



PENNSYLVANIA TURNPIKE COMMISSION

Fiber Optic Network Overview

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Introductions

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PA Turnpike Fiber Optic Broadband Network

- Overview
- Background
- Operations, Maintenance, & Commercialization
- Design-Build Fiber Optic Network

Project Delivery

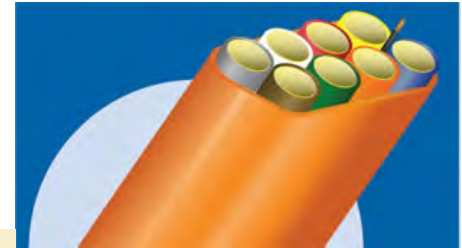
2016-2018: Public-Private Partnership (P3); one entity to design, build, finance, operate, maintain, & commercialize the network (2016 – 2018)

2019: Project approach changed from P3 to design-build plus OMC; Eastern Network design-build contracts bid and awarded

2020: Issued RFP and awarded contract for Fiber Operations, Maintenance, and Commercialization

2022: Western Network design-build contracts to be bid; OMC commercialization right to extend to Western Network

Overview



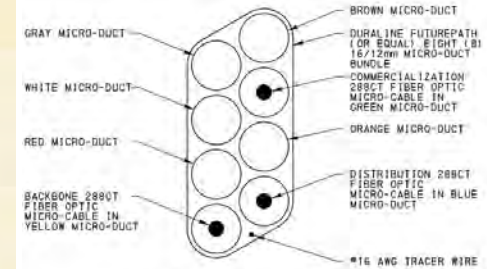
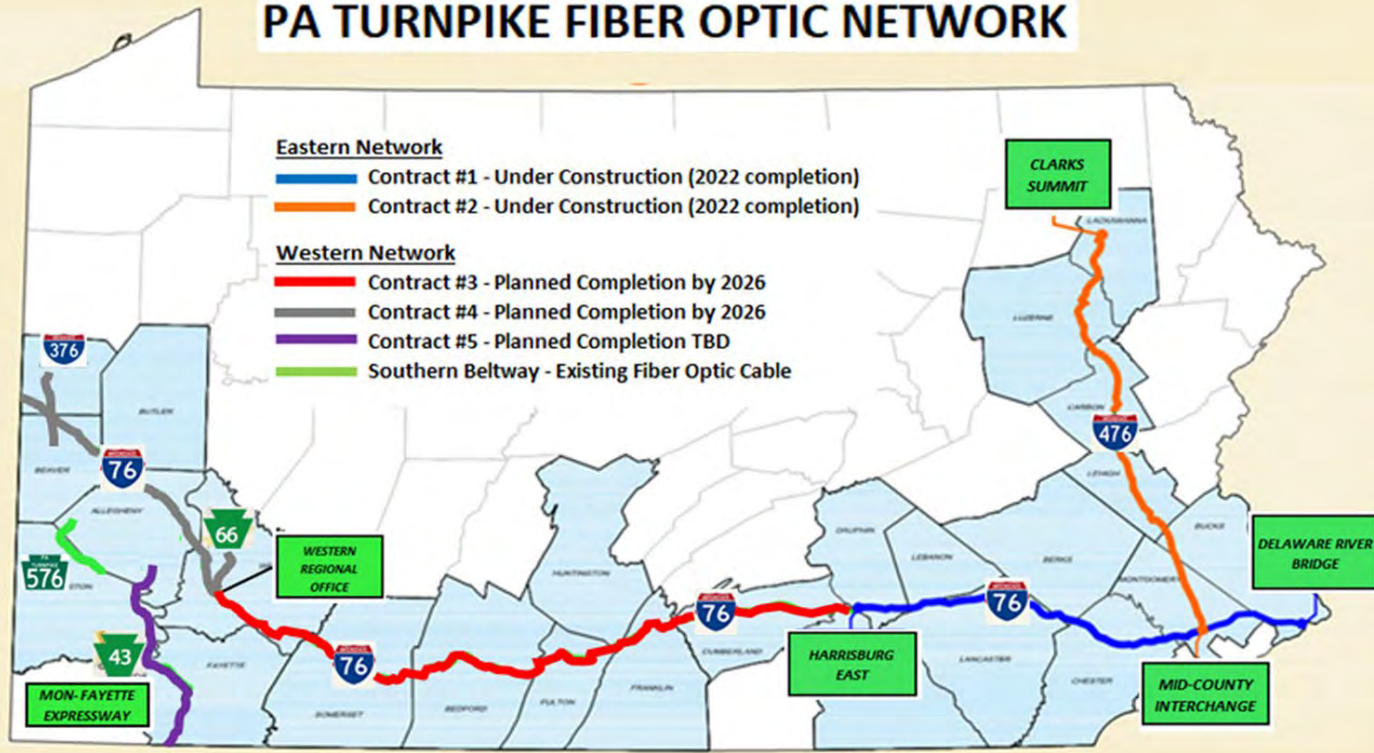
PA TURNPIKE FIBER OPTIC NETWORK

