

Request for Quotation (Services)
Open Market
Lowest Price, Technically Acceptable
USBC-MA – 1 -FY21-AUG-2021

This is a request for **Open Market Pricing Firm Fixed Pricing**.

The US Bankruptcy Court for the District of Massachusetts, for its benefit and the benefit of the US District Court and the US Probation Office for the District of Massachusetts, is seeking the services of a BICSI certified cable installer to install a single mode fiber optic cable backbone to upgrade the existing fiber optic cable backbone United States Courthouse located at 300 State Street, Springfield, MA. All services will occur at this location. Collectively, the US Bankruptcy Court, the US District Court and the US Probation Office for the District of Massachusetts are defined as the Tenant for the purposes of this RFQ. Please see the detailed Statement of Work below.

Contracting Officer's Representative (COR):

E-mail: [Laurie Mann@mab.uscourts.gov](mailto:Laurie_Mann@mab.uscourts.gov)

Phone: (617) 748-5379

Attn: Laurie Mann, Contracting Officer's Representative (COR)

Quote Due: Wednesday Aug 25, 2021 by 2:00 PM to COR

Clarifications: Monday August 23, 2021 by 2:00 PM to COR

Mandatory Site Survey: Thursday August 19, 2021 @10:00 AM
300 State Street, Springfield, MA

- *Quotes submitted by contractors who do not attend this site survey will not be considered.*
- *Please confirm intent to attend the site survey with COR.*

Contractor should supply a detailed list of the materials and estimated labor hours for the project as well as firm fixed price for the project. Using the quote sheet provided herein, email your quote no later than the date and time specified above. Late quotes will not be considered unless the judiciary determines, at its own discretion, that considering the late quote is in the judiciary's best interest and will not unduly delay the procurement.

The Tenant intends to make an award based on the **lowest priced, technically acceptable** quote. All items should be quoted as a **fixed price** and **F.O.B. Destination**. Payment terms will be considered **Net 30** unless more favorable terms are offered.

Pricing and Submittals

- Use the attached quote sheet for a price quotation including line items listed.
- Include a proposed general project schedule and estimated labor hours.
- Include the resume of the project manager overseeing the work onsite.

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Security

Upon award, contract staff assigned to this project will be subjected to NACI (National Agency Clearance Investigation) clearance checks and adjudication unless they can supply proof of HSPD-12 (Homeland Security Presidential Directive Clearance) with a Person Identity Verification (PIV) card (<https://www.dhs.gov/homeland-security-presidential-directive-12>). In some areas of the courthouse, contract staff will still require line of sight escort. The adjudication process will be coordinated with the COR and will be completed and approved prior to the start of the project.

Location - United States Courthouse, Springfield, MA

The United States Courthouse, located at 300 State Street, Springfield, MA was constructed in 2005-2006. At that time, multi-mode fiber, OM1, was installed as the vertical backbone. The 4-story building (including the basement level) has 3 vertical risers with four (4) 4-inch conduits each extending from the basement through closets stacked vertically in East, West and Chambers wings of the building. Currently 6 strands run in 1 1/4-inch innerduct from the MDF (server room) located in the basement to each IDF closet in use. In the Chamber's wing and the West wing, there are IDF closets on the 2nd and 3rd floors. In the East wing, there are IDF closets on the 1st and 3rd floors. The other IDF closets in those wings are not used by the agencies on this contract and will not be accessed or utilized by the contractor unless by court staff escort if deemed necessary.

Hours of Accessibility

The Springfield Courthouse is open from 8:00 AM through 4:30 PM, Monday through Friday and work hours will correspond to that schedule. Due to onsite trials and hearings, there may be days that various areas are inaccessible due to noise or security reasons. Upon award, a project schedule will be proposed by the winning contractor and reviewed for approval by the Tenant.

Project Schedule

A pre-performance conference will occur upon contract award to review the proposed project timeline within two weeks of contract award. The date, time and list of attendees will be provided to the winning contractor at that time.

Sincerely,

/s/ Ann E. Kelley

Ann Kelley
Contracting Officer
US Bankruptcy Court
District of Massachusetts

August 4, 2021

**United States Courthouse
300 State Street, Springfield, MA**

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Statement of Work

Fiber Optic Backbone Cable Upgrade

This statement of work and the attached specifications and drawings are intended to provide the Voice/Data contractor enough information to adequately provide estimated costing and subsequent installation of new redundant and diverse single mode fiber optic backbone cable and supporting equipment at the United States Courthouse located at 300 State Street in Springfield, MA. The installation of the fiber optic backbone shall be ready for the connection to the Tenant-provided network electronics and system equipment and devices.

The attached drawings shall be used as a point of reference only as the routing of actual conduit pathways and riser closet locations are approximated. Drawings shall not be scaled to calculate cable distances. Distances provided on the drawings are estimated and provided for reference only. Potential contractors shall participate in a mandatory site survey and kick off meeting. Contractor shall verify routing of cable pathways, pull box locations, distances and existing conditions while on project site. The new fiber backbone shall be terminated, tested, and certified in accordance with ANSI/TIA 568-D.

The bidding contractor is required to submit their bid for a complete redundant and diverse OS-2 single mode fiber backbone solution.

The Tenant maintains a server room and six telecommunications rooms on four floors of the courthouse (basement through third floor).

1. Located in the basement, Room 03 is the Server Room (or main telecommunications room).
 - a. The contractor will include in their price to provide, install, terminate and test two 6-strand OS-2 single mode, riser rated, armored backbone fiber cables from the Server Room to six different telecommunications rooms (TR) on multiple floors utilizing existing conduit pathways.
 - b. The contractor will include in their price to provide, install and label one 4RU fiber termination panel with 12 connector panels with six LC connectors each.
 - c. All data cables shall be labeled by the contractor in accordance with the Tenant's labeling standards.
2. Rooms D210 and D301 are part of the "West" riser stack and are located on the second and third floors, respectively. Fiber cable from the Server Room runs in conduit in the concrete slab in the basement with one pull box, remains in conduit as it passes through the US Marshals Service space on the first floor and is accessible in room D210. Fiber cable will traverse a combination of vertical and horizontal cable ladder to the IT rack in each room.
 - a. The contractor will include in their price to provide, install, terminate and test two 6-strand OS-2 single mode, riser rated, armored fiber backbone cables from the Server Room to Rooms D210 and D301 utilizing diverse pathways.

