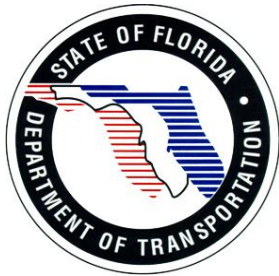


# Improving Mobility Through ITS – The SR 826 and SR 836 Interchange Application



Presented By:  
Kenneth Vorce, P.E.



For

Transpo 2010 Conference  
December 13, 2010



# The Project

- ARRA Funded – \$560 Million (Design-Build)
- FDOT District Six and MDX – Project Partners
- Project Schedule – 5 Years
- Maintaining Mobility During Construction is High Priority
- Major Interchange Reconstruction
- Mainline Widening of SR 826 and SR 836
- Collector-Distributor Roads for SR 836
- Expands Existing SR 826 and SR 836 ITS Network
- ITS Design Anticipated to be Completed in 2011/2012
- ITS Deployment Anticipated to be Completed in 2014
- Project Concludes a Two-Decade FDOT SR 826 Reconstruction Project

# The Joint Venture Project Team

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- Prime Contractors – Community Asphalt, DeMoya Group and Condotte America
- Lead Designer – BCC Engineering, Supported by C3TS
- ITS Designer – VANUS Group of Gannett Fleming
- ITS Subcontractor - TransCore

# SR 826 & SR 836 Interchange Area

● SR 836 –  
Looking East  
Towards SR 826



Section 5 - SR-826/836 Interchange  
FIN # 249581-1-5201, 249581-15290

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# Key ITS Components

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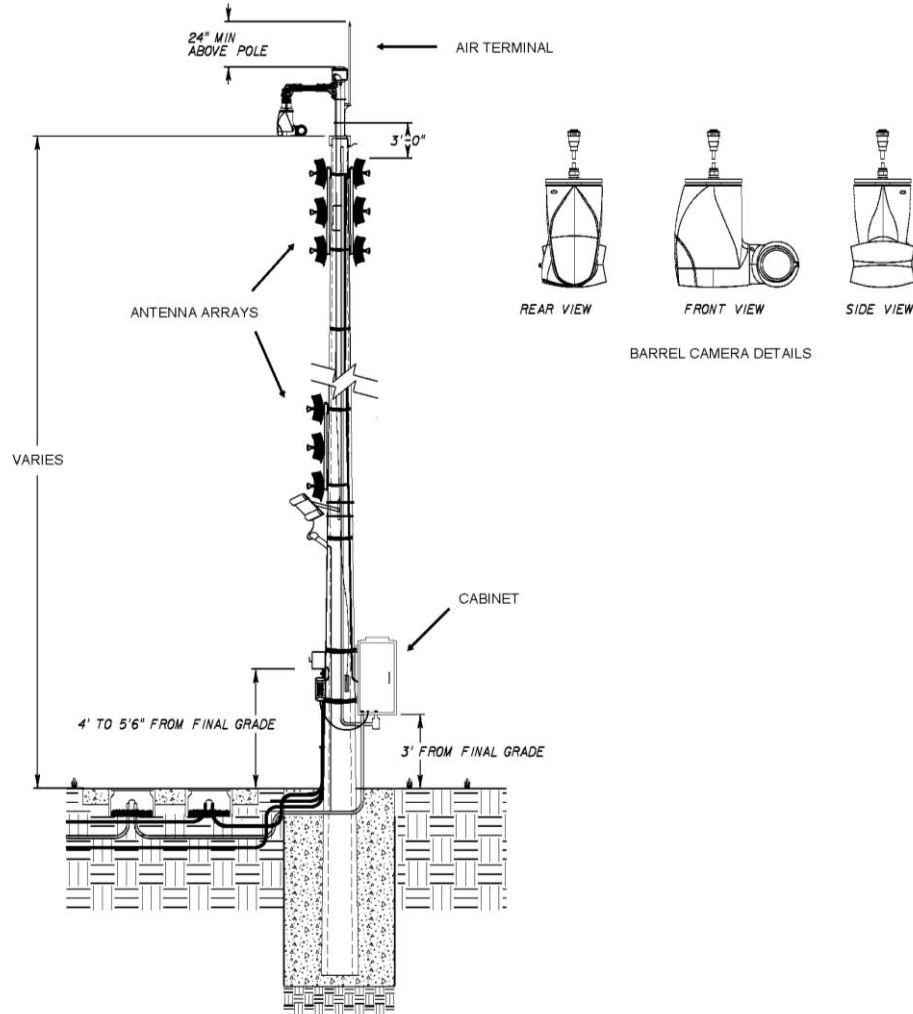
- Conversion of Existing SR 826 Wireless to Fiber Optics
- Retrofit of MDX SR 836 Communications Hub
- Upgrade of Existing ITS Devices (Detectors and CCTV Cameras)
- New Expressway and Arterial DMSs
- Replacement of FDOT District Six SunGuide TMC Core Switch

