

# Connected Corridors (Virtual) Face-to-Face Meeting

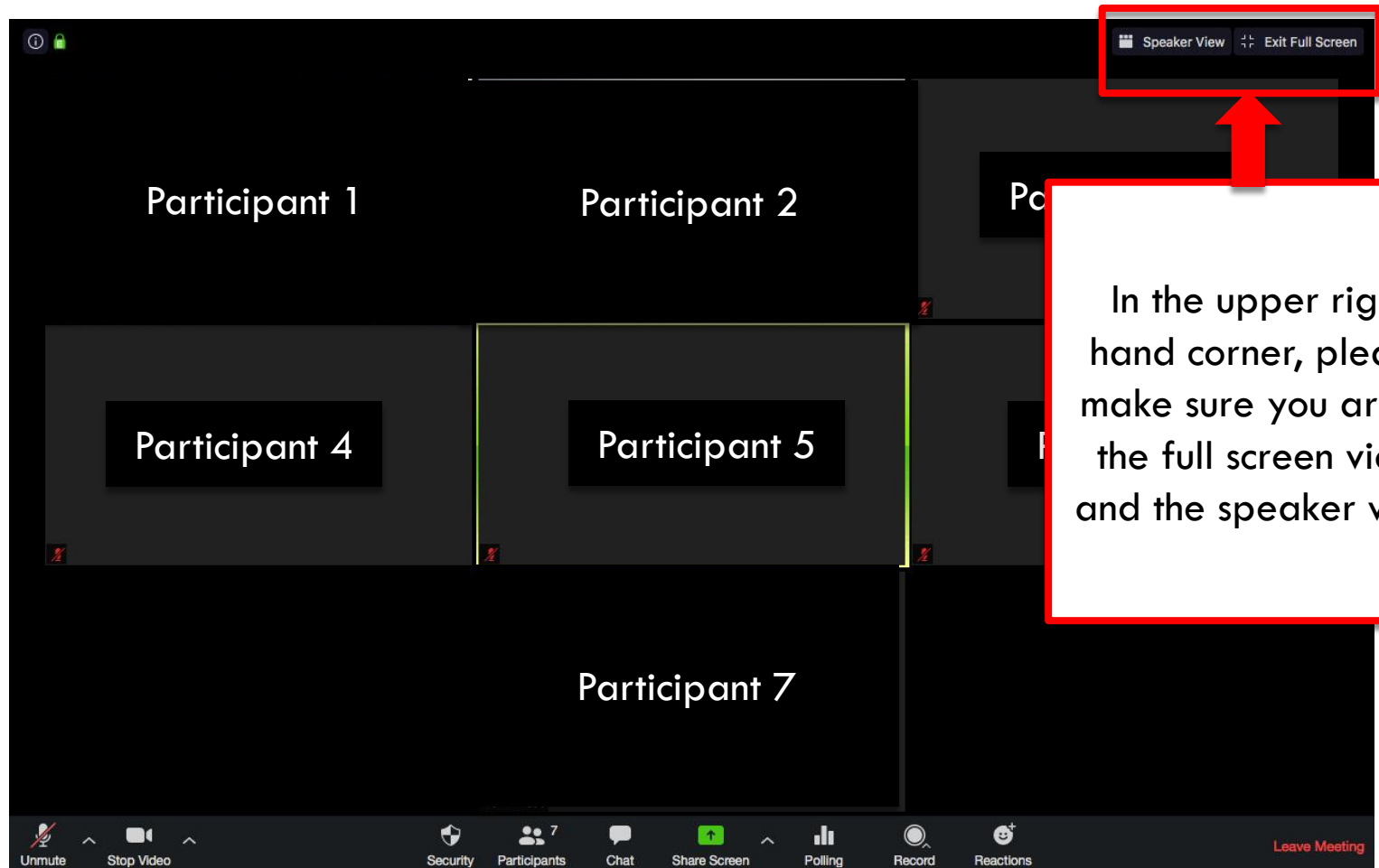
Tuesday, April 28<sup>th</sup>, 2020  
1:30 – 3:30 pm  
via Zoom Video Conferencing

April 28<sup>th</sup>  
2020



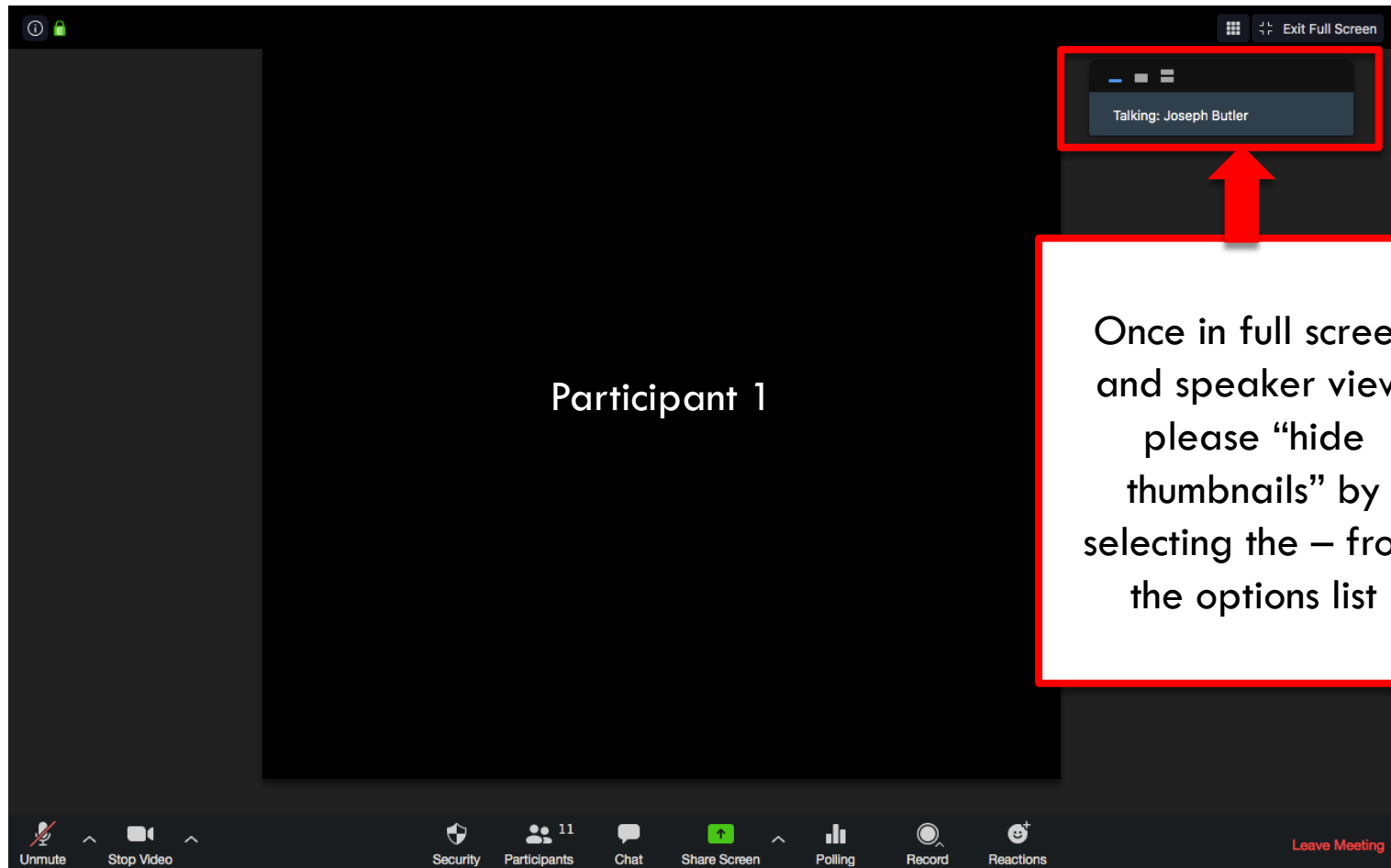
# Zoom Tips

2



# Zoom Tips

3



# Zoom Tips

4

We will be turning off video and muting all participants during the presentation to conserve bandwidth.

Please unmute yourself and turn your video on to ask a question.

Participant 1

Unmute Stop Video

Security Participants Chat Share Screen Polling Record Reactions

Leave Meeting



# Agenda

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- **1:30 - 2:00 – Introduction and Progress Summary**
- **2:00 - 2:20 – Call for Projects Update**
- **2:20 – 2:40 – Kapsch Update and Demo**
- **2:40 – 3:15 – CC ICM System Demo**
- **3:20 – 3:30 – Closing**
  - ▣ **Next Meeting - Tuesday June 9th**

Note: Meeting location sequence Monrovia, Duarte, LA Metro, Caltrans TMC, County, Arcadia, Pasadena



# Zhongren Wang, Office Chief of System Performance, Caltrans HQ

6

- **Experienced Caltrans engineer with a demonstrated history of working in the civil engineering industry**
- **Skilled in traffic management, pavement management and other transportation-related areas**
- **20 years with Caltrans**
- **Holds a Ph.D. degree in transportation engineering from University of Tennessee-Knoxville and authored numerous published papers**



# Joe is Retiring 07/01/2020 – a party at the first opportunity

7

- There will be a celebration when it is safe to do so.

July 2020						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

- Previously envisioned location: Imperial

Western Brewing

In Union Station

800 N. Alameda St.

Los Angeles, CA 90012

- <https://www.imperialwestern.com>

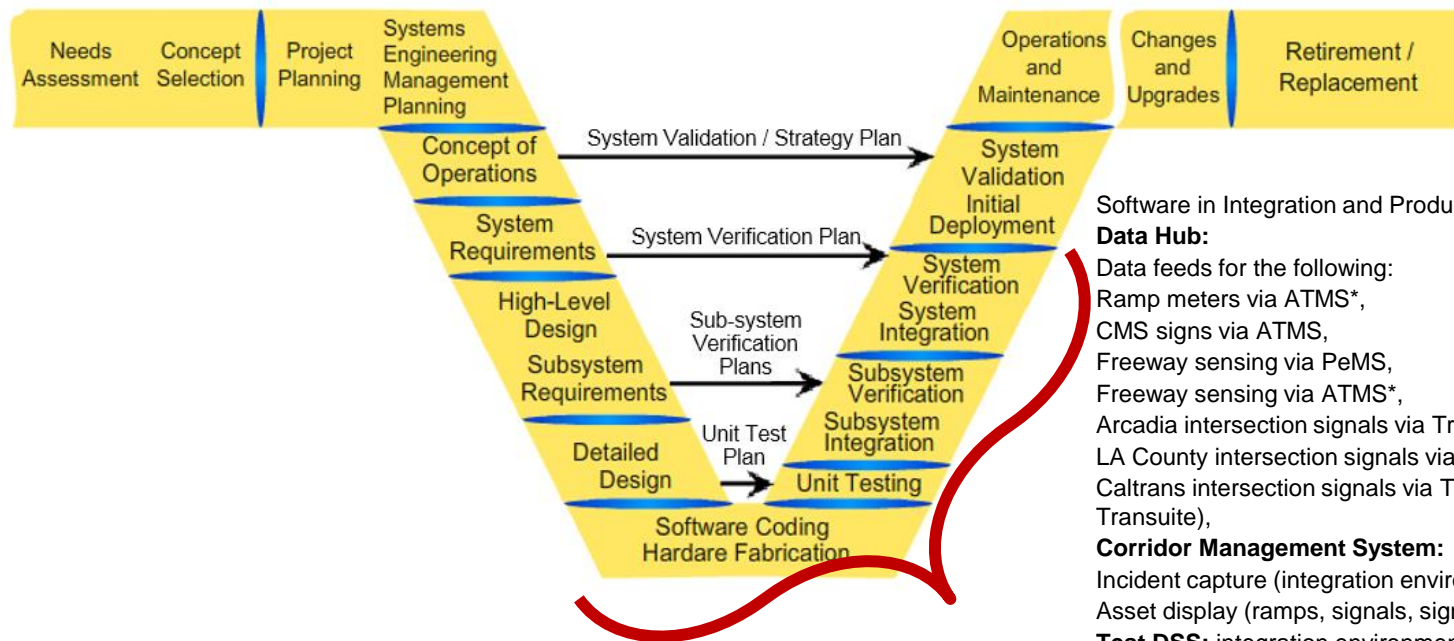


# I-210 Pilot Implementation Project Progress Summary



# Systems Engineering Status

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Software in Integration and Production environments:  
**Data Hub:**

Data feeds for the following:

Ramp meters via ATMS\*,  
CMS signs via ATMS,  
Freeway sensing via PeMS,  
Freeway sensing via ATMS\*,  
Arcadia intersection signals via Transcore Transuite,  
LA County intersection signals via KH Kits,  
Caltrans intersection signals via TSMSS (Transcore Transuite),

**Corridor Management System:**

Incident capture (integration environment only),  
Asset display (ramps, signals, signs).

**Test DSS:** integration environment only.

Note: \* These still need to be verified in production.

# Schedule – Till Launch (Page 1 of 2)

10

- ❑ **Complete Call for Projects Procurement** – Jan 2020
- ❑ **ATMS with CC modifications deployed to Production** – March 2020
- ❑ **Major functions of the Test DSS work with production ATMS incident data** – May 2020
- ❑ **Data Hub configuration and deployment management functions Deployment/Release Hardening** – May 2020
- ❑ **Complete ATMS Modifications** – August 2020
- ❑ **Prediction (Aimsun) running in the cloud** – July 2020
- ❑ **Complete McCain Transparency C2C interface** – July 2020
- ❑ **Loop Data Received by Data Hub from ATMS (currently from PeMS)** – August 2020
- ❑ **Rules Engine (Drools) running in the cloud** – October 2020
- ❑ **All ITS Elements Installed in Field** – Q3-4 2020  
(see CFP Status deck 20200415\_SLD\_I210ASI\_MonthlyStatusMeeting\_v1.pptx #7 “Data Communication Module and Video Detection Software Upgrade”)



# Schedule – Till Launch (Page 2 of 2)

11

- **Integrate Lane Closure System** – **September 2020**
- **All data (except signs) being received** – **November 2020** (bec. of CFP Package #7 ITS elements)
- **Estimation running in the cloud** – **December 2020**
- **Performance Management System Available** – **December 2020**
- **Complete C2C Sign Interfaces** – **February 2021**
- **Complete Version 1.0 System Production Deployment/Release** – **February 2021**
- **System Operational Test and Validation** – **March-May 2021**
- **Before Study** (SMG/Tom Choe, before-after study approach) – **March to May 2021**
- **Launch Pilot** – **May 2021**



# Schedule – Pilot Launch to Pilot Completion

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- **Pilot Launch** – **May 2021**
- **Kapsch** – **May 2021 – September 2021**
- **Parsons** – **September 2021 – January 2022**
- **Interim Benefits Analysis** – **January 2022**
- **Telegra** – **January 2022 – May 2022**
- **After Study** – **March to April 2022**
- **Kapsch** – **June 2022 – September 2022**
- **Procurement of CMS system** – **August 2022**
- **Procurement of Aimsun** – **August 2022**
- **Pilot complete** - **September 2022**



# Planned Accomplishments for May 2020

13

- ❑ **Functions running real-time 24/7**
  - ▣ Capture production **data** from the freeway and arterials
  - ▣ Capture the production freeway **incidents**
- ❑ **Response Plan generation on demand**
  - ▣ Response plan generation using rules engine, estimation and prediction
  - ▣ Historical and real-time modes
  - ▣ Response plans to Corridor Management System - first round trip
- ❑ **Software development**
  - ▣ Create deployment mechanism for test DSS
  - ▣ Add automated tests for TSMSS, McCain Transparency
  - ▣ Additional ATMS testing, preparation for testing of ATMS changes
  - ▣ Containerize and cluster readers for improved resilience and scalability
- ❑ **AMS**
  - ▣ Data quality
  - ▣ Automate Scorecard generation
  - ▣ Incorporate new signal timing sheets into mode



# Data Quality

14

## □ Freeway - Core I-210 above 93% - Yes!

I-210 PM 25 - 43.25	East	93.1%
	West	93.4%

## □ Currently receiving data for:

- Ramps
- CMS signs
- TSMSS Signals
- Arcadia Signals
- LA County, Monrovia and Duarte Signals

## □ Eagerly awaited:

- Pasadena
- DMS Signs



# Networking and Center to Center Connectivity

15

- **Caltrans C2C network connectivity for Data Readers**
  - ▣ System and firewall settings specially configured to allow TMDD “subscription update” dialogues
  - ▣ Ready to receive the incident information from production ATMS.
- **Arcadia**
  - ▣ RIITS firewall configuration updated to improve connectivity to Arcadia
- **Pasadena C2C**
  - ▣ Looking forward to testing the connectivity between the Data Hub and Pasadena’s servers in support of McCain Transparency application C2C
- **ICM User Secure System Access (via Kapsch application)**
  - ▣ County users received permission from IT to install RIITS VPN on workstations to access CMS/Purple Box



# Networking and Center to Center Connectivity

16

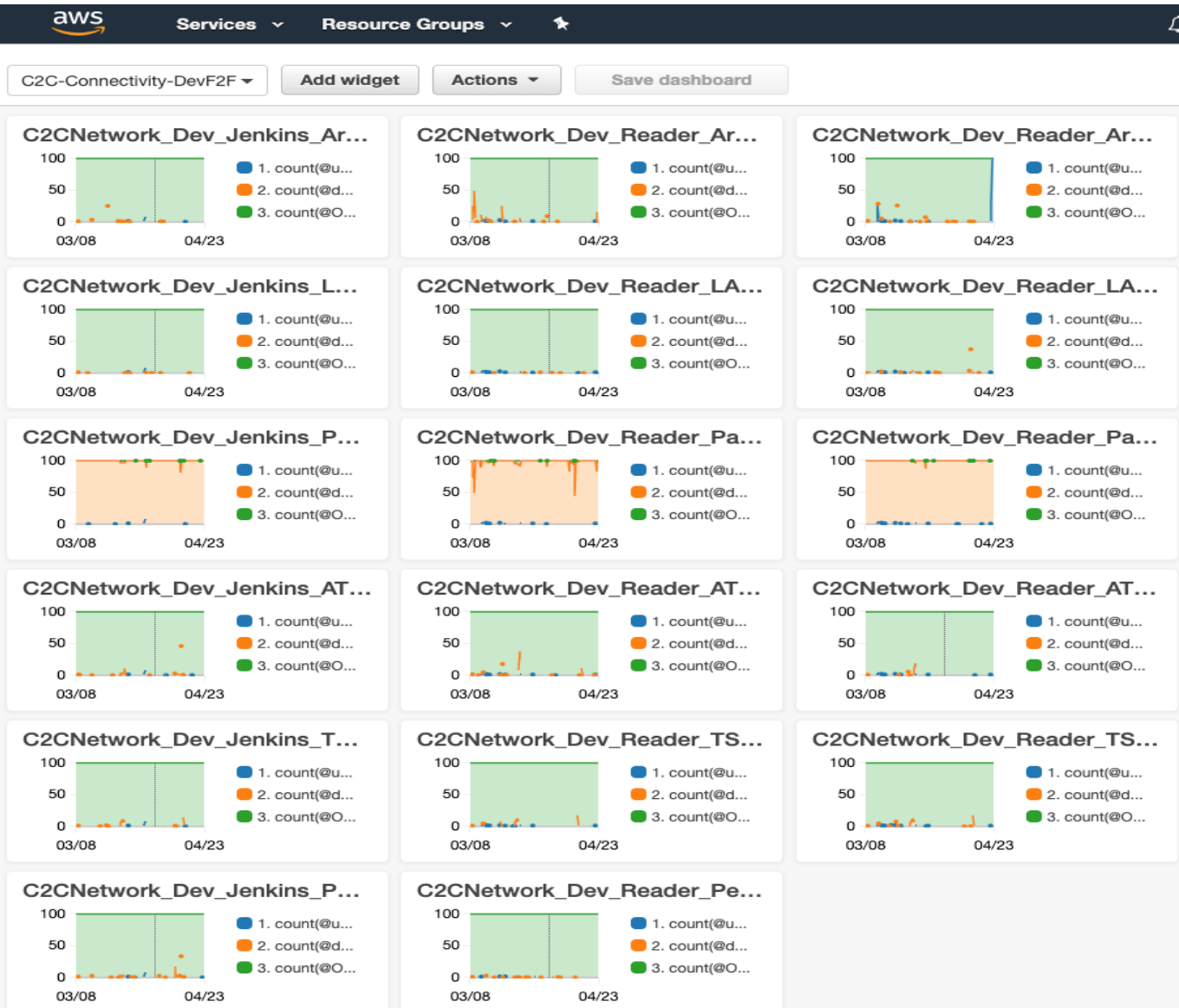
- **Ongoing weekly meetings between RIITS and PATH**
  - ▣ D7 Caltrans are temporarily “available as needed”
- **Field asset monitoring**
  - ▣ Metro and Caltrans leading the effort (Ed would you like to add?)
  - ▣ Bi-weekly calls are being held
  - ▣ PATH providing ITS element location and type information





