E-RATE CABLING PROJECT — FUNDING YEAR 2027

GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

1018 C Street #210, Galt, CA 95632

TECHNICAL SPECIFICATIONS

1. PROJECT OVERVIEW AND E-RATE REQUIREMENTS

This project is procured by the Galt Joint Union Elementary School District under the California Uniform Public Construction Cost Accounting Act, Public Contract Code sections 22000 et seq., using formal bidding procedures. These Technical Specifications are the adopted specifications for the project and are subject to the Instructions to Service Providers and to the Notice to Contractors. The scope of work, the site, the schedule, and the equipment to be furnished by the District are stated in the Notice to Contractors, which controls. The project is a public works project, and the Service Provider and all subcontractors shall comply with applicable California prevailing wage, DIR registration, certified payroll, and apprenticeship requirements in addition to all E-Rate requirements. To bid on this project, a Service Provider must satisfy both the USAC E-Rate requirements and the CUPCCAA requirements; satisfying one does not excuse the other.

- The Service Provider shall provide all materials, labor, tools, and services to install and test the complete network wiring as shown on the school maps, noted during the walkthrough, and specified in this Technical Specification. The District or its designated representative may observe installation and testing to verify compliance with the project specifications. All work shall comply with Articles 300 and 800, and Title 24 of the California Code of Regulations and all other laws, codes, and regulations. All floor and wall penetrations shall be properly firestopped in accordance with applicable code requirements.
- The scope shall include the cabling, fiber interconnect equipment, connectors, jumpers, surface mount raceway, wiring blocks, telecommunications outlets, and associated materials and equipment described in the Notice to Contractors and in these Technical Specifications. Network switches and UPS units shall be furnished by the District and installed by the Service Provider as required by the project scope. All fiber strands shall be terminated with connectors and landed on the fiber interconnect equipment. All copper station cables shall be terminated on patch panels (IDF end) and data communications outlets (workstation end).
- All labor, materials, and adjustments reasonably necessary to complete the work within the original scope shall be included in the bid price at no additional cost to the District.
- The Service Provider shall comply with applicable Disabled Veteran Business Enterprise (DVBE) participation requirements, including the District's participation goal and the DVBE documentation required before final payment, as stated in the Notice to Contractors, the Instructions to Service Providers, and the Galt Competitive Bidding Packet.
- The District reserves the right to require reasonable adjustments to the locations of exposed items to accommodate existing conditions, improve functionality, or maintain an orderly installation, provided such adjustments remain within the original scope of work.
- Except where shown in dimensional detail the locations of cable routes, receptacles, outlets, and other equipment shown on plans are approximate. Such items shall be placed to eliminate interference with ducts, piping and equipment, the exact locations shall be determined at the commencement of work.
- Any differences or contradictions within these specifications and the contract drawings shall be brought to the attention of the district project manager prior to commencing work.
- The Service Provider shall include all materials and components reasonably necessary to complete the work specified in this Technical Specification. Any additional work or materials outside the original scope shall require prior written approval from the District through the change order process.
- The service provider shall coordinate all work activities with the District and comply with all District site access, security, safety, scheduling, and operational requirements communicated before or during the project.

2. CABLING SPECIFICATIONS FOR DATA

References to specific manufacturers, products, or part numbers are intended to establish the required quality, performance, and compatibility standards. Equivalent products that meet or exceed the specified requirements will be

considered in accordance with E-Rate rules and applicable procurement requirements. The specified cabling system is a single manufacturer-certified end-to-end channel; where the Service Provider proposes an equivalent, the proposed cable, jacks, patch panels, and terminations must themselves constitute a single manufacturer-certified channel capable of supporting the twenty-five (25) year system warranty required by Section 12. Service Providers proposing equivalent products shall provide sufficient manufacturer documentation to demonstrate compliance with the specifications, and the proposed equivalent shall be submitted through the District's substitution and submittal procedures in the Contract Documents before installation, subject to the District's written approval.

