

Network Switches- City Walk
 Forest Lake Section
 City of Tuscaloosa

SECTION 270000 – COMMUNICATIONS

PART 1 - GENERAL

1.1 INTRODUCTION/ RELATED DOCUMENTS

- A. These specifications establish technical and operation requirements for various technologies planned for the CityWalk project under construction by the City of Tuscaloosa. The physical infrastructure, such as fiber, is a critical connector for IT-Communication Devices such as Security Cameras, Wireless Access Point Units, Information Terminals, Digital Signage and Network Connection Equipment throughout the project area. A properly designed and constructed telecommunications system shall be adaptable to change over time and support current and future needs.
- B. The City of Tuscaloosa is soliciting bids from qualified Contractors/Vendors for the labor to install a Data Network System (Owner/ City of Tuscaloosa will Purchase and Provide Data Network Equipment. They will also Set-up and Program the Network Equipment with IP's/ VLAN's). This bid and resultant contract is for the Forest Lake, Alberta Parkway Phase-1B, Alberta Parkway Phase-2, and 10TH Avenue Segments of the total CityWalk. The total City Walk is being implemented along a 5.2 mile greenway walking/biking path. The project will be built in 5 segments and installed over an 18 – 24 month period. The CityWalk will originate at Harmon Park near the intersection of 10th Avenue and Greensboro Avenue and terminate at a community park located in the Alberta community. Other Sections will be bid separately. Drawings for the Forest Lake Section is issued with these documents to provide the Contractor/Vendor a sample of the project layout and design. Drawings for the Alberta Parkway Phase-1B, Alberta Parkway Phase-2, and 10TH Avenue Segments will be issued at a later date.
- C. This Bid includes quantities of network equipment and patch cord/jumpers to be installed (Labor Only) for each segment as listed below.

CityWak Sections	IT-Cab. (Installed under a separate Contract.)	Cisco Catalyst 3750-X Fiber Switches/ WS- C3750X-24S-E	Cisco Compatible Fiber SM GBIC Modules/ 1000BaseT-1310 SM/ TN-GLC-LH-SM	Cisco Catalyst 3750-X Series 24 10/100/1000 PoE+, / WS- C3750X-24	Transition Networks Industrial Grade Network Switches/ SISPM1040-384-LRT	Transition Networks Power Supplies/ PT.# 25104	Transition Networks Fiber SM-GBIC Modules/ TN-GLC-LX-SM-RGD	UPS Unit EATON/ PW9130L3000 R-XL2UN	Battery Unit EATON/ PW9130N3000 R-EBM2U	Mounting Rail Unit Kits EATON	Cat6 Patch Cords/ Jumpers in IT-Cab.	Cat6 Patch Cords/ Jumpers in ER Cab.	Fiber Patch Cords/ Jumpers in IT-Cab.	Fiber Patch Cords/ Jumpers in ER Cab.
Forest Lake Phase-1/Base Bid	21	2	48	1	21	21	42	1	1	2	71	6	42	42
Forest Lake Phase-2/ Alternate	Same	2	48	1	Same	Same	Same	2	2	4	Same	12	Same	42
Alberta Parkway PH-1B	15	2	48	1	15	15	30	2	2	4	51	12	30	30
Alberta Parkway PH-2	16	0	0	0	16	16	32	0	0	0	51	0	32	32
10TH Avenue	22	2	48	1	22	22	44	2	2	4	73	12	44	44
Total	74	8	192	4	74	74	148	7	7	14	246	42	148	190

