### FUNDING AGREEMENT BETWEEN THE CITY/COUNTY ASSOCIATION OF GOVERNMENTS OF SAN MATEO COUNTY AND THE CITY OF BRISBANE FOR CONDUIT PURCHASE AND FIBER INSTALLATION FOR THE SMART CORRIDOR EXTENSION PROJECT

THIS FUNDING AGREEMENT FOR CONDUIT PURCHASE AND FIBER INSTALLATION FOR THE SMART CORRIDOR EXTENSION PROJECT ("Agreement") is entered into and effective as of the \_\_\_\_\_ day of \_\_\_\_\_, 2023, by and between the City/County Association of Governments of San Mateo County ("C/CAG") and the City of Brisbane, a municipal corporation ("City") (each a "Party" and collectively the "Parties").

## RECITALS:

WHEREAS, C/CAG is sponsoring the San Mateo County Smart Corridor Project ("Project"), which is an Intelligent Transportation System project that extends along El Camino Real and major local streets in San Mateo County connecting to US-101; and

WHEREAS, the Project enables cities and the California Department of Transportation ("Caltrans") to proactively manage daily traffic and non-recurring traffic congestion caused by diverted traffic due to major incidents on the freeway; and

WHEREAS, C/CAG, City, and Caltrans desire to extend the Project's Smart Corridor into the City of Brisbane along Bayshore Boulevard and local streets connecting near US-101, which includes the installation of fiber optic communication network as well as deployment of an interconnected traffic signal system, closed circuit video cameras, trailblazer/arterial dynamic message signs, and vehicle detection systems (the "Project extension"); and

WHEREAS, the Project extension into Brisbane would enhance the communications and coordination between the City's public safety and public works departments, other Smart Corridor cities, Caltrans, and the California Highway Patrol; and

WHEREAS, C/CAG led the Project Approval and Environmental Document (PA/ED) phase, and received Categorical Exemption determination for the NEPA from Caltrans; and continued to lead the design phase of the Project within Brisbane; and

WHEREAS, the City will serve as the lead agency for the construction phase of the Project within Brisbane, including administration of the construction contract, performance of inspection and supplying project reporting materials to C/CAG and other grantors; and

WHEREAS, Intermountain Infrastructure Group, LLC ("Intermountain") has applied to the City for permits to excavate and install privately-owned conduits in various locations in the Right of Way (ROW) throughout Brisbane; and

WHEREAS, portions of the routes in the Intermountain installation proposal overlap with

the Project's Smart Corridor alignment, which are described more particularly in <u>Exhibit A</u>, attached and incorporated herein by this reference; and

WHEREAS, the City is currently negotiating with Intermountain for the purchase of conduits that overlap with the Smart Corridor project; and

WHEREAS, C/CAG has agreed to fund the purchase of the conduits for the portion of the ROW covered in Intermountain's proposal that aligns with the Smart Corridor, as depicted in Exhibit A; and

WHEREAS, C/CAG has also agreed to cover the cost of installing 288 strands of backbone fiber in the Smart Corridor conduits, in which the City and C/CAG will each own and retain 144 strands, and the parties will enter into separate memorandums of understanding regarding fiber sharing, as well as ongoing ownership, operations and maintenance commitments; and

WHEREAS, C/CAG and the City desire to enter into a funding agreement to specify each party's obligations for implementing and funding the conduit purchases and fiber installation.

NOW, THEREFORE, in consideration of the recitals and the mutual obligations of the parties as herein expressed, City and C/CAG agree as follows:

1. <u>City Performance.</u> The City shall engage in negotiations with Intermountain for the purchase of conduits that overlap with the Smart Corridor Project within the City limit as described in <u>Exhibit A</u>. As the lead agency for the project construction, the City shall review and verify Intermountain's conduit design plans and pull box locations to confirm that the proposed deployment aligns with the Smart Corridor routes depicted in <u>Exhibit A</u>. C/CAG is available to assist the City with its determination that the proposed deployment aligns with the Smart Corridor routes deployment aligns with the Smart Corridor routes deployment aligns with the Smart Corridor Routes in Exhibit A. The City shall inspect the conduits once the trenching and/or boring process has been completed to certify that the conduits comply with the standards and specifications set in the 2022 Caltrans standard plans and specifications, the technical information presented in Exhibit B and the project specifications presented in Exhibit C. In the event that there is any conflicting information between Exhibits B and C, the most conservative requirement shall be adhered to. Upon completion of the conduit installation and satisfactory inspection results, the City will then allow Intermountain to proceed with the fiber installation. The City shall notify C/CAG of any deviations in the conduit alignment due to changes required in the field in a timely manner.

The City shall be responsible for negotiating and coordinating with Intermountain for the installation of 288 strands of backbone fiber in these conduits along the routes in <u>Exhibit A.</u> Upon completion of the fiber installation, the City and C/CAG will each own and retain 144 strands. The City shall certify that the fiber optic cable complies with the standards and specifications set in the 2022 Caltrans standard plans and specifications, the technical information presented in Exhibit B, and the project specifications presented in Exhibit C. Intermountain shall provide testing results per the requirements outlined in the 2022

Caltrans standard specifications to the City .