- The work shall include, but not be limited to the following objectives:
- Installation of a new Category 6A UTP as required by the drawings or the scope of work. Category 6A terminations will be EIA/TIA standard T568B pin/pair assignment wiring configuration into 8-position, 8-wire/4 pair universal RJ45 jacks.
- All cables shall be installed with service loops at ground boxes and MDF/IDF locations only.
- Data/VOIP/Access Control: Cable shall be a 4-pair 24 AWG Category 6A, plenum-rated, blue jacket, and shall test at 10Gbps. Jacks shall be Category 6A and shall match the faceplate and patch panel system.
- Category 6A patch panels shall be modular type consistent with the installed jack system.
- All terminations into patch panel for connection to switches using Service Provider supplied patch cords. For each data cable installed, the Service Provider shall supply one (1) 1’ Category 6A patch cord for the patch panel location using matching color. Service Provider to install patch cords from patch-panel to switches.
- Terminate all strands of fiber at each rack or wall mounted fiber enclosure. All cables shall be installed with service loops at ground boxes and MDF/IDF locations only. Fiber will be terminated using LC type connectors.
- Single Mode fiber optic cable, where used, shall be tight buffered, 8.3/125 microns. No composite cable shall be used.
- Multimode Fiber optic cable shall be tight buffered, 50/125 microns OM4. No composite cable shall be used.
- Fiber Optic connectors shall be LC type and compatible with the installed single-mode or multimode fiber, fiber enclosures, and adapter panels.
- Fiber enclosures shall be mounted at the top of the cabinet/rack.
- The fiber enclosures for the MDF shall be rack mountable with the applicable number of LC duplex port connector outlets for termination of all fiber runs. The fiber enclosure for the MDF shall be sized such that the initial installation does not exceed 60% of its capacity. The MDF fiber enclosure shall be a 72 port 19" rack mount unit, or equivalent, loaded with the appropriate number of six strand fiber adapter panels. The number of fiber runs and strands shall be as stated in the Notice to Contractors and the project scope of work, and shall be not fewer than six (6) strands per run.
- The fiber enclosures for the IDF shall be rack mountable with the applicable number of LC port connector outlets for termination of all fiber runs. The number of fiber runs and strands shall be as stated in the Notice to Contractors and the project scope of work, and shall be not fewer than six (6) strands per run. The fiber enclosure for the IDF shall be sized such that the initial installation does not exceed 60% of its capacity. The IDF fiber enclosures shall be either the 72 port unit listed above, or the 54 port, 19" rack mounted unit, or equivalent, loaded with the appropriate number of six strand fiber adapter panels.
- Fiber patch cords shall match the installed fiber type and connector configuration. Lengths and quantities shall be sufficient for the approved rack layouts and equipment connections.
- All copper and fiber optic cabling shall be tested and certified in accordance with Sections 6, 8, 9, and 14 of these Technical Specifications.
- Furnish and install a data cabinet or rack, fiber patch panel, copper patch panel, and cable management hardware at each MDF/IDF as required by the drawings or scope of work. The Service Provider shall install District-furnished switches and UPS units in the completed cabinets or racks as specified. The Service Provider shall coordinate rack layouts and equipment placement with the District's Project Manager.
- The Service Provider shall notify the District in writing at least two (2) weeks before the scheduled installation of District-furnished switches and UPS units to allow for equipment delivery and coordination.
- Set up a complete wire management system at each MDF/IDF, this includes wire management organizer(s). Service Provider shall provide one horizontal wire manager for each new category 6A patch panel and one horizontal wire manager for each switch installed.

