

I-670 SmartLane – Ohio's first ATM System



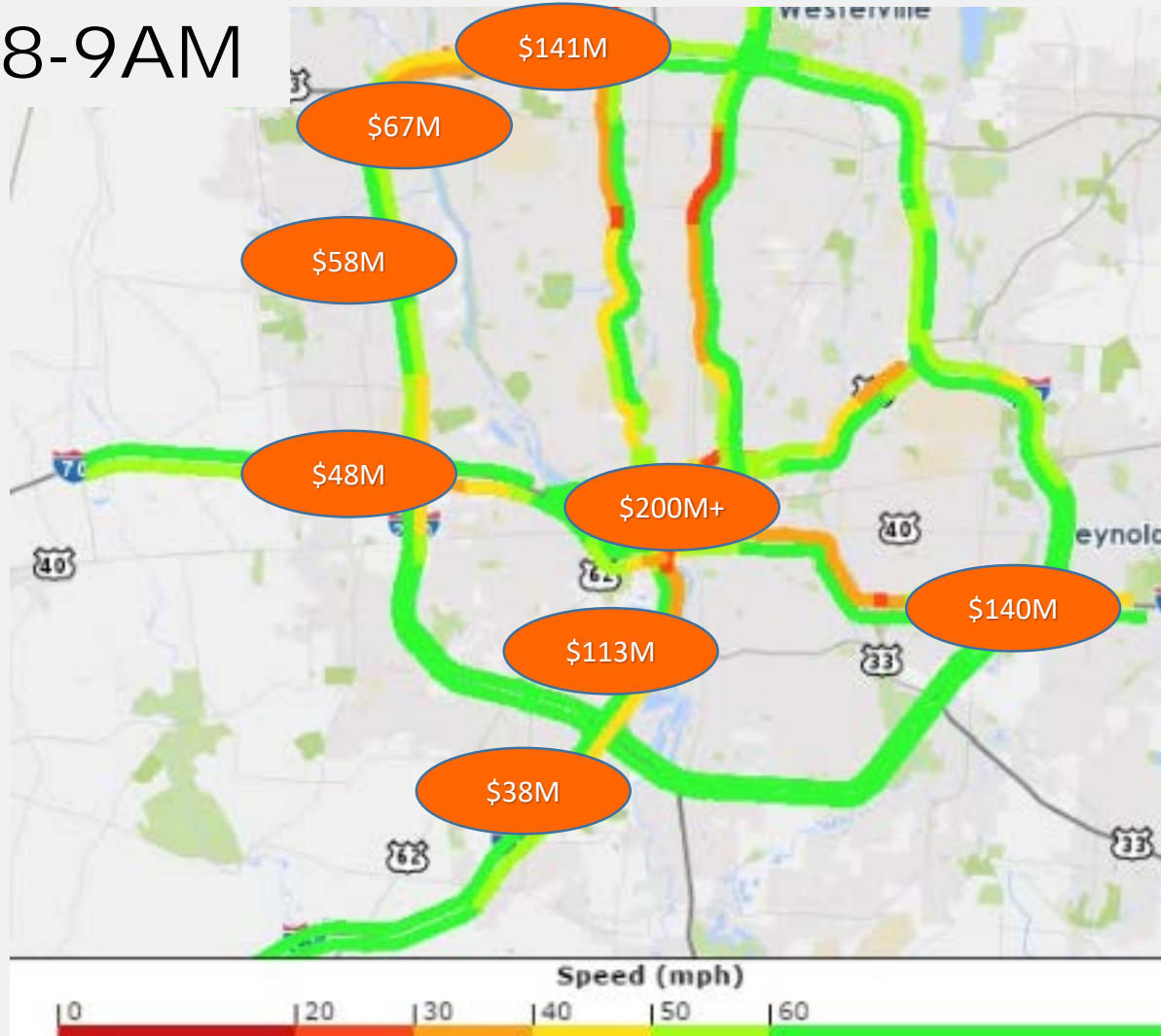
Shane Campbell, PE
Transportation Manager



