

I-40: Advanced Traffic Management Systems

Spring TexITE Meeting
April 4, 2025

Daniel Park, PE

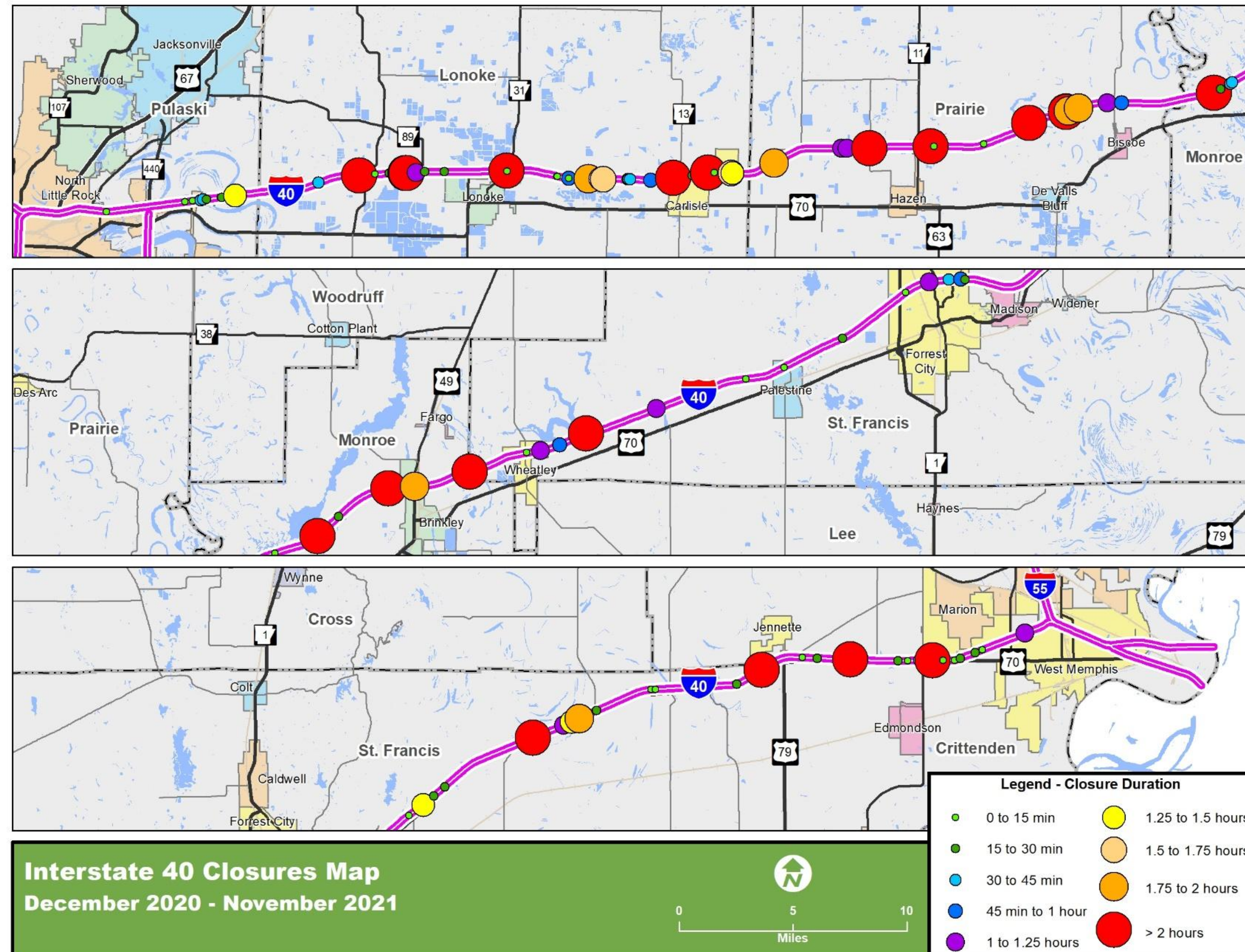
Background

- 120-mile span from North Little Rock to West Memphis
- Evaluate the diversion of I-40 traffic to Hwy 70



I-40 Closures

- 20 closures lasting more than two hours in a one-year period
- Each full closure costs the travelling public about \$100,000 per hour per direction
- High % of trucks (48-65%)





I-40 Closures



Traffic at standstill after crash on I-40 near Palestine, Arkansas

Updated: Mar. 1, 2025 at 4:59 AM CST



TRAFFIC

Crash involving multiple semis blocks all lanes of eastbound I-40 in St. Francis County