3. LOW VOLTAGE ENCLOSURES AND PATHWAYS

- Single channel surface raceway will be Wiremold or equivalent 800 or 2300 series depending on fill ratio. All fittings made for an intended purpose of installation by the manufacturer shall be included as part of this material.
- Multichannel surface raceway will be Wiremold or equivalent 2300D, 5400, or 5500 series depending on fill ratio. All fittings made for an intended purpose of installation by the manufacturer shall be included as part of this material.
- Mounting hardware and anchors recommended by the Manufacturer of any material that shall be mounted to the building or structure.
- Sheetrock/drywall/wall board: Easy Anchor, toggle bolt, other spread type anchor with load distribution, or approved equal.
- Concrete/cinder block/solid masonry: expanding compression type lag, expanding compression type bolt, expanding compression type all thread with nuts, or approved equal.
    - Tile/Stucco/hollow masonry: toggle bolts or approved equal.
    - Wood: lags, wood screws, or approved equal.
    - Metal: clamp or approved equal.
- Surface Mount Boxes for single channel raceway will be Wiremold or equivalent 2344 or 2344-2. Surface mount boxes for 2300D series dual channel raceway will be 2300SD-2A.
- Cover plates will be Panduit or equivalent with four ports (minimum). Blanks will be used to cover any unused ports.
- Wiremold or equivalent 5500 faceplates shall be 5507FRJ, Color to match existing or new installed raceway.
- Power and Communication poles will be Panduit or equivalent with the following power accessories included:
    - (2) Standard Faceplate Bracket for low voltage
- Definitions:
- A rack is defined as a sideless, bottomless, topless open-framed support structure for equipment. A rack may be mounted to a wall, ceiling, or to a floor depending on type, size, and District requirements.
- A cabinet is defined as an enclosed equipment support structure. A cabinet may be mounted to a wall, or to a floor depending on type, size, and District requirements.
- All cabinets and swingable racks must be able to open fully with no cable tension, or obstructions.
- Nomenclature:
- IDF cabinets are cabinets/racks specified for intermediate distribution frames, typically at the head of a wing and feed one or more classrooms.
- MDF cabinets are cabinets/racks specified for main distribution frames.
- All equipment shall be mounted with Phillips screws, unless otherwise specified.
- Wire management will be Panduit or equivalent Horizontal Cable Management System.
- All wiring shall be installed in accordance with the drawings, specifications, and equipment manufacturer's wiring diagrams. The Service Provider shall follow the manufacturer's engineering, installation, and testing procedures and use authorized manufacturer components and distribution channels. Proof that the installing firm is accredited by the manufacturer of the approved system must be provided. If any discrepancies or variations are identified, the Service Provider shall notify the District's Representative before making any changes. The Service Provider shall be responsible for ensuring the completed system operates in accordance with the plans and specifications.
- Splices of conductors in underground pull boxes are not permitted.
- The labor employed by the Service Provider shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the District’s Representative to engage in the installation and service of this system.
- The Service Provider shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., The Service Provider shall remove all debris and rubbish occasioned by the electronic systems work from the site. The Service Provider shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., caused by the performance of this work.

- Qualified technicians shall perform all cabling installations.
- Copper station cabling shall be installed without splices. Fiber optic splicing shall be permitted only where specifically identified in the approved project scope or drawings.
- In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a special tool.
- Under no circumstance are “channel locks” or other pliers to be used.
- Plenum rated cable may be run exposed above ceilings, provided the cabling is supported independent of other utilities such as conduits, pipes, and the ceiling support systems. The cable shall not be laid directly on the ceiling panels. The use of cable ties shall be done in accordance with the cable manufacturer’s requirements. The cable jacket composition must meet local and all other prevailing fire and safety codes.
- All firewalls penetrated by structured cabling shall be sealed by use of a non-permanent fire blanket or other method in compliance with the current edition of national Fire Protection Association (NFPA) and the National Electric Code (NEC) or other prevailing code. The Service Provider must not use concrete or other non-removable substance for fire stopping on cable trays, wire ways, or conduits.
- Conduits: All backbone cabling will run through dedicated conduits. All new conduits are to be supplied with a pull string. Service Provider shall supply pull string and pull rope for the installation of all cables in existing conduits. For all conduits left with available capacity, Service Provider shall replace pull strings with ¼-inch pull rope during the course of their work. Service Provider must seal all conduits with an approved sealing compound.
- Cabling and Termination Identifications: All new cabling shall be of the type specified herein. Any conflicts between cabling types specified and code or design requirements shall be submitted to District’s Representative for review and final disposition. All cabling shall be neatly laced, dressed, and adequately supported. Cabling must be concealed to the fullest extent possible. In addition, a numbering and marking scheme must be used to identify all cable and cabling terminations. All cables, regardless of length, shall be marked and/or numbered at both ends. Marking codes and methodologies shall correspond to the instructions in this specification.
- Seismic Requirements: Service Provider will install all equipment racks, equipment cabinet enclosures, cable runways, etc., according to the local, state and/or federal code. Service Provider will notify District’s Representative of such requirements and shall provide such bracing as required.
- District or District’s Representative may observe work or testing in progress to verify compliance with the project specifications and installation requirements.