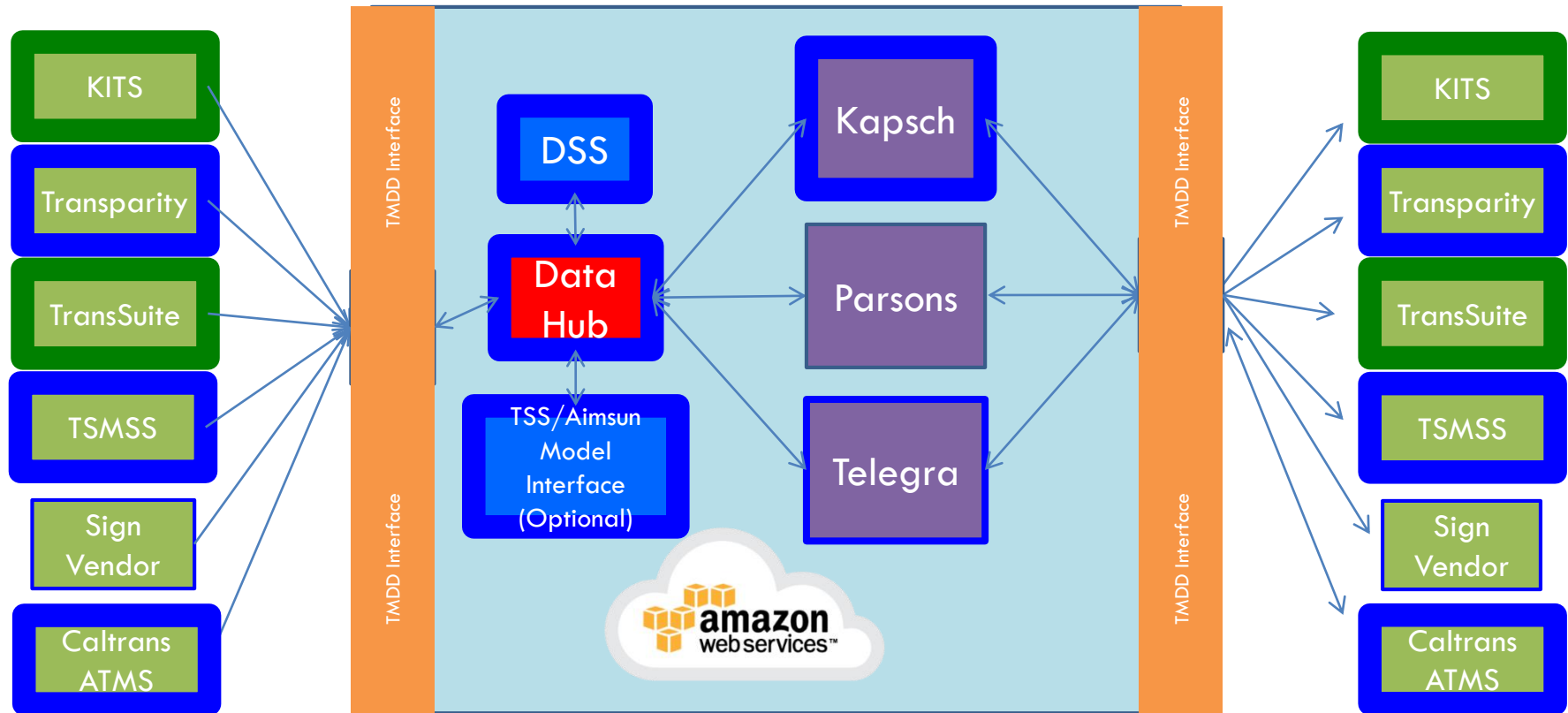
# C2C Connectivity good since last Face-to-Face

17



# C2C Interface Implementations - Status

18



## Legend:

Green border – Done; Blue border – In Progress (thickness commensurate with progress)

# Systems Integration

19

- **Pasadena**
  - ▣ McCain/Transparency C2C interface - Addressed issue preventing subscription messages (this is big!). Resuming testing
- **Dynamic Message Signs – Pasadena, LACO, Caltrans**
  - ▣ Beginning planning efforts for selected C2C interface architecture
- **Caltrans**
  - ▣ Required ATMS fixes identified. Meeting scheduled this week (4/30) to discuss plan forward
- **Environmental Stations with Air Quality Sensors and Open Data Systems (ODS)**
  - ▣ Meeting with Cal Poly Friday (5/1) to discuss access to response plans and data details



# Systems Development

20

- **Production system initial stand-up**
  - ▣ Kapsch CMS deployed to production. Will deploy latest version (v3.1) this week
  - ▣ Currently receiving data from LACO, Arcadia, D7 ATMS, D7 TSMSS, PeMS
- **Improve release frequency – goal is new release to test every week**
  - ▣ Last major component (readers) being clustered and containerized
- **Updates**
  - ▣ Updated interface specification (v1.2) implemented within the system
  - ▣ Environment updated for Test DSS demonstrated today



# TSMSS – Timing Plans Installed!!

21

tsmss

Options Int Commands Help

Sections Schedule Command List

I - District 7 TCS

- Jur 1 - Corridor Mgmt (East) (Int 1-349)
- Detectors
- Intersections
  - Int 18 - EB Colorado @ Merlon Ave
  - Int 19 - WB Foothill BL @ N Baldwin A
  - Int 20 - EB Baldwin Ave @ EB Ramp
  - Int 21 - EB Santa Anita Ave @ EB Ram
  - Int 22 - WB Santa Anita Ave @ WB Ra
  - Int 23 - EB huntington Dr @ Driveway
  - Int 24 - WB Huntington Dr @ WB Ran
  - Int 25 - WB Myrtle Ave @ Central Ave
  - Int 26 - EB Myrtle Ave @ Evergreen A
  - Int 27 - California Ave @ Evergreen A
  - Int 28 - California Ave @ Central Ave
  - Int 29 - EB Mountain @ Evergreen Av
  - Int 30 - WB Mountain @ Central Ave
- Jur 2 - Corridor Mgmt (South) (Int 350-699)
- Jur 3 - Corridor Mgmt (West) (Int 700-1049)
- Jur 4 - Testing and Training (Int. 1200+)
- Comm Servers
- External Systems

**Intersection Report**

Int	Description	Status	Timing Status	Des Plan	Act Plan	TOD Plan	Des Mode	Act I
18	EB Colorado @ Merlon Ave	coordinated	coordinated	0	1	0	local time-of-day	local tim

Detailed Info Timing **Timing Plans** Dets Failures Time Consistency Comm Test Comm Data Split Logger Vol/Occ Alarm Fla

ID	Description	Free	Cycle Length	Offset	1	2	3	4	5	6	7	8
1	Coord Plan: 1 Offset: A	X	120	65	17	*44	15	40	20	*41	6	6
2	Coord Plan: 1 Offset: B	X	120	0	17	*44	15	40	20	*41	6	6
3	Coord Plan: 1 Offset: C	X	120	0	17	*44	15	40	20	*41	6	6
4	Coord Plan: 2 Offset: A	X	120	116	17	*44	15	40	20	*41	6	6
5	Coord Plan: 2 Offset: B	X	120	0	17	*44	15	40	20	*41	6	6
6	Coord Plan: 2 Offset: C	X	120	0	17	*44	15	40	20	*41	6	6
7	Coord Plan: 3 Offset: A	X	120	48	17	*36	15	48	19	*34	6	6
8	Coord Plan: 3 Offset: B	X	120	0	17	*36	15	48	19	*34	6	6
9	Coord Plan: 3 Offset: C	X	120	0	17	*36	15	48	19	*34	6	6
31	Coord Plan: 11 Offset: A	X	135	97	17	*46	15	53	20	*43	6	6
32	Coord Plan: 11 Offset: B	X	135	0	17	*46	15	53	20	*43	6	6
33	Coord Plan: 11 Offset: C	X	135	0	17	*46	15	53	20	*43	6	6
34	Coord Plan: 12 Offset: A	X	150	34	20	*51	17	58	23	*48	6	6
35	Coord Plan: 12 Offset: B	X	150	0	20	*51	17	58	23	*48	6	6
36	Coord Plan: 12 Offset: C	X	150	0	20	*51	17	58	23	*48	6	6
37	Coord Plan: 13 Offset: A	X	135	79	20	*34	15	62	20	*34	6	6
38	Coord Plan: 13 Offset: B	X	135	0	20	*34	15	62	20	*34	6	6
39	Coord Plan: 13 Offset: C	X	135	0	20	*34	15	62	20	*34	6	6
40	Coord Plan: 14 Offset: A	X	150	91	20	*34	15	77	20	*34	6	6
41	Coord Plan: 14 Offset: B	X	150	0	20	*34	15	77	20	*34	6	6
42	Coord Plan: 14 Offset: C	X	150	0	20	*34	15	77	20	*34	6	6
255	FREE	✓	0	0	0	0	0	0	0	0	-	-



# Before and After Study – SMG/Metro

22

- **Metro has asked System Metrics Group (SMG) to study the best way to perform a before and after study for the I-210**
- **SMG has provided an initial set of ideas**
  - ▣ Broad look at performance
  - ▣ What ITS elements/third party data is needed in order to effectively measure before and after performance
- **Tom, Steve, Ed would you like to add anything?**





## I-210 Connected Corridors Face-to-Face Meeting

# CALL FOR PROJECTS

Apr 28, 2020



# Agenda

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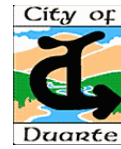
- **I-210 CC Arterial Systems Improvement Project  
System Consulting Services - Overview**
- **Status of 9 procurement packages**
- **Next Steps**







Metro



# I-210 CONNECTED CORRIDORS ARTERIAL SYSTEMS IMPROVEMENT PROJECT SYSTEM CONSULTING SERVICES

## STATUS OVERVIEW

Apr 28, 2020



# Project Objective

26

- Assist Caltrans D7 to manage the execution of the 9 arterial ITS improvement projects

#	Package Description	Contract #	Contract Status	Target
1	Bluetooth – Iteris Velocity	07A4470	Completed, Contract Closed	May 2019
2	Bluetooth – BlueToad	07A4477	Installation & Testing Phase	Jun 2020
3	New Controller Cabinets	07A4761	Material Review Phase	Q3-4,2020
4	Communication Upgrades	07A4479	Installation Completed Contract to be Closed	May 2020
5	Firmware/Timing Plan Updates/Controller Upgrades	07A4480	Material Procurement Phase	Q3-4,2020
6	Video Detection System	07A4481	Installation Completed Contract to be Closed	May 2020
7	Data Communication Module and Video Detection Software Upgrade	07A4755	Material Review Phase	Q3-4,2020
8-1	DMS Procurement	07A4792-3	in Progress	Jul 2020
8-2	DMS Integration	07A4794	Design Phase	Feb 2021
8-3	DMS & Static Sign Installation	N/A	To be handled by stakeholders	Q3-4,2020
9	Environmental Stations with Air Quality Sensors and Open Data Systems	07A4388	in Progress	Q2-3,2020



# Project Area

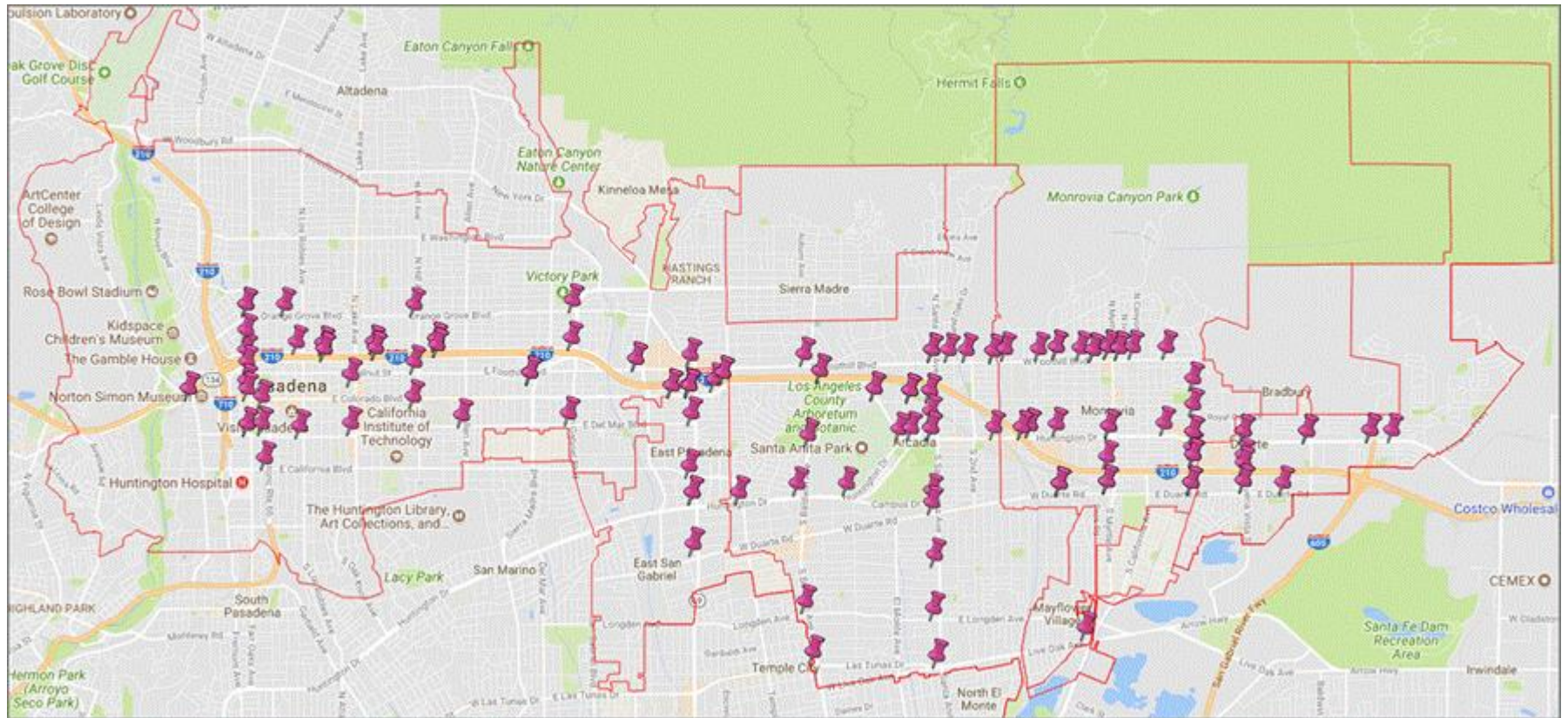
27

#	Package Description	Contract #	Metro & Caltrans	City of Pasadena	City of Arcadia	City of Monrovia	City of Duarte	LA County
1	Bluetooth – Iteris Velocity	07A4470	√		√			
2	Bluetooth – BlueToad	07A4477	√	√		√	√	√
3	New Controller Cabinets	07A4761	√	√	√			
4	Communication Upgrades	07A4479	√		√	√	√	√
5	Firmware/Timing Plan Updates/Controller Upgrades	07A4480	√	√	√	√		√
6	Video Detection System	07A4481	√	√	√	√	√	√
7	Data Communication Module and Video Detection Software Upgrade	07A4755	√	√	√	√	√	√
8-1	DMS Procurement	07A4792-3	√	√				√
8-2	DMS Integration	07A4794	√	√				√
8-3	21 DMS Installation	Stakeholders	√	√				√
	11 Static Sign Installation	Stakeholders	√	√	√	√	√	
9	Environmental Stations with Air Quality Sensors and Open Data Systems (ODS)	07A4388	√					



# Project Area (cont.)

28





# UPDATE ON PACKAGES 1-9

Apr 28, 2020



# Package Status – Pkg # 1

30

Pkg. #	Pkg.	Contract #	Project Status
1	Bluetooth – Iteris Velocity	07A4470 PTM	<ul style="list-style-type: none"> <li>• NTP: 7/10/2018</li> <li>• Kick-off Meeting: 7/30/2018</li> <li>• Submittal Approved: 8/16/2018</li> <li>• Installation &amp; Testing Completed on 5/29 &amp; 5/30/2019</li> <li>• Accepted by Arcadia, Documents Submitted</li> <li>• Completed</li> </ul>



# Package Status – Pkg # 2

31

Pkg. #	Pkg.	Contract #	Project Status
2	Bluetooth – BlueToad	07A4477 DBX	<ul style="list-style-type: none"> <li>• NTP: 7/10/2018</li> <li>• Kick-off Meeting: 7/30/2018</li> <li>• Submittal Approved: 10/12/2018</li> <li>• Installation: <ul style="list-style-type: none"> <li>• LA County, Monrovia, Duarte: 10 locations done; LACo VM server configured on 5/15/19; working on LA Co &lt;-&gt; Pasadena VPN connection</li> <li>• Caltrans: 1 location without existing comms. Equipment delivered to LA County</li> <li>• Pasadena: field installation at 11 locations completed (3/24/2020); server installed at TMC, server to be configured</li> </ul> </li> <li>• Site Testing: <ul style="list-style-type: none"> <li>• LA County: completed</li> <li>• Pasadena: to be scheduled</li> </ul> </li> <li>• System Testing: <ul style="list-style-type: none"> <li>• To be scheduled</li> </ul> </li> <li>• Expected to be completed: June 2020 (90%)</li> </ul>

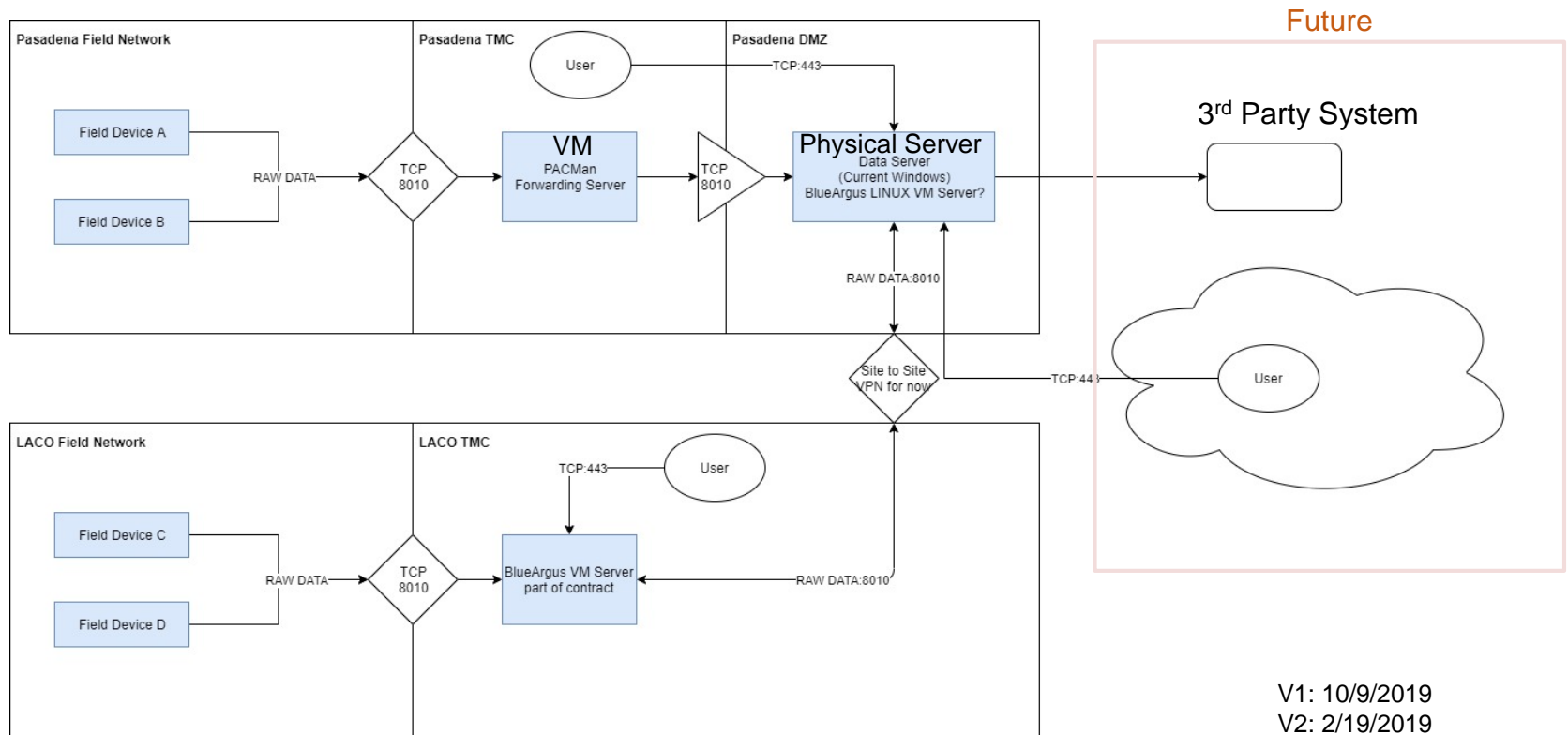




# Package Status – Pkg # 2

32

## □ P2 - BlueToad Travel Time System – Comm. Architecture





# Package Status – Pkg # 3

33

Pkg. #	Package Name	Contract #	Project Status
3	New Controller Cabinets	07A4761 Crosstown	<ul style="list-style-type: none"> <li>• <b>Advertised: 9/26/19</b></li> <li>• Awarded: 2/11/2020</li> <li>• NTP: 2/19/2020</li> <li>• Kick-off Meeting: 2/25/2020</li> <li>• On-going: <ul style="list-style-type: none"> <li>• 3/17/20: Material Submittal submitted</li> <li>• 4/3 &amp; 4/13/20: Stakeholders' Review Comments returned to contractor</li> <li>• On-going: Revising material submittal</li> </ul> </li> <li>• Expected to be completed: Q3-Q4, 2020</li> </ul>

Risk: Staff & resource availability, logistic/travel/supply chain challenges associated with COVID-19 could impact schedule.

McCain's production facility in Tijuana is closed temporarily from 4/13/2020 to 5/4/2020 due to COVID-19.



# Package Status – Pkg # 4

34

Pkg. #	Package Name	Contract #	Project Status
4	Communication Upgrades	07A4479 Kanaan Construction	<ul style="list-style-type: none"> <li>NTP: 7/13/2018</li> <li>Kick-off Meeting: 7/30/2018</li> <li>Submittal &amp; RFI Approved: 5/6/2019</li> <li>Equipment procured</li> <li>Installation of 35 locations: completed</li> <li>Testing &amp; Acceptance: completed (1/13/2020 &amp; 4/14/2020)</li> <li>Next steps: <ul style="list-style-type: none"> <li>Close all RFIs</li> <li>Close the contract in May 2020</li> </ul> </li> <li>Discussion <ul style="list-style-type: none"> <li>5 locations in LA County – no communications yet (dropped 2 locations after 3/10/2020 F2F meeting)</li> <li>Option 1 : Waiting until RIITS network and L3 Switches are available – Q3-4, 2020</li> <li>Option 2: Install 2 additional radios – cost estimate: \$17,399.50, funding source?</li> </ul> </li> </ul>



# Package Status – Pkg # 5

35

Pkg. #	Package Name	Contract #	Project Status
5	Firmware/Timing Plan Updates/Controller Upgrades	07A4480 CPE, Inc	<ul style="list-style-type: none"> <li>• NTP: 7/17/2018</li> <li>• Kick-off Meeting: 7/30/2018</li> <li>• Submittal Reviewed but Required hardware/firmware changed per Stakeholder Comment</li> <li>• Contractor revised price estimate (\$124,971) lower than original amount (\$171,600) – reviewed &amp; approved by stakeholders</li> <li>• Material Submittals – approved</li> <li>• Materials Procurement – order placed, lead time 16-20 weeks</li> <li>• Installation Permits Application – in progress</li> <li>• Expected to be completed: Q3-Q4, 2020</li> </ul>

Risk: Staff & resource availability, logistic/travel/supply chain challenges associated with COVID-19 could impact schedule.

