SUMMIT ON CROWDSOURCING FOR OPERATIONAL & TRAVELER INFORMATION STRATEGIES

September 14, 2017

I-95 CORRIDOR COALITION

Who's Here?

73 Registered

Travel Info Services

HOGs: Del Val, Tri-State, Potomac

Other Coalition Members

In-Person	Via Web
44	29

Sponsored by

Travel Information Services Committee & Delaware Valley HOGs

Meeting Requests

This is an in-person & virtual meeting – we would like a meaningful experience for all participants

- ***All Participants – in-person and via webcast***
  - Questions will be addressed at the end of each presentation
- ***Participation in-person***
  - Please give your name and agency before asking your question (at least the first time)
  - Please remember all sounds are picked up by the audio system
- ***Participation via webcast***
  - Your phone line will be muted throughout the webcast until the open discussion
  - During the Presentations – Please ask your questions through the chat box
  - During the Open Discussion – Please keep your phone line muted until you are speaking

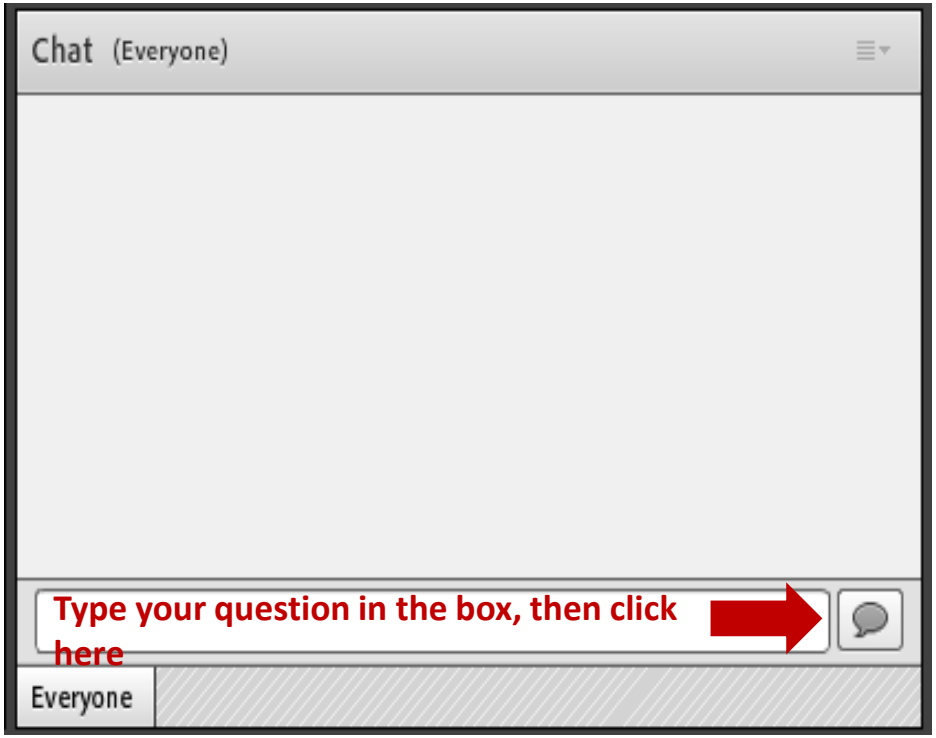
Additional Info For Webcast Participants

- The call-in phone number is:

- **Your phone line will be muted throughout the webcast (until the Open Discussion)**
- Please press *0 to speak to an operator for questions regarding audio
- Please call xxx-xxx-xxxx for difficulties with the web or audio application

For Web Participants:
Asking Questions

- Please pose your questions using the chat box
- Questions will be monitored then answered by the speakers during their presentation or at the end of their session



Other Housekeeping Items

- This web meeting is being recorded
- All materials will be available to participants after the web meeting
- Presentations will be posted to the I-95 Corridor Coalition website. Participants will receive a link to the presentations after they are posted

Welcome & Introductions

In-Person Attendees

Agency	Representative	Agency	Representative
Baltimore Metropolitan Council	Eileen Singleton	NJIT	Dejan Besenski, Kitae Kim, Timothy Medina
Connecticut DOT	Richard Launder	NJTPA	Mary Ameen, Solomon Caviness
County of Mercer, NJ	Matthew Lawson	North Carolina DOT	Jason Streich
District DOT	Kelli Raboy	PA Turnpike	Mike Pack, Matthew Shrik
DVRPC	Jesse Buerk, Paul Carafides, Chris King, Laurie Matkowski, Justin Neff	PennDOT	Emmanuel Anastasiadis, Jerome Frederick, Mark Kopko, Ryan McNary
FHWA	James Paral	Port Authority of NY & NJ	Sam Aldaher, Theodore Bobowsky, Brendan Kaplan
Jacobs Engineering	Stanley Niemczak	Total Traffic & Weather Network / iHeart Media	Hubert Clay
Kapsch TrafficCom	Robert Blick, Ken Bush, Inamdar Imran	TRANSCOM	Rob Bamford
Maine DOT	Clifton Curtis	UMD CATT Lab	Michael Pack
Maryland DOT	Rick Dye	Virginia DOT	Scott Cowherd
MassDOT	Chester Osborne	Vermont AOT	Robert White
New Hampshire DOT	Susan Klasen	I-95 CC	Denise Markow
New Jersey DOT	Sal Cowan, Jonathan Martinez, Gail Yazersky	I-95 CC Support	Karen Jehanian, Joanna Reagle

Web Meeting Participants

Agency	Representative	Agency	Representative
Colorado DOT	Weiyan Chen	North Carolina Turnpike Authority	Dennis Jernigan, Beau Memory, Rachel Ruiz
Delaware County TMA	Lauren Turton	NJDOT	Susan Catlett, Kevin Hall, Sean Henry, Michael Juliano, Pete McCloskey, Veronica Murphy, Wayne Patterson
FDOT	Russell Allen, Derek Vollmer	NJTPA	Gabrielle Fausel
FHWA	Wenjing Pu	NREL	Stan Young
Georgia DOT	Mark Demidovich	NY State DOT	Rita Carlson
GEWI NA	Eli Sherer	South Carolina	Rob Perry
Jacobs Engineering	Jeff Randall, Diederick VanDillen	UMD CATT Lab	Ignacio Tous
MD Transportation Authority	Katherine Raynor	VDOT	Mike Fontaine, Amy McElwain, Paul Szatkowski
North Carolina DOT	Kelly Wells,	I-95 CC Support	Dotty Drinkwater

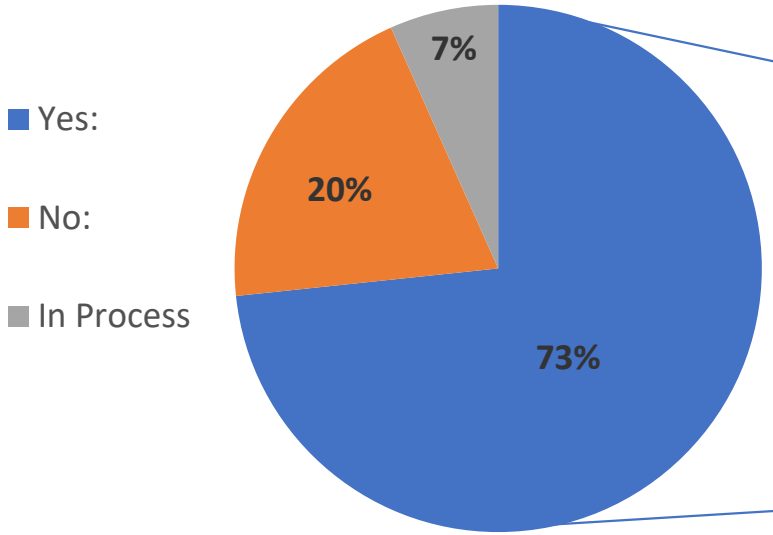
Agenda

Time	Topic	Speaker
10:00 am to 10:30 am	Welcome and Introductions	Denise Markow, I-95 Corridor Coalition
10:30 am to 10:55 am	Filling the Real-time Data Gaps with WAZE and Other 3rd-Party Data	Michael L. Pack, UMD CATT Lab
10:55 am to 11:20 am	Pros and Cons of "The Crowd" in Crowdsourced Data and How to Manage Them	Ted Bobowsky & Brendan Kaplan, Port Authority NY & NJ
11:20 am to 11:35 am	Break	
11:35 am to 12:00 am	Integrating Waze data with Public Agencies' Data	Rob Bamford, TRANSCOM
12:00 pm to 12:25 pm	Maine Waze	Clifton Curtis, Maine DOT
12:25 pm to 1:10 pm	Working Lunch - Roundtable Data Discussion (45min)	All
1:10 pm to 1:35 pm	Highway Operations Center Traffic Desk - Using Crowdsourcing Applications for Traffic Incident Management	Chester Osborne, Massachusetts DOT
1:35 pm to 2:00 pm	Waze – FDOT Integration	Russell Allen, Florida DOT
2:00 pm to 2:25 pm	Evaluation of Waze Data	Mike Fontaine, Virginia DOT/VTRC
2:25 pm to 3:00 pm	Open Discussion	All
3:00 pm to 3:15 pm	Wrap up	Denise Markow

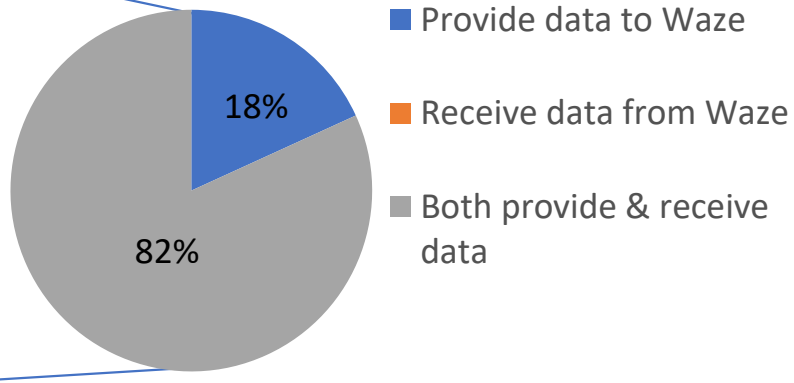
Overview
Crowdsourcing Survey

- Sent to all meeting registrants prior to event
- # of Participants - 23
- # of Participants Representing MPOs - 6
- # of Participants Representing DOTs - 17

Does your Agency currently participate in Waze Connected Citizens Program?

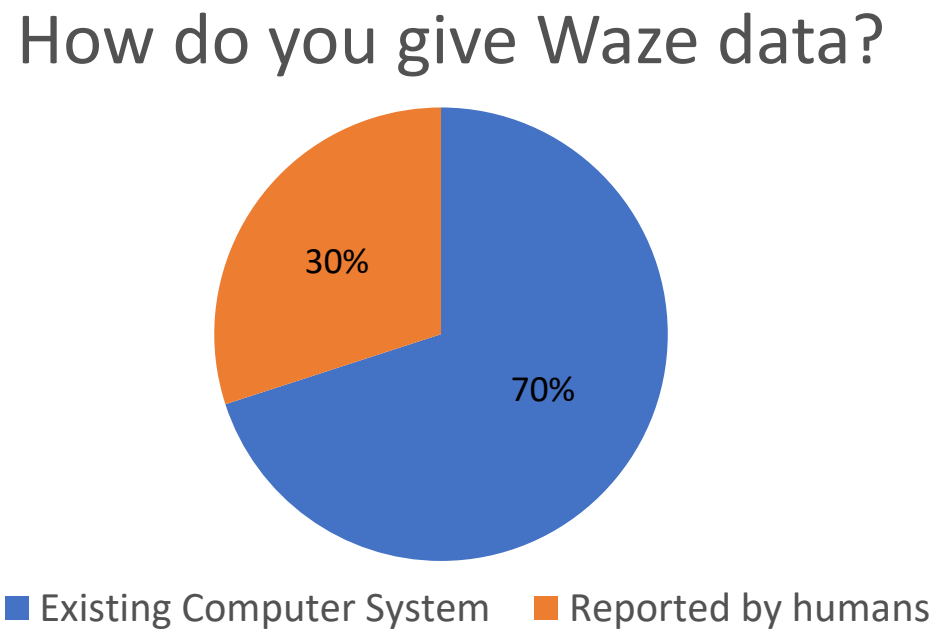


Describe your Waze data exchange:



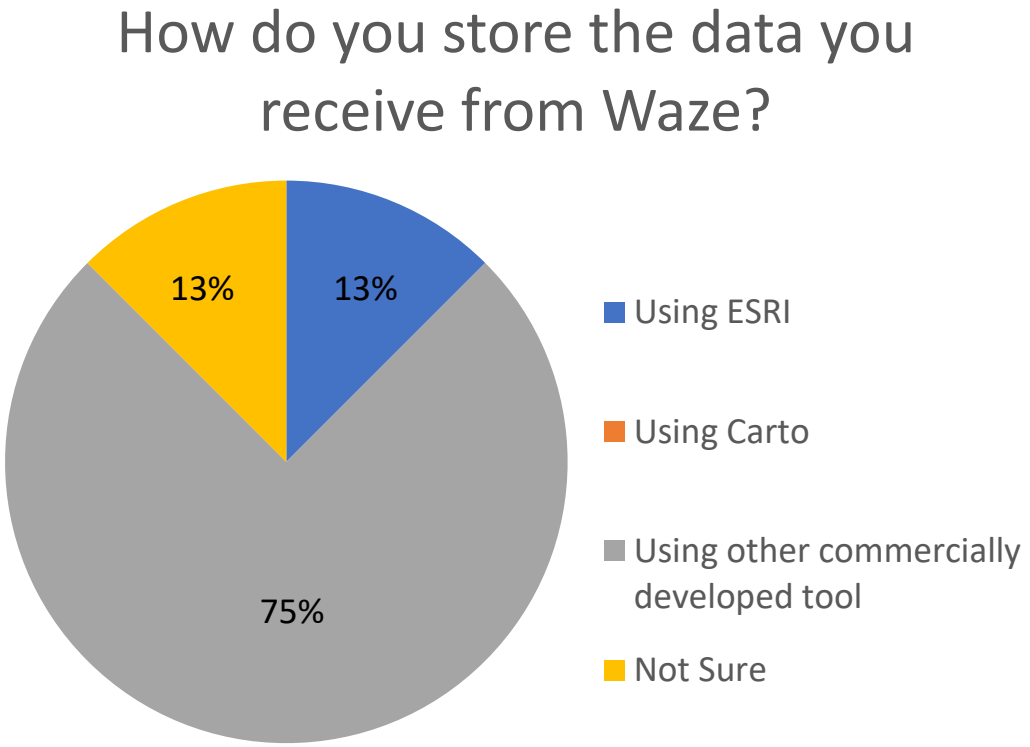
Giving Data to Waze
Crowdsourcing Survey

- Information provided to Waze
  - Hazards
  - Road Closures
  - Road Geometry
  - Places of Interest
  - Special Events
  - Construction



Getting Data from Waze
Crowdsourcing Survey

- Data received from Waze
  - Traffic Speed
  - Hazard – Potholes
  - Hazard – Crashes
  - Vehicles on Roadway
  - Weather
  - Relative Speed Histogram



Evaluating Waze data
Crowdsourcing Survey

- Does your agency work with the Waze community to affect changes to your roadway network?
  - Yes – 60%
  - No – 20%
  - Not Sure – 20%
- Does your agency filter the Waze data?
  - Yes – 60%
  - No – 10%
  - Not Yet – 30%
- Does your agency validate the Waze data?
  - Yes – 70%
  - No – 30%
- Does the public know your agency uses Waze?
  - Yes – 80%
  - No – 20%

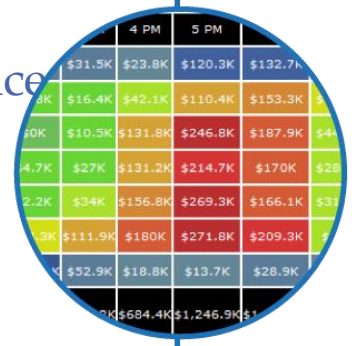
Introductions

Michael Pack
University of Maryland CATT Lab

Filling the Real-time Data Gaps with WAZE and Other 3rd-Party Data

Filling the Real-time Data Gaps with Crowdsourced Data

Performance Measures



Planning

Operations

Communications

CATT LABORATORY

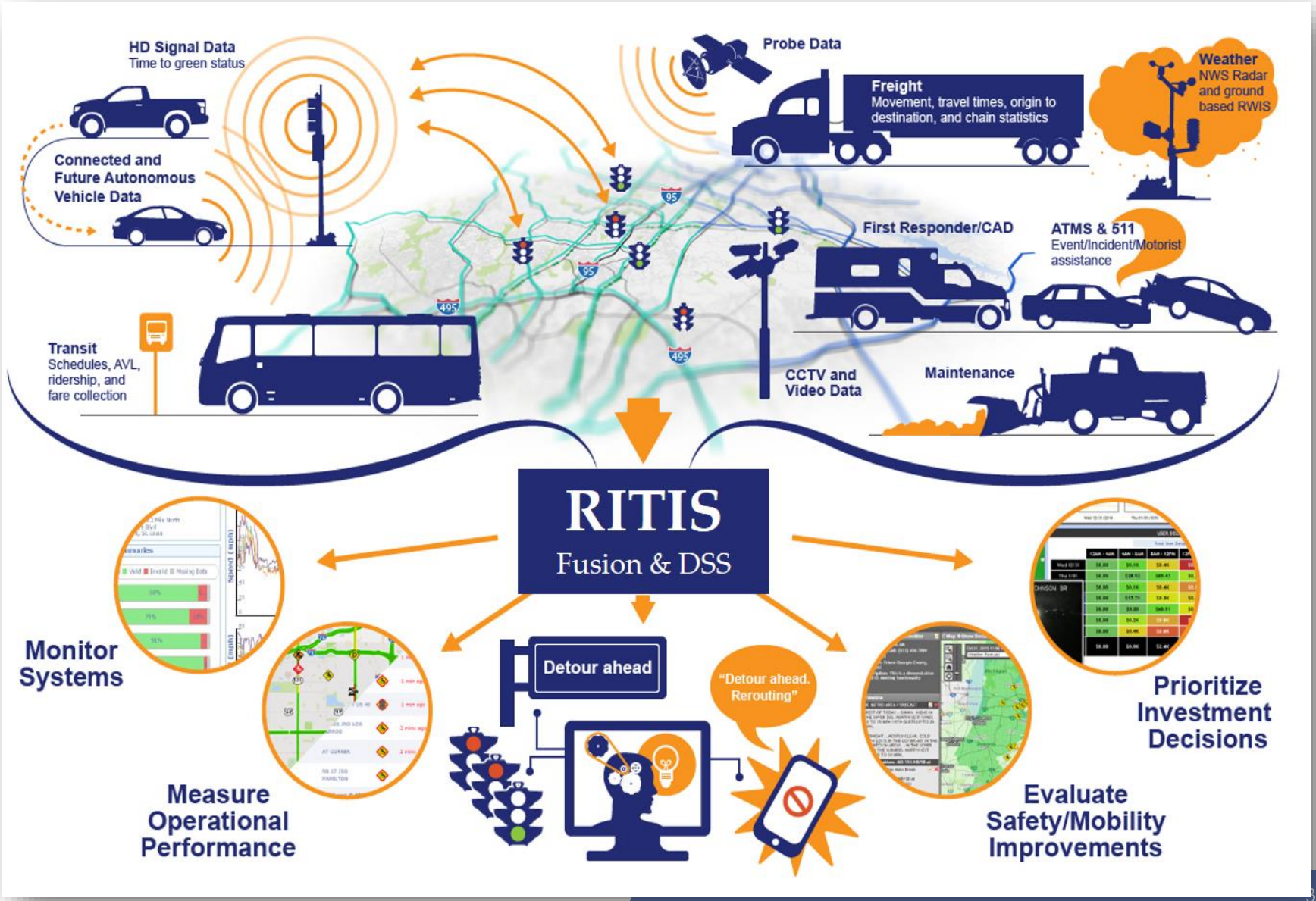
UNIVERSITY OF MARYLAND 18 56

Enabling Decision Making & Effective Communication

WAZE—another piece of the SA puzzle…

RITIS Data Analytics

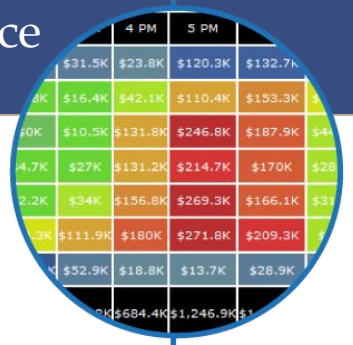
- 300+ data feeds from
  - State/Local DOTs
  - First Responders
  - Transit
  - Weather
  - Federal Gov
  - Military
- 7.5+ Billion data points every day
- 3rd Party Data Providers
  - HERE
  - INRIX
  - TomTom
  - WAZE
  - Verizon
  - Utilities
  - Etc.
- ~7,000 Users



Our Tasks

- Understand WAZE data's affect on operations and planning
- Facilitate the archiving of WAZE data for operations, planning, and research
- Explore solutions to WAZE data challenges including:
  - Integration with agency ATMS and 511 platforms
  - Duplicates (from WAZE)
  - Duplicates (WAZE and Agency/CAD/Other)
  - Long-term storage
  - Analytics
- Document recommended practices for negotiating data sharing agreements