5. CABLE ROUTING

- The cables will be routed to their respective Main Distribution Frame (MDF) or Intermediate Distribution Frame (IDF) or to service drop utilizing the shortest path possible.
- Cabling shall not be exposed in occupied or finished areas unless specifically approved by the District. Cabling installed above accessible ceilings shall be properly supported and protected in accordance with applicable codes, manufacturer requirements, and these specifications.
- Cables shall be protected and sleeved with a conduit in locations where cables need to pass through walls, floors, or hard ceilings. Service Provider shall install threaded IMC or rigid conduit with large fender washers, lock rings, and screw on protective bushings on both ends. The fire rating of the wall must be maintained during and after installation.
- At solid wall location such as plaster, brick, concrete, cinder block, tile, reinforced concrete, Service Provider will provide and install surface mounted non-metallic raceways or equivalent. The use of different series raceways is required at locations where cable fill capacities are exceeded.
- Terminations on block walls will be accomplished with District approved surface mount boxes.
- Cables will be run vertically inside the wall and into the ceiling space. Terminations on stud walls will be accomplished with cut-in type electrical boxes with a 1” conduit (flex or EMT) extended from the box within the wall to ceiling access space.
- Service loops:
- Fiber:
    - Shall be a minimum of 10’ at all MDF and IDF.

  - Shall be a minimum of 6’ at all ground box locations that allow for the minimum bend radius specified by the manufacturer.
- Category 6A (DATA/VOIP/IP CAMERAS/ACCESS CONTROL/PA SYSTEMS)
  - Shall be a minimum of 6’ at all MDF and IDF.
  - Shall be a minimum of 6’ at all ground box locations that allow for the minimum bend radius specified by the manufacturer.
- Cables shall be run in corridors wherever possible in order to avoid furniture and work areas so that access to the cables is unencumbered.
- The cables are to be as accessible as possible, placed above all other items in the ceiling, including ducts and supports.
- Do not use pulling means, including fish tape, cable, or rope, which can damage the Wiremold or equivalent raceway.
- Any pulling lubricant used shall be approved by the cable manufacturer and shall not damage or deteriorate the cable or conduit.
- Cables shall not be pulled across sharp edges. If sharp edges are present a small sleeve, insulation or grommet shall be installed to protect the cable.
- Cables shall be pulled free of sharp bends or kinks.
- Cables shall not be forced or jammed between metal parts, assemblies, etc.
- Cables shall not be pulled across access doors and pull box covers. Access to all equipment and systems shall be maintained.
- Manufacturer’s specifications for pulling stress and minimum bend radius shall not be exceeded on any cable.
- Do not use staples or drive rings.

6. CABLE INSTALLATION PARAMETERS

- Service Provider is required to adhere to the following parameters in this section whether or not existing equipment has been placed by Service Provider and/or others.
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- UTP Testing:
  - All Category 6A copper cabling shall be tested and certified after installation in accordance with the applicable ANSI/TIA standards and the acceptance requirements in Section 8.
  - UTP cable shall meet or exceed the applicable Category 6A performance requirements for 10 Gbps data transmission.
  - All UTP testing equipment shall have current calibration certification.
- Fiber cable will be multimode 50/125-micron OM4 unless single-mode cable is specifically stated in the project scope. The number of runs and strands shall be as stated in the Notice to Contractors and the project scope of work, and shall be not fewer than six (6) strands per run. Service Provider will provide a specification sheet for the cable they will be using on each job.
  - Fiber cable will be single mode 8.3/125 micron or multimode 50/125-micron OM4. The number of strands shall be as stated in the project plans and scope of work for each site, and shall be not fewer than six (6) strands per run. Service Provider will provide a specification sheet for the cable they will be using on each job.
- Fiber Optics Connectors:
  - Fiber optic connectors shall be compatible with the approved fiber enclosures, adapter panels, patch cords, and installed fiber type, as specified in the project scope and approved equipment requirements.
- Fiber Optics Cable Installation and Testing:
  - All spare optical ports and connectors shall have a dust cap in place to protect from the environment.
- Service Provider shall provide and install blanks in unused spaces of the fiber enclosure.

