



*Delaware Department  
of Transportation*

# Low Cost, High Benefit, Quick Turnaround Upgrades on SR 1

# Agenda

- \* Overview of SR 1 Widening Project
- \* Short-Term Ideas
  - \* Re-Striping Projects
  - \* Construction Projects
- \* Summary

# Project Limits

- \* SR 1, North of SR 273 to Roth Bridge



# Purpose & Need

- \* Address congestion
- \* Improve system connectivity
- \* Improve local access
- \* Improve safety
- \* Ensure emergency access & evacuation

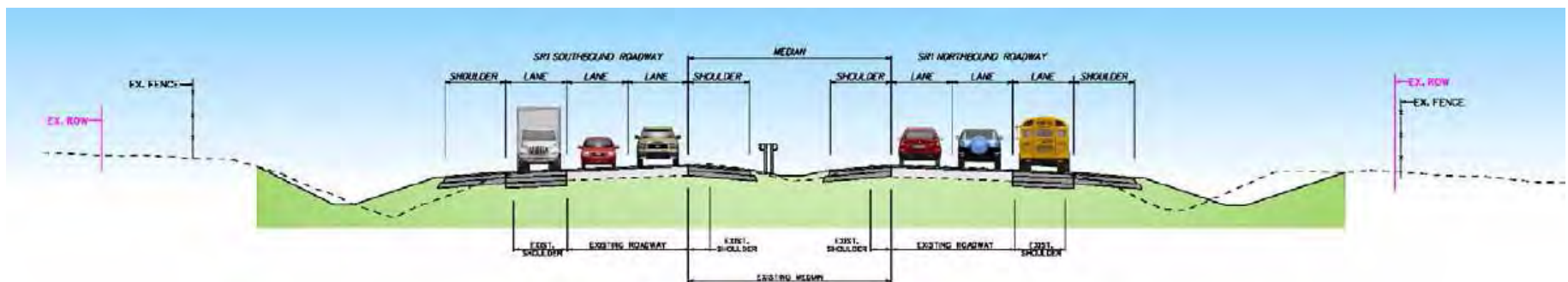


# Long-Term Alternatives

- \* Add lanes &
- \* Upgrade interchanges

..... Will take *MANY* years to implement!

..... And is *VERY* expensive (\$200M+)!