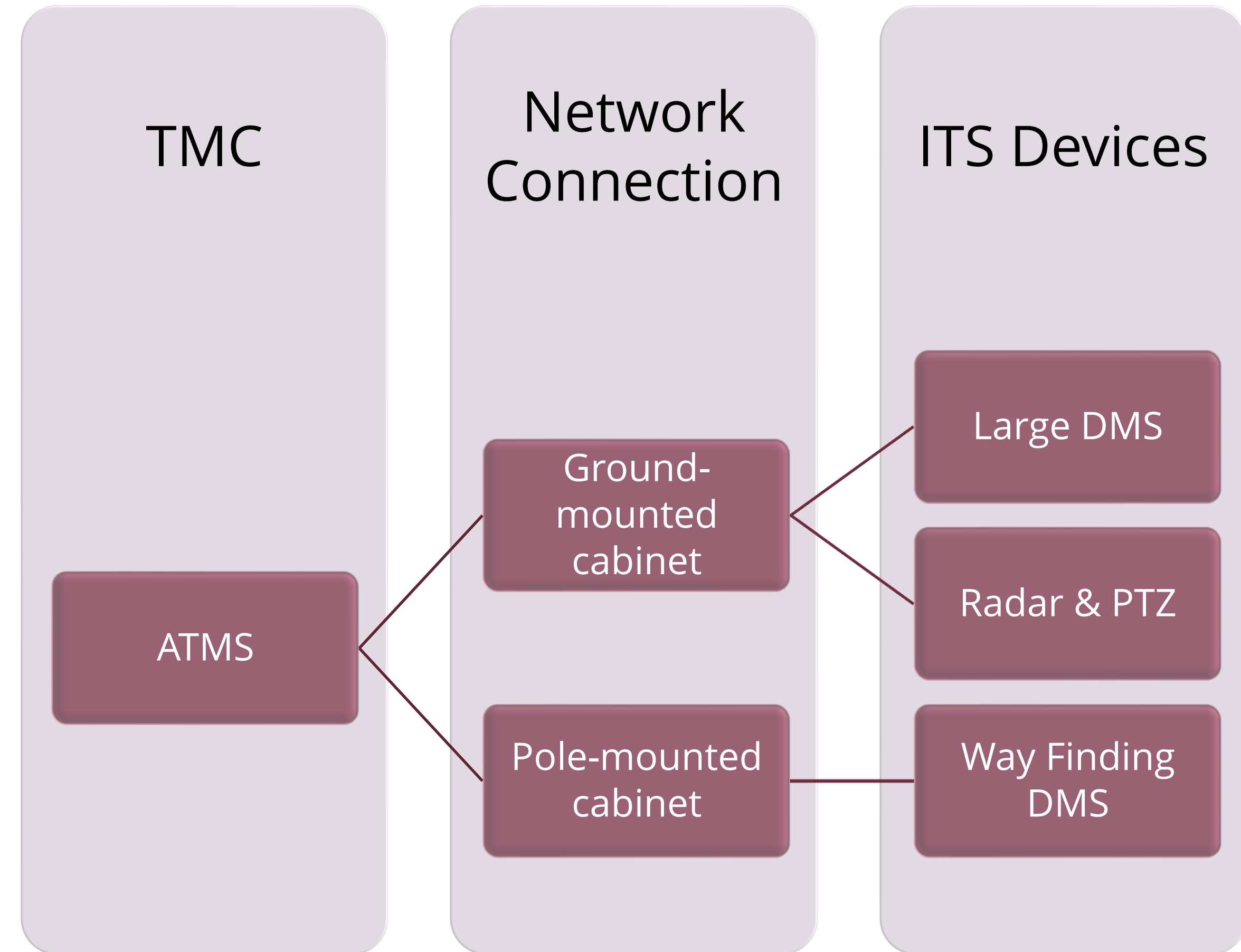
by: Ryan Turbeville
Posted: Mar 18, 2025 / 04:32 PM CDT
Updated: Mar 18, 2025 / 04:45 PM CDT