In addition to the 2022 Caltrans standard plans and specifications, technical specifications and requirements regarding the fiber conduit and installation are referenced in <u>Exhibit B</u> and <u>Exhibit C</u>. The City agrees to follow all applicable laws and statutory regulations.

- 2. <u>C/CAG Provision of Funding and Method of Payment.</u> C/CAG shall reimburse the City for the purchase of the conduits and installation of fiber in those conduits. At the time this Agreement is executed, the purchase price of the conduits and installation of fiber in those conduits is \$1,156,949. The parties recognize and agree that due to a variety of factors, including but not limited to, supply chain issues, differing site conditions and construction delays beyond the control of Intermountain, the cost to purchase and install fiber in those conducts may exceed \$1,156,949. The City shall submit an invoice reflecting the purchase price of the conduits, accompanied by documentation showing the boring and trenching footages, as well as the locations of the conduits. Upon receipt and approval of the invoices and accompanying documentation, which shall not be unreasonably withheld, C/CAG shall pay the amount claimed under the invoice within thirty (30) days of C/CAG's approval of the invoice. In no event shall the City be responsible for any payment to Intermountain other than what it receives from C/CAG. To the extent Intemountain claims that the cost to purchase the conduits and install fiber in the conduits exceeds \$1,156,949, those costs shall be borne solely by C/CAG.
- 3. <u>Time of Performance.</u> The term of this Agreement shall commence on the date first written above and end on June 30, 2024, unless further extended or sooner terminated as hereinafter provided. Until the Conduit Bill of Sale Agreement between the City and Intermountain has been fully executed, either Party may terminate the Agreement without cause by providing thirty (30) days' advance written notice to the other. After City has signed a Bill of Sale with Intermountain, this Agreement may only be amended or cancelled by mutual agreement of City and C/CAG.
- 4. **Trailblazer/arterial Dynamic Message Signs.** The installation of the fiber in the conduits will facilitate the installation of trailblazer/arterial dynamic message signs ("Message Signs" within the City limits of Brisbane. Prior to the installation of any Message Signs, City shall in its sole discretion determine if such Message Signs are to be installed within the City limits and, if so, their location, size, and all operating features. Nothing in this Agreement shall require the City to allow the Message Signs to be installed within the City limits.
- 5. <u>Accounting and Audits.</u> The City will maintain and ensure that any Project subconsultant or subcontractor will maintain, a financial management system that conforms to Generally Accepted Accounting Principles (GAAP), and that can properly accumulate and segregate incurred Project costs and billings.

The City will maintain and make available to each other all work-related documents during the term of this Agreement. The City must retain documentation and reports for a minimum

of three years after the date of issuance of the auditor's report(s) to the City; or until completion of any litigation, claim or audit, whichever is longer. The City shall require any subconsultants or subcontractors hired to participate in the work to comply with this Section.

The City shall permit C/CAG and C/CAG's authorized representative to have access to the City's books, records, accounts, and any and all work products, materials, and other data relevant to this Agreement, for the purpose of making an audit, examination, excerpt and transcription during the term of this Agreement and for the period specified in this Section. In no event shall the City dispose of, destroy, alter, or mutilate said books, records, accounts, work products, materials and data for that period of time.

- 6. <u>Prevailing Wages.</u> The City shall comply with applicable sections of the California Labor Code and regulations promulgated thereunder (including without limitation, Labor Code Section 1720 *et seq.* and Title 8 of the California Code of Regulations Section 16000 *et seq.*) governing the payment of prevailing wages, as determined by the Director of the California Department of Industrial Relations, in regards to all work performed under this Agreement. The City will include prevailing wage requirements in contracts for public work and require contractors to include the same prevailing wage requirements in all subcontracts.
- 7. <u>Non-discrimination</u>. The City and any subconsultants or subcontractors performing the services on behalf of the City shall not discriminate or permit discrimination against any person or group of persons on the basis of race, color, religion, national origin or ancestry, age, sex, sexual orientation, marital status, pregnancy, childbirth or related conditions, medical condition, mental or physical disability or veteran's status, or in any manner prohibited by federal, state or local laws.
- 8. <u>Disclosures.</u> If a Party receives a public records request pertaining to the Project, that Party will notify the other Party within five (5) working days of receipt and make the other Party aware of any public records disclosed.

## 9. Indemnity and Hold Harmless.

a. Each party shall indemnify and save harmless the other party and its officers, agents, employees, and servants from all claims, suits, or actions of every name, kind, and description resulting from this Agreement, the performance of any work or services required of City or C/CAG under this Agreement, or payments made pursuant to this Agreement brought for, or on account of, any of the following: (A) injuries to or death of any person, including City, C/CAG or their employees/officers/agents; (B) damage to any property of any kind whatsoever and to whomsoever belonging; (C) any sanctions, penalties, or claims of damages resulting from City's or C/CAG's failure to comply, if applicable, with the requirements set forth in the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and all Federal regulations promulgated thereunder, as amended; or (D) any other loss or cost, including but not limited to that caused by the concurrent active or passive negligence of City or C/CAG and/or their officers, agents, employees, or servants. However,

each party/s duty to indemnify and save harmless under this Section shall not apply to injuries or damage for which the City or C/CAG has been found in a court of competent jurisdiction to be liable by reason of its own negligence or willful misconduct. The duty of City and C/CAG to indemnify and save harmless as set forth by this Section shall include the duty to defend as set forth in Section 2778 of the California Civil Code.

b. This indemnification provision will survive termination or expiration of this Agreement.