Eastern Network

- Contract #1 - Under Construction (2022 completion)
- Contract #2 - Under Construction (2022 completion)

Western Network

- Contract #3 - Planned Completion by 2026
- Contract #4 - Planned Completion by 2026
- Contract #5 - Planned Completion TBD
- Southern Beltway - Existing Fiber Optic Cable



8-WAY MICRO-DUCT DETAIL (OR TWO 4-WAY MICRO-DUCTS)



Project Costs & Estimates

Infrastructure Costs (including optical equipment, installation, and planning)

- Eastern Network: \$110 M
- Western Network: \$234 M

IoT Devices

- Goal is to connect existing & future ITS devices to fiber
- Cameras (CCTV)
- Dynamic Message Signs (DMS)/ Variable Message Signs (VMS)
- Access Gates
- Road Weather Information System (RWIS)
- Pre-entry devices
- Other IoT devices



All Electronic Tolling

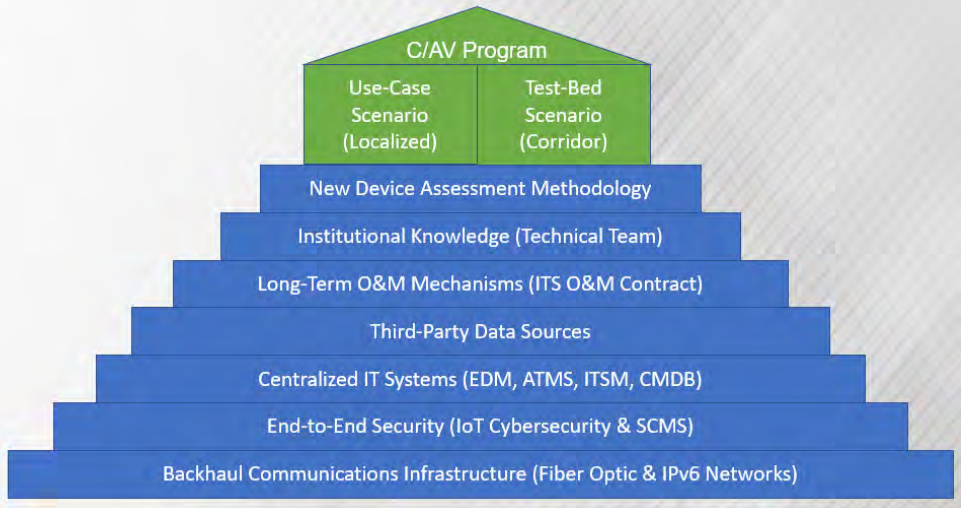
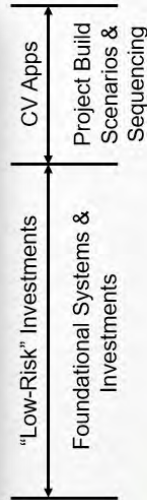
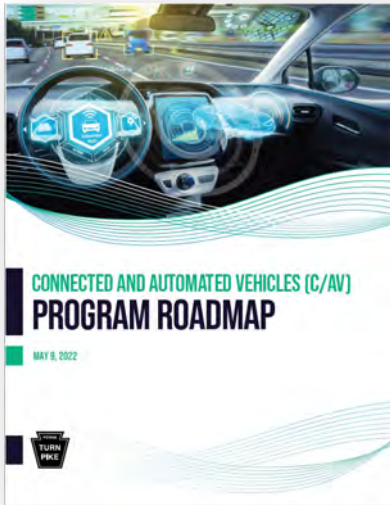