Performance Measures

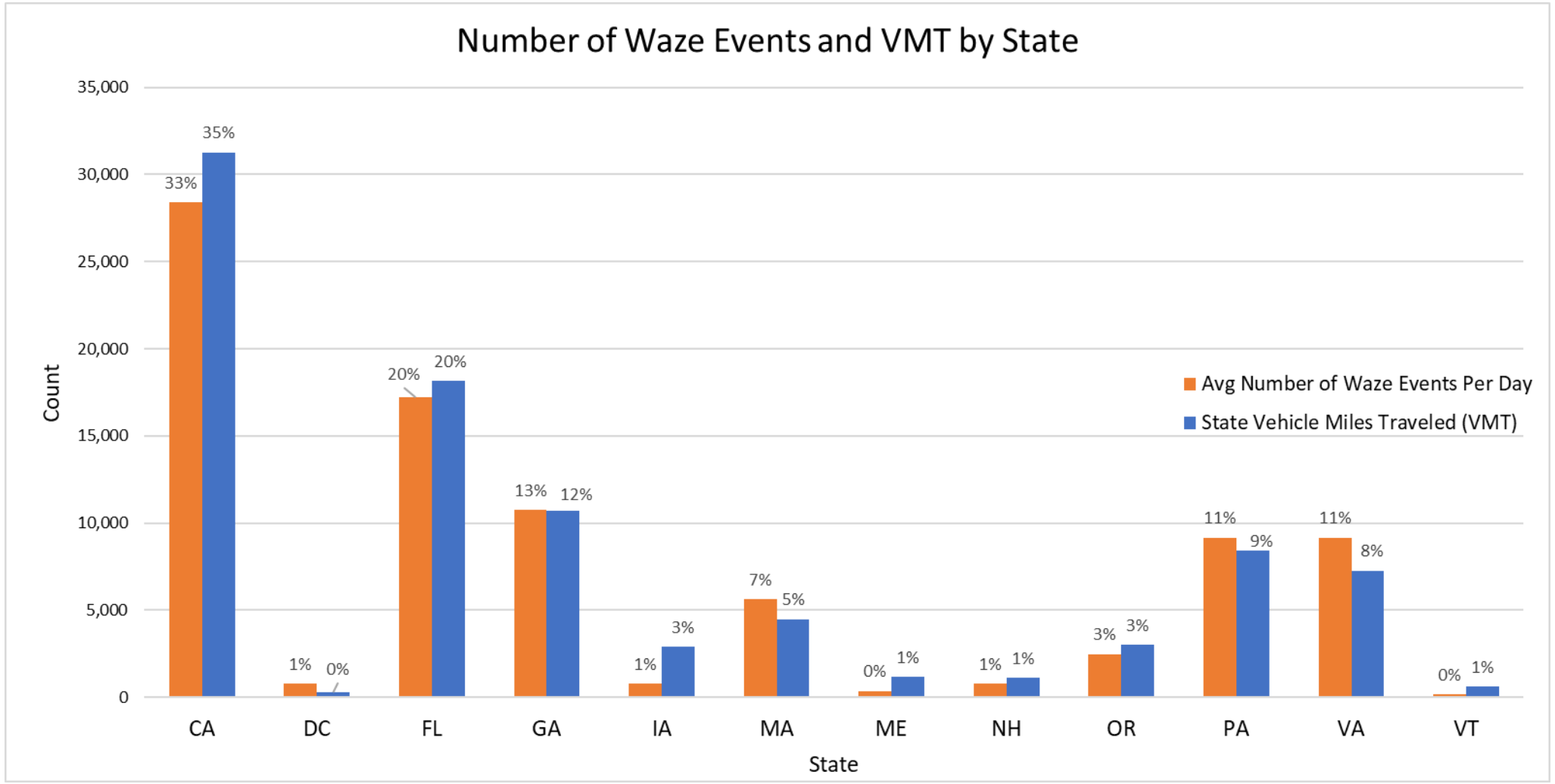


Planning

Operations

Communications

12 States for which we currently archive WAZE data

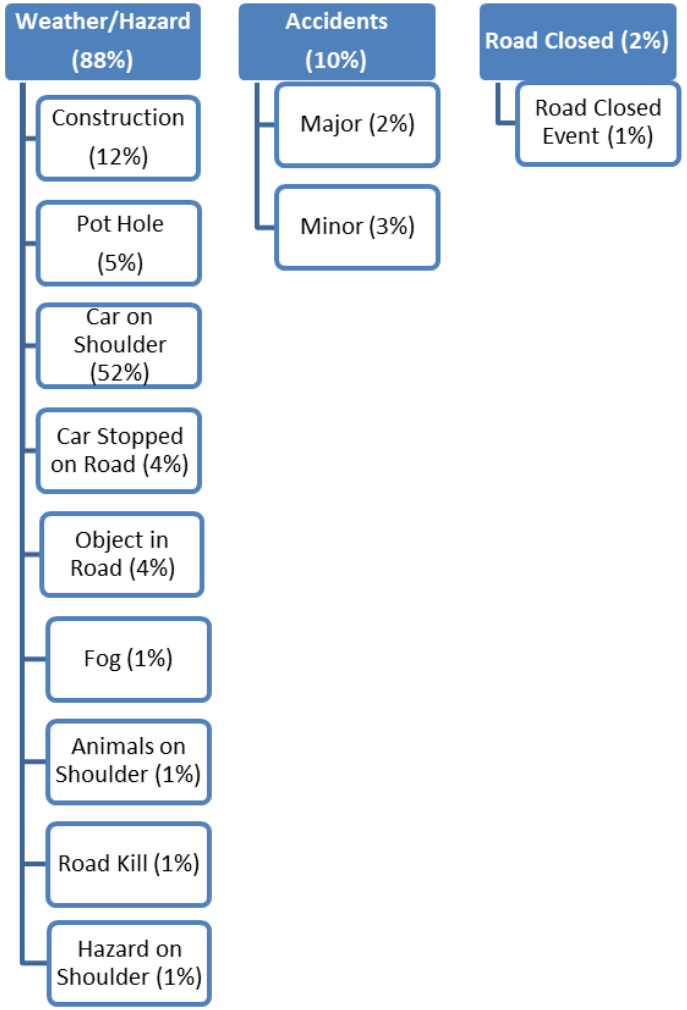


Note:

- Waze data excludes jams event type
- Waze 3 Month Period of 3/17 – 5/17 displayed

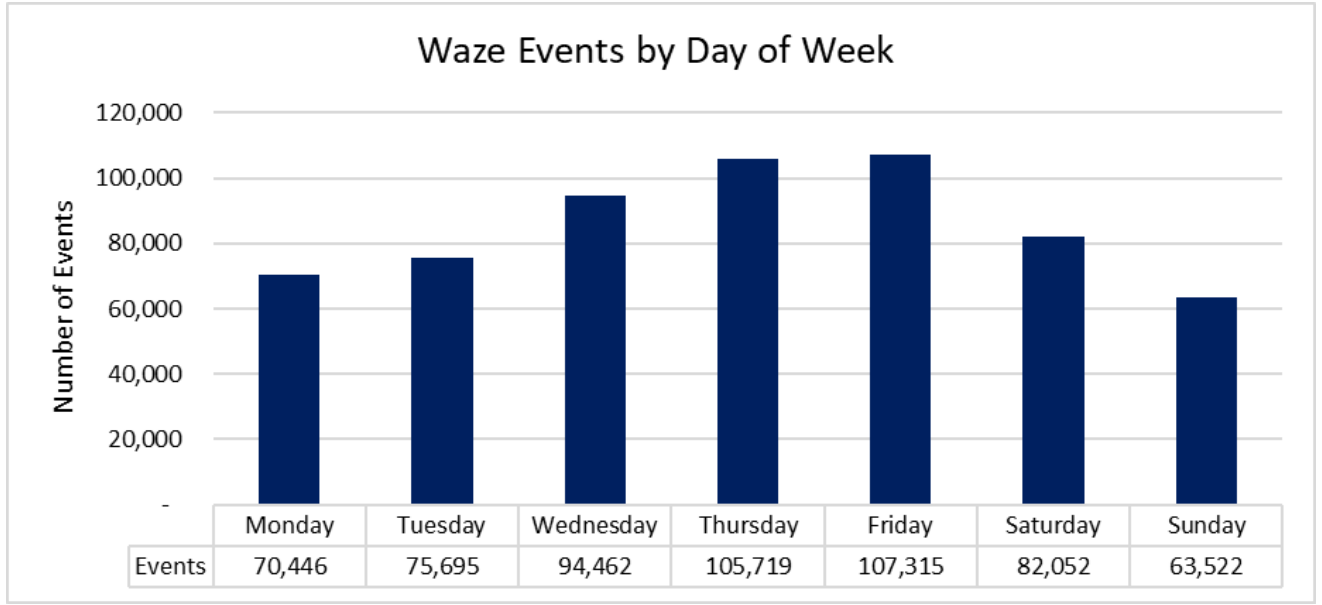
Waze Dataset Overview

Waze Event Types



Waze Event Data Summary

- Average number of daily / hourly events: 86,000 / 3,600
- Number of states: 12
- Day with maximum events: Thursday, 03/02/17 - 164,000
- Day with minimum events: Monday, 03/13/17 - 27,000



Note:

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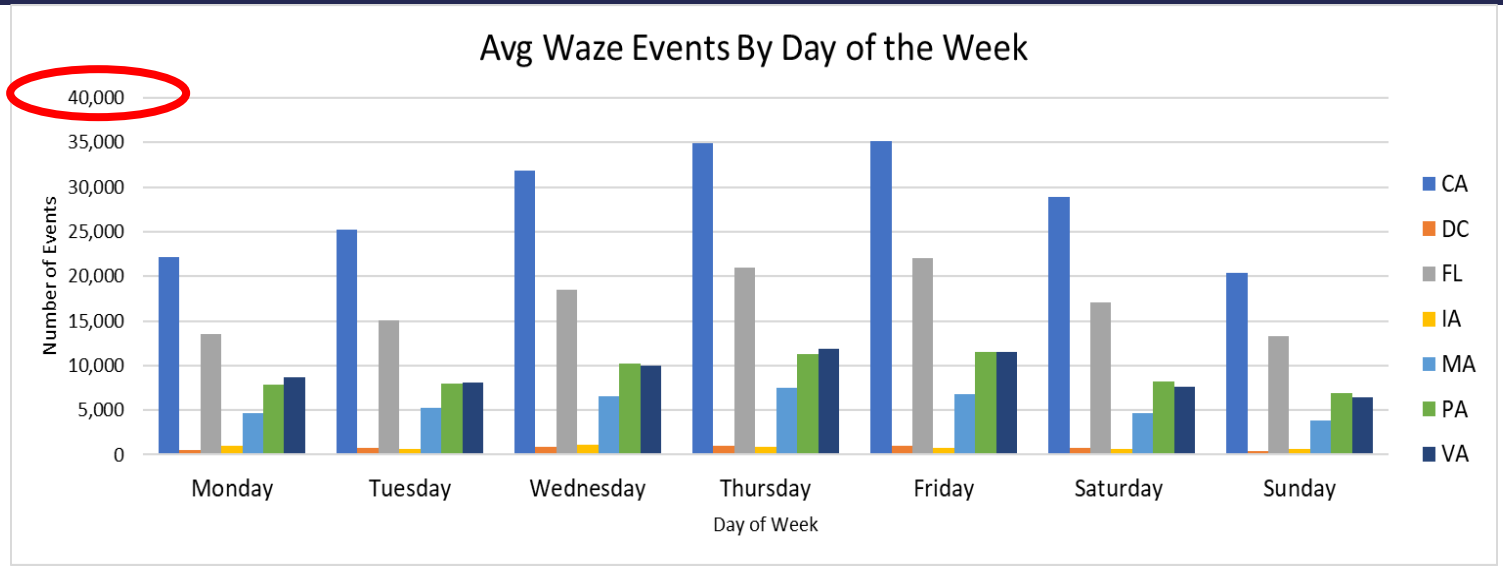
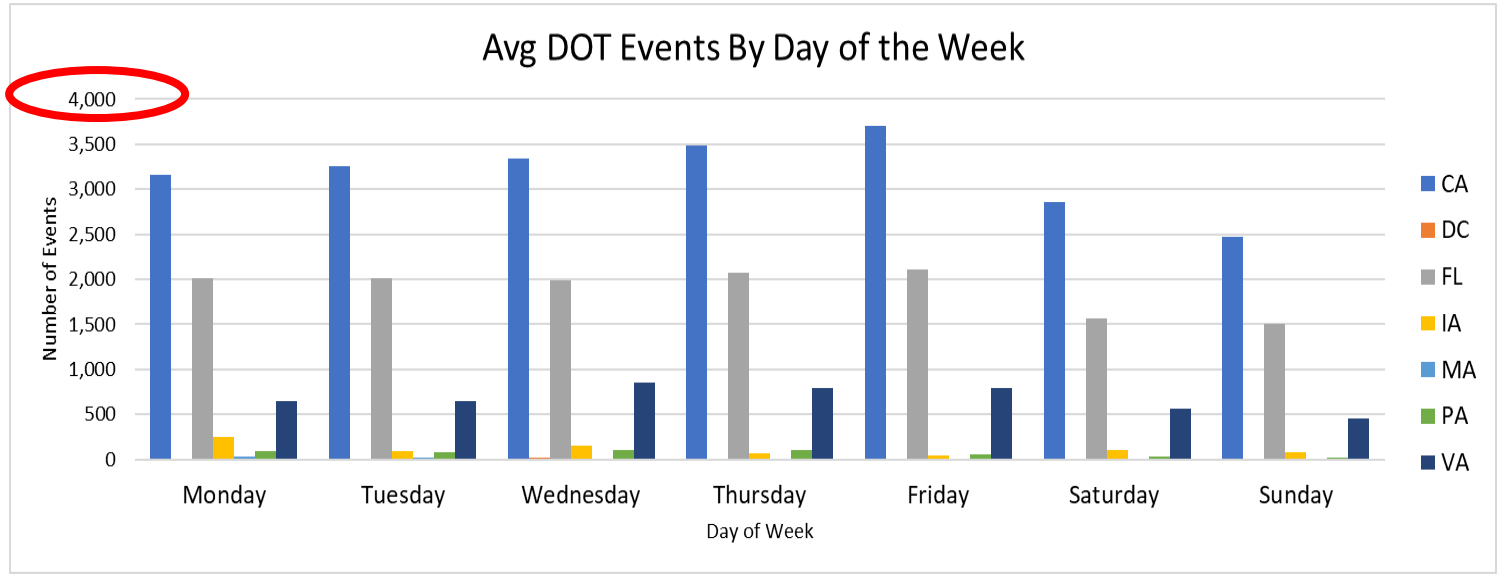
- Waze 3 Month Period of 3/17 – 5/17 displayed

Events by Day of the Week: DOT vs Waze

10x more





State	Avg Waze Events Per Day	Avg DOT Events Per Day
CA	28,389	3,184
DC	777	16
FL	17,210	1,895
IA	810	114
MA	5,613	14
PA	9,171	70
VA	9,168	681

Note:

- Waze data excludes jams event type
- Waze 3 Month Period of 3/17 – 5/17 displayed

Investigating Disabled Vehicle Analysis on Freeways/Ramps

Duplicates, speed of reporting, and more…

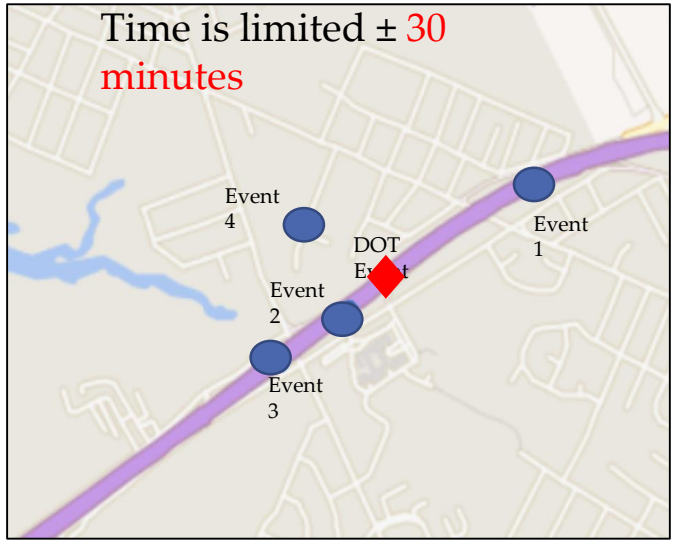
Analyzed approximately 2 million disabled vehicle events on freeways from 5 different states (FL, VA, PA, NY, MD)

Note: All results displayed in this presentation are for disabled vehicles on freeways/ramps

How do we Analyze Potential Benefits of Waze?

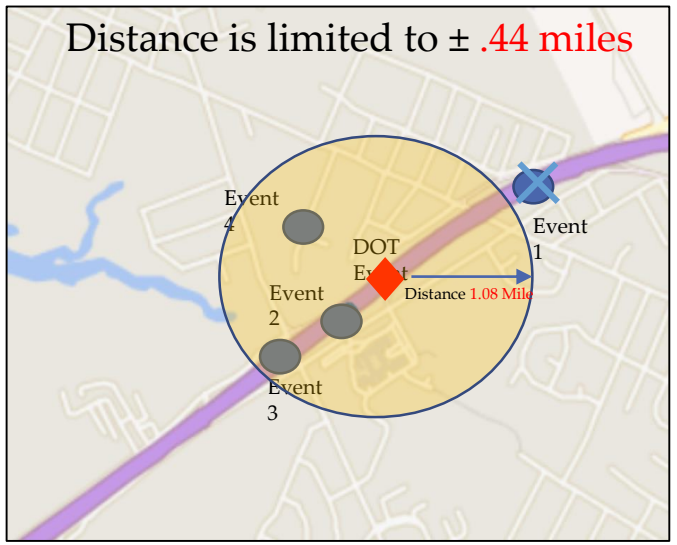
- Matched DOT reported events to Waze events from 3/01/17 to 5/31/17

Temporal Matching Threshold



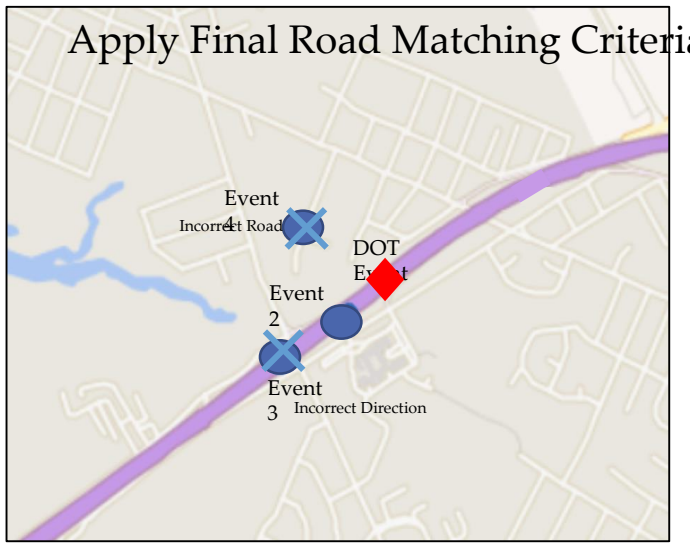
Identified 4 Waze events within ± 30 minutes of the DOT event

Spatial Matching Threshold



Determined that 3 of the Waze events were within ± .44 miles of the DOT event

Road Matching Rules



Determined that 1 of the Waze events was on the correct road and direction of travel

Enhanced Network Monitoring Results: Increased Situational Awareness

- Matched 41% (4,285) of VDOT disabled vehicle events to Waze
  - Found that in this 3 month period, 98.6% (364,646) disabled vehicle events from Waze were not matched to a VDOT event

- Matched 34% (6,562) of FDOT disabled vehicle events to Waze
  - Found that in this 3 month period, 99% (751,208) of disabled vehicle events from Waze were not matched to a FDOT event

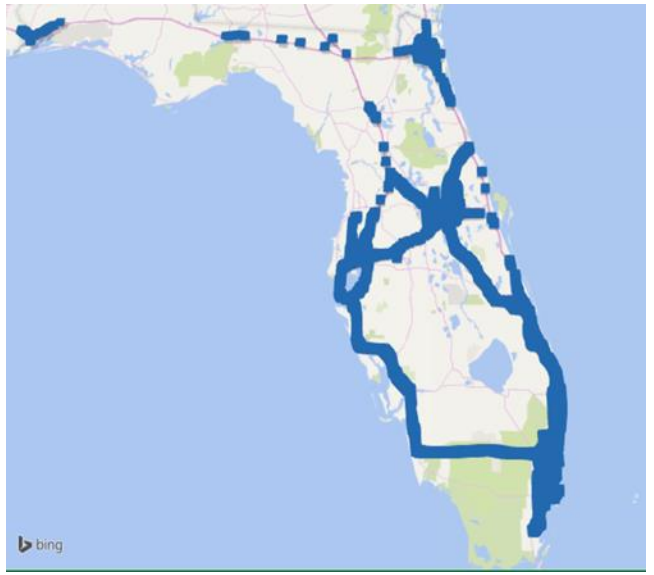
3 Month Period of 3/17 – 5/17 Displayed

Enhanced Network Monitoring Results: Florida Road Coverage

Waze Events

FDOT Events

Waze vs FDOT Matches



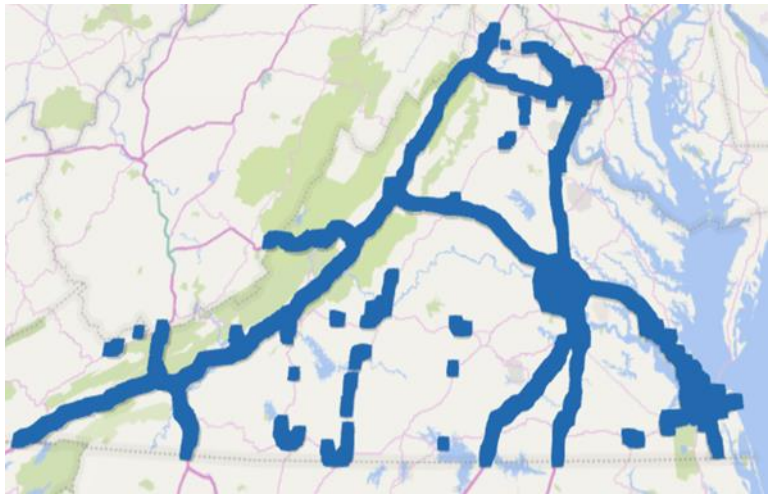
Top 3 Roadway with Highest Number of Events for FDOT

	I-95	I-75	91 Mainline/ Turnpike
Waze Dataset	160,138 (21%)	146,723 (20%)	119,570 (16%)
FDOT Dataset	7,154 (37%)	3,436 (18%)	2,559 (13%)

3 Month Period of 3/17 – 5/17 Displayed

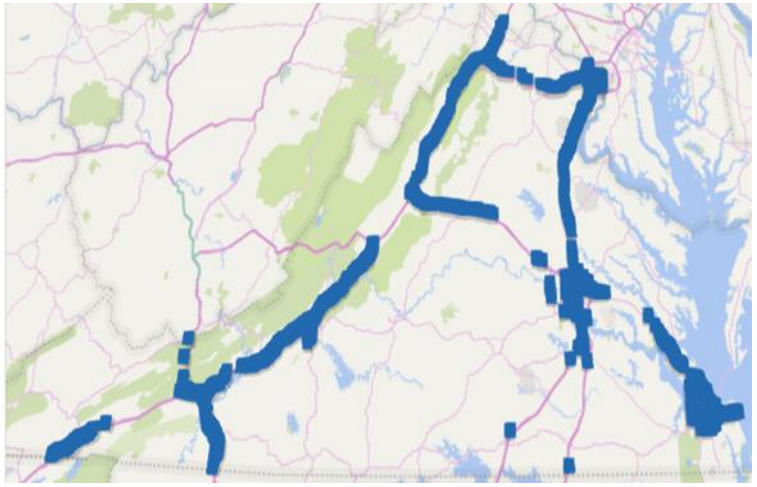
Enhanced Network Monitoring Results: Virginia Road Coverage

Waze Events



VDOT Events

Waze/VDOT overlap



Top 3 Roadway with Highest Number of Events for VDOT

	I-95	I-81	I-66
Waze Dataset	103,552 (29%)	51,639 (14%)	29,587 (8%)
VDOT Dataset	3,679 (36%)	1,978 (19%)	1,561 (15%)

3 Month Period of 3/17 – 5/17 Displayed

Enhanced Network Monitoring Results: Reducing Duplicative Waze Reports

- During this 3 month period, ~4% of disabled vehicle Waze event reports were duplicative
- Removing duplicative reports increases usability of Waze data:
  - FDOT: 309 fewer events a day / 13 fewer events an hour
  - VDOT: 187 fewer events a day / 8 fewer events an hour

Type of Event	Total Number of Waze Events During this Period	Total Number of Waze Events During this Period After Clustering	Percent Reduction in Events Due to Clustering
VA Disabled Vehicles	369,935	353,078	4.6%
FL Disabled Vehicles	758,956	731,149	3.7%

