PART 1 - GENERAL

1.1. SUMMARY

A. The work covered under this Section shall consist of a design, furnishing of all material, labor, and installation for completion of an operable end to end structured cabling system. This includes - but is not limited to - furnishing and installing cable, cable supports, cable ties, innerduct, racks, cabinets, termination components, ancillary equipment, testing, and labeling and documentation of cables and connectors, for a complete end-to-end solution.

B. Refer to the contract documents for locations of Telecom Rooms (TRs), Equipment Room (ER), and telecommunication outlets (TOs). Note that the port and cable count at each TO may vary by location.

C. Complete installation shall comply with the Owner provided latest telecommunication and IT standards documents.

D. It shall be the responsibility of the contractor, to work with the Owner and provide the necessary assistance to make any connections from the owners' outside plant, service provider to establish services which shall ride on the new cabling system. These activities include, but are not limited to patch cords, cross connects, general wiring, documentation, and cable pair identification.

1.2. RELATED DOCUMENTS

A. General and Supplementary Conditions

1.3. RELATED SECTIONS

A. Division 01 – General Conditions

B. Division 07 – Penetration Firestopping

C. Division 26 - Grounding and Bonding

D. Division 26 - Raceway and Boxes

E. Division 26 - Wiring Devices

F. Division 27 - Communications

1.4. ACRONYMS AND DEFINITIONS

A. BICSI: Building Industry Consulting Service International

B. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection

C. EMI: Electromagnetic interference

D. Horizontal Cabling: Cabling between and including the telecommunications outlet/connector and the horizontal cross-connect

E. IDC: Insulation displacement connector

F. LAN: Local area network

G. NRTL: Nationally Recognized Testing Laboratory, an independent agency, with the experience and capability to conduct the testing indicated, as defined by OSHA in 29 CFR 1910.7

H. RCDD: Registered Communications Distribution Designer, a BICSI-certification

I. RMC: Rigid metallic conduit

J. TR: Telecom Room

K. UTP: Unshielded twisted pair

L. Cat. 6A: Augmented Category 6 UTP, as defined by TIA standards

1.5. CONTRACTOR QUALIFICATIONS

A. The contractor shall be a company specializing in the installation of communication cable and accessories with a minimum of five years documented experience on similar systems.

B. Must be a current certified partner of the solutions being furnished and installed in order to meet the requirements for the extended warranty and service programs.

C. Must hold a current communications cabling license within the State the project is taking place and must be verifiable for good standing.

D. Contractor must have a current affiliation with BICSI.

E. Within the project's onsite team, 15% of installers shall hold a BICSI Installer 1 certification, 15% of installers shall also hold a BICSI Installer 2 certification (Both Optical Fiber and Copper). 10% of the team shall hold a BICSI ITS Technician certification and a minimum of (1) team member shall hold a current and valid BICSI RCDD certification.

F. All BICSI certified field installers shall take on roles of Foreman or Team Lead to ensure installations are deemed compliant per codes and standards.

G. Contractor must have satisfactorily completed (3) projects within the past 5 years of similar scope and amount within the same state.

H. The selected Contractor shall provide a Project Manager to act a single point of contact for all activities performed under this section. The Project Manager shall be a Registered Communications Distribution Designer (RCDD). The RCDD shall have a minimum of 3 years experiences in design and installation. The designer must have sufficient experience in this type project(s) as to be able to lend adequate technical support to the field forces during installation, during the warranty period and during any extended warranty periods or maintenance contracts. The Contractor must attach a resume of the responsible designer to the Contractor's submittal for evaluation.

I. The Project Manager, or designee thereof, shall be required to attend project meetings as required until project closeout/signoff.

J. Should the Project Manager assigned to this project change during the installation, the new Project Manager assigned must meet all qualifications stated in this section, and must also submit a resume for review by the Consultant.

K. If, in the opinion of the Consultant, the Project Manager does not possess adequate qualifications to support the project, the Consultant reserves the right to require the Contractor to assign a designer whom, in the Owner's opinion, possesses the necessary skills and experience required of this project.