System Overview

Advanced Traffic Management System

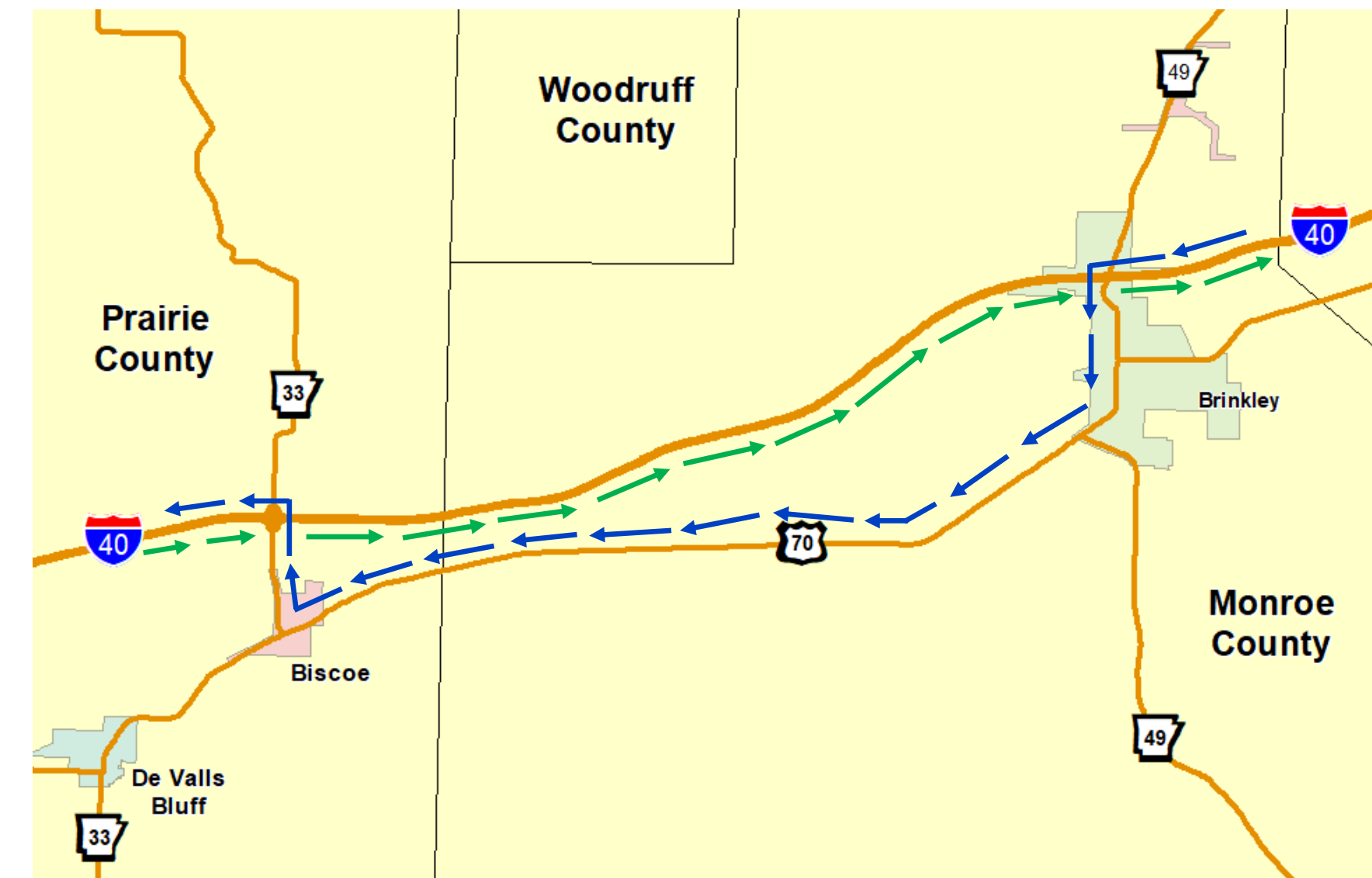
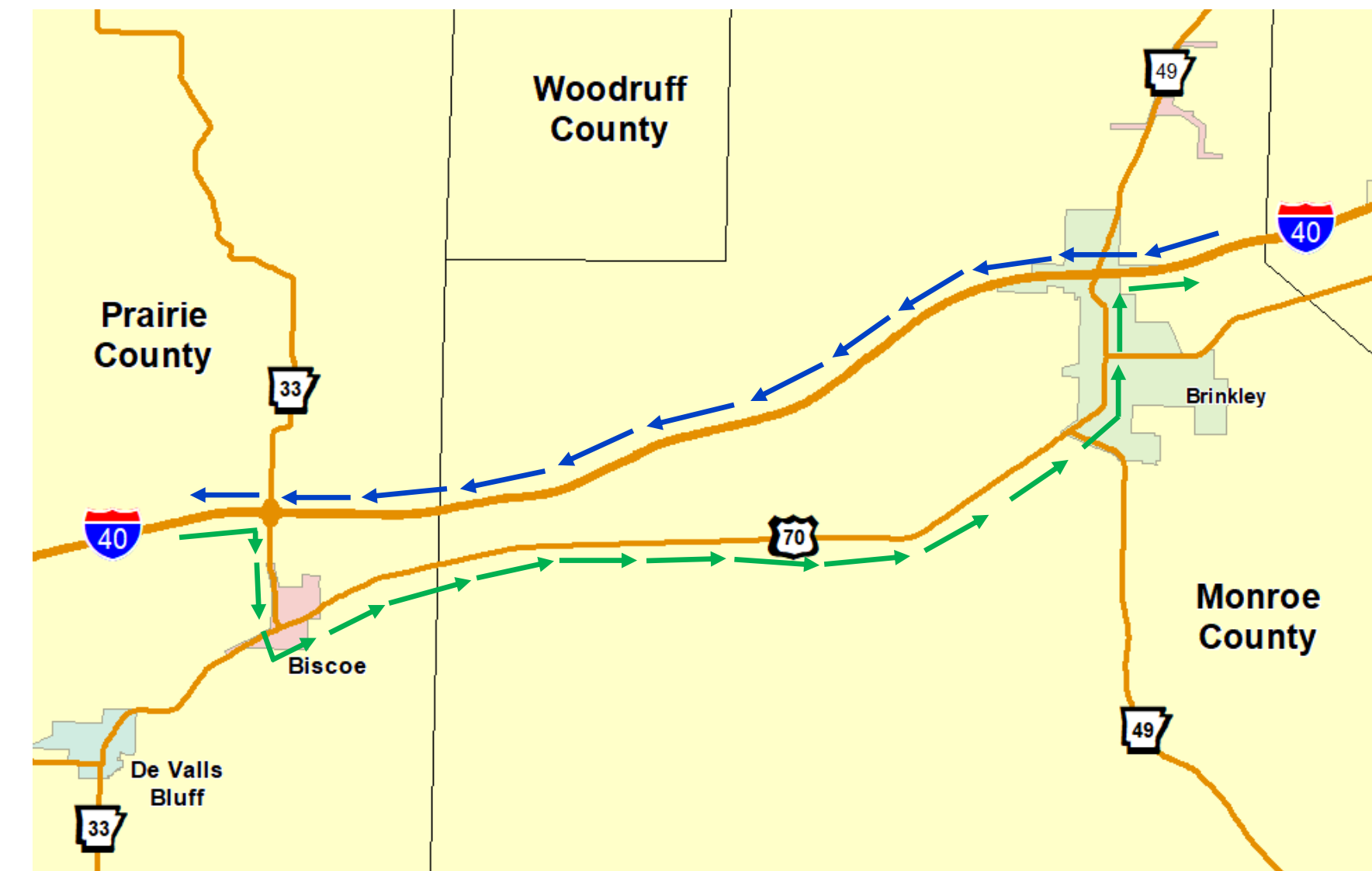
- Manage traffic flow
- Collect real-time data
- Monitor events/accidents
- Improve safety



Planning Study

Diversion Scenarios

EB & WB I-40 Lane Closure



Diversion Analysis

- Extended green times provide for improved network throughput
- Side street delay is increased due to the extended cycle lengths and often results in poor LOS, but green time is still adequate to clear standing queues

Table 1: Highway 70 Level of Service – HCS Analysis

Segment	2022 HCS LOS	2045 HCS LOS	2022 Diversions HCS LOS	2045 Diversions HCS LOS
I-440 to Hwy 391	D	D	F	F
Hwy 391 to Kerr Rd	C	C	F	F
Kerr Rd to Hwy 15	A	A	F	F
Hwy 15 to Hwy 89 Spur	A	A	F	F
Hwy 89 Spur to Hwy 31	B	B	F	F
Hwy 31 to Hwy 13	A	A	F	F
Hwy 13 to Hwy 11/Hwy 63	A	B	E	F
Hwy 11/Hwy 63 to Hwy 33	A	A	F	F
Hwy 33 to Hwy 49/Hwy 17/Main St	B	B	F	F
Hwy 49/Hwy 17/Main St to Hwy 78	A	A	E	E
Hwy 78 to Hwy 261/Main St	A	A	E	F
Hwy 261/Main St to Hwy 1	A	A	F	F
Hwy 1 to Hwy 38	C	C	E	F
Hwy 38 to Hwy 75	A	A	E	F
Hwy 75 to Hwy 149	A	A	E	F
Hwy 149 to Hwy 79	A	A	E	F
Hwy 79 to Hwy 147	A	A	F	F
Hwy 147 to Hwy 118	A	B	F	F