### 10. Insurance.

- a. *General Requirements.* City or its consultants performing the services on behalf of City shall not commence work under this Agreement until all insurance required under this section has been obtained. City shall use diligence to obtain such insurance. City shall furnish C/CAG with Certificates of Insurance evidencing the required coverage and there shall be a specific contractual liability endorsement extending City's coverage to include the contractual liability assumed by City pursuant to this Agreement. These Certificates shall specify or be endorsed to provide that thirty (30) days' notice must be given, in writing, to C/CAG of any pending change in the limits of liability or of non-renewal, cancellation, or modification of the policy.
- b. *Workers' Compensation and Employer Liability Insurance*. City shall have in effect, during the entire life of this Agreement, Workers' Compensation and Employer Liability Insurance providing full statutory coverage. In signing this Agreement, City certifies, as required by Section 1861 of the California Labor Code, that (a) it is aware of the provisions of Section 3700 of the California Labor Code, which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of the Labor Code, and (b) it will comply with such provisions before commencing the performance of work under this Agreement.
- c. *Liability Insurance*. City shall take out and maintain during the life of this Agreement such Bodily Injury Liability and Property Damage Liability Insurance as shall protect City, its employees, officers and agents while performing work covered by this Agreement from any and all claims for damages for bodily injury, including accidental death, as well as any and all claims for property damage that may arise from City's operations under this Agreement, whether such operations be by City or by any consultant or by anyone directly or indirectly employed by either of them. Such insurance shall be combined single limit bodily injury and property damage for each occurrence and shall be not less than \$1,000,000 unless another amount is specified below and shows approval by C/CAG Staff.
- d. Insurance Limits; Insured Entities; Breach. Required insurance shall include:

		Required Amount	Approval by C/CAG Staff if under \$ 1,000,000
1.	Comprehensive General Liability	\$ 1,000,000	
2.	Workers' Compensation	\$ Statutory	
3.	Professional Liability	\$1,000,000	
4.	Motor Vehicle Liability	\$1,000,000	

C/CAG and its officers, agents, employees and servants shall be named as additional insured on any such policies of insurance, which shall also contain a provision that the insurance afforded thereby to C/CAG, its officers, agents, employees, and servants shall be primary insurance to the full limits of liability of the policy, and that if C/CAG, or its officers, agents, employees, and servants have other insurance against a loss covered by such a policy, such other insurance shall be excess insurance only.

In the event of the breach of any provision of this section, or in the event any notice is received which indicates any required insurance coverage will be diminished or canceled, the C/CAG Chairperson, at his/her option, may, notwithstanding any other provision of this Agreement to the contrary, immediately declare a material breach of this Agreement and suspend all further work and payment pursuant to this Agreement.

- 11. <u>No Partnership: Independent Contractor.</u> The terms of this Agreement shall in no way be construed to create a partnership, joint venture or any other joint relationship between C/CAG and the City. The Parties and their respective employees are not employees of the other but rather are and shall always be considered independent contractors when performing services under this Agreement for the other Party.
- 12. <u>Notices.</u> All notices or other communications to either Party by the other shall be deemed given when made in writing and delivered or mailed to such Party at their respective addresses as follows:

C/CAG:	555 County Center, 5th Floor Redwood City, CA 94063 Attention: Sean Charpentier, Executive Director
City:	50 Park Place Brisbane, CA 94005 Attention: Randy Breault, Director of Public Works

13. <u>Merger Clause; Amendments.</u> This Agreement, including Exhibit A and B attached hereto and incorporated herein by reference, constitutes the sole agreement of the parties hereto with regard to the matters covered in this Agreement, and correctly states the rights,

duties and obligations of each Party as of the document's date. Any prior agreement, promises, negotiations or representations between the Parties not expressly stated in this Agreement are not binding. All subsequent amendments shall be in writing and signed by the C/CAG Executive Director and authorized representatives of the City. In the event of a conflict between the terms, conditions, or specifications set forth herein and those in Exhibits A and B attached hereto, the terms, conditions or specifications set forth herein shall prevail.

14. <u>Governing Law; Venue.</u> This Agreement shall be enforced and interpreted under the laws of the State of California. Any action arising from or brought in connection with this Agreement shall be venued in a court of competent jurisdiction in the County of San Mateo, State of California.

# [Signatures on the following page]

**IN WITNESS WHEREOF,** the Agreement has been executed by the Parties hereto as of the day and year first written above.

# CITY OF BRISBANE

## CITY/COUNTY ASSOCIATION OF GOVERNMENTS OF SAN MATEO COUNTY

Bv	Bv.
Clay Holstine	Sean Charpentier
City Manager	Executive Director
Approved as to Form:	Approved as to Form:
City Attorney	Melissa Andrikopoulos
5	Legal Counsel for C/CAG

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# Exhibit A



# Smart Corridor Alignment in City of Brisbane

# Exhibit B Technical Information

## 1. CALTRANS STANDARDS AND SPECIFICATIONS:

a. All work including the installation of fiber conduits and fiber optic cable shall be completed per the Smart Corridor plan details and built in a way that complies with the 2022 Caltrans standard plans and specifications and all applicable revisions. Please refer to section 87-19 for information related to fiber in the Caltrans specifications (<u>https://dot.ca.gov/-/media/dot-media/programs/design/documents/2022\_stdspecs-ally.pdf</u>), and more specifically Section 87-19.02 for the fiber optic cable material and 87-19.03 for the cable installation and 87-19.01D(2) for testing procedures.

