

Infrastructure Grants Workshop

ConnectMaine Authority in collaboration with Tilson and VETRO

6/23/21



ConnectMaine Staff Intro

Supporting documents are posted on our website

<https://www.maine.gov/connectme/grants/award-recipients>

Confidentiality

Data that is confidential and therefore not of public record (concerning infrastructure deployment):

- Pricing
- Revenue data
- Service area
- Types of service

Information that may be deemed confidential must be submitted as separate files.

Confidentiality is maintained by aggregating data of many locations and providers before use.

Some details of individual projects are posted online and reported by ConnectMaine.

Award Disbursements

Upon commencement, up to 25% of total project costs

1-2 progress reports that include spending analysis, up to 75% of total project costs

Upon completion that includes spending analysis & audit, last 25% of total project costs

Required Documents

- Contract form
- Commencement notice
- Progress report or extension request
- Completion report for community-driven projects
- Completion report for provider expansion projects
- Audit reporting form
- Grant tracking report

This slide presents an overview of the documents that are required to be submitted to ConnectMaine Staff during the different phases of the project. Most of these reports, minus the audit reporting form, should be familiar to you already. Information on the requirements and deadlines for these reports can be found on the documents themselves on ConnectMaine website. The audit reporting form is the new addition by Tilson and VETRO, the rest of this presentation will focus mainly on the requirements for that report.

Audit Reporting Form

1. Proposed Funded Service Area Audit
2. Technical Audit
3. Spending Analysis
4. Field Validation
5. Customer Connection Validation



So diving a little bit deeper, these are the 5 categories of reports we will need from grantees.

1. Proposed funded service area audit: To verify that the project scope has been met according to the design that was awarded
2. Technical audit: To validate the performance of the technology
3. Spending analysis: To analyze project spending against the proposed budget and compare to industry standards
4. Customer connection validation: To ensure that the end customer receives service at the quality that they have subscribed to

I. Proposed Funded Service Area Audit

SHP (preferred), or KMZ of **entire project as-built maps**

- Service locations
- Fiber or HFC routing
- Fiber or HFC counts/sizes
- Splice points
- MST/Coaxial taps
- Optical splitters (centralized or distributed architecture)
- CO, Headend and Hub Locations (notated where OLTs and CMTS are placed)
- OLT and/or HFC Node service boundaries
- FDH (field cabinets)

Plant maps must be prepared under the review of one of the following:

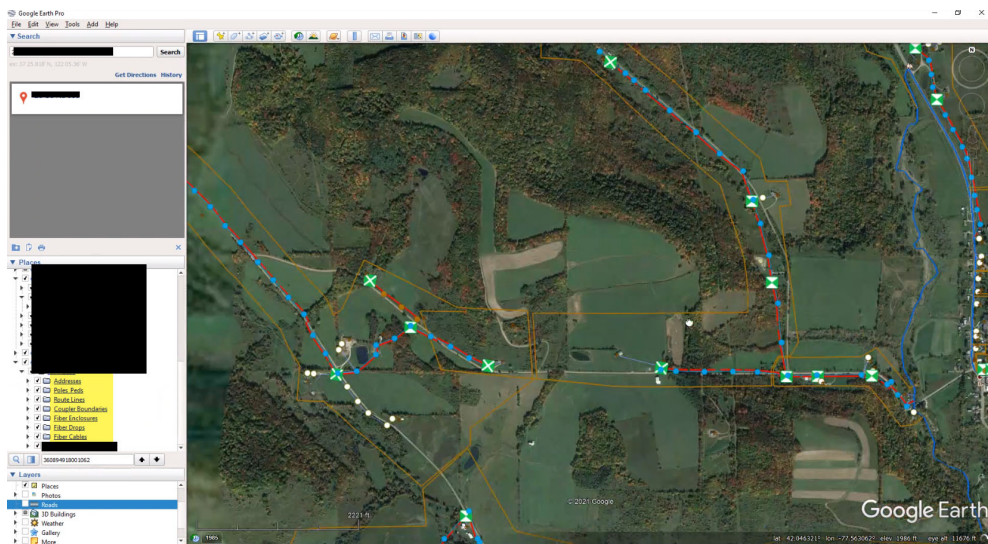
- A P.E.
- An engineer with substantial demonstrated experience designing cable or fiber networks whose credentials are submitted along with the design

If existing plant already serves areas within the awarded proposed service areas, SHP (preferred) or KMZ maps must include that plant along with the details outlined above. This includes any existing coaxial and fiber plant.