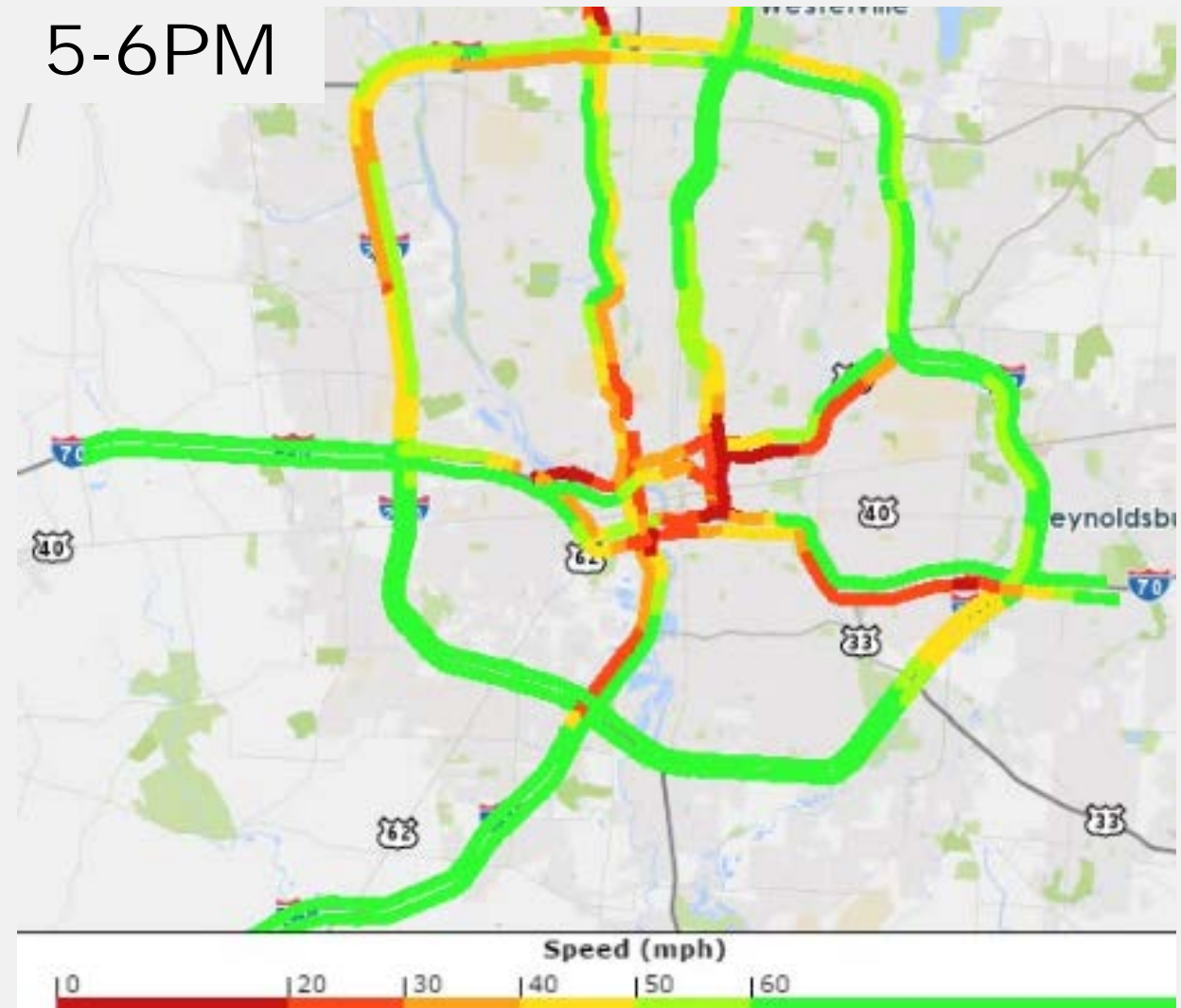
*Excellence Delivered **As Promised***

Heat Maps & Traditional Capacity Expansion