1.6. REGULATORY REFERENCES

A. ANSI/IEEE C2 - National Electrical Safety Code (NESC)

B. California Electrical Code (CEC)

C. ANSI/TIA-568-C.0 – Generic Telecommunications Cabling for Customer Premises, published February 2009 and all latest addenda derived from ANSI/TIA 568-B

D. ANSI/TIA-568-C.1 – Commercial Building Telecommunications Cabling Standard, published February 2009 and all latest addenda derived from ANSI/568-B

E. ANSI/TIA-568-C.2 – Balanced Twisted Pair Telecommunication Cabling and Components Standard, published August 2009 and all latest addenda derived from ANSI/TIA 568-B

F. ANSI/TIA-568-C.3 – Optical Fiber Cabling Components Standard, published June 2008 and all latest addenda derived from ANSI/TIA 568-B

G. ANSI/TIA/EIA 569-B - Commercial Building Standard for Telecommunications Pathways and Spaces

H. ANSI/TIA-606-B – Administration Standard for Telecommunications Infrastructure, published June 2012 including all latest addenda derived from TIA-606-A

I. ANSI/TIA-607-B – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises

J. ANSI/TIA-758-A Customer Owned Outside Plant Telecommunications Infrastructure Standard

K. IEEE 142 “Green Book”- Recommended Practice for Grounding of Industrial and Commercial Power Systems

L. UL 444 - Standard for Communications Cable

M. Rural Electrification Administration (REA) PE-89 - specification for filled telephone cables with expanded insulation

N. Rural Electrification Administration (REA) PE-39 - specification for filled telephone cables

O. CEC Article 250 for System Grounding

P. CEC Articles 770 and 800 for Cable Listing Requirements

Q. Work performed should additionally comply with and follow guidelines established in the latest edition/revision, as of the date of the Contract Documents, of the following publications:

1. BICSI Telecommunications Distribution Methods Manual (TDMM)
2. BICSI Outside Plant Design Reference Manual (OSPDRM)
3. National Electrical Contractors Association (NECA)/BICSI ANSI/NECA/BICSI-568-2006 Standard for Installing Commercial Building Telecommunications Cabling

R. All materials shall be new and listed by UL and shall bear the UL label. If UL has no published standards for a particular item, then other national independent testing standards shall apply and such items shall bear those labels. Where UL has an applicable system listing and label, the entire system shall be so labeled.

S. Notify Consultant of all material believed to be inadequate, unsuitable, in violation of law, ordinances, rules or regulations of authorities having jurisdiction.

1.7. CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Consultant for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Consultant for a decision before proceeding.

1.8. SUBMITTALS

A. Submittals shall include complete documentation of the system, products and accessories in a single submittal. Incomplete submittals will be returned unreviewed.

B. Prior to the start of work the Contractor shall submit shop drawings in an electronic form. Plans shall be fresh designs by the contractor; they cannot be overlays of the Consultant’s package which are indicative as the contract documents. Shop drawings shall contain:

1. Full size floor plans showing proposed cable routing, wire basket routes, labeling of all outlets, locations of pullboxes.
2. Full size floor plans and elevations of all telecommunication room racks and cabinets; also include all walls with equipment.

3. Elevations shall indicate part numbers and quantities for all equipment.
4. Elevations of all type of outlet faceplates which shall include the configuration for jacks, blanks and the intended outlet labeling schemes.
5. Floor plans shall include all ladder rack or overhead cable distribution hardware within the telecommunications rooms to be installed per manufacturer's instructions.
6. Outside plant manhole and handhole designs coordinated with electrical as well as the site environment.
7. Outside plant conduit arrangement details within ductbank and within the manholes and handholes as necessary.
8. Outside plant conduit ductbank overall routing coordinated with electrical as well as the site environment.
9. All seismic bracing and support details shall be provided in coordination with the general contractor as needed.