Table 2: Connector Route Level of Service – HCS and Synchro Analysis

Connector Road	Analysis Method	2022 HCS LOS	2045 HCS LOS	2022 Diversions HCS LOS	2045 Diversions HCS LOS
I-440	HCS - Freeway Facility	B	B	F	F
Hwy 391	Synchro	E	E	F	F
Kerr Rd	HCS - Two-Lane	A	A	F	F
Hwy 15	HCS - Two-Lane	A	A	F	F
Hwy 89	HCS - Two-Lane	B	B	E	F
Hwy 31	HCS - Two-Lane	C	C	F	F
Hwy 13	HCS - Two-Lane	A	C	E	F
Hwy 63	HCS - Two-Lane	B	B	E	E
Hwy 33	HCS - Two-Lane	A	A	E	E
Hwy 49	Synchro	B	B	F	F
Hwy 78	HCS - Two-Lane	A	A	E	E
Hwy 261	HCS - Two-Lane	A	A	E	E
Hwy 1	HCS - Two-Lane	A	A	E	F
Hwy 118	Synchro	B	B	D	D

Diversion Analysis

- Looked at existing phasing to improve operations
- Protected left turns, right turn overlaps
- FYA signal heads were recommended to replace existing signal heads

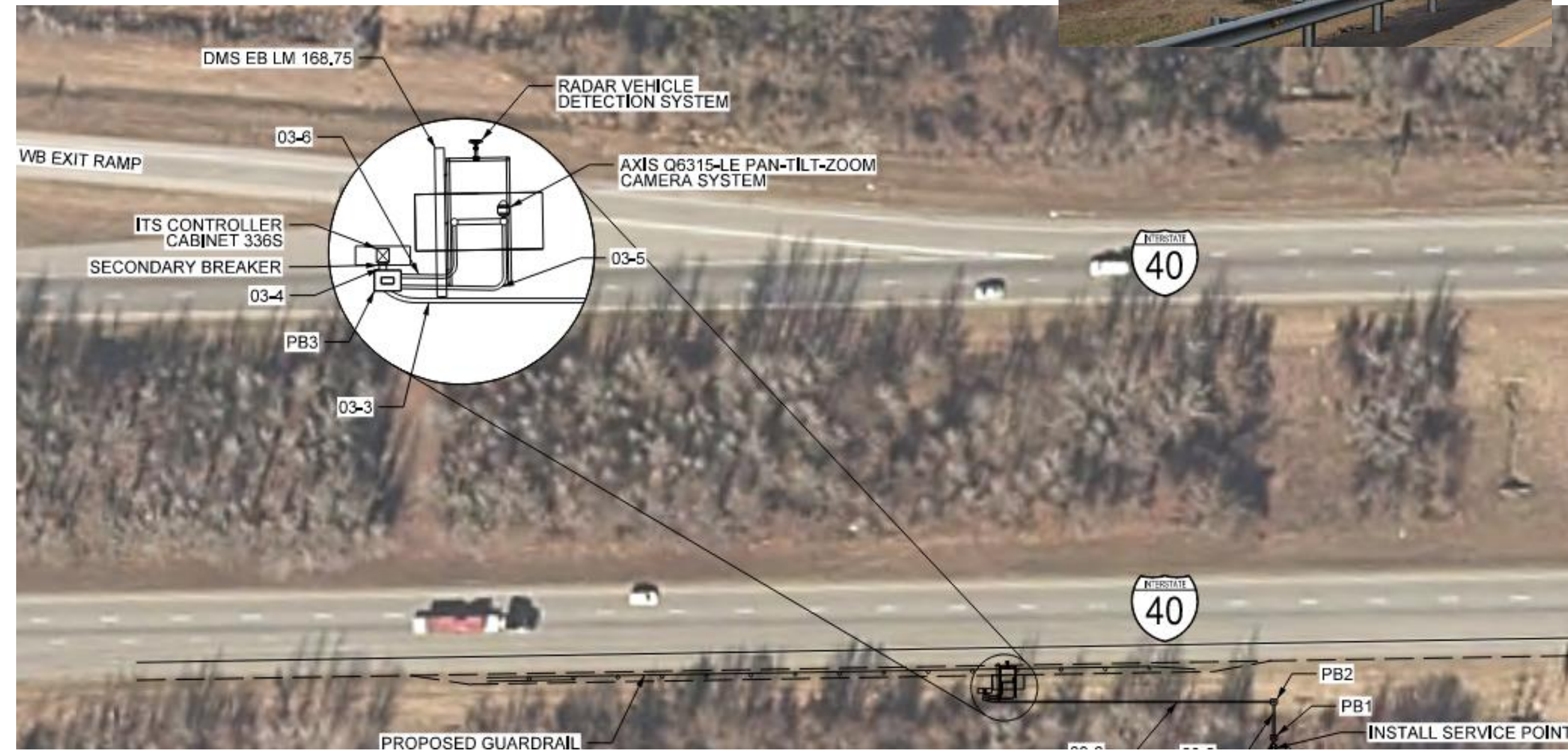


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Design

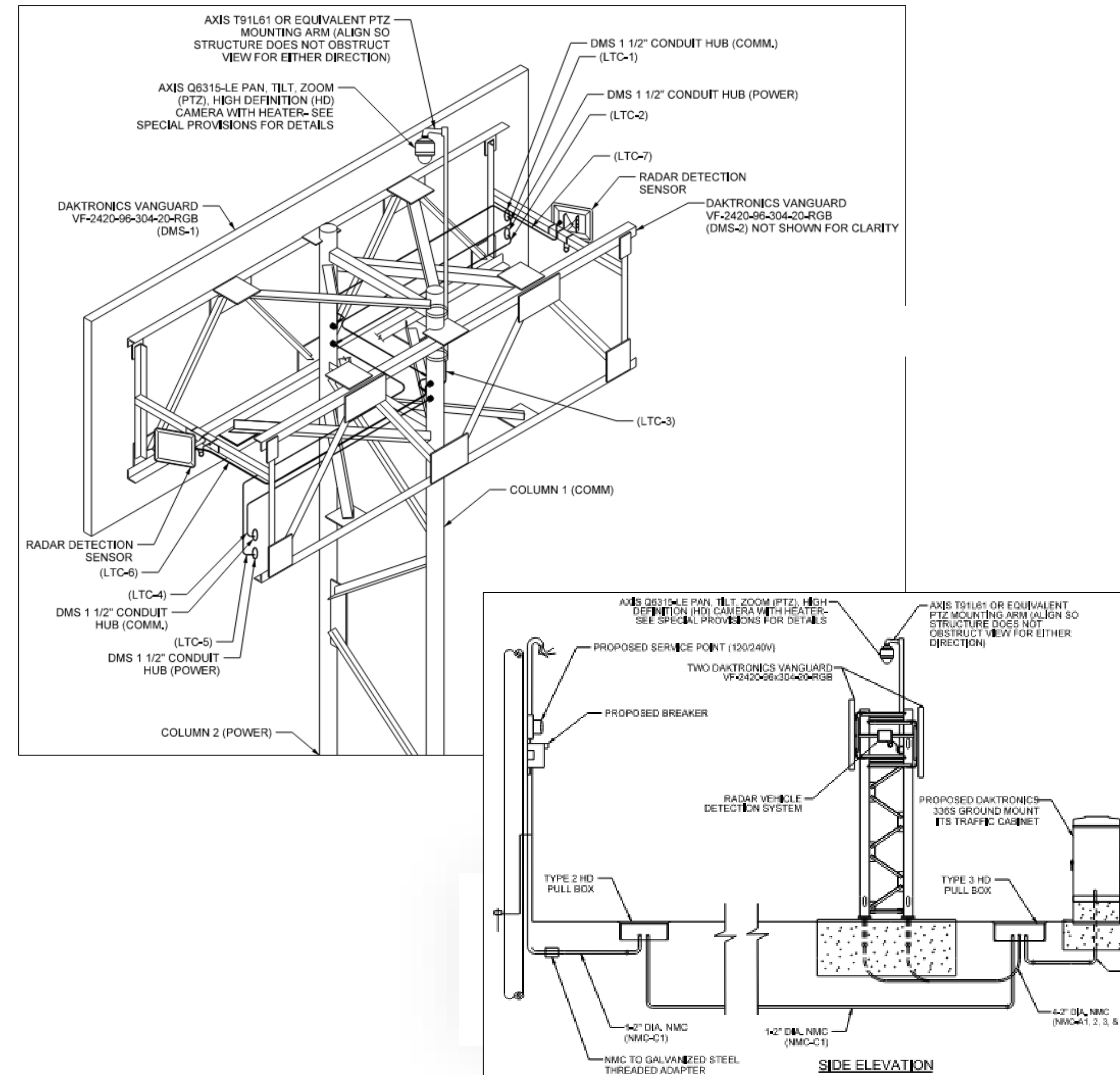
Phase 1

- Exclusively on I-40
- 39 overhead DMS assemblies
 - Dual DMS for both directions where possible
- PTZ cameras, radar devices, ITS cabinet
- Many locations required guardrail



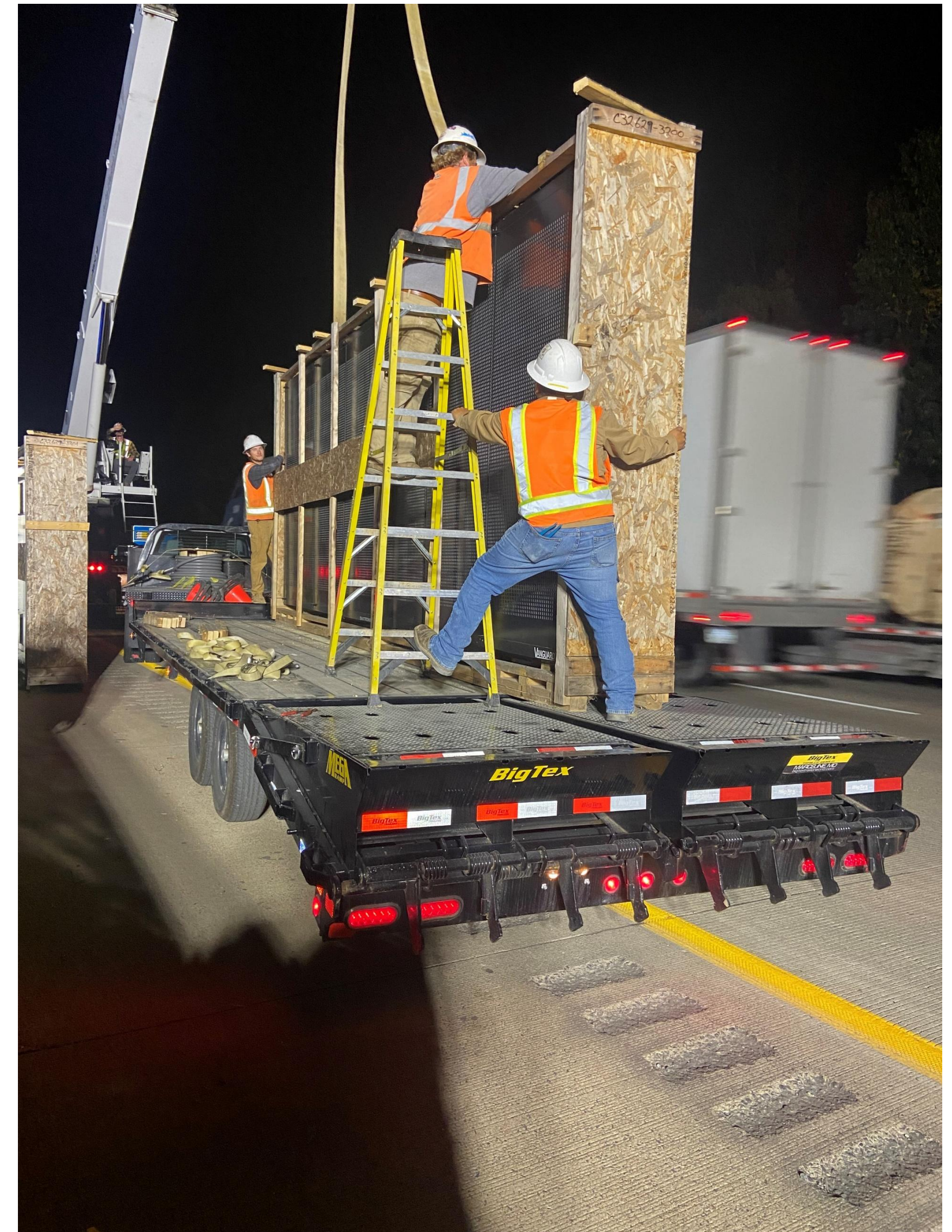
Phase 1

- ARDOT Standard Drawings
- Wiring inside structure to displays
- Conduit & wiring from cabinet and pull boxes to structure