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- D. The successful Contractor/ Vendor will be required to submit a bid that demonstrates a technical expertise, past experience with similar systems/networks, a clear understanding of the objectives/goals of the City, and capacity to engage additional resources to enhance or expand the system/network. The contractor/vendors shall include in their company's proposal descriptions, approach, and total proposed solution. The Owner has the right to select the bid that is most responsive.
- E. Contractor/Vendors are expected to review the designed system description as described and note any perceived gaps in what is described here and provide feedback via the RFI Questions Process.
- F. A complete bid will include the following sections:
 - 1. Summary of their Bid
 - 2. High level project plan to implement the installation.
 - 3. Detailed Scope of Work/ Time-Line Schedule.
 - 4. Detailed Records and Test Plan.
- G. Contractor/ Vendor shall install an operational network system as specified herein.
- H. The City of Tuscaloosa shall Furnish and provide Data Network Equipment.
- I. The City of Tuscaloosa IT-Department shall Set-up and Program the Data Network Equipment and turn over to the contractor to install.
- J. The Contractor shall install the Data Network solution utilizing Cat6 and Fiber Cabling and related peripheral equipment as indicated and specified herein, and connecting the system and related peripherals to the cabling infrastructure and network.
- K. All equipment and materials shall be new and shall be designed specifically for the work to be done.
- L. The design and construction of the telecommunications/ network system shall:
 - 1. Provide telecommunications/ network architecture based on recognized standards to support efficient, long-lasting, cost-effective operations.
 - 2. Reduce the amount of time required to install new networks or to reconfigure existing local area networks.
 - 3. Provide the flexibility to operate multiple high bandwidth technologies on a single structured cabling system.
 - 4. Eliminate the cost of installing non-standard, proprietary, vendor-specific cabling by providing standards-based cabling systems that will support a wide variety of equipment.
 - 5. Improve network manageability and facilitate automated cabling system management through the use of uniform and industry standard identification and numbering schemes.
 - 6. Allow for the growth of anticipated high speed, high bandwidth Local Area Networks (LANs), Metropolitan Area Networks (MANs) and Wide Area Networks (WANs) that may be required by future specialized applications.

1.2 STANDARDS:

- A. American National Standards Institute (ANSI) approves standards as having been properly developed.
- B. ANSI/TIA/EIA-568, Commercial Building Telecommunications Cabling Standard.
- C. ANSI/EIA/TIA-569, Commercial Building Standard for Telecommunications Pathways and Spaces.
- D. ANSI/TIA/EIA-606A, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.

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- E. ANSI/TIA/EIA-607, Commercial Building Grounding and Bonding Requirements for Telecommunications.
- F. IEEE 802.3, Local Area Network Ethernet Standard.
- G. Building Industry Consulting Service International, Inc. (BICSI) Telecommunications Distribution Methods Manual (TDMM).
- H. NFPA 70, National Electrical Code, Article 250, Grounding; Article 645, Information Technology Equipment; Article 770, Optical Fiber Cables and Raceways; Chapter 8, Communications Systems.

1.3 QUALIFICATIONS/ IT SYSTEM CONTRACTORS/ VENDORS

- A. The Contractor/ Vendor shall have a Cisco Certified Engineer and/or Certified Technical Personnel, Transition Networks Certified Engineer and/or Certified Technical Personnel and a RCDD on staff performing the role of Project Manager, be available for consultation, and attend project meetings. In addition, the contractor will appoint a job superintendent to provide onsite support and make decision regarding the scope of work and changes required by the work.
- B. The Contractor/ Vendor shall be fully capable and experienced in the installation of telecommunications/ network systems and have a minimum of five (5) years of experience installing networks.
- C. The Contractor/ Vendor must provide a minimum of five (5) reference accounts at which similar work, both in scope and design, have been completed by the Contractor/ Vendor within the last two (2) years.
- D. In the event multiple Vendors submit a joint response, a single Vendor shall be identified as the Prime Vendor. Prime Vendor responsibilities shall include performing overall project administration and serving as a focal point for the owner to coordinate and monitor plans, schedules status information and administer changes required. The Prime Vendor shall remain responsible for performing tasks associated with installation and implementation of the entire telecommunications/ network system project.
- E. All Sub-Contractors/ Vendors shall be approved by the Designer. The Sub-Contractor information shall be submitted with the Bid Proposal Documents. All submittals are subject to approval.
- F. Qualifications for the Network System Contractor/ Vendor- All telecommunication/ network installers must have five or more years of experience backed up with credential showing certification and must be regularly engaged in the installation of network communications systems.
- G. The Designer/Owner Representative may reject the Contractor/ Vendor who can't show evidence of such qualifications.
- H. The contractor/ vendor shall prepare a Mock-up of one of the IT-Cabinet with the Data Network Equipment for inspection by the owner's representative to show compliance with contract document requirements. The Contractor shall make corrections to the Mock-up if it does not meet the satisfaction of the Owners Representative. The final Mock-up shall be used to set the installed compliance standard for all other IT-Cabinets.
- I. The Contractor/ Vendor Project Manager shall act as primary points of contact for activities regarding this project. The Job Superintendent shall be required to make on-site decisions regarding the scope of the work and changes required to labor task. The Job Superintendent shall be on the job-site whenever work is being performed or workers are present.
- J. The Project Manager shall notify the appropriate Owner Representative/RCDD, Telecommunications System/ Network System Designer, and the Agency's Inspector of change requests and inspections. Final approval for change requests must be obtained prior to commencement of work. Scheduling and

coordinating inspections between the contractor, the owner representative /RCDD and the Agency's Inspector is critical.