3 Month Period of 3/17 – 5/17 Displayed

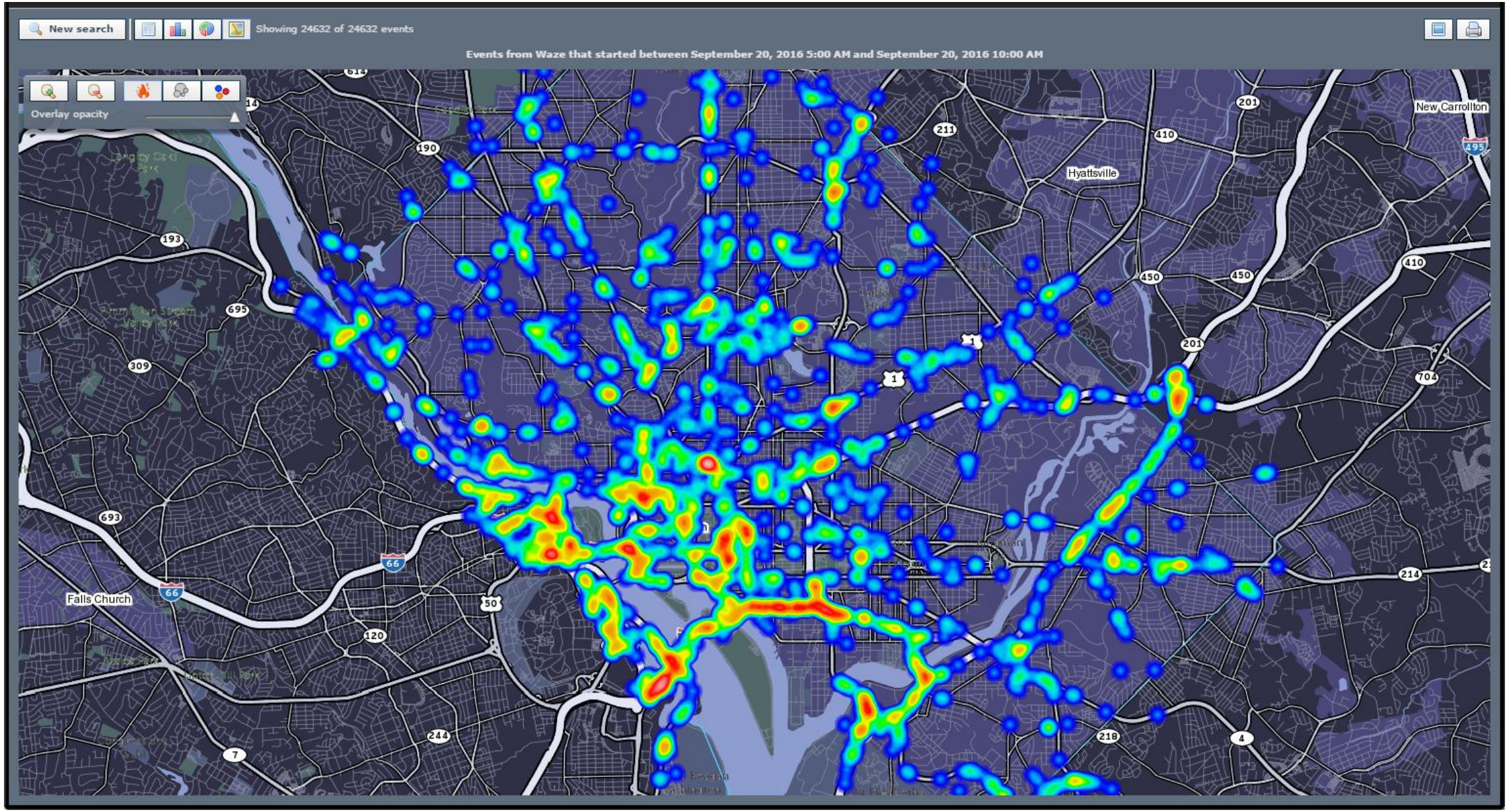
Event Detection Time Results

- During this 3 month period, Waze events were reported sooner than through the DOT ATMS which has the potential to improve response times

Type of Event	Total Number of DOT Events During This Period	Total Number of Waze Events During this Period	Percentage of Events that were Reported By Waze First	Average Time that a Waze Event was Reported Before a DOT Event
VA Disabled Vehicles	10,341	369,935	**68%**	**14 Minutes Earlier**
FL Disabled Vehicles	19,310	758,956	**56%**	**13 Minutes Earlier**

3 Month Period of 3/17 – 5/17 Displayed

Washington DC – Building Visual Analytics



Next Steps

- Continue to analyze other event types (not just disabled vehicles)
- Evaluate other states
- Explore other duplicate-reduction algorithms that take into account speeds, speed limits, and other factors beyond time and space variables.
- Synthesize other benefits and technical approaches from state partners
- Document technical approaches to reducing duplicates, storage, etc.
- Document recommended practices for negotiating acceptable use to keep from repeating past mistakes.

Thank You

Michael Pack
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www.cattlab.umd.edu

Ted Bobowsky & Brendan Kaplan
Port Authority of New York & New Jersey

Pros and Cons of "The Crowd" in Crowdsourced Data and How to Manage Them

THE PORT AUTHORITY OF NY & NJ

I-95 CORRIDOR COALITION

Pros & Cons of "The Crowd" in Crowdsourced Data and How to Manage Them

I-95 Corridor Coalition
Philadelphia, PA
September 14, 2017

Context: The Port Authority Scope of Operations

- Operates significant multi-modal facilities that connect the region:
  - Aviation
  - Ports
  - Tunnels, Bridges & Terminals
  - PATH (rail)
- 2016 Budget of $7.4 Billion including $2.9B Capital and $3.1B Operating
- 10 Year Capital Plan of $32 Billion
- Self-Sustaining Agency (no tax $)

Strategic Priorities

- Keep the region moving
- Leader in transportation
  - Traditional methods
  - Innovation
    - Embrace and lead in business and technology trends
    - Support & shape navigation preferences

How do we love automated, data-driven, crowdsourced, just-in-time, intelligent routing, communication, and road system awareness?

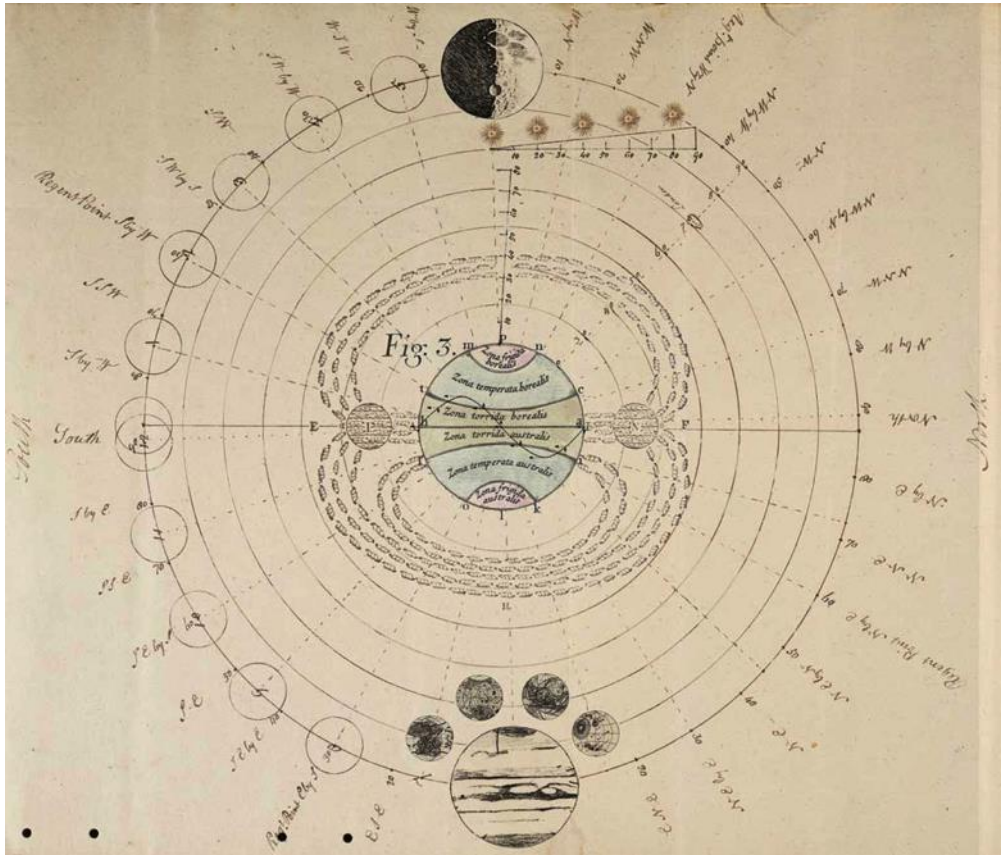
Let me count the Waze…

THE PORT AUTHORITY OF NY & NJ

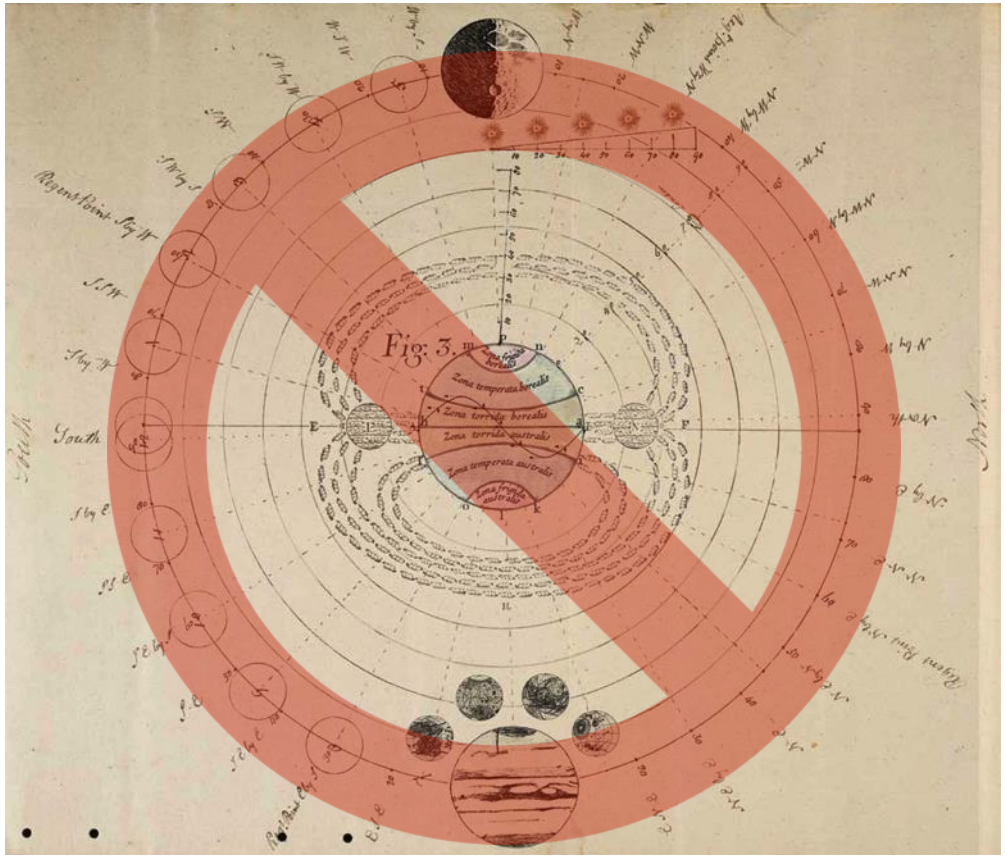
CONNECTED CITIZENS by waze

Crowdsourcing – What it isn't, and what it is

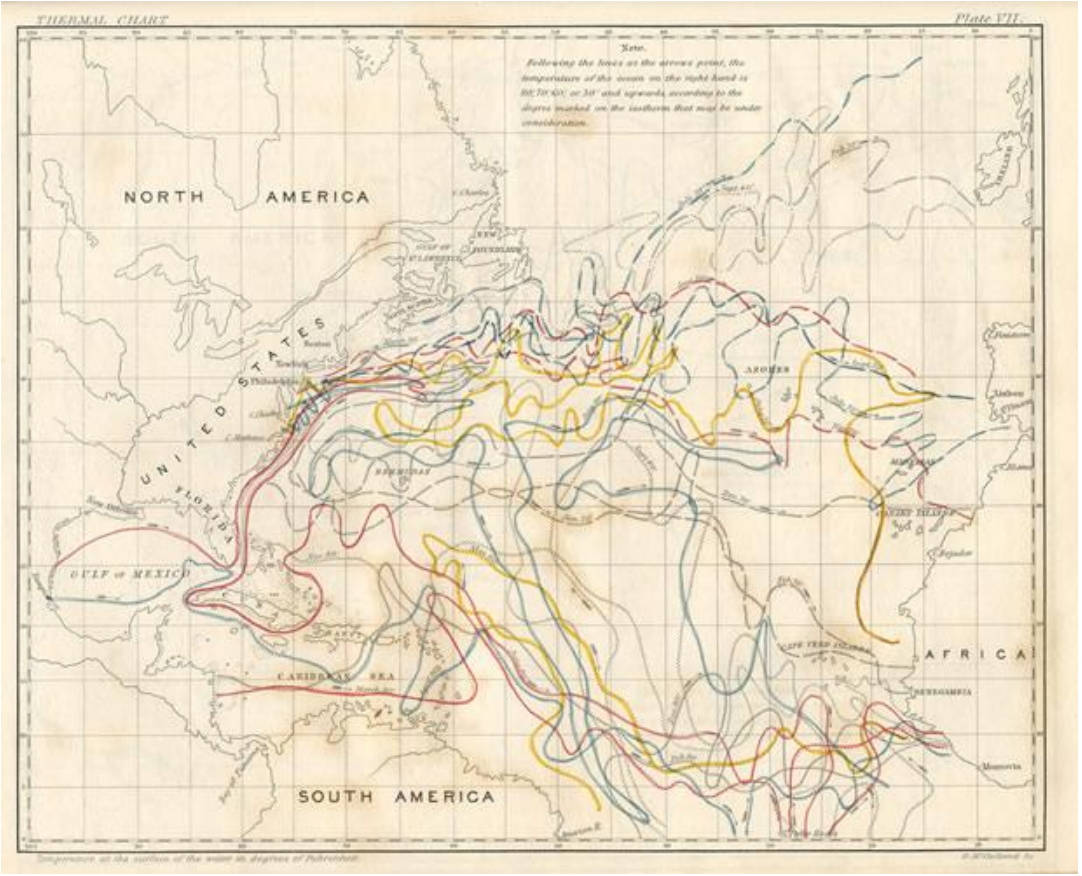
Crowdsourcing – What it isn't, and what it is



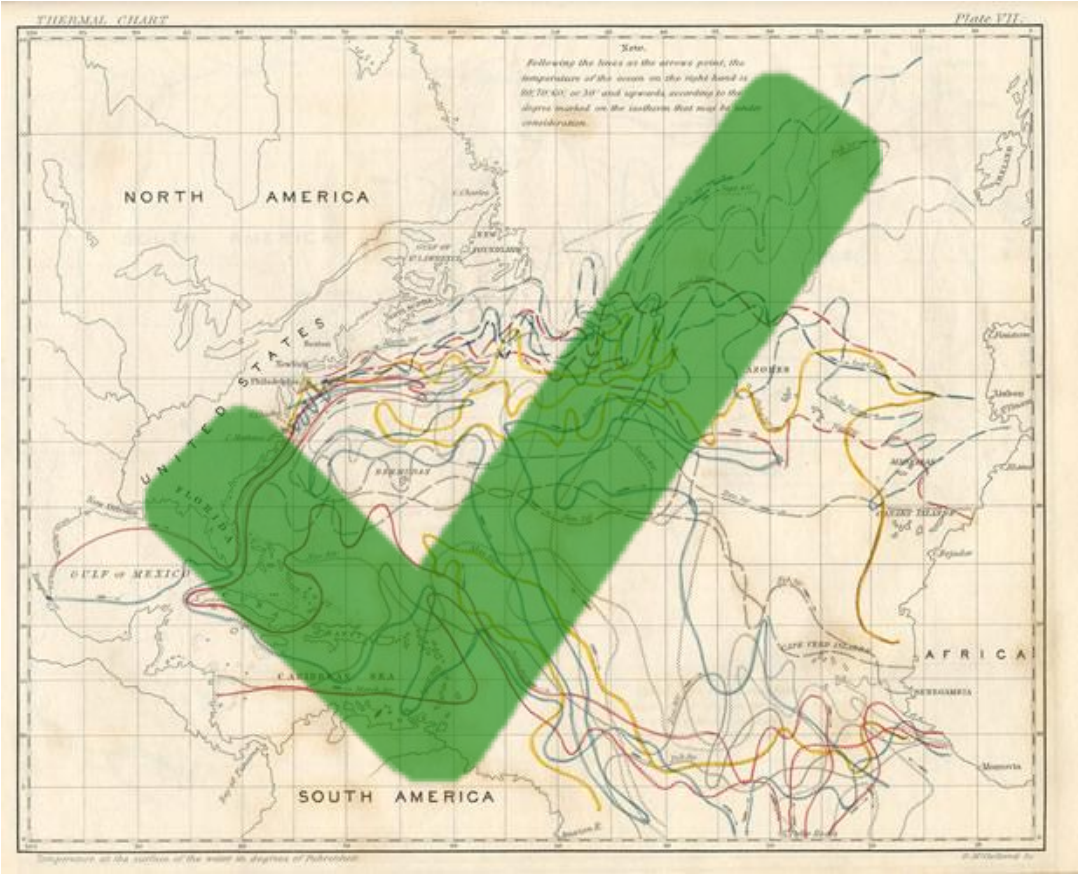
Crowdsourcing – What it isn't, and what it is



Crowdsourcing – What it isn't, and what it is



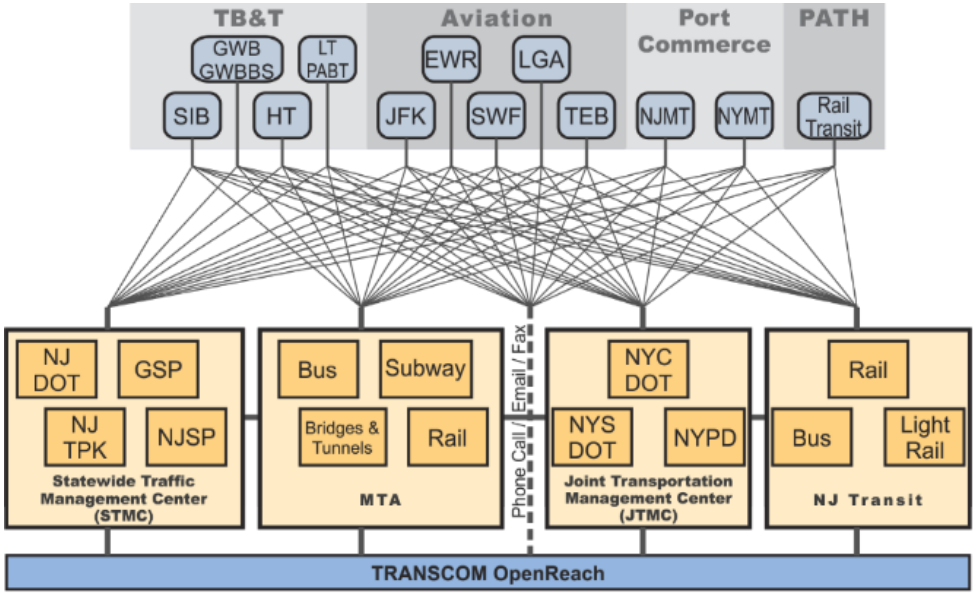
Crowdsourcing – What it isn't, and what it is



How?

