

# 2015 Service Provider Training

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## **Fiber Options**

June 2, 2015 – Phoenix

June 16, 2015 – Tampa

## Today we'll talk about:

- Review of the FCC's Second E-Rate Modernization Order
  - Expanding Access to Broadband for FY2016 and beyond
- Deep Dive: Fiber Construction

## Fiber Options

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# Second E-rate Modernization Order Review

## Overview

- Emphasis on providing additional flexibility for schools and libraries seeking high-speed broadband connections.
- Lack of access to broadband, especially in rural areas, and high cost of those services are major obstacles in meeting program goals.
- Order designed to help close the rural connectivity gap and increase affordability of high-speed broadband connections.
- Most provisions take effect from FY2016 forward.

## What's New?

- E-rate funded special construction for new fiber.
  - Cost of deploying new fiber (as opposed to ongoing cost of leasing or maintaining/operating fiber.)
  - Provides up-front capital that will reduce monthly recurring cost to applicants.
  - Available for lit services, dark fiber, and self-provisioned fiber.

## What Stays the Same?

- Regardless of the services sought (including new fiber options), E-rate rules continue to require that applicants:
  - Conduct fair and open competitive bidding process.
  - Select the most cost-effective bid.

## Amortization of Up Front Construction Costs

### Old Requirement

- Applicants had to amortize large, up-front construction costs in excess of \$500,000 over three years.

### New Requirement

- E-rate will now pay the full discounted share of up-front special construction charges in the first year.

## Installment Payments for Special Construction Costs

### Previous Requirement

- Applicants had to pay their share of non-recurring cost of special construction within 90 days of the start of service.

### E-rate will now allow:

- Applicants are allowed to pay their share of those up-front costs in installment payments over up to four years.



## Installment Payment Plan of Up Front Construction Costs

- Applicants interested in an installment payment plan option must indicate their interest on FCC Form 470.
- Service providers are under no obligation to offer such installment payment options to applicants.

## Equalizing Dark and Lit Fiber

- Beginning FY2016, funding for lit and dark fiber has been equalized.
- Dark fiber leases allow the purchase of fiber capacity separate from the service of lighting the fiber.

## Equalizing Dark and Lit Fiber

### Old Dark Fiber Rule

- E-rate would only pay special construction costs up to the applicant's property line.
- Modulating electronics not eligible in Category One.

### New Dark Fiber Rule

- E-rate will now pay special construction costs beyond an applicant's property line.
- Modulating electronics to light dark fiber will be eligible for Category One support.

## Special Construction Projects

- Applicants can receive funding for Category One infrastructure costs incurred up to six months prior to start of funding year.
  - Occurs after selection of service provider via an FCC Form 470.
  - Category One recurring service depends on installation.
  - Actual service start date is on or after July 1 of the funding year.
  - Can get one year extension due to unavoidable delays.

## Requirement to Compare Dark and Lit Fiber

- Applicants that seek bids for dark fiber must also seek bids for lit fiber service over comparable time period.
- Before selecting a dark fiber solution, applicants must fairly compare dark fiber with other available options to ensure the most cost-effective option is chosen.

## Requirement to Compare Dark and Lit Fiber (continued)

- To the extent an applicant intends to seek support for equipment and maintenance costs associated with lighting dark fiber, those costs must be included in the same application with the dark fiber lease.
- Applicants will not receive support for excess capacity and may only receive special construction support for dark fiber lit in the same funding year.

## Self-Construction of High-Speed Broadband Networks

- Applicants may seek E-rate support for self-construction of their own high-speed broadband networks, or portions of such networks, when self-construction is the most cost-effective solution.
  - Applications for self-provisioned networks should reflect the total cost of ownership, including special construction, equipment, and maintenance and operation.

## Self-Construction of High-Speed Broadband Networks

- Requirements:
  - Applicants soliciting bids for self-construction must also seek bids for lit service on the same FCC Form 470, unless the applicant already posted for broadband services for this same funding year and received no bids.
  - Applicants must compare the cost of lit service to the total cost of ownership over the life of the facility for self-construction option.
  - Applicants seeking dark fiber or self-construction must upload an RFP in new the FCC Form 470 system.