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- i. Contractor shall install each six-strand fiber optic cable in separate conduit pathways to maintain pathway diversity. If multiple cable trays exist within the TR, separate cable trays shall be utilized.
 - ii. All cables shall be properly supported.
 - iii. Fire-stopping in all conduits shall be properly restored.
 - b. The contractor will include in their price to provide and install one 1RU fiber termination panel with 2 fiber connector panels, six LC connectors each, in the existing IT rack.
 - c. All data cables shall be labeled by the contractor in accordance with the Tenant's labeling standards.
3. Rooms D260 and D360 are part of the "Chambers" riser stack and are located on the second and third floors, respectively. Fiber cable from the Server Room runs in conduit along the ceiling deck in the basement with one pull box. Fiber cable enters room D160 on the first floor via conduit from the basement and will traverse vertical cable ladder in that room before passing through conduit sleeves to room D260 on the second floor. Within the TR, the fiber optic cable will traverse a combination of vertical and horizontal cable trays to the IT rack in each room.
 - a. The contractor will include in their price to provide, install, terminate and test two 6-strand OS-2 single mode, riser rated, armored fiber cables from the Server Room to Rooms D260 and D360 utilizing diverse pathways.
 - i. Contractor shall install each six-strand fiber optic cable in separate conduit pathways to maintain pathway diversity. If multiple cable trays exist within the TR, separate cable trays shall be utilized.
 - ii. All cables shall be properly supported.
 - iii. Fire-stopping in all conduits shall be properly restored.
 - b. The contractor will include in their price to provide and install one 1RU fiber termination panel with 2 fiber connector panels, six LC connectors each, in the existing IT rack.
 - c. All data cables shall be labeled by the contractor in accordance with the Tenant's labeling standards.
4. Rooms D120 and D303 are part of the "East" riser stack and are located on the first and third floors, respectively. Fiber cable from the Server Room runs in conduit in the concrete slab in the basement with one pull box. Fiber cable enters room D120 on the first floor via conduit from the basement. Fiber cable terminating in room D120 follows along a combination of vertical and horizontal cable trays to the IT rack in the room. Fiber cable terminating in room D303 traverses vertical cable ladder in room D120, passes through conduit sleeves to room E230 on the second floor, and runs along the wall behind a metal shelving unit to the conduit sleeves to room D303. Fiber cable will then traverse a combination of vertical and horizontal cable trays to the IT rack in room E302. Room E230 is located in U.S. Attorney's space and an escort from the U.S. Attorney's Office is required while performing work in that space.

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- a. The contractor will include in their price to provide, install, terminate and test two 6-strand OS-2 single mode, riser rated, armored fiber cables from the Server Room to Rooms D120 and D303 utilizing diverse pathways.
 - i. Contractor shall install each six-strand fiber optic cable in separate conduit pathways to maintain pathway diversity. If multiple cable trays exist within the telecommunications rooms, separate cable trays shall be utilized.
 - ii. All cables shall be properly supported.
 - iii. Fire-stopping in all conduits shall be properly restored.
- b. The contractor will include in their price to provide and install one 1RU fiber termination panel with 2 fiber connector panels, six LC connectors each, in the existing IT rack.
- c. All data cables shall be labeled by the contractor in accordance with the Tenant's labeling standards.

Patch Cables:

Contractor shall provide 24 each single mode fiber optic patch cables to the Tenant. Patch cables shall be factory-made, dual-fiber, 36 inches in length, LC-LC connectors, yellow jacket. Patch cables will be installed by the Tenant.

As noted in the specification sections provided with this Statement of Work, the structured cabling system installation relies heavily on ANSI/TIA standards and associated BICSI installation guidelines and accepted practices. Although the specifications are not attached to this Scope of Work document, it is expected and specified that the work of designing, installing, and testing is to be supervised by BICSI certified technicians and registered designers (RCDD) who have been tested to know the content in these standards. Any system requirements necessary and supported by these standards are required as part of this work, whether or not it is explicitly stated herein.

For each bid response, the contractor is to provide a complete breakdown of material and labor costs. See format provided below.

Table 1: Itemized Cost Breakdown Format

| Quantity | Unit of Measure | Description | Material Unit Cost | Labor Cost |
|----------|-----------------|-------------|--------------------|------------|
| | | | | |
| | | | | |

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General Installation Requirements:

1. Complete redundant and diverse OS-2 single mode fiber backbone solution.
2. Installation and testing in compliance with specifications documents, ANSI/TIA and BICSI guidelines listed below, and in accordance with manufacturer specifications for full warranty.
3. All Fiber Optic Cable shall be armored and riser rated. Cable jacket color will be yellow.
4. Cable documentation to include cable labels in accordance with customer requirements.
5. As-built documentation to include test results, cable reports and run-lists.

Applicable ANSI/TIA and BICSI Guidelines:

1. ANSI/TIA-568.0-D – Generic Telecommunications Cabling for Customer Premises
2. ANSI/TIA-568.1-D – Commercial Building Telecommunications Cabling Standard
3. ANSI/TIA-568.3-D – Optical Fiber Cabling Components Standard
4. ANSI/TIA-569-E – Telecommunications Pathways and Spaces
5. ANSI/TIA-606-C – Administration Standard for Commercial Telecommunications Infrastructure
6. BICSI ITSIMM – Information Technology Systems Installation Methods Manual, Current Edition
7. BICSI TDMM – Telecommunications Distribution Methods Manual, Current Edition

Attached Documents:

Specifications:

- 271300 Telecommunications Backbone Cabling Telecommunications Drawings:
- Sheets T101, T102, T201

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Deliverables

Task 1:

Install and terminate fiber run as specified above between the MDF and the 6 IDF's detailed. Visibly label all terminations as specified in statement of work.

Task 2:

Statement of work details testing specifications and reporting format. Formal test results should be produced in accordance with attached specifications and emailed to the COR, Laurie Mann, for review and acceptance. Any failed terminations must be corrected and retested prior to acceptance.

Period of Performance

The period of performance will begin on a mutually agreed upon date to be determined between the contractor and the Tenant within two (2) weeks of the award and will end after all fiber and terminations are installed, labeled, and tested. All onsite work should be completed within a 2-week period. Project should be completed by end of November 30, 2021. All work must be submitted to and approved by the COR.

Inspection and Acceptance

Task 1:

Acceptance will occur when the COR has confirmed that fiber and terminations have been completed and labeled as specified in the statement of work. A report of the cable runs shall be submitted in writing in digital format.

Task 2:

Acceptance will occur when the COR has confirmed the receipt of testing establishing that fiber installation has been successfully completed in digital format as specified.

Payment

Payment for the project will be received upon successful completion and delivery of all tasks detailed above for the project. Work can be invoiced within 30 days after successful testing documentation has been produced and delivered in digital format to the COR, Laurie Mann, and approved by the COR.

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Quote Sheet for RFQ # USBC-MA – 1 -FY21-AUG-2021

Instructions for Quoter:

Provide the information requested here and below at Provision 3-5 and Clause 7-10:

| | |
|---|--|
| Company name: | |
| DUNS number or UEI: | |
| Discount terms, if other than Net 30: | |
| Company address: (Street) | |
| Company address: (City, State, Zip) | |
| Company address: (email) | |
| Company address: (phone/fax) | |
| Date: | |
| Printed or Typed Name of Signator | |
| Signature of Person Authorized to Sign Quote | |

Instructions for Quoter:

Fill in the unit price and extended price for each item.