AET in place at existing interchanges



High Speed Open Road Tolling (ORT)

Connected & Automated Vehicles



PTC CV Applications

- Curve Speed Warnings
- ATIS
- Reduced Speed Warning
- WZ Warning
- Spot Weather Warning
- Oversized Vehicle Warning
- Queue Warning
- Speed Harmonization
- Vehicle Data for Traffic Ops
- Electronic Toll Collection

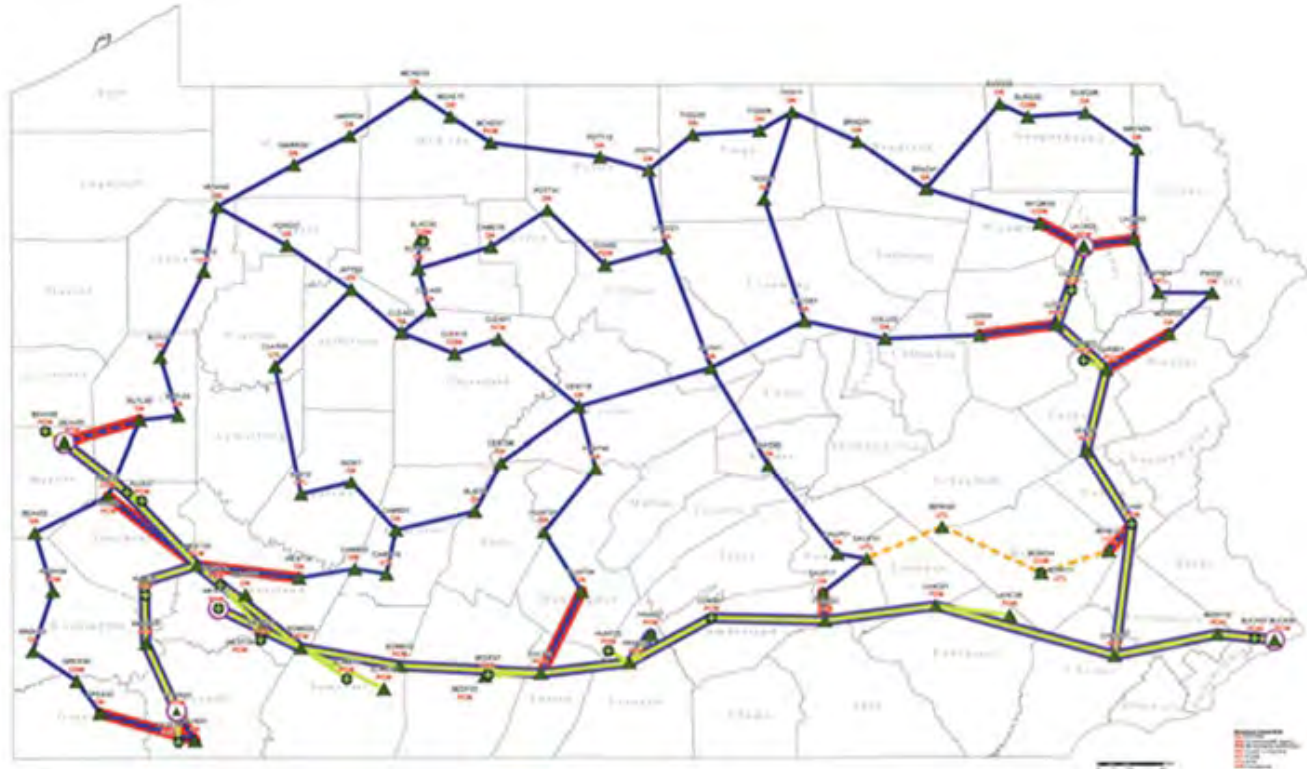
6
Locations

52
Miles

10
CV Apps



Backhaul Communications



O&M and Commercialization

- PTC awarded contract to Plenary Broadband Infrastructure (PBI) partnering with Tilson Technologies to operate, maintain & commercialize (OMC) the PTC fiber optic infrastructure