- If fiber is supplied to Service Provider by the District, it shall be tested before installation, while still on the shipping reel, using an optical time domain reflectometer (OTDR).
- The test results shall be compared to the manufacturers' test results. A discrepancy of more than 1 dB on any fiber in either window indicates possible shipping damage, and the fiber shall be returned to the supplier.
- The test results shall be maintained in a file for future reference.
- All installed fiber optic strands shall receive Tier 1 loss testing using an optical light source and power meter at the applicable wavelengths for the installed fiber type. OTDR traces shall also be provided for all installed strands. Testing shall follow applicable ANSI/TIA standards and the manufacturer's requirements. All results shall be identified using the District's approved labeling scheme and submitted in accordance with Sections 8 and 11. Failed links shall be repaired and retested at no additional cost to the District.
- Where pre-installation test results are available, the Service Provider shall compare them with the final installation test results and identify any significant discrepancies.
- All optical test equipment shall have current, traceable calibration certification.
- All installed fiber optic links shall meet the applicable ANSI/TIA performance and attenuation requirements for the installed fiber type and intended application. The Service Provider shall calculate the allowable optical loss budget for each link based on the fiber type, installed length, number of connectors and approved splices, and applicable manufacturer specifications. Measured loss shall not exceed the calculated allowable loss budget. The Service Provider shall provide the loss budget calculations and corresponding test results to the District as part of the required closeout documentation.
- Aerial fiber cable mounting hardware shall be compatible with the specified All-Dielectric Self-Supporting (ADSS) fiber cable and installed in accordance with the cable and mounting hardware manufacturers' specifications.
- Install or replace pull-string after installing cable in any EMT, IMC, Rigid or PVC conduits.
- A maximum fill capacity of 40% for conduits and 75% for raceways and surface molding shall be permitted. The Service Provider shall notify the District or its designated representative in writing if these limits cannot be met. If the Service Provider fails to provide written notification, any labor required to reroute cables to meet these requirements shall be the sole responsibility of the Service Provider, at no additional cost to the District.
- Cable shall be identified with a machine-printed tag identifying the system type in all access points (i.e., junction boxes, ground boxes, MDF, IDF's, etc.) and as they enter or exit the conduit pathway.
- Service Provider will assess whether or not the ceiling space is a plenum air return which shall dictate the use of the listed plenum type or PVC type cable required in the materials specification section. Any cable installations that shall be pulled through underground conduit will require Outside Plant (OSP) cable.
- All cabling shall be installed with proper stress relief and tied down.
- Manufacturers' specification for pulling stress and minimum bend radius shall not be exceeded on any fiber optic, data, analog, CATV, CCTV, IP Cameras, PA, or any other cable.
- Power feeds of greater than 220 volts shall not be run parallel to the UTP cables. Parallel runs of greater than twenty feet require a minimum separation distance of three feet, or eighteen inches if cables are contained in a metallic conduit, which is grounded.
- Multiple conduit runs of 110 volts power distribution shall not be run parallel to the UTP cables. Parallel runs of greater than twenty feet require a minimum separation distance of eighteen inches.
- All power feeds crossing the path of the UTP cables at right angles shall be a minimum of six inches in distance from the UTP cables.
- A minimum separation of eighteen (18) inches shall be maintained between cabling and fluorescent light fixtures. The Service Provider shall notify the District or its designated representative in writing if this requirement cannot be met.
- All cabling shall maintain a minimum separation of thirty (30) inches from heat sources, including HVAC ducting, steam valves, and other equipment producing excessive heat.
- Fiber Optic cables shall be identified with a tag as to the system and date, every thirty feet when installed in open trays or suspension systems in ceilings.
- Station Cable (UTP) or STP runs are not to exceed 295 feet for data.
- Splicing of UTP or STP station cabling is not permitted. Fiber optic splicing shall be permitted only where specifically identified in the approved project scope or drawings.
- Cables shall be securely supported to building structure (i.e., stud, beam, or other framing member) within twelve inches of any conduit or raceway entrance.

- Service Provider will place all station cables in the ceiling area on Service Provider supplied and installed wire hangers or in floor spaces and raceways.
- Insulation shall be removed to expose shielding and conductors/fibers to the exact length required by manufacturer for proper termination of plugs, pins, and fiber terminations.
- Wires and shielding shall not be nicked or damaged in any way upon termination of pins and closure of plug assembly.
- Pins and plugs, upon termination, shall not be damaged in any way.

7. LABELING AND IDENTIFICATION

- All cable plant labeling and administration documentation shall conform to ANSI/TIA/EIA 606 Administration Standard.
- The cables within the rack or cabinets shall be numbered for identification.
- Label media shall be black typeface on white tape. Tape material shall be ½" wide.
- Components shall be marked where they are administrated (label at all punch down points, panels, blocks, outlets, etc.).
- Industry standard color fields should be used where applicable as described in the Standards.
- All pathways labeled (conduit, trays, etc.).
- UTP Labeling:
  - Wiring termination locations shall be labeled to corresponding pairs at the MDF/IDF and at each workstation end.
  - Cables shall be labeled no more than 3" back from each end of the termination point with a cable label that matches the faceplate labeling.
  - Service Provider will provide tags, straps, and adhesive labels. These tags, straps and adhesive labels shall be of high quality that will endure over time.
  - Handwritten labels are not acceptable.
  - Each drop shall have a unique label throughout the site. This would allow a cable management system to track each cable pair.
- Labeling Scheme:

  The District's approved labeling scheme shall take precedence over the examples in this section. The Service Provider shall confirm the required labeling scheme with the District before installation.
- Workstation Labeling:
  - The faceplate or surface block shall be labeled with the IDF # where the cable sources from, the Room # the cable terminates in, and the sequential workstation number (ex. B10(IDF)-B2(RJ45 jack)-09(Workstation number). Each room shall have a sequential workstation number starting with the number 01 (ex. B10-B2-01 through B10-B2-10 and B10-B3-01 through B10-B3-10). The labeling itself shall be in a white background with black lettering.
  - Closet Labeling:
- Patch panel shall be labeled with the Room # the cable terminates in (RJ45 jack) and sequential workstation number only. The labeling itself shall be in a black background with white lettering.
  - Data Fiber Optics Labeling:
- Fiber termination locations shall be labeled to corresponding fiber strands pairs at the MDF or IDF.
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  - Service Provider is expected to provide tags, straps, and adhesive labels. These tags, straps and adhesive labels shall be of high quality that will endure over time.
  - Handwritten labels are not acceptable.
  - Each drop shall have a unique label throughout the site. This would allow a cable management system to track each cable.
  - Fiber optic cables shall be labeled approximately twelve inches back from the point where the cable enters the fiber enclosure, with a cable label that identifies the origin and destination of the cable. This requirement applies to fiber optic cabling only. Copper station cabling shall be labeled

in accordance with the three-inch maximum distance stated in Section 6. Where these two requirements appear to conflict at a location serving both media, the Service Provider shall confirm the required labeling location with the District before installation.

  - Closet labeling: each connection shall be labeled denoting each strand's color, origin, and destination with name of room or wing.
  - The type (single-mode or multi-mode) of fiber optic cable used shall be clearly labeled on the fiber patch panel per drawn details.
  - Color-coding shall conform to EIA/TIA specifications.

The Service Provider is responsible for supplying all test equipment required to conduct acceptance testing. Copper certification testing shall be performed with a Fluke DSX-8000 or an equivalent tester, as stated in the Notice to Contractors.

- The Service Provider is responsible for supplying all test equipment required to conduct acceptance testing.
- The District reserves the right to be present during any or all testing.
- All cabling not tested in accordance with the required procedures shall be retested at no additional cost to the District.
- One hundred percent (100%) of installed cabling must be tested and meet the applicable acceptance requirements.
- All test reports shall be provided in accordance with Section 11, Documentation and Drawings. Test results shall identify each cable or fiber strand in accordance with the District's approved labeling scheme.
- Test reports shall include the following information for each applicable cabling element tested:
  - Wire map results confirming end-to-end connectivity and identifying any shorts, opens, miswires, split pairs, reversed pairs, or crossed pairs.
  - For Category 6A copper cabling, certification results in accordance with applicable ANSI/TIA standards, including insertion loss, NEXT, PSNEXT, return loss, ACR-F, PSACR-F, and other required performance parameters.
  - Cable length, propagation delay, and delay skew, with applicable limits and pass/fail results.
  - Cable manufacturer, model/type, and nominal velocity of propagation (NVP), where applicable.
  - Tester manufacturer, model, serial number, and software version.
  - Circuit identification number and project name.
  - Test standard and specification used.
  - Overall pass/fail results.
  - Date of testing.
- Fiber optic test reports shall include the required loss and certification results for the installed fiber type, including Tier 1 loss testing and OTDR traces, as specified in Section 6.
- Electronic test reports shall be accompanied by a certification signed by an authorized representative of the Service Provider confirming the accuracy of the submitted results. Circuit identification numbers must match the electronic test records and the District's approved labeling scheme.

9. TEST EQUIPMENT

- The Service Provider shall follow the manufacturer's engineering, installation, and testing procedures and use authorized components and distribution channels as required for the specified cabling system.
- Copper cable certification equipment shall be capable of testing Category 6A cabling, shall be a Fluke DSX-8000 or an equivalent tester as stated in the Notice to Contractors, and shall meet ANSI/TIA-1152-A Level IIIe accuracy requirements or higher.
- Copper cable certification equipment shall be capable of testing Category 6A cabling and meet ANSI/TIA-1152-A Level IIIe accuracy requirements or higher.
- Fiber optic test equipment shall be capable of performing the required Tier 1 loss testing and OTDR testing for the specified single-mode or multimode fiber.
- All testing equipment shall have current calibration in accordance with the manufacturer's requirements. Calibration documentation shall be provided upon request.