For the first part of the audit report, we are looking for the network as-built maps showing how service was provided to the unserved locations. In these maps, we need the service locations and plant built to provide service like fiber or coax, splice point, MSTs or taps, splitters, CO locations and field cabinets. We also need the main attributes for these plant items like size of fiber size, fiber type, tap numbers, etc. Finally on the maps we would like to see boundaries for the service areas like OLT boundaries or HFC Node boundaries. These will give us a good idea of what service locations can get service. The maps must be prepared by a professional engineer or an network engineer with substantial experience as well as their credentials. If there is any existing plant in the proposed areas maps must be submitted with that information as well. This will give us the complete picture.

I. Proposed Funded Service Area Audit

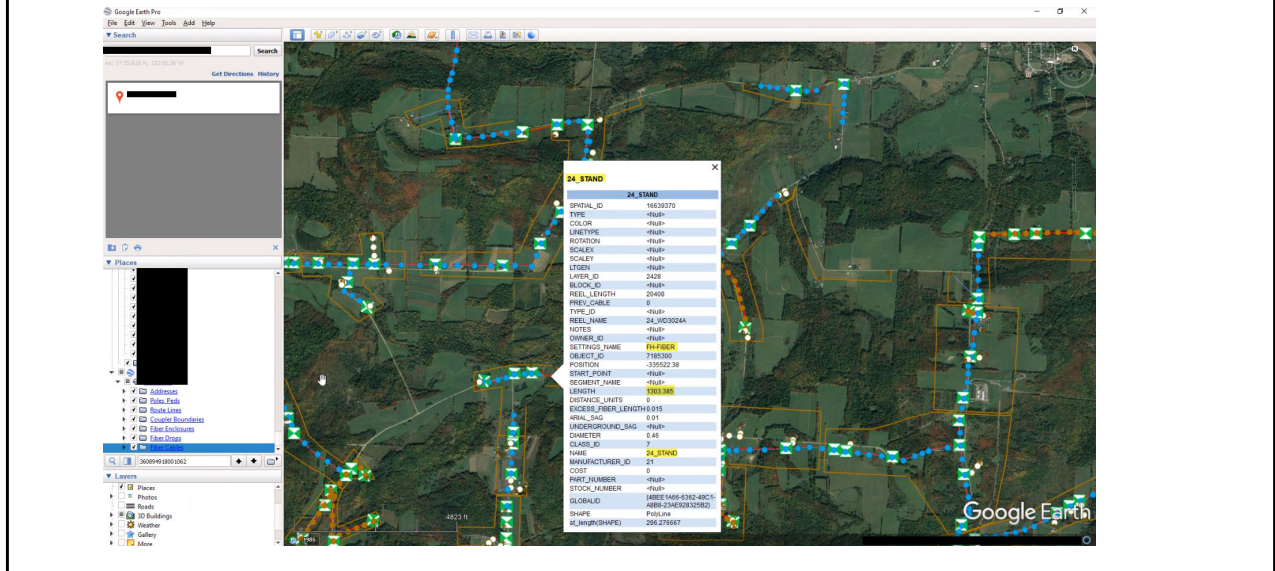
SHP (preferred), or KMZ of **entire project as-built maps**



Here is an example map where you are able to see the different types of data. In this case poles, fiber, splice points, service locations. Shape files are again preferred format. We will be providing a template before anything needs to be submitted.