C. Submittals shall include faceplates mockups sent to the Consultant for final review. Mockups shall have the manufacturer's cable markings clearly visible. The following are standard items that are to be submitted.

1. Wall mounted outlet complete with faceplate, terminated jacks, blanks, and labeling for all types of outlets in project. Outlet should also contain 24" minimum of the cable proposed for the project.
2. Wireless outlet complete with jacks, blanks, and labeling.
3. Wall phone (stainless steel) outlet.
4. Modular furniture outlet complete with faceplate, jacks, blanks and labeling.
5. Raceway outlet complete with faceplate, bezel, jacks, blanks and labeling.
6. Floorbox outlet complete with faceplate, mounting plate, jacks and labeling.

D. Where applicable, dimensions should be marked in units to match those specified.

E. Work shall not proceed without the consultant's "no exception taken" of the submitted items.

F. Floor plans will be provided to the Contractor in electronic (AutoCAD, ".dwg") formats to be utilized by the contractor in creating complete submittals and as-built documentation. These modified documents shall be provided to the Owner as part of the Record Documents.

G. All submittal documentation shall bear the stamp of a currently verifiable BICSI RCDD.

H. Plans shall be fresh designs by the Contractor; they cannot be overlays of the Consultant's package which is indicative as contract documents.

I. Contractor must submit documentation to support all Contractor Qualifications and Requirements under Section 1.5 which is to include but not limited to the following:

1. End to end solution and partner documentation indicating contractor's staff has gone through proper channels and training support a minimum 25 year warranty and service program by the manufacturers.
2. BICSI affiliations by contractor.
3. BICSI cabling team's RCDD, Installer 1, Installer 2 (Optical Fiber and Copper) and ITS Technician certifications.
4. Current copy of the State contractor's license for Communications Cabling.
5. Documentation of (3) similar projects within the past 5 years in the same State.

J. Contractor shall include data sheets and literature of test equipment to be used for fiber and copper cabling and components.

1.9. MANUFACTURER CERTIFIED WARRANTY

A. The manufacturer shall be a company specializing in communication cable and/or accessories with a minimum of five years documented experience in producing cable and/or accessories similar to those specified below.

B. The system shall be comprised of components from a single manufacturer or a combination of manufacturers entering into a partnering agreement that allows for a warranty of the system.

C. System warranty program documents must be from that of the cabling and component manufacturer and associated partners. Cabling and component warranty programs offered by the contractor alone are not acceptable.

D. The warranty period shall be for not less than 25 years and warranty the cabling system and components will perform to the stated specifications for the warranty period.

1.10. QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

B. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

C. Requirement for specialists shall not supersede building codes and regulations governing the Work.

D. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material and design.

1.11. QUALITY CONTROL

A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

C. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work.

D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1.12. OWNER STANDARDS

A. Work performed should additionally comply with Owner Standards.

PART 2 - PRODUCTS

2.1. NOT USED

PART 3 - EXECUTION

3.1. GENERAL

A. Contractor shall follow standard industry installation practices as described in the latest release of the BICSI TDMM.

B. Contractor shall be responsible for identifying and reporting to the Site Coordinator(s) any existing damage to walls, flooring, tiles and furnishings in the work area prior to start of work. All damage to interior spaces caused by the installation of cable, pathways or other hardware must be repaired by the Contractor. Repairs must match preexisting color and finish of walls, floors and ceilings. Any contractor-damaged ceiling tiles are to be replaced to match color, size, style and texture.

C. The installation shall be supervised on site by a BICSI certified installer.

D. The contractor shall have on staff a BICSI certified RCDD. RCDD certification shall be current and each submittal shall bear the stamp of the RCDD.

E. Outlets shall be mounted flush on a wall-mounted box, on Surface Raceway and in Modular Furniture. Information Outlet locations are identified on Project Drawings.

F. Avoid abrasion and other damage to cables during installation. Any cable damaged during installation shall be removed and a new cable installed.

G. Cables shall be a continuous run. No in-line splices are permitted except were explicitly indicated on the drawings.

3.2. DELIVERY AND STORAGE

A. Receive, handle, and store telecommunications system items and materials at the project site. Materials and items shall be so placed that they are protected from damage and deterioration.