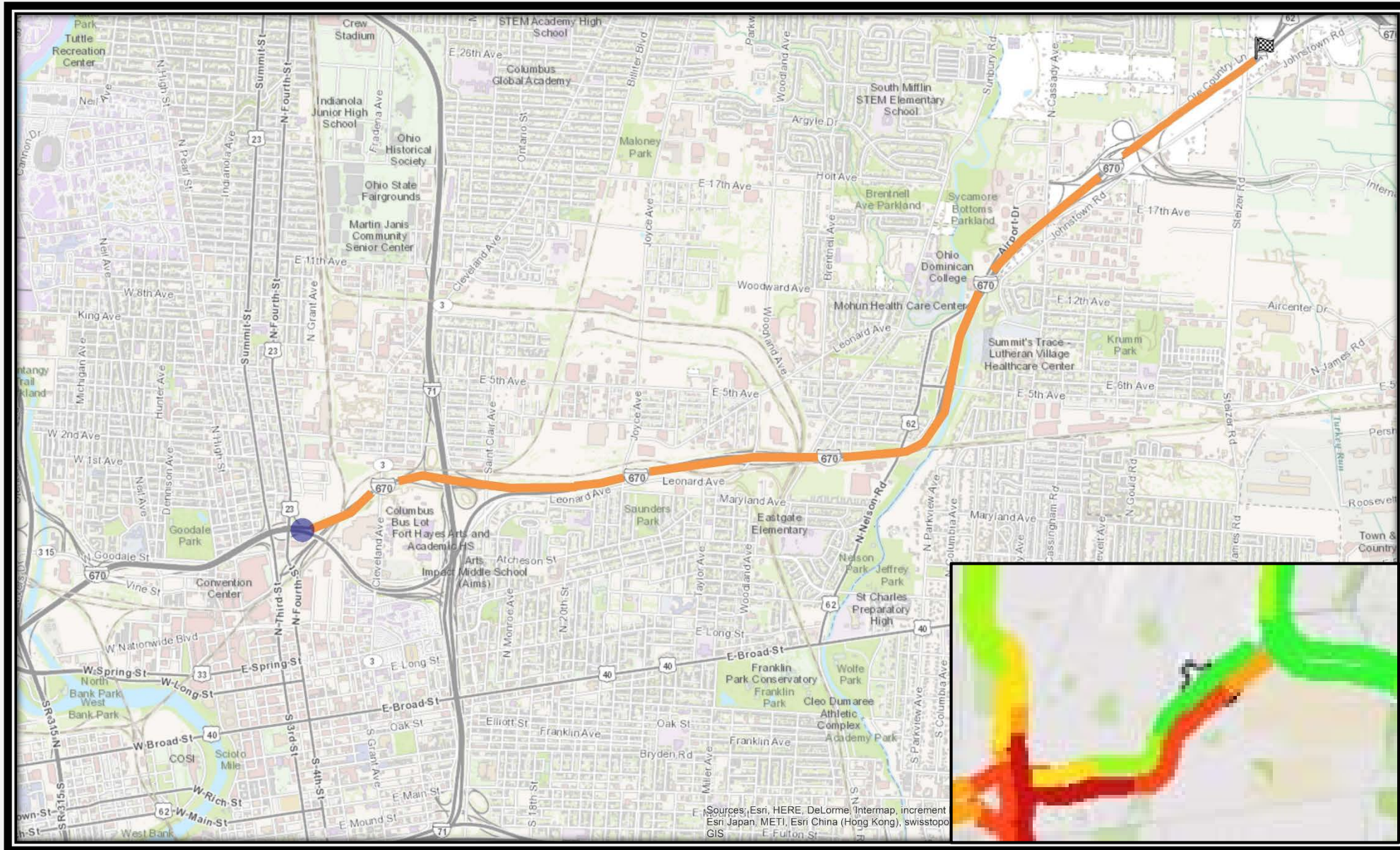
May-October 2015 (Tues-Thurs), Average Speed of All Lanes
8-9AM