- Test adapters and accessories shall be compatible with the equipment and approved by the test equipment manufacturer.
- Test equipment shall be capable of measuring and recording all performance parameters required by the applicable cabling standards and Section 8, Testing of the Cabling Plant.
- Test equipment shall be capable of storing and exporting complete test results electronically, including cable identification, measurements, and pass/fail results.
- All testing shall be performed using the appropriate settings, test limits, and procedures for the installed cabling system.

10. MDF/IDF INSTALLATION PARAMETERS

- UTP cabling shall maintain a separation of not less than six (6) feet from main power panels, switchgear, and starter motors adjacent to the MDF, IDF, CIDF, and termination locations. This requirement is separate from, and is applied in addition to, the separation requirements of Section 6 for fluorescent fixtures, heat sources, and parallel power runs. Where a location is subject to more than one separation requirement, the greater separation applies unless the District approves a lesser separation in writing.

- All racks and cabinets shall be anchored to walls or floors in accordance with manufacturer specifications and approved drawings and shall be properly bonded and grounded in accordance with applicable code requirements.
- All floor mounted racks and cabinets shall have ladder racking from top of rack or cabinet to nearest wall as directed by the District.
- Backboards for wall-mounted racks and cabinets shall be made of fire-retardant or treated materials. Outside backboards shall be mounted squarely cut, with sanded edges, void free and painted. Backboards made from particle or pressed board materials are not acceptable. Backboards shall be a minimum size of ¾” thick x 36” wide x the height of the rack or cabinet. Backboard shall be painted with white fire-retardant paint.
- Inside backboards shall be mounted squarely cut, with sanded edges and void free. Inside backboard shall match the inside dimensions of the installed cabinet. Inside backboard shall be a minimum thickness of ¾”.
- All new racks and cabinets shall be securely mounted to wall studs in accordance with manufacturer specifications and drawn details.
- All new and existing racks and cabinets shall have a dedicated electrical outlet installed where specified in the project scope or drawings. Electrical work shall comply with the applicable California Electrical Code (Title 24, Part 3) and be performed by a properly licensed contractor.

11. DOCUMENTATION AND DRAWINGS

As a condition of final acceptance, the Service Provider shall provide one complete Cable Book containing the following documentation:

- Project title and table of contents.
- Final as-built site drawings showing:
  - Exact MDF/IDF locations.
  - Size and routing of backbone cabling between MDF and IDF locations.
  - Station locations and labeling identification numbers matching the installed cabling.
  - New pathways, conduits, ground boxes, junction boxes, raceways, power poles, and floor monuments.
  - Locations of additional cabling installed for future use.
  - Any other changes made during installation.
- Fiber backbone test results organized by IDF number.
- Copper cable certification test results organized by IDF and drop number.
- Manufacturer and workmanship warranty certificates and documentation.
- Service Provider contact information and applicable rates for emergency or non-warranty service.

As-built drawings shall be professionally prepared, to scale, and reproducible. Handwritten drawings are not acceptable.

The Service Provider shall provide one printed copy of the complete Cable Book and an electronic copy, including as-built drawings in Visio format and all required test results. Electronic documentation shall be provided in an organized, searchable format on a USB drive or through another District-approved method. Test results shall identify each cable or fiber strand in accordance with the District's approved labeling scheme.

All documentation must be submitted to the District before final acceptance and final payment.