Fill in the grand total amount.

| Item | Description | Qty | Unit of Issue | Unit Price (\$) | Extended Price (\$) |
|------|------------------------------------|-----|---------------|-----------------|---------------------|
| 1 | <i>Fiber patch cables</i> | | | | |
| 2 | <i>Fiber connector panels</i> | | | | |
| 3 | <i>Fiber termination panels</i> | | | | |
| 4 | <i>Fiber Optic Cable by foot</i> | | | | |
| 5 | <i>Misc materials</i> | | | | |
| 6 | <i>Labor (project labor hours)</i> | | | | |

| | |
|---------------------|-----------|
| GRAND TOTAL: | \$ |
|---------------------|-----------|

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TERMS AND CONDITIONS

The following judiciary terms and conditions are incorporated into this request and will be included in the resulting order.

SOLICITATION PROVISIONS

The following judiciary provisions, that the Contracting Officer has indicated are applicable, are incorporated in this solicitation:

X Provision 3-5, Taxpayer Identification and Other Offeror Information (APR 2011)

(a) *Definitions.*

“Taxpayer Identification (TIN),” as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a social security number or an employer identification number.

(b) All offerors shall submit the information required in paragraphs (d) and (e) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the government to collect and report on any delinquent amounts arising out of the offeror’s relationship with the government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to payment recording requirements, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror’s TIN.

(d) *Taxpayer Identification Number (TIN):* _____

☐ TIN has been applied for.

☐ TIN is not required, because:

☐ Offeror is a nonresident alien, foreign corporation or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

☐ Offeror is an agency or instrumentality of a foreign government;

☐ Offeror is an agency or instrumentality of the federal government.

(e) *Type of organization:*

☐ sole proprietorship;

☐ partnership;

☐ corporate entity (not tax-exempt);

☐ corporate entity (tax-exempt);

☐ government entity (federal, state or local);

☐ foreign government;

☐ international organization per 26 CFR 1.6049-4;

☐ other _____.

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(f) *Contractor representations.*

The offeror represents as part of its offer that it is ☐ , is not, ☐ 51% owned and the management and daily operations are controlled by one or more members of the selected socio-economic group(s) below:

- ☐ Women Owned Business
☐ Minority Owned Business (if selected, then one sub-type is required)
- ☐ Black American
☐ Hispanic American
☐ Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians)
☐ Asian-Pacific American (persons with origins from Burma, Thailand, Malaysia, Indonesia, Korea, The Philippines, U.S. Trust Territory of the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru)
☐ Subcontinent Asian (Asian-Indian) American (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal)
☐ Individual/concern, other than one of the preceding.

(end)

 X **Provision 4-1, Type of Contract (JAN 2003)**

The judiciary plans to award a **firm fixed price** type of contract under this solicitation, and all offers shall be submitted on this basis. Alternate offers based on other contract types will not be considered.

(end)

 X **Provision B-1, Solicitation Provisions Incorporated by Reference (SEP 2010)**

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the contracting officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this address: <http://www.uscourts.gov/procurement.aspx>.

(end)

Solicitation Provisions Incorporated by Reference

| | | |
|---|------|---------------------------------|
| X | 2-15 | Warranty Information (JAN 2003) |
| X | 2-70 | Site Visit (JAN 2003) |

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300 State Street, Springfield, MA

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CONTRACT CLAUSES

Applicable to both the solicitation and contract

Clause 7-10, Contractor Representative (JAN 2003)

(a) The contractor's representative to be contacted for all contract administration matters is as follows (contractor complete the information):

Name:
Address:
Telephone:
E-mail:
Fax:

(b) The contractor's representative shall act as the central point of contact with the judiciary, shall be responsible for all contract administration issues relative to this contract, and shall have full authority to act for and legally bind the contractor on all such issues.

(end)

3. The following full text clauses are incorporated if the Contracting Officer has marked them as applicable (X):

___ Clause 2-90C Option to Extend Services (APR 2013)

The judiciary may require continued performance of any services within the limits and at the rates specified in the contract. These rates may be adjusted only as a result of revisions to prevailing labor rates provided by the Secretary of Labor. The option provision may be exercised more than once, but the total extension of performance hereunder shall not exceed 6 months. The contracting officer may exercise the option by written notice to the contractor no later than ___30___ calendar days prior to the contract's current expiration.

__X Clause 2-90D Option to Extend the Term of the Contract (APR 2013)

(a) The judiciary may extend the term of this contract by written notice to the contractor no later than ___7___ calendar days prior to the contract's current expiration date of 11/30/2021; provided that the judiciary gives the contractor a preliminary written notice of its intent to extend at least 30 calendar days , before the contract expires. The preliminary notice does not commit the judiciary to an extension.

(b) If the judiciary exercises this option, the extended contract shall be considered to include this option clause.

(c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed **nine (9)** months.

(end)

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X Clause 7-20, Security Requirements (APR 2013)

(a) Definitions. As used in this clause:

"Access" means physical entry into, and to the extent authorized, mobility within, a judiciary facility.

"Contractor employee" means an employee of the prime contractor or of any subcontractor, affiliate, partner, joint venture, or team members with which the contractor is associated. It also includes consultants engaged by any of those entities.

"Facility" and "judiciary facility" mean buildings, including areas within buildings, owned, leased, shared, occupied, or otherwise controlled by the judiciary.

"Judiciary IT resources" include, but are not limited to, computer equipment, networking equipment, telecommunications equipment, cabling, network drives, computer drives, network software, computer software, software programs, intranet sites, and internet sites.

(b) Requirements.

Contractor employees working on this contract must complete such forms as may be necessary for security purposes or other reasons. Completed forms shall be submitted as directed by the Contracting Officer's Representative (COR). Depending upon the level of access required to judiciary facilities or IT resources for performance of the work, contractor employees may be subject to any of the following types of security checks:

Fingerprint Check
Credit Check
National Agency Check with Inquires (NACI)
National Agency Check with Inquiries and Credit (NACIC)
National Agency Check with Law and Credit (NACLC)
Single Scope Background Investigation (SSBI)
Single Scope Background Investigation – Periodic Reinvestigation (SSBI-PR)
Public Trust Special Background Investigation (PTSBI)
Citizenship and Immigration Services (CIS) Check

Contractor employees visiting court sites to provide support covered under this contract may be subjected to additional FBI screening and U.S. Marshal inspection.

(c) Exemption.

Affected contractor employees who have had a Federal background investigation without a subsequent break in Federal employment or Federal contract service exceeding two (2) years may be exempt from the investigation requirements of this clause subject to verification of the previous investigation. For each such employee, the contractor shall submit the following information: employee's full name, Social Security Number, and place and date of birth.