- 25-year term of contract
- O&M Services
 - Coordination with PTC projects
 - Fiber management system
 - Perform routine maintenance
 - Connection of new and existing devices
- Commercialization
 - Eastern Network commercialization
 - Includes a net revenue share and guaranteed revenue for PTC
 - Negotiating terms of Western Network commercialization

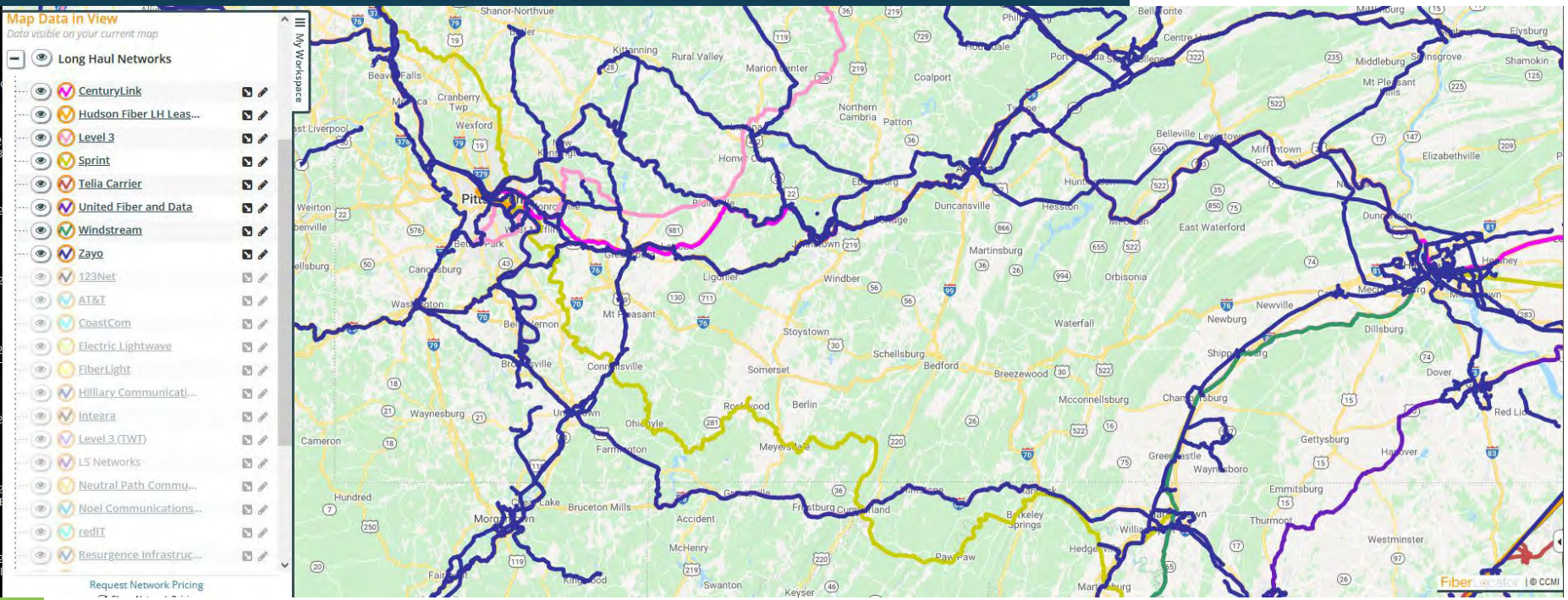
OMC Permitted Commercialization Services

- Market empty micro-ducts;
- Dark fiber services
- Lit fiber services
- New cell towers subject to PTC approval on a case-by-case basis