**SR 273 TO TYBOUTS**  
OUTSIDE / OUTSIDE WIDENING

# Short Term Ideas?

## Purpose & Need

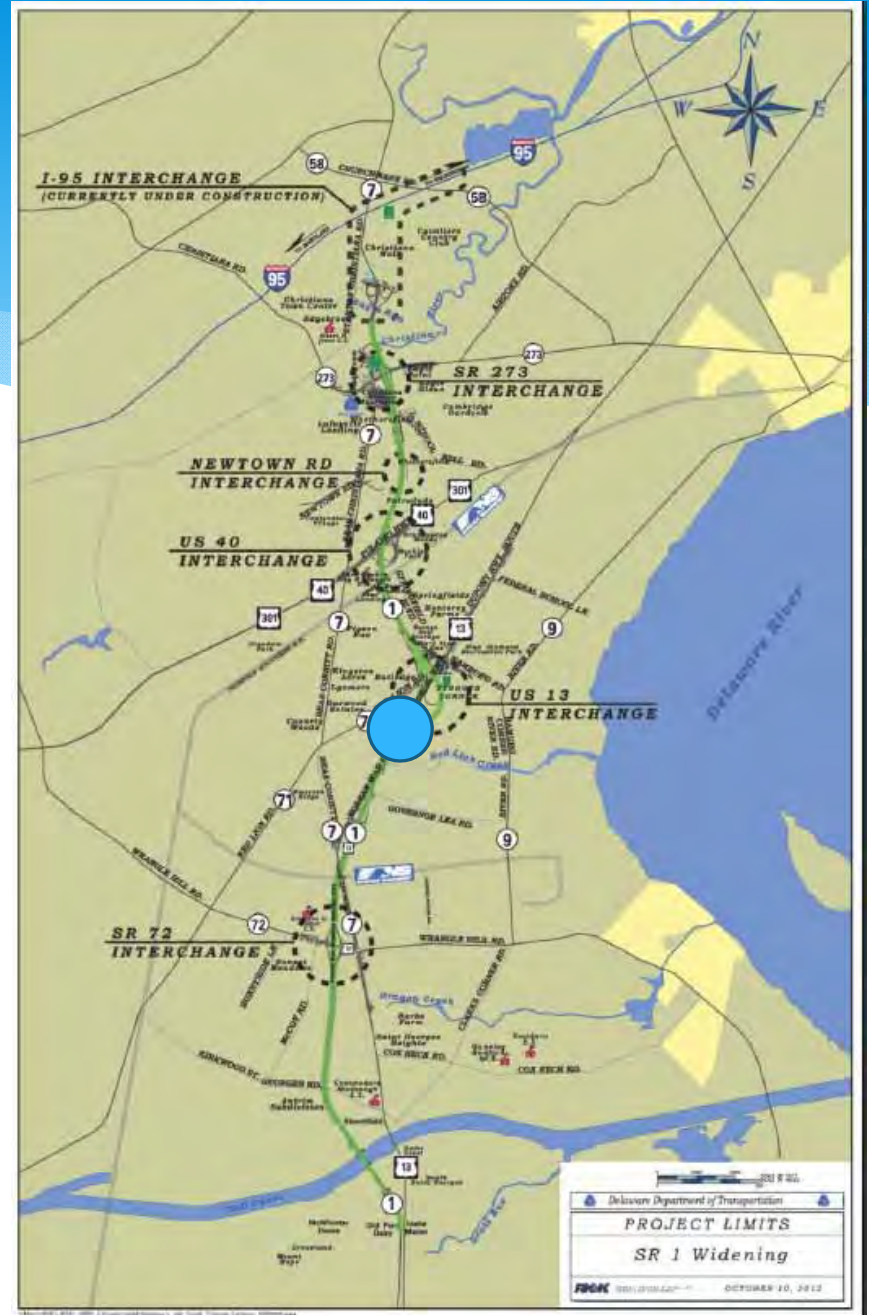
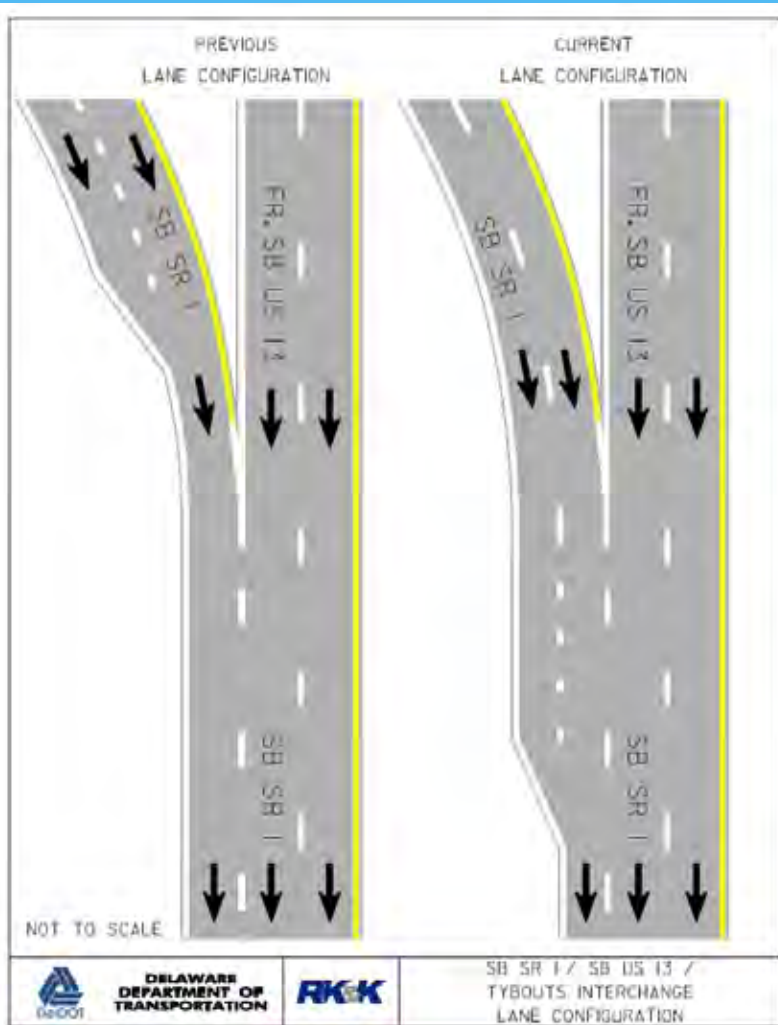
- \* Address congestion
- \* Improve system connectivity
- \* Improve local access
- \* Improve safety
- \* Ensure emergency access & evacuation



