCTIVITY, PRESSURE INDENT, HEX SCREW OR BOLT CLAMP CONNECTIONS, WITH OR WITHOUT TONGUES, DESIGNATED SPECIFICALLY FOR INTENDED SERVICE. CONNECTORS FOR CABLES 250 KCMIL AND LARGER SHALL HAVE TWO CLAMPING ELEMENTS OR COMPRESSION INDENTS. TERMINALS FOR BUS CONNECTIONS SHALL HAVE TWO BOLTHOLES. SPLIT BOLT CONNECTORS, BURNDY OR EQUAL SHALL BE ACCEPTABLE FOR ALL SPLICES OF CONDUCTORS #8 AND LARGER.

SPLIT-BOLT CONNECTORS AS SPECIFIED HEREIN.

E. PROVIDE STANDARD BOLT-ON LUGS WITH ALLEN OF CAP SCREWS TO ATTACH COPPER WIRE AND CABLE TO DISCONNECT SWITCHES AND OTHER ELECTRICAL EQUIPMENT.

F. ALL TERMINATIONS SHALL BE PROPERLY TORQUED AS PER MANUFACTURER'S

D. MAKE SPLICES AT MOTOR JUNCTION BOXES WITH PRESSURE INDENT CONNECTORS OR

REQUIREMENTS. TOOLS MUST BE CALIBRATED AND BE CERTIFIED

3.7 GROUNDING

A. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL FITTINGS, CLAMPS, CONDUITS AND WIRE OF PROPER SIZE TO MAKE GROUND CONNECTIONS BETWEEN ALL APPARATUS AND CONDUIT AND THE WATER PIPING AS REQUIRED BY THE LATEST EDITION OF THE MASSACHUSETTS ELECTRICAL CODE. GROUND WIRES SHALL BE RUN IN RIGID CONDUIT OF SIZE REQUIRED BY THE NATIONAL ELECTRICAL CODE.

B. THE EQUIPMENT AND MATERIALS REQUIRED UNDER THIS SECTION ARE INCLUDED UNDER

C. GROUND ALL SYSTEMS AND EQUIPMENT IN ACCORDANCE WITH THE BEST INDUSTRY PRACTICE. SIZE ALL CONDUCTORS PER THE LATEST ADDITION OF THE NEC.

D. THE GROUND BUS OF THE MAIN DISTRIBUTION SWITCHBOARD AND GENERATOR OUTPUT PANEL BOARD SHALL BE CONNECTED TO THE MAIN GROUNDING ELECTRODE SPECIFIED BELOW BY MEANS OF INSULATED CONDUCTORS RUN IN THREADED STEEL CONDUIT.

E. THE MAIN GROUNDING ELECTRODE SHALL BE AN ACCESSIBLE POINT ON THE NEAREST METALLIC MAIN WATER SERVICE PIPE. CONNECTION SHALL BE MADE ON THE STREET SIDE OF THE MAIN VALYE UTILIZING EXOTHERMIC WELDING. BONDING JUPEERS SHALL BE PROVIDED AROUND THE WATER METERS (IF PROVIDED) AND AROUND INSULATING

JOINTS AND/OR SECTIONS.

F. THE WATER PIPE GROUND SHALL BE SUPPLEMENTED BY AN ADDITIONAL "MADE" ELECTRODE CONSISTING OF BURIED 1" DIAMETER BY 10'-0" LONG COPPER WELD GROUND RODS SPACE 6'-0" MINIMUM APART, AND PROVIDED IN SUFFICIENT QUANTITY SO AS TO HAVE A MEASURED RESISTANCE TO GROUND OF NOT MORE THAN 25 OHMS. ESTABLISH A BONDING CONNECTION FROM THE "MADE" ELECTRODE CONSISTING OF GREEN INSULATED CONDUCTORS RUN IN THREADED STEEL CONDUIT TO THE COLD WATER

G. ESTABLISH TWO GROUND-BONDING CONNECTIONS FROM STRUCTURAL BUILDING STEEL FROM TWO DIFFERENT LOCATIONS TO THE COLD WATER MAINS ENTERING THE BUILDING.