## Guidance on RFPs

- Be as specific as possible to enable meaningful comparison of lit, dark, and self-provisioned options.
- Include estimated bandwidth sought. Terms such as “as needed” or “district-wide” are not sufficient descriptions of the quantity or capacity of the products and services requested. Applicants may identify a range, such as 100-200 Mbps.
- Include expected growth rate in bandwidth demand over the relevant time period and seek pricing for the increased level of bandwidth over time.

## Guidance on RFPs

- Include any state or local procurement requirements.
- RFPs must be available for at least 28 days.
- Fiber RFPs take time to write.
- Potential bidders need more time to respond to these bids.
- Start early!

## Competitive Bidding Considerations

### Old Rules

- Applicants must conduct fair and open competitive bidding process.
- Applicants had to select the most cost-effective service provider.
- Price of eligible products and services must be the most heavily weighted bid eval factor

### New Rules

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## Competitive Bidding Considerations

- Comparing different fiber options:
  - Determine a reasonable, defensible period of time for the comparison, based on their anticipated use of the assets. Applicants that choose to self-provision or purchase the equipment required to operate a dark fiber IRU may expect to recover their costs in 5, 7, 10, or even 20 years.
  - Identify a comprehensive and specific total cost for each option.

## Competitive Bidding Considerations

- Comparing different fiber options:
  - Applicants must be prepared to explain their assumptions, such as expected useful life.
  - Divide total cost of IRU or self-provisioned fiber by number of years to determine annual cost.
  - Compare to annual lit fiber charge.
- Applicants cannot resell service.
- Applicants must secure access to necessary resources.

## Cost Effectiveness

- USAC will focus on verifying the cost effectiveness analysis explained above in the bid evaluation phase.
- When applicants add up the total anticipated costs over a reasonable, defensible time period, the most cost effective option will be clear in most cases.
- Would this be the right solution if it was the applicant's own money?

## Cost Allocation

- For shared or multi-purpose fiber build projects, costs necessary to get the fiber to the school or library are eligible.
  - E-rate will not fund capacity beyond what the applicant needs in that funding year. Applicants may not seek E-rate funds for excess fiber that is not in use or being used by other entities in the project.
  - *Example:* Applicant needs 12 strands of fiber. Construction is for 96 strands. If no plans for other customers, only remove cost for 84 additional strands, but all other special construction costs would be fully eligible.

## Additional Matching Funds for Fiber Builds

- Providing an incentive for state support of last-mile broadband facilities.
  - E-rate match of up to 10% of the cost of construction will be provided to match state funding for special construction charges for high-speed broadband connections.
  - E-rate match also provided for Tribal schools and libraries when matched by state, Tribal government, or other federal agency.