McCain's production facility in Tijuana is closed temporarily from 4/13/2020 to 5/4/2020 due to COVID-19.



# Package Status – Pkg # 6

36

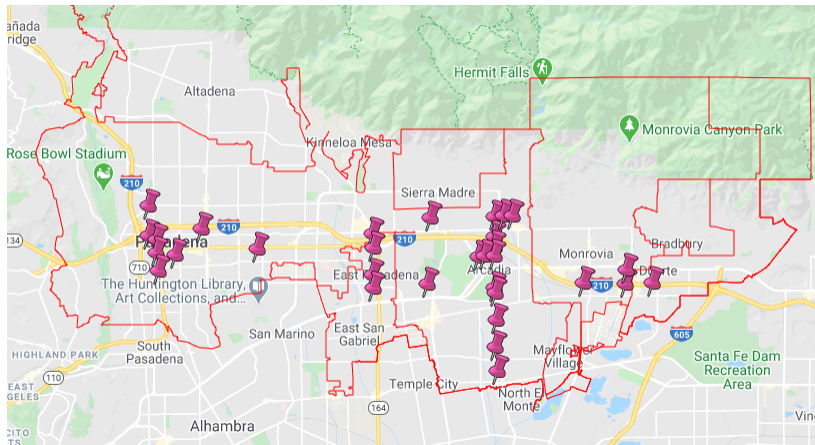
Pkg. #	Package Name	Contract #	Project Status
6	Video Detection System	07A4481 Traffic Loops Crackfilling, Inc	<ul style="list-style-type: none"> <li>• NTP: 7/10/18</li> <li>• Kick-off Meeting: 7/30/18</li> <li>• 10/9/18: Conducted Site Survey</li> <li>• 10/18/18: Submittal approved</li> <li>• Installation: all 22 locations completed (Mar 2020)</li> <li>• Acceptance Testing: in process</li> <li>• As-built &amp; Test Reports: to be submitted</li> <li>• Expected to be completed: May 2020</li> </ul>



# Package Status – Pkg # 7

37

Pkg. #	Package Name	Contract #	Project Status
7	Data Communication Module and Video Detection Software Upgrade	07A4755 Crosstown	<ul style="list-style-type: none"> <li>Advertised: 1/2/2020</li> <li>Awarded: 2/11/2020</li> <li>NTP: 2/19/2020</li> <li>Kick-off Meeting: 2/25/2020</li> <li>3/17/20: Material Submittal submitted</li> <li>4/15/20: Stakeholder Comments Returned, Contractor is revising submittal, submitted RFI regarding 2 locations in Pasadena (change of work type)</li> <li>Expected to be completed: Q3-Q4, 2020</li> </ul>



## 30 Locations:

- 4 locations in LA County
- 1 location in City of Duarte
- 3 locations in City of Monrovia
- 8 locations City of Pasadena
- 14 locations in City of Arcadia



# Package Status – Pkg # 8-1, 8-2, 8-3

38

Year	2020												2021							
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	
DMS Procurement																				
DMS Delivery																				
DMS Installation																				
DMS Integration																				
DMS System Testing																				
Training																				



April 2021, Hard Launch of I-210  
CC System (Est.)



# Package Status – Pkg # 8-1

39

Pkg. #	Package Name	Contract #	Project Status
8-1	Advanced Traveler Information Systems: DMS Procurement	07A4792-3 Elan Moyal	<ul style="list-style-type: none"><li>• Advertised: 10/25/19</li><li>• Awarded: 12/2/ 2019</li><li>• Kickoff meeting: 12/19/2019</li><li>• Material Submittals &amp; procurement: in progress</li><li>• Expected to be completed: July 2020</li></ul>



# Package Status – Pkg # 8-1

40

Item	Total	Caltrans	LACO	Pasadena	Status
DMS	21	2	2	17	Approved. Ordered on 3/27/2020 (lead time: 16 wks) Estimated Delivery Date: Mid July 2020
DMS Poles	19	0	2	17	Approved. Ordered on 2/21/2020 (lead time: 18 wks) Est. Shipping Date: 6/12/2020 Est. Delivery Date: 7/1/2020
Pull boxes	19	0	2	17	Stakeholder comments returned; Revised submittal (4/23/2020) being reviewed by stakeholders (lead time: 4 wks)
Power & Comm Cables	11,000 ft	TBD	TBD	TBD	Approved. to be ordered in May 2020 (lead time: 2 wks)
Radios	12	0	0	12	Approved. to be ordered in May 2020 (lead time: 3 wks)
Sign Control System with API	3	1	1	1	Approved. Ordered on 3/27/2020 (Ledstar is preparing testing environment for Parsons team to test API & C2C interface)
Servers	2	1	0	1	Stakeholder comments returned; updating submittal & price quote (lead time: 1 wk)





# Package Status – Pkg # 8-2

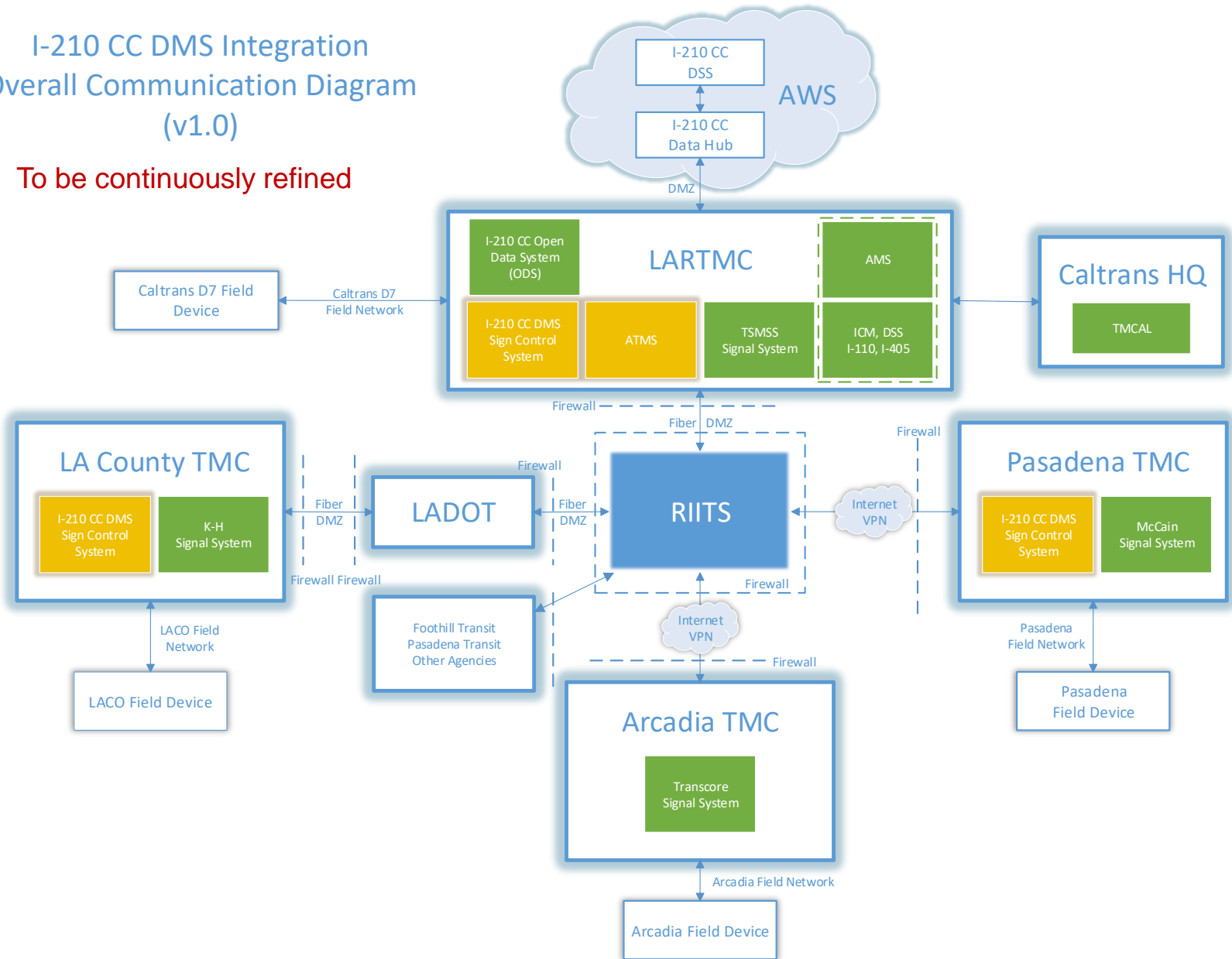
41

Pkg. #	Package Name	Contract #	Project Status
8-2	Advanced Traveler Information Systems: DMS Integration	07A4794 Parsons	<ul style="list-style-type: none"> <li>• Advertised: 11/14/19</li> <li>• Awarded: 1/3/ 2020</li> <li>• Kickoff meeting: 1/14/2020</li> <li>• Working on                             <ul style="list-style-type: none"> <li>• Installation QC checklist: draft ready, waiting for confirmed material list</li> <li>• System Diagrams:                                     <ul style="list-style-type: none"> <li>• Overall - ready</li> <li>• LA County TMC – ready</li> <li>• Pasadena TMC – in stakeholder review</li> <li>• LARTMC – ready</li> </ul> </li> <li>• C2C Interface Development:                                     <ul style="list-style-type: none"> <li>• Requirement &amp; Design Phase</li> </ul> </li> <li>• D7 ATMS Modification:                                     <ul style="list-style-type: none"> <li>• Requirement &amp; Design Phase</li> </ul> </li> </ul> </li> <li>• Expected to be completed: : Q1 2021</li> </ul>



# I-210 CC DMS Integration Overall Communication Diagram (v1.0)

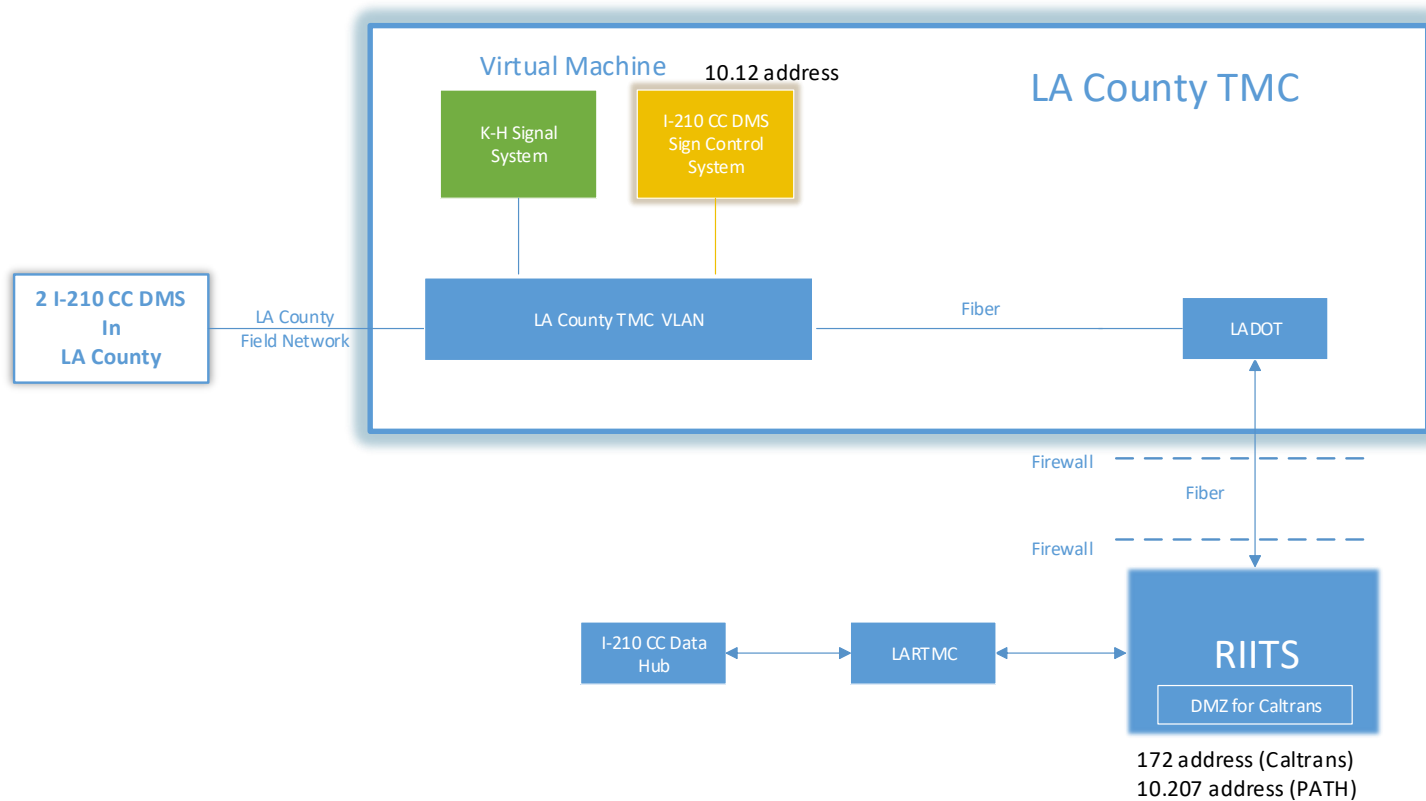
To be continuously refined



# I-210 CC DMS Integration Communication Diagram LA County (v1.0)

43

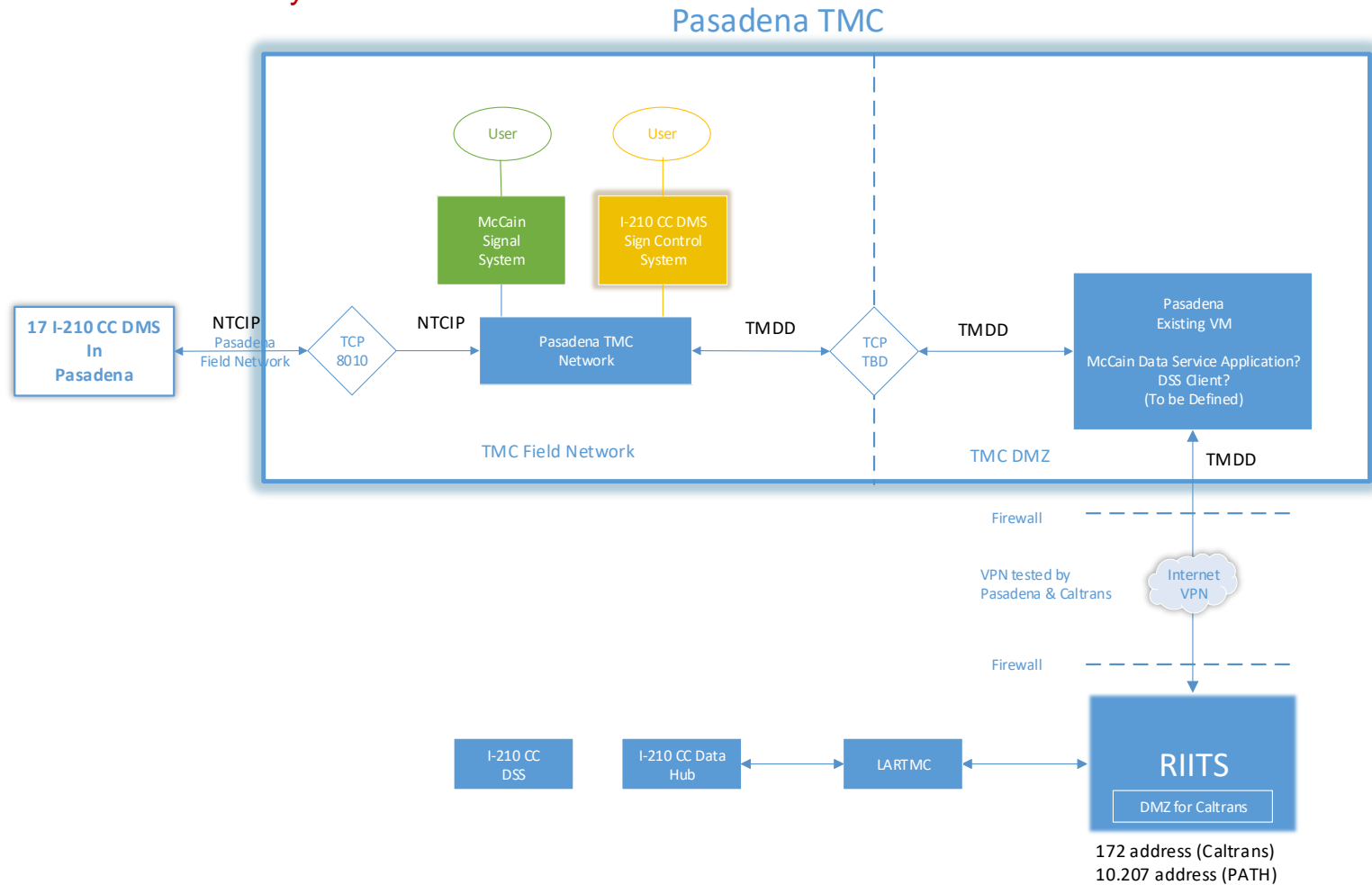
To be continuously refined



# I-210 CC DMS Integration Communication Diagram Pasadena TMC (v0.4)

44

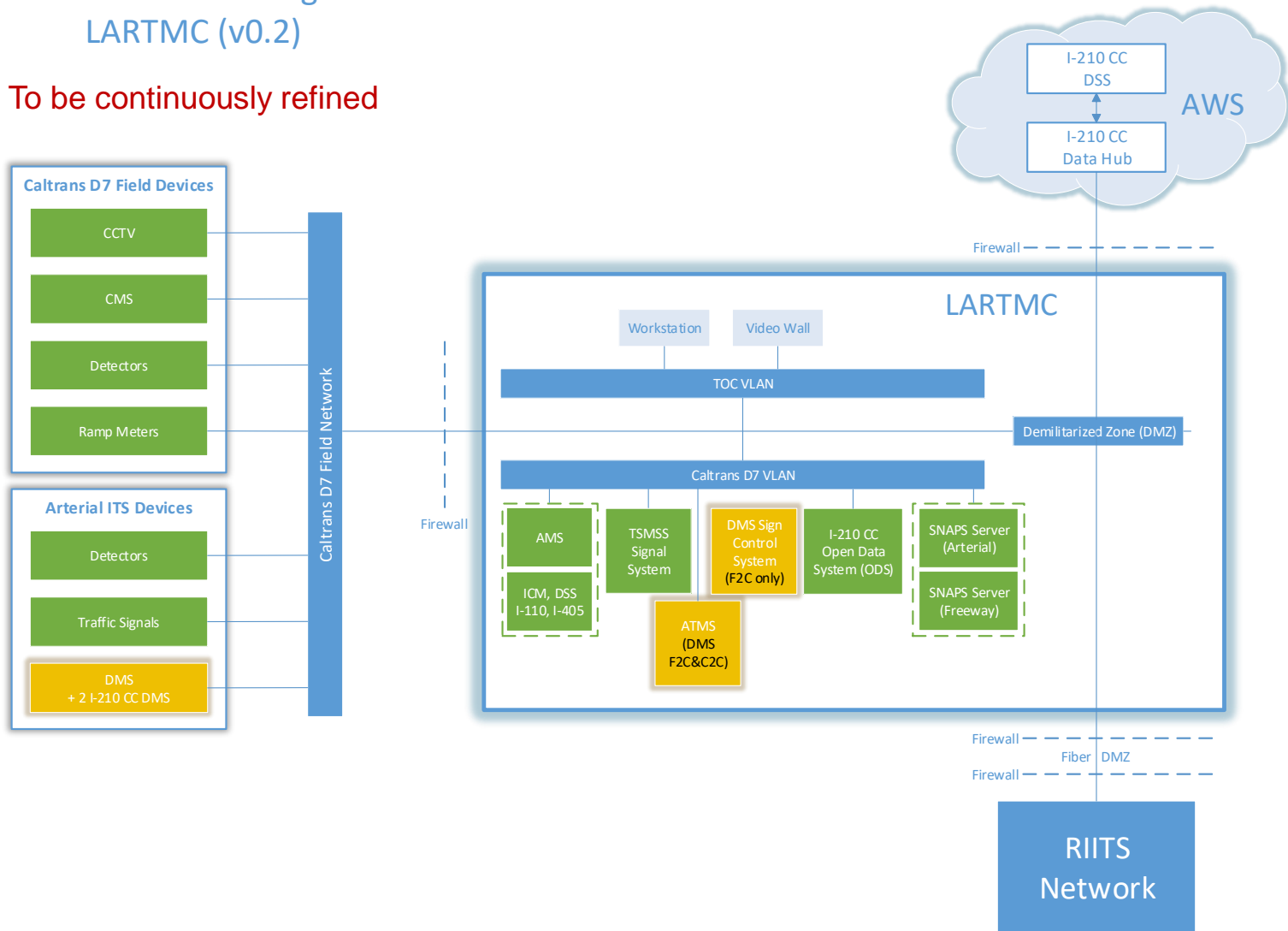
To be continuously refined



# I-210 CC DMS Integration Communication Diagram LARTMC (v0.2)

45

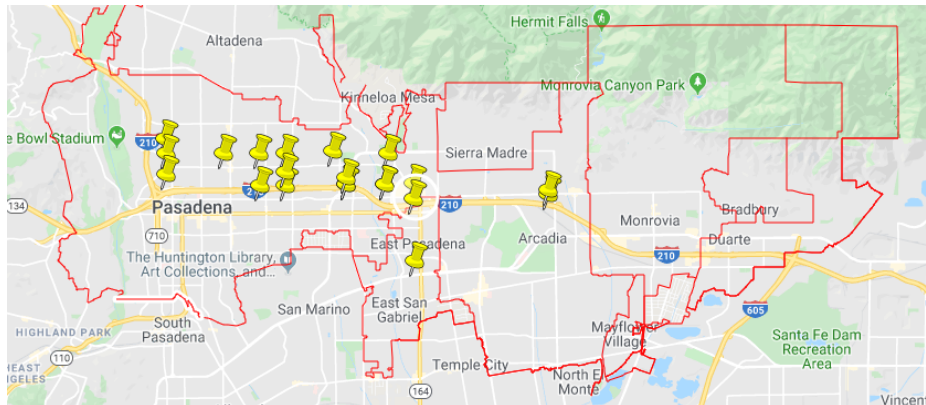
To be continuously refined



# Package Status – Pkg # 8-3

46

Pkg. #	Package Name	Contract #	Project Status
8-3	Advanced Traveler Information Systems: DMS & static sign Installation	N/A to be handled by Caltrans, LAPDW, & Pasadena	<ul style="list-style-type: none"> <li>21 DMS Installation: <ul style="list-style-type: none"> <li>LA County: start after Aug – Oct 2020</li> <li>Pasadena: expected July – Oct 2020</li> </ul> </li> <li>Static Signs Materials: <ul style="list-style-type: none"> <li>Ordered by Caltrans Maintenance Group: Jul. 2019</li> <li>Est. Ready in Jul 2020)</li> </ul> </li> <li>Installation: <ul style="list-style-type: none"> <li>to be handled by stakeholders (3 Caltrans, 2 Pasadena, 4 Arcadia, 1 Monrovia, 1 Duarte)</li> </ul> </li> <li>Expected to be completed: Q3-Q4, 2020</li> </ul>