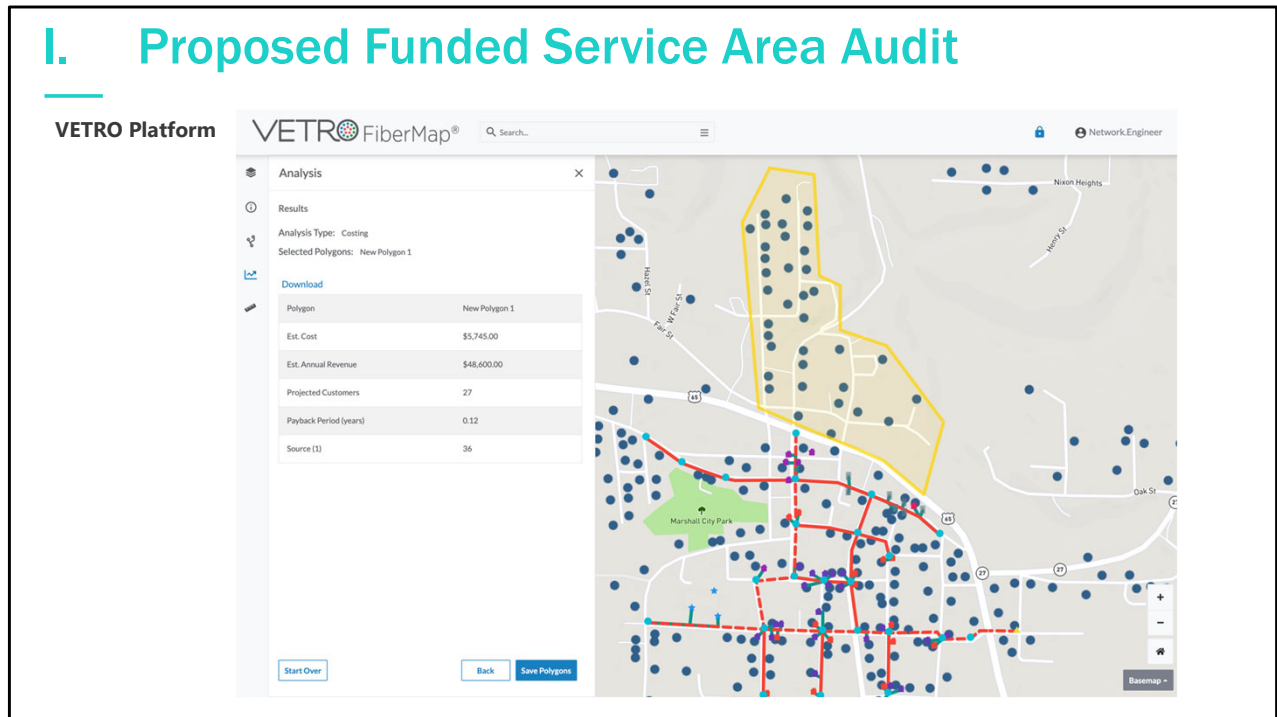
I. Proposed Funded Service Area Audit

SHP (preferred), or KMZ of entire project as-built maps



In this image you can see some of the attributes that go along with the fiber like type, size, length, etc. Similar attributes will be needed on other plant items as well as service locations.

I. Proposed Funded Service Area Audit



The shape files will be imported to VETRO FiberMap, which ConnectMaine is using to create a single source of truth of the broadband picture across the state of Maine. It is called the ConnectMaine Broadband Intelligence Platform or BIP for short. Here is a screenshot of the platform allowing ConnectMaine to capture and visualize data from the Community and/or ISP. Based on the audit the application will switch unserved locations to served locations and data will be made available to the public for future grant rounds.

As part of becoming a grantee in the May 2021 grant round, each grantee will have access to the Vetro FiberMap platform in order to provide a more seamless data flow both to and from ConnectMaine's BIP. This access will provide access to data regarding broadband across the state, ability to import the files we've discussed or design them directly in the system, and finally the ability to provide data for future grant rounds.

I. Proposed Funded Service Area Audit

Questions?

II. Technical Audit (1/5)

OTDR traces (**from OLT or CMTS to end location**) with event logs. Trace reports should include:

- Measurement wavelengths (trace 2 of the following: 1310nm, 1490nm, 1550nm, 1625nm)
- Measurement distance, total link loss, splice losses, micro/macro bend losses, link's Optical Return Loss (ORL) for the distribution and feeder cable
- Must provide identification of the specific fibers being tested
- At a minimum, 12 fibers for small projects of 10 miles or less, 24 fibers for projects between 11 and 30 miles, and 96 fibers for projects over 30 miles
- File format must be one of the following: CSOR, SOR produced PDF, or OTDR produced PDF

*Outside plant cable shall comply with TIA 568 performance standards.