5-6PM



I-670 EB Congestion



I-670 EB Average Travel Speeds

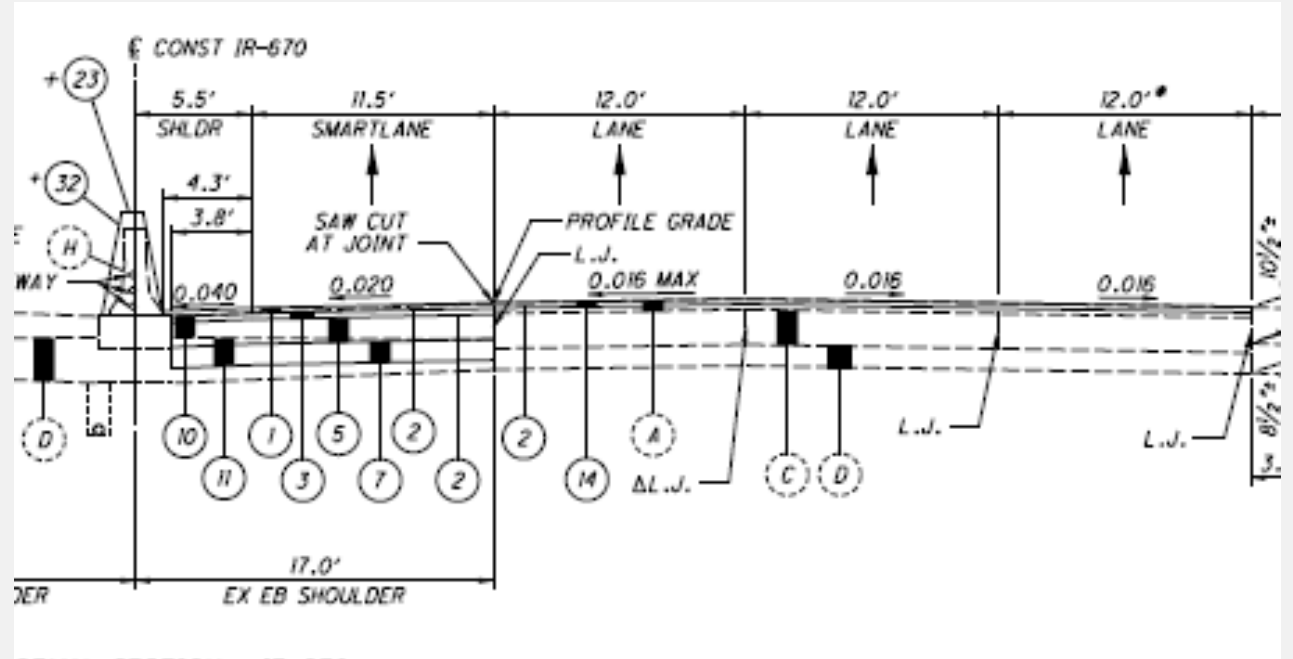
SPEED (MPH)														2016 SUMMER	
Segment	3.97 - 4.66	4.66 - 5.1	5.1 - 5.51	5.51 - 6.07	6.07 - 6.73	6.73 - 7.25	7.25 - 7.69	7.69 - 8.17	8.17 - 8.97	8.97 - 9.31	9.31 - 10.1	10.1 - Ramp	Ramp to 270		
3:00 PM	56.2	61.1	63.5	64.2	66.2	64.0	64.9	63.4	66.2	65.5	63.7	61.4	61.7		
3:05 PM	56.3	61.6	63.1	64.0	66.1	63.6	64.4	62.8	66.0	65.3	63.7	61.5	61.8		
3:10 PM	56.2	61.4	62.5	63.6	65.7	63.0	63.7	62.5	65.8	64.9	63.5	61.5	61.4		
3:15 PM	56.2	61.3	62.2	63.3	65.3	62.4	63.2	61.8	64.9	64.4	62.9	60.6	60.6		
3:20 PM	55.7	61.1	61.5	62.5	64.2	61.5	62.2	61.1	64.1	63.6	62.0	59.8	58.9		
3:25 PM	55.8	61.0	61.3	61.9	63.7	61.4	61.9	61.1	64.0	63.0	61.3	59.0	57.3		
3:30 PM	55.7	60.9	61.0	61.5	63.7	61.2	61.8	60.7	63.5	62.1	60.9	58.3	56.4		
3:35 PM	55.9	60.6	60.5	61.5	63.6	61.0	61.2	60.3	62.3	60.7	60.3	58.2	56.2		
3:40 PM	56.0	60.5	59.5	60.1	61.7	59.3	59.6	58.8	61.1	59.7	59.6	57.7	55.6		
3:45 PM	55.9	60.1	57.2	55.9	56.4	55.2	56.7	56.5	59.2	57.9	57.9	55.8	52.1		
3:50 PM	55.6	60.2	51.9	49.1	50.3	51.1	53.4	54.3	57.2	55.7	56.5	54.5	49.1		
3:55 PM	55.7	60.2	49.6	45.4	46.9	48.8	51.9	52.9	55.2	53.7	55.1	53.0	47.3		
4:00 PM	55.8	60.1	48.6	44.0	45.6	48.7	51.7	52.5	54.2	52.9	54.5	52.7	46.8		
4:05 PM	55.6	59.5	48.2	43.6	45.2	48.3	51.5	52.7	54.2	52.2	54.0	53.4	47.9		
4:10 PM	55.1	58.6	44.2	41.8	43.9	47.3	51.5	52.3	53.6	51.3	53.7	52.5	46.0		
4:15 PM	54.9	57.2	39.0	38.3	41.9	45.9	49.7	51.0	52.2	49.6	51.6	50.1	40.7		
4:20 PM	54.4	56.1	34.9	35.1	38.4	42.6	46.6	48.6	48.2	45.1	47.9	46.7	35.5		
4:25 PM	54.1	54.8	32.4	33.1	35.4	39.6	42.7	45.0	43.3	40.6	44.6	45.1	32.4		
4:30 PM	53.1	53.8	30.6	30.8	33.1	37.6	40.2	42.4	39.6	36.2	42.3	45.1	30.7		