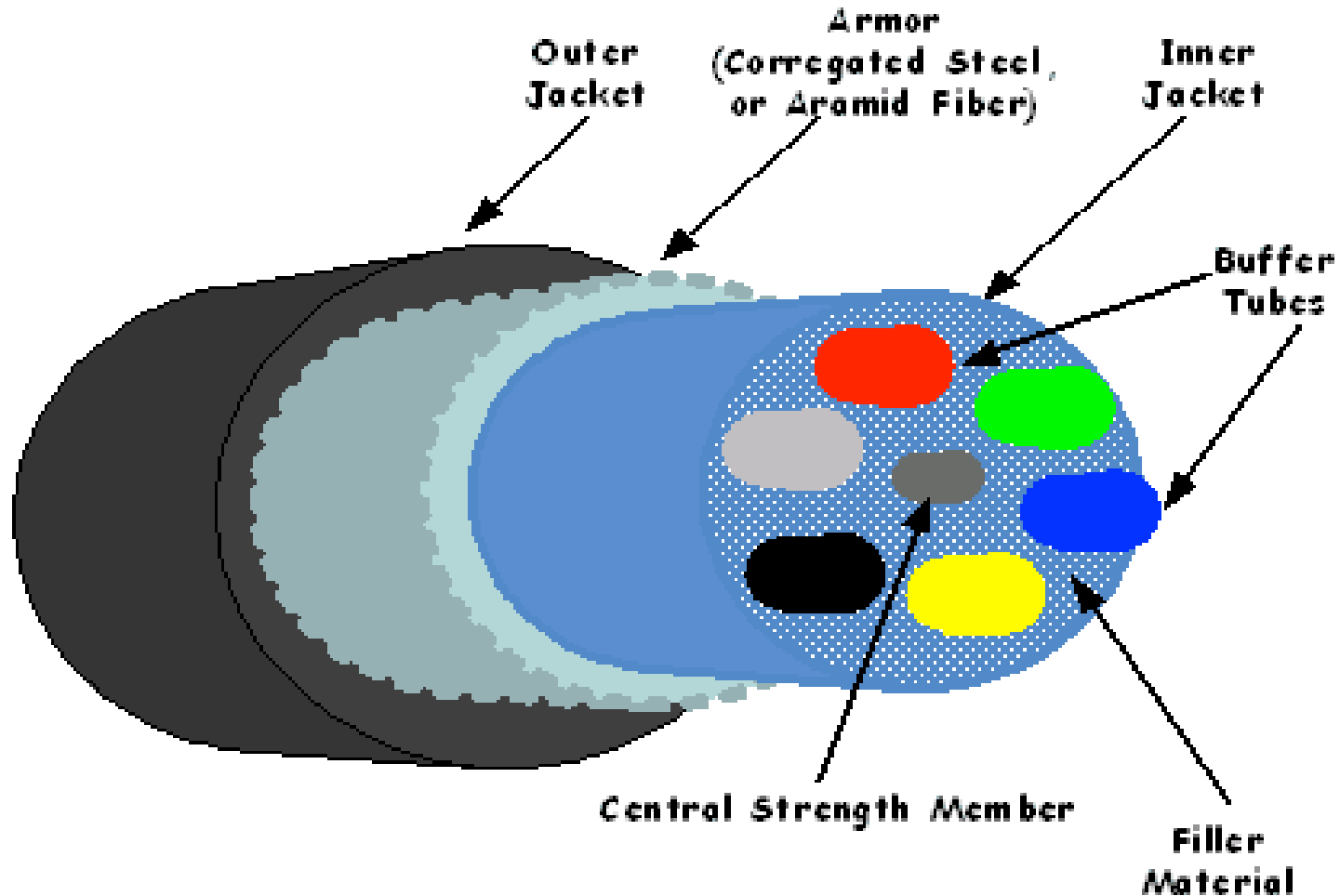


## Fiber Options

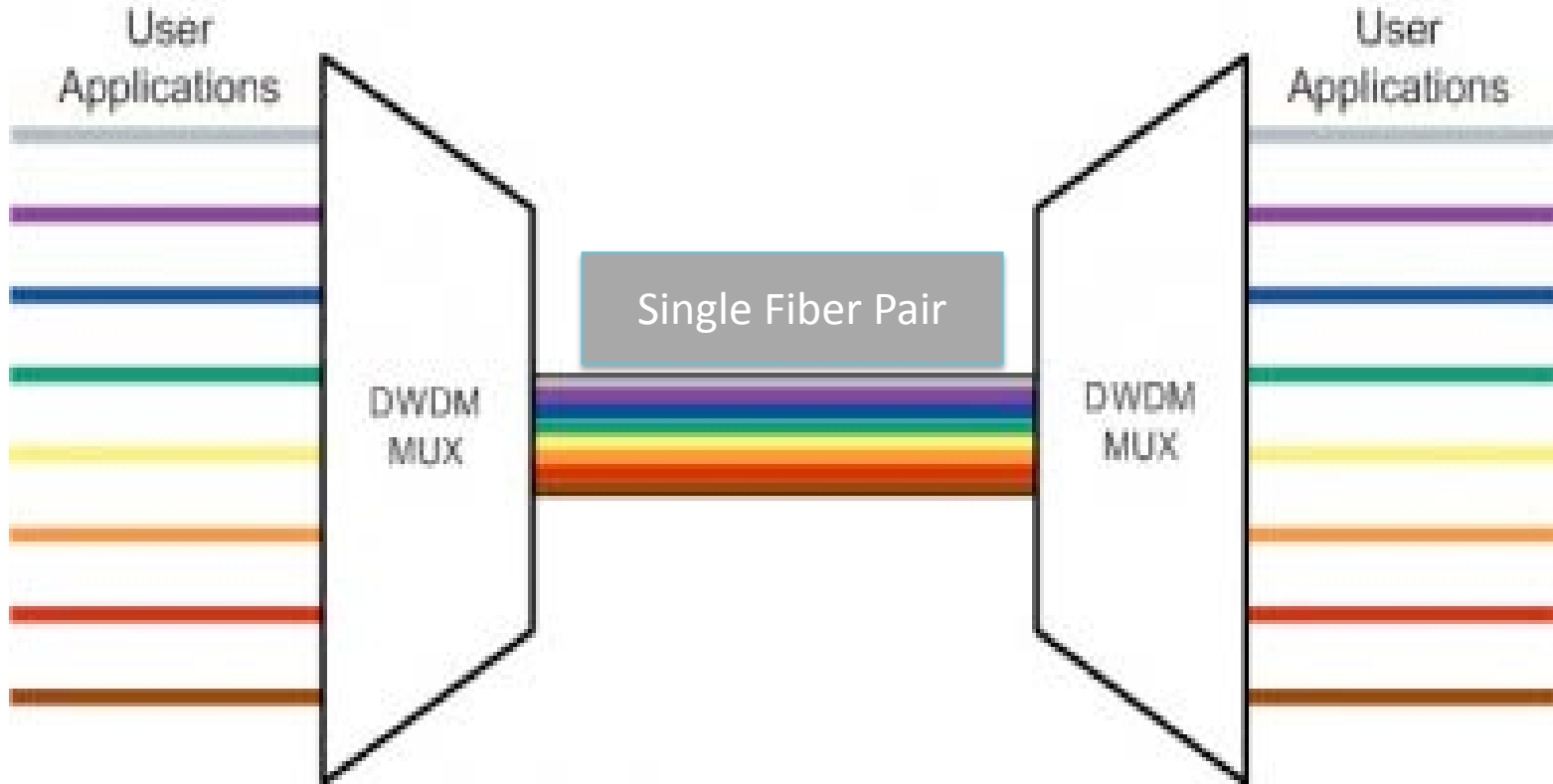
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# Deep Dive: Fiber Construction

## Resilient and Inexpensive Infrastructure



## Unlimited Capacity



## General Industry Definitions \*

- Special Construction on lit fiber service
  - Service provider owned
  - Upfront capital to reduce monthly recurring costs
- Special construction for dark fiber
  - Newly eligible (beyond property Line)
  - Long term lease (IRU) or build
  - Applicant must light and maintain fiber or hire a third party to do so

**\* The definitions in the following slides are general industry definitions, not formal FCC or USAC definitions.**

## General Industry Definitions

- **Indefeasible Right of Use (IRU)** – In telecommunications, Indefeasible Right of Use (IRU) is the effective long-term lease (usually a capital lease) of a portion of the capacity of an existing or to-be-constructed cable. IRUs are specified in terms of a certain number of strands of fiber. IRU is granted by the company or consortium of companies that built the (usually optical fiber) cable. Some IRU legal agreements forbid resale of the strands. A typical IRU ownership period is granted for 20 years.

## General Industry Definitions

- **Lit Transport Bandwidth or Transport Bandwidth** – Transport bandwidth is a dedicated amount of capacity for transporting Internet Protocol data, voice and or video traffic between two designated points. This capacity is usually measured in Mbps or Gbps. Transport circuits do not included access to the commercial Internet.