# Mobility Features of ITS Deployment

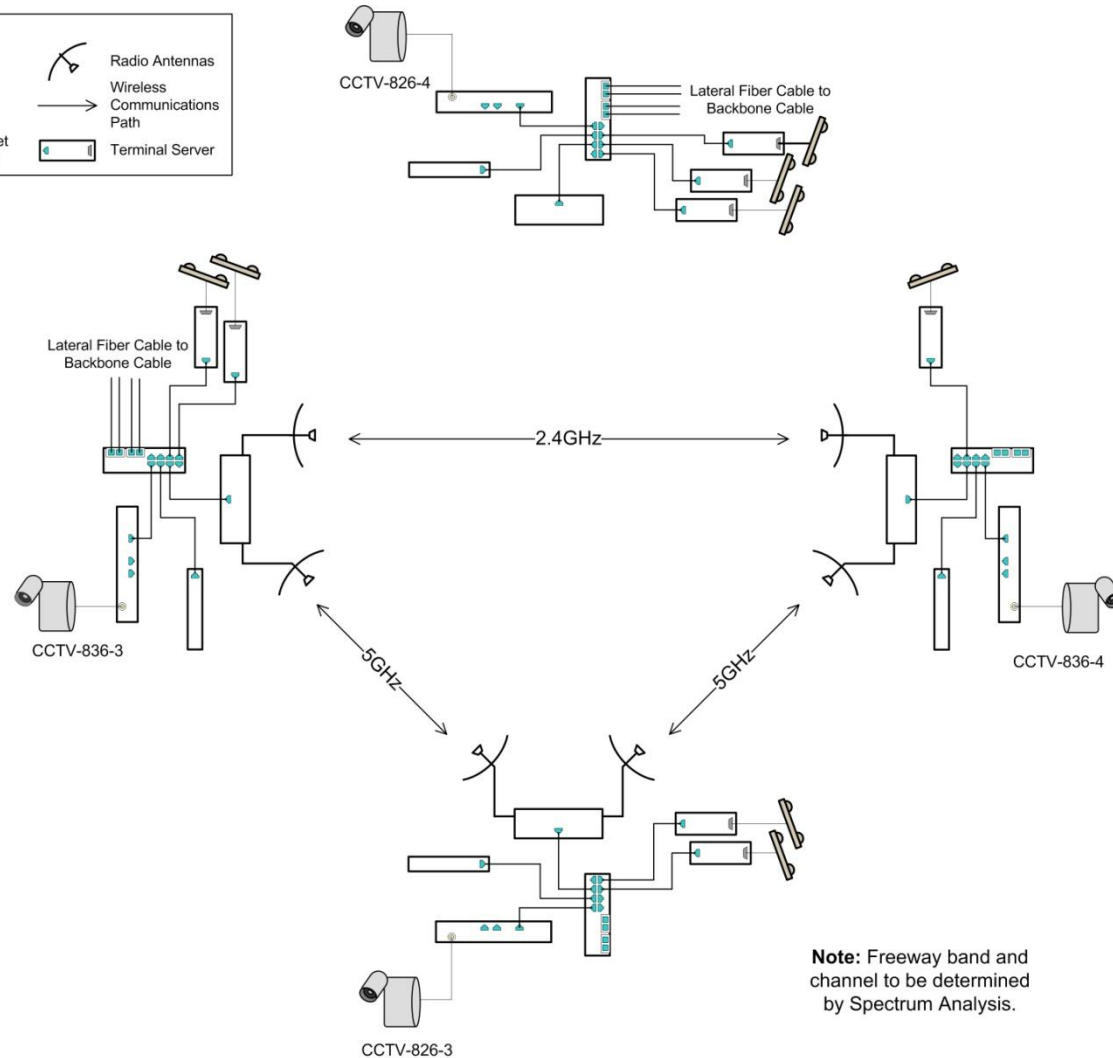
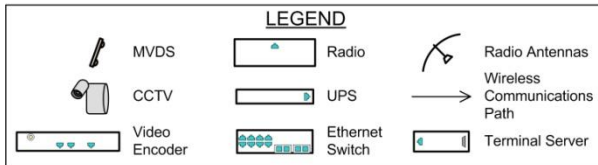
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- Early Deployment of Freeway DMS System
- Early Deployment of Interchange CCTV System
- ITS Devices to be Deployed in Advance of Roadway Construction Limits
- Portable ITS Devices
- 24-Hour Incident Management Coverage
- Maintaining Existing ITS Network Communications