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(d) Facility Access Cards (FAC).

The contractor shall be responsible for all Facility Access Cards or other judiciary identification cards issued to the contractor's employees and shall immediately notify the COR if any Facility Access Card(s) cannot be accounted for. The contractor shall notify the COR immediately whenever any contractor employee no longer has a need for his/her judiciary-issued FAC (e.g., employee terminates employment with the contractor, employee's duties no longer require access to judiciary facilities). The COR will instruct the contractor as to how to return the FAC. Upon expiration of this contract, the COR will instruct the contractor as to how to return all judiciary-issued FACs not previously returned. The contractor shall not return FACs to any person other than the individual(s) named by the COR.

(e) Control of access.

The judiciary shall have and exercise full and complete control over granting, denying, withholding, and terminating access of contractor employees to judiciary facilities and IT resources. The COR will notify the contractor immediately when the judiciary has determined that an employee is unsuitable or unfit to be permitted access to a judiciary facility following the completion of any of the security checks/investigations listed in (b) above, or as a result of new information obtained at any time during the contractor's performance. The contractor shall immediately notify such employee that he/she no longer has access to any judiciary facility and/or judiciary IT resources, remove the employee from any such facility that he/she may be in, and provide a suitable replacement who must comply with the requirements of this and other applicable clauses. In addition, the contracting officer may require the contractor to prohibit individuals from access to judiciary facilities or IT resources if the judiciary deems their initial or continued access contrary to the public interest for any reason, including, but not limited to, carelessness, insubordination, incompetence, or security concerns.

(f) The contractor shall include the substance of this clause in all subcontracts at any tier where the subcontractor may be required to have routine physical access to a judiciary facility or routine access to a judiciary IT resource.

(g) The judiciary reserves the right to refuse to grant facility access for any contractor employee who has been convicted of a felony.

(end)

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1. Clause B-5, Clauses Incorporated by Reference (SEP 2010)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the contracting officer will make their full text available. Also, the full text of a clause may be accessed electronically at this address: <http://www.uscourts.gov/procurement.aspx>

(end)

2. The following judiciary clauses, that the Contracting Officer has indicated are applicable, are incorporated by reference in this contract and marked with an 'X':

| | | |
|---|-------|--|
| | 2-20A | Incorporation of Warranty (JAN 2003) |
| | 2-20B | Contractor Warranty (Products) (JAN 2010) |
| | 2-35 | F.O.B. Destination, Within Judiciary's Premises (JAN 2003) |
| | 2-40B | Delivery of Excess Quantities (JAN 2003) |
| | 2-55 | Privacy or Security of Safeguards (JAN 2003) |
| | 2-90A | Option for Increased Quantity (APR 2013) |
| | 2-90B | Option for Increased Quantity – Separately Priced Line Item (APR 2013) |
| | 2-90D | Option to Extend the Term of the Contract (APR 2013) |
| | 2-95 | Material Requirements (JAN 2003) |
| | 2-110 | Option to Purchase Equipment (JAN 2003) |
| | 2-125 | Security for Advance Payment (APR 2013) |
| | 2-130 | Energy Efficiency in Energy-Consuming Products (APR 2013) |
| | 2-135 | Acquisition of EPEAT®-Registered Personal Computer Products (MAR 2019) |
| | 2-140 | Judiciary IT Security Standards (APR 2013) |
| | 3-1 | Contractor Use of Mandatory Sources of Products or Services (JUN 2012) |
| X | 3-3 | Provisions, Clauses, Terms and Conditions - Small Purchases (JUN 2014) |
| | 4-150 | Cancellation Under Multi-Year Contracts (JUN 2014) |
| | 5-30 | Authorization and Consent (JAN 2003) |
| | 6-10 | Deposit of Assets Requirements (APR 2013) |
| | 6-15 | Deposit of Assets Instead of Surety Bonds (JAN 2003) |
| | 6-65 | Rights in Data – Special Works (JAN 2010) |
| | 6-75 | Rights to Data in an Offer (APR 2013) |
| | 6-80 | Rights in Data – Existing Works (JAN 2010) |
| | 6-85 | Commercial Computer Software License (APR 2013) |
| | 6-90 | Notice and Assistance Regarding Patent and Copyright Infringement (APR 2010) |
| | 6-110 | Deferred Ordering of Technical Data or Computer Software (JUN 2014) |
| X | 7-1 | Contract Administration (JAN 2003) |
| X | 7-5 | Contracting Officer's Representative (APR 2013) |
| X | 7-15 | Observance of Regulations/Standards of Conduct (JAN 2003) |
| X | 7-25 | Indemnification (AUG 2004) |
| X | 7-55 | Contractor Use of Judiciary Networks (JUN 2014) |
| X | 7-65 | Protection of Judiciary Buildings, Equipment and Vegetation (APR 2013) |
| | 7-70 | Judiciary Property Furnished "As Is" (APR 2013) |
| | 7-95 | Contractor Inspection Requirements (JAN 2003) |
| X | 7-115 | Availability of Funds (JAN 2003) |
| | 7-160 | Limitation on Withholding of Payments (APR 2013) |
| | 7-170 | Notice of Intent to Disallow Costs (JAN 2003) |
| | 7-180 | Prohibition of Assignment of Claims (JUN 2012) |
| X | 7-215 | Notification of Ownership Changes (JAN 2003) |

August 4, 2021

United States Courthouse
300 State Street, Springfield, MA

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SECTION 271300 TELECOMMUNICATIONS BACKBONE CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Telecommunications Drawings T101 and T102.

1.2 SUMMARY

- A. Section Includes:
 - 1. 9/125 micrometer single mode, inside plant optical fiber cable (OS2).
 - 2. Optical fiber cable connecting hardware, patch panels, and cross-connects.
 - 3. Cabling identification products.

1.3 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. RCDD: Registered Communications Distribution Designer.

1.4 BACKBONE CABLING DESCRIPTION

- A. Backbone cabling system shall provide interconnections between communications equipment rooms, main server room, and entrance facilities in the telecommunications cabling system infrastructure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
- B. Backbone cabling cross-connects shall be located in termination rooms (telecom) and at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

1.5 PERFORMANCE REQUIREMENTS

- A. General Performance: Backbone cabling system shall comply with transmission standards in ANSI/TIA-568.1-D, when tested according to test procedures of this standard.

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For all cable, include the following installation data for each type used:
 - a. Nominal OD.
 - b. Minimum bending radius.
 - c. Maximum pulling tension.
- B. Shop Drawings:
 - 1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
 - 2. Cabling administration drawings and printouts.
 - 3. Wiring diagrams to show typical wiring schematics including the following:
 - a. Cross-connects.
 - b. Patch panels.
 - 4. Cross-connects and patch panels. Detail mounting assemblies and show elevations and physical relationship between the installed components.
- C. Qualification Data: For all qualified layout technicians, installation supervisors, and field inspectors.
- D. Source quality-control reports.

