



MASTER SERVICES PROCUREMENT AGREEMENT

THIS MASTER SERVICES PROCUREMENT AGREEMENT (the “Agreement”) is made this September 30, 2021 (the “Effective Date”) by and between **Avangrid Service Company**, a Delaware corporation, with offices located at One City Center, 5th Floor, Portland, Maine 04101 (hereinafter, “Customer”) and [REDACTED] hereinafter, “Supplier” or “Vendor” or “Contractor”). Customer and Supplier may be referred to individually as a “Party” and collectively as the “Parties.”

WHEREAS, Customer is authorized to assist the utility operating company(ies) identified in *Schedule A*, attached hereto and made part hereof, in procuring certain services that they may require from time to time in the operations of their respective businesses, including the services described in *Schedule B*, attached hereto and made part hereof (the “Services”); and

WHEREAS, the Supplier states that it is an established and well-known provider of the Services possessing the skills, qualifications, and experience necessary to perform and manage such Services in an efficient, cost-effective, and controlled manner, with a high degree of quality and responsiveness, and that it has successfully performed similar services for other customers and is willing to provide the Services to the utility operating company Affiliates of Customer in accordance with the terms and conditions of this Agreement; and

WHEREAS, in reliance upon such statements and following its review of Supplier’s proposal and negotiation of business terms, Customer has selected the Supplier as a vendor-of-choice for the Services, which shall be procured and awarded in accordance with this Agreement.

NOW THEREFORE, in consideration of the mutual covenants contained herein, and other good and valuable consideration, the Supplier and Customer hereby agree as follows:

1. DEFINITIONS

As used in this Agreement:

- (a) “Affiliate” shall mean, with respect to a Party, any other entity Controlling, Controlled by, or under common Control with such Party. The term “Control” and its derivatives shall mean with regard to any entity, the legal, beneficial, or equitable ownership, directly or indirectly, of fifty percent (50%) or more of the capital stock (or other ownership interest, if not a corporation) of such entity ordinarily having voting rights.
- (b) “Business Day” – A calendar day other than Saturday, Sunday or a legal, public or bank holiday in the State of New York, Maine and Connecticut.

- (c) “Company” shall mean the company(ies) specified in *Schedule A*, attached hereto and made part hereof.
- (d) “Company Department” shall mean the business unit in AVANGRID that coordinates and manages this Agreement.
- (e) “Contract Price” shall mean, in the aggregate, the total maximum dollar amount of all Services pursuant to this Agreement, including, without limitation, any amendment or other modification thereto.
- (f) “Day” shall mean a calendar day including Saturday, Sunday or a legal, public or bank holiday in the States of New York, Maine and Connecticut.
- (g) The “Effective Date” shall mean the date specified in the recitals of this Agreement.
- (h) “Industry Standards” - Any of the practices, methods, standards and acts engaged in, or approved by, a significant portion of the independent power industry for the engineering, procurement, construction and maintenance of a static synchronous compensator similar to the Project and located in the United States that, at a particular time, in the exercise of prudent and reasonable judgment by those experienced in the industry, in light of the facts known or that should reasonably have been known at the time a decision was made, could have been expected to accomplish the desired result consistent with good business practices, reliability, economy, health, safety and expedition. “Industry Standards” are not intended to be limited to the optimum practices, methods or acts to the exclusion of all others, but rather to be practices, methods and acts generally accepted in the United States, having due regard for, among other things, manufacturers’ warranties, contractual obligations, the requirements or guidance of any Governmental Authority, Applicable Law, applicable NERC reliability requirements and the requirements of applicable insurance policies.
- (i) “Intellectual Property “ – In relation to any and all technology, software, firmware, know-how, processes, inventions, ideas, discoveries, techniques, algorithms, programs, discoveries, improvements, devices, products, concepts, designs, prototypes, samples, models, technical information, materials, drawings, specifications, mask works, topography and other works of authorship, any and all rights, priorities and privileges relating to intellectual property therein, whether arising under United States, multinational or foreign laws or otherwise, including but not limited to copyright applications and registrations, copyright licenses, patent applications and registrations, patent licenses, trademark applications and registrations, trademark licenses, trade secret rights and all rights to sue at law or in equity for any infringement or other impairment thereof, including the right to receive all proceeds and damages therefrom.
- (j) “Project” means the Dark Fiber IRU project under this Agreement pursuant to which the Supplier will provide the Services.
- (k) “Project Completion Date,” means the date in which the Project is fully realized to the satisfaction of the Customer and applicable Company(ies).

- (l) “Purchase Order” shall mean a purchase order issued by Company or a Company(ies) in accordance with this Agreement.
- (m) “RFP” shall mean a request for proposal for all or a portion of the Services by Customer or the Company.
- (n) “Scope of Work shall mean the services described in *Schedule B*, attached hereto and made part hereof.
- (o) “Services” shall mean the services and/or related materials described in *Schedule B*, attached hereto and made part hereof.
- (p) “Small Business Concern” as defined by the Small Business Administration, shall mean a business that is independently owned and operated and which is not dominant in its field of operation. The law also states that in determining what constitutes as small business, the definition will vary from industry to industry to reflect differences accurately.
- (q) “Supplement” is a written Purchase Order Supplement, signed by the Customer and issued after the execution of this Agreement, authorizing an addition, deletion, or revision in the Services or an adjustment in the Contract Price or the Schedule.
- (r) “Term” shall mean the term of this Agreement, as extended or terminated early in accordance with this Agreement.
- (s) “Terms and Conditions” shall mean the terms and conditions governing the performance of the Services and related matters pursuant to a Purchase Order, as set forth in *Schedule C*, attached hereto and made part hereof.

2. PROCESS FOR AWARDING SERVICES

2.1 Customer agrees that, upon a request made to Customer by a Company for assistance in procuring Services, Customer shall, on its own or with the assistance of the Company(ies) requiring the Services, take either of the steps delineated in subsections (a) or (b) toward procuring Services from the Supplier:

- (a) Issuance of Purchase Order. Customer or the Company(ies) requesting the Services shall issue to the Supplier duplicate originals of a Purchase Order for the Services incorporating: (i) a scope of work consistent with the standards set forth in *Schedule B*, (ii) the Terms and Conditions set forth in *Schedule C*, and (iii) and the pricing terms set forth in *Schedule D*. Upon receipt of an authorized Purchase Order, Supplier shall commence performance of the Services in accordance with the terms therein.

OR

(b) Issuance of an RFP. (i) Customer or the Company(ies) requesting the Services shall issue an RFP to the Supplier. Within the time period specified in the RFP, Supplier shall issue a written proposal to Customer, or if so directed, to the Company specified in the RFP, setting forth: (1) a detailed description of the Services to be provided by the Supplier, consistent with the scope and other requirements specified in the RFP, and (2) Supplier's fees and charges for completing the Services, which will be incorporated as **Schedule D** of the Agreement and Supplier warrants will be calculated in accordance with the pricing terms set forth in **Schedule D**, attached hereto and made part hereof.

(ii) Within the time period specified in the RFP, Customer and/or the Company(ies) shall review the Supplier's proposal. If Customer and the Company(ies) requiring the Services, in their sole and absolute discretion, determine that they wish to award a contract for Services and thereupon select the Supplier's proposal, Customer may elect to issue a Purchase Order and (in such instance) Customer shall forward duplicate original Purchase Orders for the Services (conforming with the requirements of Section 2.1(a), above, but also incorporating the Supplier's proposal in accordance with this Agreement) to the Supplier at the address specified in **Schedule F**, below. Upon receipt of an authorized Purchase Order, Supplier shall commence performance of the Services in accordance with the terms therein.

2.2 (a) Notwithstanding anything to the contrary in this Agreement or in any Purchase Order or RFP issued hereunder, Customer makes no representation or warranty that Customer or any Company(ies) will issue any Purchase Orders or RFPs, or any minimum dollar volume of Purchase Orders or RFPs, during the Term of this Agreement. Customer or the Company(ies) requesting Services may terminate a Purchase Order or RFP for such Services at any time upon written notice, without penalty or other obligation, prior to commencement of performance of the Services by Supplier in accordance with the terms herein.

(b) Supplier acknowledges and agrees that the issuance of an RFP, Purchase Order, or other document pursuant to this Section 2 by Customer, or any Company(ies), shall not constitute an offer by Customer, or any Company, to purchase Services, and that an enforceable agreement for Services shall result only when Customer or any Company(ies) authorizes a Purchase Order for such Services, processed in accordance with this Article 2, and such Purchase Order is issued to Supplier by Customer, or a Company.

(c) Supplier further acknowledges that each Purchase Order processed in accordance with this Article 2 and issued to Supplier by Customer, or a Company, constitutes a separate and distinct contract for the particular Services set forth in the Purchase Order and shall be governed by the following documentation:

- (i) The Purchase Order (exclusive of its pre-printed terms and conditions);
- (ii) Special Conditions attached hereto as **Schedule E**.
- (iii) The Terms and Conditions attached hereto as **Schedule C**, as they may be amended or modified for the particular Purchase Order;

- (iv) The Data Security Rider attached hereto as *Schedule H*;
- (v) The Insurance requirements attached hereto as *Schedule G*
- (vi) The Scope of Services document attached hereto as *Schedule B*, as it may be amended, modified or supplemented for the particular Purchase Order; and
- (vii) This Agreement, including all Schedules other than those described in subsections (i), (ii), (iii), (iv), (v), (vi) and above.

In the event of any inconsistency among the aforementioned documentation, the order of precedence shall be as set forth in subsections (i), (ii), (iii), (iv), (v), (vi), and (vii) above.

3. PRICING; PAYMENT; DISCOUNTS AND REFUNDS

3.1 (a) Supplier agrees that pricing, fees, pass-throughs, and other charges set forth in *Schedule D* will be incorporated into and used as the basis for all pricing, fees, pass-throughs, and other charges in: (i) any proposal issued by Supplier hereunder, and/or (ii) any Purchase Orders pursuant to this Agreement.

(b) Supplier agrees that the pricing terms set forth in *Schedule D* shall be fixed for the time period specified in such Schedule and shall not be subject to increase except as expressly specified in such Schedule. If *Schedule D* does not specify a time period, pricing terms shall be fixed for the Term of this Agreement.

3.2 (a) Supplier agrees that, in calculating any discounts or adjustments to prices, fees, pass-throughs, and charges set forth in *Schedule D* that are based upon volumes or quantities of Services awarded to Supplier, Supplier shall include in such calculation the volumes or quantities of Services for all Purchase Orders issued by Customer or any Company(ies) during the relevant time period.

(b) Within thirty (30) days following each anniversary of the Effective Date of this Agreement, Supplier shall forward to Customer a draft reconciliation statement showing Supplier's calculation of any rebates or refunds payable as a result of the total value of all Purchase Orders for Services executed by the Company(ies) with the Supplier during the preceding calendar year. Customer shall review the reconciliation statement and will notify Supplier of any comments they may have with respect thereto within thirty (30)-days of their receipt thereof. Supplier shall pay to Customer the undisputed portion of any rebates or refunds due the Company(ies) under executed Purchase Orders for Services within five (5) business days following the earlier of: (i) Supplier's receipt of the comments of Customer and Company(ies), and (ii) the thirty (30) day period referenced in the immediately preceding sentence.

4. NO GUARANTY; HOLD HARMLESS

Supplier acknowledges and agrees that, notwithstanding anything to the contrary contained in this Agreement, any subsequently issued RFP, or in any Purchase Order between Supplier and any Company(ies), that with respect to any Purchase Order for Services issued by any Company(ies) pursuant to this Agreement:

- (a) All charges, fees, and expenses, as well as any credits, refunds, or rebates, resulting from Services rendered by Supplier pursuant to such Purchase Order shall be solely for the account of such Company(ies), and neither Customer nor any other Company(ies) shall be considered a guarantor or surety of any charges, fees, and expenses arising under such Purchase Order;
- (b) All communications, notices, invoices, and reports resulting from Services rendered by Supplier pursuant to such Purchase Order shall be directed to the representative(s) of the Company(ies) identified in such Purchase Order;
- (c) Supplier covenants not to sue Customer or any other Company(ies) except the Company issuing the Purchase Order, for any charges, fees, expenses, or claims arising from or attributable to Services rendered by Supplier pursuant to such Purchase Order; and
- (d) Pursuant to Article 19 of *Schedule C*, Supplier shall hold Customer and the other Company(ies) and their respective employees, agents, officers, shareholders, affiliates, managers, directors, members, partners, successors, and permitted assigns harmless from and against any and all damages or liabilities arising from or attributable to, directly or indirectly, the performance, non-performance, or other acts of the Supplier and its employees, agents, or representatives pursuant to such Purchase Order.

5. TERM

5.1 This Agreement shall remain in effect until terminated according to Section 5.2(b) below.

5.2 (a) Customer may terminate this Agreement at any time and for any or no reason in accordance with the terms of Article 27 of *Schedule C* to this Agreement. Upon the effective date of termination specified in Customer's termination notice: (i) all RFPs, proposals, and Purchase Order for which Supplier has not begun to deliver the Services shall be deemed canceled, unless otherwise agreed in writing by the Company(ies) requesting or issuing such RFPs, proposals, and/or Purchase Orders, and (ii) this Agreement shall be terminated without liability or obligation to the Parties, except for any liabilities and obligations arising under any Purchase Orders issued by Customer or Company(ies) for which Supplier has already completed Services in accordance with the terms of this Agreement. Customer shall have no liability for any costs, expenses, or other fees incurred by Supplier in connection with any RFPs, proposals, or Purchase Orders that are in process but for which provision of Services has not been completed upon the effective date of termination of this Agreement by Customer.

(b) Termination of this Agreement by Customer shall not effect, or result in, termination of any Purchase Orders issued by Customer or a Customer and for which Supplier has begun to deliver Services prior to the effective date of termination set forth in Customer's termination

notice; provided, however, that this subsection (b) shall not constitute a waiver or relinquishment of any right of termination of any Customer pursuant to the terms and conditions of such Purchase Orders.

6. GENERAL

6.1 Notices. All notices, requests, demands, and determinations under this Agreement shall be in writing and shall be deemed duly given: (i) when delivered by hand, (ii) one (1) day after being given to an express courier with a reliable system for tracking delivery designating overnight delivery, (iii) when sent by confirmed facsimile with a copy sent by another means specified in this Section 6.1, or (iv) six (6) days after the day of mailing, when mailed by United States mail, registered or certified mail, return receipt requested, postage prepaid, and addressed to Party at the address(es) specified in *Schedule F* attached to this Agreement and made a part hereof. A Party may from time to time change its address or designee for notification purposes by giving the other prior written notice of the new address or designee and the date upon which it will become effective.

6.2 Governing Law. This Agreement and performance under it, and all actions, causes of action, or claims of any kind (whether at law, in equity, in contract, in tort, or otherwise), shall be governed by and construed in accordance with the laws of State of New York, including without limitation New York laws relating to applicable statute of limitation and burdens of proof and available remedies.

6.3 Binding Nature and Assignment. This Agreement shall be binding on the Parties hereto and their respective successors and assigns. Neither Party may, or shall have the power to, assign this Agreement without the prior written consent of the other, which consent shall not be unreasonably withheld or delayed, and any such assignment or attempted assignment without such consent shall be null and void, except that Customer may assign this Agreement and its rights and obligations hereunder to an Affiliate without the approval of the Supplier, but on prior written notice.

6.4 Entire Agreement: Amendment. This Agreement, including any Schedules referred to herein and attached hereto, each of which is incorporated herein for all purposes, constitutes the entire agreement between the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to the subject matter contained in this Agreement. No change, waiver, or discharge hereof shall be valid unless in writing and signed by an authorized representative of the Party against which such change, waiver, or discharge is sought to be enforced.

6.5 Counterparts. This Agreement may be executed in several counterparts, all of which taken together shall constitute one single Agreement between the parties hereto.

6.6 Headings. The article and section headings and the table of contents used herein are for reference and convenience only and shall not enter into the interpretation hereof.

6.7 Relationship of Parties. Supplier is not an agent of Customer and has no authority to represent the Customer as to any matters, except as expressly authorized in this Agreement.

IN WITNESS WHEREOF, Customer and Supplier have each caused this Agreement to be signed and delivered by its duly authorized representative as of the date first given above.

[Signature page follows]

Avangrid Service Company

DocuSigned by:
Robert Kump

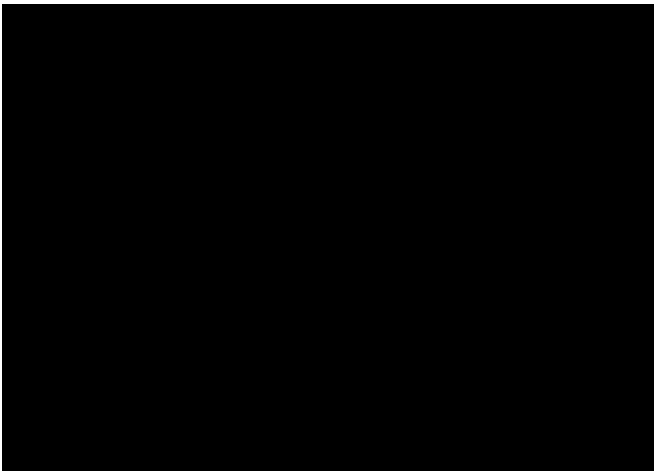
Signature

Robert Kump

Print Name

AVANGRID USA NETWORKS

Title



Avangrid Service Company

DocuSigned by:
Andrea Vanluling

Signature

Andrea vanluling

Print Name

VP Controller - Networks

Title

SCHEDULES:

- Schedule A: Companies
- Schedule B: Services
- Schedule C: Terms and Conditions
- Schedule D: Pricing Terms
- Schedule E: Special Conditions
- Schedule F: Notices
- Schedule G: Insurance Requirements
- Schedule H: Background Check Requirements

SCHEDULE A

Companies

Central Maine Power Company

Augusta General Office
83 Edison Drive, Augusta, Maine 04336

New York State Electric & Gas Corporation

89 East Avenue
Rochester, New York 14649

Rochester Gas and Electric Corporation

89 East Avenue
Rochester, New York 14649

The Berkshire Gas Company

115 Cheshire Road
Pittsfield, MA 01201

Maine Natural Gas Corporation

4 Industrial Parkway
Brunswick, ME 04011

UIL Holdings Corp.

180 Marsh Hill Rd, Orange, CT 06477

**The United Illuminating Company
Ops Center**

100 Marsh Hill Rd, Orange, CT 06477

The Southern Connecticut Gas Company

Locations:

SCG Ops Center

Southern Connecticut Gas
60 Marsh Hill Rd, Orange, CT 06477

SCG LNG

775 Oronoque Rd, Milford, CT 06461

Connecticut Natural Gas Corporation

Locations:

CNG LNG

1376 Cromwell Ave, Rocky Hill, CT 06067

CNG Ops Center

East Hartford

76 Meadow Street, East Hartford, CT 06108

SCHEDULE B

Services, Warranty, Deliverables, and Vendor Requirements

PURPOSE

This document establishes the basis for the call for tenders for the contracting of dark optical fiber links in IRU lease mode over the next three years throughout NY., ME., MA. & CT. The office Operational Smart Grids OT Telecom Department is seeking to acquire Dark Optical Fiber in IRU lease mode and or the construction of Dark Fiber to be owned by AVANGRID upon test and acceptance in order to enhance its backbone, expand its network, deliver redundancy, privatize and secure its network in order to create a high speed infrastructure that will deliver continuity and expand automation throughout the northeast region of the country. Construction of New Fiber pricing per mile is requested throughout this document in order to have available for future reference. It is the intent for AVANGRID Services Company to purchase identified links in complete IRU lease mode or if necessary have Dark Fiber constructed in areas where fiber is required and leased to AVANGRID as an IRU or owned by AVANGRID after construction is complete. There is also a request for pricing on a per mile basis that may be used for the vendor to build fiber on behalf of OSG where AVANGRID will own the fiber upon completion, test and turn-up in gap areas of the network where availability is sparse. We will also request pricing and responses for the Last Mile preparation work for all locations where fiber will be terminated known in this document as Last Mile Construction

BACKGROUND

The AVANGRID SERVICES COMPANY's communications network in the US has future business needs and would like to lease dark optical fiber links provided by third parties.

Based on the temporary periods of need for such links, AVANGRID SERVICES COMPANY may ask that dark optical fiber be constructed and leased as a 20 year IRU or purchase the indefeasible right to use the existing dark optical fiber (IRU) for a term 20 years. If you do not have fiber in the routes detailed in this RFP, you can provide a price for the fiber to be built and leased to AVANGRID for the 20 year period or built to own by AVANGRID where applicable.

RESPONSE TO THE SPECIFICATION

The supplier will provide a response:

- Point by point to this document in all that does not refer to the tables to be completed indicating explicitly whether it does or does not comply and in the latter case, specifying the degree of compliance. Please respond with a comply or do not comply where you see necessary
- In addition, in a summary file of the requested tables (according to the file included in the tender, hereinafter XS), in MS Excel format with the response to the provision of requested features, as well as with the price of the services and additional elements. This sheet will not have editing protection. Please be sure to fill out properly and do not change the format or hide any of the cells. You will have to provide answers to all columns based on your ability, inability and or

constructing of new fiber for each route requested in this RFP or location for Last Mile construction.. An answer for each question and in each column in the specifications, annexes and pricing worksheet is required. An answer is required in the price sheet in columns N – T for all bidders in order to be qualified and in the New Fiber & Last Mile Construction tab, an answer in column B must be provided. Please do not change format and fill in all cells with a response so that all cells can be compared and revised more easily.