## 2. <u>CONDUITS:</u>

- a. All work and the resulting conduit system will comply with the current requirements of all governing entities (FCC, NEC, DEC, and other national, state, and local codes).
- b. The Conduits may be placed by means of trenching, plowing, jack and bore, or directional bore. The Conduits will generally be placed on a level grade parallel to the surface, with only gradual changes in grade elevation. Crossings of roads maintained by government bodies and railroad crossings will be encased in HDPE conduit, or as required by the permitting authority.
- c. The conduits shall not be squeezed into one corner of the pull box for maintenance and constructability reasons.
- d. Once the conduits are installed, a mandrel test shall be performed and the installation of tracer wire and pull rope shall follow.
- e. Bell ends, duct plugs shall be included in the project.
- f. The color of the Smart Corridor conduits shall remain consistent throughout the project area.

## 3. <u>PULL BOXES:</u>

a. The pull boxes shall meet the Caltrans standard specifications, which can be found at <u>https://dot.ca.gov/-</u>/media/dotmedia/programs/design/documents/2022\_stdspecs-a11y.pdf. The sections for pull boxes for electrical work fall in 86-1.02C and 87-1.03C. The standard plans can be found at: <u>https://dot.ca.gov/-/media/dot-media/programs/design/documents/locked-2022-std-plans-a11y.pdf</u>. The plans regarding pull boxes for electrical work are ES-8A, ES-8B, ES-8C, ES-8D. Handholes shall be leveled and backfilled properly.

- b. The pull box lids on the project shall be labeled as SM SMART.
- c. The placement of pull boxes shall match the Smart Corridor plans and that all pull boxes need to be grouted.
- d. HTS1730 Traffic Rated security pull box shall be used for the project.
- e. A length of 100' in slack shall be included in all splice handholes and 10' of slack shall be in all other pull boxes.
- 4. <u>MATERIAL</u>. HDPE shall be a minimum of SDR-11. PVC conduit shall be minimum Schedule 40 wall thickness.
- 5. <u>MINIMUM DEPTHS.</u> The minimum cover required in the placement of Conduits shall be forty-two inches (42"). Additional depth will be required in ditches, forty-eight inches (48") and across streams, washes, culvert outfalls, and other waterways, sixty inches (60") or as otherwise required by the permitting entity.

At locations where the Conduits crosses other subsurface utilities or other structures, the Conduits shall be installed to provide a minimum of twelve inches (12") vertical clearance at the applicable minimum depth; otherwise, the Conduits will be installed under the existing utility or other structure.

In rock, the Conduits depth shall be 36 to 42 inches in HDPE. PVC or HDPE conduit will be backfilled with six inches (6") inches of select materials (padding) in rock areas. Polyurethane channel (Fiber-Rockgard or equivalent) may be used as protective cover in lieu of select material padding.

In the case of the use/conversion of existing steel pipelines or existing conduit systems, the existing depth shall be considered adequate.

- 6. <u>BURIED CABLE WARNING TAPE</u>. In open trenched areas only, the Conduits will be installed with buried cable warning tape. The warning tape shall be placed above the Conduits with generally 18 to 24 inches of cover.
- 7. <u>INNERDUCT INSTALLATION</u>. Where required Innerduct(s) shall be installed in all PVC conduits. Innerduct(s) shall extend beyond the end of all conduits a minimum of twelve inches (12"). Both the conduit and innerducts shall be sealed with foam sealant and/or duct plugs after installation.
- 8. <u>HANDHOLES/MANHOLES</u>. Handholes/manholes will be installed at intervals appropriate to site conditions. Manholes or Traffic Rated Handholes are to be installed in street builds.

- 9. <u>DEVIATIONS FROM SPECIFICATIONS</u>. Seller may only deviate from these specifications when field conditions or other requirements dictate with Buyer's prior approval.
- 10. <u>CONDITION OF CONDUIT</u>. The Conduits shall be free of any blockages, collapse points or other impediments that would prevent installation, operation, maintenance or removal of the Buyer's fiber optic cable.
- 11. <u>TESTING:</u> Fiber Optic Testing shall comply with State Standard Specifications (Section 87-19). Testing shall be performed on all fiber optic locations on all strands .
- 12. <u>SECURITY</u>: The locking mechanism shall consist of four <sup>3</sup>/<sub>4</sub>" penta head bolts.
- 13. <u>AS-BUILT FILES</u>. Seller shall provide Auto-CAD as-built files of the Conduit Segment upon completion and Buyer's acceptance of the Conduit Segment.

# **Exhibit** C

# **Project Technical Specifications**

# ORGANIZATION

Special provisions are under headings that correspond with the main-section headings of the 2022 Standard Specifications of the State of California (Standard Specifications). A main-section heading is a heading shown in the table of contents of the Standard Specifications.

Each special provision begins with a revision clause that describes or introduces a revision to the *Standard Specifications* as revised by any revised standard specification.