- E. Field quality-control reports.
- F. Maintenance Data: For splices and connectors to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Upon completion, Contractor shall provide a system warranty from the manufacturer to guarantee installation of end-to-end high-performance cabling systems that meet all application requirements associated with the cabling system installed. The system warranty shall include all optical fiber cable and connectivity components. The system warranty shall be for a period of at least 20 years.
- B. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - 1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field-testing program development by an RCDD.
 - 2. Installation Supervision: Installation shall be under the direct supervision of a Registered Technician (BICSI), who shall be present at all times when Work of this Section is performed at Project site.
 - 3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
 - 4. Contractor must be a Certified Contractor with the manufacturer that is bid prior to time of bid and must be able to provide the appropriate system warranty.
- C. Testing Agency Qualifications:
 - 1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Telecommunications Pathways and Spaces: Comply with ANSI/TIA-569-E.
- F. Grounding: Comply with ANSI/TIA-607-D.
- G. Identification and Documentation: Comply with ANSI/TIA-606-C.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
 - 1. Test optical fiber cable to determine the continuity of the strand end to end. Use optical loss test set.
 - 2. Test optical fiber cable while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector, including the loss value of each. Retain test data and include the record in maintenance data.

1.9 COORDINATION

- A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's IT Personnel.

PART 2 - PRODUCTS

2.1 PATHWAYS

- A. General Requirements: Comply with TIA/EIA-569-E.
- B. Cable Support: NRTL labeled for support of fiber optic cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
 - 1. Support brackets with cable tie slots for fastening cable ties to brackets.
 - 2. Lacing bars, spools, J-hooks, and D-rings.
 - 3. Straps and other devices.

2.2 9/125 MICROMETER SINGLE-MODE, INSIDE PLANT OPTICAL FIBER CABLE (OS2)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Panduit
 - 2. Corning
 - 3. Commscope
 - 4. Berk Tek
- B. Description: Single mode fiber optic cable, 9/125-micrometer, 6 fibers, single loose tube, with interlocking armor sheathing.
 - 1. Comply with TIA-492CAAB for detailed specifications.
 - 2. Comply with ICEA S-83-596 for mechanical properties.
 - 3. Comply with TIA-568.3-D for performance specifications.
- C. Maximum Attenuation: 0.5 dB/km at 1310 nm; 0.5 dB/km at 1550 nm.
- D. Jacket:
 - 1. Jacket Color: Yellow
 - 2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-D.
 - 3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals.
- E. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
 - 1. Riser Rated, Nonconductive: Type OFNR, complying with UL 1666.

2.2 OPTICAL FIBER CABLE HARDWARE

- A. Manufacturers: Subject to compliance with requirements, provide products from one of the following:
 - 1. Corning Cable Systems
 - 2. Panduit
 - 3. CommScope
 - 4. Leviton
- B. Standards:
 - 1. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA-604 series.
 - 2. Comply with ANSI/TIA-568.3-D.
- C. Cross-Connects and Termination Panels: Modular panels housing multiple-numbered, duplex cable connectors.
 - 1. Number of Connectors per Field: One for each fiber of cable or cables assigned to field.
 - 2. Mounting: 19-inch rack.
- D. Jumper Cords: Factory-made, dual-fiber cables in 36-inch lengths.
- E. Connector Type:
 - 1. Type LC complying with TIA-604-10-B.
- F. Plugs and Plug Assemblies:
 - 1. Male: Color coded modular telecommunications connector designed for termination of a single optical fiber cable.
 - 2. Insertion loss not more than 0.75 dB.
- G. Jacks and Jack Assemblies:

1. Female; quick-connect, simplex and duplex; fixed telecommunications connector designed for termination of a single optical fiber cable.
2. Insertion loss not more than 0.75 dB.

2.3 GROUNDING

- A. Comply with ANSI/TIA-607-D Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises.

2.4 IDENTIFICATION PRODUCTS

- A. Comply with ANSI/TIA-606-C and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- B. Contractor shall coordinate final labeling scheme with Owner for final approval.

2.5 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Factory test cables on reels according to ANSI/TIA-568.1-D.
- C. Factory test UTP cables according to ANSI/TIA-568.2-D.
- D. Factory test single mode optical fiber cables according to TIA-526-14-A and TIA-568-C.3.
- E. Cable will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

PART 3 – EXECUTION

3.1 ENTRANCE FACILITIES

- A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.2 WIRING METHODS

- A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters. Conceal raceway and cables except in unfinished spaces.
- B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES

- A. Comply with NECA 1, NECA 301, and NECA/BICSI 568.
- B. General Requirements for Cabling:
 1. Comply with ANSI/TIA-568.1-D.
 2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
 3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches, not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent

- bending cables to smaller radii than minimums recommended by manufacturer.
 - 6. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
 - 7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 - 8. Cold-Weather Installation: Bring cable to room temperature before de-reeling. Heat lamps shall not be used for heating.
 - 9. In the telecommunications room (TR), leave a 10-foot-long service loop on each end of cable.
 - 10. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
 - 11. All cable should be protected from direct paint, or incidental overspray. Painted cables shall be considered defective and will be replaced at the contractor's expense.
- C. Optical Fiber Cable Installation:
- 1. Comply with ANSI/TIA-568.3-D.
 - 2. Cable shall be terminated on connecting hardware that is rack or cabinet mounted.
- D. Open-Cable Installation:
- 1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 - 2. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
- E. Group connecting hardware for cables into separate logical fields.
- F. Pathway Diversification:
- a. Maintain diverse "A" and "B" cable pathways to each, and within each, telecommunications room. Where possible, pathway "A" cables shall not be run within the same conduits and cable tray as pathway "B" cables.

3.4 FIRESTOPPING

- A. Comply with ANSI/TIA-569-E, "Firestopping."
- B. Comply with BICSI ITSIMM, "Firestopping Systems" Chapter.

3.5 GROUNDING

- A. Install grounding according to BICSI ITSIMM, "Grounding (Earthing), Bonding, and Electrical Protection" Chapter.
- B. Comply with ANSI/TIA-607-D and NECA/BICSI-607.
- C. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.6 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with ANSI/TIA-606-C.
 - 1. Administration Class: 2
 - 2. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.
- B. Paint and label colors for equipment identification shall comply with ANSI/TIA-606-C for Class 2 level of administration.
- C. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with

rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

- D. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of ANSI/TIA-606-C. Furnish electronic record of all drawings, in software and format selected by Owner.
- E. Cable and Wire Identification:
 - 1. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 - 2. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 - a. Individually number wiring conductors connected to terminal strips and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device with name and number of particular device as shown.
 - b. Label each unit and field within distribution racks and frames.
- F. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in ANSI/TIA-606-C, for the following:
 - 1. Flexible vinyl or polyester that flexes as cables are bent.