- There are 4 Tabs in the Pricing Worksheet that will need to be addressed. The first three are for pricing for each of the routes we are looking to acquire across all of our companies across New York and New England. The IRU Price for a 20 Year Term or if constructing the route, the price for the construction of the route to be owned by AVANGRID. The fourth tab has been created in order for the bidder to define what their cost per mile for a fiber build would be with meeting all of the RFP specifications as a guideline. The same will be required for the Last Mile Construction for each site using the specification provided. Please be advised that we are looking to compare pricing so assume that all work per the specification will be needed for Last Mile Construction and be sure to add a breakdown of costs for Last Mile as an attachment. If you bid on Fiber construction for AVANGRID Ownership, you must also provide the breakdown of costs associated with the build and specifications. We are interested in your Urban and Rural pricing per mile. The idea is to be able to have fiber built for AVANGRID directly where upon test and turn-up, the fiber will be fully owned by AVANGRID. There will also be a request for Last Mile Construction as described in this document for preparing the end locations where the fiber will be terminated.

- Any detail that needs to be clarified and that requires additional information that cannot be contained in the space provided for it in the Excel table will be incorporated in an Annex prepared for this purpose in PDF format. The Annex will be referenced in the Comments box in the table.

- All information will be delivered in electronic format.

Those offers that do not comply with the previously requested details will not be accepted.

AVANGRID SERVICES COMPANY is free to award the contract in whole or in part, to declare the tender void or to subcontract partially to several companies.

SCOPE

Attached you will find a list of links that you will be expected to price out in the format below.

- There will be a requirement of **2 strand pricing** and **4 strand pricing** of fiber for each Link identified in the attachment priced separately for AVANGRID to choose the option.

- Please provide diversity, dual entrances and or alternate paths where applicable, in order to sustain communications.

- Identify the difference in costs associated with existing fiber and construction due to termination of fiber at said location. It is our intent to get the breakdown of the complete pricing for each link required. * Do not blend the pricing so that we will have the proper pricing comparisons.

- Please provide splicing costs and any other necessary elements required to deliver a fully functional service and termination at both ends.
 - Provide cost of co-location for long distance runs. (need to consider co-locations where we capital lease conditioned, secured, space and racks that offer redundant power connections and battery backup to regenerate the signal for reliability and functionality purposes where necessary)
 - Fiber lifecycle must have 20 years life remaining and provides documentation that strands or waves are uniquely identifiable as AVANGRID leased fiber.
 - Fiber must be “maintained” with a clear SLA in order to recover broken fiber and identify clear procedures for failure detection, response coordination, contact and escalation. The vendor will be required to open a trouble ticket, measuring the time to repair and identify if it passes or fails the SLA provided. Downtime and actions taken must be documented from time of discovery to the time in which service is restored and AVANGRID is fully functional. The vendor NOC will immediately communicate with the AVANGRID NMC and update the NMC every half hour until the problem is resolved. A corresponding ticket will be opened and monitored by the AVANGRID NMC and internal documentation will be required.
 - Please number accordingly as they are identified in the attachment using the name address and coordinates specific to each link for easy identification and comparison and to maintain consistency for review. Be sure to complete your response by filling in all columns associated with each fiber route including bid/no bid, existing / new construction and fiber miles.
 - Where fiber does not exist and you would like to build please identify that it is new construction in the appropriate column and price accordingly in the 2 Strand and 4 Strand columns.
 - In the 4th tab on the Pricing worksheet there is a request for the costs associated with building the fiber at a per mile cost including all construction and termination requirements meeting all specifications of the RFP at said locations. This request is for potential use in places where we have a need to build fiber for special projects and the fiber will be owned by AVANGRID. The construction needs to be priced out at a per mile basis with a defined category of Metro or Rural, Aerial or Underground. It is imperative that you submit pricing for construction properly and we can easily identify if the response is for an existing fiber link or to be built fiber link. Make sure that for these two categories of existing and to be built that you specify the time it will take to deliver upon execution of the contract.
 - Please follow the instructions for filling in the pricing sheet. It is imperative that you keep the document as is. Do not alter or change the pricing sheet. Be sure to fill in the columns for 2 strands, 4 strands and per mile if you are bidding on the link. If you are not bidding on a link, please write “No Bid”. Please identify build versus existing and IRU versus Purchase as you may be expanding your access and we need to know if the IRU option is included with expected dates of completion or it will be a direct build for AVANGRID ownership.
- Link No. 1
- _____ (state whether rental or IRU for a term of ____ years).
 - XX optical fibers (in each case define XX, according to the need) between the following points:
 - A: (specify the address and/or coordinates)

- B: (specify the address and/or coordinates)
- If applicable, include more links with the same data
- _____ (state whether rental or IRU for a term of ____ years.
- XX optical fibers (in each case define XX, according to the need) between the following points:
 - A: (specify the address and/or coordinates)
 - B: (specify the address and/or coordinates)

TECHNICAL CHARACTERISTICS

Below are the technical requirements for the different elements that make up the link(s) to be supplied.

AVANGRID SERVICES COMPANY reserves the right to make any changes it deems necessary.

Properties of the optical fiber

ITU-T.G.652-D compliant, single mode optical fiber is required.

The supplier will deliver certificates of proof.

The age of the optical fiber, cables and other associated elements, except supports, will be such that, when adding that age to the contracting period for the rental or IRU, it does not exceed 30 years. It will be the provider's duty to replace any fiber that fails or weakens due to age. An immediate replacement would be expected.

The optical fiber will be supplied without intermediate optical transmission equipment, neither passive nor active.

The proposed optical fiber will be single mode silica-silica type. The refractive index profile will be of the step-index type.

The Polarization Mode Dispersion (PMD) of the optical fiber, once installed with all its associated elements, including splices and connectors in optical fiber distribution units, must be less than or equal to 0.5 ps/ $\sqrt{\text{km}}$.

Properties of the splices

The splices of the optical fibers will be done by automatic fusion and alignment machines.

The average attenuation of the splices will be less than 0.10 dB, measured at 1330, 1550, and 1625 nm. Annex 1 describes the measurements and acceptance tests to be carried out.

The number of splices for each 3 km of circuit shall, as a general rule, be less than or equal to 3. Exceptions may be offered for sections with a greater number of splices, provided that the reason associated with a higher number is reasonably justified by the supplier.

1.1. Connectors

The optical fibers will be delivered to the corresponding fiber distribution units to be installed by the supplier.

These fiber distribution units will preferably be housed in the 19" cabinets available from AVANGRID SERVICES COMPANY.

In places where this is not possible due to space requirements, installation on the wall will be allowed with an additional 50ft. of fiber rolled up and left hanging on the wall or overhead in the cable trays or under floor panels where applicable.

The supplier will attach the plans and technical information of fiber distribution units to the offer, including the manufacturer, for prior acceptance by AVANGRID SERVICES COMPANY.

The optical fiber will be delivered to AVANGRID SERVICES COMPANY through the fiber distribution units using SC/APC connectors.

The connecting pigtail will have FC/APC type connectors.

Detailed information about these connectors and pigtail, including the manufacturer thereof, will be attached to the offer. The average attenuation of the connectors will be less than 0.50db, measured at 1330, 1550 and 1625nm.

Splice boxes

The offer will include technical information for the different types of splice boxes.

Cables

The offer will contain the technical and construction information for the cables used. The technical information on the types of support and ducts used, as well as other construction elements, such as anchors, transitions from aerial to underground, chambers, ducts and other necessary elements will also be attached to the same information.

The actual layout of the geo-referenced lines in .kmz, .kml or any MapInfo compatible format will be attached to the offer, distinguishing aerial and underground paths, as well as placement of splice boxes and supports using different layers, if possible.

The attenuation inherent in the optical fiber of the cable in the link must not exceed a mean of 0.35 dB at 1330 nm, 0.25 dB at 1550 nm and 0.27 dB at 1625 nm.

Connections to the technical premises of AVANGRID SERVICES COMPANY

Connections to the technical premises of AVANGRID SERVICES COMPANY will be the responsibility of the supplier. These connections will be part of the final price offered for the link.

To this end, before construction, the supplier will conduct a field survey accompanied by AVANGRID SERVICES COMPANY personnel, where the layout and work to be done will be agreed. Said works will be the responsibility of the supplier and will be carried out under the regulations of AVANGRID SERVICES COMPANY in this respect and a due date will be determined and agreed upon by both parties.

The supplier will provide AVANGRID SERVICES COMPANY with complete documentation of the work to be carried out. Prior acceptance of the documentation by AVANGRID SERVICES COMPANY will be necessary for the supplier to undertake the work.

Once the work is completed, the supplier will provide AVANGRID SERVICES COMPANY with complete and detailed documentation of the work performed. Said delivery will be necessary for AVANGRID SERVICES COMPANY to make any payment to the supplier.

The Construction of Fiber Routes will have the same expectations as above and they too will be responsible for the requirements for

Theoretical attenuation of the link

The offer will contain the expected maximum theoretical value of the link, calculated from distributor to distributor, as well as the hypotheses under which the calculation was performed.

ACCEPTANCE OF THE LINK

The supplier must carry out joint bi-directional tests with AVANGRID SERVICES COMPANY for the acceptance of the contracted links.

Attached Annex 1 shows the procedure for accepting a link.

MAINTENANCE

Full and peaceful use

The supplier undertakes to keep AVANGRID SERVICES COMPANY in the full and peaceful use of the rent/IRU of the contracted links during the whole term of said contract. Any disturbance in fact or right of the IRU must be communicated by the supplier to AVANGRID SERVICES COMPANY, thirty (30) days in advance and once agreed upon, the supplier must send daily updates 15 days prior to maintenance through to the day prior to activity, as far as possible,

Maintenance

The preventive maintenance, upkeep and repair of faults of the fiber optic links shall be carried out by the supplier, in the terms provided in the Annex II.

The supplier must maintain in good condition of use and repair those infrastructures owned or managed by and under its charge that are technically necessary for the continued and adequate use of the links rented/IRU to AVANGRID SERVICES COMPANY.

The price of the dark optical fiber links leased by AVANGRID SERVICES COMPANY must include the cost associated with all the work included in the two previous paragraphs and any and all construction for new fiber build if necessary.

In the case of IRU of dark optical fiber, the cost of the work included in the first two paragraphs will be billed to AVANGRID SERVICES COMPANY by the supplier on the basis of a price per mile of optical fiber pair (2 & 4 optical fibers)

In any case, the criteria, planning and execution of maintenance activities by the supplier shall ensure the compatibility of the provision of the telecommunications services for which AVANGRID SERVICES COMPANY uses the optical fiber, with quality and standards normal for optical fiber at the international level.

The supplier and AVANGRID SERVICES COMPANY will be responsible for the maintenance of the equipment on their own property.

Supplier should at any time be ready to supply time to site values and Time To Repair (TTR).

Modifications of the configuration of the links by the supplier

Any modification by the supplier in the configuration of optical fiber links contracted by AVANGRID SERVICES COMPANY, either on the supplier's own initiative or at the request of third parties entitled to it, and that may affect the full operation of AVANGRID SERVICES COMPANY's telecommunications services using said optical links shall be communicated to AVANGRID SERVICES COMPANY at least 15 working days in advance. All Planned work shall be done at night time in order not to disrupt the daily activity of AVANGRID. AVANGRID SERVICES COMPANY must expressly authorize such modification before its execution by the supplier, including agreement by mutual consent of the day and hour in which the modification will be made.

If the route is modified and this leads to an increase in attenuation of the supplied link, AVANGRID SERVICES COMPANY will only allow this if its telecommunications equipment can continue to operate with the new total attenuation increase. Otherwise, the supplier may not make such modifications without the authorization of AVANGRID SERVICES COMPANY.

The costs resulting from the modifications will always be paid by the supplier.

1.1. Modifications of the configuration of the links requested by AVANGRID SERVICES COMPANY

The offer will include the possibility and associated economic conditions so that AVANGRID SERVICES COMPANY can request modifications in the contracted links from the supplier.

Normally, said modifications will consist of opening the link in an intermediate splice box to connect with another optical fiber segment. AVANGRID SERVICES COMPANY requests that the maximum term to perform this type of work will be less than 10 working days from the date AVANGRID SERVICES COMPANY makes the written request.

For any other modifications requested, the supplier will send a budget to AVANGRID SERVICES COMPANY for the work to be carried out within a maximum period of 10 working days from the receipt of the request by AVANGRID SERVICES COMPANY.

INTEGRATION WITH AVANGRID SERVICES COMPANY SYSTEMS

AVANGRID SERVICES COMPANY requires integration with certain supplier information systems to control the links, their quality and their billing.

- Inventory of links. Actual inventory of services provided in the network. Any links not registered or that are unrecognized cannot appear in this inventory under any circumstances.
- Billing inventory. Inventory of all bills issued for the different contracted links.

Inventory of links

The operator will provide a WEB address from which it is possible to download a file with the actual inventory of the links provided, at any time. The file will be tabbed text or Excel, for later processing by AVANGRID SERVICES COMPANY. In no case will it be a .pdf or similar that does not allow simple processing of the information.

The fields that must be included in this file for each of the links are:

- ID of each of the links (Administrative number),beginning and end
- LAT/LONG for each end point
- Mnemonic
- UTM coordinates of the installation
- Link start date
- If the information is maintained when the link is unrecognized, date of withdrawal.
- Schematic maps of the link
- Test, Turn-up and Acceptance of Links we sign off.

The detailed format of this file will be agreed upon after the signing of the contract and any change in its structure will be announced at least 60 days in advance.

Billing inventory

For the links inventory, the operator will provide a WEB address from which it is possible to download a file with the billing detail for the contracted links at any time. The file will be tabbed text or Excel, for later processing by AVANGRID SERVICES COMPANY. In no case will it be a .pdf file or similar since that does not allow simple processing of the information.

The fields that must be included in this file for each of the links billed and each of the bills issued are:

- Date of bill issue
- Billing period
- Bill number
- Identification of the link billed
- Start date
- End date
- Aquisition fee. (in the case of IRU)

The detailed format of this file will be agreed upon after the signing of the request and any change in its structure will be announced at least 60 days in advance.

ECONOMIC REQUIREMENTS

1.1 Schedule of fees

Potential suppliers will indicate their schedule of fees. Said schedule will be based on the characteristics indicated below:

- IRU

Initial payment including all fees and costs to support and maintain for the duration of the contract
Price per mile of link, regardless of the number of pairs of 2 or 4 optical fibers contracted.

The initial payment will be made upon execution of the contract and will be begin billing after reception of the link.

- Price per mile for Fiber construction for links that will be requested and owned by AVANGRID for Rural and Metro, Aerial and Underground. (See last tab on pricing template)

In Annex 4 of the HE, the required information on fees must be included, depending on the different links requested.

1.2 Discounts

According to the attached HE, Annex 5, the additional discounts as well as the criteria used should be detailed.

1.3 Billing

AVANGRID SERVICES COMPANY will require the billing structure that will be used in order to coordinate payment schedule.

In its offer, the supplier will detail the different billable concepts and the information that will be included in the bill.

The bill(s) that are issued will be sent to AVANGRID SERVICES COMPANY in paper format. They will also be available at all times on the Internet.

The billing will be issued at the proper time and without errors.

The billing requirements are listed in the attached HE, Annex 3.

The offer will include a detailed delivery plan for the links, to be approved by AVANGRID SERVICES COMPANY before its implementation.

In case of failure to meet the deadlines previously specified, the supplier will pay to AVANGRID SERVICES COMPANY the penalties included in the attached HE, Annex 3.

1.4 Service level indicators

AVANGRID SERVICES COMPANY requires that the quality of the contracted service be guaranteed. The measurement of quality conditions will be established through Service Level Agreements, hereinafter SLA.

The parameters to be evaluated within the required SLA are divided into 2 blocks:

- Production. Parameters related to the normal operation of the service, such as scheduled cuts and faults.
- Operation. Parameters related to incident processes and IMAC (Installs, Moves and Changes), such as: provisioning times, modification times, and troubleshooting times

These parameters will be detailed in percentages and/or absolute values, depending on the case, indicating the corresponding quality commitments (e.g.: fault resolution time = n hours).

The supplier will send a monthly electronic report, in MS Excel or MS Access database format that includes the different parameters.

Quality indicators should be able to be displayed in reports when expressly required.

The minimum requirements for service level indicators are included in the attached HE, Annex 3.

As a minimum, the following production parameters will be included:

– **Scheduled cut.** Interruptions of the optical fibers for previously scheduled modifications, with the following limitations:

- Maximum cut time: 4 hours. If this time is exceeded, the scheduled cut will be considered a fault.
- A maximum annual limit of 16 hours per 100 miles, or fraction thereof, of links of dark optical fiber rented and IRU.

This type of cut will preferably take place during the night, provided that the conditions of occupational safety included in the applicable legislation allow it.

To avoid possible technical problems, confirmatory procedures before the scheduled cut of the link will be arbitrated, to verify that the link being cut does not cause a catastrophic situation. This is understood to mean situations in which the loss of the communications carried by the link could produce risks to the stability of the electrical system. In this case, the scheduled cut must be interrupted.

AVANGRID SERVICES COMPANY must demonstrate this situation to the link provider.

- **Faults.** Lack of availability of the fiber for the transmission of signals for causes not including force majeure or scheduled cuts.

The maximum service reset time, depending on the network element in which the fault occurred, will be:

- Aerial cable: 24 hours
- Faults in other elements: 12 hours

In addition to the above, the supplier must comply with:

- the annual maximum accumulated fault time shall not exceed forty-eight (48) hours for every five hundred (500) miles or fraction thereof of contracted links (rental and IRU) per year, for accrued contracts greater than 500 miles
- The annual maximum accumulated fault time shall not exceed thirty-six (36) hours for each two hundred (200) miles or fraction thereof of contracted links (rental and IRU) per year, for accrued contracts of more than 200 miles and less than 500 miles
- The annual maximum accumulated fault time shall not exceed twenty-four (24) hours for contracted links of less than two hundred (200) miles or fraction thereof of contracted links (rental and IRU) per year.

As a minimum, the following operational parameters will be included:

– **Maximum link provision time.** Time elapsed from the written request to the operator for the link until its commissioning. For calculation, the calendar days will be counted from the date on which the link is formally requested until the day on which it is delivered.

– **Terms of delivery and license, authorization, permits and rights of way**

The offer will include the terms planned for the provision of each link.

Potential suppliers will be responsible for requesting and obtaining any kind of license, authorization, permission and rights of way for the deployment of their communications solution.

The supplier will be responsible for all necessary licenses, authorizations, permits and rights of way that must be in force during the entire term of rental or IRU of optical fiber links.

The supplier will be responsible for delays in the delivery of the links due to failure to obtain licenses, authorizations, permits and necessary rights of way in time.

Likewise, the supplier will be responsible for any problems that arise during the rental or IRU period for the links due to erroneous management of the necessary licenses, authorizations, permits and rights of way.

The HE, in Annex 3, includes the penalties associated with non-compliance with these sections.

1.5 Service Management

The supplier will indicate in the offer the procedures that it has established to interact with AVANGRID SERVICES COMPANY and that allow the efficient management of the contracted links, both for faults and for scheduled cuts. It will be highly appreciated if the supplier has a Web tool where these processes are detailed.

In all cases, the supplier must have a Network Operator Center (NOC) with 24x7 service, which AVANGRID SERVICES COMPANY can contact for fault management. The NOC must deliver the Customer Support Escalation list along with the cell and home numbers of the people responsible for the account. It is critical that the NOC communicate with our NMC immediately upon notification of a problem. Due to compliance and potential intrusion, it is critical that all lines of communication be established immediately and collaboration be in effect until the problem is resolved.

It is required that the provider of the link send a set of reports on the quality provided monthly, or allow its automatic generation through a WEB tool. (Operational Report). At least the following data is required for each of the links:

- Operations
 - Details of incidents
 - Details of modifications
 - Details of the level of conformity with the SLA
 - Delay time in billing process

- Billing errors

According to the attached HE, Annex 3, an affirmative or negative answer is required for all the requirements indicated in this section.

1.6 Penalties

In case of non-compliance with the levels of quality of service offered, the supplier will assume the penalties described in Annex 3.

It will be appreciated that the bidder contributes other penalization plans but it must at least assume those indicated by AVANGRID SERVICES COMPANY.

The penalties will be cumulative.

Scheduled service cuts that exceed the agreed upon values in time or number will be taken into account when calculating the penalties, considering them as faults.

1.7 Relations with the Operator

The establishment of a governance model that ensures the proper functioning of the service is required. For this purpose, an Operation and Maintenance Committee will be set up between AVANGRID SERVICES COMPANY and the supplier.

Composition

An Operation and Maintenance Committee shall be set up jointly between AVANGRID SERVICES COMPANY and the supplier to ensure the proper functioning and compliance with the parameters of quality, service and repair of faults of contracted links.

Jurisdiction

The Operating Committee shall have jurisdiction over IRU links, with the following functions:

- (a) The resolution of any conflict which arises between AVANGRID SERVICES COMPANY and the supplier due to deficiencies in the installation, use, operation and maintenance of the contracted links.
- (b) Approval of contingency procedures in the event of faults in the contracted links.
- (c) The monitoring of the quality of the service provided by the supplier in relation to the contracted links.
- (d) Deployment monitoring

Internal Regime

The Operating Committee shall establish its own internal rules of operation, specifically the arrangements for meetings. In any event, during the first year the meetings shall be held on a monthly basis, without prejudice to any special meetings which, as a matter of urgency, should be held at the earliest opportunity.

ADDITIONAL CONDITIONS

1.) In addition to the general conditions and service specifications cited so far in this document, the particular conditions set out below will also be taken into account.

The successful tenderer will undertake to maintain bid prices as maxima during the term of the contract, and to send the price reductions it introduces according to its commercial policy to AVANGRID SERVICES COMPANY, as soon as they occur. In any case, the supplier agrees to apply to AVANGRID SERVICES COMPANY, during the period of validity of the contract, the corresponding price reductions and increases in volume discounts, if the market evolution reflects lower prices and economic conditions, in 5% or more of those links offered in the current contract. The impact of the new prices must be made known as soon as such circumstances become reality.