Singlemode Outside Plant (OSP)	
Connector loss (Standard Grade):	0.75 dB/connector
Splice loss:	0.3 dB/splice
Singlemode (1310nm/1550nm) fiber loss:	0.5 dB/km

FIBER OPTIC SPLICE/TEST
SPECIFICATIONS &
PROCEDURES



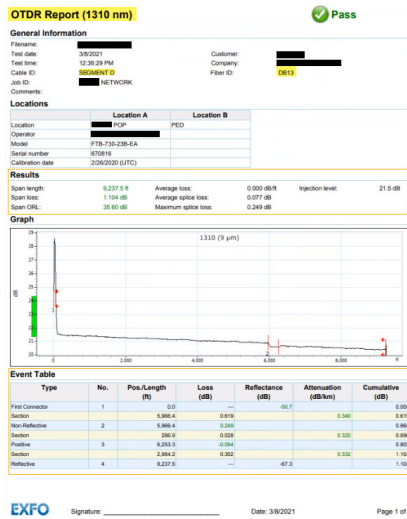
OTDR TRACES 2021
DOCUMENTATION



- A more-detailed summary of the TIA 568 Standard for Fiber Optics can be found here <https://www.thefoa.org/tech/tia568b3.htm>

II. Technical Audit (2/5)

OTDR traces (from OLT or CMTS to end location) with event logs



Click to add text




- As an industry standard, OTDR should be recalibrated every 2 years. Please verify that your OTDR has a current calibration for accurate OTDR traces

II. Technical Audit (3/5)

Manufacturer's specification information for all substantive equipment purchased for the project such as:

- Purchased fiber optic cable (must include and identify cable model numbers and losses at 1310nm, 1490nm, 1550nm, 1625nm)
- Optical Equipment, including transmitters, receivers, OLTs and SFPs
- Splice Enclosures and MSTs (If MSTs are not used, state so in a network overview in the format of a simplified, graphical diagram)
- Customer Premise Equipment, such as ONTs, ONUs, and DOCSIS modems
- Fiber Management Equipment, such as pretermination shelves and fiber distribution hubs

Toneable FTTP Tight Buffered Indoor/Outdoor Drop
Series W7 FT



PRODUCT DESCRIPTION
Series W7 FT FTTP is the first indoor/outdoor drop cable that is durable enough for outdoor environments and flexible enough for tight bends within residences. The patented design allows a fully functional 2.0 mm GFR-jacketed tight buffer cable in the core of a GR-20 OSP-rated FTTP small flat cable. The key benefit of this cable is that it can be installed from the pedestal to the indoor ONT (Optical Network Terminal) with no intermediate termination. Significant installation savings can be realized by avoiding splicing or termination on the outside or inside wall of the residence. Further savings are realized by using an indoor ONT that does not require an electrician to install. This completely dry, flat drop cable is available in universal and toneable designs that are suitable for aerial, street, or conduit installation. A water-blocking element is used to prevent water penetration.

APPLICATIONS
• Drop cables for aerial, direct bury or conduit installations
• Fiber to the premise for single family residences

FEATURES
• Toneable design
• Ductile and soft
• Indoor/outdoor design
• Meets GR-20 specifications
• Cable in a cable
• Tight/buff core is flexible tight buffer cable design

BENEFITS
• Copper element allows for toneable location
• Excellent crush resistance
• Tight buffered cable can be placed in fiber environment and is UL listed
• Industry accepted standard for OSP installations
• Eliminates splice at premises wall
• Inner cable can be wrapped around corners and stapled with no termination required

The Series W7 Flat drop is designed for easy access using the FSD-2000 cable cutting tool from Innowat Tech.

ENVIRONMENTAL SPECIFICATIONS
Operation/Storage: -20°C to +70°C
Installation: -20°C to +70°C
Based on a representative treatment of standard installation conditions.