# SR 826 & SR 836 Interchange – Early Deployment CCTV Pole Design



# SR 826 & SR 836 Interchange – Temporary Wireless System



# ITS Design & Constructability Challenges

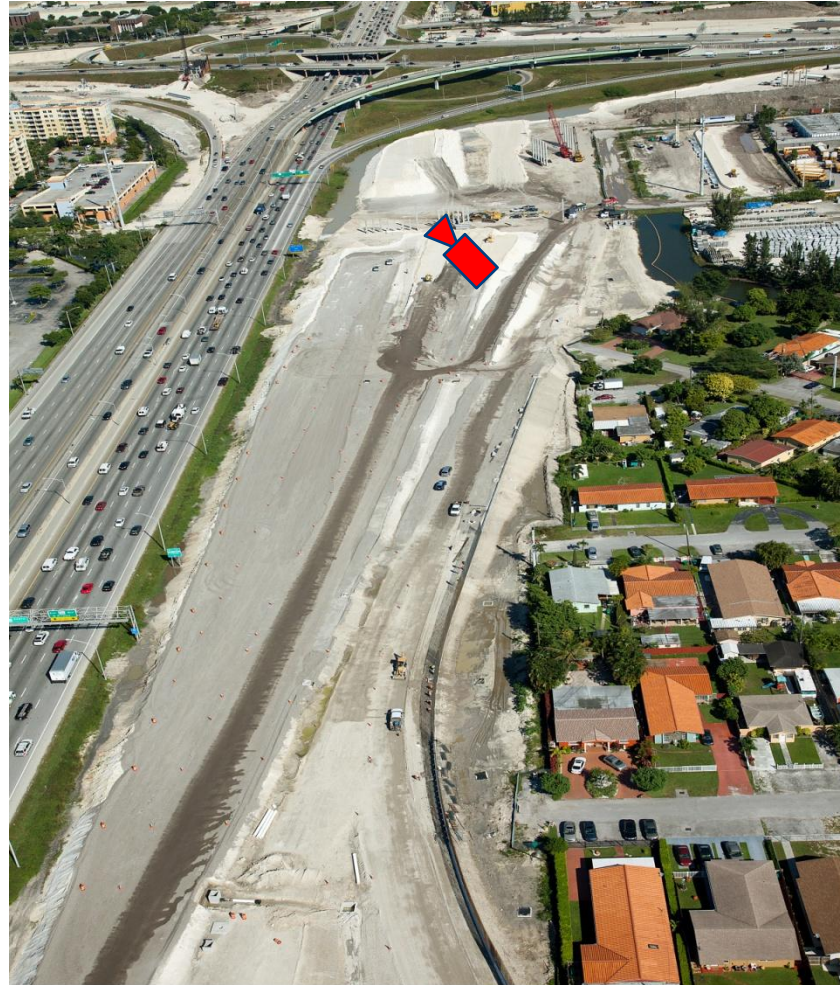
- On-going and Future Roadway Improvements
- MIA Glide Path Encroachment
- Easements and Permits
- Urban Arterial Constraints
- Maintenance Access for ITS Devices
- Internal/External Project Coordination
- Changing Field Conditions
- Preservation of Network Data Transmission