Any paragraph added or deleted by a revision clause does not change the paragraph numbering of the *Standard Specifications* for any other reference to a paragraph of the *Standard Specifications*.

# **5 CONTROL OF WORK**

#### Add to section 5-1.36C:

Contractor shall physically verify all locations of existing utilities, and certify, in writing, that there are no conflicts with planned improvements. If there are conflicts, Contractor shall indicate in writing, the specific conflict and allow the Engineer 30 working days to provide a response. Contractor shall include a schedule activity for potholing (Contractor responsibility), and notification to the Engineer in the base line schedule. The 30 working day for Engineer review shall be identified as an owner activity in the project baseline schedule. If there are no conflicts identified, this activity will then be shown as owner float.

Maintain minimum clearances required by utility owner, or minimum of 10 feet if no requirement from utility owner exists, when working near existing underground and overhead facilities. Contractor shall maintain minimum clearance from energized overhead line conductors as required by OSHA regulations when operating equipment in the vicinity.

Notify the Engineer at least 2 business days before performing work within 10 feet of all existing utilities.

Full compensation for complying with the requirements herein shall be considered included in other bid items of work and no additional compensation will be paid therefor.

# **6 CONTROL OF MATERIALS**

#### Add to section 6-2.03:

The Contractor shall procure the following Department-furnished materials from Caltrans:

• No items furnished by Caltrans.

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# **DIVISION II GENERAL CONSTRUCTION**

## 12 TEMPORARY TRAFFIC CONTROL

#### Add the following to section 12-1.01:

Lane closures are not permitted on Caltrans facilities. All lane closures must be on local roadways and shall not affect operations on Caltrans on/off-ramps.

#### Replace section 12-1.04 with:

You are responsible for flagging costs. The City does not share flagging costs.

#### Replace Reserved in section 12-3.11B(5) with:

Contractor shall furnish and install (1) Project Information Sign at project location determined at preconstruction meeting. The Project Information Sign must comply with the details provided in Exhibit A: Project Information Sign.

The sign must be a 4 ft x 8 ft plywood panel on two wood posts.

The background on the sign must be Type II retroreflective sheeting. The Type II retroreflective sheeting must be on the Authorized Material List for signing and delineation materials.

The legend must be retroreflective except for nonreflective black letters and numerals. The blue must match PR color no. 3 on FHWA's Color Tolerance Chart. The orange must match PR color no. 6 on FHWA's Color Tolerance Chart.

The sign must read as shown.

Do not add information to the project development sign unless authorized.

#### Measurement and Payment

Payments for Project Information Sign will be paid on a lump sum basis. Payment shall include full compensation for the procurement, construction, installation, maintenance, and removal of Project Information Sign with all required installation labor, materials, tools, equipment and incidentals, mounting hardware, foundations as specified in the Standard Specifications, these Special Provisions, and as directed by the Engineer. No additional compensation shall be allowed.

# 14 ENVIRONMENTAL STEWARDSHIP

#### Replace section 14-11.09 with:

# 14-11.09 MINIMAL DISTURBANCE OF REGULATED MATERIAL CONTAINING AERIALLY DEPOSITED LEAD

#### 14-11.09A General

Section 14-11.09 includes specifications for handling and managing regulated material containing ADL when there is a minimal disturbance. Regulated material containing ADL has average ADL concentrations over 80 mg/kg total lead or equal to or greater than 5 mg/L soluble lead tested using the California Waste Extraction Test or equal to or greater than 5 mg/L soluble lead tested using the toxicity characteristic leaching procedure.

Compliance with 22 CA Code of Regs is not required where there is minimal disturbance of regulated material containing ADL.

Management of regulated material containing ADL exposes workers to health hazards that must be addressed in your lead compliance plan under section 7-1.02K(6)(j)(ii).

Handle regulated material containing ADL under the rules and regulations of the following agencies:

- 1. Cal/OSHA
- 2. RWQCB, Region 2 San Francisco Bay
- 3. Bay Area Air Quality Management District

Regulated material containing ADL is typically found within the top 2 feet of material in ADL-impacted areas of the job site. Concentrations of ADL found in the area of minimal disturbance range from <u>less</u> than 1.0 to <u>1,300</u> mg/kg total lead with an average concentration of <u>113.9</u> mg/kg total lead using a 95 percent upper confidence limit. Lead concentrations were analyzed by US EPA Method 6010 or US EPA Method 7000 series.

Minimal disturbance of regulated material containing ADL occurs where the following work activities are conducted:

1. Trenching for electrical conduit installation

#### 14-11.09B Material Management

Handling of regulated material containing ADL must result in no visible dust migration. Use dust control measures. A means of controlling dust must be available at all times.

Separate material from vegetation. The resulting soil must remain on the job site.

Surplus material from the areas with regulated material containing ADL must remain in the area of disturbance. Do not dispose of surplus material outside the highway.

# DIVISION X ELECTRICAL WORK 87 ELECTRICAL SYSTEMS

#### Add to section 87-1.03B(3) Conduit Installation Underground

Conduit installed underground must be Type 3.

The conduit in a foundation and between a foundation and the nearest pull box must be Type 1.