4:35 PM	51.8	53.2	31.9	30.2	31.5	36.0	38.3	40.0	37.5	34.1	41.6	44.8	31.6		
4:40 PM	51.2	52.9	31.6	30.3	30.3	34.2	36.5	38.3	35.6	32.8	40.3	44.2	31.2		
4:45 PM	51.0	52.9	29.6	28.8	28.2	32.4	34.5	36.5	32.6	30.1	38.7	43.6	30.3		
4:50 PM	50.8	53.6	27.7	27.5	27.1	31.3	32.8	34.7	30.4	29.3	37.8	42.5	28.1		
4:55 PM	50.9	53.5	27.2	27.4	27.3	30.5	31.2	32.8	29.9	29.0	36.4	43.3	27.6		
5:00 PM	50.1	52.4	28.2	27.9	27.0	29.5	30.1	32.0	29.0	28.5	35.4	43.2	26.9		
5:05 PM	50.2	51.7	29.2	28.7	28.7	29.4	29.8	32.1	28.3	27.3	35.8	43.4	27.3		
5:10 PM	50.4	53.2	30.9	30.3	27.0	29.7	30.5	31.6	27.1	26.1	34.8	42.1	26.6		
5:15 PM	50.3	52.4	29.8	29.9	28.7	29.8	29.9	30.6	25.3	24.7	33.2	41.2	24.9		
5:20 PM	49.7	52.6	30.6	29.4	28.3	29.3	28.3	28.3	22.6	22.5	31.3	39.6	23.3		
5:25 PM	49.7	52.2	29.9	29.7	25.8	27.8	26.4	26.5	21.3	21.1	29.6	39.2	22.5		
5:30 PM	49.3	53.4	31.7	29.9	25.5	26.6	24.8	25.7	21.3	20.8	29.4	39.4	22.6		
5:35 PM	48.4	53.5	34.1	30.8	25.8	27.2	25.2	25.6	21.4	21.1	30.0	39.3	23.7		
5:40 PM	49.6	53.7	37.8	33.5	27.7	28.7	26.7	26.7	22.4	22.2	31.4	40.5	24.8		
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6:50 PM	55.6	59.7	61.9	64.2	66.5	63.5	64.4	63.1	64.8	64.0	62.5	60.1	59.1		
6:55 PM	55.8	59.7	62.6	64.7	66.6	64.0	65.2	63.7	65.5	64.8	63.3	60.5	59.9		
7:00 PM	55.9	60.0	63.6	65.9	67.1	64.7	65.0	63.9	65.4	65.0	63.8	61.3	61.2		
7:05 PM	55.3	60.1	63.2	66.3	67.4	64.9	65.3	64.1	66.1	65.7	64.0	61.7	61.8		
7:10 PM	55.0	59.9	62.5	66.0	67.4	65.1	65.5	64.3	66.7	66.0	64.3	62.0	62.1		
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7:20 PM	54.9	60.3	62.4	66.5	67.8	65.5	65.5	64.8	66.9	66.2	64.5	61.9	62.5		
7:25 PM	54.7	60.4	62.5	66.6	67.8	65.5	65.5	64.9	66.9	66.4	64.5	62.0	62.5		
7:30 PM	54.2	60.1	62.9	66.1	67.5	65.3	65.6	64.7	66.9	66.5	64.9	62.5	62.7		