1.4 SUBMITTALS:

- A. The Contractor/ Vendor shall submit shop drawings and product data to the owner's representative/RCDD and designer for review and approval prior to commencement of work.
- B. The Contractor/ Vendor shall indicate installation details, system configuration, and system numbering on shop drawings.
- C. The Contractor/ Vendor shall submit appropriate product data for each component to be supplied.
- D. The Contractor/ Vendor shall submit manufacturer's installation instructions.
- E. The Contractor/ Vendor shall submit three copies of a complete, bound, project record manual consisting of the following:
 - 1. Product cut sheets for products supplied.
 - 2. System Test Reports.
 - 3. System Programming Documents.
 - 4. Manufacturer's Warranties.
 - 5. "D-size" As-built drawings.
- F. The As-built drawings shall accurately record location of all networking equipment electronically using AutoCAD's latest version and on a minimum "D" size reproducible paper prints.
- G. The contractor/ vendor will maintain a set of drawings to document all as-built information as it occurs throughout the project. This will be maintained on a daily basis.
- H. At the end of the project, the contractor/ vendor shall provide one set of the as-built drawings.
Requirements: (1)Hard Copy of the Drawings and Test Reports as well as (1) Complete Data File of the Drawings and Test Reports including the Summary Reports on a Flash Drive.
- I. Provide two (2) copies of all operation manuals for all switches and electronic devices, bound in three-ring binders.
- J. The Contractors/ Vendors for the Fiber Infrastructure System, Security Camera System, Wireless Network System and the Data Network System shall coordinate and set up all System Records including but not limited to the following: The IT-Cabinet Numbers, Equipment Cabinet Numbers, Switch Numbers, Fiber Panel Numbers, Fiber Cabling Numbering, Fiber Splice Case Numbers, QB-Vaults Numbers, Fiber Assignments, Switch Port Assignments, Jack ID Assignments, Data Station Patch Panel Port Assignments, IP Number Assignments and MAC Addresses for all devices connected to each section of the network system. The information from each Contractor/ Vendor shall be coordinated with the Designer/ Consultant and the CMS/FMS- Record Management System Contractor/ Vendor.

1.5 WARRANTIES:

- A. The Contractor/ Vendor shall furnish an installation warranty of workmanship. Warranty time frames shall be One (1) Year.
- B. Workmanship shall be fully guaranteed by the Contractor/ Vendor.
- C. The Contractor/ Vendor obligation under its warranty is limited to the cost of repair of the warranted item or replacement thereof, at the Contractor/ Vendor option. Insurance covering said equipment from damage or loss is to be borne by the Contractor/ Vendor until full acceptance of material and services.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 270000

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SECTION 270520 – GROUNDING & BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 TELECOMMUNICATIONS/ NETWORKING EQUIPMENT FACILITIES

- A. Access to the telecommunications grounding system specified by ANSI/TIA/EIA-607-A is mandatory.
- B. The Contractor/ Vendor shall Ground all Networking Equipment to the Main Telecommunications Grounding System in the ER, TR and IT-Cabinets.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 ADMINISTRATION AND LABELING

- A. The Contractor/ Vendor shall permanently secure the label within six (6) inches from both ends of the BC.
- B. The Contractor/ Vendor shall permanently secure the tag within six (6) inches from the TMGB and TGB.

END OF SECTION 270520

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SECTION 270600 – SCHEDULE FOR COMMUNICATIONS

GENERAL

3.1 SCHEDULE

- A. The Contractor/ Vendor shall prepare a Network System/ Construction Schedule with milestones and duration of tasks defined. The schedule shall be a Gant type chart electronically produced by Microsoft Project software or approved equal.
- B. Coordinate schedule with the owner’s representative/RCDD.

PRODUCTS (Not Applicable)

EXECUTION (Not Applicable)

PART 4 - END OF SECTION 270600

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SECTION 270800 – COMMISSIONING OF COMMUNICATIONS

GENERAL

4.1 GENERAL

- A. The owner representative/RCDD will review the Contractor/ Vendor progress throughout the construction process.
- B. The owner representative/RCDD reserves the right to attend construction meetings, inspect the job site during construction to ensure compliance with the specifications and TDMM, telecommunications/ networking codes and standards.
- C. The owner representative/RCDD shall be included in all phases of the project.
- D. The owner representative/RCDD will assist the Contractor/ Vendor with the analysis, approval and commissioning of the structured cabling system.