2.) AVANGRID SERVICES COMPANY will be informed of any fee changes in advance.

3.) AVANGRID SERVICES COMPANY's award criteria are private, so that none of the participants will be able to request a claim for these criteria or for the form of award.

The information contained in this document is confidential. The bidders will not make any use of this information other than the preparation of the offer. They will not communicate, nor will they provide to third parties, nor will they publish, without AVANGRID SERVICES COMPANY's express authorization, this document, either totally or partially, as well as the data contained in the same.

The supplier must have the necessary authorizations and licenses that allow it to commercialize and maintain the links which are the subject of the tender.

4.) AVANGRID SERVICES COMPANY may cancel any of the links contracted for operational needs during the contracting period. The supplier will include the conditions associated with these cancellations in its offer.

ANNEX I

Acceptance and commissioning of links

The measures that will be carried out by the supplier in the acceptance of a link are basically two: Reflectometry and optical power.

Measurement methods

- Reflectometry. This measurement will be made with a reflectometer (OTDR) with a sufficient pulse to be able to perform the reflectometry trace with the least number of possible cuts (ideally from the beginning to the end of the line) and at the same time an acceptable level of response. The measurement will always be done at least 7 dB above the dynamic range.

AVANGRID SERVICES COMPANY will measure in both directions of transmission and the total attenuation will be the arithmetic mean of these two measures. At the same time, it will measure each splice individually and in both directions, not allowing them to individually exceed 0.3 dB in the 2nd and 3rd window and the average of all of them cannot exceed 0.1 dB.

All reflectometry measurements will be made by the supplier in the 2nd and 3rd windows, as the latter is more sensitive to the effects produced by curvatures and thus it is possible to detect defects that may have arisen in the installation.

For the calculation of splicing distances, it will use the refractive index provided by the manufacturer. If this data is not known, the supplier will adjust this index to 1.4630 and this will be noted in the initial documentation.

When short lengths of fiber are to be measured, to obtain the correct measurement, the supplier must interleave a fiber between it and the reflectometer, a fiber long enough that the signal in the section being measured is sufficiently stable (800-1000 m). In this way, the dead zone inherent to the measuring equipment is avoided as is the fact that in the first few meters there is a saturation of response that falsifies the results.

If the measurement has been made by directly connecting the end of the fiber of the link to the reflectometer or power source, it will not be necessary for the supplier to measure the connectors, since this system will be equivalent to normal operation. But if it has been necessary to connect a pigtail to the end-of-line adapter for the measurement, then a measurement of the losses at these points must be made and subtracted from the final results. This procedure will also be used for power measurements.

- Optical power measurement. This measure will be made by the supplier using a source in the 2nd and 3rd windows and a meter placed at the other end.

The power measurements will be made for each of the fibers and the insertion method will be used because it is a non-destructive method.

The supplier will make an initial measurement with a pigtail to adjust the zero of the equipment and then proceed to make measurements on the fibers. If there is only a single meter, at the end of the measurements, it is necessary to make a second measurement with a pigtail. The variation between the initial measurement and the second should not be greater than 0.3 dB; otherwise the measurements should be repeated. Another method that can be used to solve this problem is the use of a directional coupler and the continuous monitoring of the variations of the source using

another meter. In this case, we only have to subtract the variation measured on the monitoring meter from the attenuation of the line meter.

The total attenuation measure should never be higher than that theoretically calculated for the installation plus the safety margin. The insertion method to be used by the supplier consists of the optical power measurement between source and meter through two short lengths of fiber (pigtail), connected with an adapter. With this we obtain the basic initial measure to later remove the adapter and insert the line to be measured between the pigtails.

Acceptance process for sections

For this purpose, once the link is available, the supplier will communicate to AVANGRID SERVICES COMPANY that it is ready to proceed, within a maximum period of ten (10) working days, from the said communication, to jointly make the corresponding record of delivery. The measures indicated above were carried out to determine the quality of the link.

Once the measures have been taken, the corresponding minutes will be signed by the supplier and AVANGRID SERVICES COMPANY, indicating, where appropriate, the conformity of the link.

In case the tested link fails to comply with the offer of the supplier, AVANGRID SERVICES COMPANY will indicate its non-acceptance of the link and the supplier will have to rectify the defects found, at its own expense, within a maximum period of 15 working days. Then the acceptance tests indicated above must be performed again.

All measuring equipment used by the supplier must have the corresponding annual calibration certificates.

The supplier will deliver the link measurement report to AVANGRID SERVICES COMPANY, within a period of less than 3 weeks.

Presentation of the Results

The supplier will present the results of the measurement described above according to the format to be determined between the parties:

- Description of the section.
- Length of the link.
- N° of fibers and type of cable used.
- Measurements: reflectometry and power graphs of all fibers subject to the rental or IRU, in .pdf format.
- Tables with the attenuations of the splices and other events.
- Connection diagrams at delivery points (splice boxes and/or fiber distribution units), in .pdf format.
- The rest of the documentation required in this specification.

If the documentation does not correctly contain all the above, AVANGRID SERVICES COMPANY will request the correction of the same. The correction will occur within a maximum period of 10 working days.

AVANGRID SERVICES COMPANY will request that additional time be added to the contract based on penalties agreed upon.

ANNEX II

Conditions of maintenance for IRU links

The purpose of this Annex is to indicate how the provision by the supplier of the maintenance service of the contracted links will be carried out, as set forth in section 6 of this document. Said service is made up of the following concepts:

- 1.1 Periodic monitoring.
- 1.2 Preventive maintenance of cables and supports.
- 1.3 Fault repair.
- 1.4 Storage and management of spare parts.

Likewise, the conditions under which possible changes to the contracted links will be made are defined in this Annex.

Provision of maintenance services

Periodic monitoring

Included in this concept is periodic visual inspection, by aerial or terrestrial means, of the Infrastructures that support the contracted links, with the preparation of the corresponding reports that must be delivered to AVANGRID SERVICES COMPANY.

This activity consists of:

- Annual inspection of the condition of the cable.
- Annual inspection of the cable duct protection to the splice boxes.
- Annual inspection of the condition of the hardware and splice boxes.
- Annual inspection of the supports.

All reports must be delivered annually to AVANGRID Services Company as part of this RFP.

Preventive maintenance of cables and supports

The following preventive maintenance activities will be carried out by the supplier:

- Reflectometry measurements of optical fibers separate from the cable.
- Resolution of the anomalies detected in the inspections described in section 1.1, with the support of the necessary materials.
- A complete review of supports of the optical fiber cables will be made every three years. Specifically, the accesses, foundations, bars, fastening elements, plates and degree of oxidation of the metallic elements will be reviewed.
- Report of the preventive activity to be sent to AVANGRID SERVICES COMPANY Annually.

If the supplier has a continuous optical fiber monitoring system, it will inform AVANGRID SERVICES COMPANY of any faults detected in the fibers that may affect any of the contracted links, even if it does not cause a fault at the time it is detected.

The supplier will perform the work that can be scheduled, according to an Annual Maintenance Plan.

For those anomalies whose resolution implies a temporary lack of availability of any of the fibers of the contracted links, the supplier will request from AVANGRID SERVICES COMPANY prior agreement for the execution of the work, through the concept of scheduled work.

Fault repair

Any fault that is detected by AVANGRID SERVICES COMPANY or by the supplier will be immediately communicated to the other company, to start the repair or replacement processes as appropriate.

The faults will be repaired definitively within a period of no more than two (2) working days. In those exceptional cases in which a section of the aerial cable has to be replaced, the term for the substitution will be fifteen (15) working days.

Responsibilities

For the actions of the supplier, the following responsibilities are established:

The supplier will respond and will indemnify AVANGRID SERVICES COMPANY against any work accident that may be suffered by its personnel due to the carrying out and execution of this Annex in the AVANGRID SERVICES COMPANY facilities. To avoid such accidents, the supplier must at all times take the necessary precautionary measures and comply with the applicable legal regulations.

For the actions of the supplier's personnel in the AVANGRID SERVICES COMPANY facilities, in relation to the development of this Annex, the following responsibilities are established:

- If for any duly justified reason, the supplier has to access AVANGRID SERVICES COMPANY facilities, it must communicate its intention twenty four (24) hours in advance, including the work it considers necessary, the expected duration and identification of the resources involved so that the AVANGRID SERVICES COMPANY staff can be available in case it is deemed it appropriate or necessary to intervene. The provisions of this clause should be understood without prejudice to the cases of urgency due to the need to repair faults.
- In any case, the supplier will comply with AVANGRID SERVICES COMPANY's stated criteria at all times and for each infrastructure, in terms of the access regime and safety standards in the facilities.

AVANGRID SERVICES COMPANY shall provide the supplier with the necessary information on the prevention of occupational risks at the time of the contracting of the links, so that the supplier can use it in its plans for the prevention of occupational risks.

In all cases, the operators of the supplier will have the necessary training to deal with the risks of the installations and the work to be done.

The supplier will be solely responsible for the safety conditions of its workers and those of the companies that it has subcontracted, being obliged to comply, at its own expense, with the legal provisions in force. The supplier will submit there organizations Safety Program documentation as part of this submittal.

POWER ATTENUATION of the link

AVANGRID SERVICES COMPANY may request the adaptation of the link in case the attenuation of said link is greater than 2 dB in relation to the total values included in the minutes of acceptance of the link.

As an exception, this adaptation will occur from the value of 1 dB, in those situations in which AVANGRID SERVICES COMPANY technically justifies that its balance of power between its equipment so requires.

In both cases, the supplier will have to take the relevant actions so that the attenuation values, in relation to the values of the delivery record, are within the limits previously set. These corrections must be made within a maximum period of 30 days.

All costs associated with the necessary adjustments will be at the expense of the supplier

AVANGRID SMART GRID PROGRAM
Fiber Construction & Last Mile Construction Specifications

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1 Construction Installation References and Specifications

1.1 Introduction

This Installation Specification has been developed by AVANGRID for application and adherence for construction of the AVANGRID Systems. The AVANGRID Systems includes both outside plant (OSP) and inside plant (ISP) infrastructure construction.

1.2 References and Specifications

Table 1 lists the references used for this document. The latest version of the following reference documents, including amendments and notices, shall agree with manufactures information and practices.

Table 1. Construction Installation References Specifications

ASTM C150 Portland Cement
ASTM D1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557-91, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ [2,700 kN-m/m ³]), 1991
ASTM D3350 Standard Specification for Polyethylene Plastic Pipe and Fittings Materials
ASTM F 2176 Standard Specification for Mechanical Couplings Used on Polyethylene Conduit, Duct and Innerduct
ASTM F2160 Standard Specification for Solid Wall high Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD)
J-STD-607 Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
TIA/EIA-455-B3 Optical Fiber Cabling Components Standard
TIA/EIA-526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
TIA 569-B Telecommunications Pathways and Spaces
TIA/EIA-758 Customer-Owned Outside Plant Telecommunications Cabling Standard
TIA/EIA-568 Commercial Building Telecommunications Cabling Standards Set
TIA/EIA-569 Addendum (ADD) 1 - Surface Raceways
ICEA S-83-596-2001 Standard for Optical Fiber Premises Distribution Cable
RUS 1751F-641 Construction of Buried Plant
RUS 1751F-802 Electrical Protection Grounding Fundamentals
RUS 1753F-201 RUS Standard for Acceptance Tests and Measurements of Telecommunications Plant
RUS 1753F-401 Standards for Splicing Copper and Fiber Optic Cable (PC-2)
Telcordia SR-1421 Blue Book - Manual of Construction Procedures
Telcordia FR-Fiber-1 Fiber Optic Cables and Connections
Lucent 621-400-011 Guying Definitions
Lucent 621 410-200 Guying-Methods of installing

Lucent 621 410-206 Guying-Aerial Cable Lines
Lucent 621 410-220 Guying- Sidewalk Anchor Guy
Lucent 622-020-100 General Conduit and Conduit Couplings - Description
Lucent 628-200-200 Underground Cable Placing, Rodding and Cleaning Ducts
Lucent 628-200-206 Underground Cable, Pulling Cable Into Subsidiary Ducts
Lucent 628-200-216 Fiber Optic Cable Placing in Innerduct and Direct Buried Duct
Lucent 629-200-205 Guidelines for Trenching, Backfilling, and Ground Restoration of Buried Plant
Lucent 629-200-206 Guidelines for Placing Buried Plant
Lucent 629-200-215 Buried Plant Plowing
Lucent 917-356-100 ADD Buried Urban Distribution Systems
Lucent 918-117-090 ADD Clearances for Aerial Plant
Lucent 900-200-318 ATT OSP Plant Engineering Hand Book
NFPA 70: National Electrical Code®
IEEE-C2 National Electrical Safety Code – Institute of Electrical and Electronics Engineers

2 Building Entries

The preferred method for entering buildings with new fiber optic cable is underground through existing conduit or aerial depending on site-specific conditions. Underground may be utilized where the existing communications services to the building are through conduit. CONTRACTOR shall perform appropriate conduit validation techniques as defined by site-specific conditions and facility type.

In other cases, site-specific constraints may require that new conduit be installed. These premises will be served using direct buried 1.25” High-density polyethylene (HDPE) conduit, or material as designated on design prints, placing a new fiber optic cable from the meet me point to the building.

Both construction designs will be engineered by a qualified Engineering Contractor and will be documented per specification and engineering drawings and diagrams as required.

2.1 Aerial Entrance

The typical aerial drop will connect a 1/4" EHS Galvanized Strand Class A to the nearest meet me splice point aerial pole to the building. At the building a steel conduit with a weather head will be installed on the building and the strand connected to the pipe. A drop 24 strand single mode fiber optic cable will be lashed to the strand over to the weather head and placed into the building; a properly engineered slack loop will be left outside of the building in accordance with AVANGRID Engineering. All work will follow TIA-569-B (Commercial Building Standard for Telecommunications Pathways and Spaces), which standardizes specific pathway and space

design and construction practices in support of telecommunications media and equipment within buildings.

2.2 Underground Entrance

At the building outer wall:

- Core drill hole into outer wall of building as designed by AVANGRID Engineering;
- Place a pull box;
- Connect 1.25” steel conduit down transitioning to the 1.25” HDPE conduit.

All work will follow National Fire Protection Association (NFPA), National Electrical Code (NEC), and local codes.

2.2.1 Core Drill

A hole drilled through buildings outer wall, interior wall or floor up to 5.5” in diameter and 6” in depth to provide conduit and cable placement. All holes will be sealed to prevent water or fire penetration. Also used for manhole or hand hole entry penetrations for conduit and cable placement. All work will follow National Fire Protection Association (NFPA), National Electrical Code (NEC), and local codes. Where structural concerns are an issue, the use of X-ray equipment may be necessary. This will be a case by case determination to be reviewed by the DBLLC Engineering and Constructions teams.

2.2.2 Pull Boxes and LB

Pull boxes shall be sized in agreement with the guidance in Article 314.28 of the NEC 2011 and the cable manufacturer’s recommended cable bending radius (whichever is the greatest) to accommodate the fiber optic cable sized for the building. A basic premise of Article 314 for a pull box used for an angle turn is that the distance between raceway entries enclosing the same conductor (cable) shall not be less than six times the metric designator (trade size) of the larger raceway. Electrical-metallic tubing (EMT) shall not be used on the exteriors of buildings. Conduits mounted on the exterior of buildings shall be hidden from view in a manner approved and as directed by AVANGRID Engineering.

2.2.3 Conduit Transition

The transition coupling for HDPE to PVC and PVC to steel conduit for entrance conduits shall take place at the top of the trench six inches below ground after sweeps or bends to the building in compliance with ASTM F 2160 -Standard Specification for Solid Wall High Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD), and ASTM F 2176 - Standard Specification for Mechanical Couplings Used on Polyethylene Conduit, Duct and Innerduct.

2.2.4 Demarcation Point

For the purposes of this project, the demarcation point between the outside plant (OSP) work/functions and the inside plant (ISP) work/functions shall be Fiber Distribution Point (FDP).

In other words, the OSP work shall include installing a cable into a building and terminating the fiber into the FDP installed by others.

2.2.5 **Building Entrance Ground**

All grounding will be in accordance to National Electrical Code (NEC), and local codes. All power and grounding cables shall be labeled with a “DO NOT DISCONNECT” label.

2.2.6 **Grounding at Hand Hole**

When non-dielectric cables are pulled/placed into a hand hole, manhole, or vault a ground rod shall be used. Grounding is not required for dielectric cables in a hand hole. The objective earth impedance of each grounding system is 25 ohms or less. Clay silts and soils with high moisture content usually provide excellent grounds. Soils consisting mainly of well drained sand and gravel will normally be poor grounding sites. Ground rods shall be copper-clad, steel and have a minimum diameter of $\frac{5}{8}$ inches and a minimum length of 8 feet. Hand-hole ground rod will leave 6” of rod above ground in the bottom of hand-hole attaching with a universal ground rod clamp to a 3 foot piece #6 solid bare copper wire.

2.2.7 **Site-specific Construction Requirements**

AVANGRID Engineering will engineer site-specific construction requirements other than listed above by use of Construction Cost Units (CCU), as identified from the site survey. Some areas around buildings entry points for consideration are sidewalk and parking area crossings, reuse of existing underground conduit etc. Engineering shall also verify the specific installation procedure e.g., place hand holes, cut and resurface/push and bore, open trench or aerial, rod and rope etc., to be used prior to the start of construction.

2.2.8 **Hand Hole**

For this project, there will be two sizes of hand-holes: 30W x 48L x 36D and 24W x 36L x 24D.

Hand-holes shall be installed flush-mounted as shown on the AVANGRID Engineering drawings. Hand-holes shall be placed on granular bedding 8 inches (8”) deep. When hand-hole is used as splice point, a marker post will be placed within three feet. All tracer wires will be terminated both in hand-hole and marker post terminal. All HDPE duct ends shall be installed under the bottom of the hand-hole/vault, 6 inches (6”) above the ground base. Duct ends shall be trimmed neatly and plugged inside the hand- hole. The latitude and longitude coordinates of each hand-hole, manhole, vault and splice enclosure placed during construction shall be documented to a sub-meter level accuracy on the as-built drawings. The hand-holes shall not be installed or designed on steep banks or slopes where the cover cannot be leveled within a tolerance of one-inch (1”) of drop to twelve inches (12”) of grade. Hand-holes shall not be placed in roadways. Enclosure covers will be buried

flush with the surface and all securing devices, to include security bolts when provided, shall be installed

2.2.9 Strapping 1.25" Conduit on Building Entry

The 1 ¼" conduit shall be placed on unistrut that is fastened to the wall of the building. A 1 ¼" two hole steel fastener spaced at 36" apart shall hold the conduit to the unistrut with a 3/8" bolt and channel nut/spring.

2.2.10 Cabling/Labeling/Marking

Cabling shall be ran in a manner in which the cable will not be kinked or twisted and will follow the manufacturers guidelines on bend radius. Cabling shall be secured using nylon zip ties inside buildings and core locations. They shall be secured in a manner that does not damage the cable. The zip tie shall be flush cut to prevent a cutting hazard. There shall be no places where the securing of the cable is so tight that it deforms the outer jacket Cables shall be run according to the path set forth in the stamped construction drawings. All cables shall be labeled to indicate location of near and far equipment. All labels shall be white with black lettering.

2.2.11 Backboard

The Backboard required for installation of the provided equipment will be a 4' x 4' x ¾" flame retardant plywood with a minimum size of 4' x 3' x ¾". Either flame retardant plywood or 2 coats of flame retardant paint (white) shall be used. The maximum height from the floor to the backboard shall be no greater than 60". All equipment shall be installed no closer than 6" of any side of the backboard to provide sufficient air flow and ventilation. Placement of the backboard will be indicated on the stamped construction drawings for each location. A slack loop of at least 25' will be stored in cable management rings located on or near the backer board.

3 Pre-Construction Meeting

Prior to the start of construction site or segment, the Contractor shall coordinate and schedule a preconstruction meeting with the contractor team, AVANGRID stakeholders, and other affected personnel to review engineered construction plans. The meeting shall include a discussion to confirm items such as the exact location of all demarcation locations, traffic control plans, quality control, new cable, aerial hardware, hand holes, and HDPE, prior to the start of construction.

4 Contractor Responsibilities

4.1 Periodic Report

The CONTRACTOR shall provide weekly comprehensive status and progress reports which shall include a narrative description of work accomplished during the reporting period, fiscal data for the reporting period including sequential numbers, cumulative fiscal data. The report shall also address and review work accomplished during the previous time interval, work planned for the next time interval, problems encountered and the status of their resolution, problems anticipated that may impact the cost and scope, and recommendations for schedule changes.

4.2 Utility Location

The CONTRACTOR will call for locates at least 72 hours prior to any construction, or in accordance with the requirements of the local utilities and jurisdictions. An acceptable utility mark shall be within (36 inches) of the edge of the utility. After the utilities have been located and marked, the contractor is responsible for maintaining the marks until they are no longer required or call for re-marks.

Work on AVANGRID property will be coordinated with AVANGRID personnel and facilities including grounding grids will be protected. The contractor will be familiar with and comply with AVANGRID construction practices.

4.3 Pot Holing

The CONTRACTOR is responsible for positively determining the exact location and depth of all marked utilities (by hand digging and/or hydro-excavation pot holing) every ten feet, suspected to be within (36 inches) of the proposed excavation or directional drilling, to ensure the trenching or boring/drilling equipment does not damage the utilities. When pot holing in road surfaces prior to boring operations, the initial hole shall not be larger than 12 inches x 12 inches (12" x 12"). However, the hole may be increased in size as needed to determine the exact size and depth of the utility being located.

