PART 1 - GENERAL

1.1 GENERAL

- A. Architect's General Conditions are a part of this Division. All work shall be done in strict accordance with all applicable Codes and Regulations of local and State Agencies and utility companies. This Contractor shall bear the cost of all fees, permits, licenses and taxes and any utility company charges in connection with the work. All equipment installed shall be UL listed.
- B. AIA Document A201-2007 "General Conditions of the Contract for Construction" is hereby made part of these Specifications.

1.2 SCOPE A. Demolition:

- 1. The Contractor shall reference architectural and electrical plans and remove or relocate existing electrical materials as shown or which exist on walls and partitions being removed. Additionally, the Contractor shall remove all electrical feeds to existing furniture partitions to be removed. Removal of wiring that is no longer in service shall be complete back to source. Existing conduit may be reused when in suitable condition. Wiring for branch circuits shall not be reused unless otherwise noted. Circuits that remain shall be left in operating
- 2. The Contractor shall remove all unused telephone and data cables complete from outlet to patch panel.
- 3. Existing electrical materials shall NOT be reused unless so indicated on the Drawings. Existing flush-mounted boxes in good condition may be reused if located as shown for new boxes on Drawings. Flush-mounted boxes not being reused shall be covered with suitable cover plates, surface boxes and raceways shall be removed.
- 4. All materials removed under this Division and not scheduled for reuse or requested by the Owner, shall be disposed of off site.
- B. New Work:
- 1. Provide complete electrical lighting, power, fire alarm and special systems as indicated on the Contract Drawings.
- 2. Provide all electrical work necessary to power Owner-supplied equipment. Provide all receptacles, power wiring, core drills, etc., necessary for a complete installation.
- 3. Refer to architectural specifications for security system requirements, if any.
- 4. Systems shall be complete in all respects, tested, approved and ready for operation.
- Maintain existing receptacles on existing walls to remain, reconnect circuits that are interrupted.
- Refer to audio/visual drawings for all power and conduit requirements. C. Work by Others:
- 1. Other Trade Contractors and Owner's equipment vendors shall install all motors for equipment provided under their trade work contracts; motors shall be ready for wiring by the Electrical Contractor.
- 2. Other Trade Contractors and Owner's equipment vendors shall furnish and deliver to the Electrical Contractor wiring diagrams for all electrically operated equipment. Other Trade Contractors shall furnish relays and control equipment to the Electrical Contractor who shall install and wire these devices. The Electrical Contractor shall provide motor starters and disconnect switches.
- The General Contractor shall provide chases, openings, cutting, patching, painting and finish work. 4. The General Contractor shall install all access doors where required; doors needed for access to electrical
- systems shall be furnished by the Electrical Contractor. 5. The Owner's Electrical Contractor will provide the HIG tenant 480/277 volt panel and step-down transformer
- (480V to 208/120V).
- 6. This Contractor to supply the 208/120 volt panel and feeder to the step-down transformer. Supply fused disconnect on feeder.
- 1.3 SHOP DRAWING SUBMITTALS
- A. Submit shop drawings on equipment and materials, in sextuplet (6 copies), to the Architect for approval. The Drawings shall include ratings, performance information, operating data and wiring diagrams. The Contractor shall assume full responsibility for work performed or equipment supplied that is not in agreement with approved shop
- B. The following list of electrical items must be submitted by this Contractor for approval:
- Panelboards
- Circuit breakers
- 3. Wiring devices and plates

"Poke-thru" floor devices

- 4. Lighting fixtures (submit samples as requested)
- 5. Fire alarm system components
- C. Submit for record an itemized list detailing electrical systems and components to be seismically restrained and associated seismic restraint system to be used.

1.4 RECORD DRAWINGS

- A. Neatly and accurately record all changes to Contract Documents on record set of drawings furnished by the General Contractor. These record "as-built" drawings shall include locations of specific items as listed in the various Specification DIVISIONS. Upon project completion, these record drawings shall be turned over to the Engineer.
- A. As used on Contract Drawings, the term "to provide" shall mean "to furnish, install and connect completely in the specified or approved manner the item or material described."