# Package Status – Pkg # 9

47

Pkg. #	Pkg.	Contract #	Project Status
9	Environmental Stations with Air Quality Sensors and Open Data Systems (ODS)	07A4388 Cal Poly Pomona	<ul style="list-style-type: none"> <li>NTP: 6/29/18</li> <li>Kick-off Meeting: 7/12/18</li> <li>Environmental stations                             <ul style="list-style-type: none"> <li>Roadside study done</li> <li>Field installation done – 6/7/19</li> <li>Collect data and analyze data - ongoing</li> </ul> </li> <li>ODS                             <ul style="list-style-type: none"> <li>Coordination w/ Foothill Transit &amp; Pasadena Transit</li> <li>Coordination w/ PATH                                     <ul style="list-style-type: none"> <li>Data Specification</li> <li>Sample Response Plan</li> <li>Inventory of Road Network, Signal ID</li> <li>Reviewing &amp; testing sample response plan (meeting on 5/1/2020)</li> </ul> </li> <li>Coordination w/ Caltrans                                     <ul style="list-style-type: none"> <li>Communications Architecture - done</li> </ul> </li> </ul> </li> <li>Expected to be completed: Q2-Q3 2020</li> </ul>



# Next Steps

48

- ❑ Package 2: Configure server, conduct site & system testing in Pasadena
- ❑ Package 3: Submit revised material submittal
- ❑ Package 4: Process remaining paperwork, close contract
- ❑ Package 5: Estimate material delivery & installation schedule
- ❑ Package 6: Submit as-built & test reports, close contract
- ❑ Package 7: Respond to RFI, Submit revised material submittal
- ❑ Package 8-1: Continue procurement; coordinate with 8-2
- ❑ Package 8-2: Finalize system diagrams, complete development requirements, start design
- ❑ Package 8-3: Track status
- ❑ Package 9: Support setting up comms & system testing





# **Thank You and Questions?**

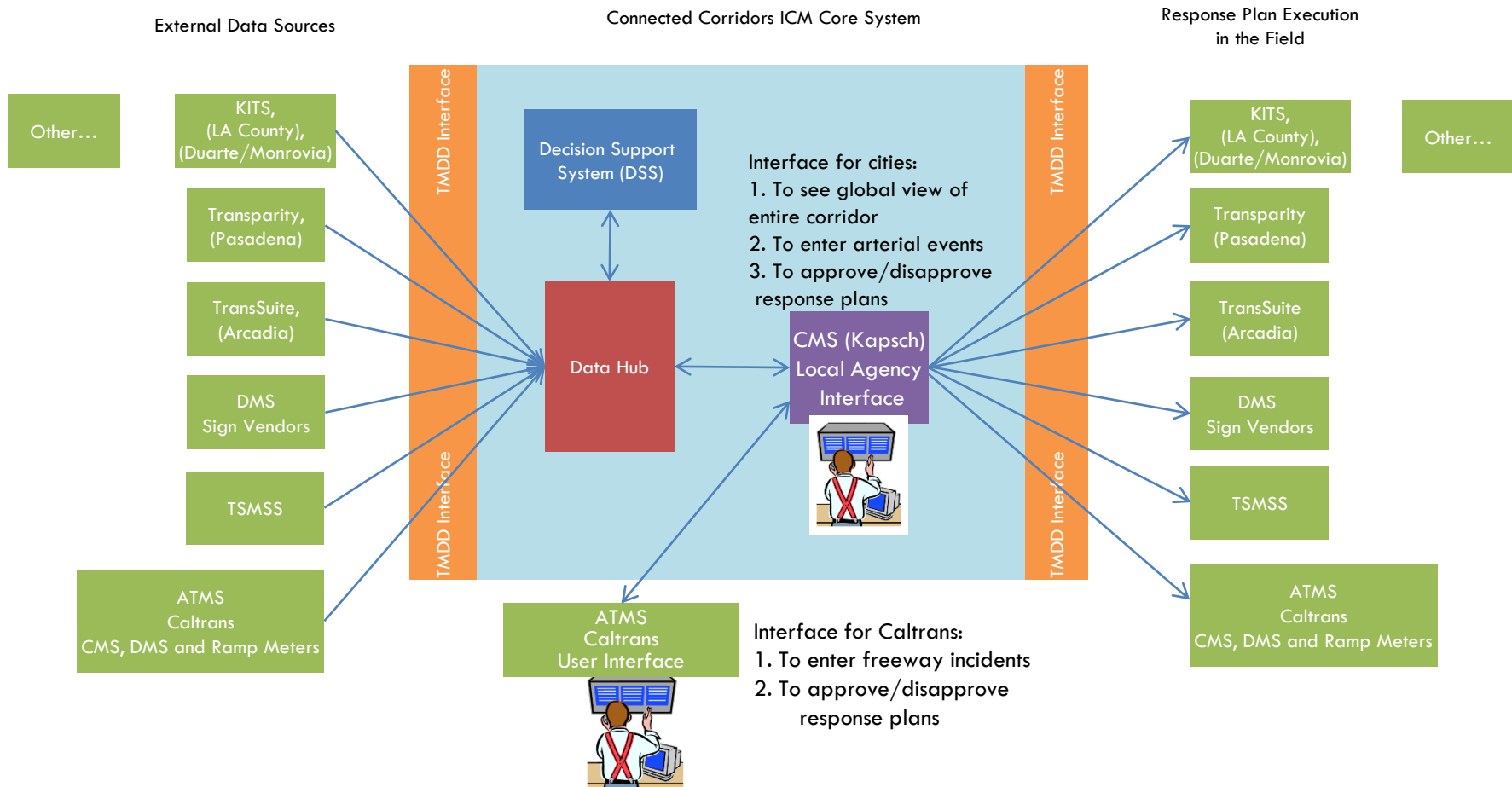
Apr 28, 2020

50

## Kapsch Update and Demo

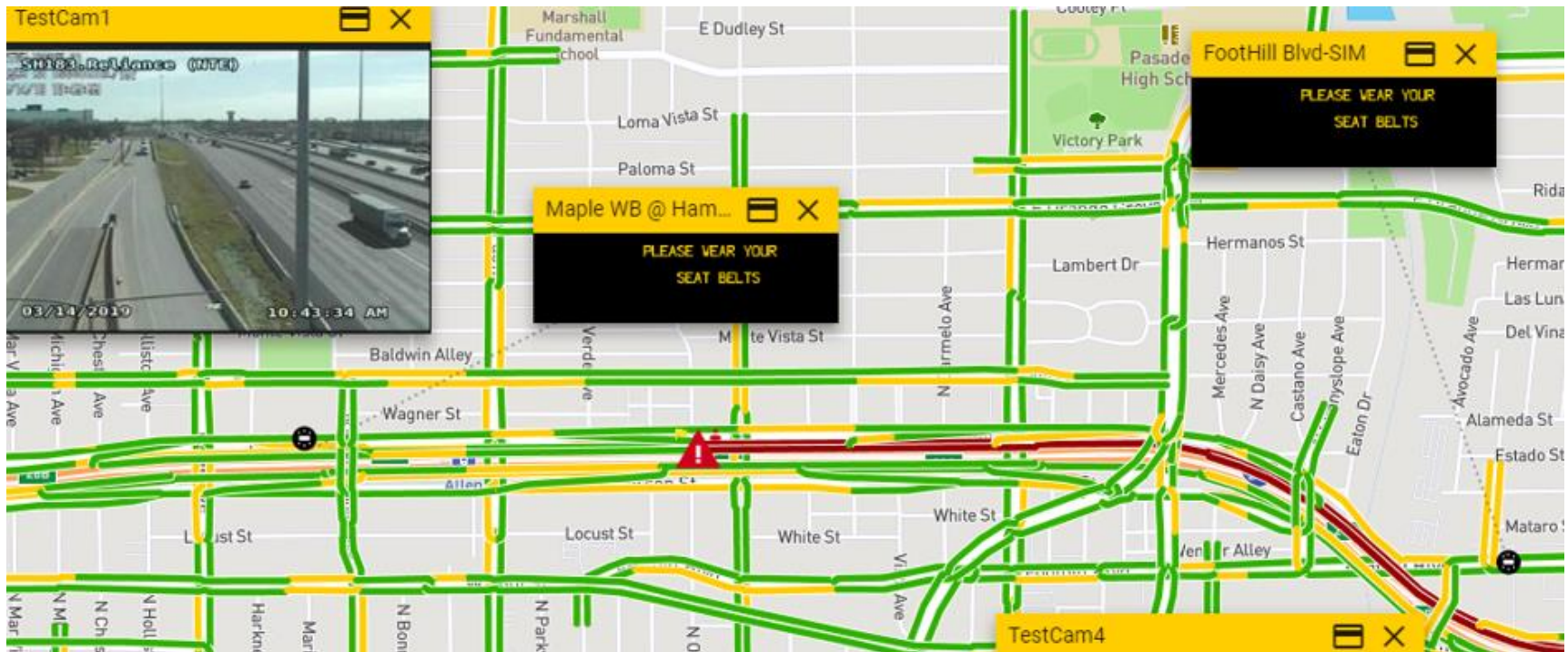
# CC ICM System Overview

51



# I-210 Integrated Corridor Management Kapsch Update

52



Tim O'Leary  
April 28, 2020



# EcoTrafIX Interface Status

53

## Good progress:

- ❑ Deployed latest EcoTrafIX V3.1 to CALTRANS AWS test environment
- ❑ Supports latest PATH TMDD V1.2
- ❑ Advanced link/lane closures - multiple roadway links; flexible lane closures
- ❑ Translate ATMS roadway links to Corridor roadway links
- ❑ EcoTrafIX ready to receive Response Plans from DSS
- ❑ Ready to deploy EcoTrafIX V3.1 to CALTRANS AWS production environment



# EcoTrafIX Interface Status

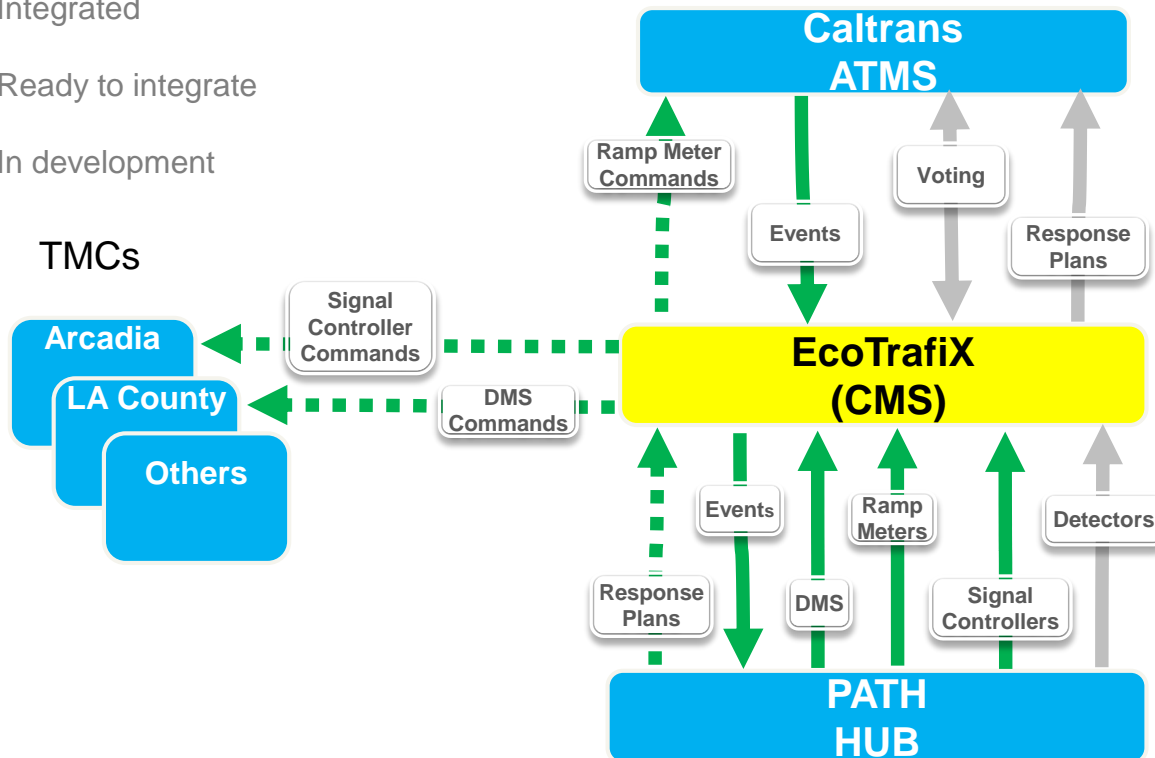
54

## Interface

→ Integrated

→ Ready to integrate

→ In development



# EcoTrafIX Status

55

## Next Steps

- Receive Response Plans from PATH's Decision Support System (DSS)
- Request TMCs execute device commands
- EcoTrafIX sends Response Plans to ATMS



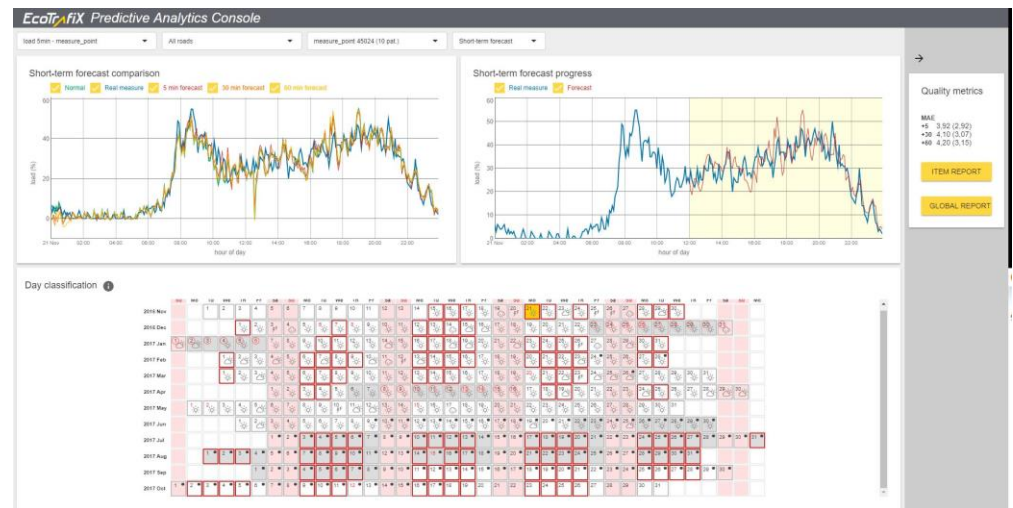
# EcoTrafIX Product Status

56

❑ EcoTrafIX V3.2 scheduled for June 2020

❑ In progress:

- Improve roadway link incident creation
- Waze integration
- Regional Map device filters
- Regional Map transparent layers





# Corridor Management System Workflow

57

## Traffic Management Centers

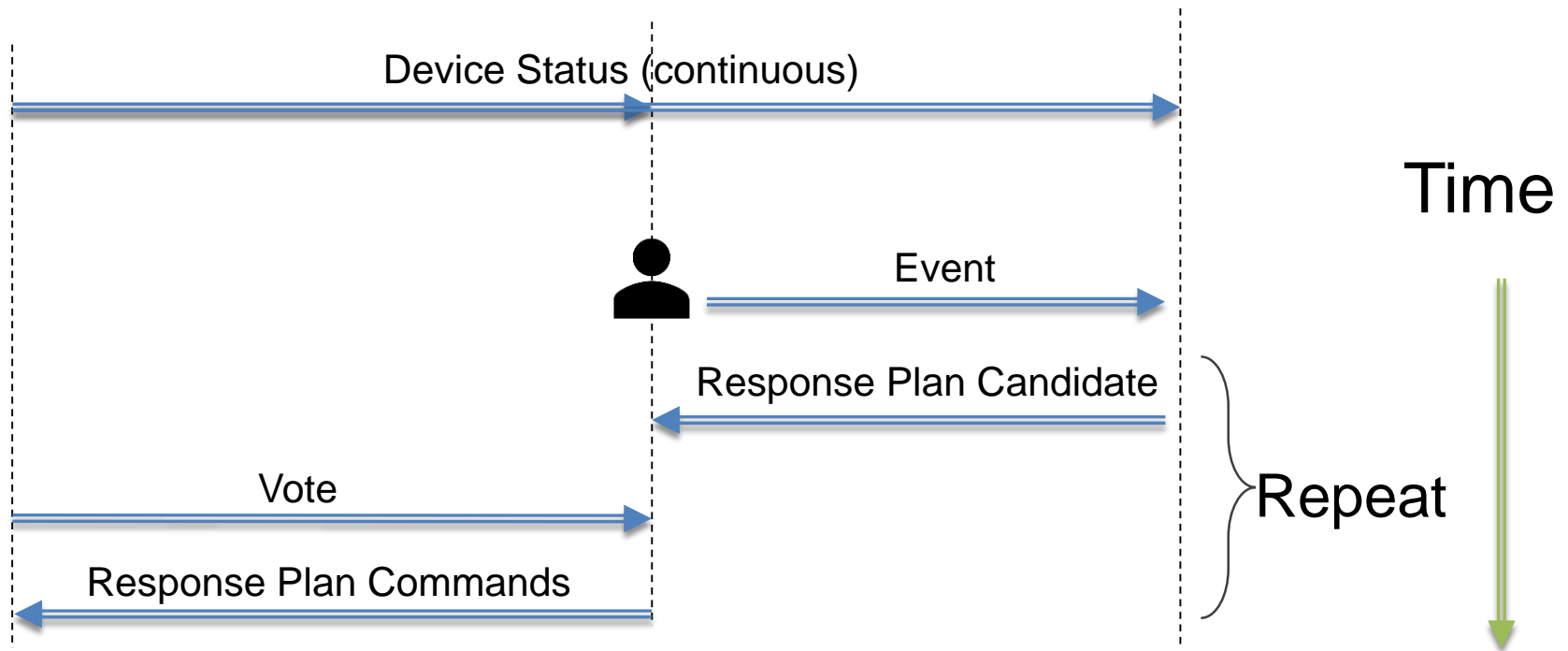
ATMS, Arcadia, LA County,  
Pasadena, etc.