PRODUCTS (Not Applicable)

EXECUTION (Not Applicable)

PART 5 - END OF SECTION 270800

SECTION 272100 – DATA COMMUNICATIONS NETWORK EQUIPMENT/SWITCHES

GENERAL

1.1 DATA COMMUNICATIONS NETWORK EQUIPMENT/ SWITCHES

- A. The Contractor/ Vendor shall install an operational network system as specified herein.
- B. The installation of a Data Network Solution shall utilize the Cat6 and Fiber Cabling Infrastructure and related peripheral equipment as indicated and specified in these documents.
- C. All equipment and materials shall be new and shall be designed specifically for the work to be done.
- D. Interfacing the system with the data communications network and coordinating the installation of all required facilities, shall be coordinated with the Owner's IT- Department.
- E. All equipment described herein shall be the products of manufacturers as described herein.
- F. The Contractor/ Vendor must provide in the Contract, as a minimum, a one-year warranty on the system, labor and those materials, and parts supplied by the Contractor unless stated otherwise in this document. The warranty will cover the contractor supplied parts/ equipment, labor, travel and miscellaneous costs. The warranty period will commence the day following the date of System Acceptance. The Contractor/ Vendor shall comply with this statement unless requirements differ for specific items as indicated below.
- G. The data concerning the IT-Cabinet with all hardware, NEMA J-Box, Seal-tight conduit connections to the NEMA J-Box, Fiber and LIU/FODPU, CAT-6 Station Cable and Termination Box, and the Electrical Receptacle/Outlet and Ground Bar that are provided on the drawing documents are for information purposes only. These items shall be installed by others under separate contracts.
- H. The placement of all items listed in Paragraph-G are being installed under separate contracts.
- I. The Installation of all Network Data Switches and Power Supplies with all Mounts and Mounting Hardware/Din Rail (SQ-D Pt. # 9080MH339), Power Connections to the equipment, Ground Connections to the equipment, Fiber Patch Cords and the CAT-6 Patch Cords in the IT-Cabinet as well as the Network Equipment in the Main Comm. Center Cabinet in University Place school and/or the Comfort Center Comm. Room are the Data Network- Vendor/Contractor's Responsibility.
- J. All Fiber and CAT-6 Patch Cords are being provided under a separate contract. All Patch Cords will be provided to the Network Equipment System- Contractor/ Vendor for installation.

1.2 NETWORK EQUIPMENT SYSTEM

- K. Drawings for the Forest Lake Section is issued with these documents to provide the Contractor/Vendor a sample of the project layout and design. Drawings for the Alberta Parkway Phase-1B, Alberta Parkway Phase-2, and 10TH Avenue Segments will be issued at a later date.

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- L. This Bid includes quantities of network equipment and patch cord/jumpers to be installed (Labor Only) for each segment as listed above in Section 270000- PART 1 General, Paragraph C.

- M. Contractor/ Vendor shall install the Network Equipment System. The System will be segmented into VLANS partitions for Network Security as indicated for 1.) VLAN-1 Security Camera System, 2.) VLAN-2 Wireless Network System, 3.) VLAN-3 Data Network.

- N. The Owner/ City of Tuscaloosa IT-Department shall be responsible for the Set-up of the Network and all Programming. The Owner will work with the Contractor/Vendor to coordinate all programming for each section and specific information for the records and naming requirements.

- O. The Contractors/ Vendors for the Fiber Infrastructure System, Security Camera System, Wireless Network System and the Data Network System shall coordinate and set up all System Records including but not limited to the following; The IT-Cabinet Numbers, Equipment Cabinet Numbers, Switch Numbers, Fiber Panel Numbers, Fiber Cabling Numbering, Fiber Splice Case Numbers, QB-Vaults Numbers, Fiber Assignments, Switch Port Assignments, Jack ID Assignments, Data Station Patch Panel Port Assignments, IP Number Assignments and MAC Addresses for all devices connected to each section of the network system. The information from each Contractor/ Vendor shall be coordinated with the Designer/ Consultant and the CMS/FMS- Record Management System Contractor/ Vendor.

- P. The network shall have dual fiber connections from the ER-MDF/Core Fiber Switches to the IT-Cab. / TR-IDF/User-Edge Switches.

- Q. The Contractor/ Vendor shall make up and provide an Industrial Grade Electrical Extension Cord 18” to 24” in length from the Transition Networks Power Supplies to the Electrical Outlet/Receptacle in each IT-Comm. Cabinet. There shall also be an Electrical Wiring Harness placed between the Transition Networks Switches and the Transition Networks Power Supplies for connection. The cords and harness shall be routed and neatly secured to the cabinet backboard.