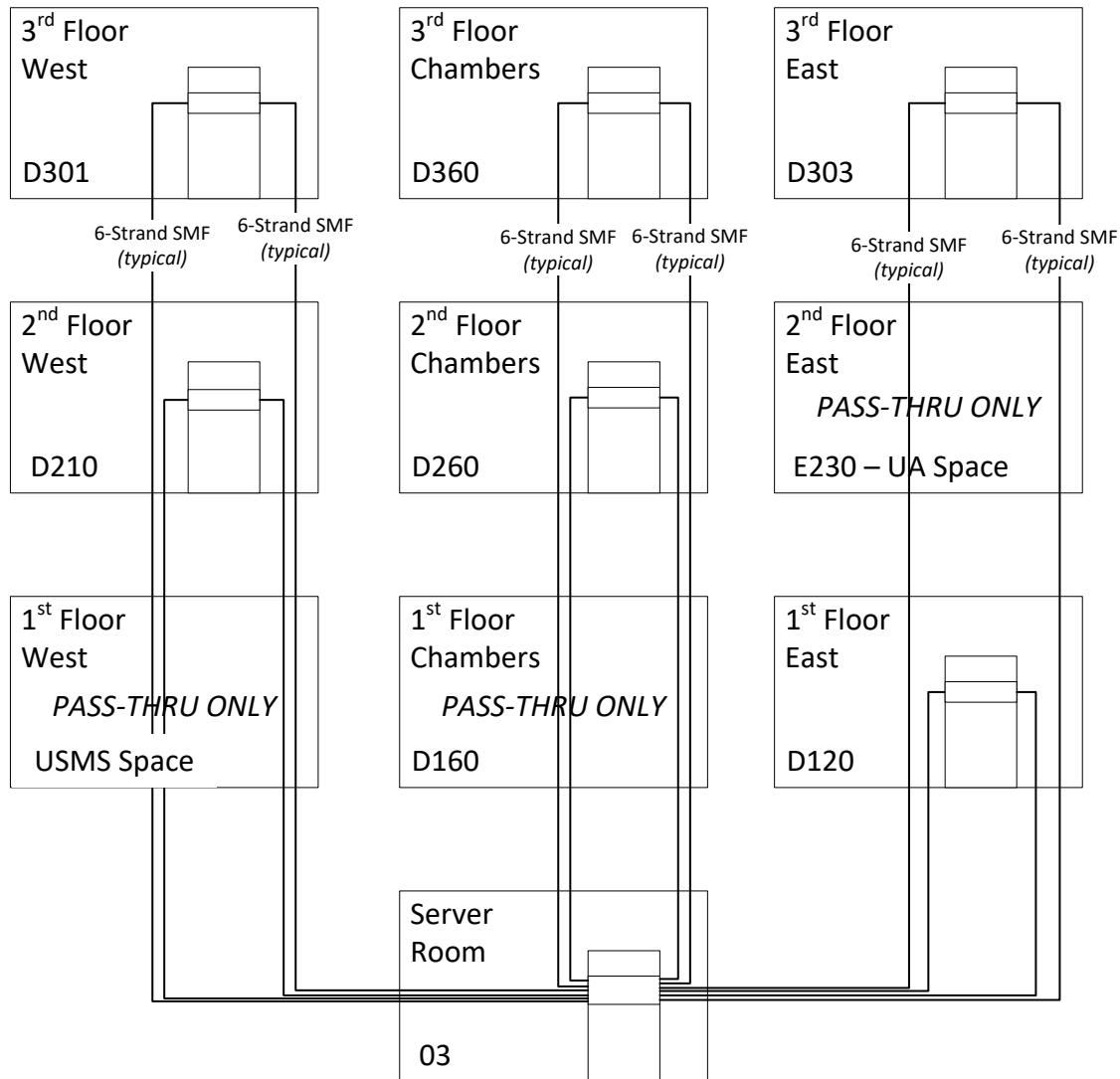
3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Tests and Inspections:
 - 1. Visually inspect optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with ANSI/TIA-568.1-D.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - 3. Optical Fiber Cable Tests:
 - a. Test instruments shall meet or exceed applicable requirements in ANSI/TIA-568.3-D. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - b. Link End-to-End Attenuation Tests:
 - 1) Attenuation test results for backbone links shall be less than 2.0 dB.
- B. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
- C. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
- D. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

END OF SECTION 271300

SHEET NOTES:

1. CONTRACTOR TO PROVIDE, INSTALL, TERMINATE, TEST AND LABEL TWO 6-STRAND OS-2 SINGLE MODE FIBER OPTIC BACKBONE CABLES FROM THE SERVER ROOM TO THE SIX TELECOMMUNICATIONS ROOMS DEPICTED ON RISER DIAGRAM.
2. FIBER OPTIC CABLE SERVICING A TELECOMMUNICATIONS ROOM SHALL BE INSTALLED IN SEPARATE CONDUIT PATHWAYS TO MAINTAIN PATHWAY DIVERSITY. ONE PATH SHALL BE REFERRED TO AS PATH "A" AND THE OTHER SHALL BE REFERRED TO AS PATH "B". SEE DETAIL 3 ON SHEET T201.
3. CONTRACTOR TO PROVIDE AND INSTALL ONE 4RU FIBER TERMINATION PANEL WITH TWELVE FIBER CONNECTOR PANELS, SIX LC CONNECTORS EACH, IN THE SERVER ROOM IT RACK. SEE DETAIL 1 ON SHEET T201.
4. CONTRACTOR TO PROVIDE AND INSTALL ONE 1RU FIBER TERMINATION PANEL WITH TWO FIBER CONNECTOR PANELS, SIX LC CONNECTORS EACH, IN THE EXISTING IT RACK IN EACH TELECOMMUNICATIONS ROOM. SEE DETAIL 2 ON SHEET T201.
5. UTILIZE EXISTING CONDUIT PATHWAYS AND CABLE TRAY. PROPERLY SUPPORT ALL CABLES AND RESTORE ALL FIRESTOPPING.
6. CONTRACTOR SHALL LABEL ALL FIBER OPTIC BACKBONE CABLES IN ACCORDANCE WITH THE TENANT'S LABELING STANDARDS.