## Corridor Management System

EcoTrafIX (Arterial Events)  
ATMS (Freeway Events)

## Decision Support System

CALTRANS



# Thank You!

58

**Kapsch TrafficCom**

**4256 Hacienda Drive, Suite 100  
Pleasanton, CA 94588  
USA**

**[www.kapsch.us](http://www.kapsch.us)**

**timothy.oleary@Kapsch.net**

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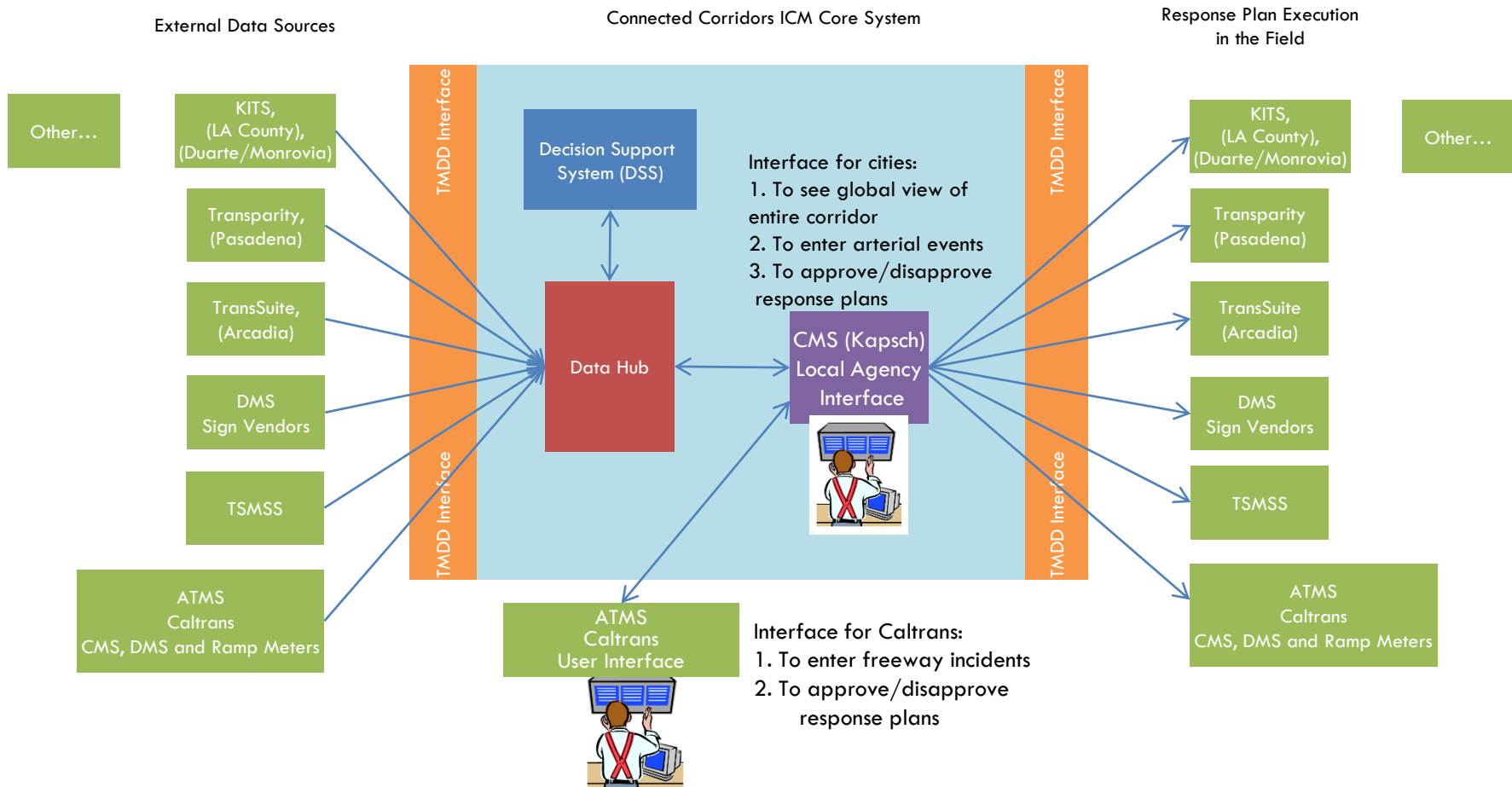


59

## CC ICM System Demo

# CC ICM System Overview

60



# Accomplishments

61

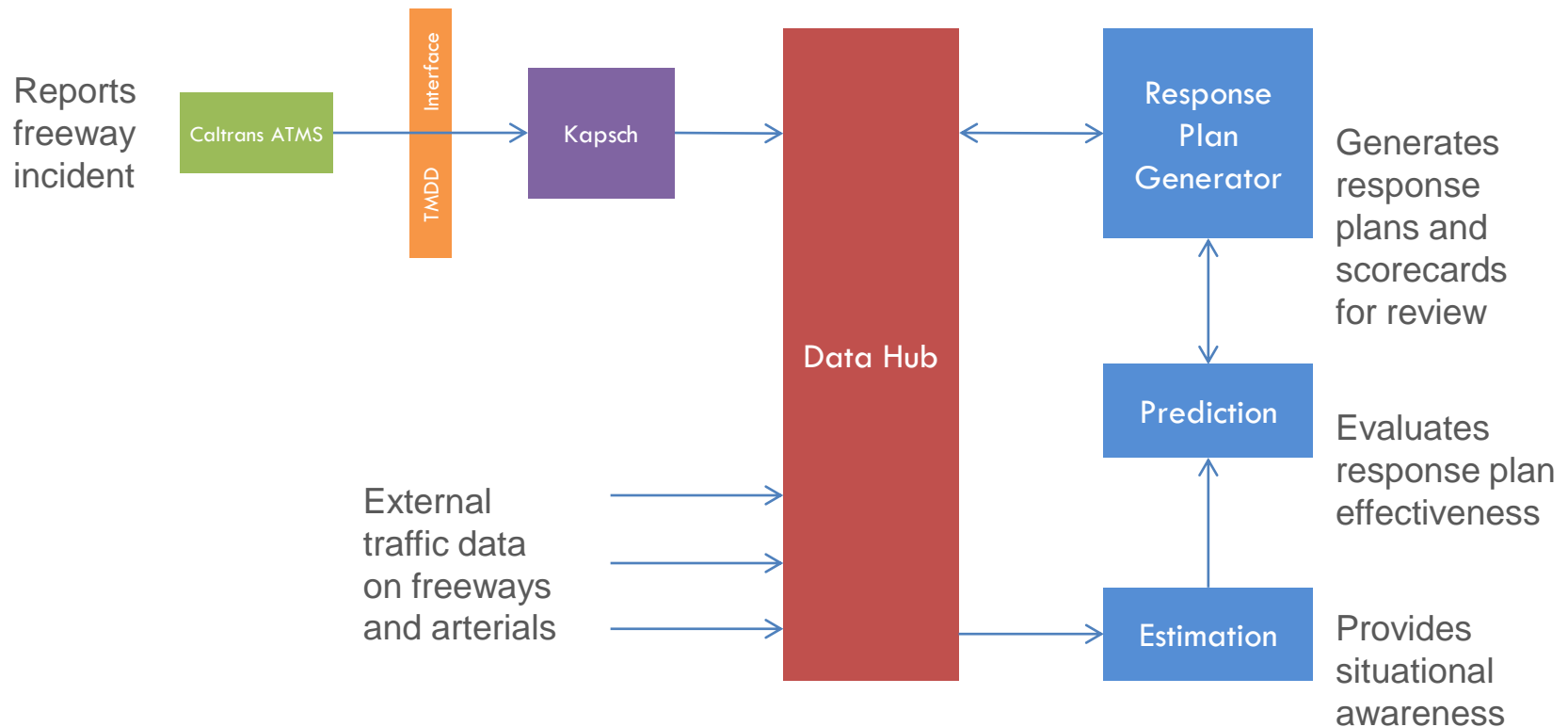
- **The Connected Corridors system works seamlessly with real existing systems**
- **This demonstration is working with the Caltrans Test ATMS and Kapsch EcoTrafIX**
- **The Connected Corridors Data Hub and Test DSS manage a great deal of complexity beneath the surface**
- **For a one-hour, three-lane incident in this demonstration, projected benefits include:**
  - ▣ Arterial and freeway delay reduced by **507 veh-hours** (-4.3%)
  - ▣ Freeway max queue reduced by **2.0 miles** (-27.6%)



# Today's Demonstration Overview

62

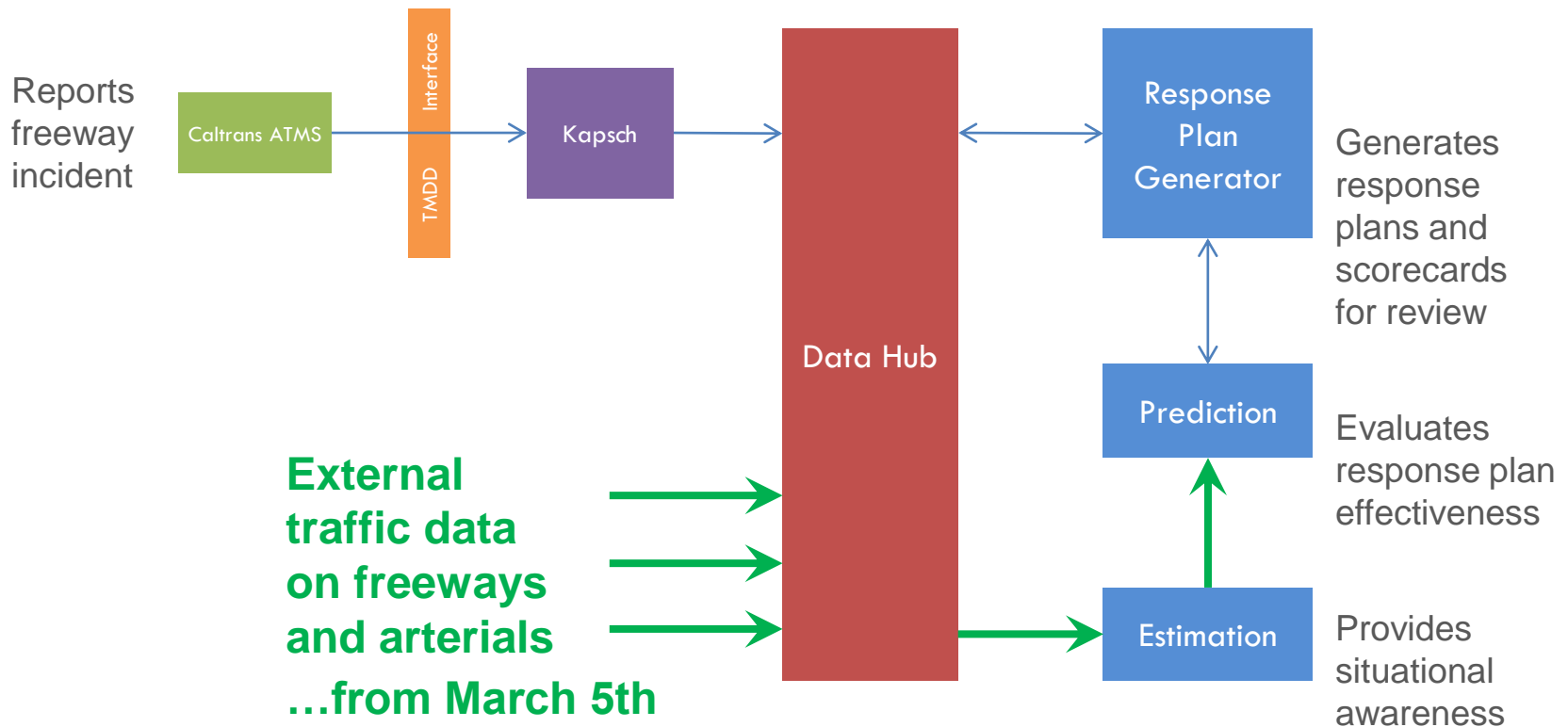
- This is the map for what will be shown next



# Estimation Provides Situational Awareness

63

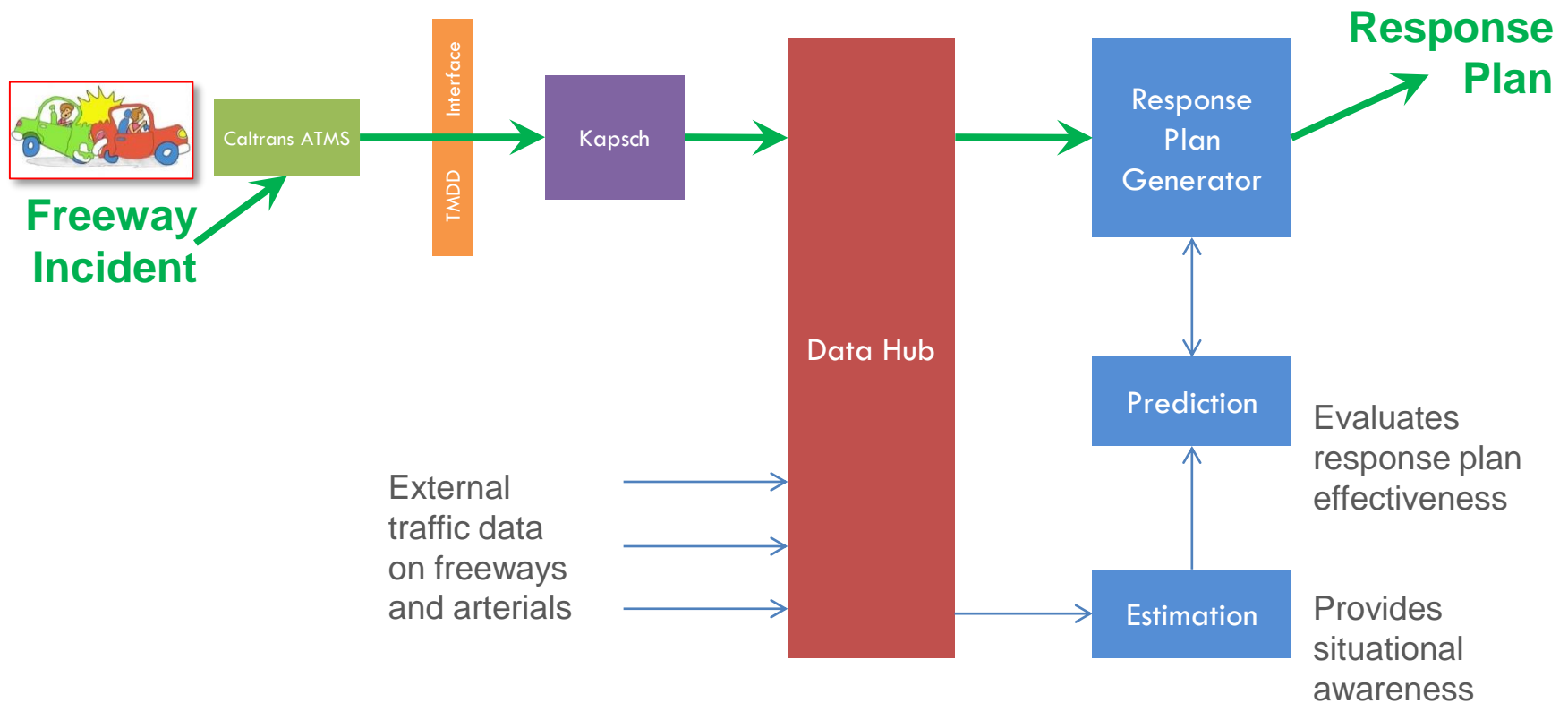
- For this demonstration Estimation runs in historical mode



# Today's Demonstration Overview

64

## □ An ATMS incident triggers response plan generation

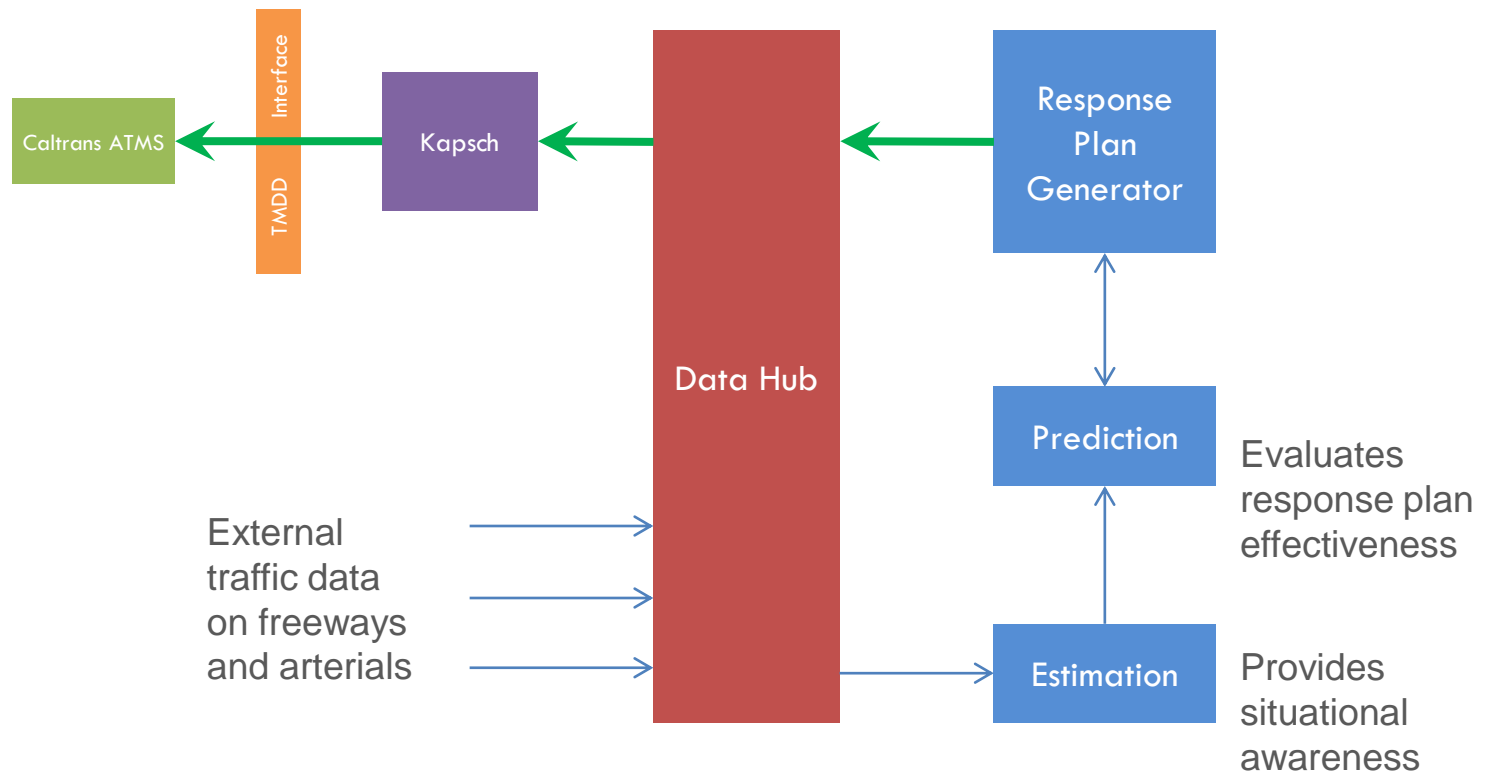




# Goal for Next Time (Not Today)

65

- **Future goal: Show communication in other direction**



## Behind the scenes...

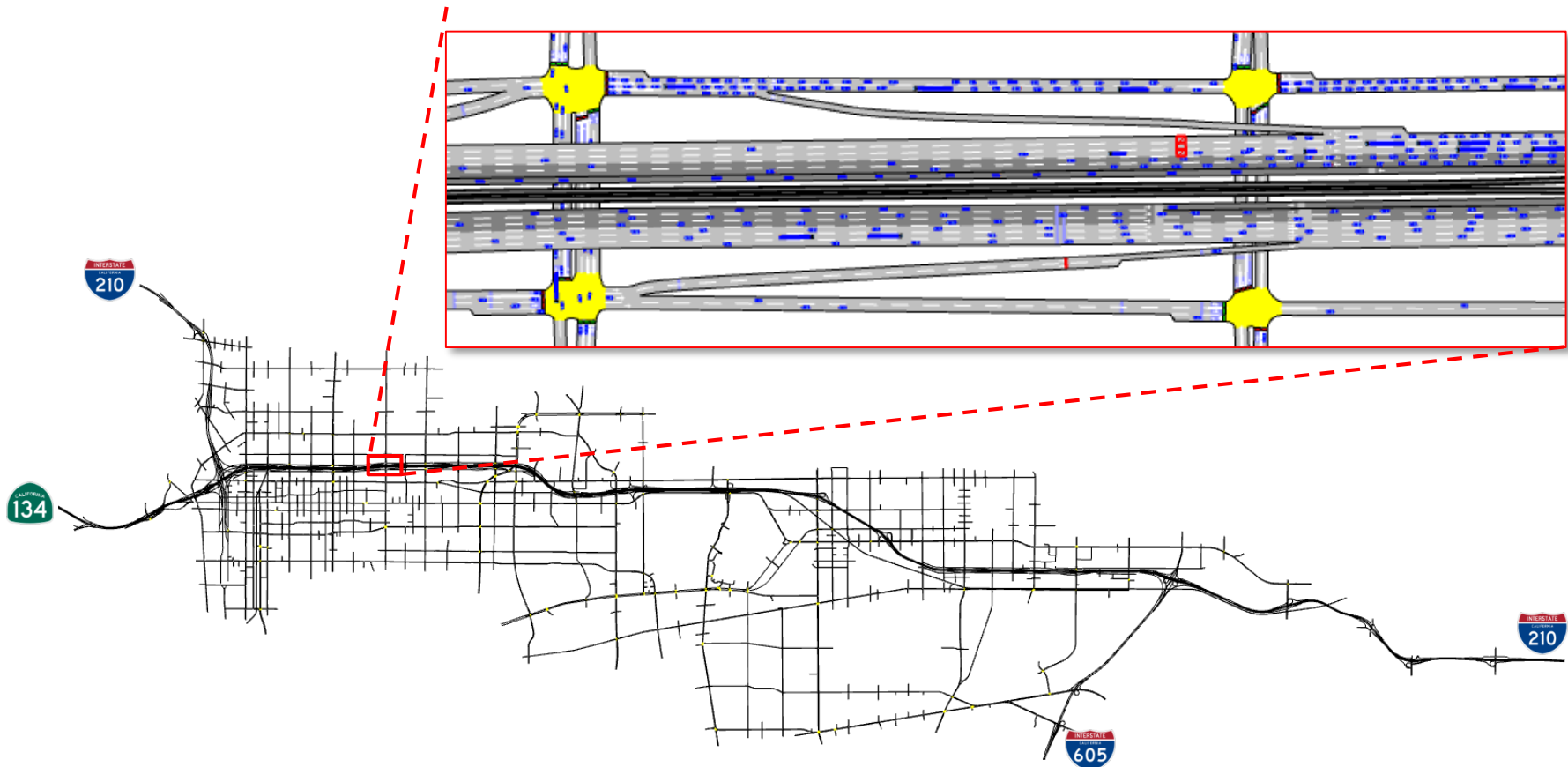
An illustrated view of what happens inside of Prediction

This is a show and tell of the analysis that the Test DSS performs behind the scenes