Phase 1

- Construction underway
- DMS installation along I-40



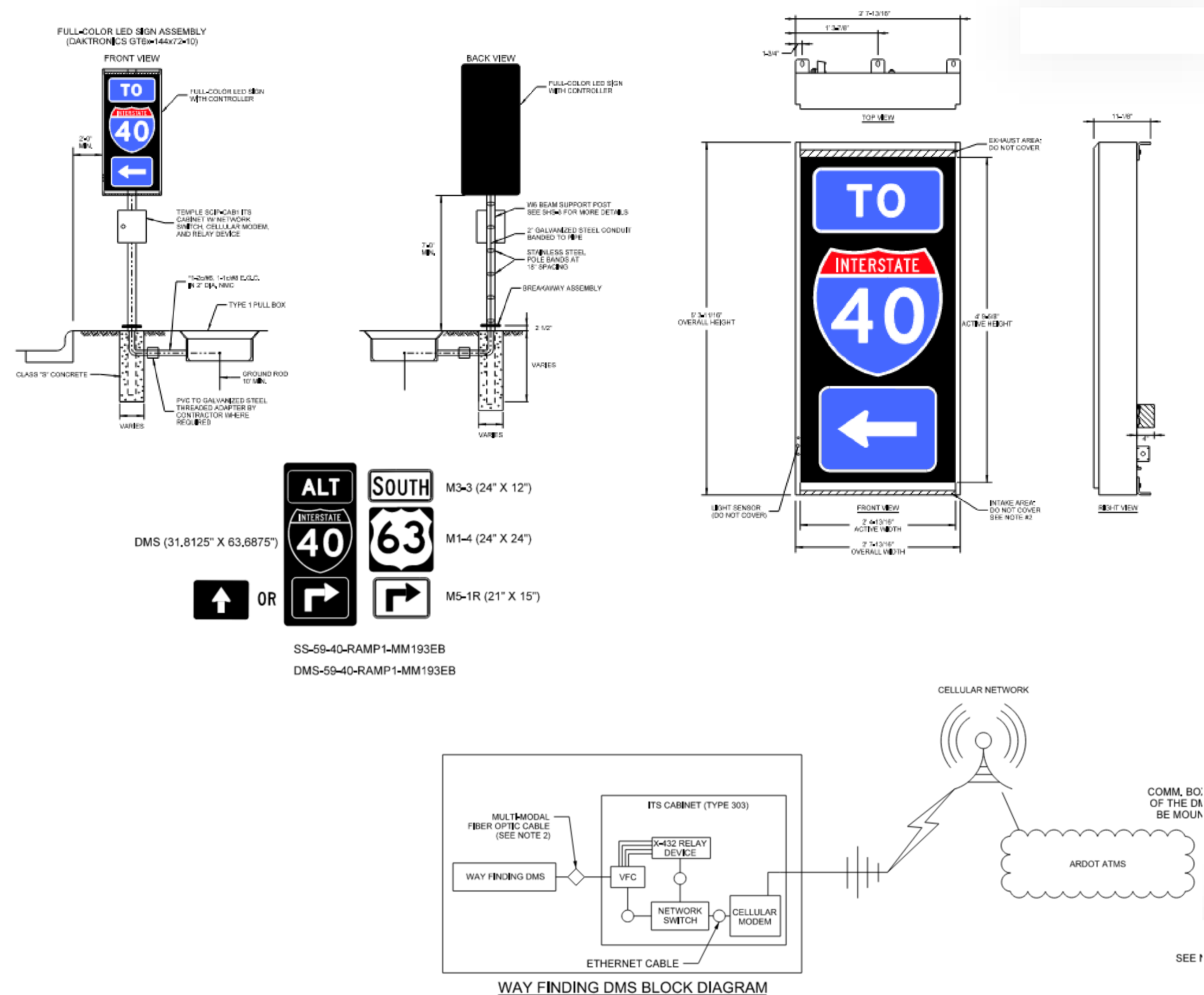
Phase 2

- Hwy 70 and the connecting routes between I-40 and Hwy 70
- Existing sign upgrades
- Signal upgrades
- Alternate signal timings
- Way Finding DMS