1.6 GUARANTEE

A. Materials, equipment and workmanship shall have standard warranty against defects in material and workmanship. Failures due to defective or improper material, equipment, workmanship or design shall be made good, forthwith, by and at the expense of the Contractor, including damage done to areas, materials and other systems resulting from such failures. Guarantee period shall extend for one year from the Date of Acceptance.

- 1.7 INSPECTION A. Contract Drawings are diagrammatic and do NOT show every required fitting, etc. The Contractor shall familiarize himself with existing site conditions prior to submitting a bid, and shall include all equipment and accessories necessary for complete and operational systems.
- 1.8 INSURANCE
- A. Furnish insurance certificates required by the Owner.
- 1.9 PERMITS, LAWS, ORDINANCES, CODES AND STANDARDS
- A. Obtain and pay for permits, inspections, licenses and certificates required. Work of this Contract shall meet current accepted editions of the State Building Code, State Fire Safety Code and other laws, rules and regulations of local, State and Federal authorities including, but not limited to: National Fire Protection Association #13; National Fire Protection Association #90A; National Fire Protection Association #90B; National Fire Protection Association #99; International Plumbing Code; International Mechanical Code; National Fire Protection Association #70 (National Electrical Code); and local utility company requirements. Pay utility company backcharges. Equipment, materials and components listed in UL Product Directories, shall bear UL labels.
- 1.10 ARRANGEMENT OF WORK
- A. Work shall be coordinated between trades to prevent interference. Work shall present a neat coordinated appearance. Install work as necessary to provide maximum possible headroom, adequate clearance and ready access for inspection, operation, safe maintenance and repair and Code conformance. Where space appears inadequate, consult the Architect before proceeding with installation.
- A. Equipment and materials shall be new, of first quality, selected and arranged to fit properly into spaces indicated. Install equipment and materials in accordance with manufacturer's recommendations.
- 1.12 COORDINATION WITH OWNER
- A. Work shall be scheduled with the Owner. Interruptions in Owner's access to the site shall be subject to Owner limitations of date and duration.
- 1.13 OPERATION OF SERVICES AND UTILITIES
- A. Shutdown of existing services and utilities shall, without exception, be coordinated with the proper utility and with the Owner as to date, time of day, and duration before any service is interrupted. Notify the Owner of estimated duration of shutdown period at least ten days in advance of proposed shutdown.
- 1.14 PROTECTION
- A. Close open ends of work with temporary covers or plugs during construction to prevent entry of foreign material. Protect existing property, equipment and finishes from damage. Repair, to original condition, existing property that
- has been damaged during execution of the work. 1.15 CLEANING
- A. Work site must be kept clean. Rubbish, debris and leftover or excess materials shall be removed daily.
- 1.16 LUBRICATION
- A. No equipment shall be operated for temporary service or testing without proper lubrication. Items requiring lubrication shall be left freshly and fully lubricated at time of substantial completion. Furnish Owner with one complete new set of any special lubrication devices required for servicing, e.g., grease guns, fittings and adapters.
- A. Equipment and materials shall have standard manufacturer's finish except where otherwise noted.
- A. Provide necessary sleeves, caulking and flashing required to make openings waterproof.
- A. At closing of each working day, opening cut between floors and through fire-rated partitions shall be provided with UL approved, Class A "Noncombustible", firestopping with ratings equal to that of adjacent construction.
- 1.20 BASES AND SUPPORTS
- A. Provide necessary supports, pads, bases and piers for equipment. Equipment shall be securely attached to building structure in acceptable manner. Attachments shall be of strong and durable nature, as determined by the Owner.
- 1.21 ACCESS
- A. Provide adequately sized access doors, for access to concealed equipment and components requiring servicing or inspection. Doors shall have fire ratings equal to construction in which they are located.
- 1.22 TESTS
- A. Perform tests required by the Owner, legal authorities and agencies. Each piece of equipment, including motors and controls, shall be operated continuously for minimum one-hour test. Correct all defects appearing during tests, and repeat tests until no defects are disclosed. Final tests shall be made in the Owner's presence.