## General Industry Definitions

- **Internet access bandwidth** – This is also typically termed Internet Service Provider bandwidth. This is a dedicated amount of capacity to access the commercial Internet. This bandwidth is purchased from one of several Internet points of presence (PoPs) across the country. Typically a customer buys transport bandwidth to reach a PoP and then access bandwidth from the PoP to access the Commercial Internet.

## General Industry Definitions

- **Dark Fiber** – Unused optical fiber that has been constructed/installed but is not currently being used in fiber-optic communications. Because fiber-optic cable transmits information in the form of light pulses, a "dark" cable refers to one through which light pulses are not being transmitted.
- **Lit Fiber** – Optical fiber that is regularly being used to transmit data.



## General Industry Definitions

- **Aerial Fiber** – Fiber construction where the fiber is placed on existing or newly built poles. Fiber typically shares space with electrical transmission lines on these poles.
- **Attachment Fee** – An annual fee charged by a utility pole owner as “rental” for the placement of fiber on their utility pole.
- **Buried Fiber** – Fiber construction where the fiber, typically placed in a plastic conduit, is buried underground. Industry standard is to bury fiber and conduit at a depth of 3’ or more.

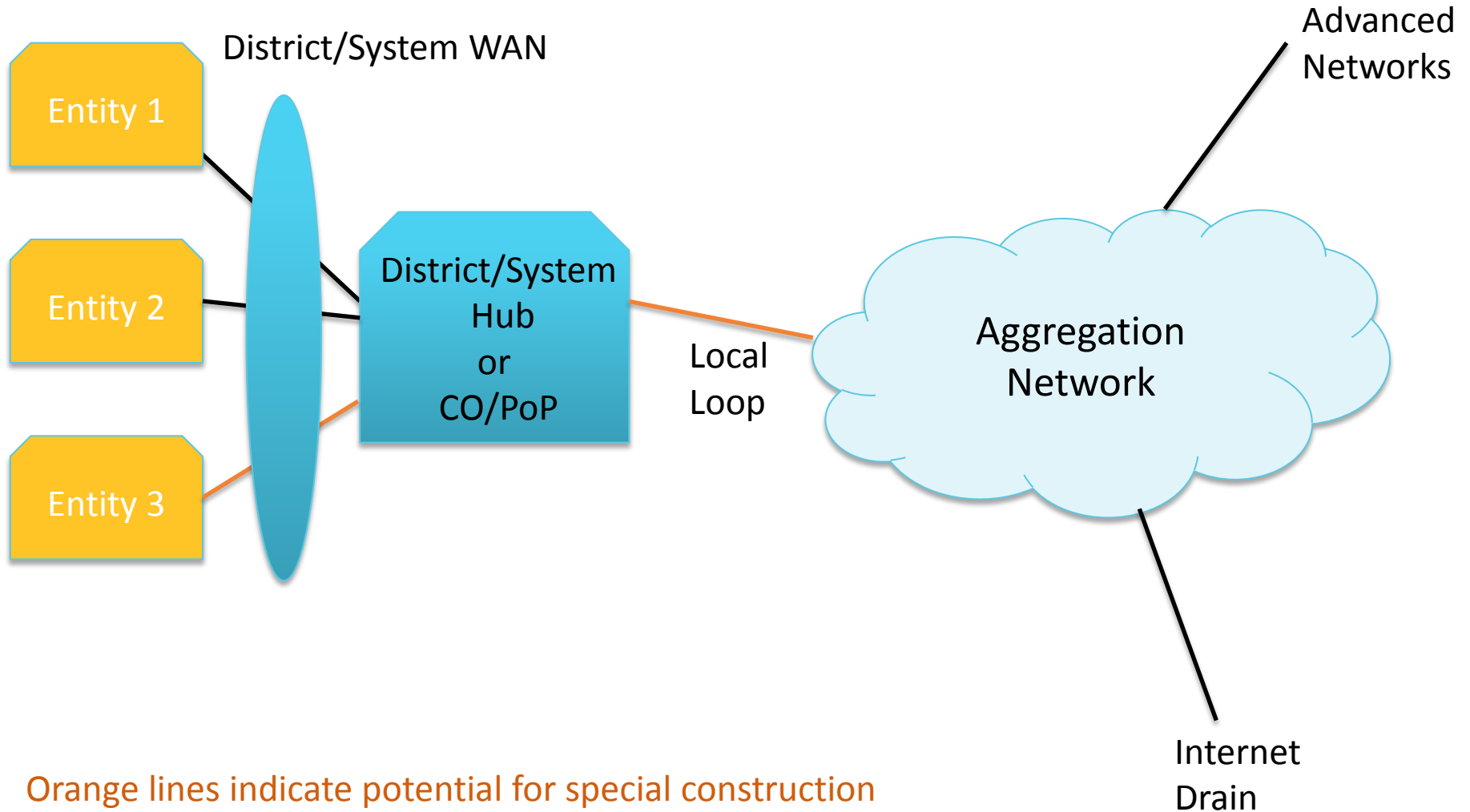
## When to consider special construction for lit fiber service?