FAST NUMBER AND PHYSICAL CHARACTERISTICS

Part Number	Fiber Count	Major Dia. (in)	Minor Dia. (in)	Fiber Component Dia. (in)	Nominal Weight (lb/1000 ft)	Cable Tensile Load (lb)	Cable Bend Radius (in)	Fiber Component Bend Radius (in)
W7000001	1	0.17 (4.3)	0.40 (10.2)	0.13 (3.3)	31.647	300 (13,350)	90 (4.5)	3.0 (15)
W7000002	2	0.17 (4.3)	0.40 (10.2)	0.13 (3.3)	31.647	300 (13,350)	90 (4.5)	3.0 (15)

WATER BLOCK AND JACKET PRINT CODES
Dry core Dry core special
Fast Moisture Fast Moisture

FIBER TYPES: SINGLE MODE
Tight/buff bend resistant
G-657.A1 G-657.A2 G-657.B3
"Napkin Y" with K L L

For "Optical Fiber Characteristics" visit: www.innowat.com

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BUSSELLINE SUPERIOR ESSEX B-53

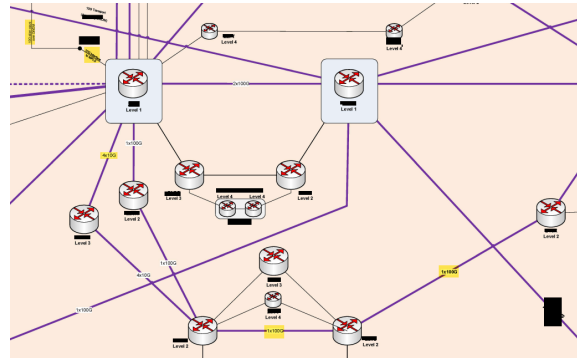
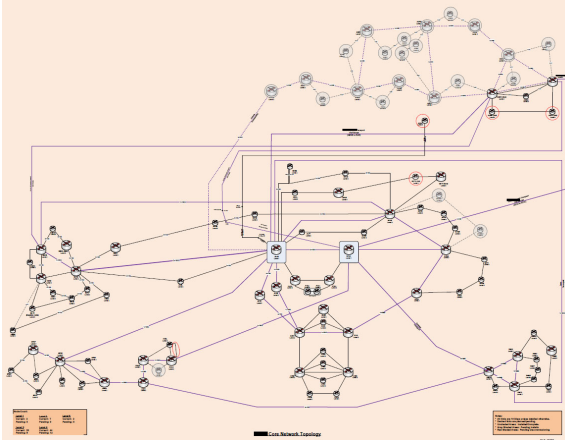
II. Technical Audit (4/5)

Engineering Documentation and calculations that provide:

- A high-level edge/core/transport/access logical diagram of the IP and OLT network showing hub names consistent with the system maps and predicted data throughput (both upstream and downstream)
- An overview of the project technology (GPON FTTP, AE FTTP, RFOG FTTP, HFC, etc)
- If GPON, EPON or RFOG: an overview of the splitter architecture (i.e. centralized, distributed, both, etc) and the splitter configurations (1:32, 1:64, 1:8 to 1:4 field splits, etc)
- For HFC projects or sections: Maximum and minimum tap output levels and end of line performance calculations for Composite Intermodulation Noise (CIN)

II. Technical Audit (5/5)

Engineering Documentation and calculations



II. Technical Audit

Questions?

III. Spending Analysis

Line item spending report in MS Excel format that includes items purchased, date, invoice number, vendor, description and amount

Proof of purchase and payment (in pdf format) for:

- Fiber optic cable elements
- Network electronic (including, but not limited to: OLTs, CMTS, routers, switches and transport) that individually exceed \$5,000
- ONTs
- Makeready
- Project related contractor labor
- In-house labor records
- MSTs, splice enclosures, FDHs, vaults and pedestals
- All other grant related purchases that exceed \$5,000 per item or \$10,000 collectively for an appurtenance

The spending analysis requires a completed Excel sheet essentially itemizing your project costs from invoices. We have a template of the spreadsheet posted online and I will show you an example in the next slide. You will still need to provide a copy of proof of payment for project costs. This can be a scan of an invoice saved as a PDF. You can take some time to read all of the expenditures we will need proof of, but its good practice to send all applicable project cost invoices especially ones that were identified in the proposed budget.

III. Spending Analysis

Questions?

IV. Field Validation

This audit segment consists of an **on-site visit** to visually inspect and examine the:

- Central office
- Outside plant
- Hub and subscriber installation deployments (if applicable)
- Observe craftsmanship
- Verify consistency with the project scope as defined in GDA
- Verify that any deficiencies identified have been remediated

V. Customer Connection Validation

Verifying active internet connection to previously unserved customers who subscribe to internet service as a result of the newly expanded broadband infrastructure.