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4.4 Road Crossings

The preferred method of road crossings is by directional bore. In the event directional bore is not the best solution, open cut will be allowed with prior approval from the AVANGRID representative. Pavements shall not be cut where the traffic detection wires or traffic light control systems are embedded.

4.5 Cuts and Resurfaces

Cuts shall typically extend at least 6 inches beyond either side of the trench to provide a stable base for the surface material, unless otherwise directed by AVANGRID Engineering or permit specifications. Roads, streets, parking lots, etc., shall only be closed for as long as is required to complete the work to place the duct (including tamping the backfill) and to allow the slurry, concrete, and/or asphalt to properly set in agreement with manufacturer's specifications.

Once the concrete or slurry has set, the surface shall be restored to original conditions within 72 hours, unless otherwise approved by the AVANGRID PM or Engineers. Certain streets or roadways may have cutting restrictions or special requirements that require traffic be resumed as soon as possible.

Contractors shall be prepared to comply with these restriction and requirements. Steel plates may be used as an option to open the street to traffic while the material is curing. All work and materials will follow ASTM C150 Portland cement.

4.6 Rock Trenching or Plowing

Rock shall consist of boulders measuring 1/2 cubic yard (yd³) or more, or other material such as solid rock in ledges, solid bedded deposits, unstratified masses and conglomerate deposits, or below-ground concrete masonry structures that cannot be moved without systematic drilling and blasting or the use of a rock saw. Pavements will not be considered as rock. Excavate rock to a minimum of 18 inches cover required to place the duct. Backfill the rock excavation with select granular material. All trenched spoil not used to backfill will be disposed at a "recognized dump facility" in the area as designated by the local governing authority. All determination of rock will be agreed upon by AVANGRID inspector prior to and during trenching or plowing.

4.7 Rock Directional Drilling

Rock shall consist of rock in ledges, bedded deposits, unstratified masses and conglomerate deposits, or below-ground concrete masonry structures that cannot be moved without the use of All Terrain rock drill or mud motor or rock hammer. Aggressive bore head (i.e. rail head, eagle claw etc.) will not qualify for rock. When Boring and Solid Rock is encountered an additional cost per foot will apply. The CONTRACTOR shall provide all labor and rock drilling equipment and materials other than what is being provided by bore unit. All drilling spoil will be disposed at a

“recognized dump facility” in the area as designated by the local governing authority. All determination of rock will be agreed upon by AVANGRID inspector prior to and during the boring.

4.8 Unstable Soil

When wet or otherwise unstable soil that is incapable of properly supporting the conduit or hand-hole is encountered in the trench bottom, the CONTRACTOR shall remove such soil to the depth required, establish a sound base, and backfill the trench to trench bottom grade with coarse sand or fine gravel. The site AVANGRID Representative will determine if the soil is stable. Applicable safety procedures (such as Occupational Safety and Health Administration (OSHA), AVANGRID PSSP, and local/jurisdictional requirements) shall be followed for shoring or sloping.

4.9 Select backfill

Any select backfill required shall conform to the requirements of the governing authority.

4.10 Backfill

All excavated areas around the new hand-holes, ducts, or cables shall be backfilled with approved excavated materials consisting of earth, loam, sandy clay, sand, gravel, and soft shale free from large clumps. In areas where open trench methods were used and backfill mounded over the trench, grading or filling will be required for final restoration.

4.11 Unsatisfactory Materials

Blasted rock, large boulders, broken concrete or pavement shall not be used as backfill materials.

4.12 Restoration

Restoration to the same condition, as found prior to construction shall be completed within 72 hours for all areas where no additional intrusion is required.

4.13 Improved Areas

Roadways, walks, paved areas, and other surfaces disturbed by the CONTRACTOR shall be resurfaced with same type of material and to the same thickness as the original surface. Roadways shall have a minimum thickness of 4 inches of resurfaced area.

4.14 Grass

All grass surfaces shall be leveled using suitable, native, organic soil and reseeded, unless otherwise directed, such as the placement of sod in the site-specific engineered details. When an area is repaired using seed or sod the CONTRACTOR shall ensure the area receives adequate water to establish the new plants. For grassy areas where the CONTRACTOR shall have to bring heavy

equipment back onto the construction site, the areas shall be rough graded and covered with protective matting to prevent erosion. For durations longer than two weeks between construction and final disturbance, the contractor shall rough seed the area to provide cover until final grading and seeding are accomplished.

4.15 Waste Disposal, Cleanup and Tree Trimming

Tree tops, tree trimming, slashing, branches, brush, stumps and other debris shall be removed from the right-of-way and disposed of at locations in a manner satisfactory to Engineer. Debris shall not be buried or pushed off the cleared right-of-way and left on adjoining areas or shoved into piles either separately or with earth from grading. Debris shall be completely disposed of ahead of the construction operation. All trash materials to be removed shall be disposed of at a “recognized dump facility” in the area as designated by the local governing authority.

Areas impacted by the CONTRACTOR’s construction (roads, sidewalks, parking lots, etc.) shall be maintained free from waste, debris, washout, etc. The CONTRACTOR shall clean any mud tracks built up on roads, parking lots, etc., or washouts within 24 hours or as specified by the AVANGRID PM Team or local authority.

5 Underground Conduits

5.1 Warning Tape

The tape should be installed at approximately 1/3 to 1/2 of the depth of cover over all conduits except when bored. All warning tape shall be polyethylene plastic tape, a minimum width of 3” in agreement with Uniform Color Code and imprinted with the words “Caution-Buried Fiber Optic Cable Below” at no more than 48-inches intervals. Minimum thickness of the tape shall be 0.004 inches. Tape shall have a minimum strength of 1750 PSI lengthwise and 1500 PSI. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector or underground cable detector typically used in the OSP industry when tape is buried up to 3-feet deep. The materials in the warning tape shall be chemically inert and shall not degrade when exposed to acids, alkalis, and other destructive substances found in soil.

5.2 Damage Repair

CONTRACTOR shall take photographs of all areas on the outside and inside of the building where construction is proposed, prior to commencing construction, paying attention to any pre-existing damage. Damages done during construction to property are to be paid for and repaired by CONTRACTOR to existing conditions or better. ALL repairs to be inspected by local inspectors and approved by Engineer and the property owner.

5.3 Detection Wire for Non-Metallic Cable and Duct

Detection wire shall be insulated, single strand, solid copper with a minimum of 12 American Wire Gauge (AWG) High Molecular Weight Polyethylene (HMWPE) coated with a minimum 45-mm

PE jacket designed specifically for buried use and copper clad steel #10HMW-PE45mil for directional drilling. All wires place for tracing will have a continuity test performed for acceptance.

5.4 Conduit/Duct

Underground conduit structures consist of pathways for the placement of telecommunications cable between points of access. Underground installation of ducts/conduits shall be achieved by trenching, boring, or plowing.

5.5 Ducts Installed

The type of duct for new installation shall be High Density Polyethylene (HDPE) SDR11 for plowing, trenching and directional boring.

5.6 Joints and Connectors

Ducts shall be joined in such a manner as to be soil tight. Both press-on and thread-on airtight connections of HDPE duct joints shall form a sufficiently smooth interior surface between joining sections so that cables shall not be damaged when pulled past the joint. Joints between dissimilar types of ducts (PVC or HDPE, galvanized iron pipe (GIP), etc.) shall use the appropriate connectors designed for providing a seal between the ducts and preventing damage to cables pulled through these joints. All joint surfaces shall be prepared in agreement with manufacturer's instructions, and at a minimum, the mating surfaces shall be wiped clean before joining.

5.7 Bends and Sweeps

Changes in direction of runs exceeding a total of 10 degrees, either vertically or horizontally, shall be accomplished using long sweeping bends having a radius of not less than 10 times the inside diameter of the duct for a single or dual duct configuration or 25 feet. The 10 percent applies to a deliberate direction change not floating ducts in a path. Bends made manually shall not reduce the internal diameter of the conduit. There shall be no more than the equivalent of two 90 degree bends or 180-degree total between pull points.

5.8 Duct Installation Guidelines

1. Depth of Cover – At least 36 inches of cover is required above the top of the duct. At least 36 inches of cover is required under roads or sidewalks, or to the minimum depth requirements of the government agency having jurisdiction, whichever is the greatest cover if applicable. For ducts installed in solid rock, the cover shall consist of at least 18 inches. In crop lands the minimum depth of the cable is to be 48 inches (48”) of cover in soil by or to the minimum depth requirements of the government agency having jurisdiction.

2. Duct Placement – New 1.25 inch HDPE shall be connected with the proper 1.25 inch coupler to a 45 degree 1.25 inch PVC duct and shall be swept up into hand holes.

3. Pull Tape – Once HDPE has been verified for integrity and if required, a pull string, pull rope, or pull tape rated at not less than 5,400 newton (N) (1200-lb) tensile strength shall be installed in duct. A minimum of 10 feet shall be provided at each end of the conduit. The tape shall be coiled and secured at each end in such a manner as to prevent it from being accidentally pulled back into the duct.

4. Plugs – All ducts, sub-ducts, and, innerducts, whether main or subsidiary runs, shall be plugged using screw-type duct plugs in maintenance holes, hand holes and building entrances. Foam sealant is not acceptable in a building. Outdoor rated ducts (sub-ducts, etc.) entering a building will be fire stopped in agreement with the NEC, local codes, and the manufacturer's instructions.

5. Duct Seals – The area between the entrance conduits and the penetrated floors and/or walls of a building or maintenance hole shall be sealed to be waterproof or fire-stopped as appropriate. Use of hydraulic cement between the duct and wall is acceptable for waterproofing.

5.9 Galvanized Rigid Steel Conduit and Steel Casings

For specialty road crossings, water crossings or railroad crossing that may require RSC, steel pipe casings, or HDPE duct placed by HDD shall be used as specified by AVANGRID engineering. The RSC, steel casings, or HDPE shall be placed under the highway or water crossing in a manner that does not damage the conduit or casing.

5.10 Galvanized Rigid Steel Materials

Galvanized RSC used as telecommunications conduit must be made from soft, weldable quality steel that is suitable for bending. The hot-dipped zinc coating (galvanization) placed on the interior of the conduit must be smooth and free from blisters, projections, and other defects. The weight of the zinc coating on the interior and exterior surfaces shall not be less than 61 grams per 1,000 square centimeters (cm²) (two ounces per square foot [ft²]) of total coated surface. Steel pipe casings shall

comply with ASTM A139 Grade B or ASTM A252.

5.11 Split Duct

Pre-manufactured split ducts and split couplings are designed to be placed around existing cable, such as when repairing conduit, capturing existing conduit when tying into and overset hand hole application. Duct glue shall be used when joining the split duct to augment the clamps and prevent dirt or foreign matter from seeping through the joints. Normal conduit shall be used in all other areas.

5.12 Corrugated 1.25" Innerduct

Corrugated HDPE SDR 13.5 Innerduct 1.25” manufactured from High Density Polyethylene (HDPE) and is intended to be placed inside of existing innerduct. The pathway and shall be placed within or in place of a duct to subdivide the space and facilitate initial and subsequent placement of multiple cables in a single duct space. All subdivided spaces shall have a pull rope or pull tape installed. On the field end the multi-cell fabric mesh shall be cut off in each hole with at least 2 feet of slack in the material left and at least 5 feet of pull string that will be attached to a permanent part of the maintenance hole / hand hole structure, such as tied to the pulling irons or able racks, at the site end the multi-cell fabric mesh will not be extended more than 10’ with in the building tying the pull strings off to a fixed object in the site.

5.13 Fabric-Mesh Innerduct

Fabric-mesh innerducts are made of a stiff, fabric-mesh cloth that has been folded and sewn in such a way as to create individual cells through which a cable may be installed without tangling with cables in other cells. Multi-cell fabric mesh shall have an uninterrupted, shared, sewn spine to prevent twisting. On the field end the multi-cell fabric mesh shall be cut off in each hole with at least 2 feet of slack in the material left and at least 5 feet of pull string that will be attached to a permanent part of the maintenance hole / hand hole structure, such as tied to the pulling irons or able racks, at the site end the multi-cell fabric mesh will not be extended more than 10’ with in the building tying the pull strings off to a fixed object in the site.

6 Rod/Mandrel/Slug/Clean Ducts or Conduits

6.1 Rod Duct

Rodding a duct entails inserting or pushing a rod into the duct to:

- Determine the length of the duct.
- Locate the other end of the duct.
- Determine if the duct is usable or blocked.
- Insert a pull string in the duct.

6.2 Mandrelling

Mandrelling a duct consists of pulling a test mandrel or slug through the duct to insure the integrity and alignment of the ducts. The mandrel’s diameter shall be 0.25 inches less than the duct’s inside diameter. The test mandrel shall be used to verify the integrity of the duct joints, to test for out-of-round duct, and to verify that sweeps are not so severe as to preclude the placement of cables. It is recommended that the pulling of the test mandrels through the conduits should be performed after backfilling but prior to the replacement of any grass, sod, repaving, etc.

6.3 Existing Ducts

Existing vacant ducts that are to be used in new cable installations, as defined by AVANGRID Engineering for site-specific requirements, shall be cleaned and tested with a test mandrel to detect

any obstructions, collapsed ducts, or duct inconsistencies. The contractor shall repair damaged ducts if approved by AVANGRID Engineering. The duct shall not be mandrelled if existing cables are in the duct.

6.4 Innerduct Used in Existing Conduit

Multiple HDPE innerducts shall be placed to facilitate multiple cables in a single existing duct space. All innerducts shall have a pull rope or pull tape installed. The HDPE innerduct that do not have cables installed shall be plugged with a screw-type duct plug. Outdoor rated ducts entering a building will be fire stopped in agreement with the NEC and the manufacturer's instructions. Innerducts are smaller diameter ducts, typically 1.25-inch diameter (minimum), that are placed inside existing ducts. The innerduct shall consist of a minimum of three each, 1.25-inch PE ducts installed inside a single, 4-inches duct. Innerducts shall be used in existing conduit systems.

6.5 Bidirectional Boring/Horizontal Directional Drilling (HDD)

The HDD is a trenchless method for installing ducts for underground cable. Ducts are installed by drilling or boring a path through the soil and placing the ducts within this path. The vertical profile of the bore alignment is typically in the shape of an inverted arc.

6.6 Equipment

The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pullback of pipe, a drilling fluid mixing and delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.

6.6.1 Drilling Fluids System

The drilling fluid system shall have a minimum capacity to supply mud in accordance with the drilling equipment pull-back rating at a constant required pressure. The drilling fluid system shall have filters in line to prevent solids from being pumped into the drill pipe. All connections between the drill pipe and pump shall be relatively leak free and any drill fluid spilled during operations shall be contained and properly disposed of.

6.6.1.1 Mixing System

Self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid composed of bentonite clay, potable water and appropriate additives. The mixing system shall be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. The drilling fluid reservoir tank shall be sized for adequate storage of the mud. Mixing system shall continually agitate the drilling fluid during drilling operations.

6.6.1.2 Drilling Fluids

CONTRACTOR shall use drilling fluid composed of clean water and an appropriate additive. Water shall be from a clean source with a pH of 8.5 – 10 and/or as per mixing requirements of the Manufacturer.

Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium

carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clods or clumps. No hazardous additives may be used at any time. Drilling fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of the bore wall.

6.6.2 Drill Rig

The CONTRACTOR shall provide a directional drilling machine that consists of a hydraulically powered system to rotate, push, and pull hollow drill pipe at variable angles into the ground while delivering a pressurized fluid mixture to a guidable drill head. The drill rig shall be properly anchored to the ground to withstand pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Drill Rig shall have a system to monitor and record maximum pull-back pressure during all pull back operations. Drill rig hydraulic system shall be free of leaks

6.6.3 Drill Head

The CONTRACTOR shall use a drill head that is steerable and providing the necessary cutting surfaces and drilling fluid jets.

6.6.4 Drill Pipe

CONTRACTOR shall use a drill pipe of high quality 4130 seamless tubing, grade D or better, with threaded box and pins. Tool joints should be hardened to 32-36 RC.

6.6.5 Guidance System

CONTRACTOR shall use a proven type of guidance system and should be setup and operated by trained personnel with experience in operation. The operator shall be aware of any magnetic anomalies and shall consider such influence in the operation of the guidance system if using a magnetic system.

6.6.6 Pits

In order to confine any free flowing slurry at the ground surface during pull back or drilling, sump areas shall be created to contain any escaping slurry that might damage or be hazardous in surrounding areas. All residual slurry shall be removed from the surface and the site restored to

preconstruction conditions. Excavation for entry, recovery pits, slurry sump pits, or any other excavation shall be carried out as specified by AVANGRID Engineering. Sump areas are required to contain drilling fluids.

6.6.7 Drilling Procedures

A pilot hole shall be drilled on bore path per drawings with no deviations greater than five percent (5%) of depth over a span of one hundred feet (100'). If the pilot does deviate from the bore path more than five percent (5%) of depth in one hundred feet (100'), CONTRACTOR shall notify AVANGRID Engineer of any deviations and AVANGRID Engineer may require CONTRACTOR to pull-back and re-drill from the location along bore path before the deviation. In the event of a drilling fluid fracture, inadvertent returns or return loss occurs during pilot hole drilling operations, the CONTRACTOR shall cease drilling and wait at least thirty minutes, inject a quantity of drilling fluid with a viscosity exceeding 120 seconds as measured by a March funnel and then wait another thirty minutes. If mud fracture or returns loss continues, the CONTRACTOR will cease operations and notify the AVANGRID Engineer. AVANGRID Engineer and the CONTRACTOR will then discuss additional options and work will then proceed accordingly.

6.6.8 Reaming

Upon successful completion of pilot hole, the CONTRACTOR will ream a bore hole to a minimum of twenty five (25%) greater than outside diameter of pipe using the appropriate tools. CONTRACTOR will not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle.

6.6.9 Pull-Back

During pull-back operations CONTRACTOR will not apply more than the maximum safe pipe pull pressure at any time. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. In the event the pipe becomes stuck, CONTRACTOR will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, CONTRACTOR will notify AVANGRID Engineer. AVANGRID Engineer and CONTRACTOR will discuss options and then work will proceed accordingly.

6.6.10 Restoration

The site shall be restored after installation of the conduit is complete. The work site shall be cleaned of all excess slurry remaining on the ground. The CONTRACTOR performing the boring is responsible for removal and final disposition of excess slurry or spoils as the conduit is introduced. Excavated areas shall be restored to their original condition or better as soon as practicable following cable placing operations. The cost of restoring damage caused by heaving, settlement, escaping drilling fluid (fracout), or the directional drilling operation to roads, parking lots, pavements, curbs, sidewalks, driveways, lawns, storm drains, landscapes, and other facilities shall be borne by the CONTRACTOR.

6.6.11 **Warning Signs/Marker Post**

Buried cable warning signs or route markers post shall be provided no less than every 1000 feet or shall be installed at Engineer designated locations along the cable route, or at each change in route direction, on both sides of street crossings, on pipelines, and on buried power cables. Color-coded warning signs or markers shall be orange in color. In a metro environment it is understood that this is not applicable and surface mount type signs will be used. CONTRACTOR shall install an additional sign on the post and warning sign markers at splice, assist and pull-box locations. Proper designation of splice and slack points: example (slack = 1 ring of tape on cott marker, splice = 2 rings of tape).

Warning signs and posts shall be 6', 3.5" OD PVC. The posts shall be secured to a 7' steel channel driven a minimum of four feet (4') and the marker post will be placed over steel channel at a minimum of 6" below ground level.

6.6.12 **Underground Cable Identification Tags**

An identification tag, disclosing the owner of the fiber optic cable shall be attached on the fiber optic cable at each hand-hole and building entrance. The tag shall be weatherproof wrap around type to fit the fiber optic cables. CONTRACTOR is responsible to adhere to AVANGRID Engineer naming and tag identification requirements.

7 **Trenching**

7.1 **Backhoe Trenching**

Trenching with a backhoe shall be done only for short distances (i.e., hand-hole to building, hand-hole, bore pits, etc.). The CONTRACTOR shall hand dig at all existing hand-hole locations, building entrance points, utility crossings, under curbs, etc. All excavations left open overnight must be fenced or plated per specifications of the governmental authority having jurisdiction. Detailed coordination by the CONTRACTOR must be accomplished with personnel of the appropriate governing authority.

7.2 **Trencher Trenching**

A maximum trench width of 6 inches shall be used in direct buried HDPE applications done by a trencher. The CONTRACTOR shall hand dig at all existing hand-hole locations, building entrance points, utility crossings, under curbs, etc. All excavations left open overnight must be fenced or plated per specifications of the governmental authority having jurisdiction. Detailed coordination by the CONTRACTOR must be accomplished with personnel of the appropriate governing authority.