# Incident

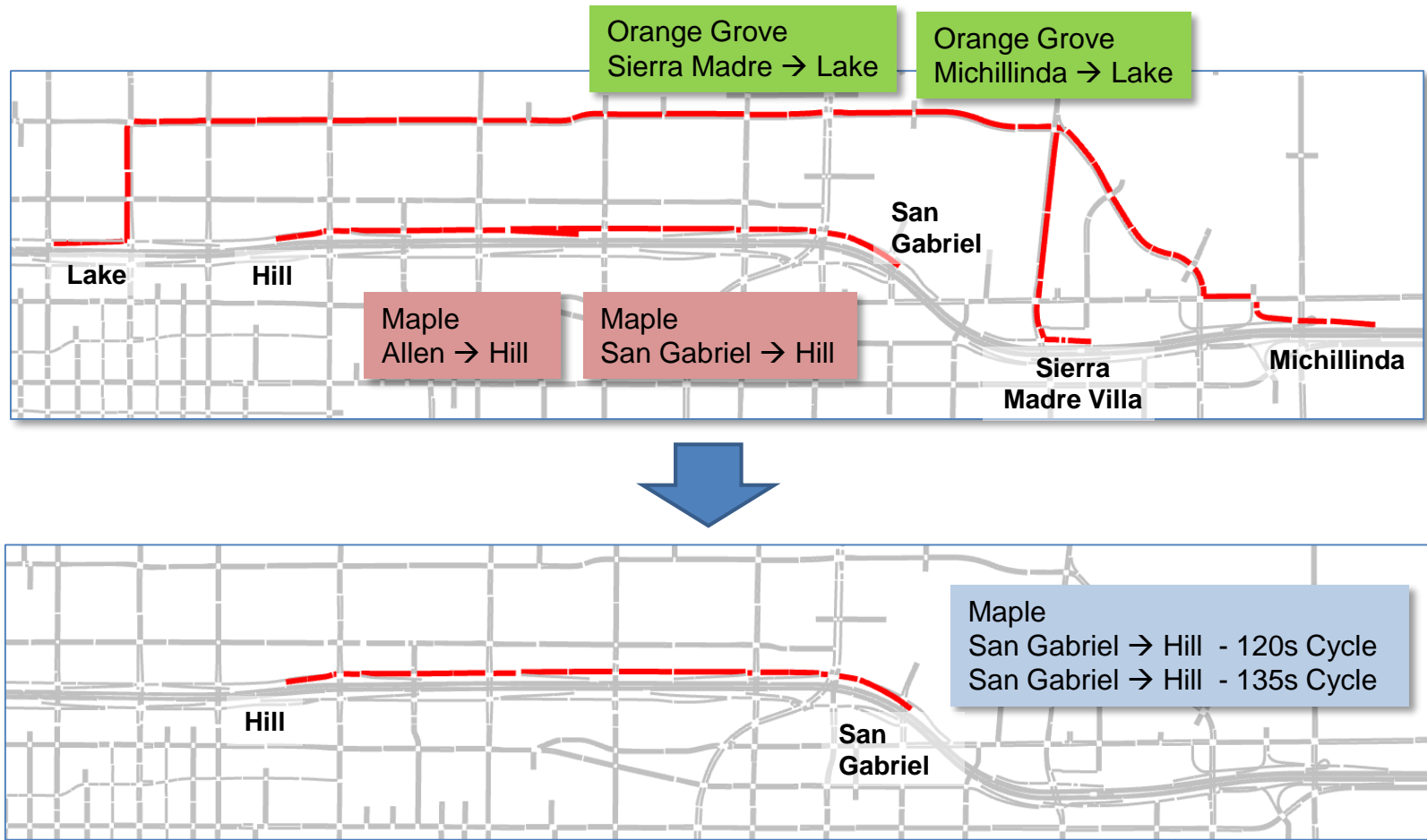
67

- 3 right lanes blocked at Hill on I-210 WB at 2:00 PM for 1 hour



# Potential Detours

68



## 69

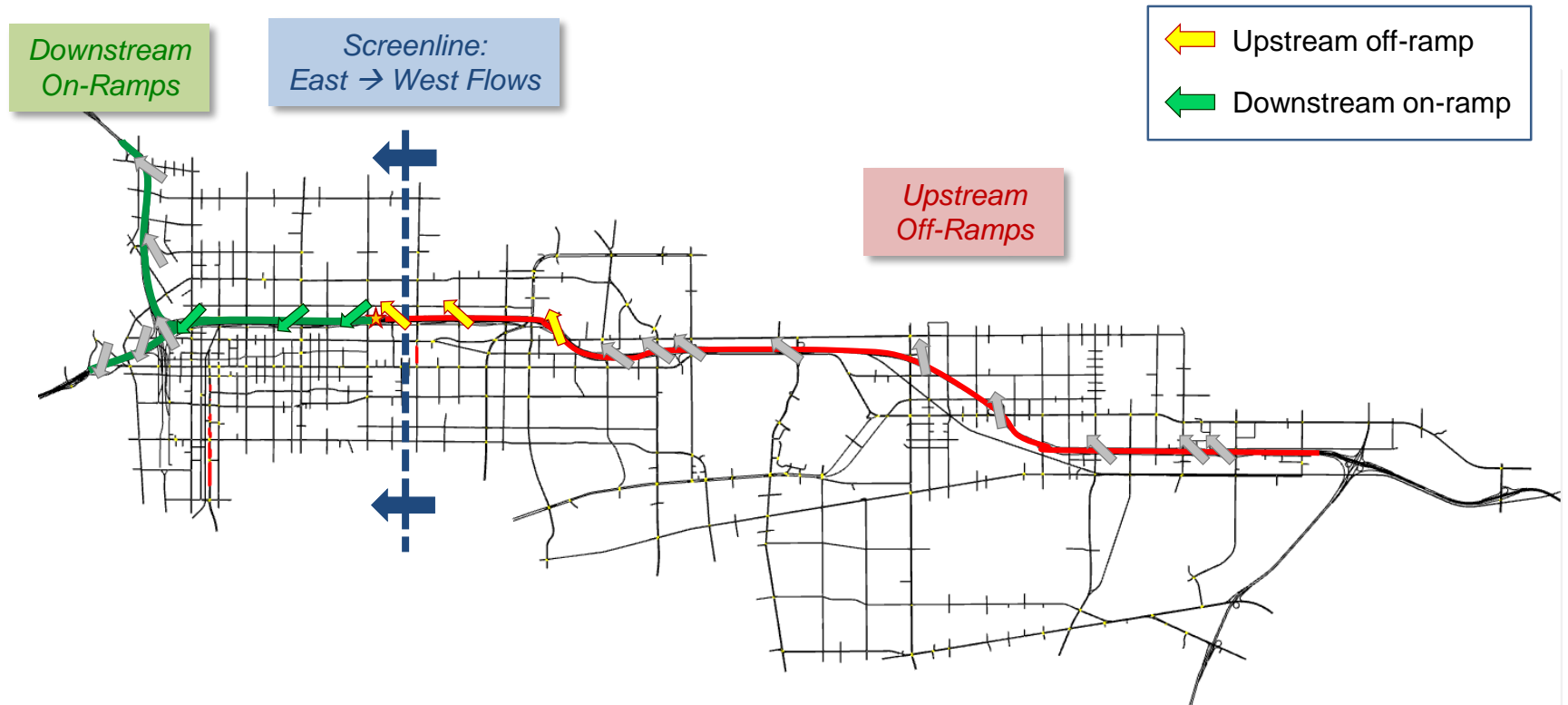
A diagram of a 135s arterial corridor. A red line runs horizontally across the top, with a green circle labeled "Green Ball" at the left end. Below the red line, there are several yellow circles, each labeled "135s". Two purple arrows labeled "Arterial Guidance" point left towards the "135s" labels. A black star is located on the red line between the second and third "135s" labels. The diagram is set against a background of a road network with dashed lines.

# Decision Scorecard

One-hour simulation for decision support as run behind the scenes in the existing system

# Flow Stats

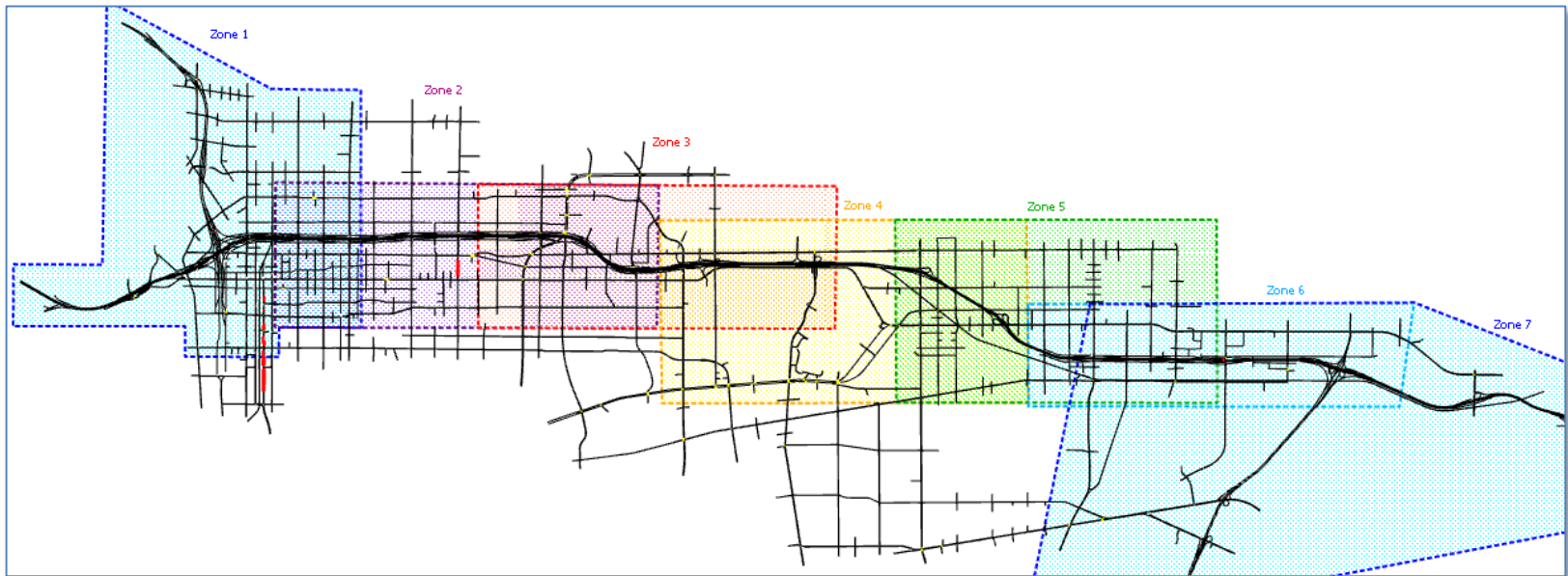
71



# Area Stats

72

- **VMT, VHT, Delay, Average Speed within**
  - ▣ Specific zone
  - ▣ Combination of zones covering incident congestion





# Freeway / Detour Stats

73

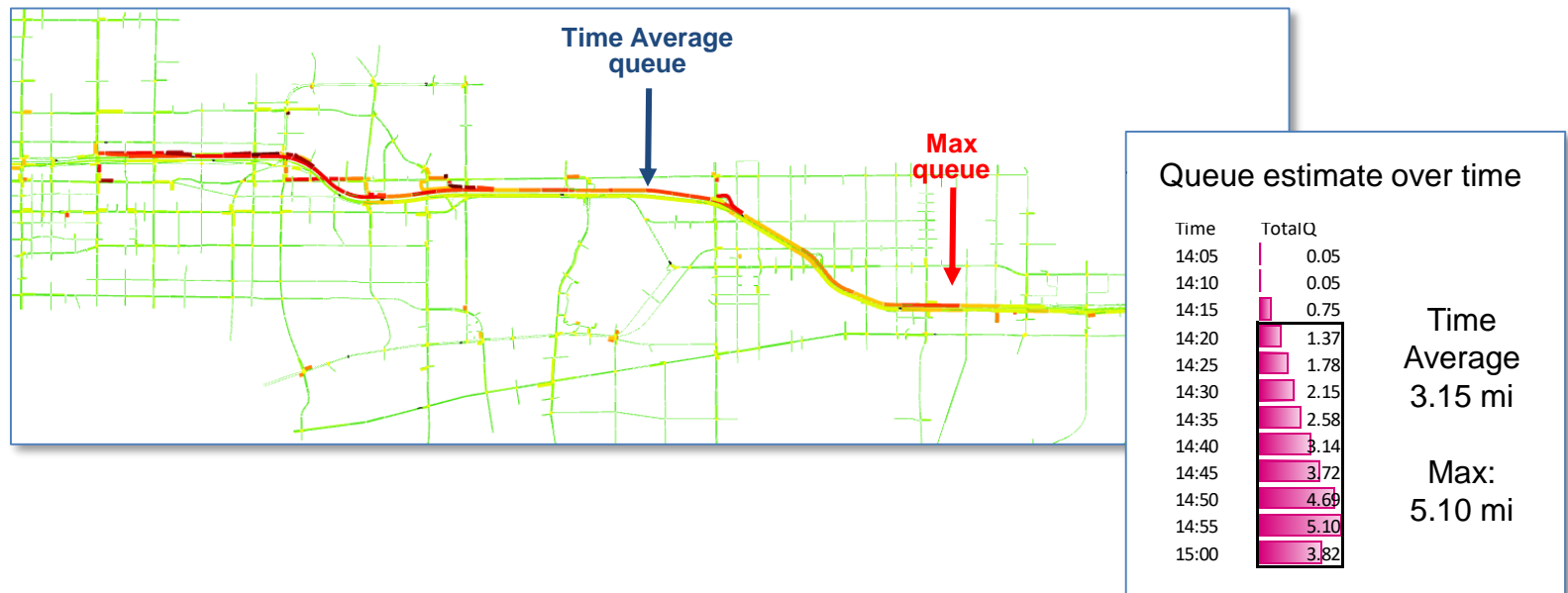
- **VMT, VHT, Delay, Average Speed along**
  - ▣ Freeway segment from corridor end (I-605, SR-134) to incident ■
  - ▣ Detour(s) considered ■



# Queue Stats

74

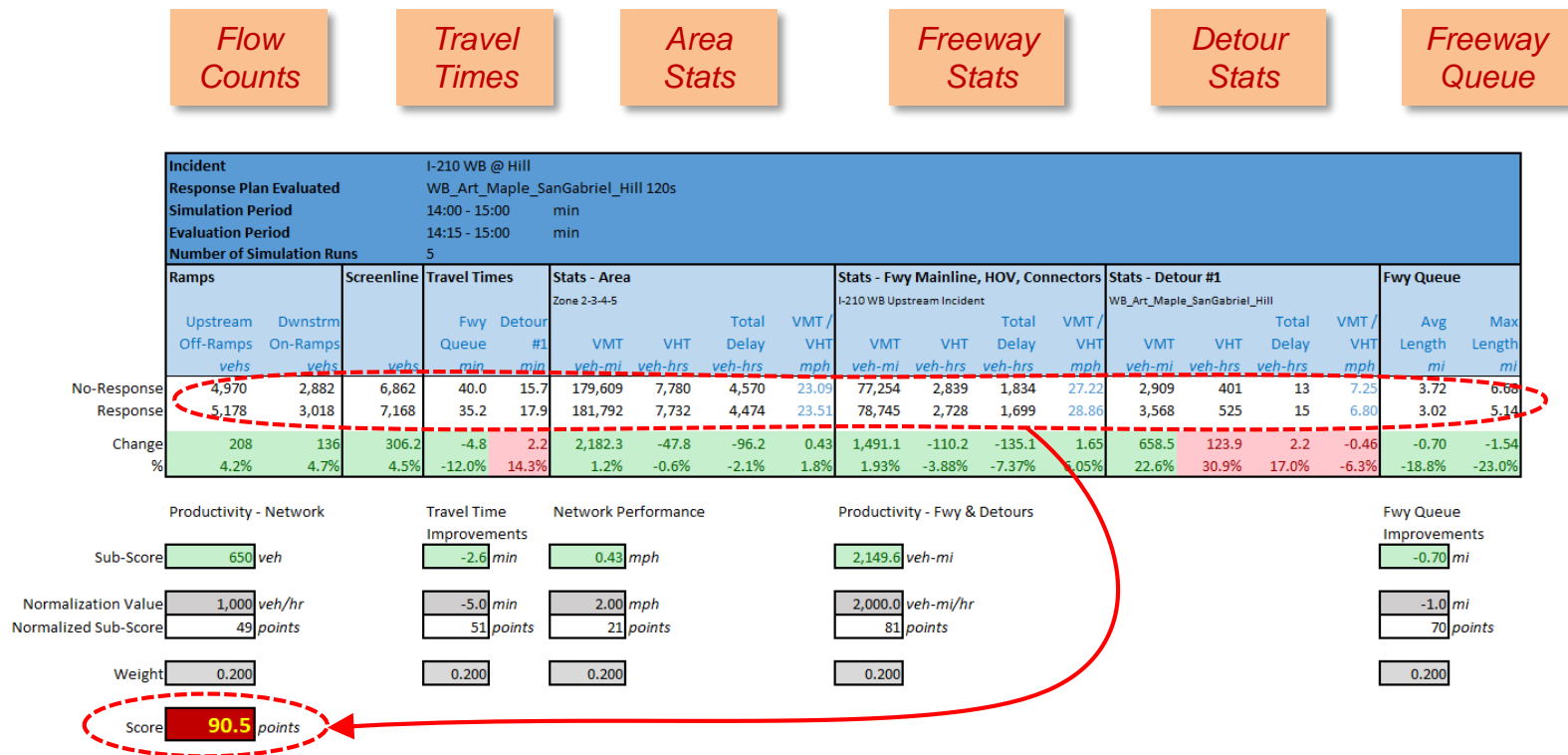
- **Average and max 15-mph back of queue**
  - ▣ Estimated only while incident is active



# Resulting Scorecard

75

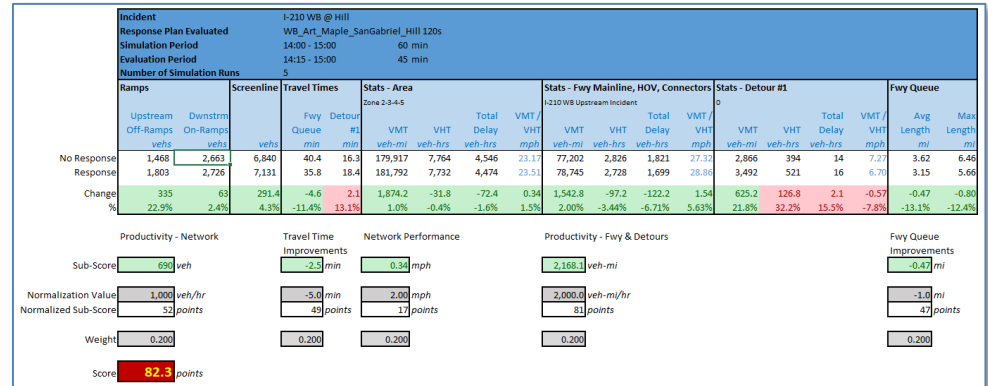
## □ Conversion of all collected stats into a single evaluation score



# Response Recommendation

76

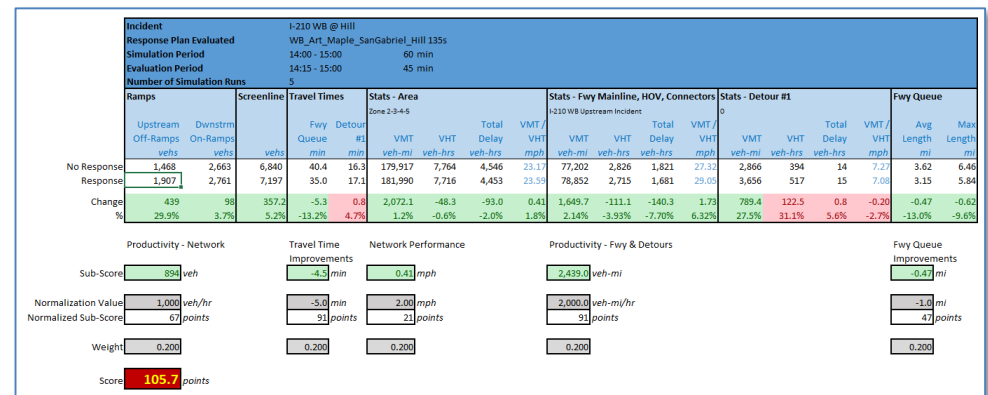
120s Cycle  
Score: 82.3



135s Cycle  
Score: 105.7



Recommends  
135s Cycle Response



# After-the-fact Incident Evaluation

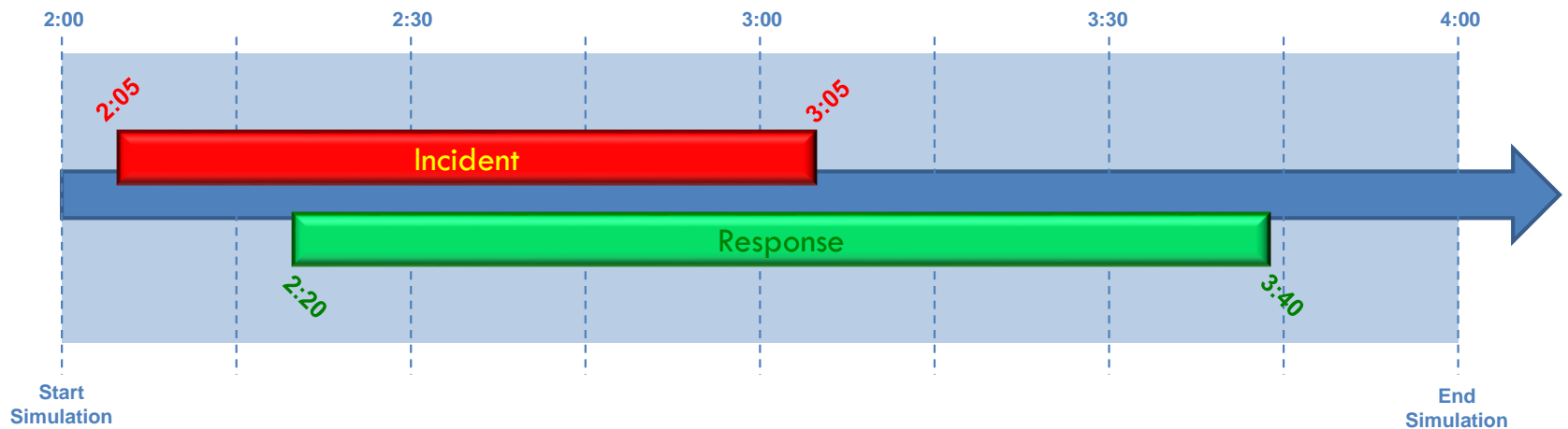
Longer simulation for a full accounting of traffic benefits

This kind of retrospective evaluation can be performed after the incident to refine future operations