If Type 3 conduit is placed in a trench, not in the pavement or under concrete sidewalk, after the bedding material is placed and the conduit is installed, backfill the trench (including caution tape) to not less than 4 inches above the conduit with minor concrete under section 90-2, except the concrete must contain not less than 421 pounds of cementitious material per cubic yard. Backfill the remaining trench to finished grade with backfill material.

After conductors have been installed, the ends of the conduits terminating in pull boxes, service equipment enclosures, and controller cabinets must be sealed with an authorized type of sealing compound.

At those locations where conduit is required to be installed under pavement and underground facilities designated as high priority subsurface installation under Govt Code § 4216 et seq. exist, conduit must be placed by the trenching in pavement method under section 87-1.03B(6).

At other locations where conduit is required to be installed under pavement and if a delay to vehicles will not exceed 5 minutes, conduit may be installed by the trenching in pavement method.

#### Payment

Payment for locating utilities prior to open trench or directional bore operations, excavation, backfill, locator wire, and caution tape are considered as included in payment for conduit installation and no additional payment made therefor.

#### Add to end of Section 87-1.03B(4) Horizontal Directional Drilling Method

Install conduit by the directional boring method, with approval of the Engineer, as shown or as specified in these special provisions.

Notify the Engineer 2 working days before starting directional boring operations.

Include the location and the equipment to be used in the advance notice to the Engineer.

Perform directional boring operations in the presence of the Engineer unless otherwise notified by the Engineer.

Install conduit to a minimum depth of 3 ft below finished grade.

The diameter of the boring tool must be 1.5 times the outside diameter of the conduit. Use only mineral slurry or wetting solution to lubricate the boring tool and to stabilize the soil surrounding the boring path. Mineral slurry or wetting solution must be water based and environmentally safe.

The directional boring equipment must have directional control of the boring tool and must have an electronic tool location detection system. During operation, the directional bore equipment must be able to determine the location of the tool both horizontally and vertically.

The directional boring equipment must be equipped with a tension measuring device that indicates the amount of tension exerted on conduit during conduit pulling operations.

Prior to starting work, provide a layout and a profile plot to the Engineer showing the location of the bore to a resolution of 6 inches. Layout and profile plot shall include all utility crossed by the bored conduit.

You must have direct charge and control of the directional bore operation at all times.

Reform schedule 40 conduit with a mandrel after installation.

# Add the following to section 87-1.03B(6) Conduit Installation by the Trenching-In-Pavement Method:

Temporary trench backfill shall by temporary hot mix asphalt.

The concrete backfill for the installation of fiber optic conduits in trench shall be a medium to dark, red color to clearly distinguish the concrete backfill from other concrete and soil. The concrete shall be pigmented by the addition of commercial quality cement pigment to the concrete mix. The red concrete pigment shall be LM Scofield Company; Orange Chromix Colorant; Davis Colors; or equal. The concrete shall conform to the provisions in said Section 90-10, "Minor Concrete."

For trenches in pavement areas, only the top 4 inch of concrete backfill will be required to be pigmented concrete. At the option of the Contractor, the full depth may have the pigment.

#### Replace the 3rd paragraph in section 87-1.03C(1) with:

In a ground or sidewalk area, embed the bottom of a pull box in crushed rock.

#### Add to section 87-19.01B Fiber Optic Glossary:

Active Component Link Loss Budget -- The active component link loss budget is the difference between the average transmitter launch power (in dBm) and the receiver maximum sensitivity (in dBm).

**Backbone** -- Fiber cable that provides connections between the TMC and hubs, as well as between equipment rooms or buildings, and between hubs. The term is used interchangeably with "trunk" cable.

**Breakout** -- The cable "breakout" is produced by (1) removing the jacket just beyond the last tie-wrap point, (2) exposing 3 to 6 feet of the cable buffers, aramid strength yarn and central fiberglass strength member, and (3) cutting aramid yarn, central strength member and the buffer tubes to expose the individual glass fibers for splicing or connection to the appropriate device.

**Connector** -- A mechanical device used to align and join two fibers together to provide a means for attaching to and decoupling from a transmitter, receiver, or another fiber (i.e., patch panel).

**Connectorized** -- A term that describes the termination point of a fiber after connectors have been affixed.

**Connector Module Housing (CMH)** -- A patch panel used in the FDU to terminate single mode fibers with most common connector types. It may include a jumper storage shelf and a hinged door.

**Couplers --** Couplers are devices which mate two fiber optic connectors to facilitate the transition of optical light signals from one connector into another. Couplers may also be referred to as: adapters, feed-throughs, and barrels. They are normally located within FDUs mounted in panels. They may also be used unmounted, to join two simplex fiber runs.

**Distribution Cable --** Fiber cable that provides connections between hubs. Drop cables are typically spliced into a distribution cable.

**End-to-End Loss --** The maximum permissible end-to-end system attenuation is the total loss in a given link. This loss could be the actual measured loss, or calculated using typical (or specified) values. A designer should use typical values to calculate the end-to-end loss for a proposed link. This number will determine the amount of optical power (in dB) needed to meet the System Performance Margin.

**Fan Out Termination** -- Permits the branching of fibers contained in an optical cable into individual cables and can be done at field locations; thus, allowing the cables to be connectorized or terminated per system requirements. A kit provides pull-out protection for individual bare fibers to support termination. It provides three layers of protection consisting of a Teflon inner tube, a dielectric strength member, and an outer protective PVC jacket.