# Short Term Ideas . . .

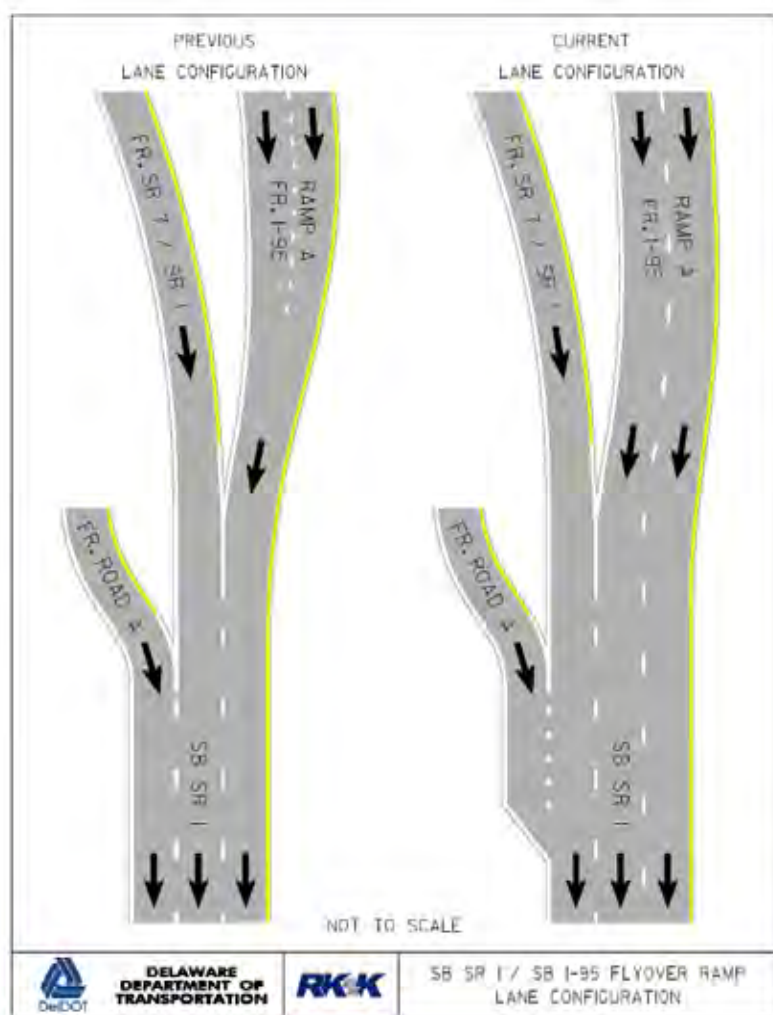
- \* Lane Re-Striping, SR 1 SB Merge with US 13 SB
  - \* Completed 2012
- \* Lane Re-Striping, SR 1 Flyover SB to SR 1 SB
  - \* Completed 2014
- \* SR 1 Auxiliary Lane, US 40 to SR 273
  - \* Completed 2015
- \* SR 1 / SR 72 DDI
  - \* D-B Contract Awarded Dec. 2015

# Re-Striping





# Re-Striping



SR 1 Auxiliary Lane, US 40 to SR 273

# Shailen Says: “I want Ramp Metering!”



- \* February 2014 “request”
- \* March – June 2014 – analysis
- \* August 2014 – switch to “hard shoulder running”
- \* August – December 2014 – additional analysis, alternatives, concept design
- \* January 2015 – final decision on concept to move ahead