- 1.23 SYSTEMS OPERATION AND MAINTENANCE
- A. Upon completion of the work and at a time designated by the Engineer, the Contractor shall furnish instruction manuals including data, warranties, etc., and shall instruct the Owner or his representative as to the arrangement, location and operation of all equipment and systems furnished and installed under the Electrical Contract.
- PART 2 PRODUCTS
- 2.1 WIRE CABLE AND RACEWAYS
- A. Electrical Metallic Tubing (EMT) shall be used for feeders run above ground in dry areas. Connectors and couplings shall be galvanized steel, either compression type or heavy-duty set screw-type, listed for EMT use. Indent or crimp-type connectors are NOT allowed.
- B. Minimum sizes shall be as follows:
- Conduit and EMT: 3/4" unless otherwise noted.
- Flexible Metal Conduit: ½"
- C. Type MC metal-clad cable may be used for branch wiring to light fixtures, receptacles and switches. Wherever MC cable is used for light fixture wiring, leave sufficient slack for future removal or servicing of fixtures in finished ceilings. The MC cable shall be UL listed, 600V, 90 degree C rated, metal clad with THHN insulation and green insulated ground wire. Connectors and fittings shall be galvanized steel, listed for MC cable use. All cables shall be rigidly supported from the building structure at least 4' O.C. and within 12" from every fitting and shall run in lines parallel or perpendicular to building structural members. Cable shall not rest on the ceiling structure. Type MC cable shall not be used for homeruns. Cable sheath of interlocked aluminum is not acceptable. Type AC armored cable shall not be permitted on the job.
- Engineers Note: For use in Healthcare Facilities, ADD "MC cable shall not b used in wiring of life safety or critical circuits."
- D. Flexible Metallic Conduit (FMC) or liquid-tight flexible metallic conduit (LFMC) shall be used for connections to vibrating equipment and furniture partitions. Connectors, fittings and clamps for FMC shall be galvanized steel, listed for FMC use. Connectors and couplings for LFMC shall be zinc plated malleable iron or steel, with engagement window locknut and sealing ring: liquid, oil, and rain-tight; suitable for wet locations, listed for LFMC use: acceptable equivalent to O-Z/Gedney "Type 4Q".
- 1. Blue Type LA liquid-tight flexible metal conduit (LFMC) shall be used for all wiring beneath raised floor.
- 2. Grey/tan Type LA liquid-tight flexible metal conduit (LFMC) shall be used for final connections to vibrating equipment and to furniture partitions from underfloor duct activation fittings.
- E. Conductors shall be new copper with 600 Volt code gauge insulation conforming to NEC requirements. Wire #10 and smaller shall be solid conductor with THWN/THHN insulation. Size #8 and larger shall be stranded conductors with THWN/THHN insulation. Size #3 and larger shall be stranded conductors with XHHW insulation. Minimum size wire for light and power circuits shall be #12 AWG. The Contractor shall include an individual code sized green insulated ground conductor for all circuits; the use of the conduit system or cable covering as the sole means of grounding will
- F. Common neutrals shall not be used for receptacle circuits, unless otherwise noted on plans. When used, common neutral conductor ampere rating shall be double the phase conductor rating.
- G. All conduits and wiring shall be run concealed inside walls where possible. Exposed conduits where allowed shall be run neatly in lines parallel or perpendicular to building walls.
- H. All splices for #10 or smaller shall be made with "Scotchlok" spring connectors or equal. Splices for #8 or larger shall be made with UL approved compression connectors
- Provide nylon pull lines for all empty conduits.