7.3 **Plowing**

Plowing operations shall be performed according to the following:

1. The plowing equipment and construction methods used by the Contractor shall minimize soil displacement. Where required by the R.O.W. Owner, additional compaction of the plow slot shall be carried out.
2. The plow machine shall be a rubber-tired or crawler-type tractor. The plow shall be complete with capstan wheel, duct fair leads, marker tape dispenser, and be capable of variable pitch, depth and offset. The plow chute shall have a removable gate and shall accommodate multiple duct(s), cables and marker tape simultaneously.
3. The plow tractor shall be well suited to the terrain and have adequate power, size and maneuverability to directly bury the duct in one pass at a minimum depth of 36 inches.
4. The plow shall be equipped with chutes and cable feed equipment so that the operation of installing the duct(s) shall not damage or kink the duct(s).
5. A tractor truck and low bed shall be provided as an auxiliary unit where required to transport the plow unit.
6. In areas of marshlands or where the ground is soft, a second tow tractor may be used to provide additional tractive power.
7. In the case that severe construction conditions (e.g. hard clay, shale, boulders, rock, etc.) are noted by a route survey, or encountered during actual plowing operations, a pre-rip operation may be necessary.
8. The speed of the plow shall be maintained as constant as possible and the path as straight as possible, avoiding sudden starts, stops, and preventing backward movement of the blade in the ground.
9. Trenches or pre-excavated pits shall be used in the plowing operation at the beginning and end of a run. Prior to starting or resuming plowing from the pit, each duct shall be firmly anchored and held until the plow has advanced a sufficient distance so that friction from the ground prevents the plant from moving. Whenever the plow is to emerge from the ground, the blade shall be advanced far enough into the pit to allow their duct to be carefully removed from the chute.
10. Where the duct system is plowed close to the edge of pavements, care shall be taken to avoid damage to the pavement. If damage does occur, it shall be repaired immediately to the satisfaction of the Road Authority.
11. Ducts shall be offset a minimum of 36 inches horizontally and 20 inches vertically from any other utility. This offset may be varied for installations on bridges or tunnels where the space is limited by the size of the structure.
12. When installing ducts, the minimum bending radius of the plow chute will be dictated by the minimum bending radius of the duct as recommended by the manufacturer and this will increase for duct sizes.
13. Where cable is plowed in place, restoration shall be accomplished by driving a tractor or heavy truck over the plow furrow until the plowed area conforms to the surrounding

terrain. The use of a vibratory roller having a weight of three tons and a width of 4' to 6' may also be used.

8 Environmental Protection

8.1 General

CONTRACTOR shall place silt fence between all drilling operations and any drainage, wetland, watercourse or other area designated for such protection by contract documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains or other measures.

CONTRACTOR shall adhere to all applicable environmental regulations. Oil and fuel containers stored in bulk containers shall not be stored within 200' of any water-body or wetland.

8.2 Erosion Control

The CONTRACTOR shall take all necessary steps to insure the stability of the trench or plow furrow and the right-of-way. Ground surfaces disturbed during construction may need filling, repair, or stabilizing. This will include filling and stabilizing ruts which develop off the right-of-way because of the construction activity in addition to proper backfilling of the trench to assure stabilization. Guidelines must be followed to minimize soil erosion problems. Vehicular or equipment traffic on the cable right- of-way shall be kept to a minimum, consistent with proper operation of the job. Bulldozing of road shoulders, ditch, gully and stream banks shall be kept to a minimum. Excavations shall be kept open a minimum amount of time. Existing vegetation cover shall not be disturbed any more than necessary.

Streams or gully banks shall be immediately restored allowing water to follow its original course. All agricultural terraces shall be restored to their original condition and to the satisfaction of Soil Conservation Service of the County Conservation Board.

9 Aerial

9.1 Strand

Cables are supported on 6.6M EHS galvanized suspension strand. After the strand has been placed, it should be tensioned so that the final sag with cable in place conforms to clearances.

Table 2. Maximum String Tension – 6.6M EHS and 6M Steel Strand

	Temperature	Stringing Tension in Pounds	Stringing Tension in Pounds	Stringing Tension in Pounds
°F	°C	Spans Under 250 Feet	Spans Between 250 and 450 Feet	Spans Over 450 Feet
0	-18	900	850	775

20	-7	800	750	725
40	4	700	675	650
60	15	600	600	600
80	27	500	525	550
100	38	425	475	525

9.2 Methods of Obtaining Stringing Tension

Determine the temperature of the air by placing a thermometer in a vertical position in approximately the same sun or shade conditions existing along the section of strand being tensioned. Use a dynamometer to determine the tension of the suspension strand.

For best results, first pull the strand until it is tighter than the desired tension; then slack off until the desired tension is obtained. This extra tension should not exceed 125% of the designed stringing tension or 500 pounds whichever is less.

The points at which strand tension should be measured under various conditions are as follows:

- Straight sections free from changes in grade:

Less than 10 spans - Measure the tension near the middle of the section of strand.

10 to 20 spans - Measure the tension first at a point about two-thirds of the distance from the pulling end; then at a point about one-third of the distance from the pulling end.

Over 20 spans - Measure the tension first at a point about three-fourths of the distance from the pulling end; then at a point about one-half of the distance; finally, at one-fourth of the distance.

- Sections including changes in grade or corners:

Measure the tension first at the far side of the farthest corner or pole where change in grade occurs; then at each corner or change-in-grade pole, working toward the pulling end.

As the desired tension is obtained in each portion of the strand being pulled, tighten the bolts of the suspension clamps.

9.3 Tensioning and Sagging of Cable Strand

When tensioning strand for the use of supporting cable(s), the strand shall be tensioned to:

- (a) Provide sufficient support for the cable(s) and cable apparatus under the expected outside plant weather conditions (i.e., heat, cold, ice, and wind), and
- (b) To meet clearance minimums engineered by AVANGRID Engineering.

It is imperative that this tension is calculated using industry approved strand tensioning tool to meet the minimum tensioning requirements for the strand size and cable weight for the existing pole line.

There are instances when tensioning strand to its recommended or full capacity could lead to contact with the existing cable plant. This is common when cables are placed between or below existing plant. In these cases, it is recommended to place the strand at a tension that will adequately support the cable meeting structural requirements and provide enough sag to comport with the existing aerial cables.

If a conflict occurs between the strand tension requirements and matching the sag of adjacent plant, rearrangement of existing plant may be required such as moving plant up or down on the pole. At all times cable clearances must be maintained over roadways and from the power plant.

9.4 Suspension Clamps

A cable suspension clamp supports all sizes of suspension strand at inline poles and 6.6M or 6M strand at corner poles with less than 10-foot pull. The suspension clamp must be a type recommended for the size of suspension strand used. The corner suspension clamp supports 6.6M or 6M suspension strand at corners where the pull is 10 to 50 feet. At any corner where the pull is greater than 50 feet, the strand must be dead-ended and guyed each way.

9.5 Suspension Bolts

Suspension bolts are used to secure the suspension clamps to the pole. The bolts are available with one end threaded “A Bolt” or with both ends threaded “B Bolt”). The double threaded type bolt is generally used where it is planned to place two strands, one on each side of the pole, at the same level.

The length of the bolt to be used is determined by the diameter of the pole plus the amount required to extend the bolt through the suspension clamp and nuts. The bolt must be long enough to extend at least three complete threads beyond the outer nut. The end of the bolt must not extend more than 1-1/2- inches beyond the nut. Any excess must be cut off and painted with a cold galvanizing compound

9.6 Guy Hooks/Pig Ear

Guy hooks and Pig Ear are used to terminate suspension strand or guy strand. The guy hook or Pig Ear can be attached to the pole with the same bolt that supports the suspension strand for the main cable.

9.7 Thimble Eye Bolts

There are two types of thimble eye bolts: angled (bent) and straight. Angled thimble eye bolts are used to terminate guy strand when the lead-over-height ratio is less than

1-1/4-inch. Straight thimble eye bolts are used when the ratio is greater than 1-1/4-inch. Thimble eye bolts can be used to terminate all sizes of guy strand and, when equipped with an eye nut, they can be used for dead-ending suspension strands of all sizes.

9.8 Guy Grips (“B” Strand Grips)

Guy grips, sometimes referred to as strand grips, may be used to terminate guy strand and suspension strand on guy hooks pig ears, strain insulators, and eye-type hardware. The grips are made of spirally- formed high-strength steel wires and are available in sizes corresponding to the outside diameters of standard galvanized strand.

9.9 Strandvises

The strandvise consists of three parts: a cartridge, a yoke, and a bail. The bail and the yoke may be reused but not the cartridge. There are two sizes of bail: long and short. The long bail is designed solely for use with strain insulators. The short bail is used on eye-type hardware and guy hooks.

9.10 Guys

Down guys are attached to the pole applying downward forces at various angles most typically between 20-45 degrees to the pole. The guy hook hardware has spurs or prongs that dig into wood poles and provide supplementary bonding and stability for the guy wire/guy hook attachment.

9.11 Anchors and Guy Rods

Guy rods of size 5/8 inch by 8 feet (5/8” x 8’) used with expanding anchors are to be made of galvanized steel having an integral single, double, or triple thimble. The use of down guards or guy guards shall be used.

9.11.1 Stainless Steel Banding

Stainless steel bands are to be Type 201 and meet ASTM-A666 standards including but not limited to, chemical composition requirements of carbon, manganese, phosphorus, sulfur, silicon, chromium, and nickel and the tensile and break strengths. Use Stainless Steel banding with fully rounded smooth edges for safety and easy installation with proper banding tool.

9.11.2 **Stainless Banding Buckles**

Stainless steel banding buckles are to be Type 201 and meet all ASTM-A666 standards including but not limited to, its chemical composition requirements of carbon, manganese, phosphorus, sulfur, silicon, chromium, and nickel, and be made of fully annealed stainless-steel material.

9.11.3 **Aluminum Mounting Plate**

Aluminum extruded plate with 5/8 - 11 x 2" plated bolt and nut.

9.12 **Expanding Anchors**

For eight (8) blade type expanding anchors, a pincer-type nut retainer is welded to the underside of the base to retain the guy rod nut. The wires used to hold the blades to the anchor base plate must not be removed. These wires will shear off during the expanding process.

Where practical, use earth augers to bore the hole for the anchor. Expanding anchors develop most of their holding power by the blades engaging undisturbed earth. Therefore, it is important that the hole is no larger than necessary to admit the unexpanded anchor.

9.13 **Screw Anchors**

Screw anchors are available in a variety of helix configurations, rod sizes, and thimble eyes. Proper selection depends on the type of soil and the guying requirements. Correct installation is achieved only when the anchor is installed using the appropriate torque for the particular soil and anchor type as recommended by the manufacturer. Installation torque is usually measured using a device connected in series with the wrench and digger kelley bar during installation.

9.14 **Bonding and Grounding for Aerial Plant**

The connection to a vertical grounding conductor of a power system MGN is made in the communications space on a pole by using an approved connector determined by AVANGRID Engineering. Connecting to a Guy or Strand with a Strand Ground Clamp with a #6 solid bare copper wire to split bolt connector. When a new vertical ground is required a #6 solid bare copper wire will be placed from the communications strand down the pole to a new copper-clad steel ground rod having a minimum diameter of 5/8 inches and a minimum length of 8 feet. All interconnecting grounding conductors shall be #6 bare copper laid in smooth curves. Ground rod will be left 6" above ground at the bottom of pole attaching a universal ground rod clamp to the new #6 solid bare copper wire.

9.15 **Drip Loop**

The drip loop will be located below the point of entry on the building to keep moisture from penetrating the building. The loop will be hand formed and the maximum bending radius will not exceed the manufacturer's specifications and will not be more than a 12" loop.

Note:**NATIONAL ELECTRICAL CODE ARTICLE 820**

820-10. (b) Lead-in Clearance. Lead-in or aerial-drop cables from a pole or other support, including the point of initial attachment to a building or structure, shall be kept away from electric light, power, Class 1, or non-power limited fire alarm circuit conductors so as to avoid the possibility of accidental contact.

10 Aerial Cable

Lashing aerial cable will be accomplished with a cable guide and “C” type of lasher or bigger. Suspension clamps should be tightened at least one span ahead of the cable lashing operation. This is necessary to keep tension from building up in the strand as lashing progresses. Assist rollers may be required to support the cable above streets and other obstacles during lashing process. All work will be in compliance with authorities having jurisdiction.

10.1 D Lashing Wire Clamp ¼”

The D Lashing Wire Clamp ¼” “Bug Nut” will be place 12” from the center of pole both field and node side of pole. Place groove plates over strand, cross lashing wire over top of strand two raps following the lay of the strand. Thread lashing wire between stud collar and first washer. Then rap half turn around stud. Do not rap lashing wire 360 degrees around stud. Tighten nut and tuck free end of lashing wire into clamp. If over lashing, place second wire between two flat washers and repeat process.

10.1.1 Over Lashed Cable

Over lashing will be the same practice as lashing aerial cable, there will be cases when a larger lasher will be required.

10.1.2 Lashing Wire

The lashing wire (.045 type 302) to aerial cable will be lashed tightly against the strand. This is accomplished by proper adjustment of the rear cable lifter on the lasher and particularly by not permitting the lashing wire to slack off during any of the lashing, terminating, or splicing operations.

10.2 Forming Lashed Cable

At poles, splices, or other points where the cable is not held snugly against the strand, the cable should be formed in a long, smooth curve, supported in this position, and kept free from possible contact with hardware or other points of interference that might cause sheath abrasion. Use of

lashing wire clamps placed at 12 inches from center of pole to terminate lashing wire and cable spacers placed at 15 inches from center of pole for cable supports. To provide separation between strand and cable at suspension clamps, place the suspension clamp so that the strand groove and strand are below the suspension bolt.

10.3 Cable Tension

To keep excessive cable out of the spans during the lashing operation, the following must be observed. A moderate amount of tension should be maintained in the cable ahead of the lasher. At cable section ends, the splice point ends and their slack loops should be supported to the strand so not to damage the fiber optic cable. At dip poles, the cable slack loop should be secured to the strand after the lashing wire has been terminated.

10.4 Double Lashing Special Crossings

Double lashing is required on special crossings - using two sets of wire to lash the cable to the strand the termination on the lashing wire will use two clamps. Special crossings are over Interstate highways, Waterways, Railways and any span over 300' etc.

10.5 Slack Loops

A slack loop is a spare amount of optical fiber, slack cable that is looped for storage at strategic locations. In the event of a break or other required services, slack cable is used to aid in restoration. Unless otherwise stated, a loop shall have a length of 150 feet.

10.6 Slack Loop Deployment

Where indicated on the engineering drawings, the CONTRACTOR shall install 150 feet (150') of slack loop cable. Deltec strapping and lashing wire with clamps to terminate wire will be used to store slack loop. Loops must be secured in a horizontal orientation and must not be allowed to rotate to a vertical orientation.

10.7 Aerial Cable identification Tags

An identification tag, disclosing the owner of the support strand and of the fiber optic cable shall be attached on the fiber optic cable at each pole. The tag shall be weatherproof wrap around type to fit the fiber optic cables. CONTRACTOR is responsible to adhere to AVANGRID Engineer naming and tag identification requirements. The approved tag will be Blue and White in color with Black lettering.

10.8 Riser/Dip Pole

When cable transitions from aerial to underground the cable and will be covered within 6 inches of the cables bend at high of attachment with a 2 inch plastic u-guard. At ground level a 1.25" schedule 40-36" radius 90 degree sweep will be connected to the SDR11 1.25" HDPE. The 1.25" sweep will be placed 6" above ground under the U-guard at the base. All open ends of the HDPE shall be neatly trimmed and sealed/plugged with an approved weatherproofing material.

12 Cable Placement Underground – General

The CONTRACTOR shall ensure that there has been an inspection of the route and have a copy of the duct proofing report on hand, verifying the integrity of the duct. To ensure a dependable, reliable service life for the cable, extreme care will be taken to protect it during handling, storage and placement, ensuring that all of the cable manufacturer's recommendations (e.g. with respect to pulling tension and bending radius) are followed.

- Cable reels shall not be stacked during transportation and storage.
- Small radius bends and twists must be avoided. The cable shall not be bent in a radius less than specified by the manufacturer.
- All open cable ends shall be capped.
- Cable shall not be cut without approval from the AVANGRID Engineer.
- The cable shall not be removed from its reel until it is to be installed. Where possible, the cable shall be placed directly from the reel.
- A suitable lubricant, rated and specified for fiber optic installation and the ambient temperature, shall be used for ducts that have not been factory lubricated. Where curves may increase the pulling tension, a particular effort shall be made to lubricate the sheath surface over the entire cable length. If necessary, lubricant shall be applied at each manhole or hand-hole.
- Work shall be carried out in a downhill direction, whenever possible, ensuring that the correct fiber optic cable reel has been selected for the segment.
- Where it is necessary to remove the cable from the reel, either a mechanical re-spooler shall be used or the cable shall be arranged in a figure-eight configuration. When "figure-eighting" is performed in more than one location on one cable end, the complete "figure-eight" shall be flipped.
- Once the cable has been installed in one direction, work shall proceed in the reverse direction of placement when breaking down the machines, stripping off the temporary duct and dressing up the duct in the hand-holes. When mounting the slack coils, the Contractor shall make sure that the minimum bend radius is not exceeded; the radius is equal to 10 times the outside diameter of the cable in a static application and 20 times the outside diameter in a dynamic application.
- If any cable is damaged during installation, it shall be brought to the attention of the Inspector and Engineer immediately. A damage report shall be filled out and the Client

informed of the extent of the damage with a recommendation as to the method of correction either by introducing a splice or replacing the cable.

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12.2 Cable Jetting

The preferred method of cable installation is to jet the cable into the conduit using high- volume compressed air. This blowing technique reduces the amount of stress put on the cable which minimizes the risk of damage to the cables' internal glass fiber strands. The process requires the set-up of one or more high-pressure air jetting machines along the Right of Way to install the fiber optic cables to the Project guidelines as stated below.

- A compressor of sufficient air pressure and volume shall be used to blow the cable in a duct via a specialized cable guide using a mechanical belt along with air flow to propel the cable. Typically a compressor capable of delivering a pressure of 130 to 200 psi with an air flow of 300 to 400 cubic feet per minute (cfm) is required for placing a fiber optic cable.
- The cable jetting equipment shall be sized for the diameter and type of cable being deployed.
- The CONTRACTOR shall ensure that there is adequate room to assemble the machine, hydraulic compressor and air compressor and that there is sufficient room to safely maneuver the fiber optic cable.
- The CONTRACTOR shall ensure there is a general sequence plan for the installation of each cable reel and that all personnel in each blowing crew are familiar with the plan.
- The CONTRACTOR shall observe all the proper operating procedures of machines and adhere to manufacturer's guidelines, ensuring that the blowing lubricant specified by the manufacturer is being used.
- Radio communication shall always be maintained between all jetting points to help maintain production rates and to prevent any damage to the fiber optic cable.
- Air coolers and water separators may be required in geographical locations with high humidity and temperatures.
- Blowing inserts shall be positioned with the "V" part of the seal facing the direction of cable flow. All equipment shall be assembled outside the hand-hole and behind the outbound duct position. The CONTRACTOR shall verify that all seals are adequate, and all the manufacturer's directions are followed. Any loss of air pressure will adversely affect the installation performance.
- Before starting the jetting process, a foam plug with lubrication shall be blown through the duct to eradicate any water or debris and lubricate the duct.
- Upon commencement of cable blowing, 17 fluid ounces of an approved lubricant shall be inserted into the duct for every 3,300 feet of cable to be blown. The speed and distance indicator on the jetting machine shall be set to zero and the hydraulic unit that supplies pressure to the cable pushing tracks shall be set to between 800 and 2500 psi.

- Once the blowing process begins, it is essential to monitor the air pressure within the duct, the hydraulic pressure on the pushing track, the distance jetted and the speed of the cable being installed. The average speed maintained for proper cable flow shall be between 150 to 300 feet per minute. When the cable flow slows measurably, it means the unit is reaching its jetting limit. Should the air pressure drop off in the jetting progress or the speed indicator shows a "stop", then pressure shall be removed until the problem is corrected. If this is not done, damage could occur to the cable.
- For the reel lengths that are typically used, each of the fiber optic cable reels shall be set up in the center of the cable run. The cable shall be blown in one direction, and then, the remaining cable shall be extracted off the reel onto a unit such as the CE-93 Cable Extractor manufactured by Stewart & Stevenson or approved equal or place the remaining cable in a figure eight, on a protective ground sheet. After the cable has been extracted, it shall be installed by blowing in the opposite direction.
- A section of inner-duct between 20 and 30 feet in length shall be temporarily installed into inbound and outbound inner-ducts at each hand-hole requiring a cascaded blowing machine. After cable placement in each direction, the temporary sections of inner-duct shall be carefully stripped back and removed to avoid any damage to the cable.
- When cascading jetting units, the secondary units shall be placed above the hand-holes and behind the upstream inner-duct. The temporary sections shall be installed into the inbound and outbound conduit and attached to the input and output of the cable blowing machine. The Contractor shall ensure that there is enough of a loop on the inbound side to properly operate the machine and to have a workable slack coil for completing the hand-hole and cable installation. During the process of receiving the cable from the primary location, adequate communications shall always be maintained.
- A single slack loop is required to be maintained around all four walls of the hand-hole when all the fiber cable on each reel has been installed. At no time shall any fiber cable be cut unless previously authorized by the AVANGRID Engineer. A slack coil of a minimum length of 80 feet shall be required within each splice hand-hole, loop-through hand-hole and slack container. At all hand-hole locations, a fiber optic identification tag shall be placed on the cable.

12.3 Cable Pulling

The CONTRACTOR will pull the cable to the manufacturer-approved specifications into a direct buried or underground innerduct or conduit system.

- Cable pulling eye shall be employed for pulls over 300 feet.
- The use of a Kellum grip is acceptable for pulling cable through duct, however the central strength member and/or Kevlar shall be woven into and secured onto the grip on these pulls.
- The maximum allowable pulling tension shall not exceed the cable manufacturer's allowable tension - normally 600 pounds. A dynamometer shall be used to provide a warning before the maximum tension is reached. Swivels and breakaways between the cable pulling eye and the pull line set for the maximum tension shall be used during pulling operations.