# Hard Shoulder Running

SR 1 Northbound Improvements			
"Year of Opening" CORSIM Results Summary - 2016 AM Peak			
Condition	Delay Per Vehicle	Queue (mi)	User Cost Savings Per Year*
No Build	3 minutes	1.25	0
1,200 foot Acceleration Lane	2 minutes	0.75	\$400,000
Full Auxiliary Lane - US 40 to SR 273	20 seconds	0	\$1,000,000
Full Auxiliary Lane - US 40 to Christina River Bridge	Free Flow	0	\$1,200,000

\* Compared to No-Build condition in 2016

SR 1 Northbound Improvements			
"10-Year Horizon" CORSIM Results Summary - 2025 AM Peak			
Condition	Delay Per Vehicle	Queue (mi)	User Cost Savings Per Year^
No Build	15 minutes	5.9	0
A: 1,200 foot Acceleration Lane	14 minutes	5.8	\$700,000
B: Full Auxiliary Lane - US 40 to SR 273	3 minutes	1.7 <sup>#</sup>	\$8,000,000
C: Full Auxiliary Lane - US 40 to Christina River Bridge	Free Flow	0	\$10,500,000

^ Compared to No-Build condition in 2025

# Queue starts at diverge to SR 273

# Hard Shoulder Running

SR 1 Northbound Improvements Summary of CTP Cost Estimates	
Condition	CTP Cost
No Build	\$0
A: 1,200 foot Acceleration Lane	\$600,000
B: Full Auxiliary Lane - US 40 to SR 273	\$4,800,000
C: Full Auxiliary Lane - US 40 to Christina River Bridge	\$8,600,000

# Details of SR 1 Auxiliary Lane Project

- \* 1.75 Miles of auxiliary lane
- \* \$ 2.1M in construction costs
- \* 70 days for construction
- \* Separate sign structure materials contract

# Final Project timeline

- \* Initiated work December 2014
- \* Preliminary Plans March 2, 2015
- \* NEPA cleared May 26, 2015
- \* Project initiation approved FHWA April 10, 2015
- \* STIP MOD approved by WILMAPCO May 7, 2015
- \* Final Plans May 29, 2015
- \* Advanced Sign Structure contract Advertise– June 2015
- \* SR 1 Auxiliary Job PS&E – June 30, 2015
- \* Advertised July 23, 2015
- \* Award August 28, 2015
- \* Completed November 22, 2015

# Innovation for Acceleration

- \* Smaller More Efficient
  - \* Independent Utility
  - \* Crafted Project Around Constraints
  - \* Provided Secretary with a plan to have it built and open by end of 2015
- \* Long Lead items - Separate Procurement contract for the sign structure
- \* Utilize SWM options to reduce/eliminate right of way needs



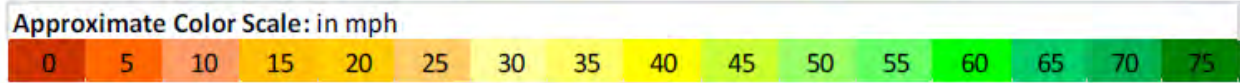
# Results . . .

- \* Reduced length of queue
- \* Reduced time of congestion
- \* Average peak travel time reduced 43%
- \* Many compliments

**FIGURE 2 - SPEED DATA DASHBOARD FOR MAINLINE – BEFORE CONDITIONS**  
 (September 8-10&15-17, 2015)



	5:00 AM	5:15 AM	5:30 AM	5:45 AM	6:00 AM	6:15 AM	6:30 AM	6:45 AM	7:00 AM	7:15 AM	7:30 AM	7:45 AM	8:00 AM	8:15 AM	8:30 AM	8:45 AM	9:00 AM	9:15 AM	9:30 AM	9:45 AM	10:00 AM
RT1 AT CHRISTIANA MALL	No Data Available																				
SR1 @ SR 273	67.6	66.5	66.1	66.1	64.5	62.7	58.7	55.4	54.1	53.9	56.6	57.6	57.9	57.8	58.0	56.5	58.2	63.5	63.9	64.0	63.9
DE1 AT CHRISTIANA MEADOWS	68.6	67.5	67.1	66.7	65.2	63.4	52.5	42.5	43.5	42.3	39.8	44.4	45.8	47.3	47.9	45.2	50.8	63.1	64.0	64.3	65.2
DE1 NORTH OF US40	68.3	67.2	67.1	67.0	65.4	63.8	55.6	28.4	29.4	22.8	21.8	22.3	22.3	23.3	27.5	36.6	57.3	66.2	65.6	65.9	66.1
DE 1 AT BEAR RD	70.4	69.4	69.5	69.2	68.1	66.7	62.9	35.2	33.3	27.4	25.0	26.1	27.7	28.8	31.7	48.2	64.3	67.4	66.9	67.6	68.1
DE 1 AT SPRINGFIELDS BLVD	67.6	66.6	66.9	66.4	65.1	63.5	61.0	33.3	30.2	22.5	18.3	20.9	22.6	23.5	30.8	48.8	62.7	65.0	64.6	64.8	65.2
DE 1 AT DE1-US13 SPLIT EXIT 156.N	68.9	68.5	68.7	68.0	67.0	65.1	62.5	54.7	48.5	44.3	41.8	42.7	48.5	58.1	61.4	61.6	67.3	67.4	67.1	67.7	67.4