2.2 GROUNDING AND BONDING

- A. Equipment Grounds
- 1. Grounding shall be installed and tested in accordance with NFPA 70 (NEC) and to satisfaction of local electrical inspector and Architect.
- 2. Provide green THHN insulated copper equipment grounding conductor between the ground bus of the source distribution panel or switchboard and each load being served. Conductor shall be sized according to NEC Table 250.122. Provide separate grounding conductor for each branch circuit, unless otherwise indicated on Contract
- 3. Maintain electrical continuity of raceways.
- B. Ground Fault Protection
- 1. If excessive ground current flows, main breakers and/or circuit breakers with ground fault sensing shall trip to protect against arcing ground faults.
- 2. Provide ground fault circuit interrupter protection for receptacles located within six feet of sink or faucet and as
- required and indicated.
- C. Materials
- 1. Above-grade and exposed connections shall be Burndy or acceptable equivalent.
- 2. Wire shall be stranded bare copper or insulated copper, as indicated on Contract Drawings.
- 3. Bus shall be copper bar, as indicated on Contract Drawings.
- 4. Bushings and Pressure Lugs shall be by T&B, O.Z./Gedney or acceptable equivalent. 5. Pipe clamps shall be by O.Z./Gedney or acceptable equivalent.
- 2.3 PANELBOARDS
- A. Panelboards shall be by Square D, General Electric, Cutler-Hammer or equal. Refer to Contract Drawings for requirements on special ratings and auxiliary devices such as relays, contactors and time switches.
- B. Panelboard shall have mains and branches as scheduled. Unless otherwise noted, breakers shall have minimum interrupting rating consistent with series-connected ratings for breakers and fuses as published in UL Recognized Component Directory or as listed in manufacturer's published literature. Panelboards shall be as follows:
- 1. 120/208V lighting and small panelboards shall be Square D "NQOD" or equal with minimum 22,000 AIC rating.
- C. Panelboards shall conform to standards of NEMA PB-1. Panelboards shall have distributed phase bussing throughout. Unless noted otherwise, panels shall be surface-mounted and main lugs shall be at top or bottom. Panels shall include ground bus.
- D. Panelboards shall have copper bussing.
- E. Each cabinet shall have hinged locking metal door and card holder for directory. All locks shall be fitted to same key. Panelboard card directories shall be completely filled out (typewritten) upon completion of project.
- F. Cover trims for panelboards shall be hinged to box with full height semi-concealed piano hinges and be fastened to box lip with screws. Trim clamps may only be used on opening part of trim. Trim door shall also be hinged. Trims
- G. Provide oversize gutters for gutter taps where wiring runs through to floor above. Through-fed lugs will NOT be accepted for continuation of risers.

2.4 SAFETY SWITCHES

- A. Safety switches shall be fused, 600 VAC, heavy-duty type in NEMA enclosures suitable for the environment in which they shall be installed. Switches shall be Square D, General Electric or Cutler-Hammer equivalent to the following
- Type FRN-RK (250 Volt) or FRS-RK (460 Volt) UL Class RK5 or approved equal.

A. Fuses for circuit protection shall be UL listed, non-renewable, low peak, dual-element, time delay fuses. Bussman

2.6 OUTLET AND JUNCTION BOXES

1. Fused disconnect 2- and 3-pole: "Type H"

- A. Switch and receptacle outlet boxes in partitions where wiring is concealed shall be standard 4 inches square, 1-1/2 inches deep, hot-dipped, galvanized steel, with device ring for boxes installed in sheetrock walls. Use 1-1/2 inch deep square corner tile wall extension for boxes installed in tile, exposed brick or exposed block masonry walls.
- B. Boxes shall be securely fastened to the building structure. Suitable means shall be provided to support outlet boxes to take the weight of fixtures. Recessed outlet boxes or their extension covers shall be set flush with face of finished wall, but in no case set greater than 1/4 inch behind finished face of wall. The Contractor shall check with the Architectural Drawings for possible box interference.
- C. Junction boxes shall be sized in accordance with Code requirements.
- D. Junction and outlet boxes where exposed to the weather and wet locations shall be threaded hub type and provided with watertight screw-on covers and gaskets
- 2.7 SWITCHES, RECEPTACLES AND PLATES
- A. Switches and receptacles shall be as manufactured by Hubbell, Arrow-Hart, Leviton or Pass and Seymour and equivalent to the following specification grades, with color matching Building Standard:
- 1. Single-pole switches shall be Hubbell #1221.
- 2. 3-way switches shall be Hubbell #1223.
- 3. Momentary contact switches shall be single-pole, double-throw equivalent to Hubbell #1557.
- 4. Duplex grounding type receptacles shall be 20 Ampere Hubbell #5362.

#DT-300 or equal by Sensor Switch, Hubbell or Philips. Set for 30 minute delay.

- 5. Isolated ground type receptacles shall be 20 Ampere Hubbell #IG5362 6. Ground fault type receptacles shall be Hubbell #GF-5362 feed-through receptacles.
- B. Wall mounted occupancy sensor switches shall be Watt-Stopper WS-250 or equal by Sensor Switch, Hubbell or Philips, passive infrared technology line voltage wallbox type rated to control up to 600 Watts at 277 VAC. Units shall have adjustable light level and off-time. Set for 30 minute delay.
- C. Ceiling mounted occupancy sensors to be mounted in corners of rooms. Provide directional unit by Watt-Stopper Model #DT-200 or equal by Sensor Switch or Hubbell or Philips. Set for 30 minute delay.