# ITS Design Issue Example



# ITS Constructability Issue – Changing Field Conditions

- SR 826 – Looking North Towards SR 836

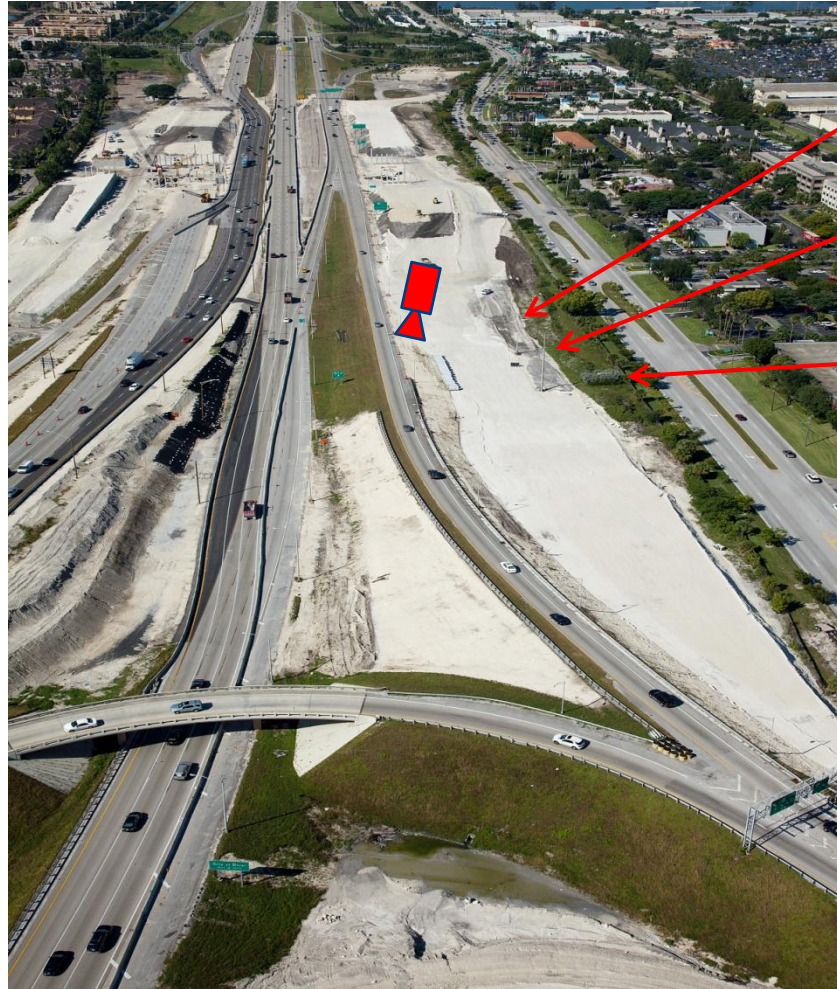


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# ITS Constructability Issue – Changing Field Conditions