TSMO Strategy: Hard Shoulder Running



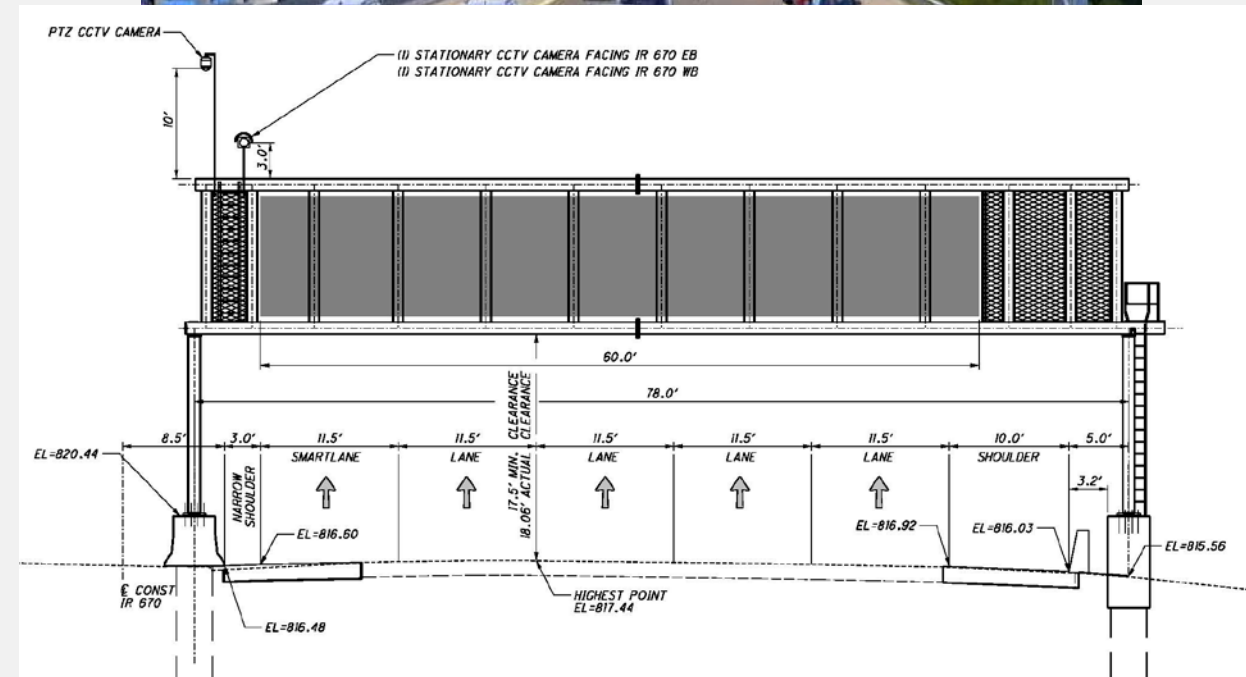
SmartLane – Overview

- Left side (inside) operation
- Existing shoulder width: 14-17 ft
- Reconstructed shoulder pavement
- SmartLane width: 11.5 ft
- SmartLane shoulder width: 3-4 ft