FBC -- Fiber Backbone Cable.

**Fiber Distribution Unit (FDU)** -- A rack mountable enclosure containing both a Connector Module Housing (CMH) and a Splice Module Housing (SMH).

**Fiber Storage Enclosure (FSE)** -- Designed for holding excess cable slack for protection. The FSE allows the user flexibility in equipment location and the ability to pull cable back for resplicing.

F/O -- Fiber optic.

FOIP -- Fiber optic inside plant cable.

**FOOP** -- Fiber optic outside plant cable.

**FOTP** -- Fiber optic test procedure(s) as defined by TIA/EIA standards.

FPC -- Fiber Pigtail Cable

FTC -- Fiber Trunkline Cable

**Light Source --** A portable fiber optic test equipment that, in conjunction with a power meter, is used to perform end-to-end attenuation testing. It contains a stabilized light source operating at the designed wavelength of the system under test. It also couples light from the source into the fiber to be received at the far end by the receiver.

**Link** -- A passive section of the system, the ends of which are connectorized. A link may include splices and couplers. For example, a video data link may be from video F/O transmitter to video F/O receiver.

**Link Loss Budget --** A calculation of the overall permissible attenuation from the fiber optic transmitter (source) to the fiber optic receiver (detector).

**Loose Tube Cable --** Type of cable construction in which fibers are placed in buffer tubes to isolate them from outside forces (stress). A flooding compound or material is applied to the interstitial cable core to prevent water migration and penetration. This type of cable is primarily for outdoor applications.

**Mid-span Access Method --** Description of a procedure in which fibers from a single buffer tube are accessed and spliced to an adjoining cable without cutting the unused fibers in the buffer tube, or disturbing the remaining buffer tubes in the cable.

**MMFO** -- Multimode Fiber Optic Cable.

**Optical Time Domain Reflectometer (OTDR)** -- Fiber optic test equipment similar in appearance to an oscilloscope that is used to measure the total amount of power loss in a F/O cable between two points. It provides a visual and printed display of the losses associated with system components such as fiber, splices and connectors.

Optical Attenuator -- An optical element that reduces the intensity of a signal passing through it.

**Patch Cord** -- A short jumper used to join two Connector Module Housing (CMH) couplers, and or a CMH and an active optical electronic device.

**Pigtail --** Relatively short length of fiber optic cable that is connectorized on only one end. All pigtails shall be tight buffer cable.

**Power Meter --** A portable fiber optic test equipment that, when coupled with a light source, is used to perform end-to-end attenuation testing. It contains a detector that is sensitive to light at the designed wavelength of the system under test. Its display indicates the amount of power injected by the light source that arrives at the receiving end of the link. Segment - A section of F/O cable that is not connected to any active device and may or may not have splices per the design.

**Segment** -- A section of fiber optic cable that is not connected to any active device and may or may not have splices per the design.

SMFO -- Single mode Fiber Optic Cable.

**Splice** -- The permanent joining of two fiber ends using a fusion splicer.

**Splice Closure --** A environmentally sealed container used to organize and protect splice trays. The container allows splitting or routing of fiber cables from multiple locations. Normally installed in a splice vault.

**Splice Module Housing (SMH)** -- A unit that stores splice trays as well as pigtails and short cable lengths. The unit allows splitting or routing of fiber cables from and to multiple locations.

**Splice Tray** -- A container used to organize and protect spliced fibers.

Splice Vault -- An underground container used to house excess cable and splice closures.

**System Performance Margin** -- A calculation of the overall "End to End" permissible attenuation from the fiber optic transmitter (source) to the fiber optic receiver (detector). The system performance margin

should be at least 6 dB. This includes the difference between the active component link loss budget, the passive cable attenuation (total fiber loss) and the total connector/splice loss.

**Tight Buffer Cable --** Type of non-breakout cable construction where each glass fiber is tightly buffered (directly coated) with a protective thermoplastic coating to 900 µm with the exception of the protective thermoplastic coating. The tight buffer cable shall meet all the characteristics of the fiber in the fiber optic outside plant cable specified elsewhere in these specifications.

#### Add to section 87-19.02C Fiber Optic Cable:

#### General

Each fiber optic outside plant cable (FOOP) for this project shall be all dielectric, gel filled or waterblocking material, duct type, with loose buffer tube construction with a maximum outside diameter of 0.55 inch and shall conform to these special provisions. Cables shall contain single mode (SM) dual-window (1310 nm and 1550 nm) fibers with the numbers described below and as shown on the plans:

Cable Sizes			
Cable Size	Number and Type of Fibers		
288 SMFO	288 SM Fibers		
12 SMFO	12 SM Fibers		

#### Packaging and Shipping Requirements

Documentation of compliance to the required specifications shall be provided to the Engineer prior to ordering the material.

Fiber Optic Testing shall comply with State Standard Specifications (Section 87-19)

The completed cable shall be packaged for shipment on reels. The cable shall be wrapped in a weather and temperature resistant covering. Both ends of the cable shall be sealed to prevent the ingress of moisture.

Each end of the cable shall be securely fastened to the reel to prevent the cable from coming loose during transit. Two meters of cable length on each end of the cable shall be accessible for testing.