- R. The Fiber Backbone/SM-OSP System is being installed under a separate contract.

- S. All Fiber and Cat-6 jumper/patch cords are being furnished under a separate contract.

- T. Approved Product for the Data Network Equipment System:

Cisco Networks, Transition Networks, and Eaton Power Systems. (For System Compatibility)

1.4 DATA NETWORK EQUIPMENT CONTRACTORS/ VENDORS

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- A. The Contractor/ Vendor shall have a Cisco Certified Engineer or Certified Technical Personnel, Transition Networks Certified Engineer or Certified Technical Personnel and a RCDD on staff performing the role of Project Manager, be available for consultation, and attend project meetings. In addition, the contractor will appoint a job superintendent to provide onsite support and make decision regarding the scope of work and changes required by the work.
- B. The Contractor/ Vendor shall be fully capable and experienced in the installation of telecommunications/ network systems and have a minimum of five (5) years of experience installing networks.
- C. The Contractor/ Vendor Project Manager shall act as primary points of contact for activities regarding this project. The Job Superintendent shall be required to make on-site decisions regarding the scope of the work and changes required to labor task. The Job Superintendent shall be on the job-site whenever work is being performed or workers are present.
- D. The Project Manager shall notify the appropriate Owner Representative/RCDD, Telecommunications System/ Network System Designer, and the Agency's Inspector of change requests and inspections. Final approval for change requests must be obtained prior to commencement of work. Scheduling and coordinating inspections between the contractor, the owner representative /RCDD and the Agency's Inspector is critical.

1.5 SYSTEM EQUIPMENT

- A. Cisco Network Fiber Switch:

The Contractor/Vendor shall install (Labor Only) the Cisco Fiber Switches-

Phase-1/Base- (2) WS-C3750X 24-E, 24 Fiber Port Units with (48) Fiber GBIC Mod's.

Phase2/Alternate - (2) WS-C3750X 24-E, 24 Fiber Port Units with (48) Fiber GBIC Mod's.

- B. Cisco Network User Switch:

The Contractor/Vendor shall install (Labor Only) the Cisco User Switches-

Phase-1/Base- (1) WS-C3750X 24P-E, 24 Copper Port Units with (2) Fiber GBIC Mod's.

Phase2/Alternate - (1) WS-C3750X 24P-E, 24 Copper Port Units with (2) Fiber GBIC Mod's.

- C. Transition Networks Industrial Grade Network Switches

Industrial Grade Network Switches-

The Contractor/Vendor shall install the- (21) Transition Networks SISPM1040-384-LRT switches equipped with (21) Power Supplies, TN/PT. 25104 and (42) TN-GLC-LX-SM-RGD, SM-GBIC Modules as indicated on the drawing documents.

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The Contractor/ Vendor shall make up and provide an Industrial Grade Electrical Extension Cord 18” to 24” in length from the Transition Networks Power Supplies to the Electrical Outlet/Receptacle in each IT-Comm. Cabinet. There shall also be an Electrical Wiring Harness placed between the Transition Networks Switches and the Transition Networks Power Supplies for connection. The cords and harness shall be routed and neatly secured to the cabinet backboard.

The Contractor/ Vendor shall Provide and Install all Mounting Hardware/DIN-Rail (SQ-D Pt. # 9080MH339) in all (21) IT-Cabinets.

D. UPS and Battery Pack Units-

The Contractor/Vendor shall install (Labor Only) the Eaton UPS and Battery Pack Units -

Phase-1/Base- (1) Eaton UPS PW9130L3000R-XL2UN and Eaton Battery Unit PW9130N3000R-EBM2U with Mounting Rails.

Phase2/Alternate - (2) Eaton UPS PW9130L3000R-XL2UN and Eaton Battery Units PW9130N3000R-EBM2U with Mounting Rails.

1.6 WARRANTIES:

- D. The Contractor/ Vendor shall furnish an installation warranty of workmanship. Warranty time frames shall be One (1) Year.
- E. Workmanship shall be fully guaranteed by the Contractor/ Vendor.
- F. The Contractor/ Vendor obligation under its warranty is limited to the cost of repair of the warranted item or replacement thereof, at the Contractor/ Vendor option. Insurance covering said equipment from damage or loss is to be borne by the Contractor/ Vendor until full acceptance of material and services.

PRODUCTS (Not Applicable)

EXECUTION (Not Applicable)

END OF SECTION 272100