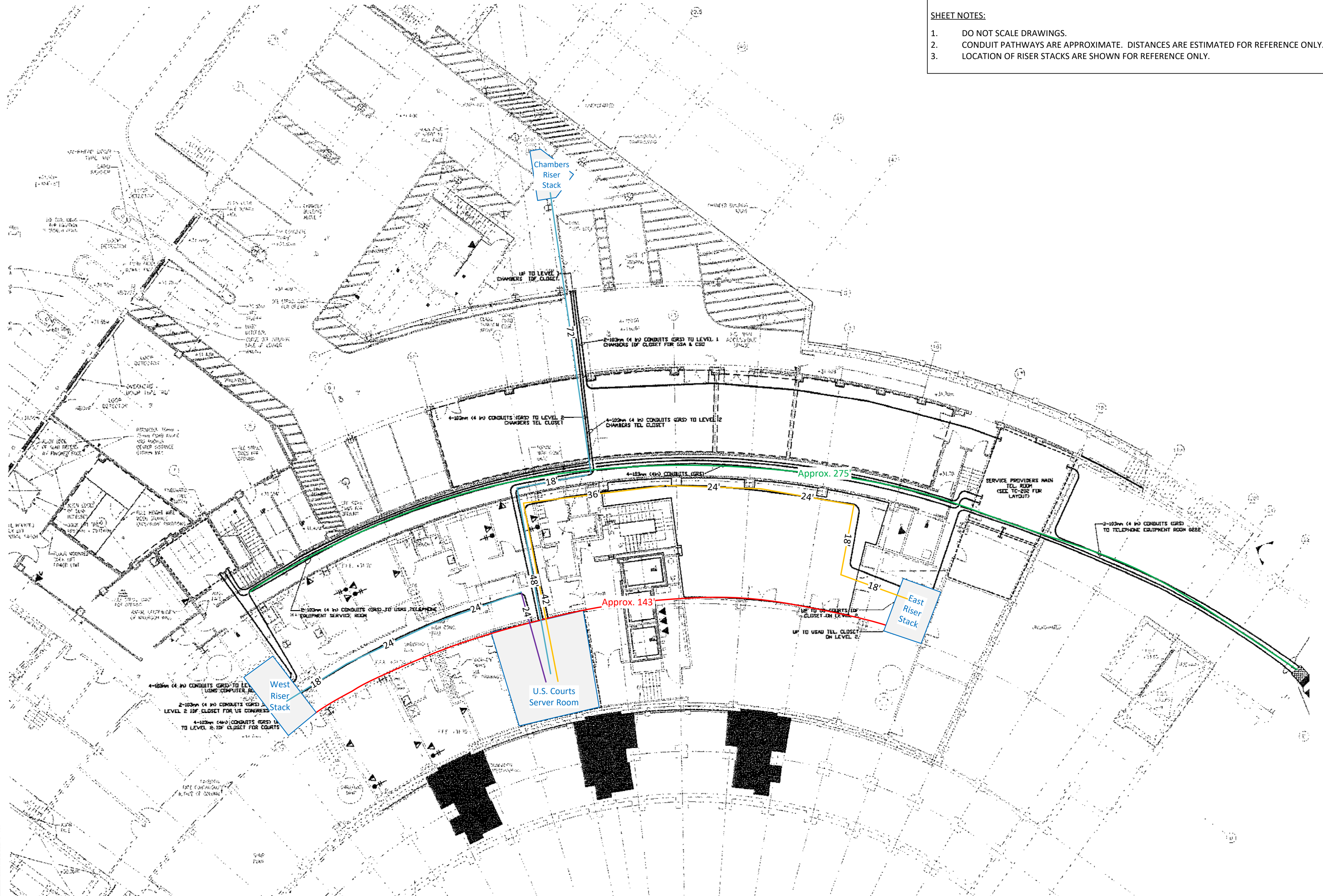


U.S. COURTS – SPRINGFIELD, MA FEDERAL COURTHOUSE – RISER BACKBONE
Not to Scale

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| <p>SEAL</p> | SHEET | | T101 |
| | TITLE | | U.S. COURTS – RISER BACKBONE |
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| | ISSUE | PAGE | FINAL 1 OF 3 |

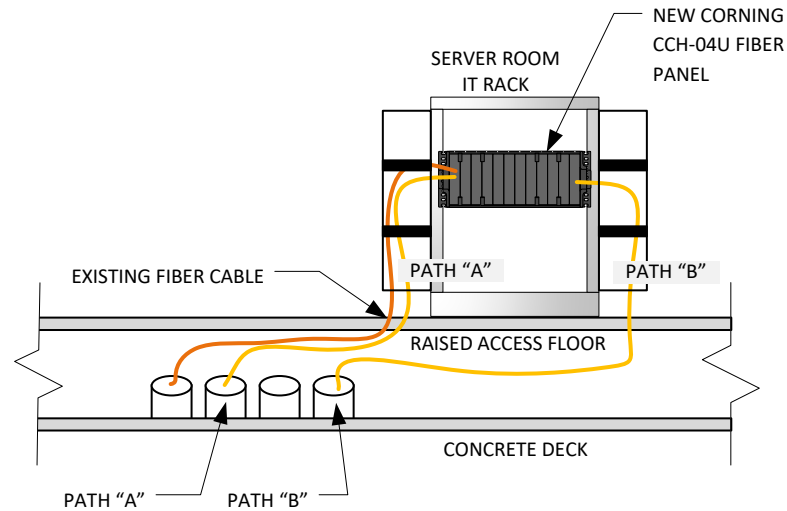
SHEET NOTES:

1. DO NOT SCALE DRAWINGS.
2. CONDUIT PATHWAYS ARE APPROXIMATE. DISTANCES ARE ESTIMATED FOR REFERENCE ONLY.
3. LOCATION OF RISER STACKS ARE SHOWN FOR REFERENCE ONLY.



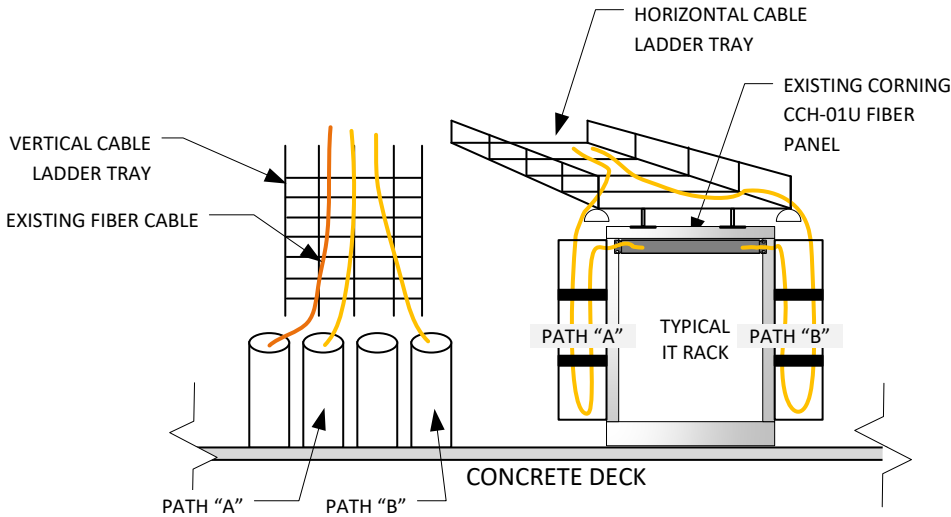
U.S. COURTS – SPRINGFIELD, MA FEDERAL COURTHOUSE – TELECOMMUNICATIONS PATHWAYS AND SPACES
Not to Scale