● SR 836 –  
Looking West  
from SR 826



Existing HAR  
Transmitter

Existing CCTV Pole

Existing MDX  
Comm Hub



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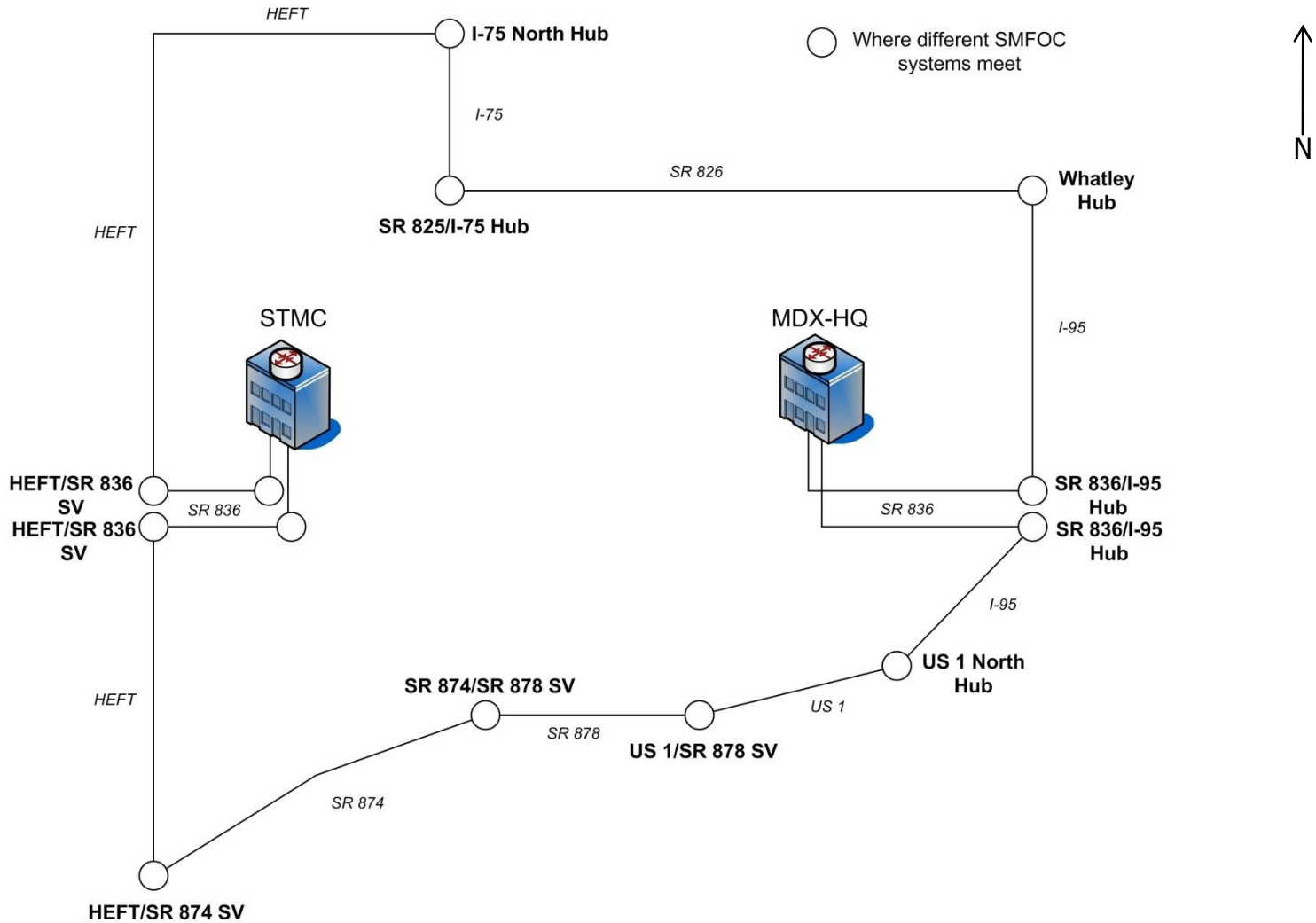
# Preservation of Network Data "Mobility"

- Dense Wave Division Multiplexing (DWDM) Solution
  - Temporary solution for network data to by-pass the SR 826 and SR 836 interchange construction
  - Two DWDM devices – one at D6 TMC and one at MDX Headquarters
  - Rerouting data (17 channels) via two fiber communications paths (one north and one south)
  - Should one path be disrupted (i.e., fiber cut), the other (alternate) path will be the conduit for data transmission
  - Dependent on fiber sharing agreements between FDOT, MDX, and Florida Turnpike Enterprise

# Existing Network Data Channels (Gigabit Link)

Link ID	Link-Point A	Link-Point B	Description/Purpose
1	FDOT D6 ITS	MDX Headquarters	FDOT-MDX/C2C
2	MDX HUB SR 826	MDX Toll Plaza at 17 <sup>th</sup> Ave	MDX SR 826 HUB to at 17 <sup>th</sup> Ave/ITS
3	MDX Toll Plaza 137 <sup>th</sup> Ave	MDX Headquarters	MDX Toll Plaza at 137 <sup>th</sup> Ave to MDX Headquarters/ITS
4	MDX Toll Plaza 137 <sup>th</sup> Ave	MDX Headquarters	MDX Toll Plaza at 137 <sup>th</sup> Ave to MDX Headquarters/TOLLS
5	MDX HUB SR 826	MDX Headquarters	MDX HUB SR 826 to MDX Headquarters/ITS
6	Florida Turnpike Okeechobee Toll Plaza	MDX Headquarters	Link not active- Donated to Express Lanes (see link 15)
7	Florida Turnpike Bird Rd Toll Plaza	MDX Headquarters	Florida Turnpike Bird Rd Toll Plaza to MDX Headquarters/TOLLS
8	MDX Toll Plaza 97 <sup>th</sup> Ave	MDX Headquarters	MDX Toll Plaza at 97 <sup>th</sup> Ave to MDX Headquarters/TOLLS
9	MDX Toll Plaza on SR 924	MDX Headquarters	MDX Link between Headquarters and on SR 924/ITS
10	MDX Toll Plaza on SR 874	MDX Headquarters	MDX Link between Headquarters and on SR 874/ITS
11	FDOT D6 ITS	I-95/SR 836 HUB	FDOT link between FDOT D6 ITS TMC and Comm. HUB on I-95-SR 836/ITS
12	FDOT D6 ITS	FDOT D4 ITS	Link between D6 and D4 ITS/C2C
13	FDOT D6 ITS	FDOT D4 ITS	Link between D6 and D4 ITS/video
14	FDOT D6 ITS	NAP of Americas	Link between FDOT D6 ITS and D6 Network gear at the NAP/ITS
15	Florida Turnpike Okeechobee Toll Plaza	Express Lanes HUB Building	Link between Express lanes system and Florida Turnpike Tolls/TOLLS
16	FDOT D6 ITS	Express Lanes HUB Building	Link between FDOT D6 ITS to Express Lanes HUB/ITS
17	MDX Toll Plaza at 137 <sup>th</sup> Ave	MDX Toll Plaza at 17 <sup>th</sup> Ave	Link between MDX Toll Plaza at 137 <sup>th</sup> Ave to MDX Toll Plaza at 17 <sup>th</sup> Ave/ITS