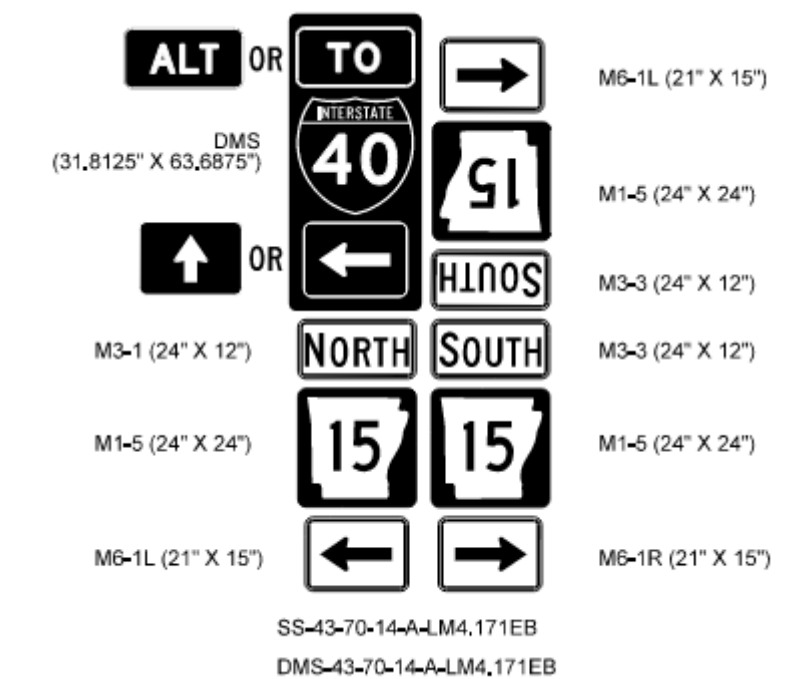
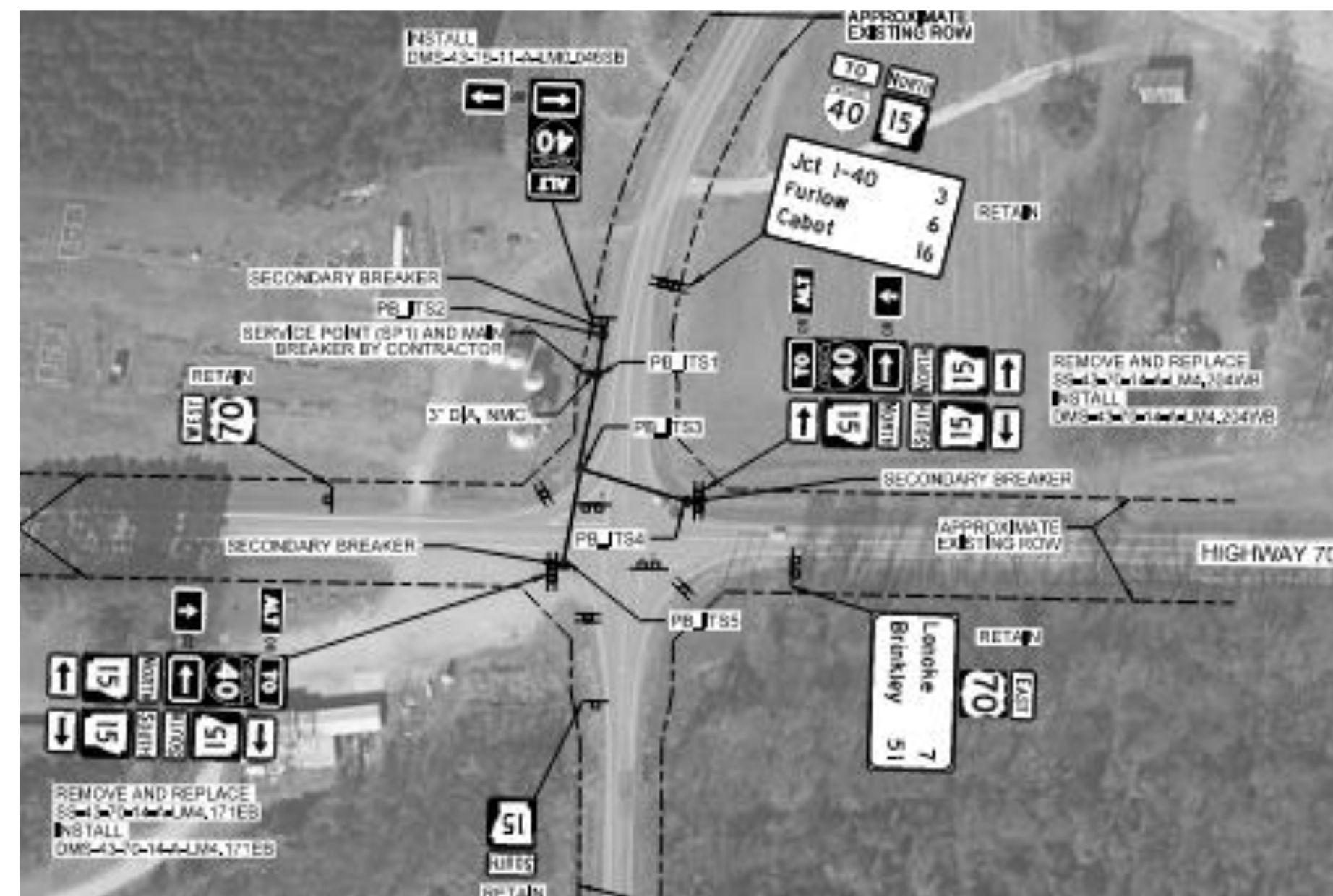
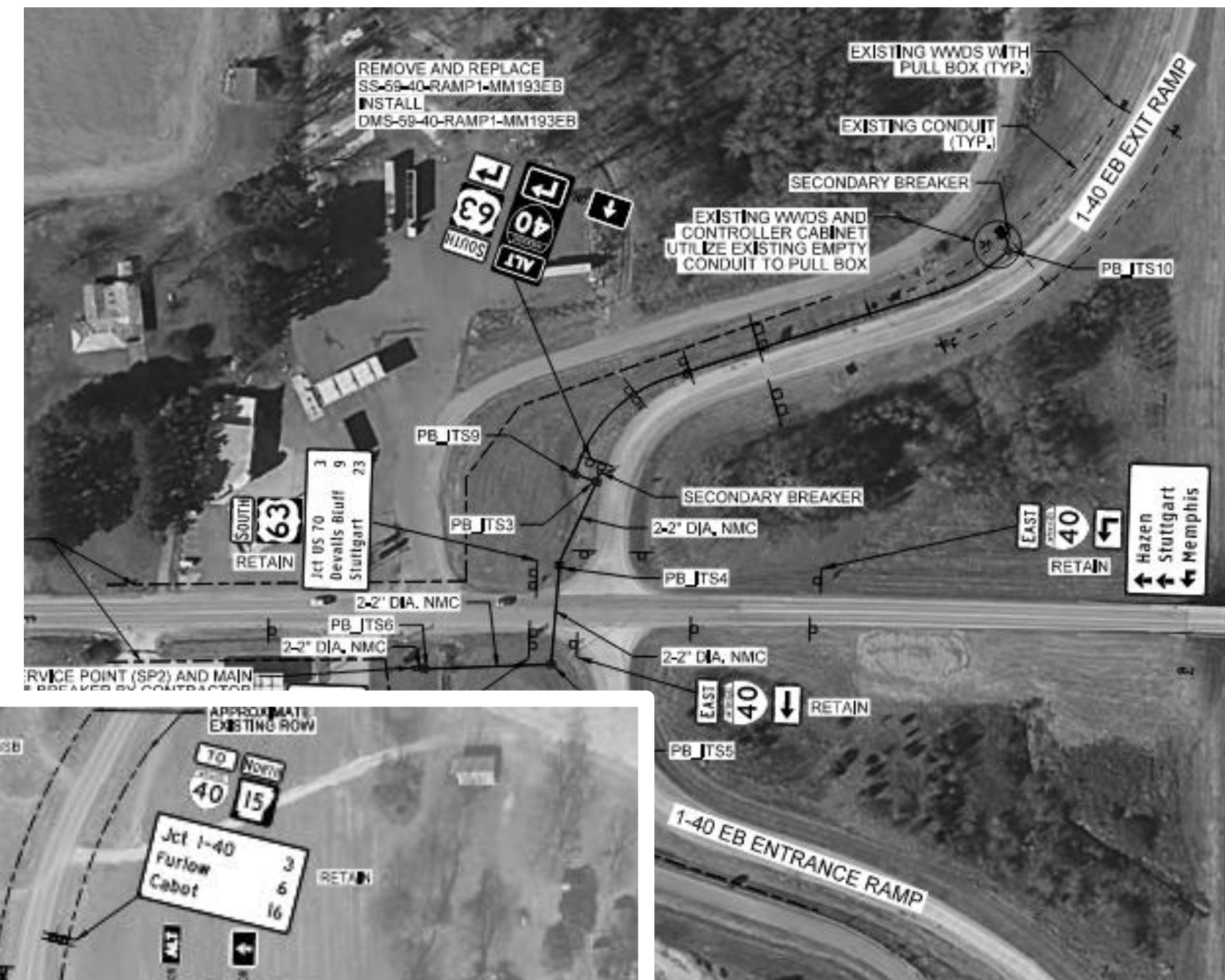
Digital Way-Finding Signs