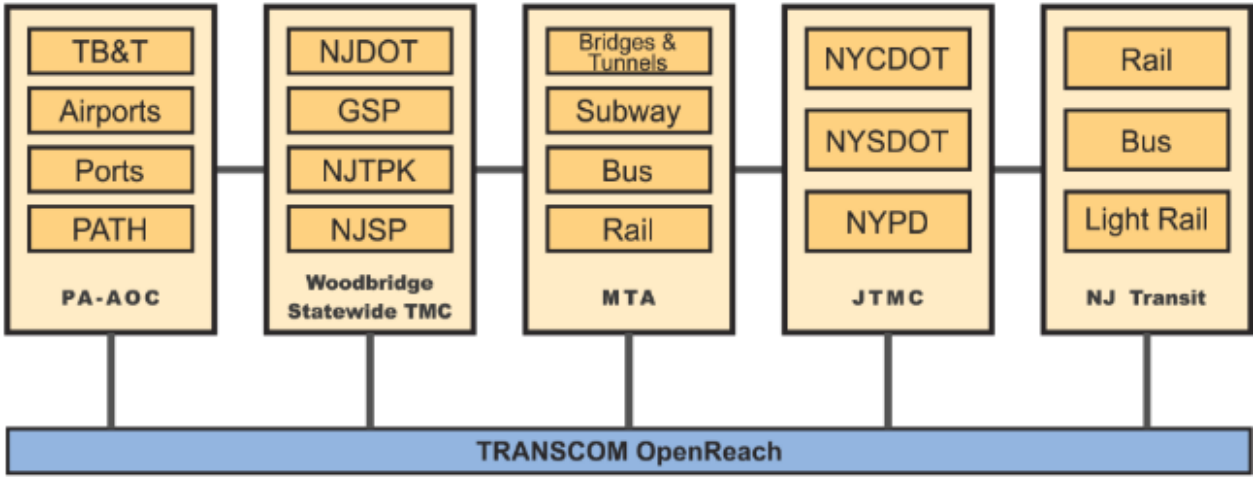
Get, Process, Give

Agency Operations Center (AOC)



Regional Communications
Before the AOC

AOC

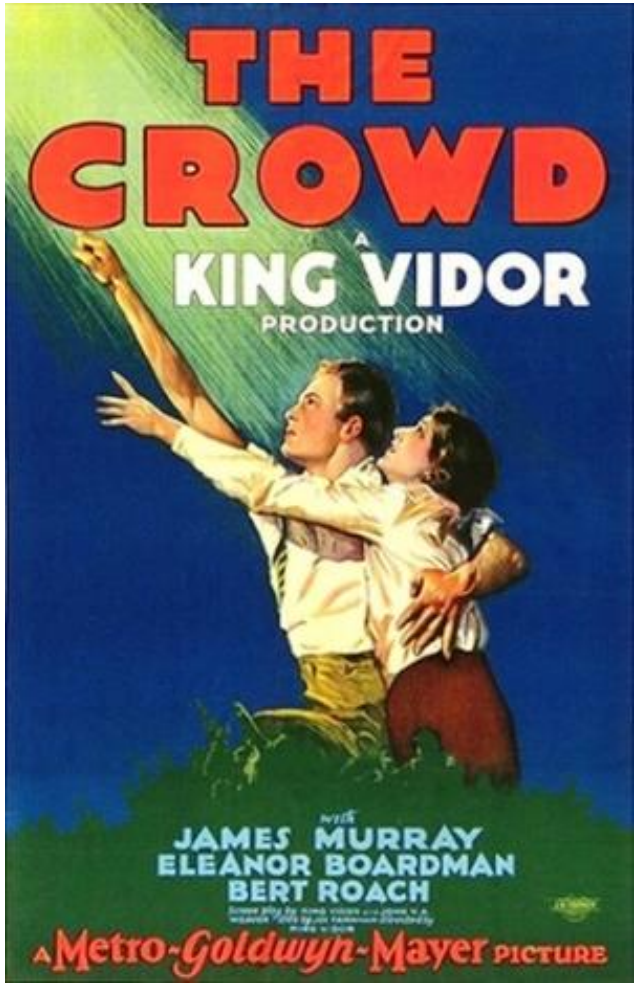


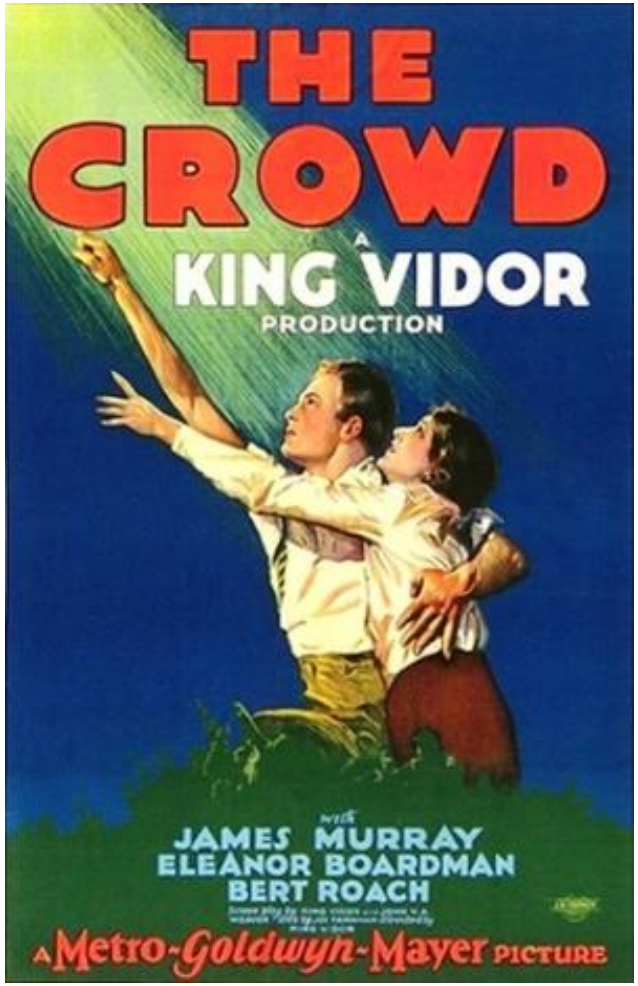
Regional Communications With the AOC

AOC

AOC

Perfect Candidate


THE CROWD
A KING VIDOR PRODUCTION
with
JAMES MURRAY
ELEANOR BOARDMAN
BERT ROACH
A Metro-Goldwyn-Mayer PICTURE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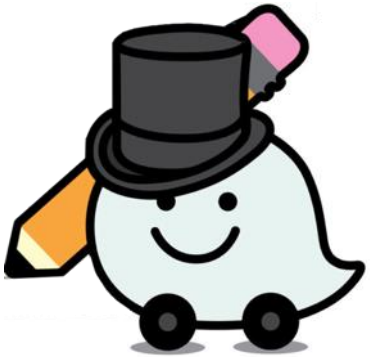
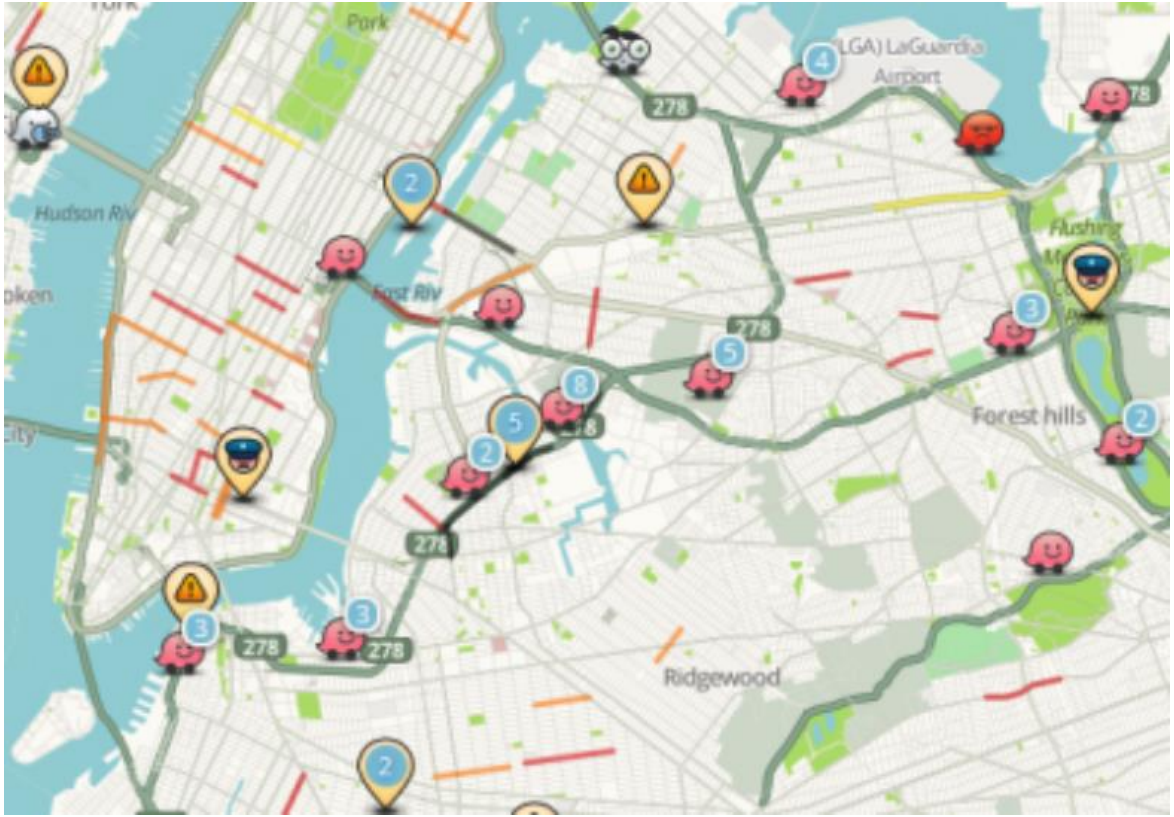
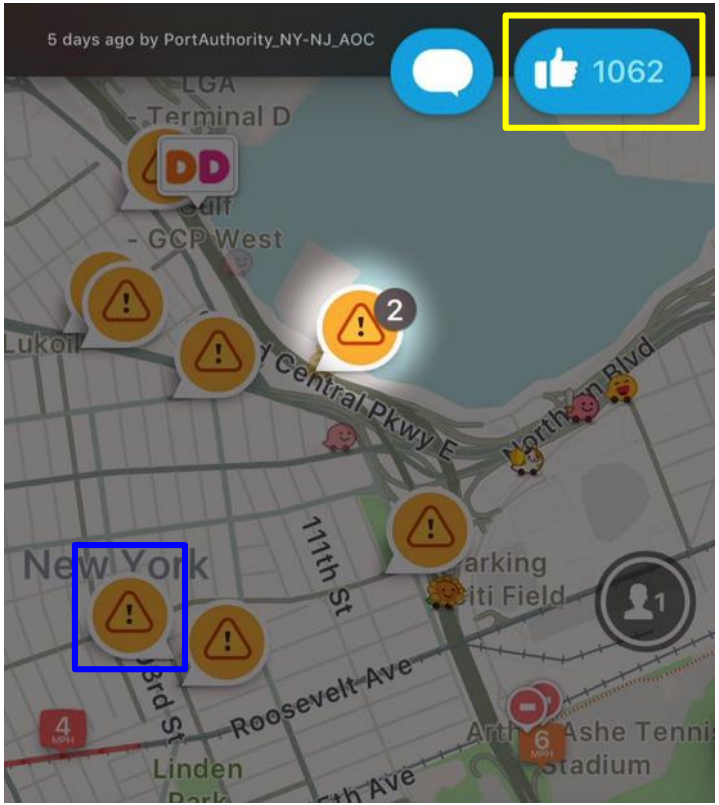
BERT ROACH
A Metro-Goldwyn-Mayer PICTURE



Validation Baked In



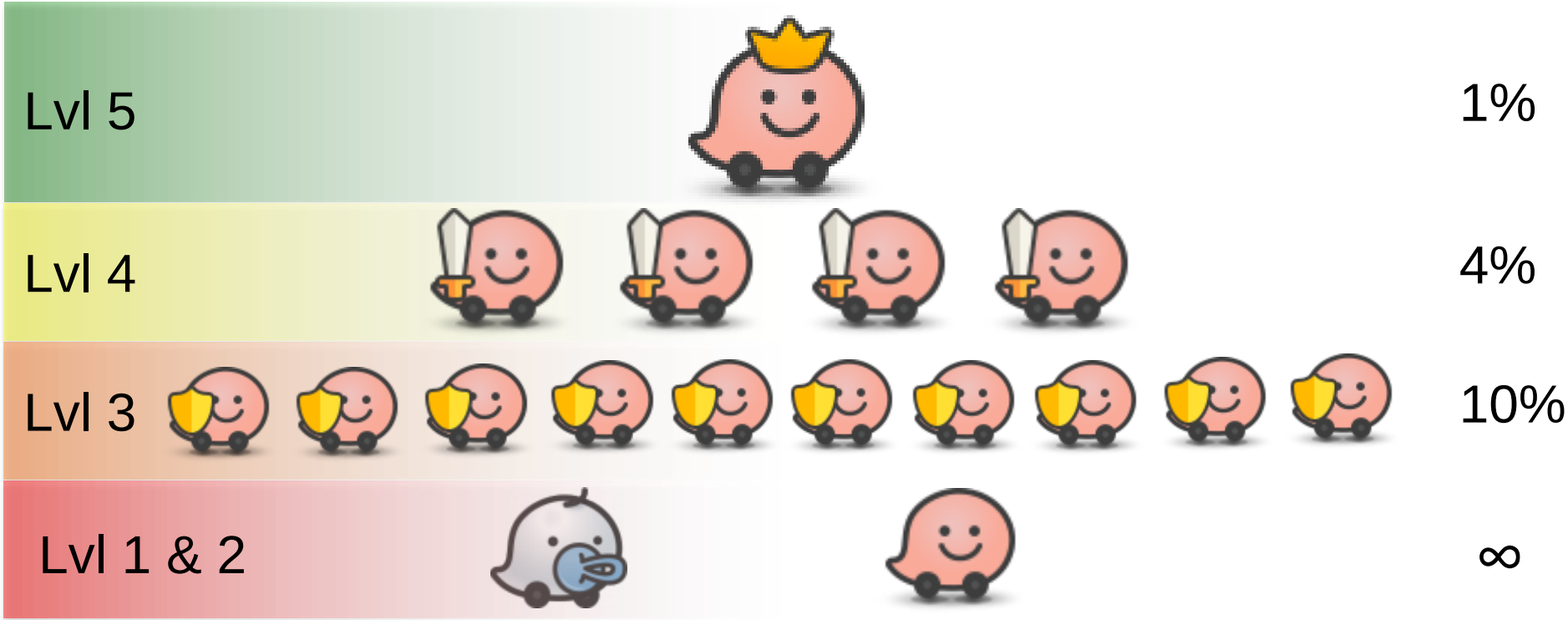
Validation Baked In – Weighted by Population



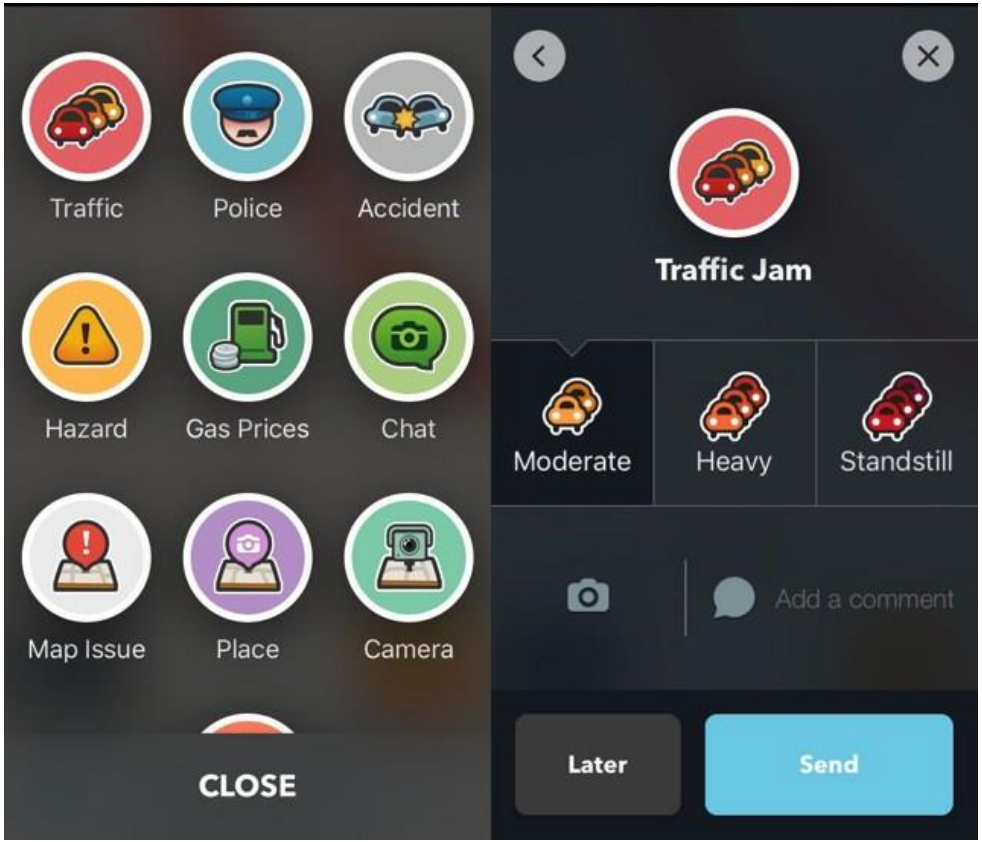
Validation Baked In – Population Weighted by Value

Points, Levels, Authority

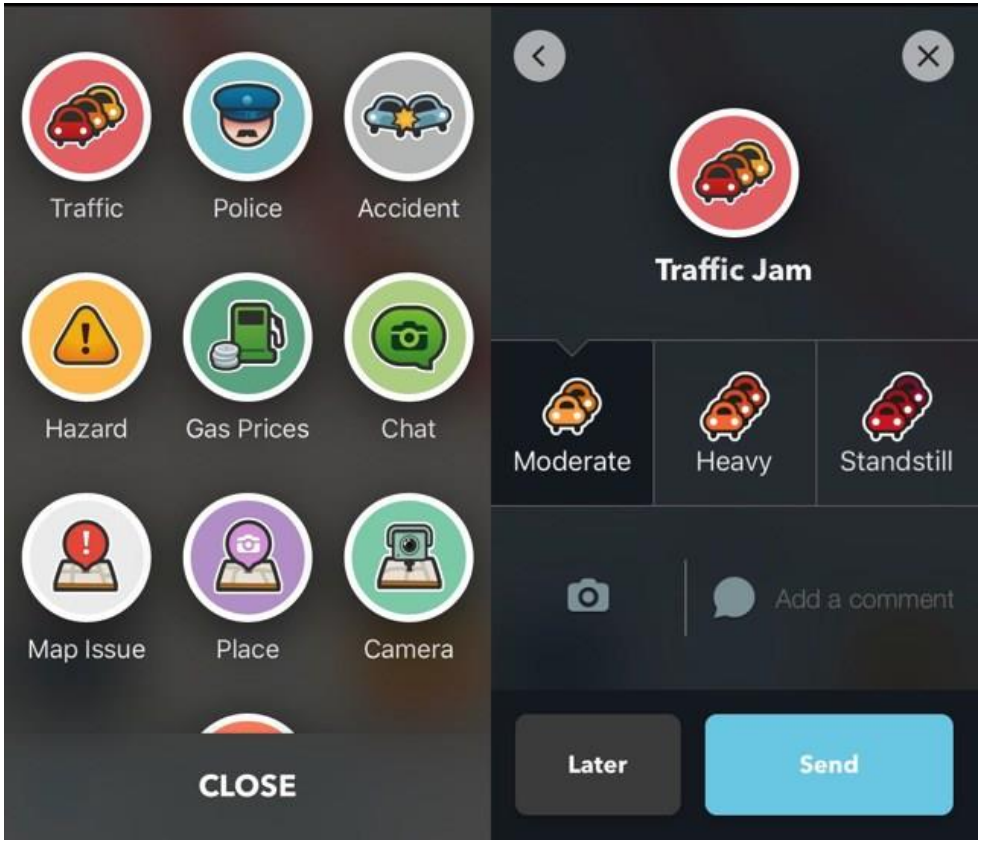
Validation Baked In



Leveling Up


Traffic
Police
Accident
Hazard
Gas Prices
Chat
Map Issue
Place
Camera
CLOSE
Traffic Jam
Moderate
Heavy
Standstill
Add a comment
Later
Send

Leveling Up



Activity	Points	Unit
Road reporting[1]	6	per report
Gas/Fuel price reports	8	per report
Report comments	3	per comment
Editing the map[2]	3	per edit
Place photo	6	per photo
Place update	3	per detail added[3]
Solving map update requests	3	per request solved
Adding street names	3	per name[4]
Adding house numbers	1	per segment
Forum posts	2	per 3 forum posts
Road goodies	Face Value	per goodie

Activity	Per mile	Per km
Normal driving[5]	5	3.2
Road munching	16	10
New road recording (paving)	64	40

Leveling Up

1 SEGMENT SELECTED

Holland Tunnel Outbound (west), Manhattan, New York

This segment is locked. You need to be a level 5 editor to edit this segment.

General | Closures

ROAD TYPE

Freeway

Unpaved

Tunnel

Next to carpool/HOV/bus lane

View restrictions

DIRECTION

One way (A → B)

SPEED LIMIT

A to B 35 mp/h

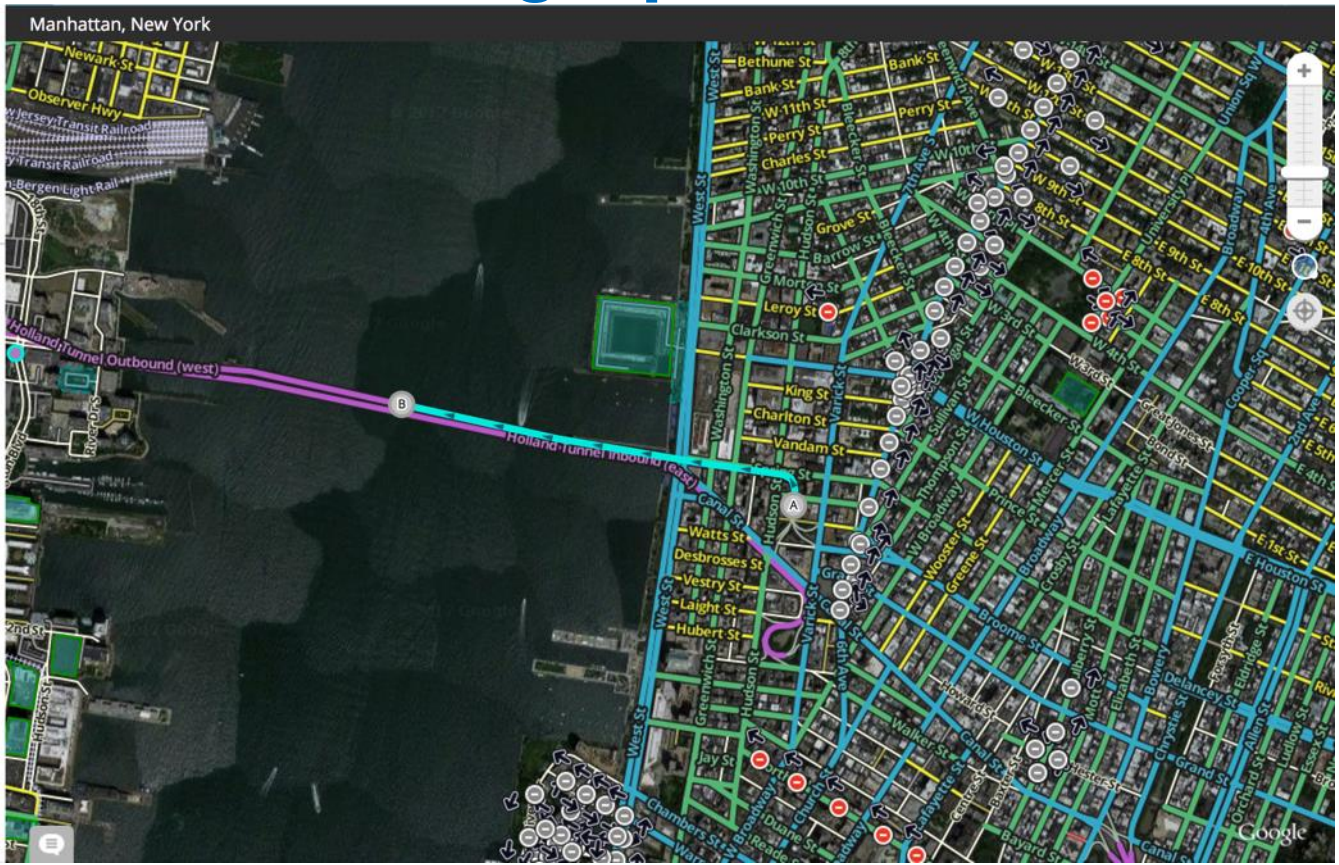
ELEVATION

-5

LOCK

5

Select entire street



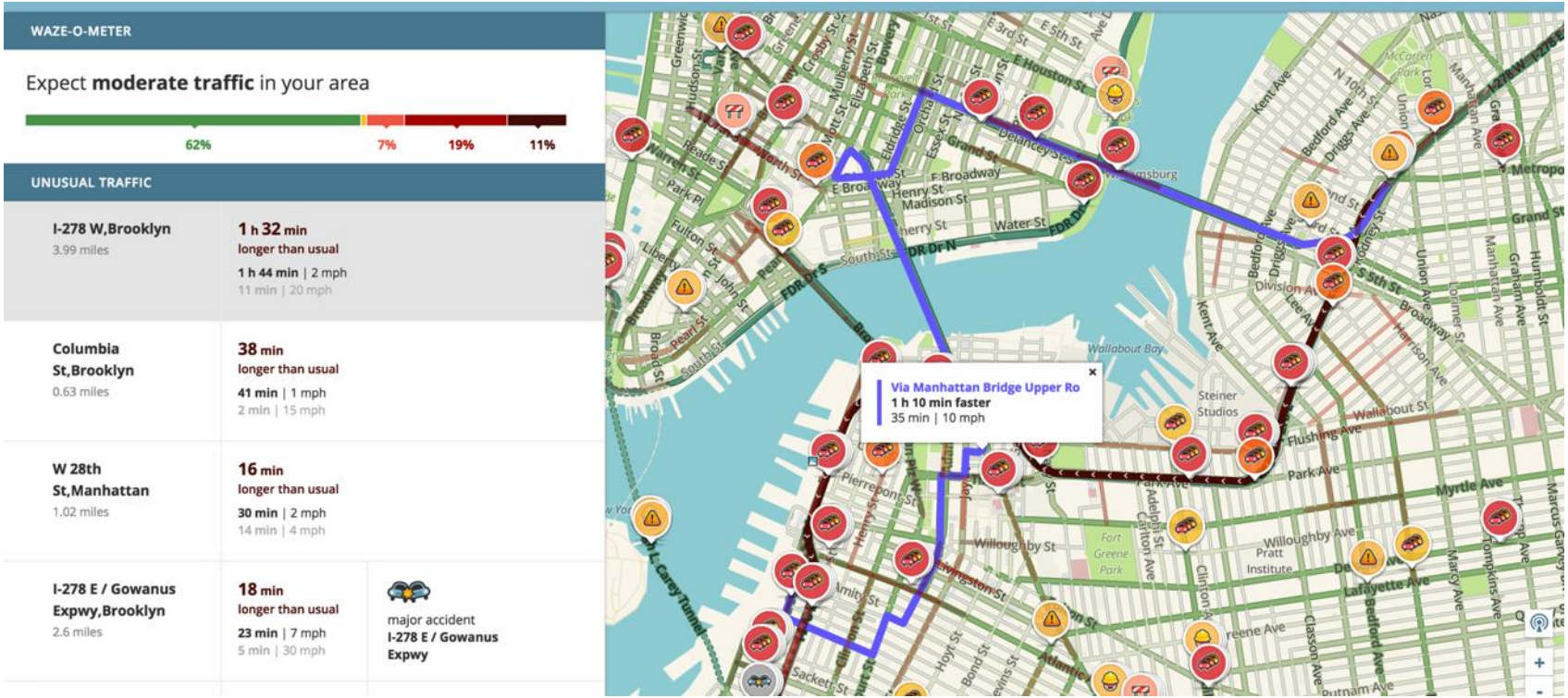
AOC + Waze: Maintain Situational Awareness