- Projected bandwidth demand outstrips the capacity of the existing infrastructure.
- Local market will yield lit service bids that cost effectively scale to meet the need.
- Capital costs to upgrade infrastructure are significant and special construction capital will reduce monthly recurring costs.

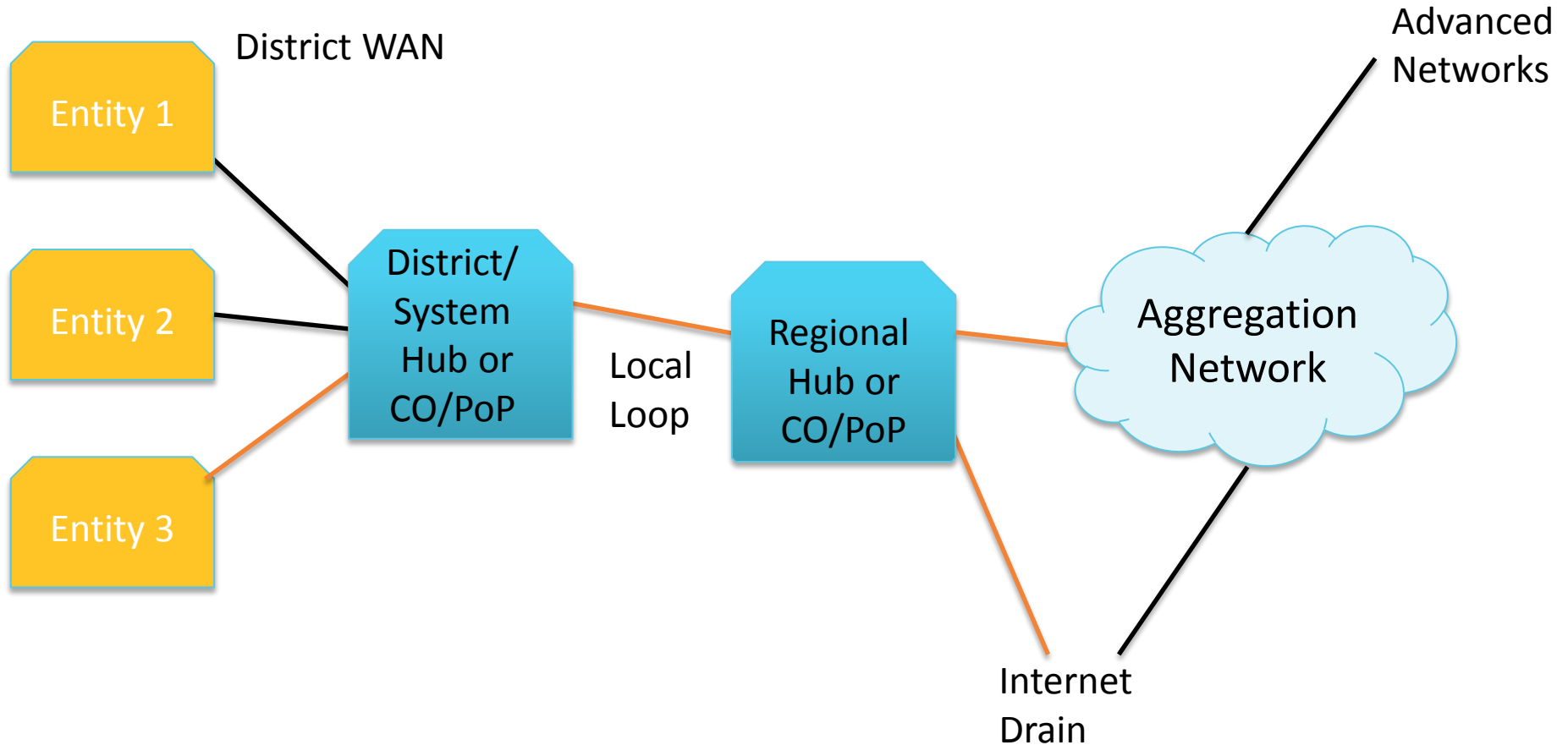
## When will an applicant likely consider self-provisioning of dark fiber?