- Direct traffic once they exit
- Communication with the ARDOT Traffic Management Center
- Coordination with vendors and others
- Redundancy with ATMS software and physical connection via relay device



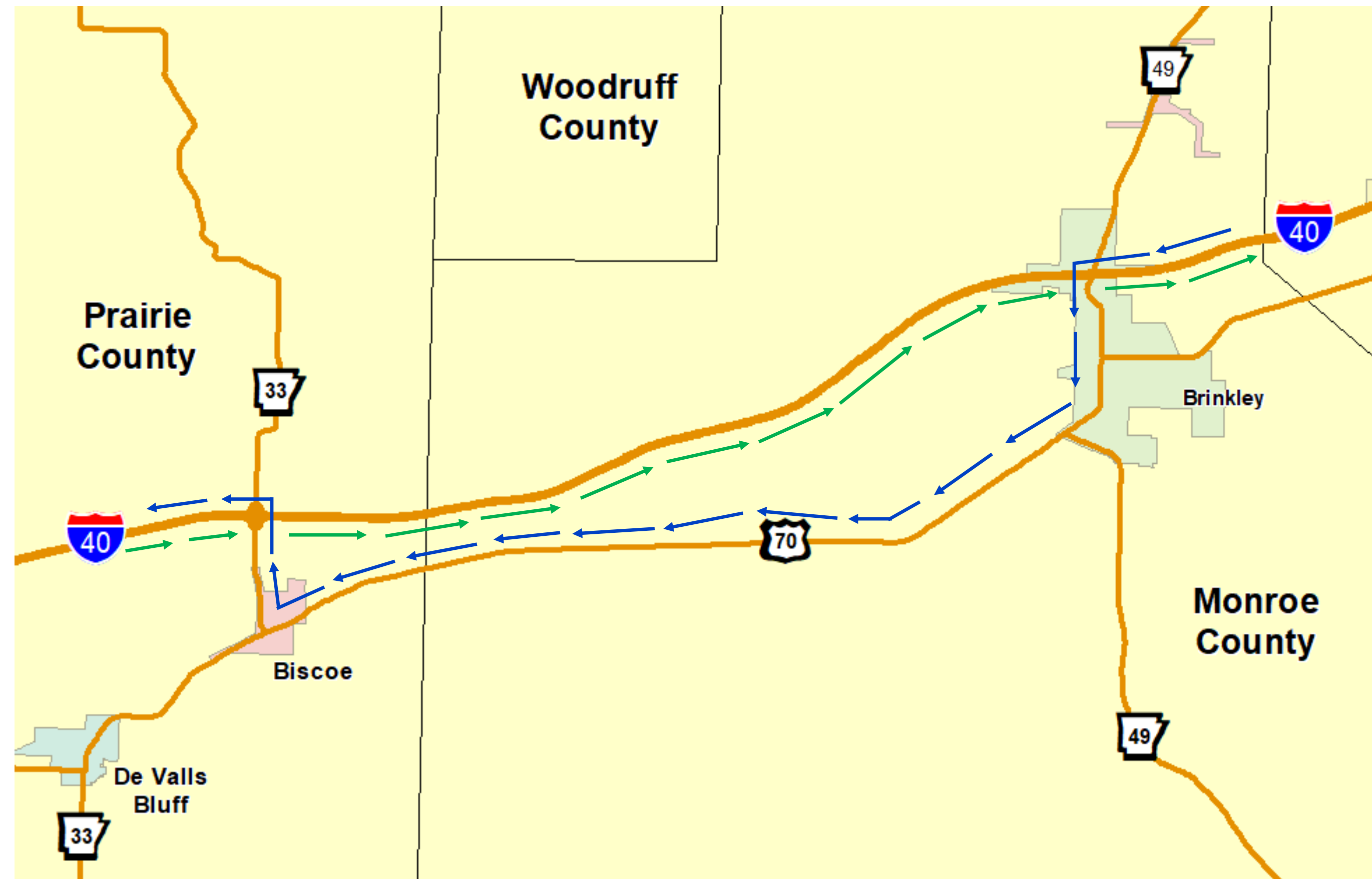
Digital Way-Finding Signs

- Provided LED Signs at the I-40 Ramps and at the intersections of the connecting routes at Hwy 70
- Challenges
 - Alternate signal timings
 - Way Finding DMS displays
 - Voltage drop calcs



Recap of ATMS

- Large DMS to guide and inform road users
- Way Finding DMS's to re-route
- Alternate signal timings
- TMC with ATMS software



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Questions?