AOC + Waze: Aid Customer Navigation

Communicate w/ Customers to Set Expectations and Improve Experience

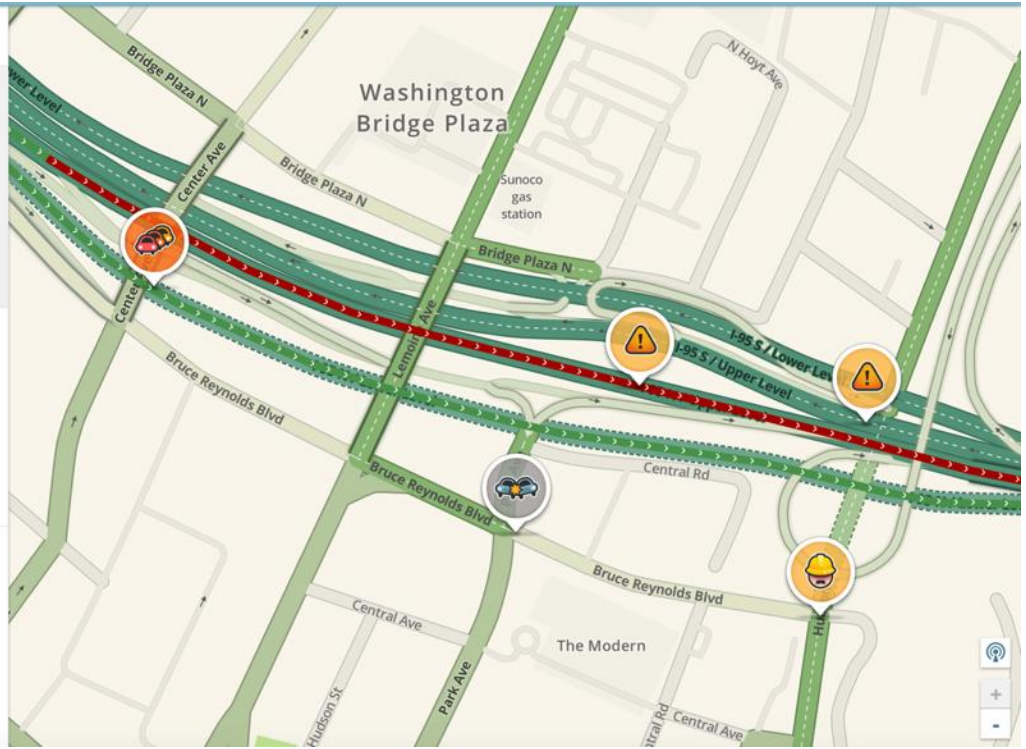
Automation via Enterprise Software Integration

Specifics – Maintain Situational Awareness

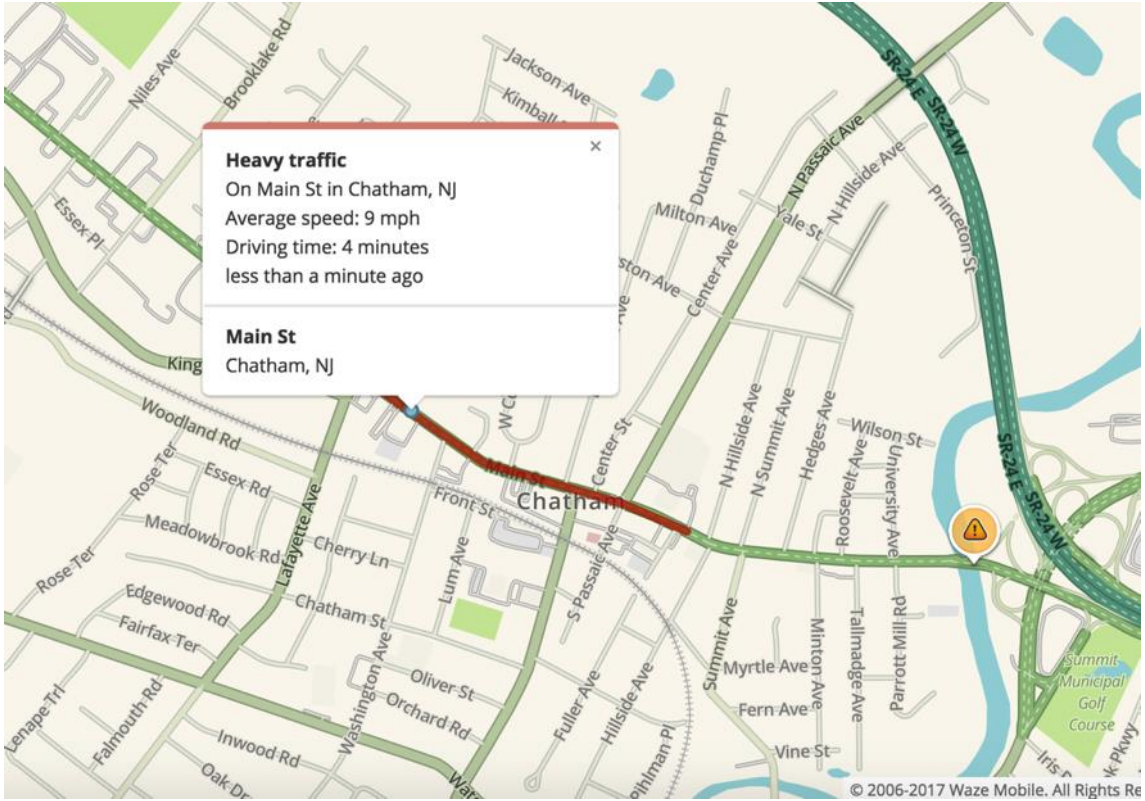


Specifics – Maintain Situational Awareness

Dyer Ave 0.26 miles			
I-95 N / Express Leonia; I-95 N / Upper Level Fort Lee I-95 N / Express to Exit 1 C-D (Old Exit 3): I-87 / Major Deegan Expwy / Albany / Queens 5.2 miles	**3 min** longer than usual **11 min** | 27 mph 8 min | 38 mph	⚠	road construction **I-95 N / Upper Level**
GWB EB - Palisades Interstate Parkway from Exit 1 to the Alexander Hamilton Bridge Palisades Interstate Pkwy S to I-95 S 4.27 miles	**3 min** longer than usual **10 min** | 25 mph 6 min | 39 mph	⚠	road construction **I-95 N / Upper Level**
GWB EB - Route 4 from Fort Lee to the Alexander Hamilton Bridge via the Upper Level SR-4 E to Exit 1 C-D (Old Exit 3): I-87 / Major Deegan Expwy / Albany / Queens	**3 min** longer than usual **10 min** | 21 mph 7 min | 30 mph	⚠	road construction **I-95 N / Upper Level**



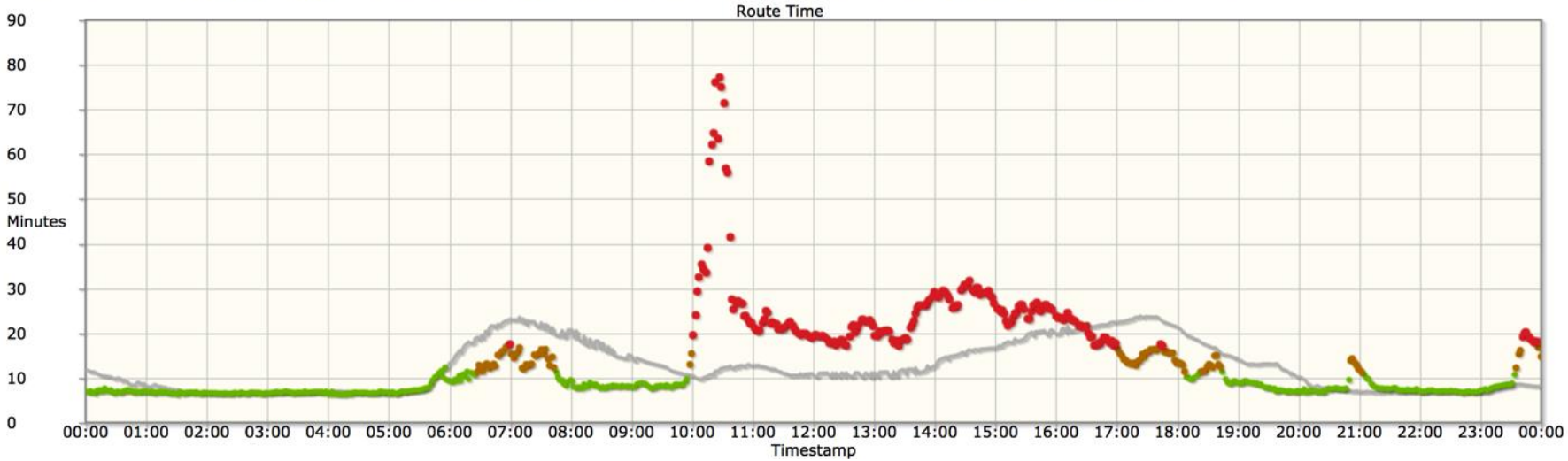
Specifics – Maintain Situational Awareness



Specifics – Maintain Situational Awareness

GWB - PIP Helix Const - EB - NJ Side to NY Side (From I-80/I-95 Local to Amterdam Ave via X-Over)

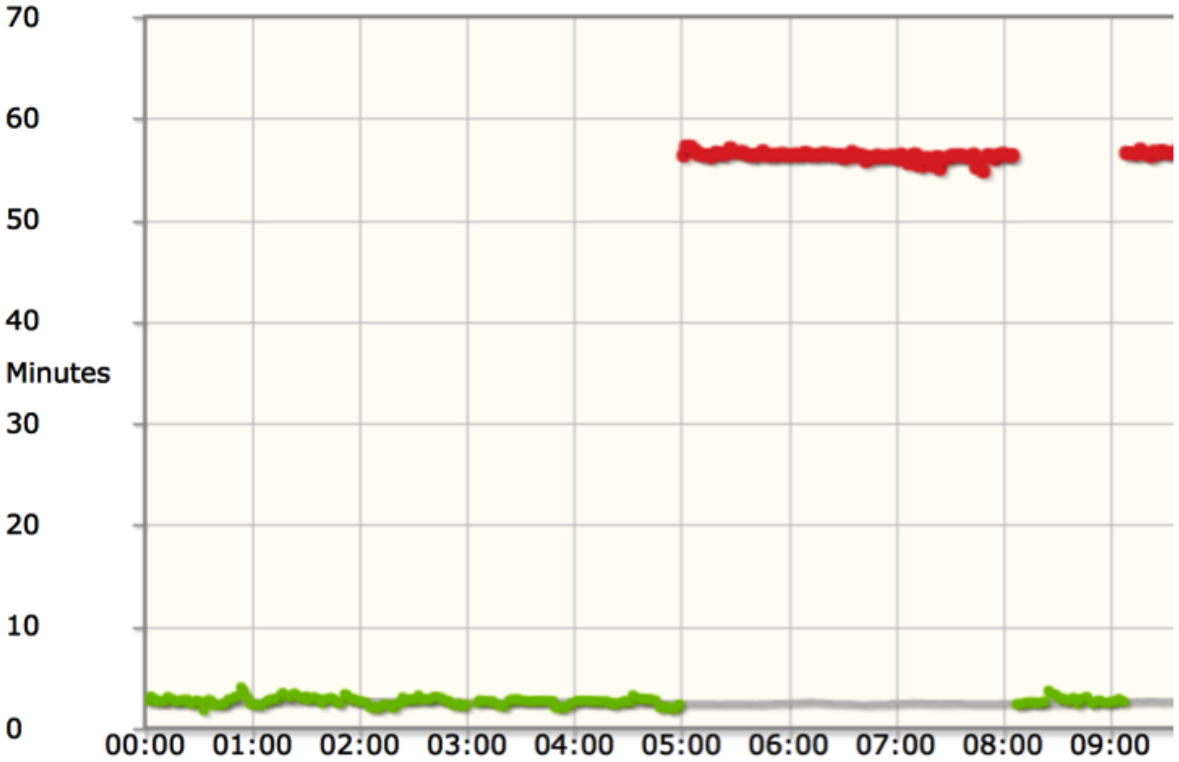
« Route list - **Period:** 2017-06-30 | 2017-07-01 | 2017-07-02 | 2017-07-03 | 2017-07-04 | 2017-07-05 | 2017-07-06 | **2017-07-07** | 2017-07-08 | 24 hours



Specifics – Maintain Situational Awareness

Timestamp	Route Time	Usual Time	Delay	Jam Level
2017-07-07				
23:59:48	14:46	08:10	7 mins (80%)	🚗
23:57:04	16:48	08:12	9 mins (104%)	🚗
23:55:41	18:11	08:12	10 mins (121%)	🚗🚗
23:52:58	17:56	08:14	10 mins (117%)	🚗🚗
23:51:36	18:18	08:15	10 mins (121%)	🚗🚗
23:48:52	18:45	08:21	10 mins (124%)	🚗🚗
23:47:32	19:12	08:23	11 mins (129%)	🚗🚗
23:44:40	20:14	08:26	12 mins (139%)	🚗🚗
23:43:19	19:56	08:30	11 mins (134%)	🚗🚗
23:41:56	19:10	08:32	11 mins (124%)	🚗🚗

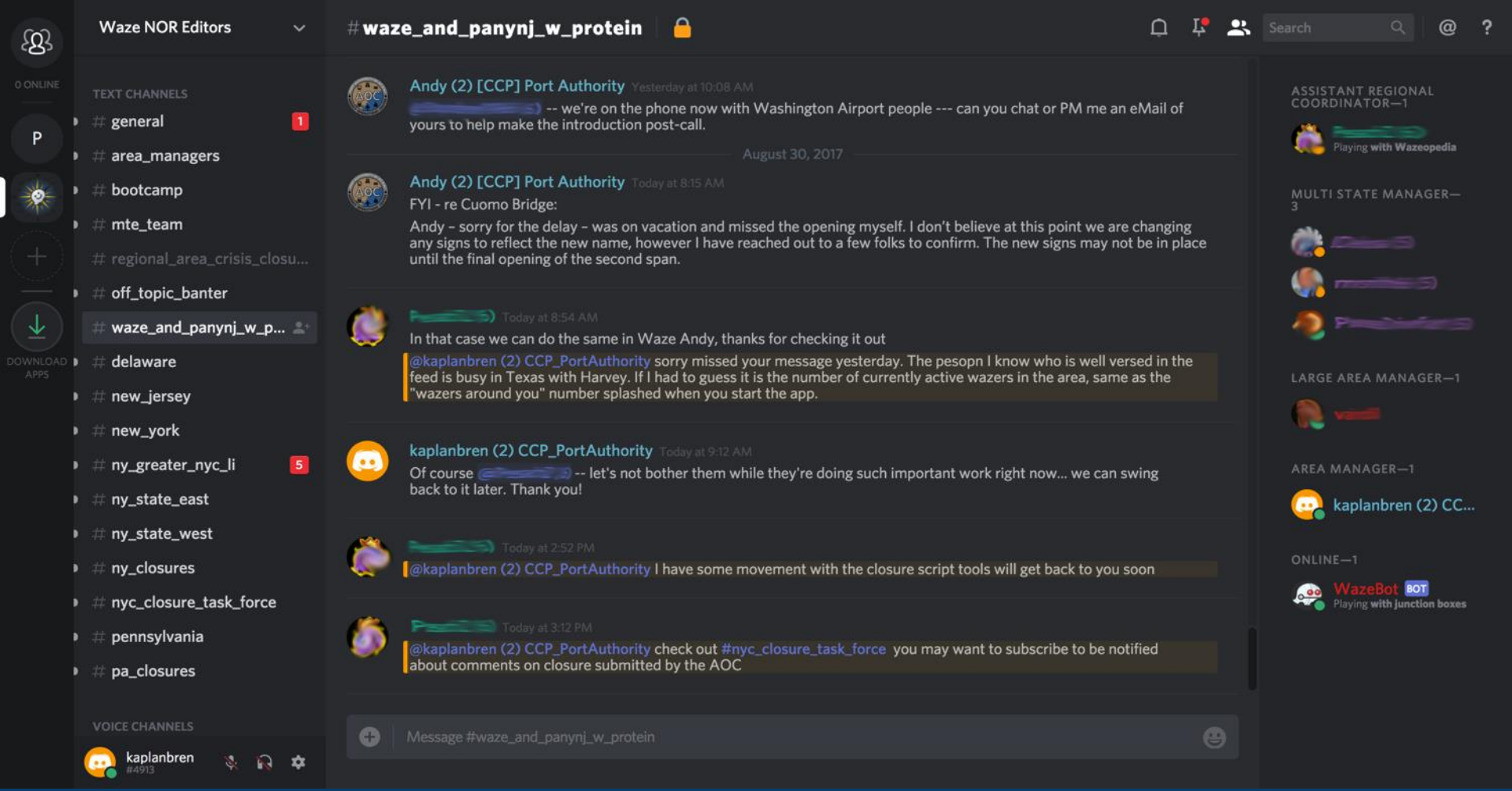
Specifics – Maintain Situational Awareness



Specifics – Working w/ the Crowd:

Orbit, George, Jay, John, Pesach

THANK YOU!


Waze NOR Editors
0 ONLINE
TEXT CHANNELS
general
area_managers
bootcamp
mte_team
regional_area_crisis_closu...
off_topic_banter
waze_and_panynj_w_p...
delaware
new_jersey
new_york
ny_greater_nyc_li
ny_state_east
ny_state_west
ny_closures
nyc_closure_task_force
pennsylvania
pa_closures
VOICE CHANNELS
kaplanbren
#4913
DOWNLOAD APPS
#waze_and_panynj_w_protein
Search
Andy (2) [CCP] Port Authority Yesterday at 10:08 AM
-- we're on the phone now with Washington Airport people --- can you chat or PM me an eMail of yours to help make the introduction post-call.
August 30, 2017
Andy (2) [CCP] Port Authority Today at 8:15 AM
FYI - re Cuomo Bridge:
Andy – sorry for the delay – was on vacation and missed the opening myself. I don't believe at this point we are changing any signs to reflect the new name, however I have reached out to a few folks to confirm. The new signs may not be in place until the final opening of the second span.
Today at 8:54 AM
In that case we can do the same in Waze Andy, thanks for checking it out
@kaplanbren (2) CCP_PortAuthority sorry missed your message yesterday. The pesopn I know who is well versed in the feed is busy in Texas with Harvey. If I had to guess it is the number of currently active wazers in the area, same as the "wazers around you" number splashed when you start the app.
kaplanbren (2) CCP_PortAuthority Today at 9:12 AM
Of course -- let's not bother them while they're doing such important work right now... we can swing back to it later. Thank you!
Today at 2:52 PM
@kaplanbren (2) CCP_PortAuthority I have some movement with the closure script tools will get back to you soon
Today at 3:12 PM
@kaplanbren (2) CCP_PortAuthority check out #nyc_closure_task_force you may want to subscribe to be notified about comments on closure submitted by the AOC
Message #waze_and_panynj_w_protein
ASSISTANT REGIONAL COORDINATOR—1
Playing with Wazeopedia
MULTI STATE MANAGER—3
LARGE AREA MANAGER—1
AREA MANAGER—1
kaplanbren (2) CC...
ONLINE—1
WazeBot BOT
Playing with junction boxes

Ted's Board
Andy's Board
Brendan's Board
Waze Maps
Technical Work
Waze Community Board
Home Base
Status Board
Rizwan's Board
Farukh's Board
Partner Responsibility Board
Kathleen's Board

Home Base

Add gadget | Edit layout | •••

'My Mentions is Past 7 Days' below shows '@Mentions' that are directed towards you in past 7 days.

Filter Results: My Mentions in Past 7 Days

Updated ↓	T	Key	Summary	P
07/Jul/17		OPS-8	OPS-4 / Give 2nd Account to AOC and LGA MOC + Enter Trips into TrafficView	↑
07/Jul/17		FEED-1	GTFS Feed for JFK	↑
07/Jul/17		COM-7	Assist in adding Waze Live map to LGA Website	↑
07/Jul/17		COM-5	Use Waze as a crash mitigation strategy	↑
06/Jul/17		CLS-2	Jones Road MTE	↑
03/Jul/17		WFD-10	WFD-6 / Multiple Usernames CCP Umbrella Feature	↑
03/Jul/17		OPS-1	Multiple Usernames	↑

Your work graph will appear on top, with text tickets below.

Created vs. Resolved Chart: My Issues

Issues in the last 45 days (grouped daily) View in Issue navigator

- Created issues (70)
- Resolved issues (40)

Filter Results: My Work

T	Key	Summary	P
	XCOM-3	Confirm movement of Waze DFE integration from dev to production	↑
	XCOM-1	Format Waze Hazards for TRANSCOM consumption	↑

'Activity Stream' shows recent acctivity within the system, just like Facebook newsfeed shows all all activity from all your friends on FB. Graph on top, text tickets below. Click 'Show More' at bottom of **'Activity Stream'** for more items.