**FIGURE 3 - SPEED DATA DASHBOARD FOR MAINLINE – AFTER CONDITIONS**  
 (December 1-3, 2015)

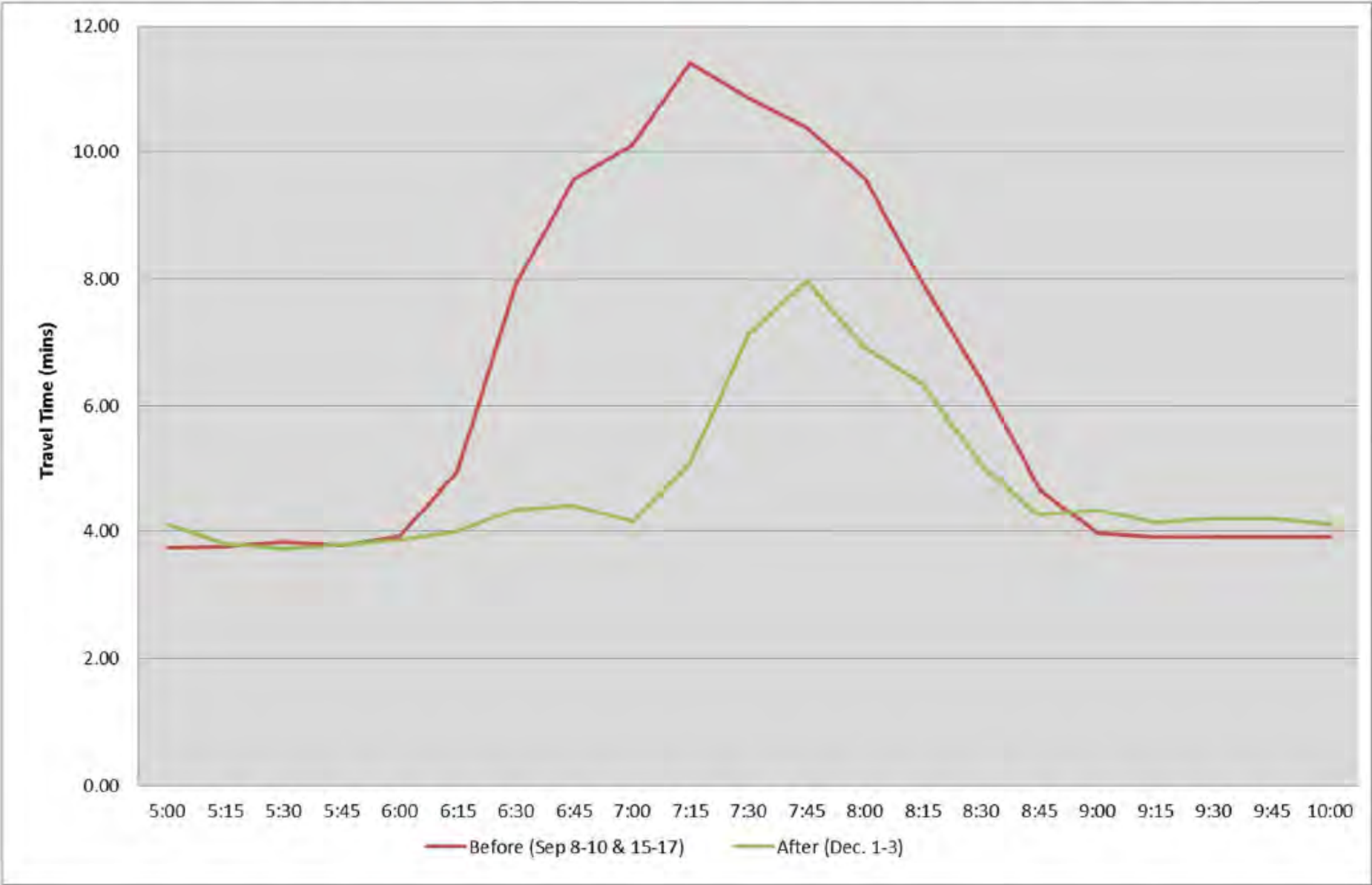


	5:00 AM	5:15 AM	5:30 AM	5:45 AM	6:00 AM	6:15 AM	6:30 AM	6:45 AM	7:00 AM	7:15 AM	7:30 AM	7:45 AM	8:00 AM	8:15 AM	8:30 AM	8:45 AM	9:00 AM	9:15 AM	9:30 AM	9:45 AM	10:00 AM
RT1 AT CHRISTIANA MALL	53.6	54.1	53.3	54.1	54.3	53.4	52.6	52.6	52.2	51.5	46.5	46.7	51.4	49.8	50.6	51.1	51.7	51.6	52.0	52.1	52.2
SR1 @ SR 273	64.9	65.2	65.0	65.8	65.2	64.2	59.8	56.3	60.1	54.3	50.5	46.6	56.2	58.4	55.4	57.8	61.7	61.8	61.0	61.3	61.5
DE1 AT CHRISTIANA MEADOWS	65.7	65.4	65.5	66.5	65.8	64.4	59.9	56.4	60.5	49.5	42.7	33.1	49.1	56.7	54.0	58.1	60.0	60.6	60.0	61.0	60.8
DE1 NORTH OF US40	63.4	62.6	64.6	64.2	64.6	62.3	56.5	55.4	56.9	47.5	26.9	33.2	18.0	31.9	46.3	60.4	59.6	60.9	60.3	62.2	61.3
DE 1 AT BEAR RD	67.4	67.0	67.8	68.1	67.4	66.5	63.3	63.1	64.0	58.0	42.2	40.4	47.3	51.0	58.8	64.6	64.4	65.6	64.8	66.7	65.8
DE 1 AT SPRINGFIELDS BLVD	65.7	64.7	65.4	65.7	64.6	63.4	59.8	59.2	61.0	55.7	40.9	38.0	46.1	47.9	58.3	61.2	62.0	63.7	62.7	64.3	63.7
DE 1 AT DE1-US13 SPLIT EXIT 156.N	67.1	67.3	67.5	68.0	66.5	65.3	61.1	56.5	60.5	54.2	50.1	55.7	61.5	61.1	62.4	61.6	64.4	65.5	64.0	65.4	65.4

Approximate Color Scale: in mph



**FIGURE 5 – AVG TRAVEL TIME DASHBOARD FOR ROUTE 1 NB (Sep. to Dec.)**



SR 1 / SR 72 DDI

# What is Design Build ?

## DESIGN-BUILD CONTRACTUAL RELATIONSHIP

### Traditional Project Delivery



Owner must manage two separate contracts; owner becomes middleman, settling disputes between the designer and the contractor. Designer and contractor can easily blame one another for cost overruns and other problems.

VS

### Design-Build Project Delivery



Owner manages only one contract with a single point of responsibility; designer and contractor are on the same team, providing unified recommendations. Changes are addressed by design-build entity, not used as excuses.