Commercial Benefits

- Unique Asset for Long Haul
- New Fiber
- Underground
- Diverse Route
- Direct Route
- Catalyst for Economic Development

Competing Long Haul Commercial Fiber Routes

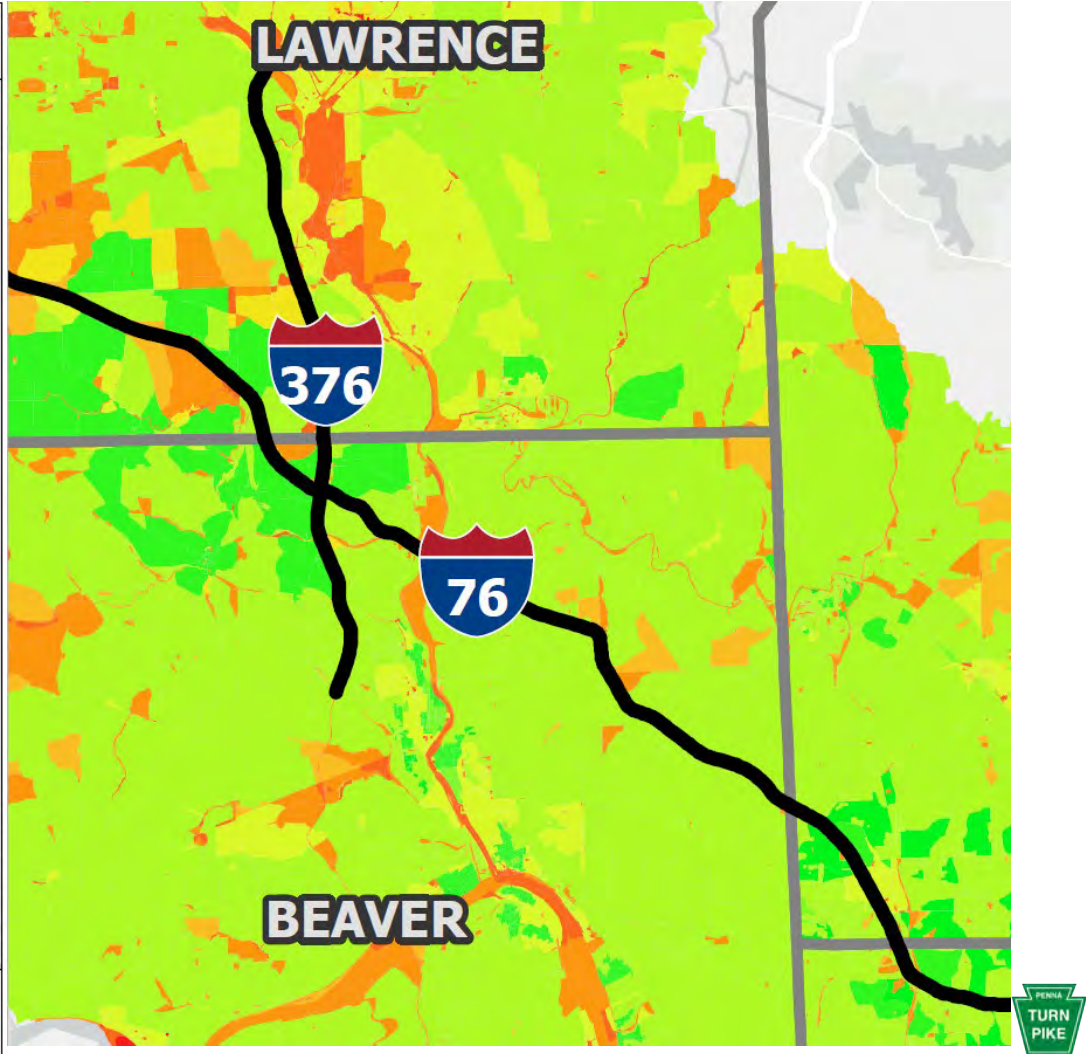
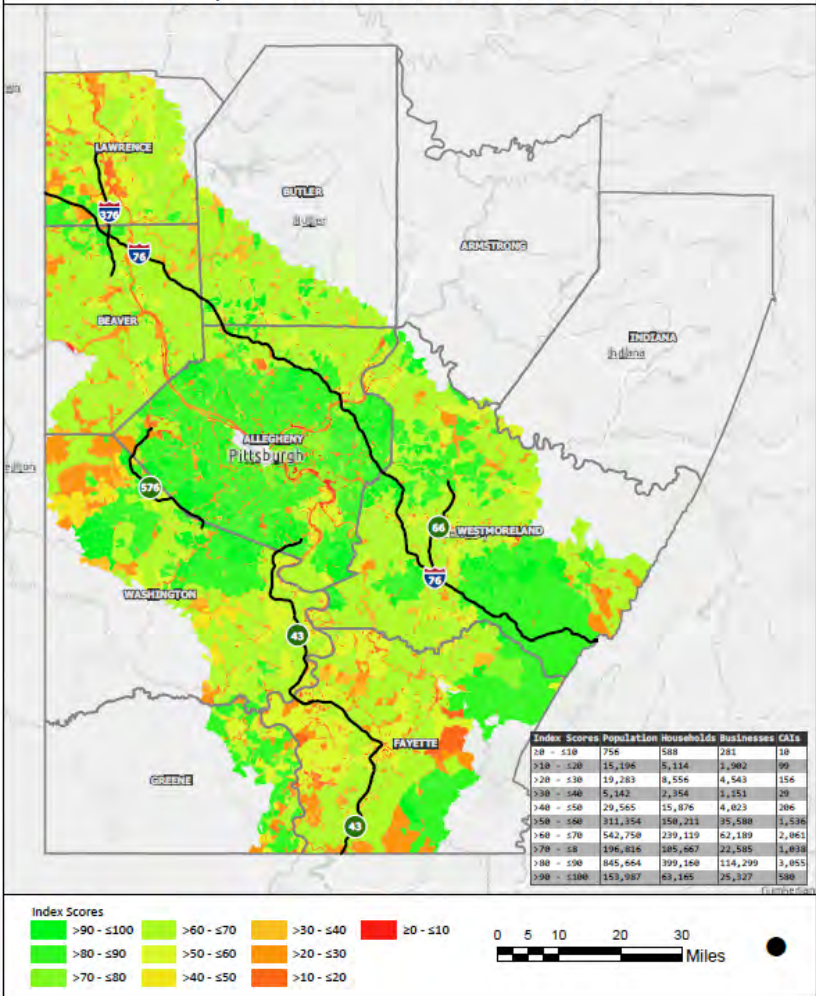