# DWDM Communications Paths

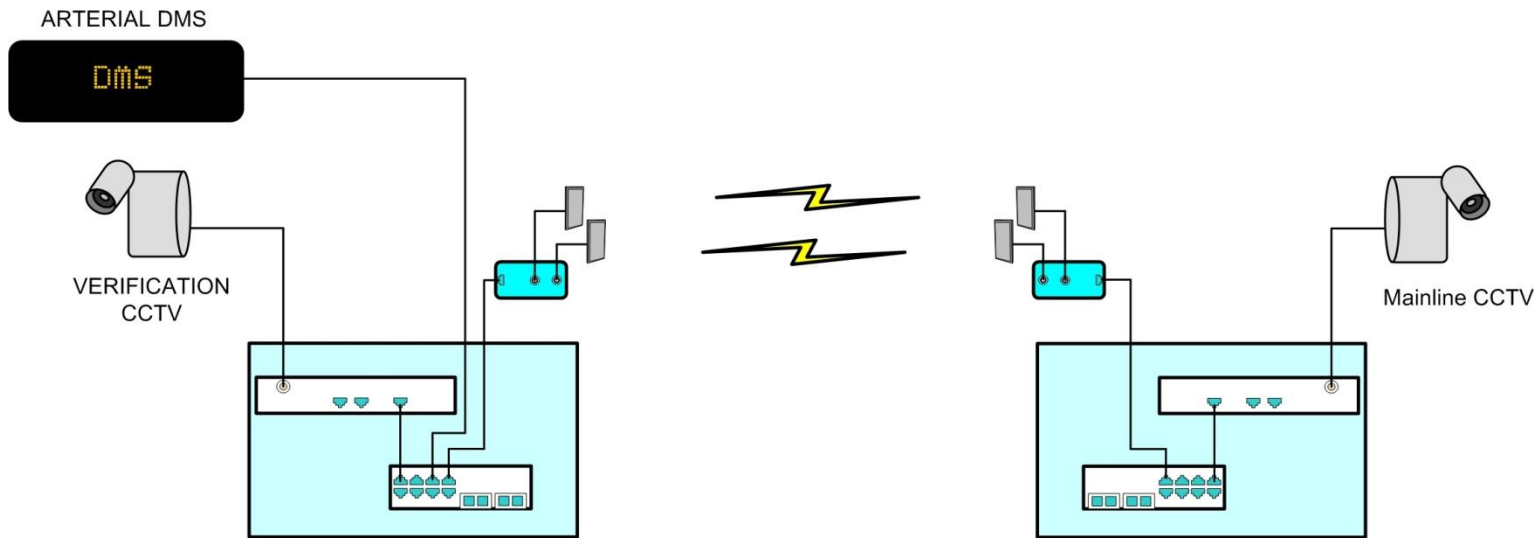


# Permanent ITS Solution

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- DMS Coverage of Mainlines and Arterial Approaches to Mainlines
- 100% CCTV Coverage of Mainlines and DMS Installations
- MVDS Coverage of Mainlines and Ramp Entrances and Exits
- Hybrid Arterial Device Communications
- 96 Fiber Backbone on SR 826 and SR 836