## Diverging Diamond Interchange Informational Guide

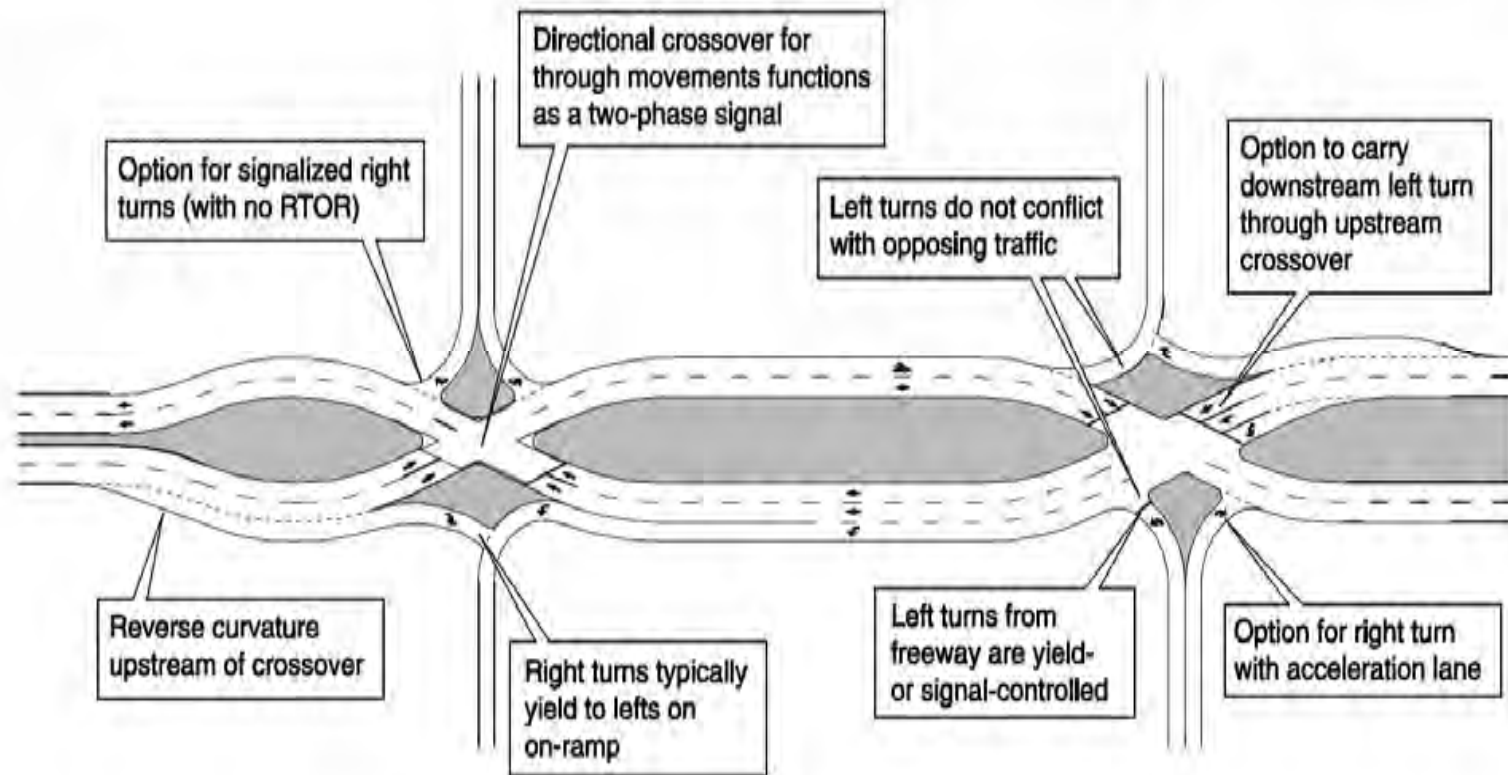
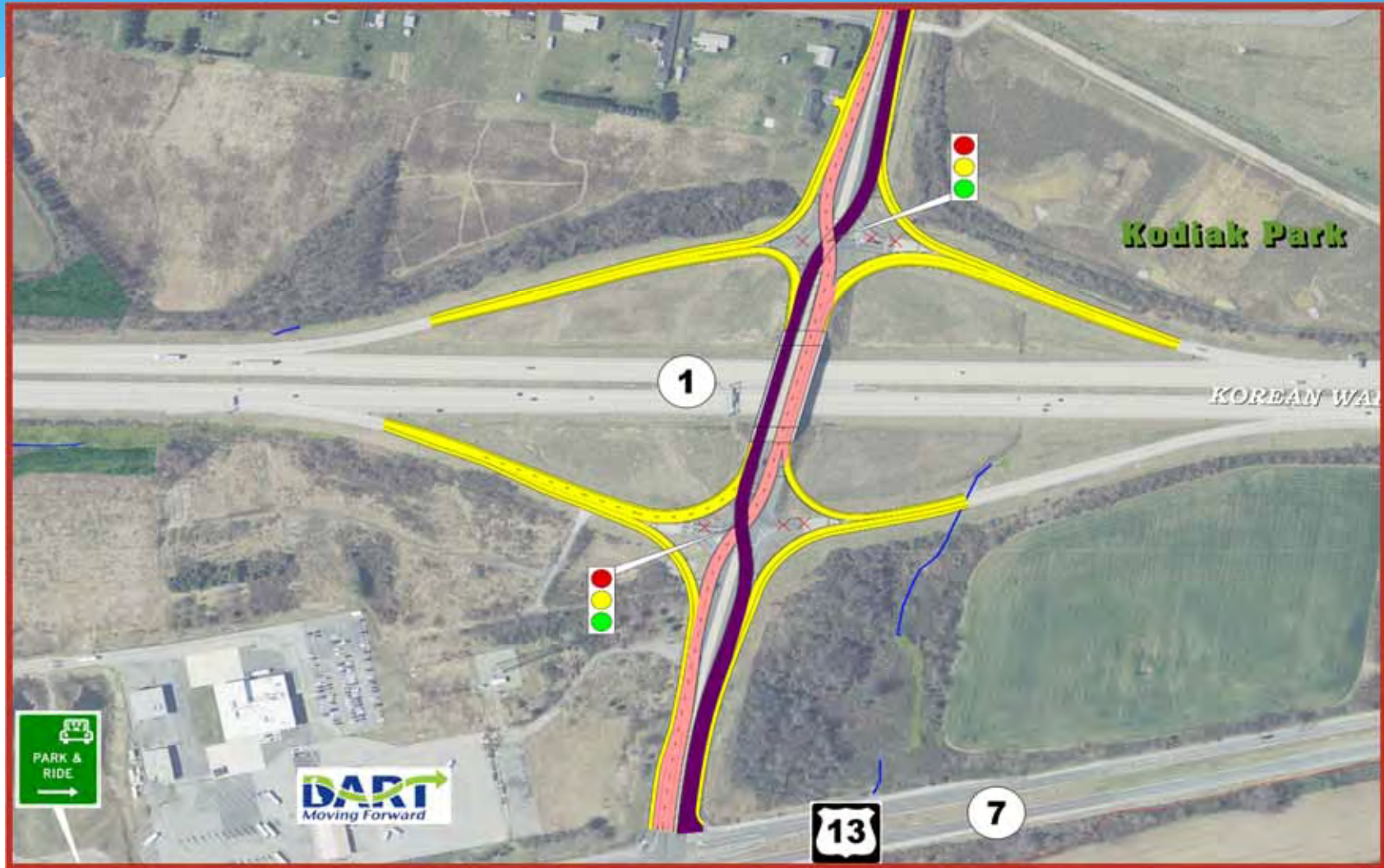


Exhibit 1-1. Key characteristics of a DDI.

# SR 1/SR72 DDI Concept





## SR 1/SR72 DDI

- May 2015 - Project RFQ for the Design Build Teams
- August 2015 – Project RFP for the Shortlisted Design Build Teams
- December 2015 – Selection of Design build Team of Diamond Materials and JMT Engineers
  - Based on 3 part criteria of
    - Time ( 33 %)
    - Technical Proposal ( 33%)
    - Cost ( 33 %)

# SR 1/SR72 DDI

- Diverging Diamond Portion of the Project - \$ 4.9 M was within 5 % of Conceptual Estimate
- Design Schedule - Package 1 complete and approved in 2 months.
- Design Schedule - Package 2 complete and approved in 4 months
- Construction to be completed by end of 2016

# Summary

- \* “Find” small projects within big projects
- \* Examples of Performance Based Practical Design
- \* Use of DeIDOT’s extensive traffic data systems



# Thank You!

Mark Luszcz

Chief Traffic Engineer

Delaware Department of Transportation

[Mark.luszcz@state.de.us](mailto:Mark.luszcz@state.de.us)