D. Ceiling mounted occupancy sensors in open areas to be mounted in center of area. Provide Watt-Stopper Model

- E. Provide Watt-Stopper Power Pack BZ-150 or equal by Sensor Switch, Hubbell or Philips to control lights and HVAC
- F. Provide wall plates equal to building standard on all switches and receptacles. When no standard exists provide specification grade stainless steel (Type 302).

G. Where there are multiple devices in one location, devices shall be ganged under one cover plate. All wall switches

shall be flush mounted, where applicable. H. Receptacles shall be mounted 18 inches above finished floor with U ground up unless otherwise indicated.

I. Wall switches shall be mounted 48 inches above finished floor, on strike side of door, unless otherwise indicated.

- 2.8 POKE-THRU DEVICES CONFERENCE ROOM
- A. Provide Wiremold "poke-thru" floor device for power, data and A/V requirements

standard for type and color and clean all reflecting surfaces, diffusers and louvers.

- 2.9 LIGHTING FIXTURES A. The Contractor shall furnish and install all lighting equipment as shown on the Drawings and specified on Drawings
- complete with lamps ready for operation. B. All existing lighting fixtures to remain in the construction area shall be re-lamped with new lamps to match building
- C. Any new 2' x 2' or 2' x 4' parabolic fixtures shall match existing fixtures. 2' x 2' fixtures are 9 cell and 2' x 4' fixtures are
- 18 cell parabolics. Fixtures to be equal to Philips Dav-Brite LP-3 series. D. All lamps for new fluorescent fixtures shall be T-8 type, 3500 degree K color unless otherwise indicated. Lamps shall
- be Philips, General Electric or Osram/Sylvania. E. Ballasts for fluorescent fixtures shall be electronic high power factor, CBM/ETL certified with an "A" sound rating.
- Ballasts shall be by Advance, Motorola, Valmont or Universal. F. Fluorescent ballasts shall be approved for local Utility Rebate Program and be in conformance with the latest Utility
- Ballast Eligibility List. Ballasts shall meet or exceed FCC Regulations Part 10.
- G. Ballasts operating at 120 V shall have less than 10 percent Total Harmonic Distortion (THD). Ballasts operating at 277 V shall have less than 15 percent THD. In both cases, third harmonic shall be less than 10 percent.

H. Ballasts shall have minimum ballast factor of 0.87, minimum power factor of 0.90, and maximum lamp current crest

factor of 1.7.

Advance "Mark V Electronic Integrated Circuit" or acceptable equivalent.

Ballast shall produce normal rated life for lamps specified.

- J. Unless otherwise noted, fluorescent ballast for interior applications shall be electronic, high frequency, full light output type with a minimum 50 degree F starting temperature; for use with 265 mA, rapid start T-8 lamps. Ballasts shall be
- K. Ballasts for compact fluorescent lamps (PL, DTT, TT or BIAX), shall be Class P with "A" noise rating, high power
- L. Existing fixtures in the space shall be reused where noted on the Drawings. The fixtures shall be disconnected, removed and stored by the Electrical Contractor and then be cleaned and replaced prior to reinstallation. The Electrical Contractor shall document, in writing, any damage noted on the fixtures prior to removing them and submit a copy to the General Contractor and the Engineer. The Electrical Contractor shall be held responsible for damage
- M. Fixtures not noted as being reused will be turned over to the Building Owner, or disposed of per the Owner's direction
- during construction. N. Installation of Lighting Fixtures:
- 1. Fixtures shall be securely attached to the building structure by mechanical means and by safety wire. Provide box-mounted studs and additional structural supports as required. Provide two safety wires per fixture. Each safety wire shall be capable of supporting four times the weight of the fixture. Safety wire shall be adjusted to be
- 2. Install seismically rated clips to secure recessed grid-supported luminaires in place. Provide four clips per fixture.

be Xenon strobe type.