12. WARRANTY AND SUPPORT SERVICE

- Warranty Effective Date: All warranties required under this section shall commence upon the District's final written acceptance of the completed project, except where the manufacturer's warranty terms provide otherwise.
- Manufacturer Warranty: All equipment, cabling, and components furnished by the Service Provider shall be covered by the applicable manufacturer’s warranties. Where a manufacturer-certified structured cabling system is specified, the Service Provider shall provide the manufacturer's extended system warranty, including performance and application assurance, for a minimum of twenty-five (25) years. The installed Category 6A cabling system shall meet applicable standards supporting 10 Gbps performance. The Service Provider shall complete all manufacturer registration and certification requirements and provide warranty documentation to the District before final acceptance.
- Contractor Workmanship Warranty: The Service Provider shall warrant all installation workmanship and Service Provider-furnished materials against defects for a period of two (2) years from final written acceptance. Defects resulting from improper installation, defective materials, or failure to comply with approved specifications shall be corrected at no additional cost to the District.
- Warranty Repairs: The Service Provider shall acknowledge warranty-related service requests within one (1) business day and coordinate corrective action with the District. Deficiencies affecting the operation of the installed cabling system shall be addressed promptly. All repairs shall be performed by qualified personnel and shall include any necessary testing and documentation to verify that the affected cabling meets the required performance standards.
- District-Furnished Equipment: The Service Provider shall be responsible for proper installation and handling of District-furnished switches, UPS units, and other equipment included in the approved project scope. Manufacturer warranties for District-furnished equipment shall remain the responsibility of the District. The Service Provider shall be responsible for damage caused by improper handling or installation.
- Additional Services: Maintenance, repairs, or support services outside the required warranty obligations shall not be included unless specifically identified in the project scope or separately authorized by the District. Any such services shall be separately priced and performed in accordance with applicable procurement and E-Rate requirements.
- Warranty Documentation: Before final acceptance, the Service Provider shall provide all applicable manufacturer warranty certificates, system registrations, contractor warranty information, and contact information for requesting warranty service.

13. FINAL ACCEPTANCE

- The District or its representative may inspect the work during installation to verify compliance with the project specifications and installation requirements.
- Upon completion of the installation, the Service Provider shall notify the District in writing that the project is ready for final review. The District or its representative will conduct a final inspection within one week of notification.
- All required testing, labeling, cleanup, and closeout documentation identified in Section 11 must be completed and submitted before the final review.
- The District will review the installation, certification test results, and closeout documentation before granting final acceptance.

- The District reserves the right to independently test any portion of the installation to verify the certification results. If substantial discrepancies are found, the District may require independent testing of the entire installation at the Service Provider's expense, to the extent permitted by the contract and applicable law.
- Any deficiencies, failed tests, or required repairs identified during the final review shall be corrected and retested by the Service Provider at no additional cost to the District within ten (10) days of notification, unless otherwise approved in writing by the District.
- Final acceptance will be issued in writing by the District upon satisfactory completion of all work, testing, labeling, cleanup, punch-list items, and required closeout documentation.
- All required test results and closeout documentation must be received and approved by the District before final payment, subject to applicable California public works payment requirements.

14. INDUSTRY GUIDELINES AND STANDARDS

All materials, equipment, and installations shall comply with applicable federal, state, and local codes, regulations, and recognized industry standards. Work shall be performed in accordance with the manufacturer's written installation instructions and the District's approved plans and specifications.

Where the specifications exceed minimum code requirements, the more stringent requirements shall apply unless otherwise directed in writing by the District. Any conflicts between the specifications, drawings, and applicable codes shall be brought to the District's attention for clarification before proceeding with the affected work.

Applicable California Codes

- California Building Standards Code, Title 24, including applicable provisions of:
  - California Building Code (Part 2)
  - California Electrical Code (Part 3)
  - California Fire Code (Part 9)
  - California Existing Building Code (Part 10)
- Applicable California Division of the State Architect (DSA) requirements.
- Applicable local codes and regulations.

Applicable Telecommunications and Cabling Standards

- ANSI/TIA-568 Series — Telecommunications Cabling Standards, including requirements for copper and fiber optic cabling.
- ANSI/TIA-569 — Telecommunications Pathways and Spaces.
- ANSI/TIA-606 — Administration and Labeling of Telecommunications Infrastructure.
- ANSI/TIA-607 — Telecommunications Bonding and Grounding.
- ANSI/TIA-598 — Optical Fiber Cable Color Coding.
- ANSI/TIA-526 Series — Optical Fiber Cable Plant Testing.
- ANSI/TIA-455 Series — Fiber Optic Test Procedures, where applicable.
- ANSI/TIA-604 Series — Fiber Optic Connector Intermateability Standards, where applicable.
- ANSI/ICEA Standards — Applicable indoor and outside plant fiber optic cable requirements.
- ANSI/BICSI Standards and applicable installation practices.
- IEEE 802.3 — Ethernet performance requirements, where applicable.
- ISO/IEC 11801 Series — Generic Cabling for Customer Premises, where applicable.
- Applicable UL listings and certifications for cables, components, and equipment.

All copper and fiber optic cabling shall be installed, terminated, labeled, and tested in accordance with the applicable standards for the specified cable type and performance requirements.

The Service Provider shall comply with the editions of all codes and standards applicable to the project, including adopted amendments. Any conflicts or proposed deviations must be submitted to the District for written approval before proceeding.