Proximity to Underserved Areas

- Unique path benefits rural areas
- Customers benefit from competition
- Federal broadband funding implications
- County and regional initiatives

SPC Broadband Access Index

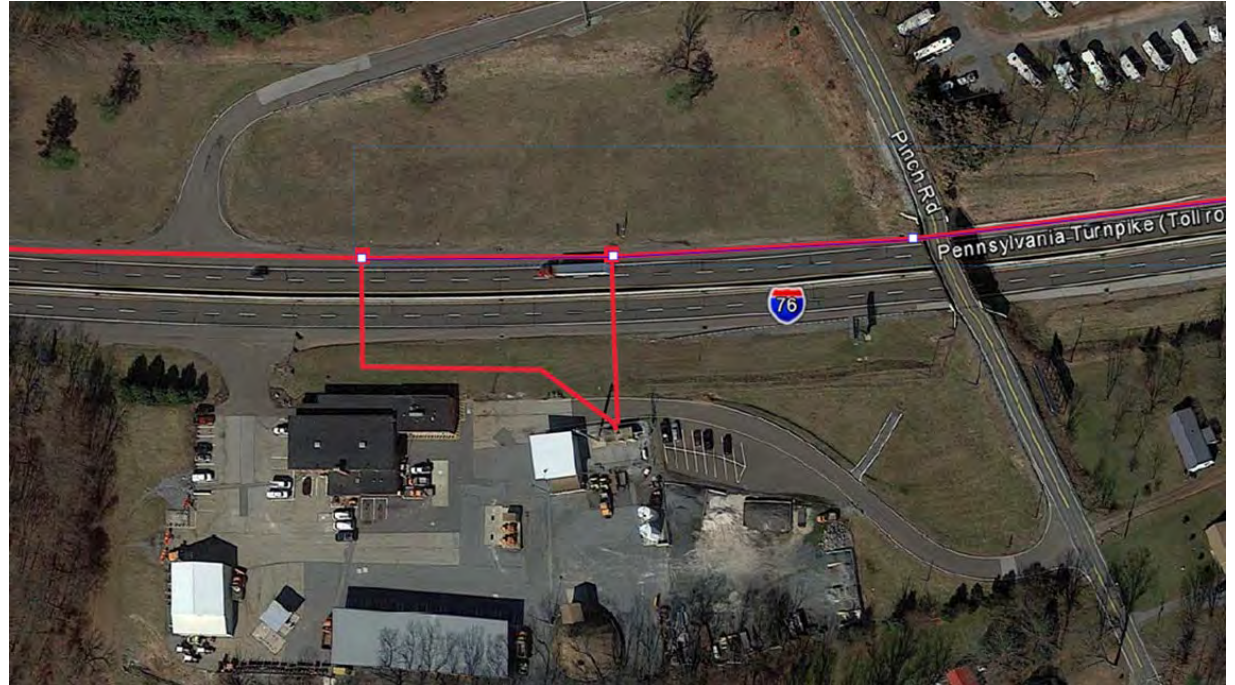
PA Turnpike Routes 43, 66, 76, 376, and 576



Design Considerations

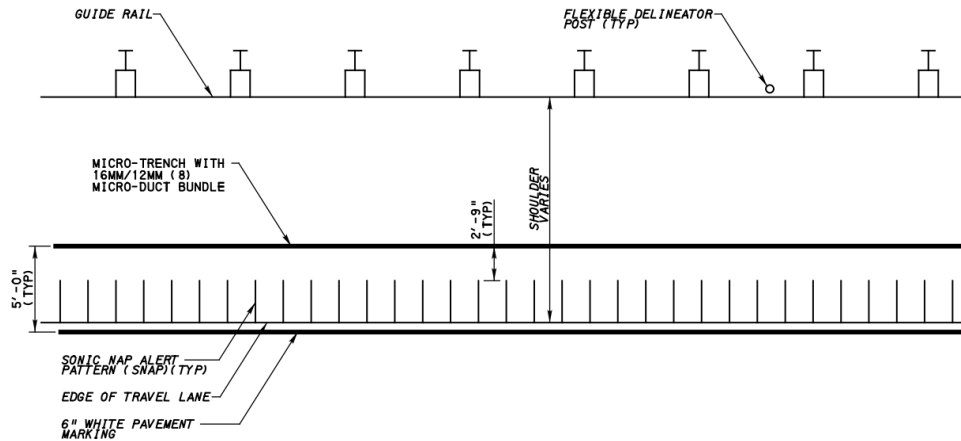
- Eight micro ducts for PTC(4) and PBI(4)
- Two 288-count fiber optic cables for PTC
- One 288-count fiber optic cable for PBI
- Micro-trench in shoulder
- Junction boxes in shoulder
- Coordination with other projects
- Utility protection

Demarcation Sites

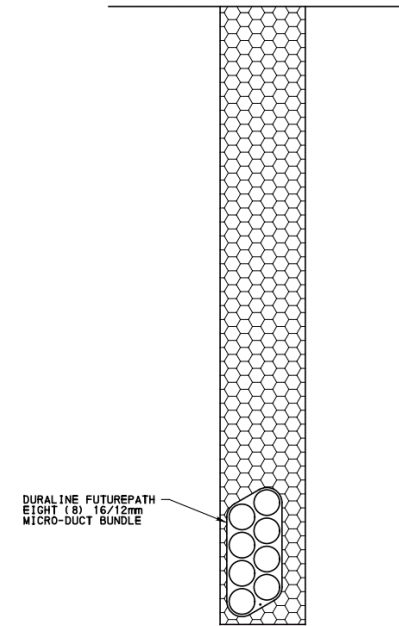


Micro-Trench Details

- Installed in shoulder 5' from white line
- 16" to trench bottom with 13" of cover;