# Evaluation Setup

78

## □ Evaluation period



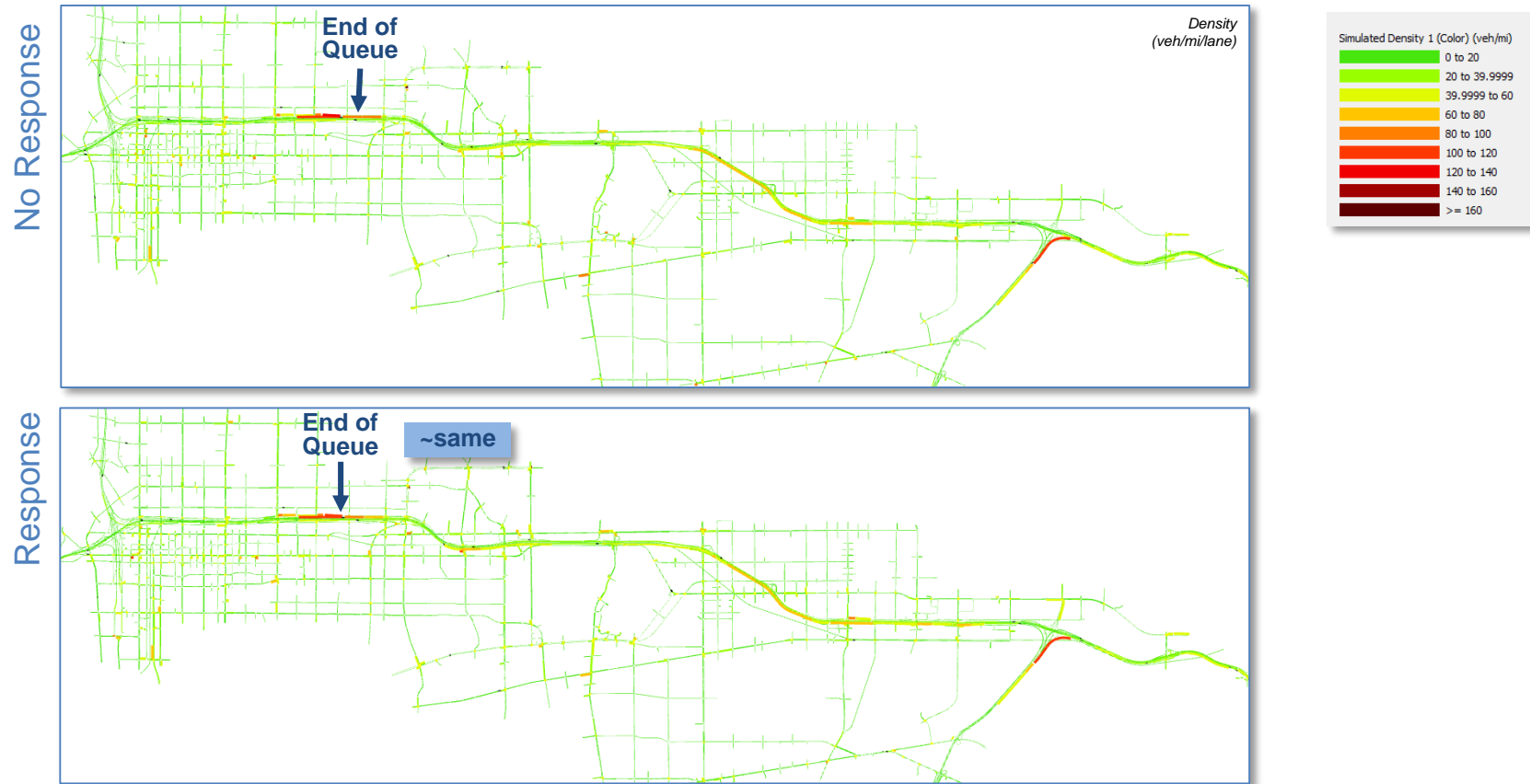
## □ Simulation replications

- 5 runs for each scenario → Average results taken to reduce simulation stochastic variability

# Simulation Results

79

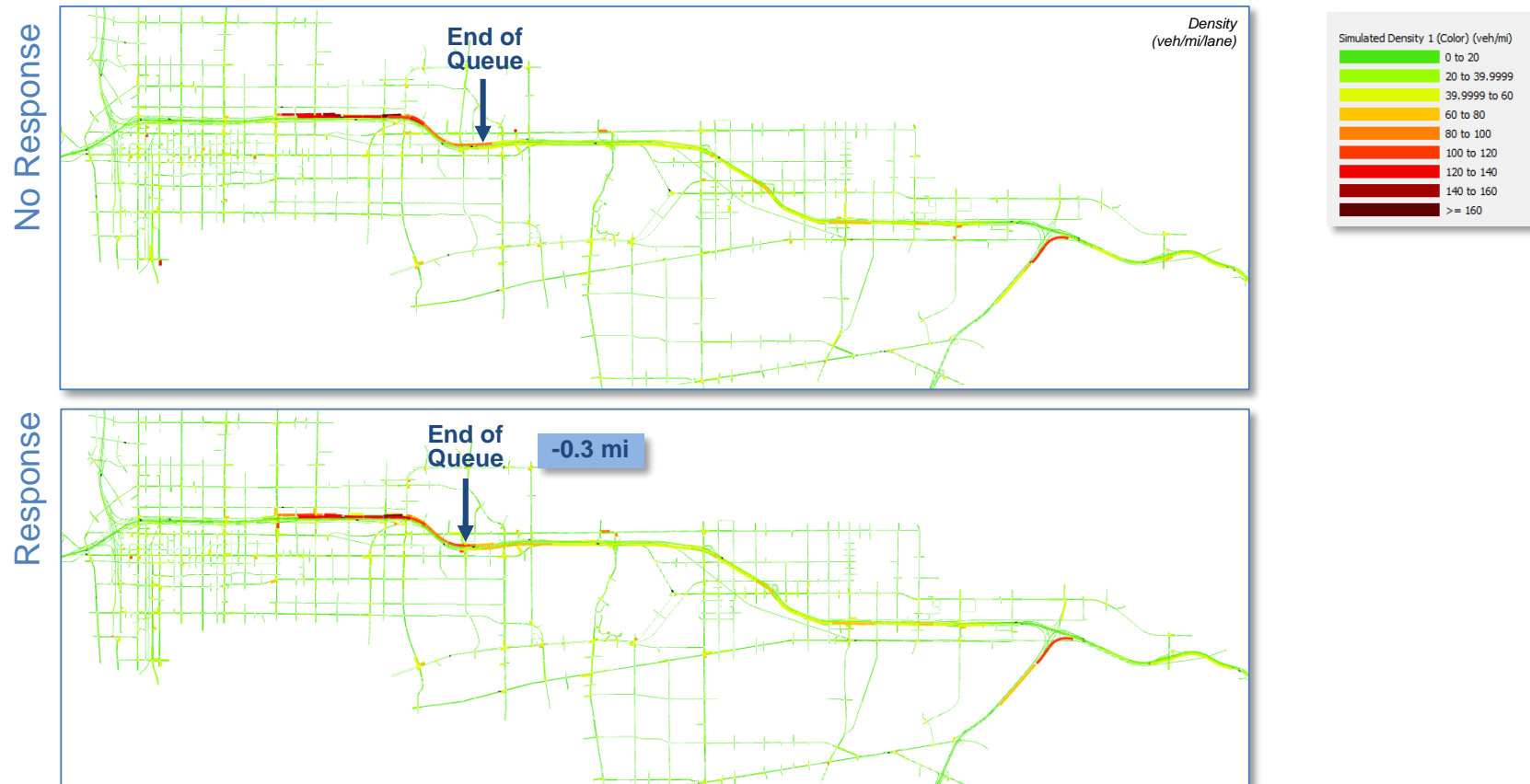
## □ 2:15 PM – 10 min into incident



# Simulation Results

80

- 2:30 PM – 25 min into incident / 10 min into response

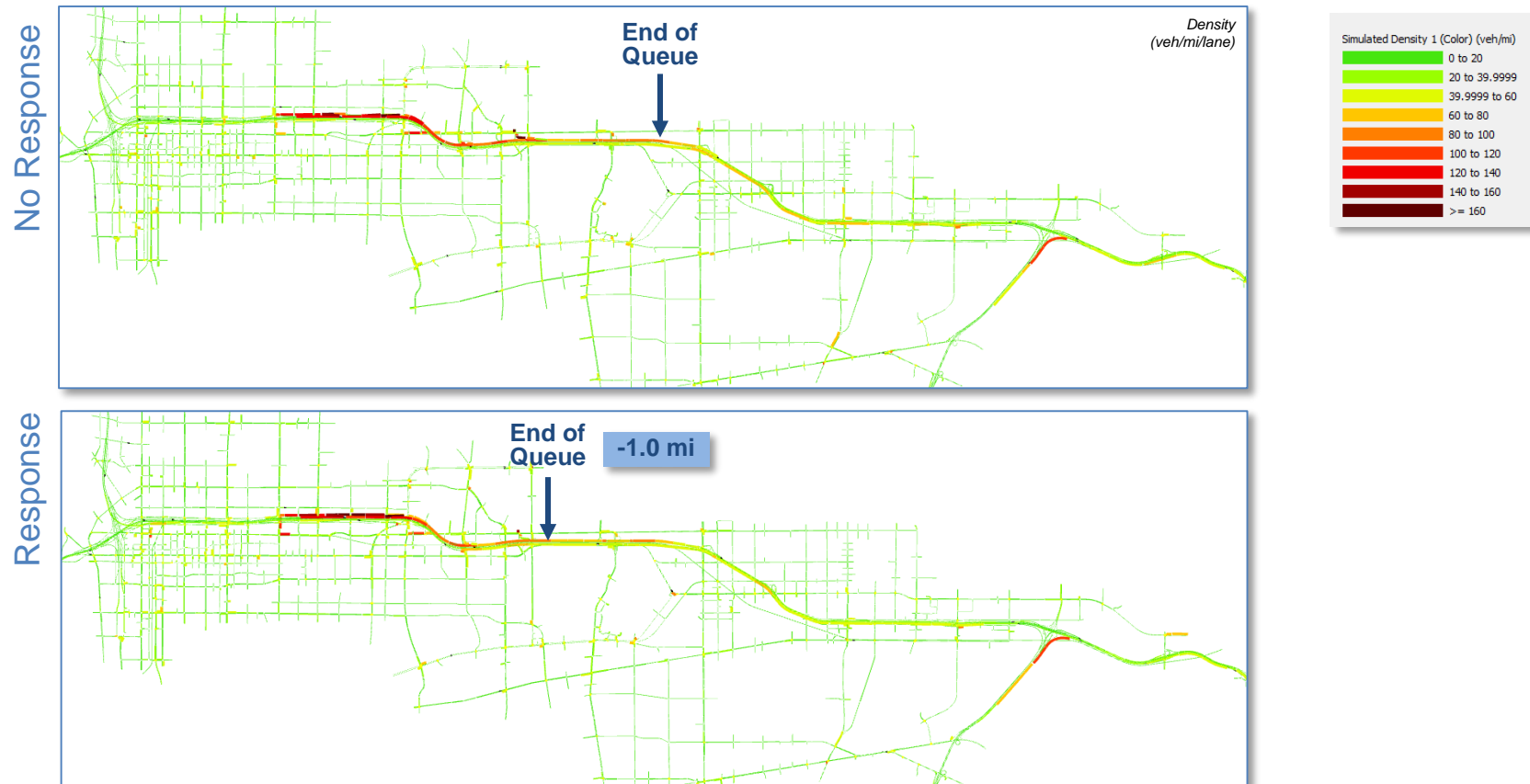




# Simulation Results

81

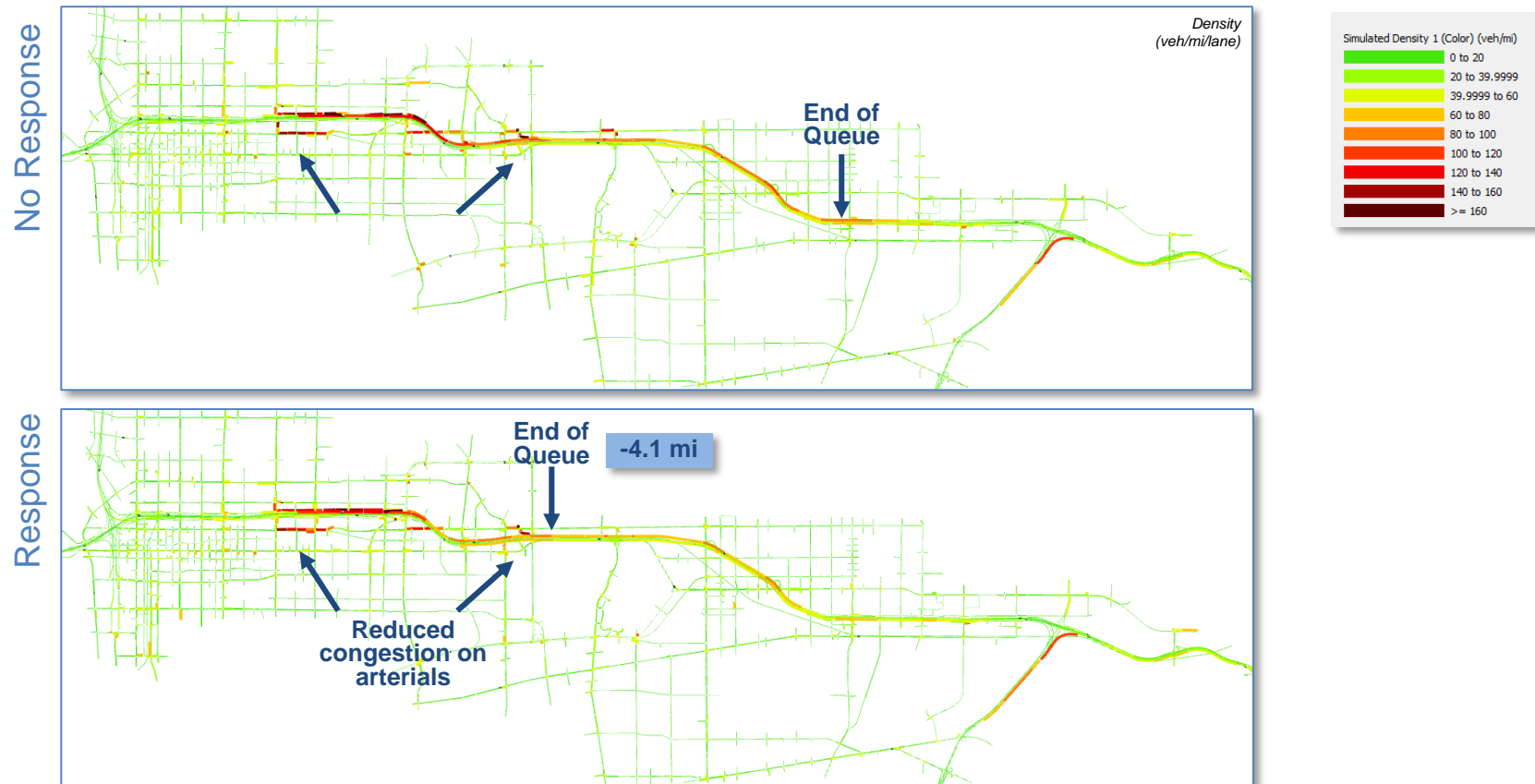
- 2:45 PM – 40 min into incident / 25 min into response



# Simulation Results

82

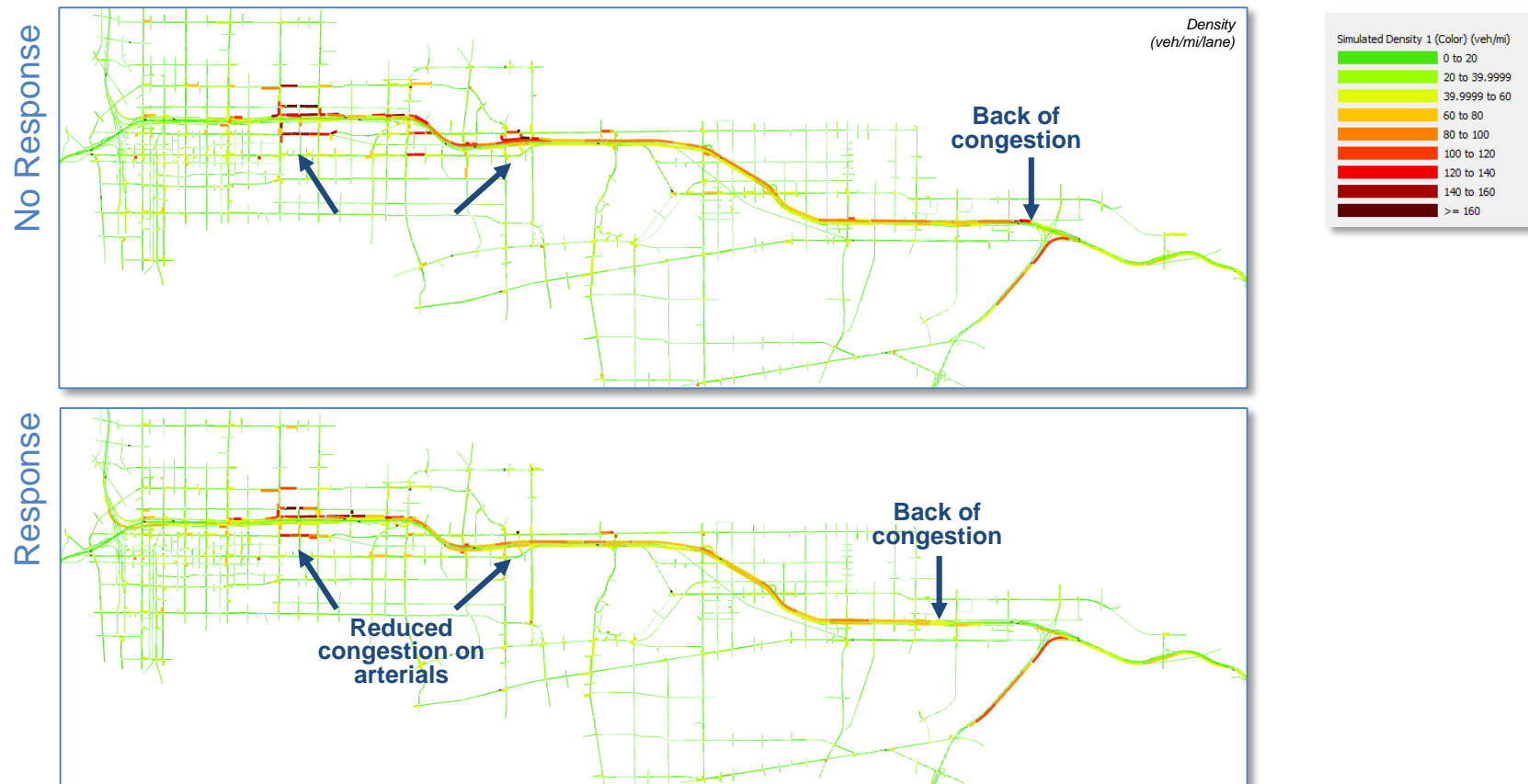
## □ 3:00 PM – 55 min into incident / 40 min into response



# Simulation Results

83

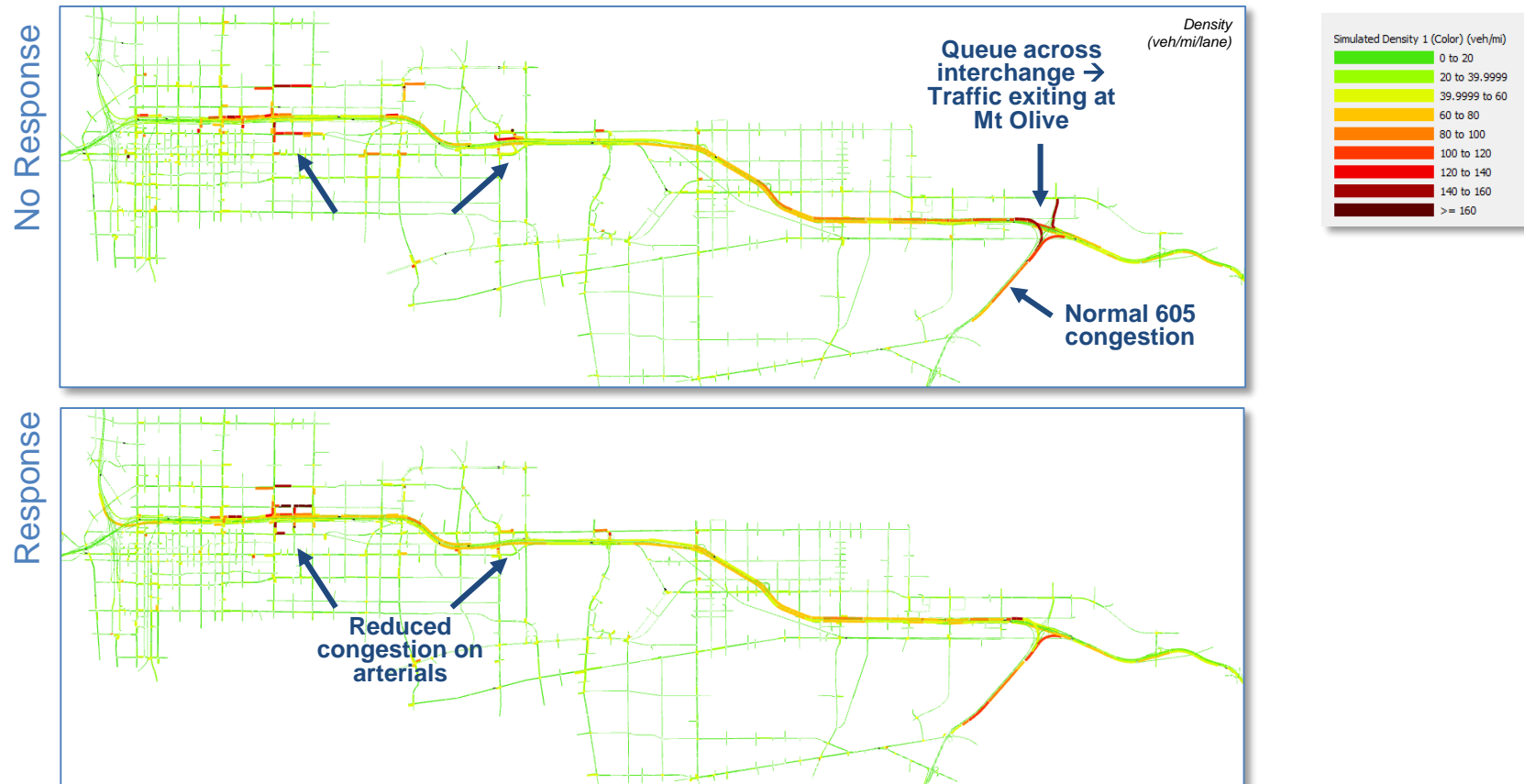
- 3:15 PM – 10 min after incident end / 55 min into response