Created vs. Resolved Chart: All Issues

Issues in the last 14 days (grouped daily) View in Issue navigator

- Created issues (44)
- Resolved issues (39)

Activity Stream

Activity Stream

Yesterday

Ted Bobowsky attached one file to WDI-16 -

Ted's Board
Andy's Board
Brendan's Board
Waze Maps
Technical Work
Waze Community Board
Home Base
Status Board
Rizwan's Board
Farukh's Board
Partner Responsibility Board
Kathleen's Board

Status Board

Add gadget | Edit layout | •••

Filter Results: Status: To Do

Key	P	T	Summary
ANY-3	↑	☑	Analyze TrafficView Logger data output for data quality review
APPL-6	↑	☑	Follow up With Scott M re: Document
ATMS-1	↑	☑	Brendan coordinate w/ Mike W. to scheduling time for ATMS interface building
ATMS-2	↑	☑	Brendan Initial Scheduling w/ Desk Staff
ATMS-6	↑	☑	Maps API Protocals

1–5 of 79 1 2 3 4 5 6 7 8 9 ▸

Filter Results: Status: Done

T	Key	Summary	P
☑	VOICE-4	JFK Airport Voice Match	↑
☑	WDI-24	WDI-16 / Address TravelTime Bug	↑
☑	WFD-8	Traffic View Bug	↑
☑	COM-7	Assist in adding Waze Live map to LGA Website	↑
☑	CLS-2	Jones Road MTE	↑

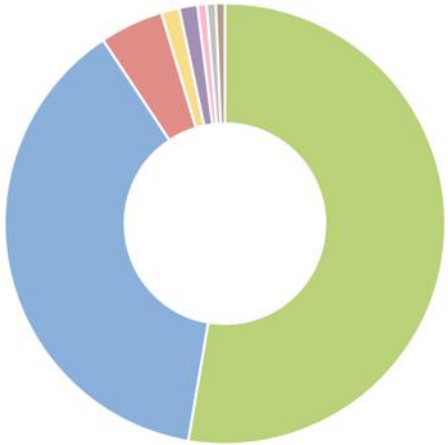
1–5 of 57 1 2 3 4 5 6 7 8 9 ▸

Filter Results: Status: In Progress

T	Key	Summary	P
☑	VOICE-2	Port Newark/Elizabeth Voice Match	↑

1–1 of 1

Pie Chart: All



Status
Total Issues: **150**

To Do	79
Done	57
Waiting for Waze	7

Filter Results: Status: Waiting for Waze

T	Key	Summary	P
☑	WDI-25	Travel Time Formatting Bug	↑
☑	WDI-33	WDI-5 / Ask Waze difference between API urls	↑
☑	WFD-3	Frontage Feature	↑
☑	WFD-1	Waze - Flight Integration	↑
☑	VOICE-6	George Washington Bridge Voice Match	↑

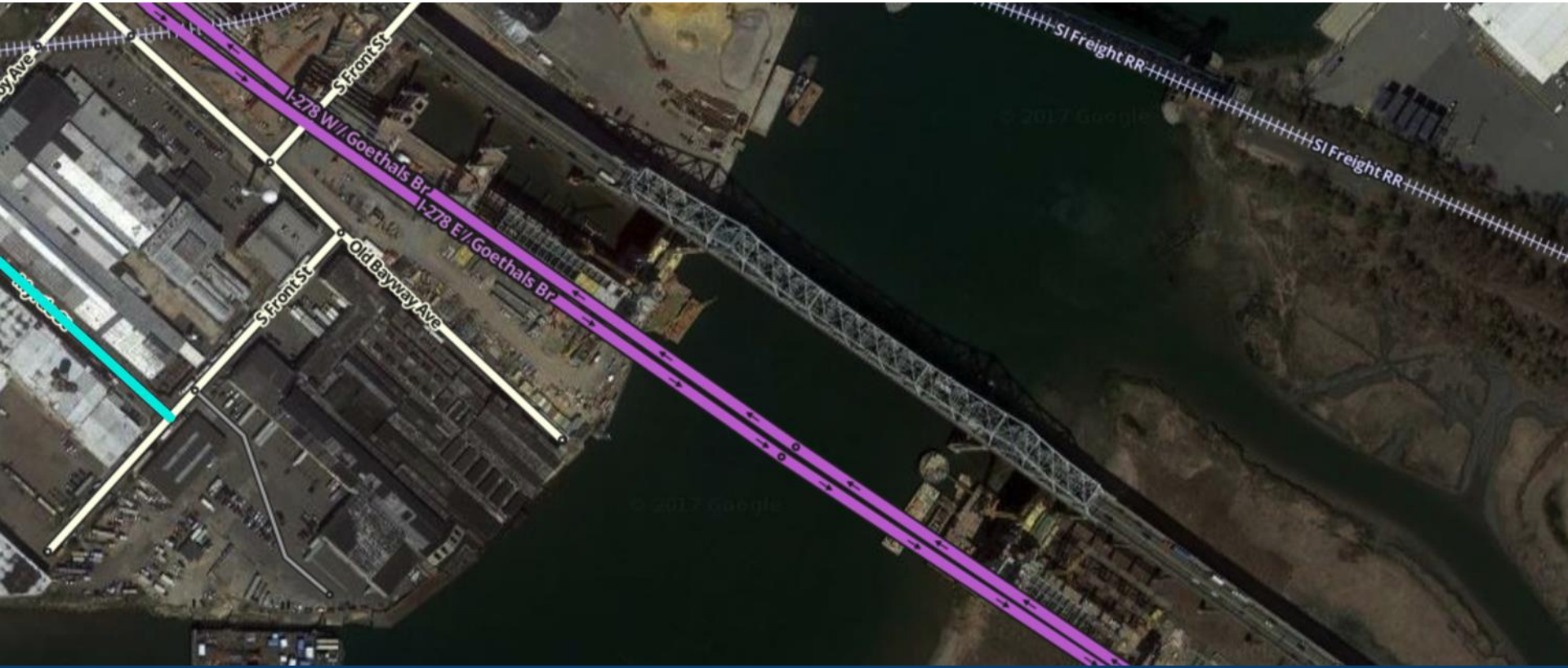
1–5 of 7 1 2 ▸

Filter Results: Status: On Hold

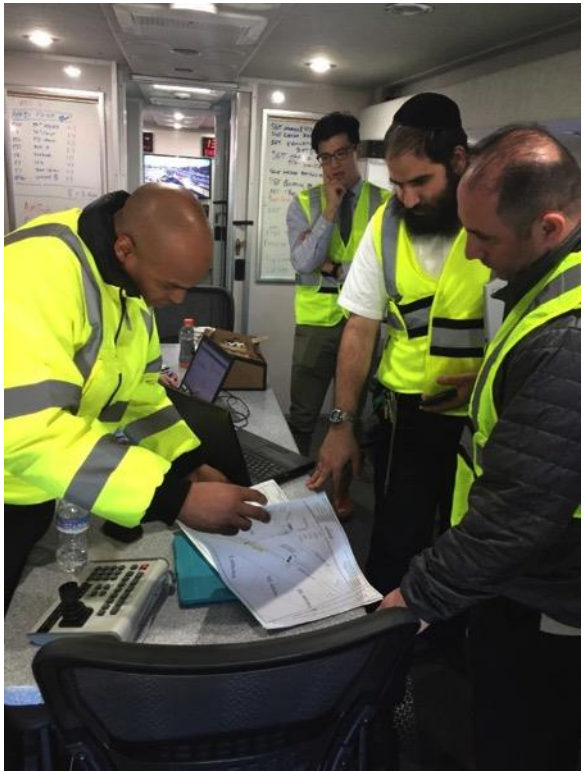
T	Key	Summary	P
☑	ANY-1	Zendrive @ LGA	↑

1–1 of 1

Specifics – Basemap: Goethals Bridge



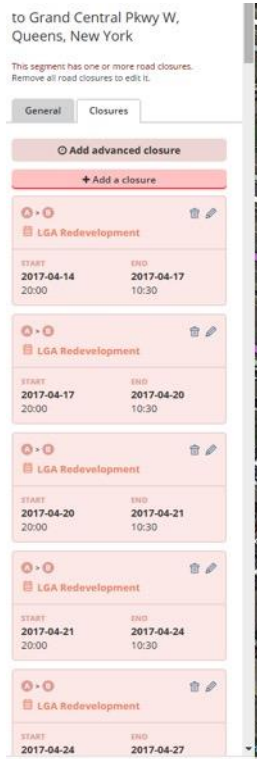
Specifics – Basemap: LGA

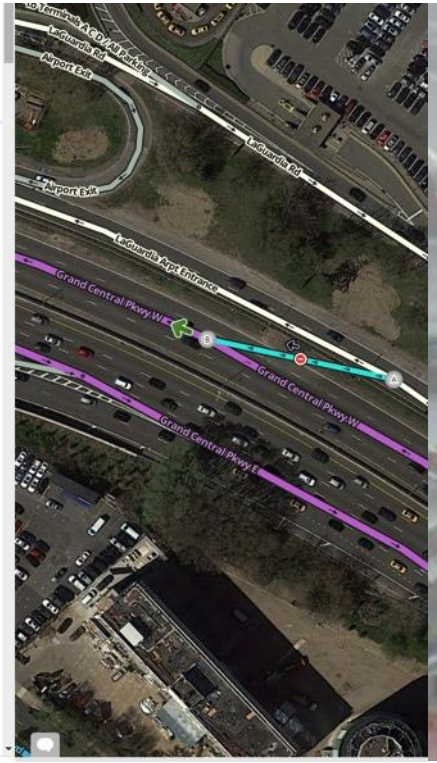


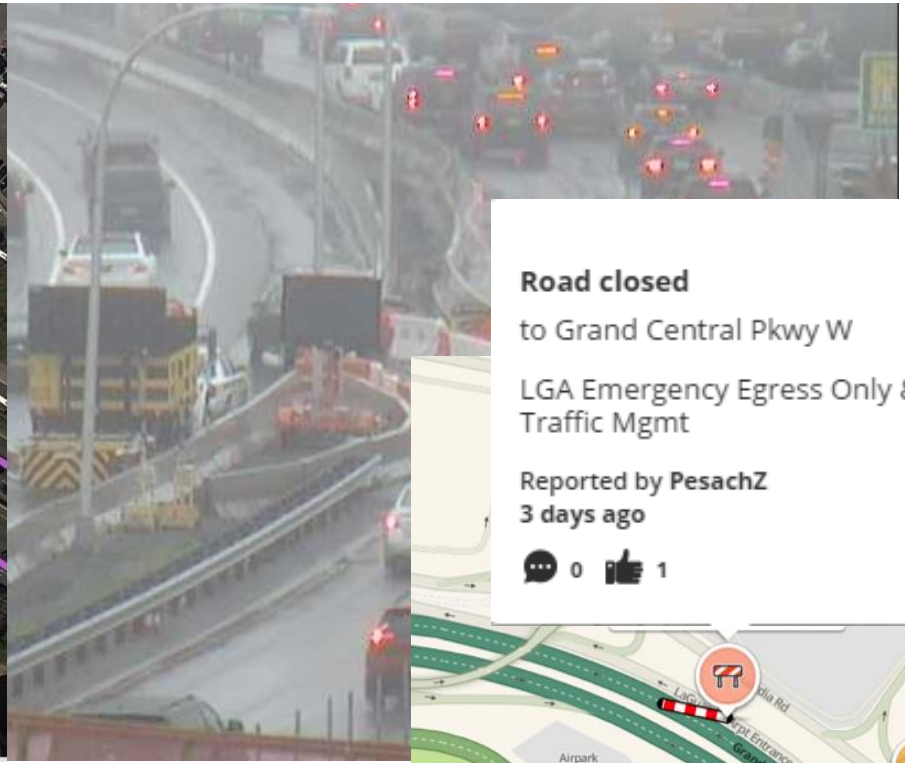
Specifics – Basemap: LGA

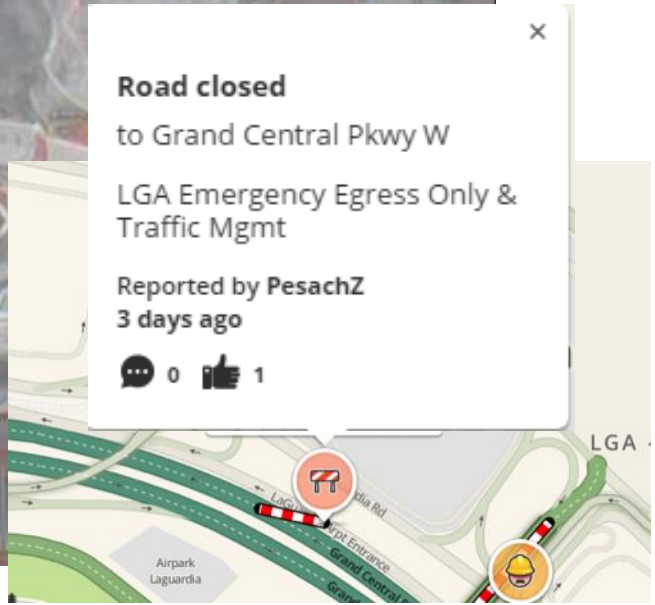
Specifics – Basemap: LGA

Specifics – Basemap: LGA









Specifics - Navigation: Bayonne Bridge

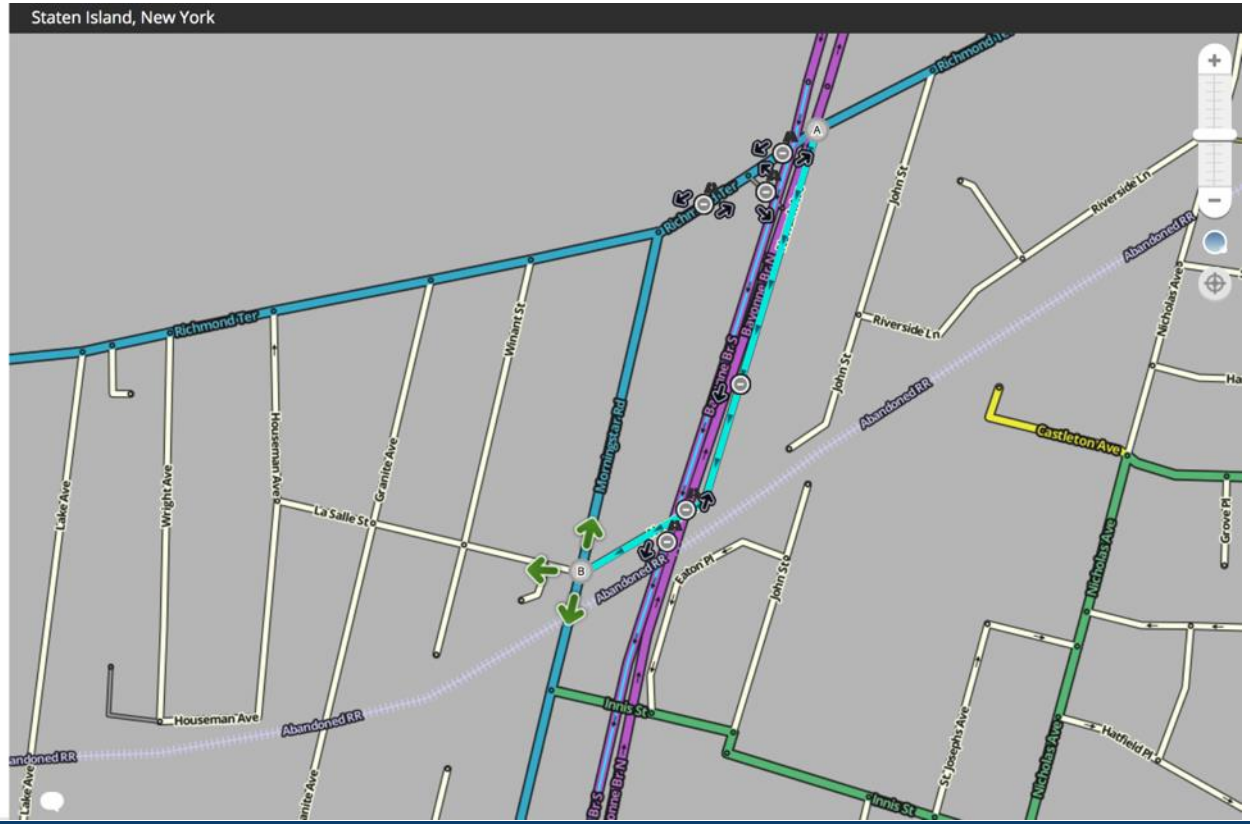
Today

Future

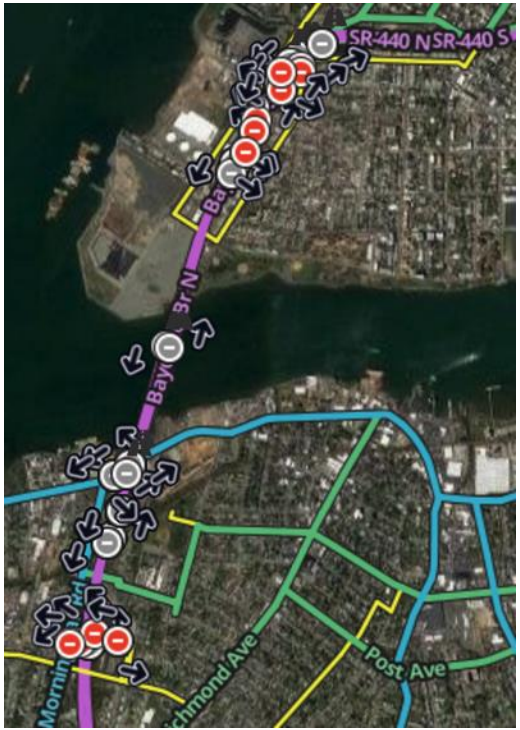
Specifics - Navigation: Bayonne Bridge

Specifics - Navigation: Bayonne Bridge

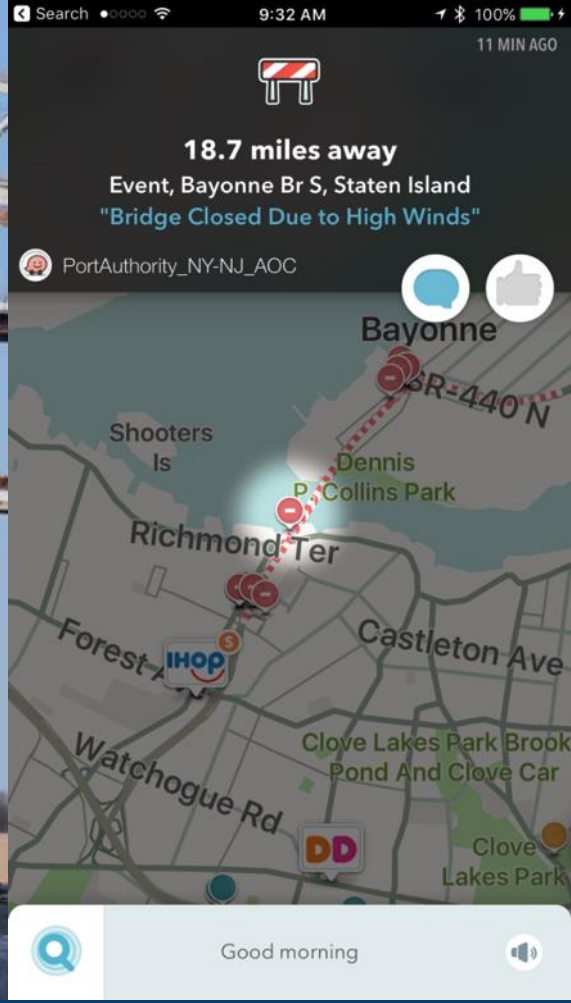
Specifics - Navigation: Bayonne Bridge



Specifics - Navigation: Bayonne Bridge

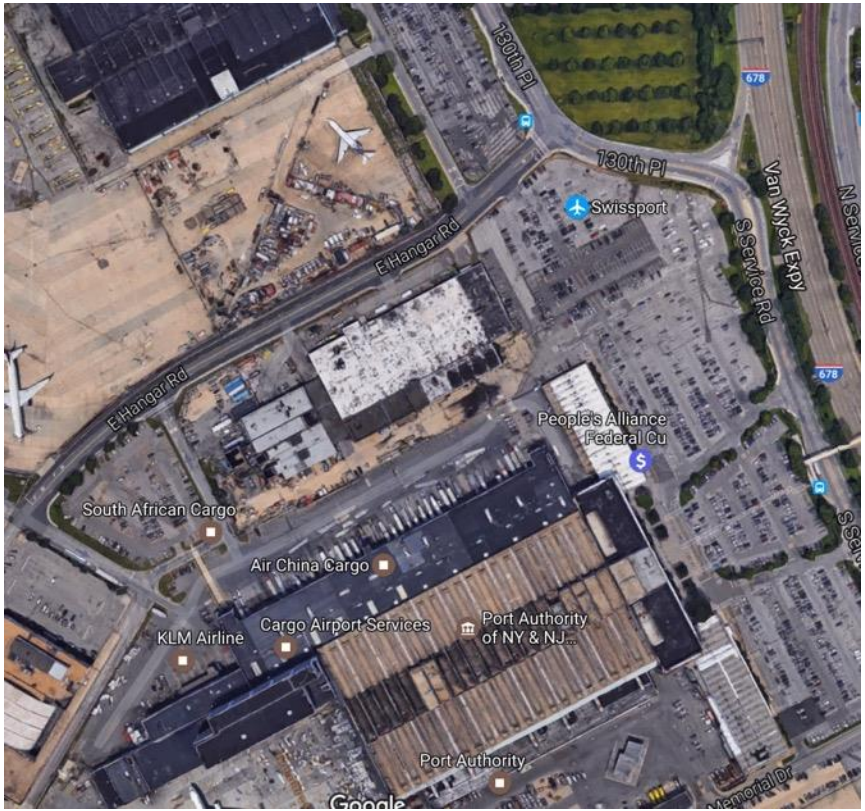


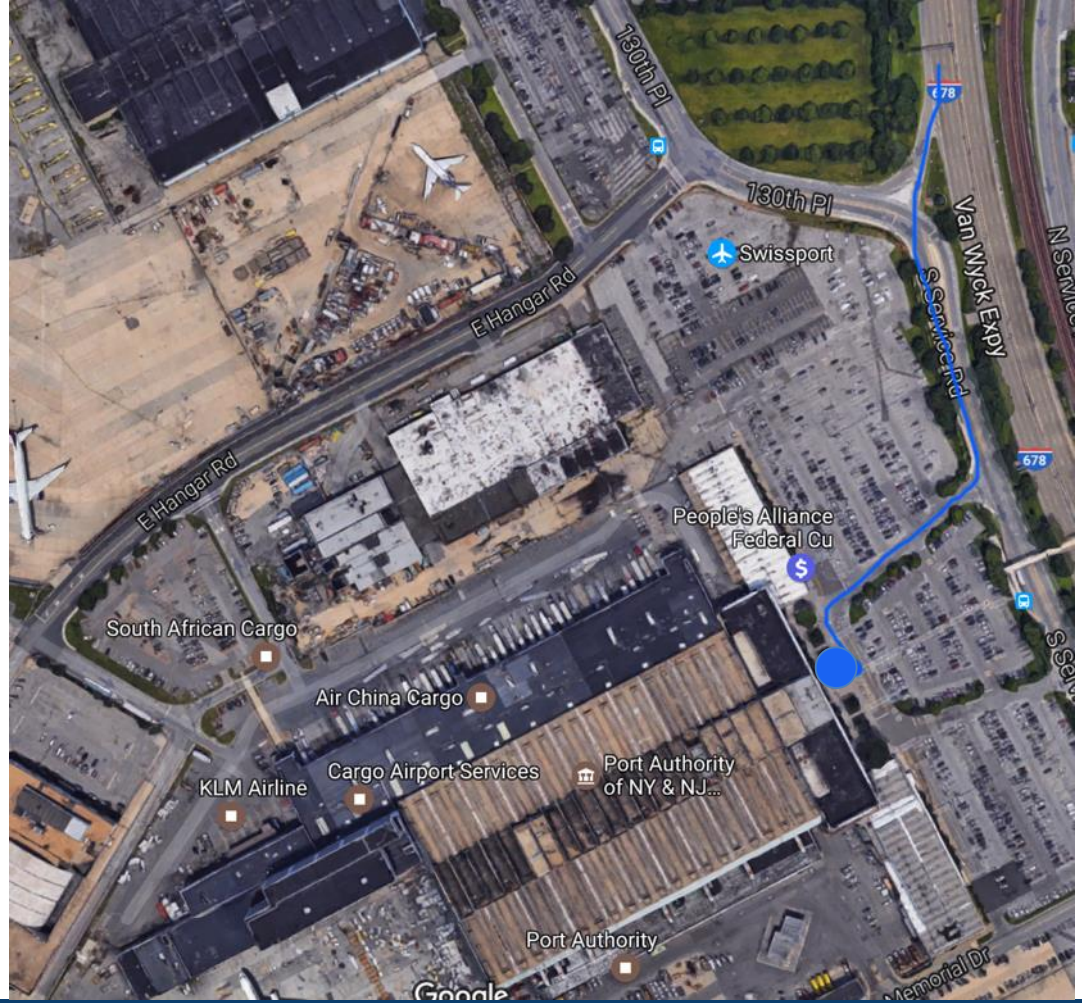
Bayonne Bridge
@BayonneBridge
Follow
The Bayonne Bridge in both directions is closed due to adverse weather. [07]
RETWEETS
2