- Projected bandwidth demand outstrips the capacity of the existing infrastructure.
- Total cost of ownership analysis of lit service vs. dark fiber, including costs reflecting the complexity of ownership, are very favorable.
  - Assumptions on bandwidth growth and costs are reasonable and defensible.
- There are no other options, or no other cost-effective options available.

# Self-provisioning: Example A



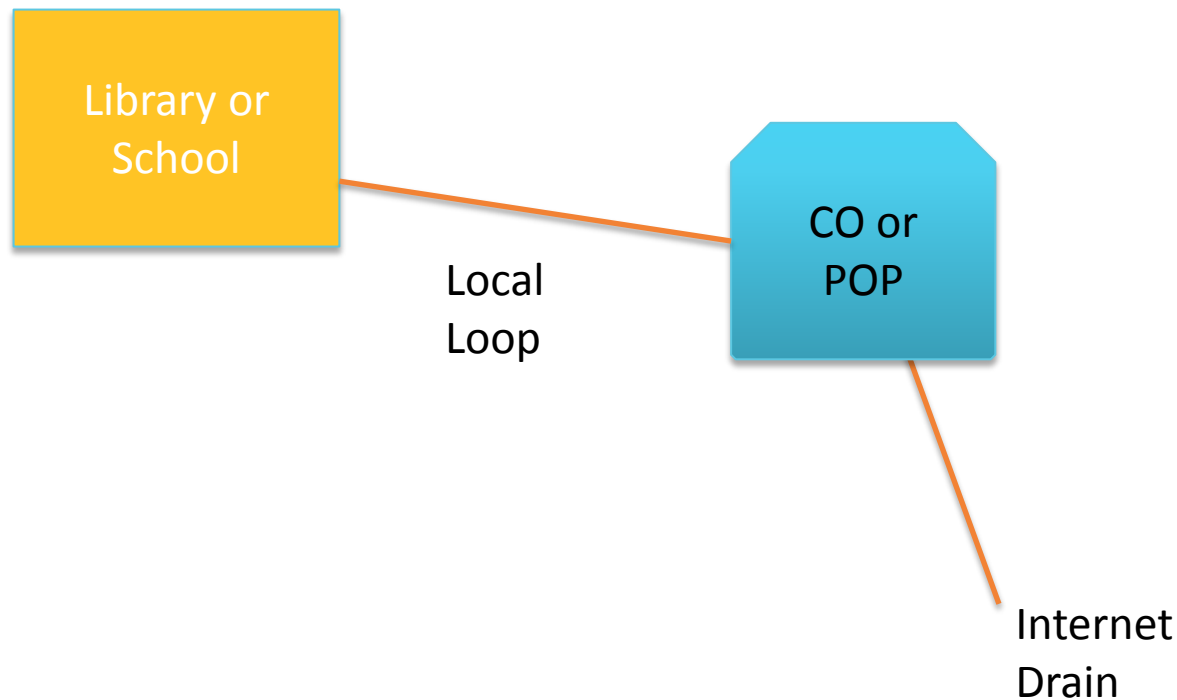
# Self-provisioning: Example B



Orange lines indicate potential for special construction

(Billed based on use)