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| SEAL | | SHEET | | T102 | |
| | | TITLE | | U.S. COURTS – TELECOMMUNICATIONS PATHWAYS AND SPACES | |
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FIBER TERMINATION IN THE SERVER ROOM IT RACK:

1. CONTRACTOR SHALL PROVIDE AND INSTALL ONE 4RU FIBER TERMINATION PANEL WITH TWELVE 6-FIBER CONNECTOR PANELS. THE NEW FIBER PANEL WILL BE INSTALLED IN THE SPACE WHERE THE EXISTING 3RU CORNING LANDSCAPE CCH IS LOCATED. INSTRUCTIONS:
 - a. GENTLY REMOVE EXISTING 3RU FIBER PANEL FROM IT RACK AND PLACE ON A STURDY SURFACE WITHOUT DISCONNECTING ANY CONNECTIONS OR TERMINATIONS. ALL FIBER CONNECTIONS SHALL REMAIN ACTIVE.
 - b. INSTALL NEW FIBER PANEL IN SPACE WHERE EXISTING FIBER PANEL WAS REMOVED.
 - c. ROUTE FIBER CABLES TO PATH "A" DOWN THE LEFT SIDE OF THE IT RACK.
 - d. ROUTE FIBER CABLES TO PATH "B" DOWN THE RIGHT SIDE OF THE IT RACK.
 - e. TERMINATE FIBER CABLES FROM PATH "A" IN SLOTS 1-6 OF THE FIBER PANEL.
 - f. TERMINATE FIBER CABLES FROM PATH "B" IN SLOTS 7-12 OF THE FIBER PANEL.
2. CONTRACTOR SHALL LABEL ALL FIBER OPTIC CABLES IN ACCORDANCE WITH THE TENANT'S LABELING STANDARDS.



FIBER TERMINATION IN THE TELECOMMUNICATIONS ROOM (TR) IT RACK:

1. IN EACH TR, CONTRACTOR SHALL PROVIDE AND INSTALL ONE 1RU FIBER TERMINATION PANEL WITH TWO 6-FIBER CONNECTOR PANELS WITHIN THE EXISTING IT RACK IN THE TR. INSTRUCTIONS:
 - a. INSTALL NEW FIBER TERMINATION PANEL IN THE FIRST AVAILABLE SPACE AT THE TOP OF THE RACK.
 - b. ROUTE FIBER CABLE FROM PATH "A" TO THE LEFT SIDE OF THE IT RACK.
 - c. ROUTE FIBER CABLE FROM PATH "B" TO THE RIGHT SIDE OF THE IT RACK.
 - d. TERMINATE FIBER CABLE FROM THE "A" PATHWAY IN SLOT 1 OF THE FIBER PANEL.
 - e. TERMINATE FIBER CABLE FROM THE "B" PATHWAY IN SLOT 2 OF THE FIBER PANEL.
2. CONTRACTOR SHALL LABEL ALL FIBER OPTIC CABLES IN ACCORDANCE WITH THE TENANT'S LABELING STANDARDS.

1 SERVER ROOM FIBER CABLE INSTALLATION

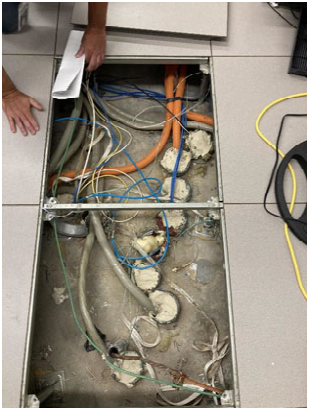
2 TYPICAL TELECOMMUNICATIONS ROOM – FIBER CABLE INSTALLATION

RISER PATHWAY DIVERSITY:

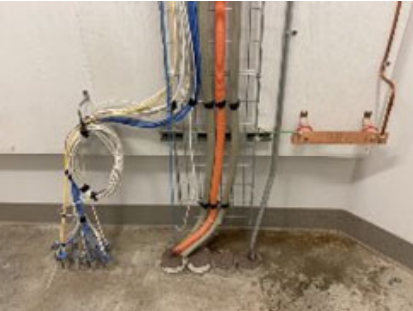
1. CONTRACTOR SHALL MAINTAIN PATHWAY DIVERSITY WHEN INSTALLING THE FIBER OPTIC CABLE FROM THE SERVER ROOM TO EACH TELECOMMUNICATIONS ROOM (TR). FIBER OPTIC CABLE RUNS SERVICING A TR SHALL BE INSTALLED IN SEPARATE CONDUIT PATHWAYS. ONE PATH SHALL BE REFERRED TO AS PATH "A" AND THE OTHER SHALL BE REFERRED TO AS PATH "B".
2. EACH RISER STACK HAS FOUR 4" CONDUIT PATHWAYS FROM THE SERVER ROOM.
 - a. CONDUITS SUPPORTING THE "EAST" RISER STACK AND THE WEST RISER STACK START UNDER THE RAISED ACCESS FLOOR IN THE SERVER ROOM NEAR THE IT RACK.
 - b. FIBER SUPPORTING THE "CHAMBERS" RISER STACK RUNS UNDER THE RAISED ACCESS FLOOR AND UP THE WALL TO ONE FOUR INCH CONDUIT ABOVE THE CEILING TILE TO THE CORRIDOR. THE CONDUIT RUNS TO A PULL BOX IN THE CORRIDOR AND THEN TRANSITIONS TO FOUR 4" CONDUITS TO THE "CHAMBERS" RISER STACK.
3. FIBER OPTIC CABLE FROM PATH "A" AND FIBER OPTIC CABLE FROM PATH "B" IN THE TR SHALL NOT BE BUNDLED TOGETHER. EACH FIBER OPTIC CABLE SHALL BE PLACED ON OPPOSITE SIDES OF THE CABLE TRAY. IF MULTIPLE CABLE TRAYS ARE AVAILABLE, THE FIBER OPTIC CABLES SHALL TRAVERSE DIFFERENT CABLE TRAYS TO THE IT RACK.

3 FIBER OPTIC BACKBONE CABLE DIVERSITY


U.S. COURTS – SPRINGFIELD, MA FEDERAL COURTHOUSE – INSTALLATION DETAILS
Not to Scale



SERVER ROOM
EAST AND WEST RISER CONDUITS



TYPICAL TELECOMMUNICATIONS
ROOM

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| SEAL  | SHEET | | T201 |
| | TITLE | | INSTALLATION DETAILS – PATHWAY DIVERSITY |
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