- Cable feeders and equipment capable of maintaining a steady continuous pull shall be used. Where feasible, continuous cable pulls shall not be made through more than two 90-degree bends or more than a total of 180 degrees in conduit bends. However, when this is not possible, care should be taken to ensure that the maximum pulling tension is not exceeded.
- When it is not possible to locate the pulling apparatus adjacent to the vault, a "C" vault sheaf shall be used. Where the hand-hole or vault opening does not permit the use of 28 inch diameter sheaves, a quadrant block shall be used to ensure a dynamic bending radius of at least 20 feet.
- A cable feeder shall be used to protect and guide the cable into the duct. Where an extension section is required, its nozzle end shall be placed in the bell end of the main section. The cable feeder also shall be used to feed lubricant onto the moving cable. In sections where the cable shall be pulled in two directions, the flexible inner-duct used for cable protection shall serve as the cable feeder and the pull line from the inner-duct shall be fed through the cable feeder before the connection is made between the line and the cable.
- A marker consisting of several turns of friction tape on the pull line shall be placed 20 feet from the cable end. This marker shall be used to indicate when the cable is about to enter the manhole.
- Before starting the pull, the equipment shall be checked carefully to minimize the chance of interruption once pulling has started. The cable reel shall be inspected to ensure there are no factory reel defects, exposed nails, splinters, or similar hazards that could cause cable damage. The proper wrapping of the cable at the factory shall be verified.
- A pulling speed of 80 to 100 feet per minute shall not be exceeded. The cable shall be watched carefully as it unreels, continually inspecting it for sheath defects or damage. If a cable defect or damage is noticed during the pull, the pull shall be stopped and the Engineer or the Owner's representative shall inspect the cable before resuming the operation.
- When stops are necessary, the pull line operator shall stop the pulling operation, but shall not release tension unless signaled to do so. In starting up again, the inertia of the cable shall be overcome by gradually increasing the tension in steps a few seconds apart until the cable starts to move.
- When pulling through manholes, radio equipped staff shall be located at each manhole to assist with pulling and lubrication and to halt the pulling if necessary.

13 Bridges

AVANGRID Engineering will provide under Special Conditions the As-Constructed Bridge drawings compiled for each bridge, which include the bridge bracket material list and bracket drawings for each bridge.

Bridge attachments, carrier pipe and other installation details shall be produced by revising the approved general Project drawings.

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ARTICLE 1 – CONTRACT DOCUMENTATION AND DESCRIPTION OF SERVICES

Pursuant to that certain Master Services Procurement Agreement (the “Agreement”) between Avangrid Service Company (hereinafter, “Customer”), and [REDACTED] (hereinafter, “Supplier” or “Contractor”), the entity (Customer and/or Company(ies)) named in the given Purchase Order, engages the Supplier, and the Supplier hereby agrees to perform the Services.

The Services shall be as described in *Schedule B* of the Agreement; as such Schedule may be amended, modified or supplemented and attached hereto for the purposes of the Purchase Order.

The provision of the Services shall be governed by the order of precedence set forth in the Agreement, Section 2.2(c) of the Agreement.

All work shall be invoiced in accordance with the pricing schedule approved by Customer for the Services, “Pricing Schedule,” included in *Schedule D*, attached hereto and made a part hereof (unless otherwise agreed to in writing by the Customer).

Supplier further agrees to do the following:

A. Supplier, through its experience and the normal course of business, has included full provision for local wage rates, travel and subsistence rates, allowances and conditions, if any, as well as allowances for any other measures necessary to complete the work in a satisfactory manner in accordance with this Agreement.

B. Supplier has read, understands and shall comply with *Schedule E*, hereby referred to as “Special Conditions”, attached hereto and made a part hereof.

C. Upon execution (for purposes hereof execution means when Supplier has begun to provide Services pursuant to the Purchase Order) of a Purchase Order:

1) Supplier has examined all available records pertaining to the work.

2) Supplier further states that the Contract Price and detailed schedule for completion of the work are based on Supplier’s known knowledge and judgment of the conditions and hazards involved, and not upon a representation of the Customer. The Customer assumes no responsibility for any understandings or representation made by any of their representatives during or prior to execution of this Agreement unless such understandings or representations are expressly stated in this Agreement and the Agreement expressly provides that the responsibility is assumed by the Customer.

ARTICLE 2 - CONTRACT PRICE

The Contract Price for the Services (made up of the costs, fees and expenses arising under Article 3 below) shall be set forth in the Purchase Order and shall be considered fixed unless stated otherwise (time and equipment, for example) on the face of the Purchase Order.

ARTICLE 3 - REIMBURSABLE ITEMS

The Supplier shall be reimbursed for the following items for Services performed under this Agreement:

A. Fees

Supplier shall be paid at the rates per hour specified in *Schedule D* to the Agreement for time spent in the actual performance of Services hereunder, including the preparation of reports, UNLESS a predetermined firm lump sum price has been agreed upon by both parties for all or part of the work, the criteria of which would take precedence as referenced therein. Time spent in Normal Commuting is not a billable expense. The term "Normal Commuting" means Supplier's first trip to any Work Location in a given day and Supplier's last trip from any Work Location in a given day. The term "Work Location" shall mean any location at which Services are or are to be performed by the Supplier. The term "Supplier's Base" shall mean the location or respective locations (which shall be disclosed to Customer in advance) from which Supplier will normally travel to Work Locations to perform Services. The Supplier agrees whenever possible, to coordinate travel arrangements that will maximize time spent in performing Services for the Customer.

(i) Customer will not reimburse Supplier for additional expenses invoiced separately under a fixed bid project. The Supplier must include all the expected expenses from the quoted project within the fixed bid proposal.

(ii) Customer reserves the right to renegotiate or reject expenses when the Supplier's local office personnel are not utilized for the awarded project but meet the required job classification/criteria to complete the project and Supplier utilizes resources from other Supplier's offices.

B. Travel Expenses

(i) Customer will pay or reimburse Supplier for actual cost of travel expenses incurred during the course of travel undertaken at Customer's request for the performance of Services, including travel from Work Location to Work Location, not including Normal Commuting, as follows:

- Customer will pay or reimburse Supplier for the actual cost of reasonable meals; and
- Customer will not reimburse Supplier's meal expenses for travel when an individual leaves their home base and returns to their respective home base within the same day.

(ii) Supplier will use the travel agency online platform provided by Customer and the choices therefore offered to book the necessary travel arrangements. (car rental, hotel, plane/train, etc.).

(iii) The Supplier may rent a car to travel from Work Location to Work Location. Supplier will be reimbursed actual cost of all parking, highway, and/or bridge charges paid en route.

ARTICLE 4 - PAYMENTS

A. Payments of any undisputed portions of an invoice will be made by the 60th day after the receipt by Customer of a properly completed invoice, supported by original receipts, and detailing the travel expenses.

B. An original and copy of each invoice are to be mailed to the "Bill to Location" provided in the Purchase Order.

Each invoice shall show the Purchase Order Number, Supplier work location, payment terms and the job name and other information, which may be required or reasonably requested by Customer.

The following documentation must accompany each invoice:

(i) Summary statements listing employee name, job classification, hours charged and hourly billing rates (both straight time and overtime if applicable) and total charges for the invoice period.

(ii) Copy of invoices for material, services, rentals, contracts, and other items purchased or rented in connection with the Services.

(iii) Copies of expense account summary sheets for each individual performing Services will be provided. The summary sheet will summarize lodging, meals, transportation and any other expenses. The period of time will also be shown. Supplier shall retain copies of supporting documents for such expense accounts, and these will be made available for Customer review upon

written request by Customer. Supplier shall preserve all pertinent records supporting payment for Services hereunder for a period of two (2) years after final payment for the Services.

(iv) For the initial invoice submitted by Supplier for the Services under this Agreement, the bank account number of Supplier to which payments should be made by Customer and/or Company under this Agreement must be provided in writing with evidence of account ownership as provided herein. For any change in such bank account information, Supplier shall at least thirty (30) days prior to the applicable payment date provide Customer and Company with an account ownership certificate acceptable to Customer for any change to the original bank account information, in addition to the requirements set forth below.

Supplier acknowledges that invoices which do not contain the above information or are not addressed as stated in the Purchase Order may cause payment delay.

A) Method of payment

All payments by Customer and/or Company will be made by bank transfer to the following bank account owned by the Supplier: *** (preferred option) or to the bank account that the Supplier notifies Customer at least thirty (30) days prior to the applicable payment date pursuant to the notice requirements in this Agreement. Supplier must prove the account ownership and the identifying details of the bank account.

Any change in the bank details of the Supplier must be duly notified to Customer and/or Company, including the relevant supporting documentation. Otherwise, Customer and Company will not be obligated to make payment to the new account and payment to the former account will constitute a discharge of all obligations by Customer and Company. In any case, Customer and Company may withhold the corresponding payment, without incurring any type of liability, until the provider proves reasonable evidence of the ownership of the bank account. In the event Supplier owes money to the Customer or has defaulted under this Agreement or under any other agreements with the Customer, or Supplier has failed to pay any amount owed to the Customer whether pursuant to an agreement, a statutory or regulatory fine, the imposition of statutory or regulatory damages, or otherwise (collectively, the "Obligations"), the Customer may, at its option, setoff and/or net any or all such Obligations against any amounts owed by the Customer to the Supplier.

B) Communications

Any notifications, requests and other communications by Supplier related to the administrative management and payments under this Agreement shall be made in writing through the secure communication channel implemented for that purpose by Customer and/or Company. If such secure communication channel is not available, such notifications, requests and other such communications by Supplier must be either: (i) delivered personally; (ii) sent by fax or e-mail (with confirmation); or (iii) sent by mail (with proof of delivery) to the address listed as belonging to each party in the Agreement.

ARTICLE 5 – TAXES

The Contract Price does not include sales/use taxes. Supplier shall be responsible for payment of and assumes exclusive liability for any and all contributions or taxes imposed by or required under the laws of the State of New York or any other state or Federal law, or the Federal Social Security Act or any other act, now or hereafter in effect, upon or in respect to, wages, salaries, benefits or other compensation paid to employees engaged upon or in connection with the Services. Customer shall withhold from any payments due Supplier hereunder any amounts that it is required to withhold pursuant to any Federal or State tax laws.

ARTICLE 6 – CHANGES

No changes in the Scope of Services are authorized unless made by Customer and sustained by written Supplement. A Change is an addition, deletion, or revision in the Services or an adjustment in the Contract Price or the Schedule. Changes made by Supplier, unless authorized by an executed Supplement, shall be made at the sole risk of Supplier, there being no financial recourse against Customer. No changes in the Agreement will be made without a Supplement agreed by Customer and/or Company(ies). Unless otherwise agreed, all Supplements shall be governed by the conditions of this Agreement.

ARTICLE 7 - CLAIMS/DISPUTES

A. Any claims by Supplier relating to this Agreement, must be submitted to the Customer in writing within fourteen (14) calendar days of initial occurrence of the basis for the claim. Failure to provide such notification shall be deemed waiver of such claim.

B. The notice of claim shall include the particulars and shall specify the cause or other basis of the claim, and shall include substantiation of the amount and/or extension to which the Supplier considers itself to be entitled in connection with the Agreement.

C. dispute or claims by the Supplier shall not affect the diligent prosecution by Supplier of the Services.

D. The Parties agree to hold a meeting promptly to attempt in good faith to negotiate a resolution of the dispute, such meeting to be attended by representatives of the Parties with decision-making authority regarding the dispute. If, within twenty-one (21) days after such meeting, the Parties have not succeeded in negotiating a resolution of the dispute, either Party may refer the dispute to a court under Article 41 which is to be the sole legally binding forum available to the Parties for resolution of a dispute hereunder.

ARTICLE 8 – AUDIT

Supplier shall check all materials and labor entering into the Services and shall keep full and detailed accounts as may be necessary to provide proper financial management under this Agreement. At all reasonable times, the Customer shall have access to the Supplier's offices, work and records pertinent to all charges, for inspection, audit and review. Supplier shall permit such examination and make appropriate adjustments as may be required by the results of the audit. All

results of these audits must be kept confidential between the Parties and their agents. This provision shall remain in effect for two (2) years following final payment under this Agreement.

ARTICLE 9 - RIGHTS, PRIVILEGES, REMEDIES; NON WAIVER

All rights, privileges and remedies afforded each of the parties hereto by this Agreement shall be deemed cumulative and the exercise of any one or more of such rights or remedies shall not be deemed a waiver of any other right, privilege or remedy provided for herein or available at law or in equity.

ARTICLE 10 - NON WAIVER OF RIGHTS

Any failure by the Customer to enforce or require the strict performance of the terms or conditions of this Agreement shall not constitute a waiver of such terms or conditions and shall not affect or impair such terms or conditions in any way.

ARTICLE 11 - SET-OFF

In the event Supplier owes money to the Customer or has defaulted under this Agreement or under any other agreements with the Customer, or Supplier has failed to pay any amount owed to the Customer whether pursuant to an agreement, a statutory or regulatory fine, the imposition of statutory or regulatory damages, or otherwise (collectively, the "Obligations"), the Customer may, at its option, setoff and/or net any or all such Obligations against any amounts owed by the Customer to the Supplier.

ARTICLE 12 - CONFLICTING DOCUMENTS

To the extent, if any, that the specifications, drawings or other documents that may be referenced herein conflict with the provisions of this Agreement, the order of precedence set forth in Section 2.2(c) of the Agreement shall govern such conflict.

ARTICLE 13 - INDEPENDENT SUPPLIER

Supplier is and shall always remain an independent contractor in its performance of this Agreement. With the exception of staff augmentation engineering services required by Customer, where Supplier's personnel work out of Customer's offices under Customer's direction, the provisions of this Agreement shall not be construed as authorizing or reserving to Customer any right to exercise any control or direction over the operations, activities, employees or agents of Supplier in connection with this Agreement. Neither Party to this Agreement shall have any authority to employ any person as agent or employee for or on behalf of the other party to this Agreement for any purpose, and neither Party to this Agreement, nor any person performing any duties or engaging in any work at the request of such Party, shall be deemed to be an employee or agent of the other Party to this Agreement.

Customer shall carry no worker's compensation insurance, health insurance or accident insurance to cover the Supplier, or any of its agents, employees or subcontractors. Customer shall not pay

any contributions to Social Security, unemployment insurance, federal or state withholding taxes, or provide any other contributions or benefits which might be expected in an employer/employee relationship. The Supplier agrees to report and pay any contributions for taxes, unemployment insurance, Social Security and any other required payments himself or herself.

ARTICLE 14 – SUBCONTRACTS

If Supplier shall cause any part of the work to be performed by a sub-contractor, the provisions of this Agreement shall apply to such sub-contractor and its officers, agents or employees in all aspects as if they were employees of Supplier, and Supplier shall not thereby be discharged from any of its obligations and liability hereunder, but shall be liable hereunder for all acts and omissions of the sub-contractors. Nothing hereunder shall create any contractual relationship between Customer and any subcontractor or any sub-subcontractor.

The Supplier shall submit a list of those work items which it plans to subcontract and the names of Supplier's subcontractor proposed for the work together with all materials for an evaluation by Customer's Corporate Security Group. Supplier's subcontractor may not be changed except at the request of or with the written approval of the Customer, which shall not be unreasonably withheld. The Customer shall promptly notify the Supplier in writing if, after due investigation, Customer has reasonable objection to any subcontractor on such list and does not accept it. Copies of all subcontracts shall be furnished to the applicable Customer contract management representative.

Supplier shall assign to Customer any subcontractor warranties applicable to the Services that extend beyond the applicable warranty period upon the expiration or termination of such warranty period. Contractor shall assign any subcontractor warranties applicable to the Services to Customer if Supplier becomes insolvent or files for bankruptcy.

ARTICLE 15 - THIRD PARTY BENEFITS

Except as may be specifically provided for herein, no provision of this Agreement is intended or is to be construed to be for the benefit of any third party.

ARTICLE 16 – SAFETY

Customer may at any time suspend the work or any part thereof, immediately and verbally for reasons of safety. In the event of any work stoppage, Supplier shall properly protect such work as may be liable to sustain injury from any cause.

The Customer's Safety Rules and Regulations for Suppliers are attached hereto and made a part hereof, as *Appendix 1 to this Schedule C* and shall apply to all work performed under this Agreement.

ARTICLE 17 – ACCIDENT, SECURITY AND LOSS PREVENTION

For the protection of workers and the public, the Supplier will take all necessary and advisable precautions for the safety of all persons and property at, on, or near the work site and will erect

and maintain all necessary and advisable safeguards as required by the conditions, prudent industry practice, and progress of the work. Supplier is responsible for the security and protection of its own equipment, supplies, and tools used in connection with the Services. Supplier must use due care to protect any of the Customer's or Company(ies)'s property in its possession or under its control at any time while performing the Services, which must not be less than the care exercised by Supplier with its own property, and Supplier is responsible for any damage to such property resulting from its failure to use such care. For the avoidance of doubt, this Article shall be subject to the terms of the Data Security Rider, if applicable.

ARTICLE 18 – INSURANCE

Supplier shall maintain insurance in accordance with the requirements as set forth in *Schedule G*. Supplier must maintain applicable insurance for the full term of this Agreement. An insurance certificate must be mailed to Customer prior to starting Services.

ARTICLE 19 – INDEMNIFICATION

Supplier will indemnify, defend at its expense and hold harmless, to the fullest extent permissible by law, the Customer and its Affiliates, directors, officers, employees, shareholders, managers, members, partners, agents, successors, permitted assigns, and all affiliated and subsidiary companies, corporations, trusts, partnerships, joint ventures (including joint venture partners), associated companies, associations, subsidiaries of the foregoing and individuals which are now or may hereafter be owned, controlled, operated, or directed by or a subsidiary to Customer (the "Indemnitee"), from and against any and all claims, demands, suits, losses, costs, fees, damages or expenses it may suffer, or for which it may be held liable, whether including, without limitation, reasonable expenses and attorney's fees incurred in the connection therewith, by reason of:

- A. any patent, trademark, or copyright infringement claim, or any design, device, process or procedure used, installed or provided by the Supplier or its agents or subcontractors under this Agreement;
- B. any work-related accident or injury affecting an employee, agent or subcontractor of the Supplier, arising in connection with work performed under this Agreement;
- C. any claim by an agency or instrumentality of the federal, state or any local government, or by an employee, agent or subcontractor of the Supplier alleging that:
 - i. the Indemnitee is required to maintain worker's compensation or unemployment or any other type of insurance upon any employee, agent or subcontractor of the Supplier;
 - ii. the Indemnitee is liable for tax payments or withholding with respect to any employee, agent or subcontractor of the Supplier;
 - iii. any employee, agent or subcontractor of the Supplier is entitled to receive employee benefits from the Indemnitee, including, without limitation, vacation, deferred compensation, medical, pension, 401(k) or any other benefit available to the Indemnitee's employees; and

- iv. the Indemnitee is liable to any party, for any reason, due to the negligent performance of Services or omissions by an employee, agent or subcontractor of the Supplier;
- D. bodily injury, including death, to any person or persons due to the negligent, reckless or willful actions or omissions of the Supplier or its agents or subcontractors; or
- E. damage to or destruction of any property, including loss of use thereof, due to the negligent, reckless or willful actions or omissions of the Supplier, or its agents or subcontractors.

Individual employees, agents and subcontractors of the Supplier who are performing services for the Indemnitee under this Agreement shall be considered to be employees, agents or subcontractors of the Supplier for all purposes under this Agreement, notwithstanding any judicial or administrative determination that such employees, agents or subcontractors of the other party should be regarded as employees under applicable law. All actions of the employees, agents and subcontractors of the Supplier under this Agreement shall be deemed to be actions of the Supplier under these indemnities and this Agreement. In furtherance of the foregoing indemnification and not by way of limitation thereof, the Supplier hereby waives any defense or immunity it might otherwise have under applicable worker's compensation laws or any other statute or judicial decision (including, for work or Services to be conducted in Maine, without limitation, *Diamond International Corp. v Sullivan & Merritt, Inc.* 493 A2d. 1043 (Me 1985)) disallowing or limiting such indemnification, and the Supplier consents to a cause of action for indemnity.

ARTICLE 20 – WARRANTY

The Supplier warrants that the Services performed under this Agreement shall be performed in accordance with any Customer and applicable Company's technical documentation, standards, manuals and procedure or and other procedure specified in the RFP together with the specifications set forth in a Purchase Order or elsewhere herein, and otherwise in accordance with sound and generally accepted industry practice by those who render these types of services with that degree of skill and care as required by customarily accepted professional practices and procedures, at the time such services are performed. If the Supplier's Services are faulty, the Supplier shall for a period of one (1) year after completion of Services, without labor charge and adders or other fee to Customer, promptly re-perform such Services to the extent necessary to correct the fault therein. This provision shall not be construed to affect or limit the liability of the Supplier to third parties, Supplier's obligation to Customer pursuant to the Indemnification clause contained herein or any other remedy which may be available to Customer under applicable law. The warranty hereunder is transferable to any assignee of Customer's rights under this Agreement, including for any remaining warranty period should an assignment occur.

ARTICLE 21 - APPROVAL/ACCEPTANCE

All work under this Agreement shall be subject to the Customer's inspection and approval before payment. Acceptance of Services hereunder by Customer does not relieve Supplier from any of its obligations under this Agreement or any scope of work, and does not constitute waiver of any of the rights and remedies of Customer hereunder. Supplier shall notify Customer when the work

is ready for Customer's inspection. If Customer fails to inspect same within thirty (30) days of Supplier's notice, Customer shall be deemed to have accepted the work and the Services.