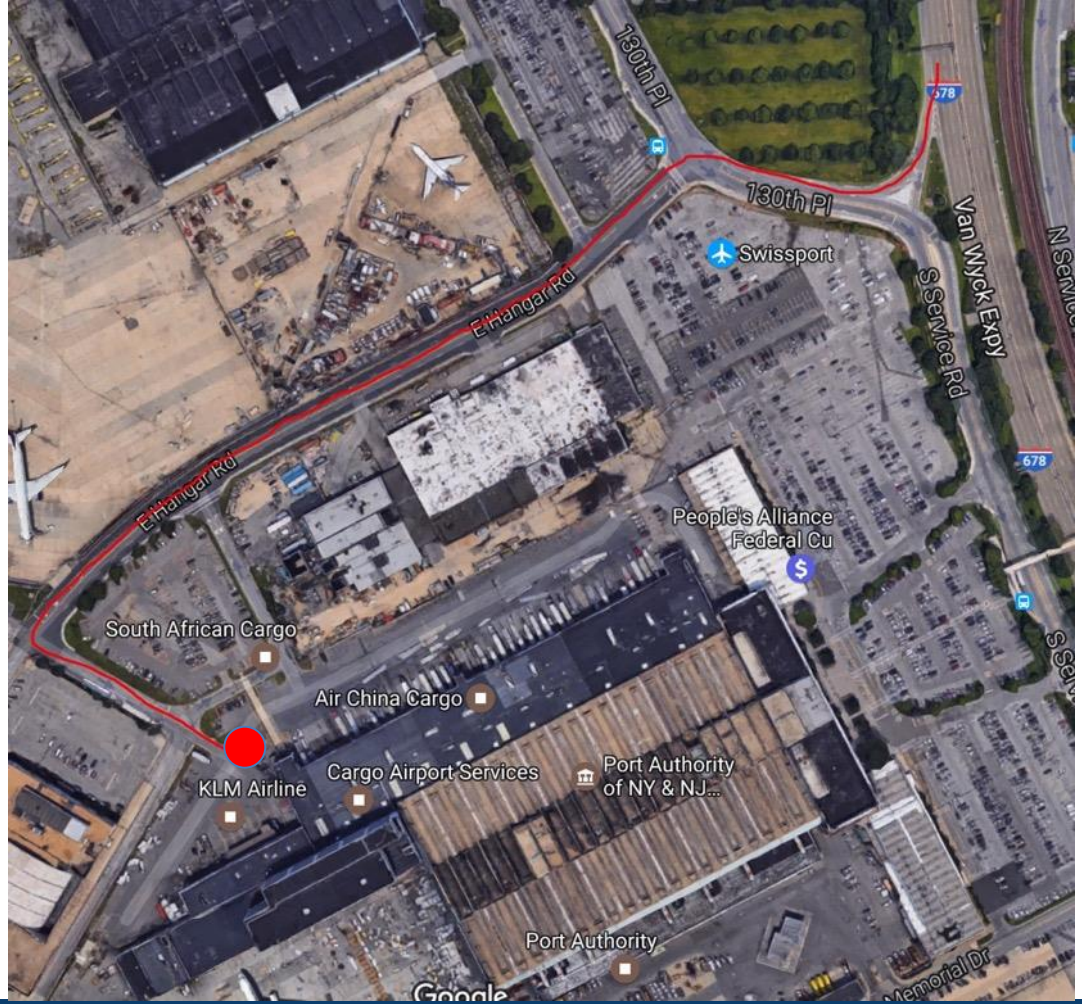

Search
9:32 AM
100%
11 MIN AGO
18.7 miles away
Event, Bayonne Br S, Staten Island
"Bridge Closed Due to High Winds"
PortAuthority_NY-NJ_AOC
Bayonne
BR-440 N
Shooters Is
Dennis P Collins Park
Richmond Ter
Castleton Ave
IHOP
Watchogue Rd
Clove Lakes Park Brook Pond And Clove Car
Clove Lakes Park
Good morning

Specifics – Navigation: Point Validation

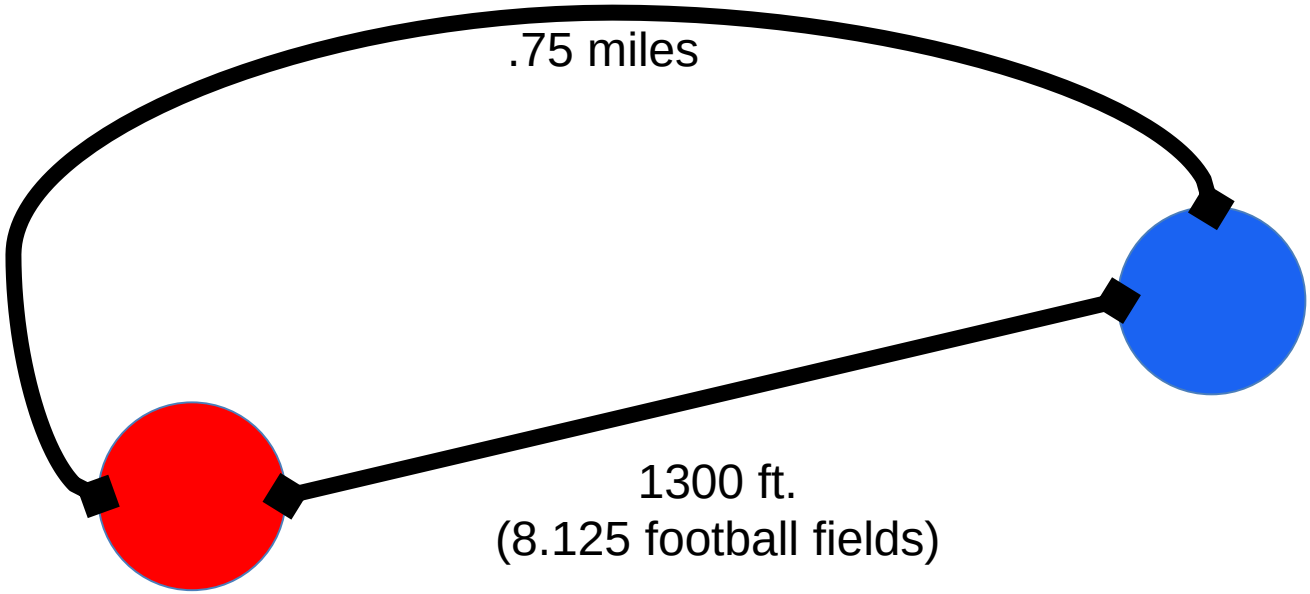
Specifics – Navigation: Point Validation



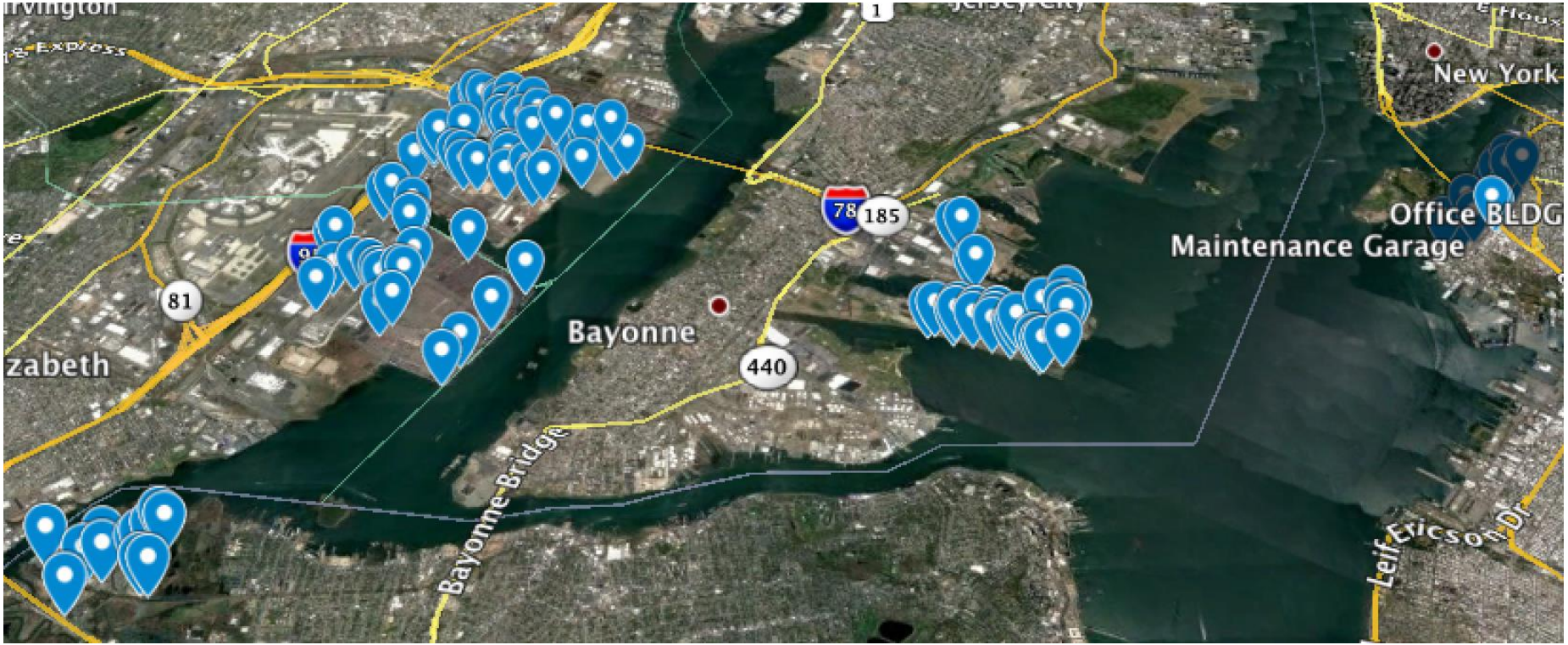

130th Pl
130th Pl
678
Swissport
E Hangar Rd
E Hangar Rd
Van Wyck Expy
S Service Rd
678
People's Alliance Federal Cu
South African Cargo
Air China Cargo
Cargo Airport Services
Port Authority of NY & NJ...
KLM Airline
Port Authority
Google


130th Pl
130th Pl
678
Swissport
E Hangar Rd
E Hangar Rd
Van Wyck Expy
S Service Rd
678
People's Alliance Federal Cu
South African Cargo
Air China Cargo
KLM Airline
Cargo Airport Services
Port Authority of NY & NJ...
Port Authority
Google

Specifics – Navigation: Point Validation



Specifics – Navigation: Point Validation

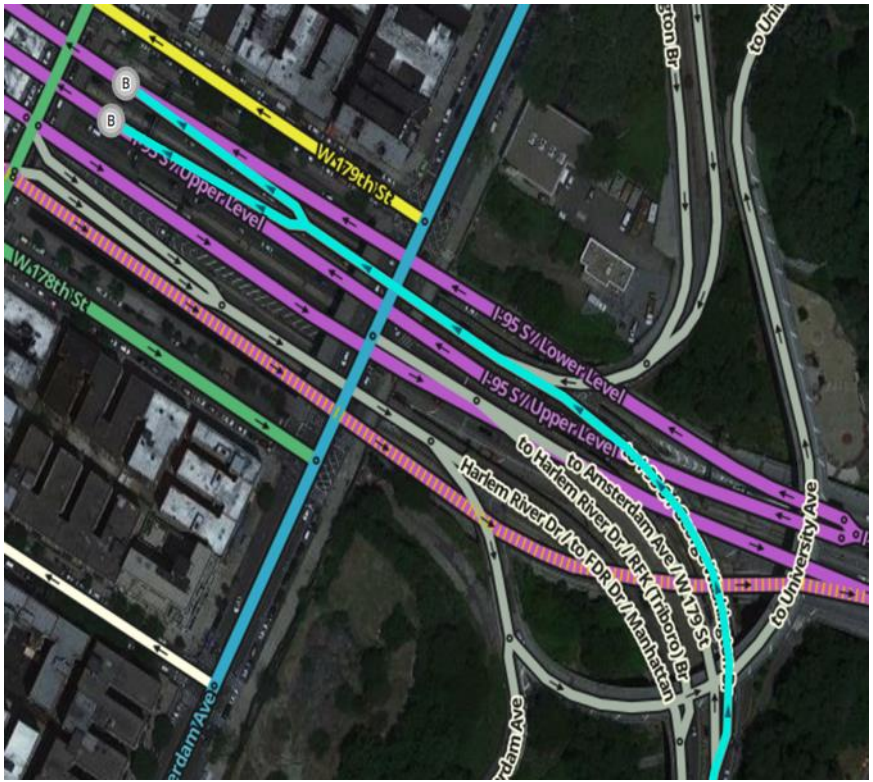


Specifics – Communication: Upcoming MTEs

14A Interchange ...	Feb, 2017 - Feb, 2018
Bayonne Bridge Repair	Feb-Dec, 2017
I-280, SR-21 Improvem...	Jan-Dec, 2017
I-78 Ramp Recon...	Mar, 2017 - Jan, 2018
Kosciuszko Bridge Proj	Feb-Dec, 2017
LGA Redevelopm...	Feb, 2017 - Jan, 2018
LGBT Pride Festival	Aug, 2017
Midtown (Bogota...	Mar, 2017 - Feb, 2018
Pulaski Skwy Reh...	Apr, 2014 - Dec, 2017
QMT Rehab - Sandy	Feb-Sep, 2017

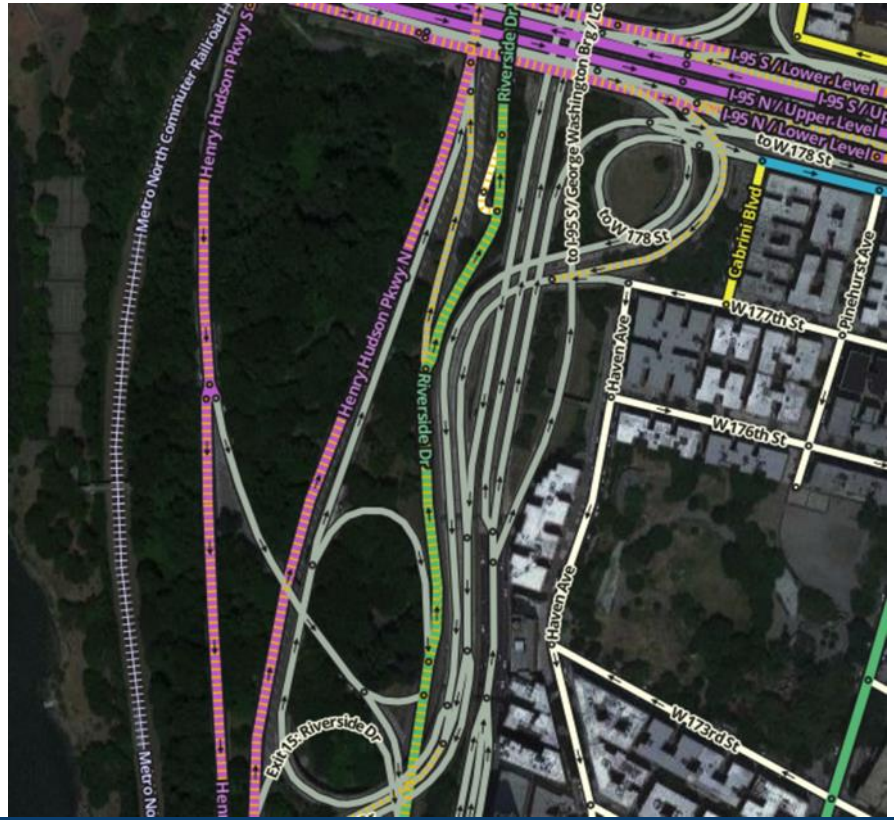
Specifics - Navigation: Harlem River Drive → GWB

Specifics – Navigation + Comm: Harlem River Drive → GWB

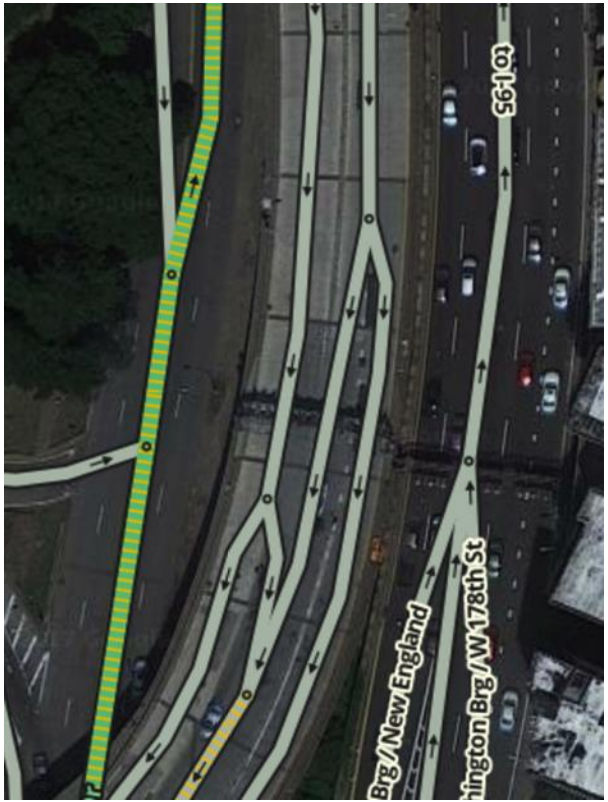


Specifics - Navigation: Harlem River Drive → GWB

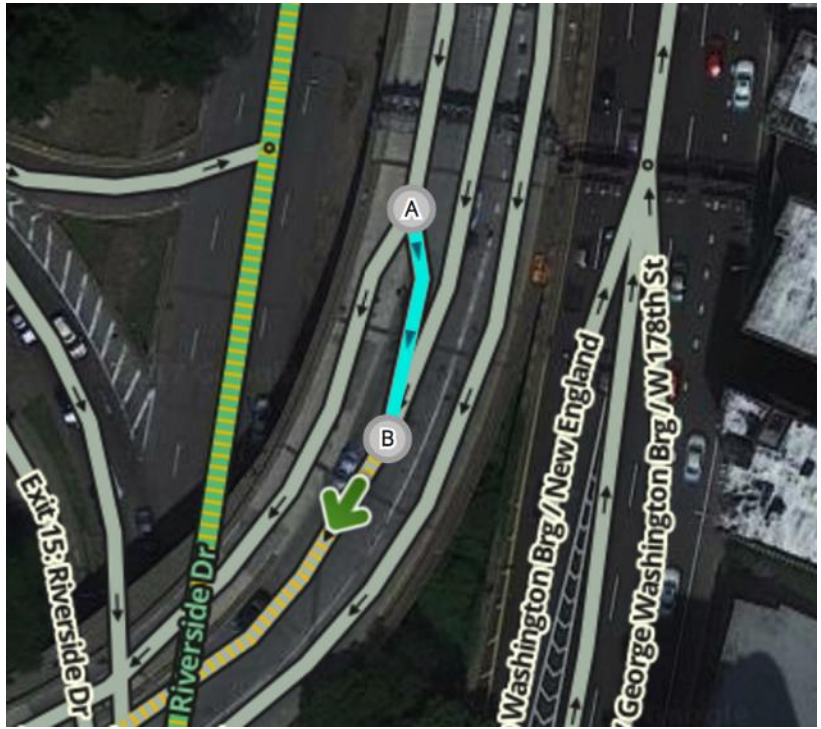
Specifics – Communication: Road Sign/ Voice Direction Match



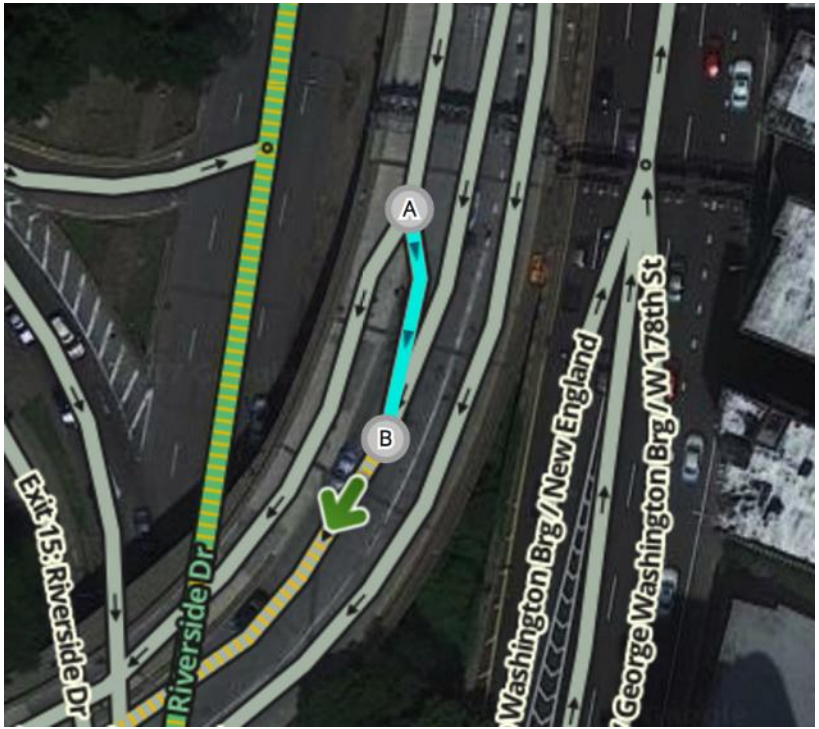
Specifics – Communication: Road Sign/ Voice Direction Match