# Simulation Results

84

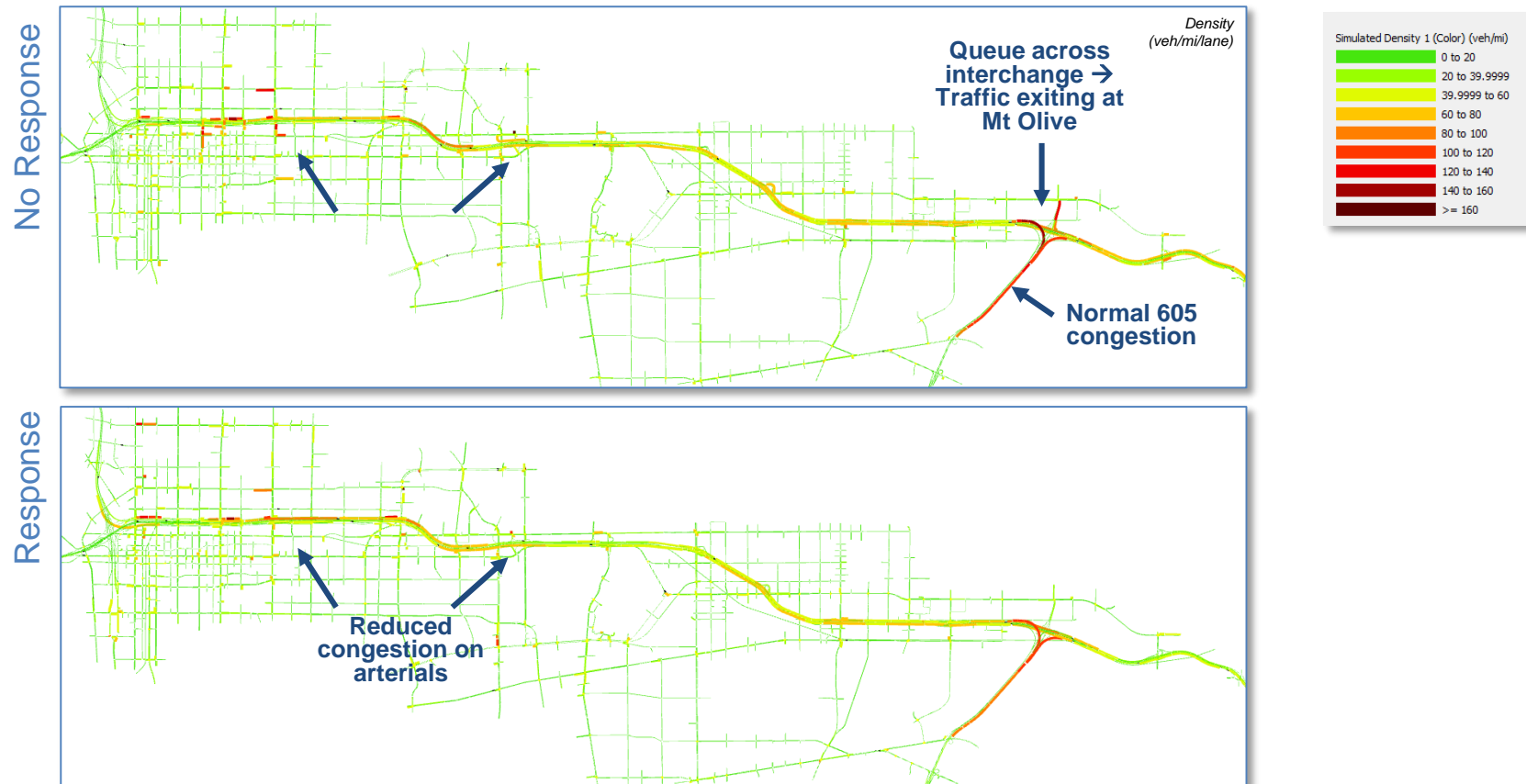
## □ 3:30 PM – 1hr 10 min into response



# Simulation Results

85

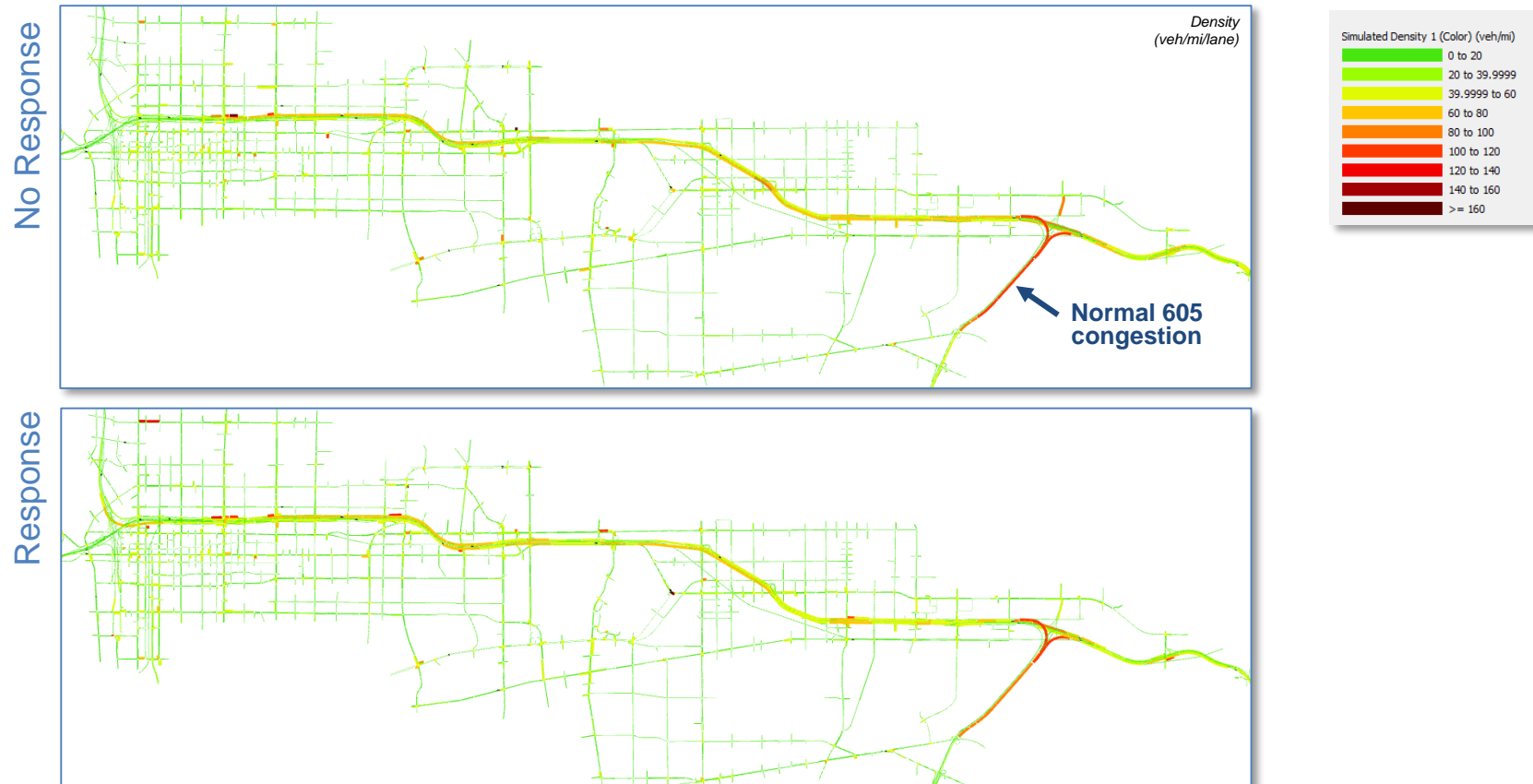
## □ 3:45 PM – 5 min after response termination



# Simulation Results

86

## □ 4:00 PM – Return to normal



# Highlights of Response Plan Benefits

87

- **Upstream off-ramp flow increases by 428 vehicles (+12.7%)**
- **Freeway Travel time reduced by 4.8 minutes (-12.9%)**
- **System benefits including arterial and freeway:**
  - ▣ VMT increases by 3418 veh-miles (+0.8%)
  - ▣ Delay reduced by 507 veh-hours (-4.3%)
- **Freeway max queue reduced by 2.0 miles (-27.6%)**

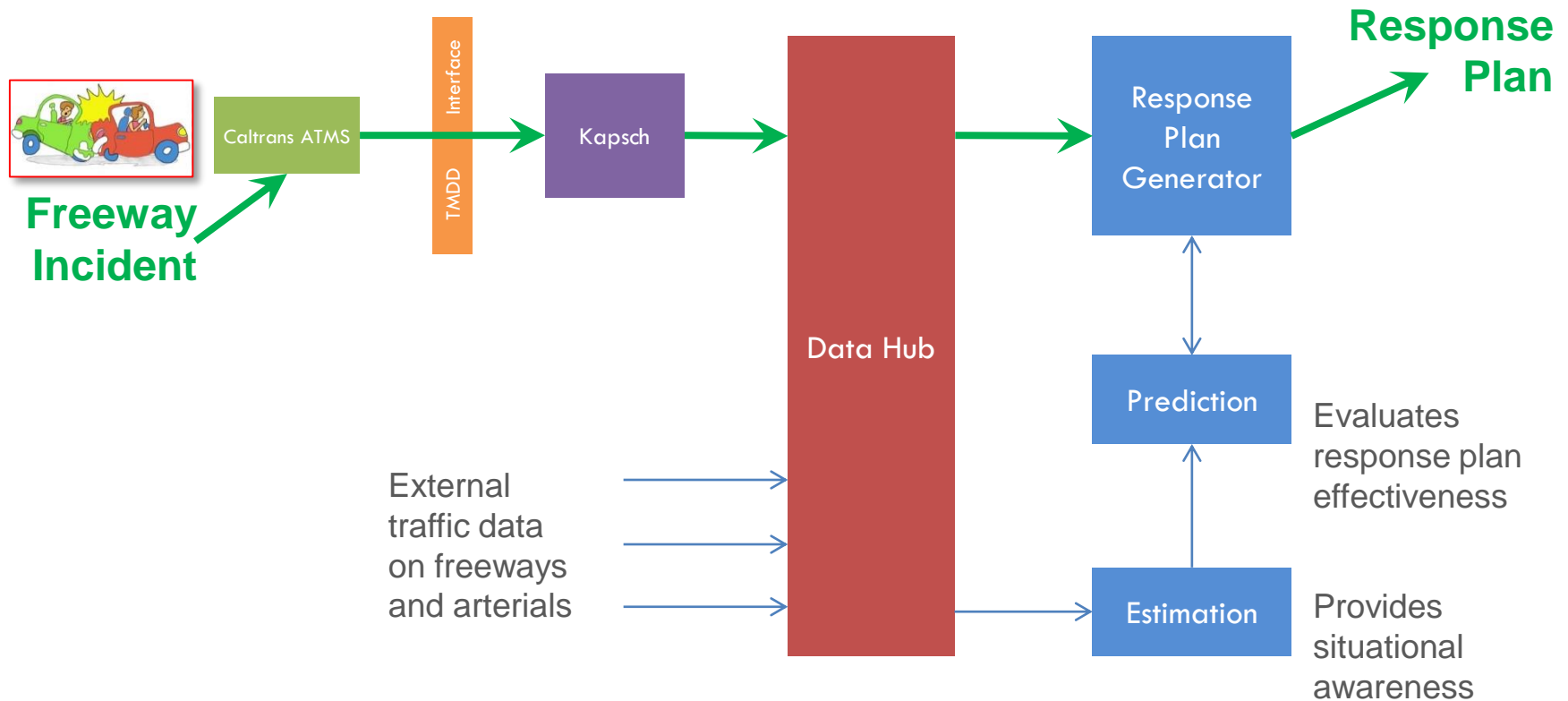




# System Integration is Happening

89

- An ATMS incident triggers response plan generation



# Accomplishments

90

- **The Connected Corridors system works seamlessly with real existing systems**
- **This demonstration is working with the Caltrans Test ATMS and Kapsch EcoTrafIX**
- **The Connected Corridors Data Hub and Test DSS manage a great deal of complexity beneath the surface**
- **For a one-hour, three-lane incident in this demonstration, projected benefits include:**
  - ▣ Arterial and freeway delay reduced by **507 veh-hours** (-4.3%)
  - ▣ Freeway max queue reduced by **2.0 miles** (-27.6%)



91

# Data Quality

# I-210 – Freeway Data Quality

92

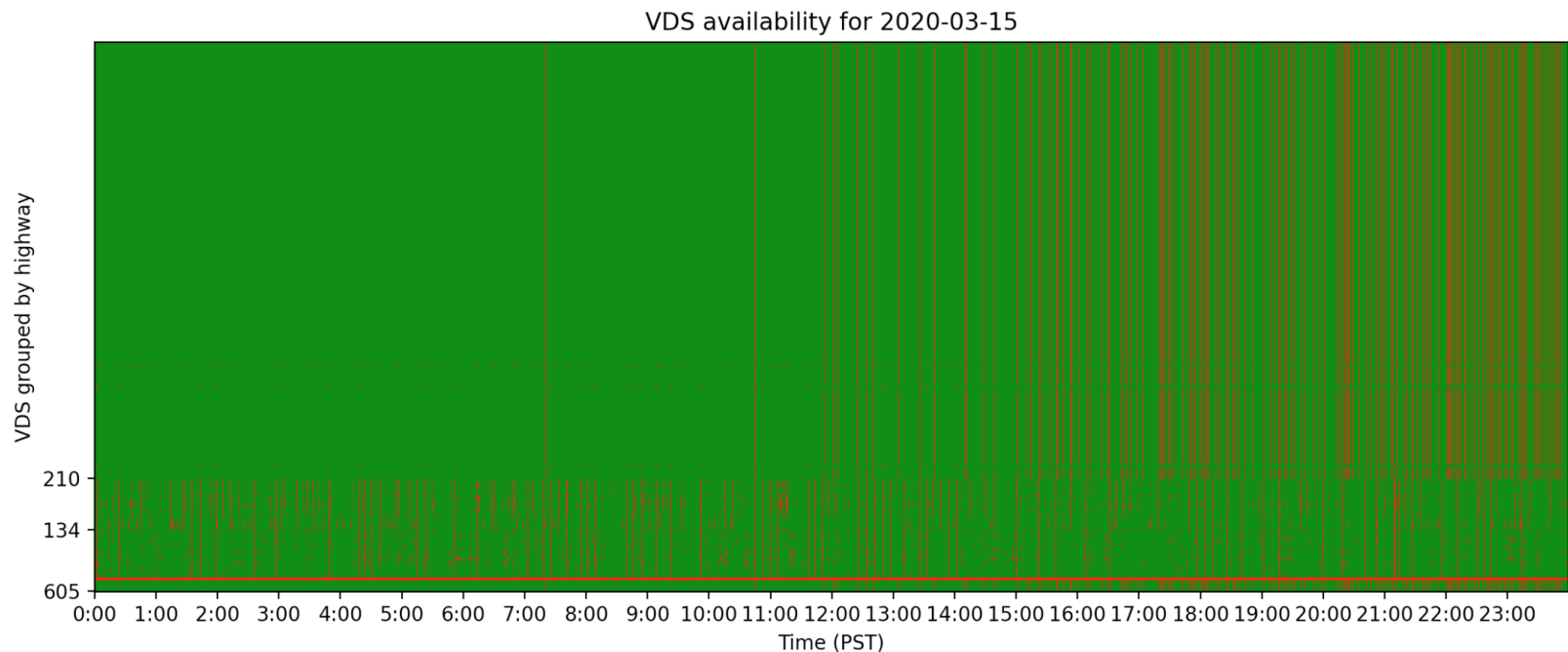
- **Despite recent outages core I-210 above 93%**
  - ▣ SR-134 is under construction through May
  - ▣ I-605 lost about 6 days of data but coming back on line

Freeway Section	Direction	Sensor Availability Percentage	Sensor Availability Target	Past Target Accomplishment	Date of Degradation
I-210 PM 22.6 - 25	East	81.4%	90%	na	na
	West	85.7%	90%	2/8/2020	3/7/2020
I-210 PM 25 - 43.25	East	93.1%	90%	3/7/2020	
	West	93.4%	90%	2/8/2020	
SR-134 PM 11.4 - 13.5	East	50.7%	90%	3/21/2020	4/4/2020
	West	54.2%	90%	3/21/2020	4/4/2020
I-605 PM 22.93 - 28	North	68.0%	90%	1/18/2020	4/4/2020
	South	67.3%	90%	3/7/2020	3/14/2020

# Real-time I-210 Freeway Data Quality

93

## □ Determining trade-offs between latency, aggregation, and robustness



Red horizontal streak → no data from one VDS

Red vertical streak → no data for one timestamp

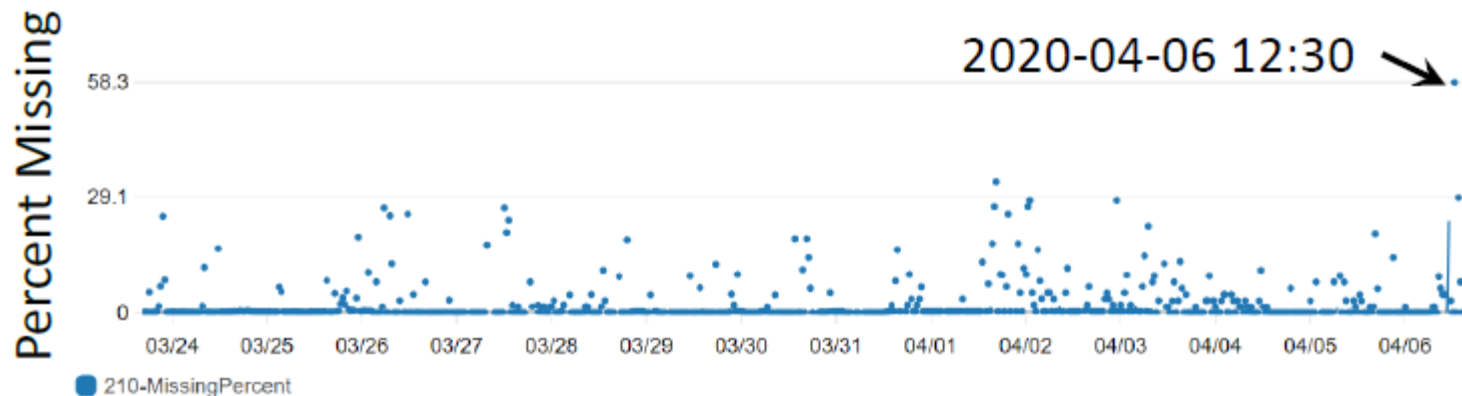
Data available

Not available

# Real-time I-210 Freeway Data Quality

94

- **Real-time feed for PeMS D7 data on I-210 corridor**
  - ▣ Monitoring percentage of VDS missing every 30 minutes
  - ▣ Data drops are typically short-lived
  - ▣ Loss of data will affect estimation results



# Arcadia Data Quality

95

## □ **Detector Inventory**

- ▣ 543 detectors at 52 intersections
- ▣ 264 of them (at 19 intersections) are on detour routes

## □ **Detector Health**

- ▣ Overall detector health rate (on detour routes) in 70% range

# LACO, Monrovia and Duarte

96

- **Detector Inventory**
  - ▣ 123 detectors at 21 intersections
    - 54 from LACO, 43 from Monrovia, and 26 from Duarte
  - ▣ 107 of them (at 18 intersections) are connected to KITS and on detour routes
- **Data feed temporarily stopped due to improvements to data quality code**
- **No update on detector health**



- **Analysis of ATMS TMDD Messages**
  - ▣ Reviewed missing assets on westbound side of I-210 freeway
  - ▣ Parsons updated corridor database table
  - ▣ Collecting data for second review
- **Analysis of TSMSS data structures**
  - ▣ Bug reported in date-time format and fix sent by McCain today
  - ▣ In-depth analysis to continue
- **Conducted an initial Changeable Message Sign data evaluation**  
from the production ATMS

# Stakeholder Progress

# Response Plans – Stakeholder Progress

99

- **Pasadena (80 CC Intersections)**
  - ▣ All intersections are programmed with Connected Corridors flush plans
- **LA County (6 CC Intersections)**
  - ▣ All 6 timing sheets completed and ready for implementation
- **Monrovia and Duarte (17 CC Intersections)**
  - ▣ 3 revised signal plans completed along Huntington



# Response Plans – Stakeholder Progress

100

- **Arcadia (19 CC Intersections)**
  - ▣ 17 intersections are programmed with Connected Corridors flush plans on Huntington, Foothill, and Santa Anita
  - ▣ 2 additional intersections awaiting installation of 2070 controllers on Colorado
- **Caltrans TSMSS (15 CC Intersections)**
  - ▣ All signal plans loaded onto controllers (!!!)



101

# Next Steps

# Next Steps

102

- ❑ **Read real incident data from the production ATMS**
- ❑ **Generate and review the Response Plans based on this data**
- ❑ **Continue systems integration**
- ❑ **Refine plan for demonstration at 2020 ITS World Congress**



**Thank You**  
**and**  
**Next Meeting**  
**(Suggest Tuesday June**  
**9th @ Zoom)**