# Self-provisioning: Example C



Orange lines indicate potential for special construction

## Dark fiber special construction options:

Indefeasible Right of Use (IRU) of Existing or New Build Fiber	Construction
Capital Lease length in range of 5-20 years	Applicant can ask for design build or act as own General Contractor
Lessee still responsible for lighting	If General Contractor – every element must be bid separately <ul style="list-style-type: none"> <li>• Engineering/Environmental</li> <li>• Outside plant</li> <li>• Construction</li> <li>• Electronics</li> <li>• Legal and administrative</li> </ul>
Annual maintenance and operations <ul style="list-style-type: none"> <li>• Markers</li> <li>• General inspection</li> </ul>	Responsible for operations and maintenance of entire build
Cuts and relocates – pro rata share	Contemplating partnership builds and parameters of this
Eligible Services list for details	Eligible Services list for details

## Information for USAC review

- Applicants and service providers should expect detailed review of self construction applications. A **sampling** of information applicants and service providers should be prepared to offer:

471 IRU	471 Build
Lit service cost comparison	Lit service cost comparison
Term	Miles and strands
Miles and strands	Estimated cost per mile
Annual lit operating costs	Annual lit operating costs
Annual maintenance Fees	Annual maintenance Fees
Cuts and relocates	Cuts and relocates



## Guidance to Applicants

- Added support planned for applicants
  - Self identify early
- RFP process – start early!
- Key information
  - End points of service
  - Proposed route
  - Known right of way, pole attachment (aerial), railroad crossing or environmental issues

## Items to Consider: IRU RFPs

- Length of IRU should be seen as commitment to use
- Consider whether annual maintenance fee should be part of bid
- Cuts and relocates clauses
- Follow your state and local procurement regulations
- Ability to pay clause included
- Timelines for test and completion
- Specification for repair of cuts or outages
- Outside plant specs
- Electronics specs

## Items to Consider: Construction RFPs

- Be as specific as possible.
- Long term commitment to use the fiber
- Be aware of state and local procurement regulations including ability to pay
- Timelines for completion of every phase of work – engineering, OSP manufacturing, construction, permitting, electronics delivery, maintenance
- Outside plant, electronics, and maintenance specifications
- Aerial or buried construction specs
- Annual fee for pole attachments for aerial
- Specification for repair of cuts or outages

## Items to Consider: Annual Maintenance

- Who will light and operate the fiber?
- Define the managed service provided?
  - What role in notification/troubleshoot/NOC
  - What role in fiber repair
  - What role in electronics repair
  - Bandwidth limitations, if any

## Scenarios

1. Applicants are already proactively seeking advice
2. Library system has state appropriation to bring fiber to 95 locations

## Scenario 1: Special Construction Program

- Lit Service Special Construction
  - Applicant needs upgraded service from 1.544 mbps to 20 mbps and beyond.
  - Lit service in the region is scalable and cost effective so special construction with no installment payment option met the need.
  - Service provider maintains ownership of the fiber.

## Scenario 2: Fiber Greenfield Opportunity

- State has 95 libraries it wants to serve with owned fiber.
  - FCC Form 470 calls for comparison of Lit Service to new build fiber (acquired via IRU).
  - FCC Form 470 outlines 95 builds from library premise to regional aggregation points and also outlines a minimum 50 mbps service as a minimum.
  - Service Provider bids both scenarios showing cost comparison as part of the bid.

**Thank you!**