MICRO-TRENCH IN SHOULDER (PLAN VIEW)
TYPICAL FOR RECONSTRUCTION OR NEW CONSTRUCTION
NOT TO SCALE



MICRO-TRENCH SECTION DETAIL
NOT TO SCALE

Micro-trenching



Images from current Eastern Network construction

Micro-duct placement



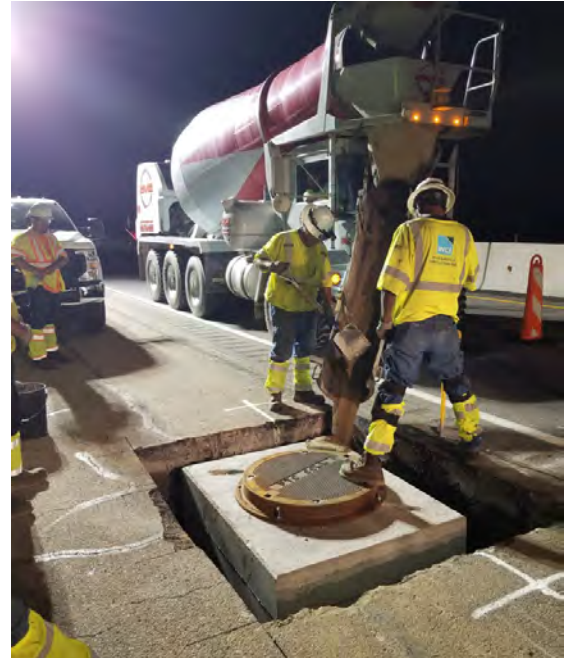
Images from current Eastern Network construction

Micro-trench reinstatement



Images from current Eastern Network construction

Junction Boxes



Images from current Eastern Network construction

Bridge Attachments



Images from current Eastern Network construction

Borings

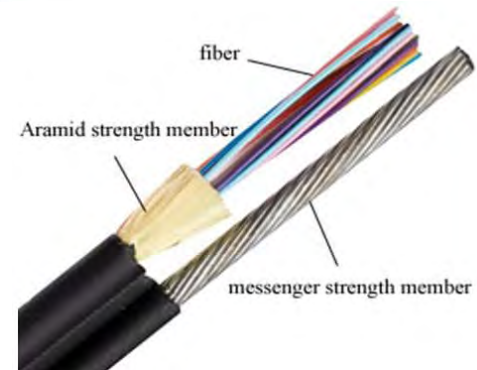
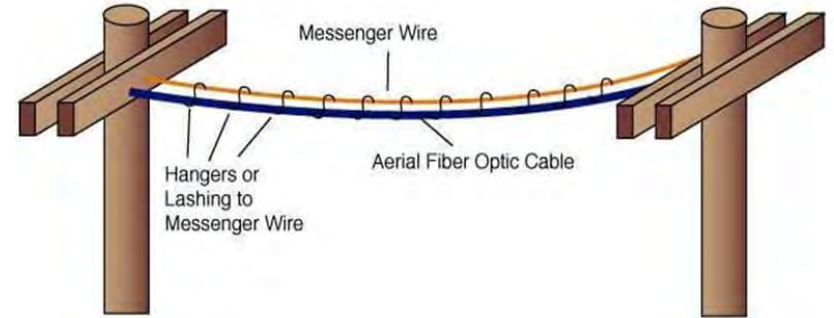


Images from current Eastern Network construction

Aerial Fiber Optic Cable



Images from current Eastern Network construction



Benefits of PTC Fiber Optic Broadband Network

- PTC operations & infrastructure
- Source of non-toll revenue
- Commercial asset
- Community benefit