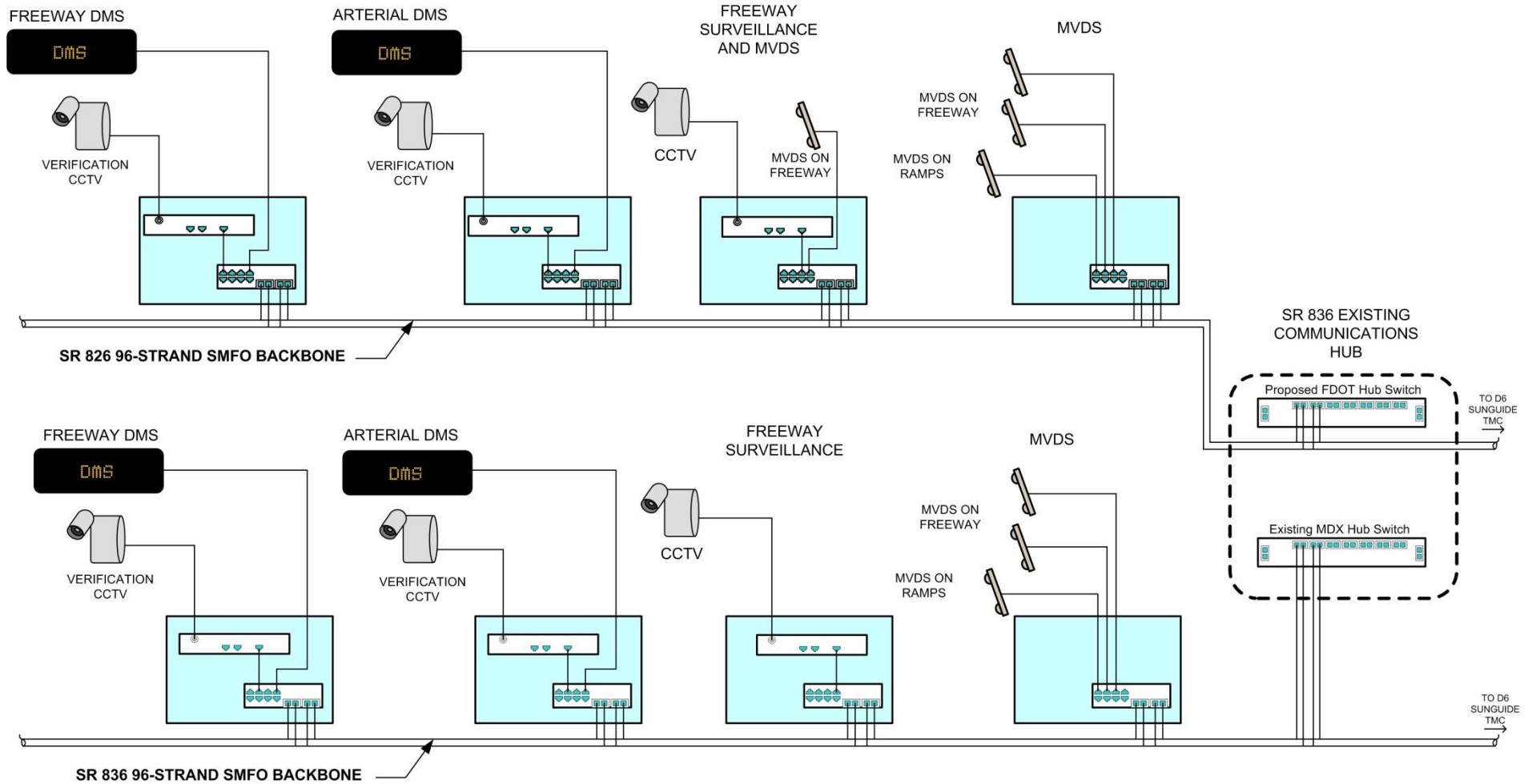
# Arterial Device Communication – Typical Wireless Diagram



**Note:**

There will be two wireless links between the arterial devices and the fiber backbone with a minimum reliability of 99.9%.

# SR 826 & SR 836 Mainline – Typical Fiber Network Diagram



# Lessons We Are Learning

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- Keeping Up with Roadway Contractors' Work Schedule
- "Bonding" with the ITS Subcontractor
- Understanding Complexities of Major Roadway Design
- Meetings, Meetings and More Meetings
- Walking the Job Takes on New Meaning
- ITS Will be on Critical Path