- Corrected SmartLane cross slope
- Initially time of day operation
- Legal speed: 65mph to 45mph
- ATP to Tracings in nine months
- Construction is ongoing.
- SmartLane to open fall 2019



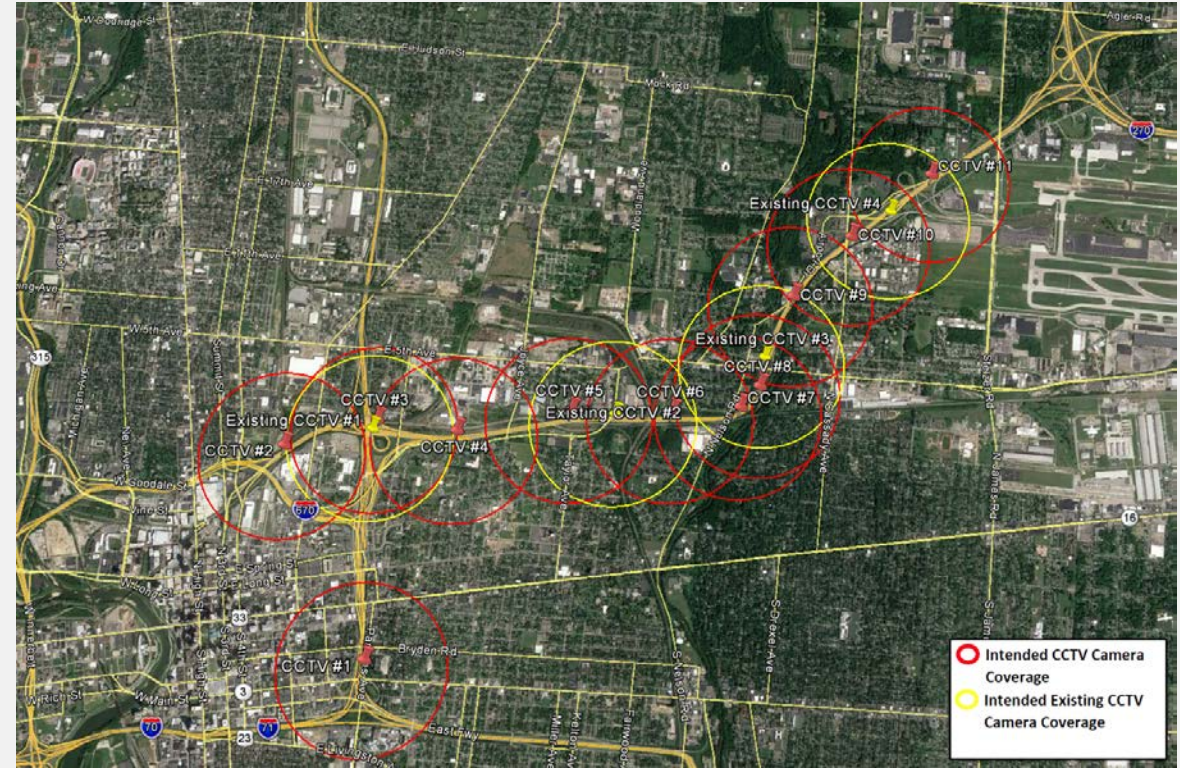
SmartLane – ITS Design Requirements/Summary