H. PROVIDE SUPPLEMENTARY GROUND BONDING WHERE METALLIC CONDUITS TERMINATE AT METAL CLAD EQUIPMENT (OR AT THE METAL PULL BOX OF EQUIPMENT) FOR WHICH A GROUND BUS IS SPECIFIED. ACCOMPLISH THIS BY EQUIPPING THE CONDUITS WITH BUSHINGS OF THE GROUNDING TYPE CONNECTED INDIVIDUALLY BY MEANS OF JUMPERS TO THE GROUND BUS. EXCLUDED THE JUMPERS WHERE DIRECTED. THIS EXCLUSION WILL BE REQUIRED WHERE AN ISOLATED GROUND FOR ELECTRONIC EQUIPMENT IS TO BE

I. THE CENTRAL EQUIPMENT FOR THE FIRE PROTECTION ALARM SYSTEM SHALL HAVE ITS GROUNDING TERMINAL CONNECTED TO THE NEAREST METALLIC COLD WATER MAIN BY MEANS OF A #6 GREEN CODED INSULATED CONDUCTOR, RUN IN 3/4" THREADED METALLIC CONDUIT. UTILIZE A GROUND CLAMP OF A TYPE SPECIFICALLY MANUFACTURED FOR THE PURPOSE.

J. FOR EACH FEEDER OR RUN OF LIGHTING AND APPLIANCE BRANCH CIRCUITRY INCLUDE EQUIPMENT AND RACEWAY GROUNDING CONDUCTORS RUN WITHIN THE RACEWAYS.

THE INDICATED QUANTITIES OF CONDUCTORS DO NOT INCLUDE THE GROUND WIRES.

K. CONDUCTORS UTILIZED FOR GROUNDING AND BONDING SHALL HAVE TYPE OF INSULATION, COMPARABLE TO THE PHASE CONDUCTORS, COLOR CODED GREEN.

3.8 TEMPERATURE CONTROL WIRING

CONDITIONING CONTRACTOR.

B. ALL ELECTRIC WIRING AND WIRING CONNECTIONS REQUIRED FOR THE INSTALLATION OF THE TEMPERATURE CONTROL SYSTEM SHALL BE PROVIDED BY THE TEMPERATURE CONTROL CONTRACTOR.

C. ELECTRICAL CONTRACTOR SHALL PROVIDE 120 VOLT CONTROL POWER TO ALL TEMPERATURE CONTROL PANELS.

3.9 SLEEVES, INSERTS AND SUPPORTS

A. THE TEMPERATURE CONTROL SYSTEM SHALL BE INSTALLED BY THE HEATING AND AIR

A. FURNISH AND INSTALL ALL INSERTS, CONDUIT HANGERS, ANCHORS AND STEEL SUPPORTS NECESSARY FOR THE SUPPORT AND INSTALLATION OF ALL ELECTRICAL EQUIPMENT.

B. WHERE OPENINGS ARE REQUIRED IN WALLS AND FLOORS FOR THE PASSING OF RACEWAYS THE ELECTRICAL CONTRACTOR SHALL FURNISH THE GENERAL CONTRACTOR WITH THE NECESSARY INFORMATION REGARDING DIMENSIONS AND LOCATIONS SO THAT HE MAY INSTALL SUITABLE CONCRETE STOPS TO PROVIDE THESE OPENINGS. SUCH OPENINGS SHALL BE BY THE GENERAL CONTRACTOR IN SUCH A MANNER SO AS TO INTERFERE WITH

THE FIREPROOF INTEGRITY OF THE BUILDING.

C. THE ELECTRICAL CONTRACTOR WILL BE HELD RESPONSIBLE FOR THE LOCATION OF THE MAINTAINING IN PROPER POSITION, SLEEVES, INSERTS AND ANCHOR BOLTS SUPPLIED AND/OR SET IN PLACE BY HIM. IN THE EVENT THAT FAILURE TO DO SO REQUIRED CUTTING AND PATCHING OF FINISHED WORK, SUCH WORK SHALL BE DONE AT THE ELECTRICAL CONTRACTOR'S EXPENSE BY THE GENERAL CONTRACTOR.

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REWSTER THORNTON GROUP

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O. REVISION DESCRIPTION

SHEET TITLE
ELECTRICAL
SPECIFICATIONS

SHEET

SHEET

Wozny/Barbar & Associates, Inc.
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## **SIGN-IN SHEET**



## **Pawtucket School Department**

RFP: C2024-010 Goff Tolman Fire Code Upgrades

#### Non-Mandatory Site Visit

Monday, December 23, 2024

| NAME               | REPRESENTING     | PHONE NO.   | EMAIL ADDRESS               |
|--------------------|------------------|-------------|-----------------------------|
| ANTHONY DEPOSQUALE | ANS CONSTRUCTION | 401465-1452 | adepasquale @ adsconst, com |
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