3.3. INSTALLATION

A. The drawings for work under Division 27 Sections related to communication systems are diagrammatic and are intended to convey the scope of work and indicate the general arrangement of conduit, boxes, equipment, termination hardware, fixtures and other work included in the Contract.

B. The Contractor shall verify all dimensions and clearances before procuring any equipment.

C. Location of items required by the drawings or specifications not definitely fixed by dimensions are approximate only and exact locations necessary to secure the best conditions and results shall be determined at the site and shall be subject to the approval of the Architect/Telecom Design Engineer.

D. Follow drawings in laying out work, check drawings of other trades to verify spaces in which work will be installed, and maintain maximum headroom and space conditions at all points.

1. Where space conditions appear inadequate, the Architect/Telecom Design Engineer shall be notified before proceeding with installation.
2. Minor conduit and cable tray rerouting and changes shall be made at no additional cost to the Owner.
3. As necessary, adjust elevations of rack-mounted termination hardware and horizontal wire management panels so as to compensate for rack unit sizes of actual hardware used, as compared to hardware rack unit sizes depicted in Contract Drawings.

E. Perform all work with skilled mechanics of the particular trade involved in a neat and workmanlike manner.

F. Perform all work in cooperation and coordination with other trades and schedule.

G. Furnish other trades advance information on locations and sizes of frames, boxes, sleeves and openings needed for the work, routes for conduit and cable tray raceway, and also furnish information and shop drawings necessary to permit trades affected to install their work properly and without delay.

H. Where there is evidence that work of one trade will interfere with the work of other trades, all trades shall assist in working out space allocations to make satisfactory adjustments and shall be prepared to submit and revise coordinated shop drawings.

I. With the approval of the Architect/Consultant and without additional cost to the Owner, make minor modifications in the work as required by structural interferences, by interferences with work of other trades or for proper execution of the work.

J. Work installed before coordinating with other trades so as to cause interference with the work of such other trades shall be changed to correct such condition without additional cost to the Owner and as directed by the Architect.

K. Minor changes in the locations of outlets, fixtures and equipment shall be made prior to rough in at the direction of the Architect/Consultant and at no additional cost to the Owner.

L. Contractor shall cooperate with other trades and coordinate work so that conflicts with other work are eliminated.

M. Equipment shall be installed with adequate space allowed for removal, repair or changes to equipment. Ready accessibility to removable parts of equipment and to wiring shall be provided without moving other equipment which is to be installed or which is in place. Contractor shall verify measurements. Discrepancies shall be brought to the Architect/Telecom Design Engineer's attention for interpretation.

N. Determine temporary openings in the buildings that will be required for the admission of apparatus furnished under this Division, and notify the Architect/Consultant accordingly. In the event of failure to give sufficient notice in time to arrange for these openings during construction, assume all costs of providing such openings thereafter.

O. Location of telecommunication outlets and raceway pathways are approximate and exact locations shall be determined on site.

P. Contractor shall refer to contract documents for details, reflected ceiling plans, and large scale drawings.

3.4. COORDINATION

A. The Contractor shall be responsible for the coordination of telecommunications work with the work of all other trades and shall, in preparing the drawings, check the work of other trades in order to avoid possible installation conflicts arising therefrom. It shall be understood that the work shown on the shop drawings has been so coordinated. In the event of conflicts or interference that cannot be resolved in the field, the Contractor shall request a written clarification from the Architect/Consultant.

B. Coordinate service entrance arrangement with local exchange carrier(s).

1. Meet jointly with local exchange carrier representatives and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
2. Record agreements reached in meetings and distribute to other participants.
3. Adjust arrangements and locations of distribution frames and cross-connect and patch panels in equipment rooms and wiring closets to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.

C. Where work covered by this Section connects to equipment furnished under other Sections, verify telecommunications work involved in the field and make proper connection to such equipment.

END OF SECTION