ARTICLE 22 - FORCE MAJEURE

For purposes of this Agreement, "Force Majeure Event" means, with respect to a Party, any event or circumstance, regardless of whether it was foreseeable, that was not caused by that Party or the negligence of that Party and that prevents a Party from complying with any of its obligations under this Agreement, and that the Party claiming the occurrence of such event has furnished the other Party with prompt notice when it appears that such cause will result in non-performance or shall threaten to impair such Party's performance, except that a Force Majeure Event will not include a strike, workforce unavailability, or other labor unrest that affect only one Party, late delivery or breakage of equipment or materials (except to the extent due to a Force Majeure event otherwise excusable hereunder), lack of funds or change in economic circumstance, a failure of performance of any third party (except to the extent due to a Force Majeure event otherwise excusable hereunder), an increase in prices, a change in market demand, a change in law, weather or climatic conditions within the range of severity as recorded by the *National Oceanic and Atmospheric Administration* over the past twenty-five (25) years in the vicinity of the Site or elsewhere, or actions of a Governmental Authority with respect to the Supplier's compliance, or failure to comply, with Applicable Laws, Permits, or Governmental Authority-imposed measures. Force Majeure may include the following events, (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies in each case within the country; (b) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war in each case within the country; (c) riot, commotion, disorder, strike or lockout in each case within the country, by persons other than a Party, that Party's Personnel, Subcontractors and other employees of that Party; (d) ionising radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such radiation or radio-activity; or, (e) natural catastrophes, such as earthquake, volcanic activity, hurricane or typhoon (but not any other weather, climate or metocean conditions). Supplier shall have used its best efforts to remedy the delaying cause or condition and recommence performance, and has furnished the Customer with prompt written notice when it appears that such cause will result in non-performance or shall threaten to impair Customer's ability to operate. Customer shall have the right, at its option and without being under any liability to Supplier, to cancel by notice in writing to Supplier the portion or portions of the work so affected and to take such compensation action as may be necessary. Correspondingly, Customer shall be excused for failure of performance herein due to any cause beyond its control and without its fault or negligence, including delays by Customer in performing its obligations under this Agreement. Upon occurrence of a Force Majeure Event, the nonperforming Party shall promptly notify the other Party of occurrence of that Force Majeure Event, its effect on performance, and how long that Party expects it to last. Thereafter the nonperforming Party shall update that information as reasonably necessary. During a Force Majeure Event, the nonperforming Party shall use reasonable efforts to limit damages to the other party and to resume its performance under this Agreement. If the Force Majeure Event extends for more than twenty (20) days and if the Supplier cannot reasonably reschedule or perform any affected element of this Agreement, the Customer shall be entitled to terminate this Agreement upon notice to the Supplier. Supplier shall furnish timely reports every ten (10) Business Days during the continuation of each Force Majeure Event with respect thereto and whenever such Force Majeure Event has ceased. If a Force Majeure Event

materially affects Supplier's schedule for performance hereunder, Supplier may request an equitable adjustment and the Parties agree to memorialize schedule changes in a change order. If the effects of a Force Majeure Event last longer than twelve (12) months, that shall entitle Customer or Supplier to terminate the Agreement or Purchase Order, as the case may be.

ARTICLE 23 - TITLE AND LIENS

Supplier represents and warrants that it has title to all equipment or material furnished hereunder free and clear of all liens and encumbrances. Complete legal and equitable title to each item of equipment or material covered by this Agreement shall pass to the Customer immediately upon delivery at job site. This provision shall apply irrespective of any terms of payment specified in this Agreement. Passage of title pursuant to this provision shall not release or waive any continuing or subsequent responsibility of Supplier under this Agreement.

Supplier shall take all action reasonably necessary to discharge, remove, or satisfy any lien filed against any property of the Customer, or any portion thereof, arising from any work, labor, services, or materials claimed to have been performed or furnished for, or on behalf of, the Supplier or any person or entity by or through the Supplier. Supplier shall forthwith take such action necessary to discharge, remove, or satisfy any such lien filed against the property of the Customer, including but not limited to posting of a bond. If the Supplier shall fail to discharge, remove, or satisfy any such lien within ten (10) days after notice of the existence of such lien has been provided by the Customer, the Customer shall have the right, but not the obligation, to pay the amount of such lien, or discharge the same by deposit or bonding, and the amount so paid or deposited, or the premium paid for such bond, with interest at the maximum allowable by law, may be set-off against any payment due Supplier under this Agreement.

ARTICLE 24 - PROGRESS AND COMPLETION

It is expressly understood by the Supplier that except as excused by Force Majeure or as set forth elsewhere in this Agreement TIME IS OF THE ESSENCE in the performance of this Agreement. The Supplier shall begin the work on the date of commencement set forth in the Agreement. The Supplier shall carry the work forward expeditiously with adequate forces and shall complete it by the time work is to be completed as stated in the Agreement.

If the Supplier is delayed at any time in the progress of the work, written notice thereof, including an explanation of the cause and the anticipated duration of the delay, shall be given promptly to the Customer by the Supplier, but in no event later than five (5) days after such delay becomes apparent. Failure to give such notice promptly and within such time limit shall be deemed sufficient reason for denial by Customer of an extension of time for performance and may be deemed a default.

Failure of Supplier's subcontractor or materials and equipment suppliers to meet schedules shall not be cause for an extension of time. Supplier acknowledges that it has sole responsibility for expediting the efforts of its subcontractors, suppliers, and others.

Without prejudice to other remedies that Customer may have under the Agreement or the law, if Supplier fails to meet the time schedule or other delivery date obligations set forth in the Agreement (the “Guaranteed Delivery Dates”), then Supplier shall pay to Customer as liquidated damages for such delay, and not as a penalty, the amounts set forth in the applicable Agreement, if any, for each day the delivery is late under the applicable Agreement (the “Liquidated Damages”). If the Agreement does not establish an amount, the amount of the Liquidated Damages shall be equal to one per cent (1%) of the Contract Price for each full calendar week's delay.

Such Delay Damages shall never exceed fifteen per cent (15%) of the Contract Price.

The Parties acknowledge and agree that because of the unique nature of the performance it is difficult or impossible to determine with precision the amount of damages that would or might be incurred by Customer as a result of Supplier’s failure to meet the Guaranteed Delivery Dates under the applicable Agreement, Statement of Work, or applicable order. It is understood and agreed by the Parties that (i) Customer shall be disadvantaged by failure of Supplier to meet such obligations, (ii) it would be impracticable or extremely difficult to quantify the amount of Customer’s damages resulting therefrom, and (iii) any Liquidated Damages payable under the applicable Agreement, Statement of Work, or applicable order are not a penalty, but instead represent a fair and reasonable estimate of damages for failure to meet Supplier’s Guaranteed Delivery Dates.

In no event shall the payment of any Liquidated Damages excuse Supplier from performance of any of its other obligations under this Agreement or prejudice Customer’s rights under the Agreement or Applicable Law.

Customer shall have the right to deduct any Liquidated Damages due from the payment of any pending invoices to Supplier.

ARTICLE 25 - EMERGENCIES

The Supplier shall perform any work and shall furnish and install any materials and equipment necessary during an emergency affecting the safety of persons and property. In all cases, Supplier shall notify the Customer of the emergency as soon as practicable, but shall not wait for instructions before proceeding to properly protect both life and property. Any additional compensation or extension of time claimed by the Supplier on account of emergency work shall be determined by mutual agreement of the parties.

ARTICLE 26 - WORK STOPPAGE

Supplier’s personnel shall not honor any union picket lines or strikes nor take part in any work slowdown or stoppage nor refuse to report for work, unless such action is protected by any state or federal labor relations law. Notwithstanding the preceding sentence, it shall be the obligation of the Supplier to supply a qualified work force. Customer may terminate this Agreement if Supplier fails to provide a qualified work force within twenty-four (24) hours of Customer’s notification to Supplier that a qualified work force has not been supplied.

ARTICLE 27 - TERMINATION

Customer may for any reason, with or without cause, on written notice to Supplier terminate all or any part of the unperformed portion of this Agreement without liability to Customer except as stated in this Article. Termination of a scope of work or a Purchase Order under this Article 27 does not terminate this Agreement unless expressly stated in the notice of termination. In full discharge of any obligations to Supplier with respect to this Agreement and such termination, Customer shall pay Supplier, in accordance with the payment terms of the Agreement, only for Services satisfactorily performed prior to receipt by Supplier of notice of termination; provided, however, that such payment shall not result in a total payment to the Supplier exceeding the maximum amount payable to the Supplier pursuant to this Agreement. Termination shall not relieve Supplier of any obligation which may arise out of Services performed prior to termination. In no event shall Customer be liable to Supplier for lost profit or overhead in respect of Services not performed prior to termination, unabsorbed overhead or anticipated profits on uncompleted portions of this Agreement.

In the event Supplier is in default of any of its obligations under this Agreement, Customer shall have the right, on ten (10) days written notice to Supplier, to terminate this Agreement for such default; provided, however, that Supplier shall have the right to cure by submitting a plan acceptable to the Customer to cure the default during the ten (10) day notice period in order to avoid termination and providing that such default is, in fact, cured within thirty (30) days after Supplier first received notice of the default from Customer, or such longer period of time if the nature of the default is such that it cannot reasonably be cured within thirty (30) days, provided that Supplier has commenced such and is diligently prosecuting same, or some other period of time acceptable to Customer. Without limiting the provisions of this Agreement, the following events shall also constitute a default by Supplier under this Agreement:

- (i) In the event that Supplier is declared to be bankrupt or insolvent, Supplier makes an assignment for the benefit of creditors, Supplier shall file a voluntary petition in bankruptcy or insolvency or an involuntary petition is filed against Supplier, or a receiver shall be appointed for Supplier and such appointment or bankruptcy or insolvency proceedings, petition, declaration or assignment is not set aside within sixty (60) days.
- (ii) There has been a material adverse change in the financial condition of Supplier that affects the ability of Supplier to perform.
- (iii) Supplier assigns or attempts to assign its rights or obligations under this Agreement or any part thereof to any third party without the prior written consent of the Customer or Company(ies).
- (iv) Supplier (i) fails or refuses to comply with any applicable laws or regulatory or permitting requirements, and (ii) either (A) within five days after obtaining knowledge of such non-compliance does not commence steps to comply or is not in compliance with such requirements within a reasonable period of time thereafter, or (C) Company(ies) or the Customer faces any civil or criminal action or penalty as a result of such non-compliance by Supplier.

- (v) Any data breach as defined in the Data Security Rider, as applicable.

In the event of such termination, the preceding paragraph of this Article shall not apply and Customer shall have all rights and remedies provided by law or equity and under this Agreement. In addition, in such event, Customer may retain from any money otherwise due for Services rendered prior to termination an amount which Customer reasonably determines is adequate to cover all damage resulting from the Supplier's default. In the event that Supplier demonstrates that a cancellation for default is erroneous, the cancellation shall, at Customer's option, be withdrawn or be deemed to have been issued as a termination for convenience pursuant to the preceding paragraph and the rights and obligations of the parties hereto shall in such event be governed accordingly. The value of Services performed not in accordance with this Agreement shall be subject to audit, assessment and approval by Customer.

ARTICLE 28 – TERM AND SURVIVAL

This Agreement shall remain in effect unless otherwise terminated as provided herein, or upon receipt by Customer of Supplier's Release and Certificate Form and Final Payment is made as set forth in Article 30 below. Notwithstanding the foregoing, Articles 4 Payments, Article 5 Taxes, Article 7 Claims/Disputes, Article 8 Audit, Article 9 Rights, Privileges, Remedies, Article 10 Non Waiver of Rights, Article 13 Independent Suppliers, Article 14 Subcontractors, Article 16 Safety, Article 17 Accident, Security and Loss Prevention, Article 18 Insurance, Article 19 Indemnification, Article 22 Force Majeure, Article 23 Title and Liens, Article 31 Assignment, Article 36 Public Release of Information, Article 37 Limitation of Liability, Article 38 Confidentiality, Article 39 Equal Employment Opportunities Compliance, Article 41 Governing Laws, Article 47 Ethics, and all other terms which contain obligations or duties which by their nature are to be or may be performed beyond any termination hereof, shall survive the termination of this Agreement without regard to the reason for termination.

ARTICLE 29 - REMOVAL OF EQUIPMENT

In the case of termination of this Agreement for any reason whatsoever, the Supplier, if notified to do so by the Customer, shall promptly remove any part or all of Supplier's equipment and supplies from the property of the Customer, failing which the Customer shall have the right to remove such equipment and supplies at the expense of the Supplier.

ARTICLE 30 - FINAL PAYMENT

Final payment under this Agreement shall not be made until successful completion and acceptance of the work by the Customer and when requested by Customer, Supplier's delivery of a completed Release and Certificate Form, the form of which shall be provided to Supplier at the time of the request.

ARTICLE 31 - ASSIGNMENT

Supplier shall not assign all or any of its rights or obligations under this Agreement except with the prior written consent of Customer. Any assignment made without such consent shall be void ab initio.

ARTICLE 32 - SEVERABILITY

If any provision of this Agreement is unenforceable under any applicable law or is held invalid, such holding shall not affect any other provision hereof, and this Agreement shall be construed as if such unenforceable or invalid provision had never been contained herein.

ARTICLE 33 - NON WAIVER OF RIGHTS

Any failure by the Customer to enforce or require the strict performance of the terms or conditions of this Agreement shall not constitute a waiver of such terms or conditions and shall not affect or impair such terms or conditions in any way.

ARTICLE 34 - OWNERSHIP OF PLANS

All drawings, plans, specifications, reports, designs, design data, technical and scientific data, findings, recommendations and memoranda of every description whether furnished to or prepared by Supplier under this Agreement shall (i) remain the Intellectual Property of Customer or Company (as applicable); (ii) be delivered to Customer upon completion of the work or termination or cancellation of this Agreement if requested by Customer, (iii) be deemed to have been prepared by Supplier for Customer on a work-made-for-hire basis, and (iv) shall be the property of Customer and may be used by Customer for any purpose whatsoever without any claim on the part of Supplier for additional compensation. To the extent any of the foregoing are not deemed a work for hire by operation of law, Supplier hereby irrevocably assigns, transfers, and conveys to the Customer without further consideration all of its right, title, and interest in such drawings, plans, specifications, reports, designs, design data, technical and scientific data, findings, recommendations and memoranda of every description, including all rights of patent, copyright, trade secret or other proprietary rights in such materials.

Except as specifically authorized by this Agreement, or as otherwise authorized in writing by Customer, information and other data developed or acquired by or furnished to the Supplier in the performance of this Agreement shall be used only in connection with the work under this Agreement.

ARTICLE 35 - KEY PERSONNEL

Personnel assigned to perform work hereunder who are designated as “Key” Personnel in this Agreement specified on *Schedule E* of this Agreement shall devote their working time to the work as required by the Agreement Schedule of Activities and shall not be removed, without the prior written consent of Customer, until their assignments are completed. The Customer shall have the right to reject replacements for personnel.

ARTICLE 36 - PUBLIC RELEASE OF INFORMATION

Dates, photographs, sketches, advertising and other information relating to the work under this Agreement, which Supplier desires to release or publish, shall be submitted to the Customer for approval two (2) weeks prior to the desired release date. As a part of the approval request, Supplier shall identify the specific media to be used as well as other pertinent details of the proposed release. All releases must have the prior written approval of the Customer which approval may be withheld without reason or explanation to Supplier.

ARTICLE 37 - LIMITATION OF LIABILITY

To the fullest extent permitted by law, Customer shall not be liable for any special, indirect, punitive, exemplary, incidental or consequential damages resulting in any way from the performance of the services hereunder, including lost profits or other business interruption damages, whether based in contract, warranty, tort, negligence, strict liability, or otherwise, and whether suffered by Supplier or by any of its subcontractors, under or in respect to this Agreement or for any failure or performance related to this Agreement howsoever caused. Any damages expressly permitted under Article 24 re: liquidated damages and/or *Schedule E*, as applicable are not deemed to be consequential damages under this Article 37.

ARTICLE 38 – CONFIDENTIALITY

Supplier, and its employees and agents, shall treat any information, (including any technical information, experience or data) regarding Customer or Customer's plans, programs, plants, processes, costs, equipment, operations, of Customer (or of Customer's Affiliates), which may be disclosed to, or come within the knowledge of, Supplier its employees and agents in the performance of this Agreement, as confidential, and will not use or disclose this information to others, during the term of this Agreement, and for three (3) years thereafter, except as is necessary to perform the Services hereunder, without Customer's prior written consent. The provisions of this Article shall not apply to any information referred to in this Section which (i) has been published and has become part of the public knowledge through no effort by Supplier, its employees, or agents, (ii) has been furnished or made known to Supplier or Supplier's affiliates by third parties (other than those acting directly or indirectly for or on behalf of Customer) as a matter of legal right and without restriction on disclosure, (iii) was in Supplier's possession prior to disclosure by Customer and was not acquired by Supplier or Supplier's affiliates, its employees and agents directly or indirectly from Customer or, (iv) is required by law or by any other governmental regulatory authority to be disclosed.

Any information, which is supplied by the Supplier to Customer will be similarly restricted, including clauses (i) through (iv) in the paragraph above. Customer will not disclose such information to others or publish it in any form at any time; provided, however, that notwithstanding the foregoing, Customer may disclose any such information to its Affiliates, employees, and consultants, to any regulatory agencies or instrumentalities when such disclosure is necessary, or otherwise required by law.

Each Party agrees that they will cooperate with the other in an effort to minimize the amount of such information, which will be disclosed in any such case, and to make reasonable efforts to secure confidential treatment of such information.

In no event shall Customer's name and/or logo or the name and/or logo of its Affiliates be used, whether written or verbal, duplicated, reproduced by any means whatsoever without the prior written permission of the Customer.

All inquiries by any governmental, business, or other entity, including media, regarding any work performed or to be performed by Supplier for Customer shall be directed by Supplier to Customer for response.

ARTICLE 39 - EQUAL EMPLOYMENT OPPORTUNITY COMPLIANCE

To the extent, if any, that the provisions of the following executive order and statutes, as amended or supplemented, along with their implementing regulations, apply to the performance of the Services by Supplier, the Supplier will comply with the applicable executive order, statutes and regulations: Section 202 of Executive Order 11246 (41 CFR § § 60, et seq.); Section 402 of the Vietnam Era Veterans Readjustment Act (41 CFR § § 60-250.1, et seq.); Section 503 of the Rehabilitation Act of 1973 (41 CFR § § 741.1, et seq.); and New York Executive Law §§ (5 NYCRR § § 140.1, et seq.). These regulations may require the Supplier to develop an Affirmative Action Compliance Program and file a standard Form 100 Report (EEO-1), or other reports, as prescribed.

Without limiting the foregoing, the Supplier and each of its subcontractors (if any) shall abide by the requirements of 41 CFR 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity or national origin. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability or veteran status.

ARTICLE 40 - SURETY BOND

The Company shall have the right, at all times, to require the Supplier to furnish a bond covering faithful performance of this Agreement and the payment of all obligations arising hereunder (i.e., Performance Bonds, Mechanics Liens), including any damages that may be payable under Article 27. The Company shall be entitled to approve the amount, form, premium cost, and surety Company issuing such surety bond.

ARTICLE 41 - GOVERNING LAWS

The Supplier will comply with all applicable federal, state and local laws, rules, ordinances and regulations of any governmental entity, board or agency having jurisdiction over the work or the premises, including, without limitation, Federal, state, or local laws, rules and regulations and any

applicable Executive Orders (state or Federal) in the performance of the Services. All questions concerning the interpretation, validity and enforceability of this Agreement and of its terms and conditions, as well as questions concerning the sufficiency or other aspects of performance under the terms or conditions of this Agreement, shall be governed by the law of the State of New York, without reference to its conflict of law provision and any action or proceeding brought in connection therewith, will be brought in the appropriate court located in the State of New York. The Parties hereby irrevocably consent to the jurisdiction of such court and hereby waive, to the fullest extent permitted by, any objection which they may now or hereafter have to the venue of any such dispute related to or arising out of this Agreement brought in such court or any defense of inconvenient forum for the maintenance of such dispute. Each Party agrees that a judgment in any such dispute may be enforced in other jurisdictions by suit on the judgment or in any other manner provided by law.

ARTICLE 42 - PERFORMANCE MONITORING

Customer will evaluate Supplier's performance by utilizing Supplier Corrective Action Reports and Supplier Performance Evaluation Reports. The Supplier must provide upon request the OSHA incident rate and Experience Modification Rate for Customer's review. The Customer's Project Manager will evaluate the Supplier's performance upon the conclusion of every project by completing the specified report. The Customer will continuously monitor the Supplier's performance. Performance by a Supplier that is less than desirable may potentially eliminate this Supplier from bidding on future projects and/or lump sum projects.

ARTICLE 43 – INTENTIONALLY DELETED

ARTICLE 44 - NO DISPUTE

Supplier represents and warrants that it is not aware of any pending billing dispute or other contractual dispute (pursuant to current contracts or contracts no longer in effect) or any pending or threatened litigation between Supplier and/or any of Supplier's affiliates and Customer and/or and of Customer's Affiliates.

ARTICLE 45 - SECURITY REQUIREMENTS

Supplier shall comply with Customer's Security Requirements in their performance of Services as provided herein.

Services that involve access, process, storage or transmission of non-public information, the Parties agree that the Supplier and each of its subcontractors (if any) shall comply with the data security rider attached hereto as *Schedule H* and made a part hereof, which includes, without limitation, the following Annexes thereto:

- a) Annex 1 (the "Cyber Insurance Rider")
- b) Annex 2 (the "Third Party Lite Assessment"). For purposes of clarity, Supplier and each of its subcontractors (if any) agree to complete the Third Party Lite Assessment that

assesses the Supplier's security program and maturity level; provided, however, additional questions may be required by Customer based on the answered submitted by Supplier.

- c) Annex 3 (the "Security Scope Framework"). For purposes of clarity, Supplier and each of its subcontractors (if any) agree to complete the security scope framework; provided, however, additional questions may be required by Customer based on the answered submitted by Supplier.
- d) Annex 4 (the "IT Service Provider Requirements).
- e) Annex 5 (the Third Party Mobile Attestation").
- f) Annex 6 (the "Cloud Security Assessment"). For purposes of clarity, Supplier and each of its subcontractors (if any) agree to complete the Cloud Security Assessment to assess and determine the risks associated with a cloud computing provider and compliance to the Annex 7 (the "Cloud Controls Matrix.").
- g) Annex 8 (the "Cybersecurity Cloud SaaS Requirements").
- h) Annex 9 (the "NERC CIP TCA and RM").
- i) Annex 10 (the "TCA_RM Vendor Attestation").
- j) Annex 11 (the "CIP 13 Supplier Risks Requirements")
- k) Annex 12 (the "CIP 004 Cyber Security Personnel & Training Requirement"). For the purposes of clarity Supplier and each of its subcontractors (if any) shall have a documented personnel risk assessment program, in accordance with federal, state, provincial, and local laws, and subject to existing collective bargaining unit agreements, for personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets.