Each cable reel shall have a durable weatherproof label or tag showing the manufacturer's name, the cable type, the actual length of cable on the reel, the Contractor's name, the contract number, and the reel number. A shipping record shall be provided to the Engineer in a weatherproof envelope showing the above information and also include the date of manufacture, cable characteristics (size, attenuation, bandwidth, etc.), factory test results, cable identification number and any other pertinent information

The minimum hub diameter of the reel shall be at least thirty times the diameter of the cable. The F/O cable shall be in one continuous length per reel with no factory splices in the fiber. Each reel shall be marked to indicate the direction the reel should be rolled to prevent loosening of the cable.

Installation procedures and technical support information shall be furnished at the time of delivery.

#### Add to section 87-19.01D(2) Quality Control:

Testing shall be performed on all fiber optic locations on all strands.

Testing shall be performed in the presence of Engineer or Engineer-designated representative.

#### Add to section 87-19.03C Fiber Optic Installation:

Fiber optic cable shall be installed in conduit system as show on the plans. Plan Sheet DT-09 shows various scenarios for installing fiber optic cable into the cabinet using existing infrastructure and installing new upgrades where necessary. The contractor shall confirm the scenario to be used at each controller cabinet location with the Engineer prior to beginning construction.

Fiber optic conduit system shall consist of conduits, fiber optic pull boxes and fiber optic splice vaults or cabinets.

There shall be no re-use fiber optic cable for the installation.

Existing conduit system identified for usage in the plans must be investigated to be free and clear of debris, breakages or blockages that will inhibit fiber optic cable installation or damage the fiber optic cable during its installation and operations.

As directed by the Engineer, existing conduits may need to be located. Excavate exploratory holes for locating existing conduit. Excavate and backfill exploratory holes to a maximum size of 2-1/2 feet in width, 5 feet in depth, and 5 feet on each side of the marker or directed. If the conduit is not found and if ordered, increase the size of the exploratory holes beyond the dimensions specified. The additional excavation and backfill is change order work.

Existing conduit system investigation methods must use industry accepted methods to positively determine whether there is a continuous and unobstructed path in each existing empty conduit between any two consecutive boxes. The Contractor must use standard industry methods such as mandrel or cylindrical wire brush, and blow-out with compressed air. Submit the findings in an organized report to the Engineer.

Installation procedures shall be in conformance with the procedures specified by the cable manufacturer for the specific cable being installed. The Contractor shall submit to the engineer the manufacturer's recommended procedures for pulling fiber optic cable at least 20 working days prior to installing cable. Mechanical aids may be used, provided that a tension measuring device is placed in tension to the end of the cable. The tension applied shall not exceed 500 lb-force or the manufacturers recommended pulling tension, whichever is less.

The F/O cable shall be installed using a cable pulling lubricant recommended by the cable manufacture and a non-abrasive pull tape conforming to the provisions described under "Conduit" elsewhere in these special provisions. Contractor's personnel shall be stationed at each pull box, vault and cabinet through which the cable is pulled to lubricate and prevent kinking or other damage.

During cable installation, the bend radius shall be maintained at not less than twenty times the outside diameter of the cable. The cable grips for installing the fiber optic cable shall have a ball bearing swivel to prevent the cable from twisting during installation. At the Contractor's option, the fiber cable may be installed using the air blown method. If integral innerduct is used, the duct splice points or any temporary splices of innerduct used for installation must withstand a static air pressure of 110 psi.

The fiber installation equipment must incorporate a mechanical drive unit or pusher, which feeds cable into the pressurized innerduct to provide a sufficient push force on the cable, which is coupled with the drag force created by the high-speed airflow. The unit must be equipped with controls to regulate the flow rate of compressed air entering the duct and any hydraulic or pneumatic pressure applied to the cable. It must accommodate longitudinally ribbed or smooth wall ducts from nominal 0.625-inchto 2-inch inner diameter. Mid assist or cascading of equipment must be for the installation of long cable runs. The equipment must incorporate safety shutoff valves to disable the system in the event of sudden changes in pneumatic or hydraulic pressure.

The equipment must not require the use of a piston or any other air capturing device to impose a pulling force at the front end of the cable, which also significantly restricts the free flow of air through the inner duct. It must incorporate the use of a counting device to determine the speed of the cable during

installation and the length of the cable installed. The cable shall be installed without splices except where specifically allowed on the plans or described in these special provisions. Minimum slack of the cable as shown on the plans shall be provided at each cable access location without a cable splice. At fiber optic splice location, a minimum of 30 feet slack of each cable shall be stored in the splice location.

The Contractor shall furnish and install conduit dividers to allow the fiber-optic cable to be installed over the existing cables or conductors. Conduit dividers shall have a minimum of two cells and be installed according to the manufacturer's recommendations. The conduit divider shall be installed on top of existing cables or conductors, and the fiber-optic cable installed in one of the cells. Conduit dividers shall be MaxCell by TVC Communications, or approved equal. Rigid or semi-rigid innerduct is not allowed. Conduit dividers are not required for empty conduits. Furnishing and installation of conduit dividers shall be considered incidental to the installation of fiber optic cable.

#### Replace the last sentence of section 87-19.02B Splice Vaults with:

4. Have markings "SMART CORRIDOR FIBER" on each section.