- 86,000' of 24, 48, 72, & 288 perm. fiber
- Nine full color matrix DMS
 - Longest DMS – 60' seamless
 - Eight truss gantry structures
 - Longest structure – 83' span
 - One cantilever structure
- 17 CCTV PTZ and stationary cameras
- Nine side fired radar detectors
- Nine post mounted VSLs
- Two amber pedestal mounted DMS
- 17 new power services



SmartLane – HSR ITS Design Best Practices

1. Engage FHWA early to complete systems engineering analysis per CFR 940.
2. Develop a traceability matrix of detailed requirements for design and testing
3. Require a Conceptual ITS Device Location Report.
4. Identify horizontal and vertical clearance constraints/design exceptions
5. Begin stakeholder and vendor outreach during conceptual design



SmartLane – HSR ITS Design Best Practices

6. Confirm sign access preferences (rear, front, or walk-in)
7. Design similar sign structures for fabrication efficiencies
8. Verify DMS and gantry lead time
9. Consider placing temporary ITS plan on contractor (if applicable)
10. Build off industry practices and standards as much as possible.



SmartLane – HSR ITS Design Best Practices

11. Designate an owner representative to be involved in procuring new power services.
12. Require ITS devices to be compatible with ATMS software.
13. Don't overlook incident management as part of the ATMS rule set.
14. Prepare an educational outreach plan
15. Be aware of MUTCD, experimental, and behavioral study constraints/processes.



Lane open



Lane closed



Merge left



Merge right



Merge left or right

What is a SmartLane? It's a shoulder that is available as a travel lane during rush hour to reduce congestion. The SmartLane uses technology to control access, speed limits and communicate with the motoring public.

When is ODOT getting a SmartLane? ODOT kicks off a project in June 2018 that will create a SmartLane on the east side of Columbus on Interstate 670 eastbound and make improvements to the interchange of I- 670 & 270.

SmartLane Project Details

- Pilot project will use the SmartLane for eastbound travel on I-670
- Westbound I-670 and other areas around the state are under consideration
- The I-670 SmartLane begins just east of I-71 and ends just before I-270
- The SmartLane is available for just over six miles on I-670 eastbound
- In use only during the hours of 3:30 to 6:30 PM Monday thru Friday
- Install 45 cameras to monitor traffic conditions 24/7 along the route
- Install nine overhead signs to inform drivers when the SmartLane is open or closed
- GREEN ARROW** on the overhead sign means the SmartLane is OPEN
- RED X** on the overhead sign means the SmartLane is CLOSED
- Utilize variable speed limits - 45 mph when SmartLane is open - to keep traffic at a constant speed, reducing the slow/go effect

SmartLane Benefits

- Delays are reduced by 25%
- More reliable travel time; less buffer needed for commute
- Improved incident management communications by using digital signage to inform drivers in advance of an incident
- Only available for eastbound traffic during the afternoon when congestion's the worst
- Avoids the high cost and impact of constructing a new lane

Fast Facts

2015: ODOT studies congestion statewide and uses innovation and technology to solve the issue

2016: I-670 EB selected as the pilot project

2017: Detail design and public outreach

2018: Construction starts

2019: I-270/670 interchange complete and SmartLane open

GREEN ARROW: SmartLane is OPEN

RED X: SmartLane is CLOSED

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by ODOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 11, 2015, and executed by FHWA and ODOT.

SmartLane – Contact Information

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OHIO DEPARTMENT OF
TRANSPORTATION