- 2.10 FIRE ALARM A. Fire alarm components shall be compatible with existing building system. Provide additional cards as required to control additional initiation devices. Provide additional amplifiers, etc. required to power additional devices required to comply with A.D.A. All devices and mounting heights shall conform to current A.D.A. Standards. Strobe units shall
- 1. Combination fire speaker/strobe units shall be multi-tap speaker, initially set appropriate tap to provide proper sound levels and synchronized visual unit with appropriate module adapter mounted on common mounting plate.
- 2. Contractor shall install cable in a class A configuration or "building standard".

B. All wiring to match building's existing fire alarm wire.

being installed, unless noted otherwise.

A. All new circuit breakers shall match existing in style, manufacturer and interrupting rating for panel in which they are

2.11 CIRCUIT BREAKERS

PART 3 - EXECUTION

A. The Electrical Contractor shall ensure that no piping, ductwork, leak protection apparatus or other equipment foreign

to the electrical trade passes through the space equal to the width and depth of the electrical distribution equipment and extending from the floor to the structural ceiling.

3.1 GENERAL

3.2 LOAD BALANCE A. The Electrical Contractor shall balance the loads on the three phases in the electrical panelboard in which he does

work insofar as physically possible, and report each panel loading to the Engineer.

3.3 GENERAL WIRING TESTS

- A. At the time of final inspection and test, all wiring and connections throughout the renovation areas must be completed, devices and equipment properly operating, lighting fixtures installed, and power and lighting circuit and control wiring clearly identified with approved tags ready for acceptance. Each system shall test free from short circuit and grounds.
- B. Insulation resistance for low voltage cables and wiring shall be performed at 1000 Volt D.C. for one (1) minute. When insulation resistance must be determined, switchboards, panelboards, fuse holders, switches and overcurrent devices shall be in place, and the insulation resistance when tested at 1000 Volts D.C. shall be no less than 100,000 ohms for

A. Ground Fault Circuit Interruption shall be tested after installation by random connection of plug-in tester to various protected receptacles, as directed by Architect.

3.4 GROUNDING SYSTEM TESTS

- 3.5 OPERATIONAL TESTS
- A. Each piece of electrical equipment, including lighting fixtures, motors and controls shall be operated continuously for minimum test period of one hour.

B. Demonstrate by operating equipment that circuits and devices are in good operating condition. Each item of control equipment shall be operated minimum of five times. Demonstration shall be performed after wiring tests.

#14 and #12 wire and 250,000 ohms for #10 wire and larger.

3.6 FIRE ALARM SYSTEM INSTALLATION AND TESTING

A. Fire alarm wiring shall be run in EMT or "building standard;" devices shall be securely affixed to building surfaces.

B. Junction boxes, pull boxes, outlet boxes and covers in the fire alarm raceway system shall be painted red. C. Test every device and operation, including test by simulation of trouble, in presence of the Owner and the Architect. Notify the Owner, the Architect and interested parties of testing 72 hours in advance.

D. The system as described shall be installed, tested and delivered to the Owner in fully operational and first-class

condition. The system shall include all required hardware, raceways interconnecting wiring and software to accomplish the requirements of this Contract. The fire alarm equipment supplier will have had ten (10) years previous experience with facility operations and requirements.

- 3.7 LABELING A. Label all new disconnects, starters, motors, furniture feeder boxes, in a manner acceptable to the Architect. Provide
- updated panel schedules in all panelboards within the scope of work. B. All manufacturer's nameplates shall be kept clean and free of paint.
- C. Data/communications wiring done under this Contract shall be recorded on cable management drawings. Each outlet shall be assigned a number which shall be keyed to its punchdown location. D. Provide printed, colored, adhesive labels for all electrical equipment, such as but not limited to panelboards, disconnect switches, etc. to warn qualified personnel of potential electric arc flash hazards. Label shall be a minimum

END OF SECTION

of 4" x 5" and read as follows:

HARRIS &

GREYSTONE COURT WEST 573 H2PMEAD2W STREET PO BºX 95 SIMSBURY, CT 06070-0095

860-651-3777

Consultants

Fax 860-651-7316

chk@chkarch.com

VANZELM HEYWOOD & SHADFORD, INC. 10 TALCOTT NOTCH FARMINGTON, CT 06032 TEL: (860) 284-5064 FAX: (860) 284-5098



Revisions 1 Owner's Review Comments/ Issue for Bid 5/26/16

NO SCALE

Project Number