ARTICLE 46 - EMPLOYEE SOLICITATION

Supplier understands and acknowledges that Customer has expended and continues to expend significant time and expense in recruiting and training its employees and that the loss of employees would cause significant and irreparable harm to Customer. To the maximum extent permitted under applicable laws, the Supplier agrees and covenants not to directly or indirectly solicit, hire, or recruit, or attempt to solicit, hire, or recruit—any employee who has been employed by the Customer or its Affiliates during the term of this Agreement, with whom Supplier has had contact in connection with the negotiation, execution, or performance of this Agreement (collectively, "Covered Employee"), or induce the termination of employment of any Covered Employee for a period of one (1) year, beginning on the employee's last day of employment with the Customer or one (1) year after the term of this Agreement, whichever is sooner in the applicable case, except with the prior written consent of the Customer, and Supplier shall not induce or attempt to induce, directly or through an agent or third party, any such Covered Employee to leave the employ of the Customer or its Affiliates. As used herein, the term "Affiliate" shall mean any person or entity

controlling, controlled by, or under common control with the Customer through majority stock or other ownership interest, direct or indirect. Notwithstanding the foregoing, nothing in this clause shall either (i) limit Supplier from employing any person who contacts Supplier on his or her own initiative and without any solicitation by Supplier specifically directed to such employee, or (ii) directly or indirectly prohibit or restrict either Party from soliciting or hiring another Party's current or future employees to the extent such prohibition or restriction is prohibited or impermissible under applicable laws.

ARTICLE 47 – ETHICS

Supplier shall comply with the Avangrid Suppliers' Code of Ethics ("Suppliers' Code of Ethics") in connection with its performance under this Agreement. The Suppliers' Code of Ethics can be found at the Avangrid website (www.Avangrid.com).

ARTICLE 48 – UTILIZATION OF SMALL BUSINESS CONCERNS

Supplier and subcontractors of all tiers must comply with section 52.219-8 of the Federal Acquisition Regulation. This policy requires that small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, women-owned small business, Alaskan Native Corporation, and Indian tribe concerns shall have the maximum practicable opportunity to participate in the performance of Services.

ARTICLE 49 – SMALL BUSINESS SUBCONTRACTING PLAN

Some or all of the Goods and Services provided hereunder may be used in a contract with the Federal government and, therefore, may be subject to the requirements of FAR section 52.219-9. If applicable, each Supplier (except small business concerns) whose contract is expected to exceed \$650,000 (\$1,500,000 for construction) and has subcontracting possibilities is required to submit an acceptable subcontracting plan to the Customer. The plan shall include spending goals with businesses that are defined by the U.S. Small Business Administration as small, women-owned small, veteran-owned small, service-disabled veteran-owned small, HUBZone, small disadvantaged (SDB), Alaskan Native Corporations, and Indian tribes. If the Supplier fails to submit a plan within the time limit prescribed by the Customer, Customer may terminate this Agreement.

The Supplier assures that the clause entitled "Small Business Subcontracting Plan" will be included in all subcontracts, that offer further subcontracting opportunities, and all subcontractors (except small business concerns) who receive subcontracts in excess of \$650,000 (\$1,500,000 for construction) will be required to adopt a plan similar to this plan.

ARTICLE 50 - GRATUITIES PROHIBITED

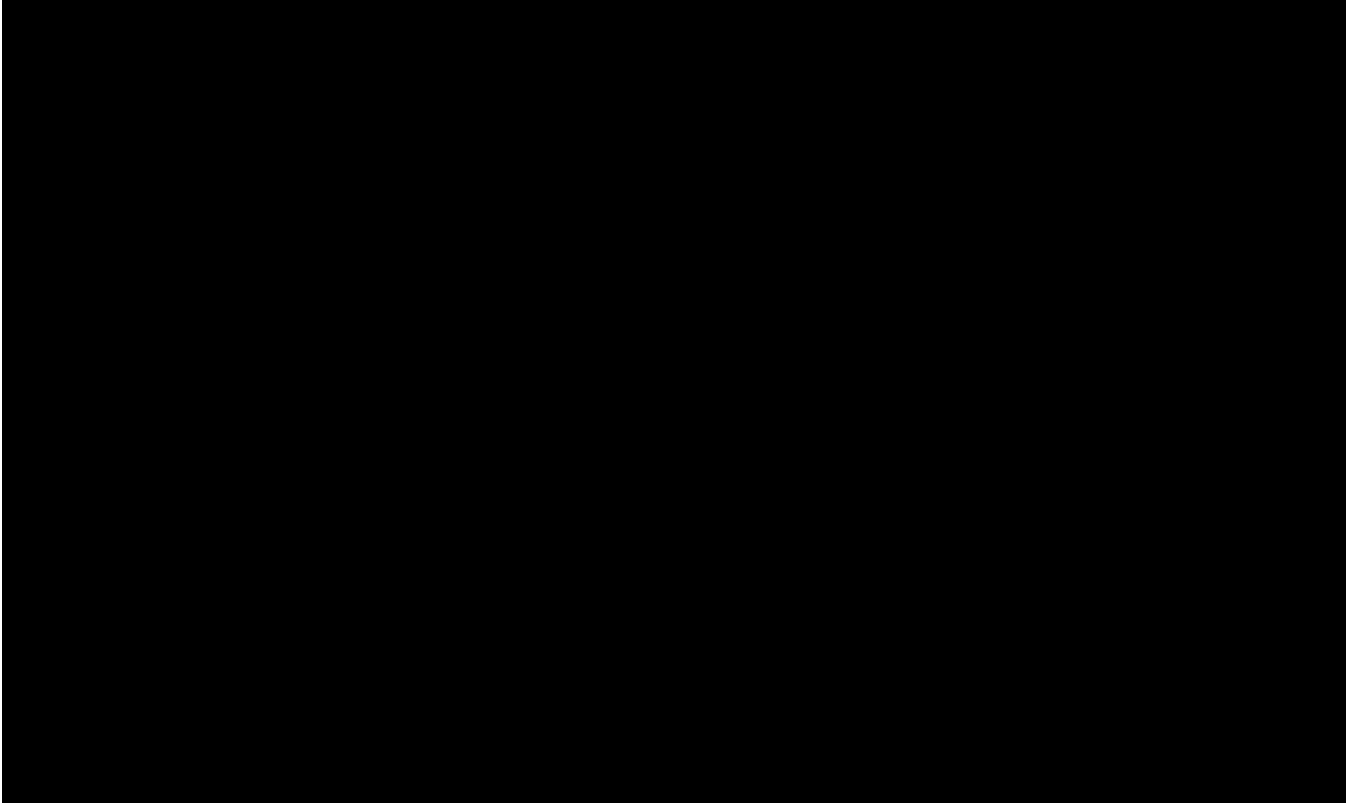
The Supplier shall not, under any circumstances, offer or extend any gratuity or special favor to any employee or agent of the Customer or its Affiliates or do anything which might reasonably be

interpreted as an attempt to influence any employee or agent of the Customer in the conduct of their duties.

SCHEDULE D

Pricing Terms

1. Prices shall remain firm for orders placed during the term of this Agreement.



SCHEDULE E

Special Conditions

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SCHEDULE F

Notices

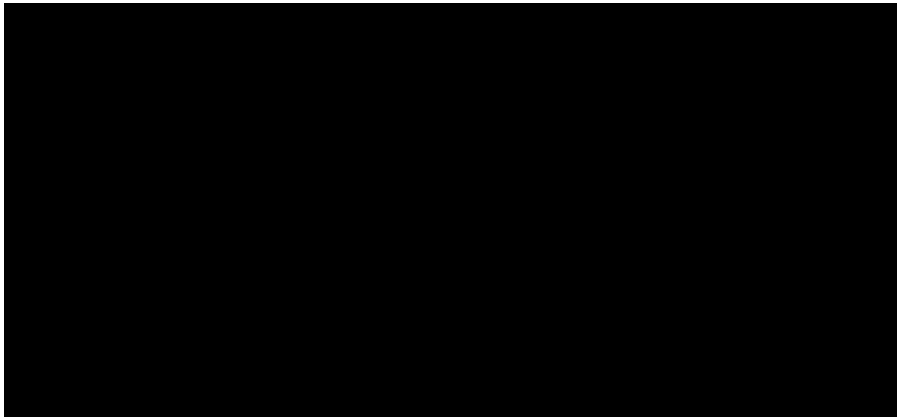
Along with all other correspondence requirements included in this Agreement, any notice, request, approval or other document required or permitted to be given under this Agreement shall be in writing and shall be deemed to have been sufficiently given when delivered in person or deposited in the U.S. Mail, postage prepaid, addressed as specified herein or to such other address or addresses as may be specified from time to time in a written notice given by such Party, or when email notice has been given with an acknowledgement given by the appropriate Party representative. The Parties shall acknowledge in writing the receipt of any such notice delivered in person.

All communications to **Customer** shall be directed to:

Avangrid Service Company
Contract Administration
89 East Avenue
Rochester, NY 14649
Phone: 585-724-8028
Fax: 585-771-2820

With Copy To :
Thomas O. FitzGerald
180 South Clinton Avenue
Rochester, NY 14604
Email: thomas.fitzgerald@avangrid.com

All communications to Supplier shall be directed to:



SCHEDULE G

Insurance Requirements

Before commencing Services, the Supplier shall procure and maintain at its own expense for a period of Five years beyond completion of the Services, the insurance types, limits, terms, and conditions listed in Section 1 below. The amounts as specified are minimums only and in no way limit the indemnification obligations of the Supplier. The actual amounts above the minimums shall be determined by the Supplier. In addition, for any Services that are authorized to be subcontracted, the Supplier shall require each subcontractor to procure and maintain all insurance as outlined below.

IF YOU DO NOT HAVE A CURRENT CERTIFICATE ON FILE WITH CUSTOMER prior to commencement of Services, Certificates of Insurance evidencing Supplier's and/or subcontractor's possession of insurance as outlined in Section 1 shall be filed with Customer and the Companies for its review.

Certificates of Insurance should be mailed to the Procurement Department at the following address:

**Procurement Department/ Insurance Cert.
89 East Avenue
Rochester, NY 14649-0001**

A. General Insurance Requirements

Each insurance policy shall:

- 1) be placed with an insurance company licensed to write insurance in the State where the Services are to be performed and shall have an A.M. Best Rating of not less than "A- VII" and a policyholder surplus of at least \$25,000,000.
- 2) have defense costs outside of the limits of liability;
- 3) add Customer and its Affiliates as additional insureds except of any required professional liability coverage, which shall name Customer and its Affiliates as indemnified parties;
- 4) not preclude Customer or its Affiliates from making claims against the policy for the wrongful acts, omissions or other tortious conduct of the Supplier/Consultant/Labor Supplier;
- 5) provide Customer with 30-day notice of cancellation, except for non-payment of premium and then it shall be 10 days;
- 6) notify Customer of any reduction in the aggregate policy limits;
- 7) contain a breach of warranty clause;
- 8) be primary and non-contributory with respect to Customer and its Affiliates;
- 9) contain a waiver of subrogation in favor of Customer and its Affiliates;
- 10) contain a separation of insureds clause;
- 11) contain a terrorism provision; and
- 12) contain a choice of law provision which states that the policy shall be governed by the State in which the Services are being performed.

B. Required Coverages

1) Workers' Compensation and Employers' Liability Insurance:

Coverage A: Statutory

Coverage B: Limits apply per issued annual policy

Bodily Injury by Accident - \$500,000 each Accident

Bodily Injury by Disease - \$500,000 each Employee

Bodily Injury by Disease - \$500,000 Policy Limit

Policy Information Page Requirements:

Item 1 – First Named Insured and Other Named Insureds

Item 3.A. – State(s) of Operations

Item 3.C. – All Other States Except Monopolistic States

Endorsements:

Voluntary Compensation – WC 00 03 11 A

Alternate Employer – WC 00 03 01 A

FELA – If any basis

Maritime – If any basis

USL&H – If any basis

2) Automobile Liability

Combined Single Limit - \$5,000,000 (limits in excess of \$1M can be satisfied by umbrella/excess coverage)

Uninsured/Underinsured – Minimum allowed by State law

Hired/Non-owned liability - \$5,000,000

Symbol – 1

Endorsements:

Employees as Insureds

Fellow Employee Coverage

MCS 90

CA 9948

3) General Liability: ISO Form CG 00 01 or its functional equivalent

Per Occurrence - \$1,000,000

General Aggregate - \$2,000,000

Products Completed - \$2,000,000

Personal and Advertising Injury - \$1,000,000

Endorsements:

Contractual Liability Amendment

Explosion, Collapse, Underground Coverage

Independent Contractors Coverage

Broad Form Property Damage

No Punitive or Exemplary Damages Exclusion
No Subsidence Exclusion

- 4) Umbrella/Excess Liability: Written on a Follow Form Basis and Worldwide Coverage
Per Occurrence - \$5,000,000
General Aggregate - \$5,000,000
Products/Completed Operations - \$5,000,000
Personal & Advertising Injury - \$5,000,000

Underlying Policies: Commercial General Liability, Auto Liability, Employer's Liability

- 5) Contractor's Pollution Liability
Per Occurrence - \$5,000,000
Policy Aggregate - \$5,000,000

Coverage:

Environmental Impairment Liability
Bodily Injury, sickness, disease, mental anguish or shock sustained by any person, including death and mental anguish
Property Damage including physical injury or destruction of tangible property including resulting loss of use, clean-up costs, and loss of use of tangible property that has not been physically injured or destroyed
Disposal site coverage and transportation extensions
Underground storage tanks
Loss, remediation, clean-up costs and related legal expenses
Sudden and non-sudden pollution conditions
No exclusion for loss occurring over water including but not limited to a navigable waterway

Endorsements:

Extended Completed Operations – 10 years

- 6) Professional Liability:
Per Claim - \$5,000,000
Policy Aggregate - \$5,000,000
Mitigation of Loss/Rectification - \$5,000,000

Coverage:

Extended Reporting Period – 120 months
Retroactive Date – Date of first design
No Exclusion for environmental impairment liability
No Exclusion for punitive damages to the extent insurable

SCHEDULE H

Background Check Requirements

Domestic Background Checks

Contractor, at its expense, shall conduct a background check for each employee, agent, representative, contractor, or independent contractor (collectively, "Representatives"), as well as for the Representatives of its subcontractors, who will provide work or services to the Company or who will have access to Company computer systems, either through on-site or remote access (collectively, "Contractor Representatives"). Contractor Representatives, for the purpose of this requirement, include such temporary staff as office support, custodial service, and third party vendors used by Contractor to provide, or assist in the provision of, work or services to the Company hereunder. Contractor's obligations with respect to required background checks shall include those obligations specified for Contractor in the Customer –Contractor Background Check Rule, as such Rule may be revised and/or supplemented from time to time, which Policy is incorporated herein and made part of this Agreement by reference (the "Rule"). Background checks are to be conducted using the Contractor's background check vendor consistent with the process developed with the Company under this Agreement. The minimum Background Check process shall include, but not be limited to, the following checks:

- a. Social Security Number Verification
- b. Motor Vehicle Report
- c. Prohibited Parties Database Search\Debarment Lists
- d. County Criminal History Search in each county where a Contractor or Contractor Representative has resided during the seven (7) years preceding the search.
- e. National Sex Offender Registry.

The Background Check must be completed prior to initial access by Contractor Representative(s) and must, at minimum, meet the criteria specified in this Rule and be repeated every two (2) years for Contractor(s) and Contractor Representative(s) under continuing engagements. Any Contractor Representative who separates employment or other commercial relationship with the Contractor must undergo another Background Check prior to renewed access to the Company. The Company Department charged with managing the relationship with the Contractor hereunder (the "Company Liaison") shall have the right to require more frequent Background Checks of Contractor Representatives or to require checks from other or additional sources than those listed above, and shall have the right to require that the Contractor furnish Background Check results to them. The Company reserves the right to audit Contractor's Background Check process using either a third-party auditor or representatives from the Company's Audit Department or the Company Liaison. All Contractor Representatives are responsible to self-disclose any

misdemeanor or felony conviction(s) that occur during the course of their assignment hereunder within three (3) business days of the conviction. The conviction must be reported to the Contractor and the Company Liaison. If reported first to the Contractor, the Contractor shall notify the Company Liaison and the Company Director of Security within three (3) days of learning of the conviction. If, at any time during the term of this Agreement, it is discovered that any Contractor Representative has a criminal record that includes a felony or misdemeanor conviction, the Contractor is required to inform the Company Liaison who will assess the circumstances surrounding the conviction, time frame, nature, gravity, and relevancy of the conviction to the job duties to determine whether the Contractor Representative will be placed on, or continue in, the assignment with the Company, and consistent with, and to the extent permitted by, applicable state law. The Company may withhold its consent in its sole and absolute discretion. The failure of the Contractor to comply with the terms of this provision shall constitute good cause for termination of this Agreement by the Company, in whole or in part.

Foreign Background Checks

Contractor, at its expense, shall conduct a background check for each employee, agent, representative, contractor, or independent contractor (collectively, “Representatives”), as well as for the Representatives of its subcontractors, who will provide work or services to the Company or who will have access to Company computer systems, either through on-site or remote access (collectively, “Contractor Representatives”). Contractor Representatives, for the purpose of this requirement, include such temporary staff as office support, custodial service, and third party vendors used by Contractor to provide, or assist in the provision of, work or services to the Company hereunder. Contractor’s obligations with respect to required background checks shall include those obligations specified for Contractor in the Customer –Contractor Background Check Rule, as such Rule may be revised and/or supplemented from time to time, which Rule is incorporated herein and made part of this Agreement by reference (the “Rule”). Background checks are to be conducted using the Contractor’s background check vendor consistent with the process developed with the Company under this Agreement. The minimum Background Check process shall include, but not be limited to, the following checks:

NERC CIP Access. If applicable (i.e., when IUSA determines that the Contractor engagement is such that compliance with NERC CIP Standards is required), the background check needs to include an identity verification and 7-year criminal history check as more particularly set forth below.

- For someone who has resided and/or worked outside of Spain in the last 7 years, the contractor should perform an International Background Check to show the absence or existence of a criminal record. International background checks should verify known data such as employment, education, criminal and civil records, travel and immigration records, as well as address and identity verification
- For someone who has resided and worked only in Spain for the last 7 years, their passport and recent Criminal Record Certificate from the Spanish Ministry of Justice is sufficient (assuming it shows the absence of a criminal record).
- Due to EU privacy rules, the Criminal Record Certificate can only be supplied to the applicant after proof of identify. The Certificate certifies the absence or existence of a criminal record. If the applicant is not willing to obtain and provide the Certificate, an International Background Check should be conducted.

Non CIP Access. To comply, the background check needs to include the following:

- For someone who has resided and/or worked outside of Spain in the last 7 years, the vendor should include identity verification and perform an **International Background Check** to show the absence or existence of a criminal record. The international background check should verify known data such as employment, education, criminal and civil records, travel and immigration records, as well as identity.
- For someone who has resided and worked only in Spain for the last 7 years, a **certificate duly signed** by the vendor is sufficient if it states that its employee(s) assigned to work for Customer (i) are duly affiliated to the Spanish Social Security and (ii) have the necessary academic and professional experience.

The Background Check must be completed prior to initial access by Contractor Representative(s) and must, at minimum, meet the criteria specified in this Rule and be repeated every two (2) years for Contractor(s) and Contractor Representative(s) under continuing engagements. Any Contractor Representative who separates employment or other commercial relationship with the Contractor must undergo another Background Check prior to renewed access to the Company. The Company Department charged with managing the relationship with the Contractor hereunder (the "Company Liaison") shall have the right to require more frequent Background Checks of Contractor Representatives or to require checks from other or additional sources than those listed above, and shall have the right to require that the Contractor furnish Background Check results to them. The Company reserves the right to audit Contractor's Background Check process using either a third-party auditor or representatives from the Company's Audit Department or the Company Liaison. All Contractor Representatives are responsible to self-disclose any misdemeanor or felony conviction(s) that occur during the course of their assignment hereunder within three (3) business days of the conviction. The conviction must be reported to the Contractor and the Company Liaison. If reported first to the Contractor, the Contractor shall notify the Company Liaison and the Company Director of Security within three (3) days of learning of the conviction. If, at any time during the term of this Agreement, it is discovered that any Contractor Representative has a criminal record that includes a felony or misdemeanor conviction, the Contractor is required to inform the Company Liaison who will assess the circumstances surrounding the conviction, time frame, nature, gravity, and relevancy of the conviction to the job duties to determine whether the Contractor Representative will be placed on, or continue in, the assignment with the Company, and consistent with, and to the extent permitted by, applicable state law. The Company may withhold its consent in its sole and absolute discretion. The failure of the Contractor to comply with the terms of this provision shall constitute good cause for termination of this Agreement by the Company, in whole or in part.

Contractor Certification Form

The undersigned agent of [REDACTED] certifies that the employees, contractors, or subcontractors listed below meet the requirements agreed to.

It is the responsibility of the vendor to notify Customer of all personnel changes to include additions as well as voluntary or involuntary terminations. Additions and voluntary terminations are to be communicated within seven (7) calendar days and involuntary terminations must be communicated immediately.

Employee Name	Employer	Date of Last Background Check

Further, I attest that the employees, contractors, or subcontractors listed above working for Customer are in good standing and have been in good standing since their last background check.

[End of Schedule I – Background Check Requirements]