Provider documentation of service:

- If GPON, EPON or RFOG: Image of OLT and ONT
- For HFC projects or sections: Image of CMTS and Modem showing both ends active
- Image of billing statement excluding identifying information of customer, but must include address

V. Customer Connection Validation

Provider documentation of service:

The screenshot shows a service management interface with the following sections:

- Subscriber Account:**
 - Account ID: 1177
 - Account Name: [Redacted]
 - Established: Aug 24, 1987
 - CPNI Opt Out Status: never
- Service List:**
 - Account Explorer - Accounts (1)
 - [Redacted] (Active) 497-2
 - [Redacted] Residential Line
 - Internet Service 25 x 10
 - [Redacted] (201-1)
- Network Diagram:**
 - Shows a connection from a fiber network to a residential router.
 - Labels include: Secondary Fiber Port (SAUNK-1-7-F910), Fiber Strand (W-140), 2014 ONT (0014762EEF), and a house icon representing the customer's router.
 - The router is connected to a laptop and a mobile phone.

```
(L5148-7) #show mac-addr-table interface 0/10
-----
Mac Address      VLAN ID  Status
-----
:EE:FE          207    Learned
:EE:FE          410    Learned

(L5148-7) #show interface sfp 0/10

Interface..... 0/10
Vendor Name..... Photonics
Vendor Part Number..... 3754-2583
Vendor Revision Number..... V1.0
Connector Type..... SC (01h)
Supported length..... 20 kilometer(s) for 9/125 mm fiber
Supported length..... 20000 meters for 9/125 mm Fiber
Nominal Bit Rate..... 1300 Mbits/sec
Temperature..... 70.375 (degree Celsius)
Voltage..... 3.250 Volts
Bias Current..... 52.640 mA
TX Power..... -6 dBm
RX Power..... -11 dBm
```

V. Customer Connection Validation

Provider documentation of service:

EVERY CONNECTION MATTERS

System Configuration Tests

Status

- Device Info
- Statistics
- Interfaces
- SFP
- Identification
- Status
- Route
- ARP
- Firewall
- Bridge Table
- DHCP
- IGMP
- LLDP-MED
- Voice

Status - SFP Status

Status of the Small Form Factor Device

	SFP
Is Present	True
Current Link State	Up
Link Up Transitions	1
Receive Level	-9.54 dBm
Transmit Power	-6.17 dBm
Bias Current	25.7 mA
Temperature	29.8 C (85.6 F)
Voltage	3.3 Volts

EVERY CONNECTION MATTERS

System Configuration Tests

Status

- Device Info
- Statistics
- Interfaces
- SFP
- Route
- ARP
- Firewall
- Bridge Table
- DHCP
- IGMP
- LLDP-MED
- Voice

Status - Device Info

Summary of System Information

	Description	Status
System	Name	ZNID42xx-Router
	Location	www.dasanzhone.com
	Contact	DASAN Zhone Global Support
	Date and Time	Wed Feb 19 10:45:56 2020
	Uptime	18 hours, 44 minutes, 19 seconds
	Model Number	ZNID-GE-4226
	Serial Number	06483710
Registration ID	0000000000	
Firmware	Bootloader Version	1.0.38-114.185 (3.1.357)
	Version	S3.1.357
	Alternate Version	S3.1.344
Ethernet LAN Interfaces	Fiber WAN (eth0)	00:01:47:...
	LAN 1 - Gige (eth1)	00:01:47:...
	LAN 2 - Gige (eth2)	00:01:47:...
	LAN 3 - Gige (eth3)	00:01:47:...
	LAN 4 - Gige (eth4)	00:01:47:...
	LAN 5 - Gige (eth5)	00:01:47:...
	LAN 6 - Gige (eth6)	00:01:47:...
Craft Port (usb0):	00:01:47:...	
Alarms	No System Alarms:	System Status OK

Questions?

Email questions to the ConnectMaine at

Connect.ME@maine.gov

If you have any follow-up questions, please email those to ConnectMaine Staff. They will act the middle man for communication, and Tilson and VETRO will assist the email responses. If we notice some common questions we would prefer to host a virtual Q&A sessions to limit the back and forth over email. The reporting documents and other supporting documents can be found on the ConnectMaine website