Specifics – Communication: Road Sign/ Voice Direction Match



Specifics – Communication: Road Sign/ Voice Direction Match



Keep Right

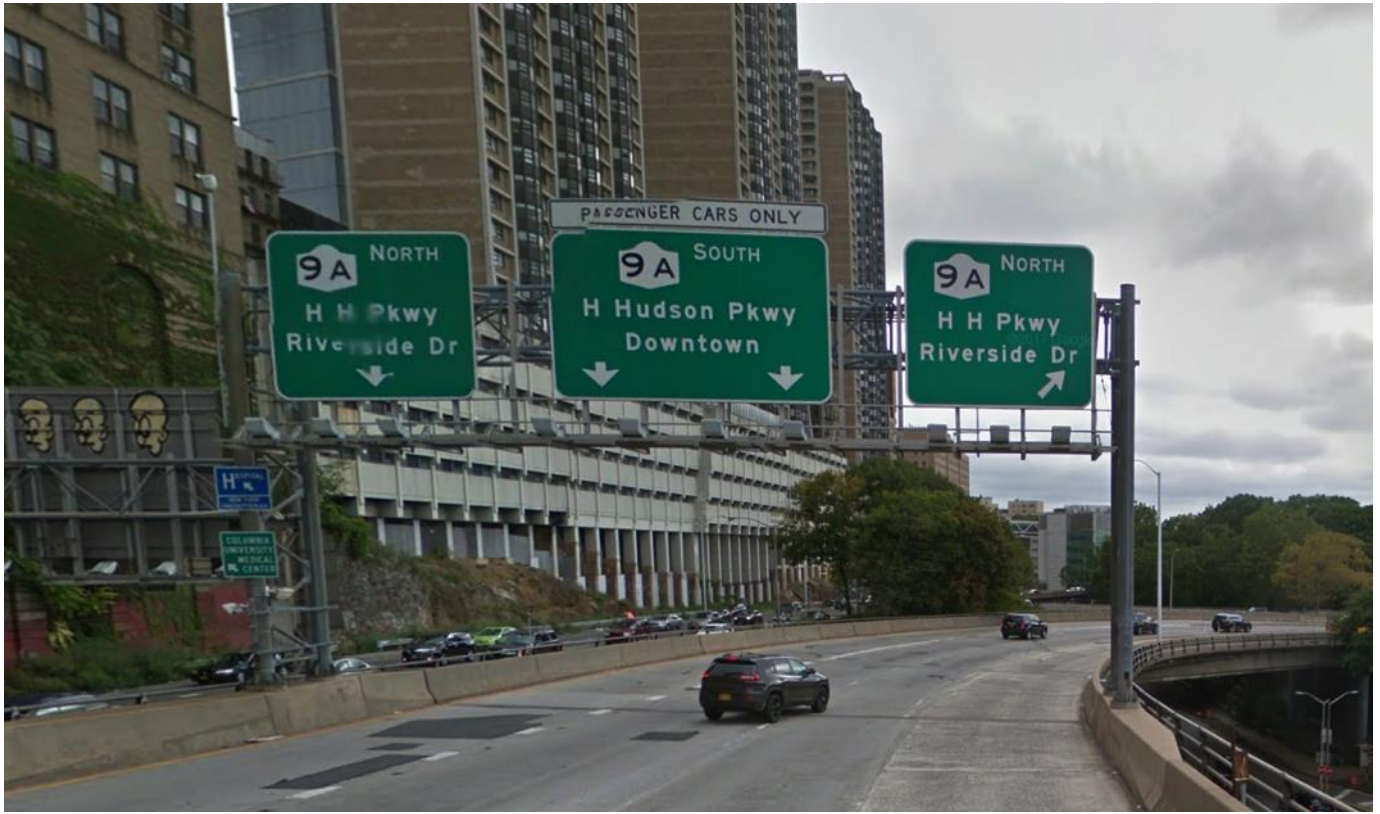
Keep Left

Keep Right

Keep Center

Specifics – Communication: Road Sign/ Voice Direction Match

Specifics – Communication: Road Sign/ Voice Direction Match

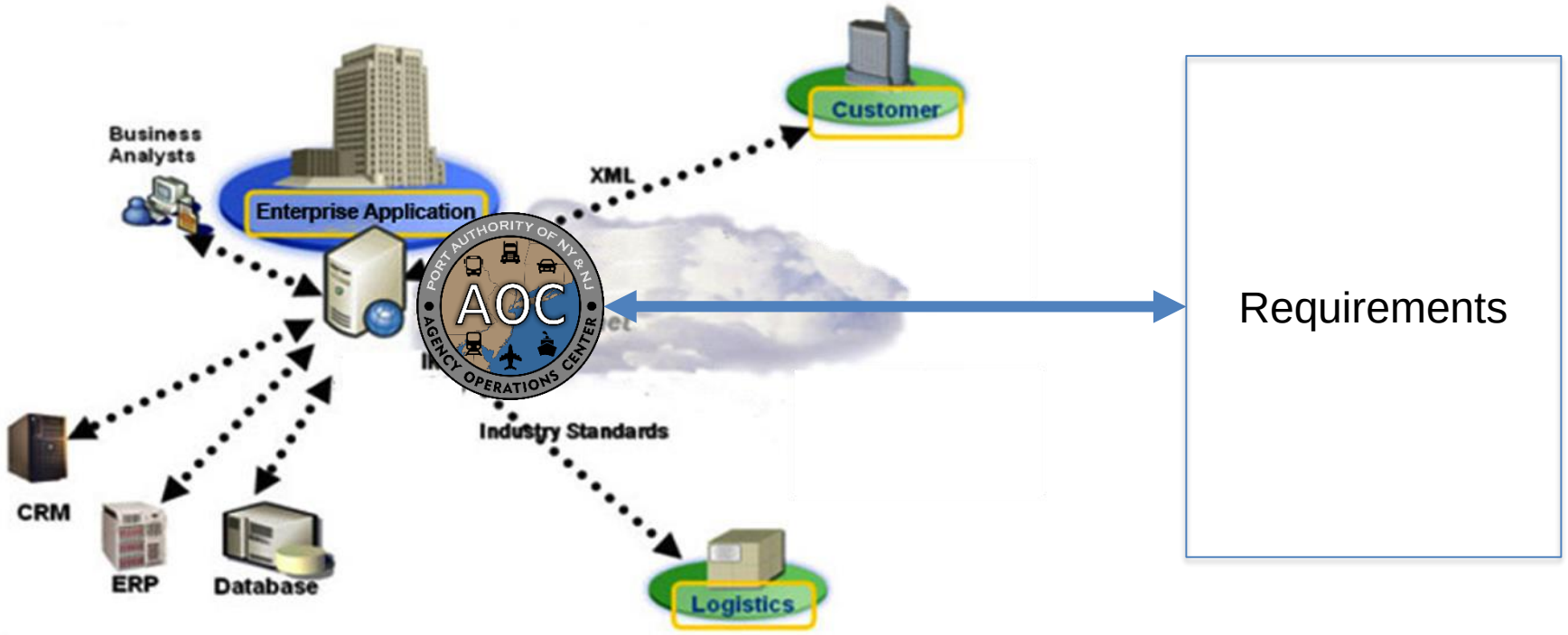


Specifics – Communication: Road Sign/ Voice Direction Match

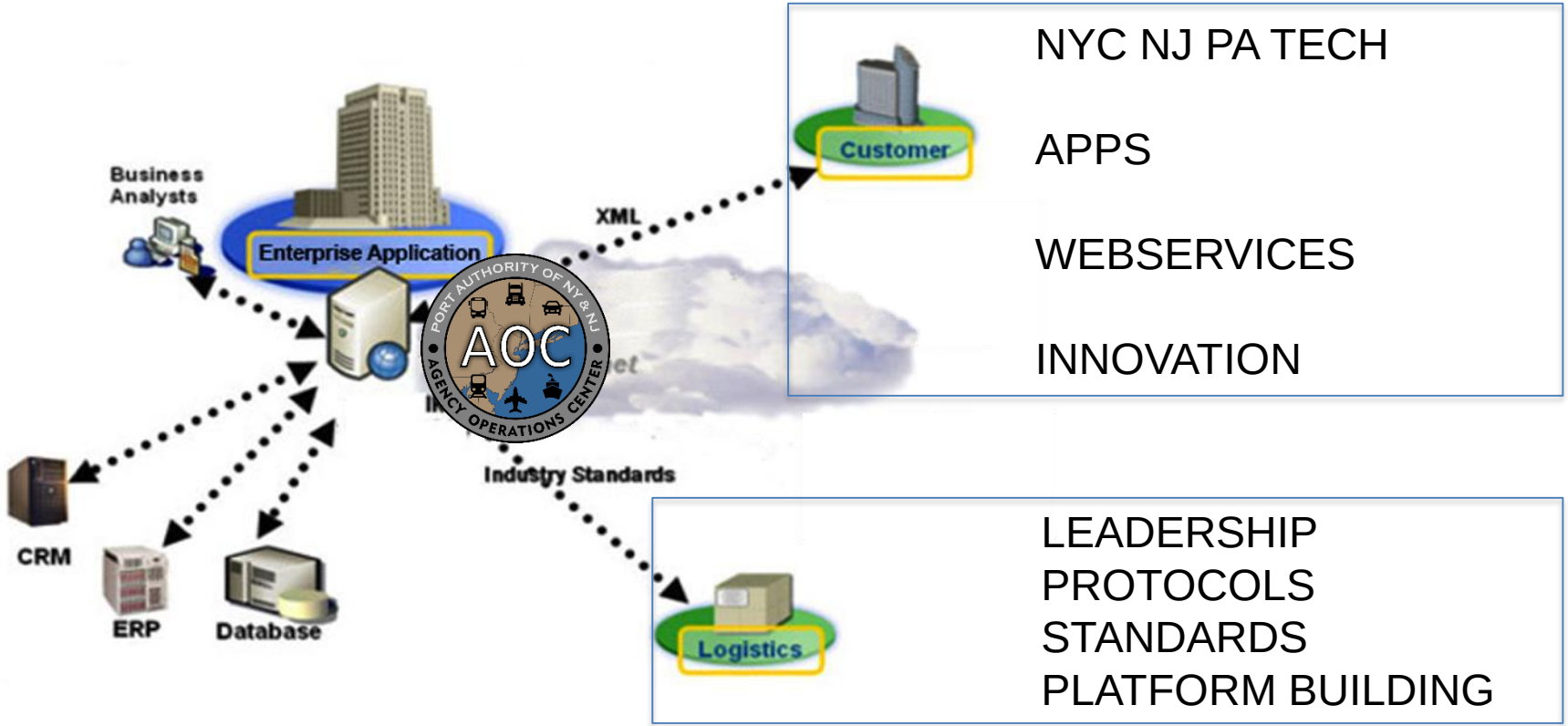
1 SEGMENT SELECTED

to NY-9A S / Henry Hudson Pkwy / Downtown, Manhattan, New York

Specifics - Automation via Enterprise Software Integration



Specifics - Automation via Enterprise Software Integration



Thank You

QUESTIONS?

Visit us at: **www.panynj.gov**

follow@panynj

www.instagram.com/panynj

www.facebook.com/panynj

www.linkedin.com/company/port-authority-of-ny-&-nj

Break (15 min)

Rob Bamford
TRANSCOM

Integrating Waze data with Public Agencies' Data

Integrating Waze Data with Public Agencies' Data

TRANSCOM

I-95 Crowdsourcing Summit

WAZE "One-Click" Agreement

- Two Options
  - One-Way (WAZE → XCM)
  - Two-Way (WAZE <-> XCM
- WAZE CCP Program operates per terms of "One-Click"
  - XCM Data Exchange T&C's will not be recognized
  - Reviewed agreement with Counsel and no additional exposure or risk to TRANSCOM and/or Member Agencies.
  - It was decided to provide TRANSCOM Data to WAZE per terms of "One Click" Agreement.

Initial Look at Waze Data

- Data secured for states of New York/New Jersey/Connecticut
- Per TRANSCOM Agency Policy – 3rd party data used for informational purposes by agencies only
- 3 types of events available in Event Feed:
  - Alerts
  - Jams
  - Irregularities

Alerts in the Waze Data

- ACCIDENT
  - Minor
  - Major
  - No subtype
- JAM
  - MODERATE TRAFFIC
  - HEAVY TRAFFIC
  - STAND STILL TRAFFIC
  - LIGHT TRAFFIC
  - NO SUBTYPE

Alerts in the Waze Data

- WEATHER HAZARD/HAZARD
  - On road
  - On shoulder
  - Weather
  - On road object
  - On road pot hole
  - On road road kill
  - On shoulder car stopped
  - On shoulder animals
  - On shoulder missing sign

Alerts in the Waze Data

- WEATHER HAZARD/HAZARD (continued)
  - Weather fog
  - Weather hail
  - Weather heavy rain
  - Weather heavy snow
  - Weather flood
  - Weather monsoon
  - Weather tornado
  - Weather heat wave
  - Weather hurricane

Alerts in the Waze Data

- WEATHER HAZARD/HAZARD (continued)
  - Weather freezing rain
  - On road lane closed
  - On road oil
  - On road ice
  - On road construction
  - On road car stopped
  - No subtype

Alerts in the Waze Data

- MISC
  - No subtype
- CONSTRUCTION
  - No subtype
- ROAD CLOSED
  - Hazard
  - Construction
  - Event
  - No subtype

Alerts in the Waze Data
Tuesday 12/6/16

- All alerts
  - 3,223,001
  - 2,092,198 - Minus yellow event types
- Total unique alert count
  - 66,034
  - 40,174 – Minus yellow event types

Alerts in the Waze Data
Tuesday 12/6/16

- Total unique alert count with confidence > 3
  - 2,476
  - 989 - Minus yellow event types
- Total unique alert count with confidence > 3 and no 511NJ alerts
  - 2,458
  - 971 - Minus yellow event types

Jams in the Waze Data

- Streets
- Primary Streets
- Freeways
- Ramps
- Trails
- Primary
- Secondary
- 4X4 Trails
- Ferry crossings

Jams in the Waze Data

- Walkway
- Pedestrian
- Exit
- Stairway
- Private roads
- Railroads
- Runway/taxiway
- Parking lot roads

Jams in the Waze Data
Tuesday 12/6/16

- All jams
  - 2,675,934
  - 2,632,209 - Minus yellow roadway types
- Total unique jam count
  - 207,820
  - 207,774 – Minus yellow roadway types

Jams in the Waze Data
Tuesday 12/6/16

- **Total unique jam count with congestion level = 5**
  - 40,466
  - 40,422 - Minus yellow roadway types
- **Total unique alert count with congestion level = 5 and no 511NJ alerts**
  - 1,051
  - 1,007 - Minus yellow roadway types

Irregularities in the Waze Data

- Per definition from Waze, Irregularities are Events and Jams that exceed ‘normal’ conditions.
  - Important note: original Event or Jam distributed in feed prior to issuing Irregularity.

Waze Data
Tuesday 12/6/16

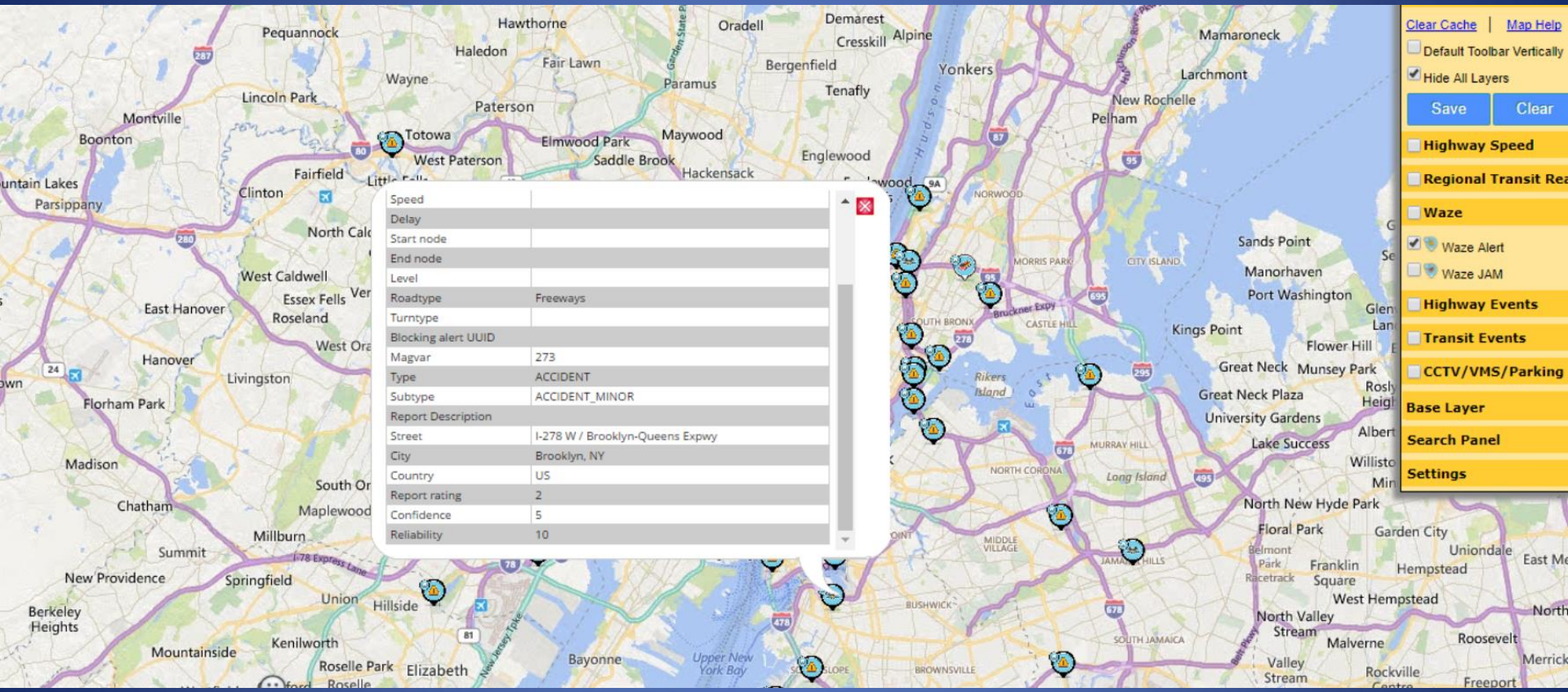
- ALERTS – 971
- JAMS – 1,007
- IRREGULARITIES - ??

- TOTAL – 1,978

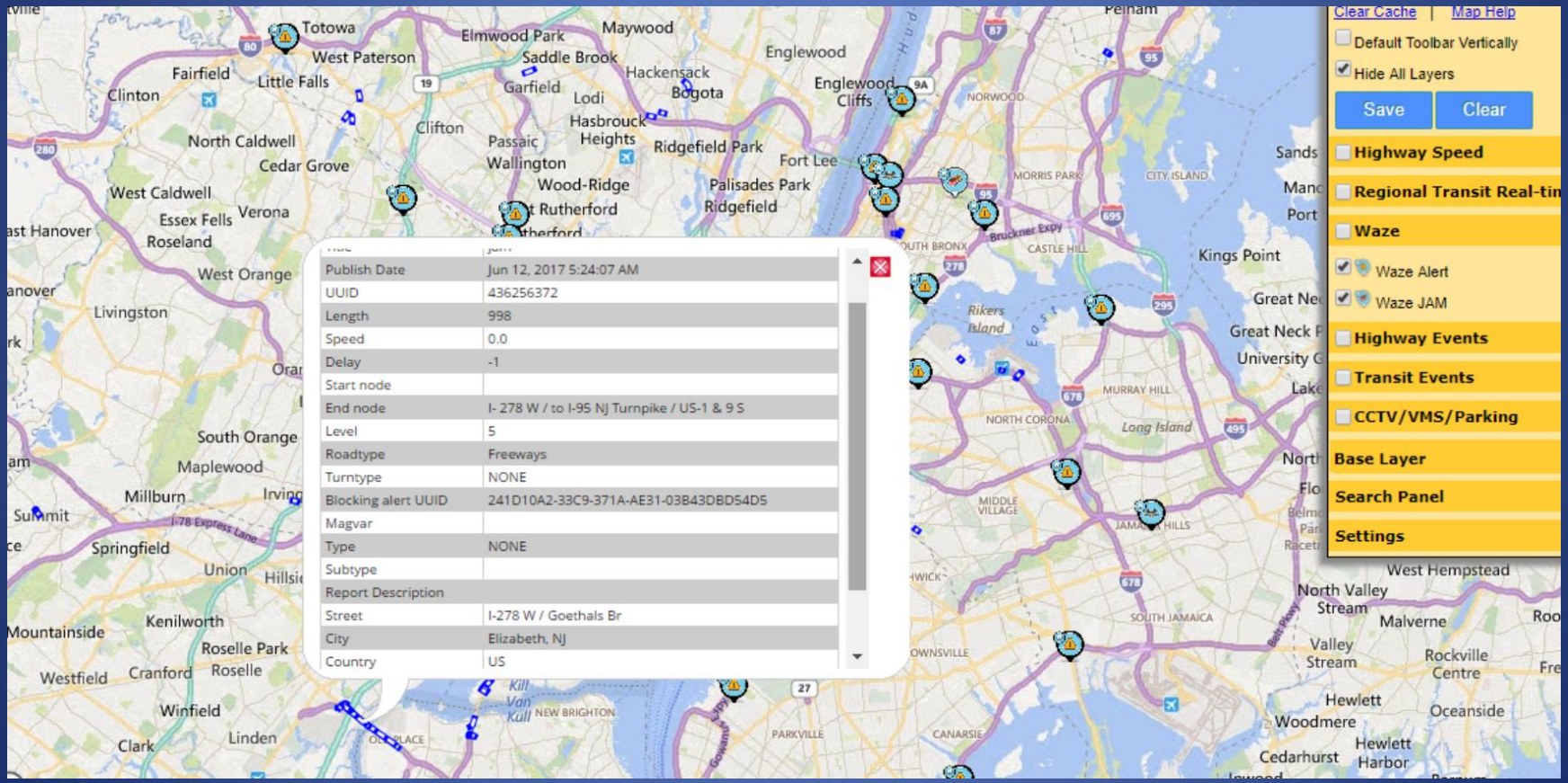
Waze Data

- Data did include:
  - Lat/Long
- However, data did not always include:
  - Agency
  - Roadway
  - Direction
  - Type of accident
  - Specifics of incident

Waze Data – Event Sample



Waze Data – Jam Sample



Waze Data Usage

- Per TRANSCOM Agency Policy – 3rd party data used for informational purposes only
  - Data available via TRANSCOM System Tools
  - Usage/actions are determined by agencies subject to their procedures and policies
    - Example - Jam vs. recurring congestion

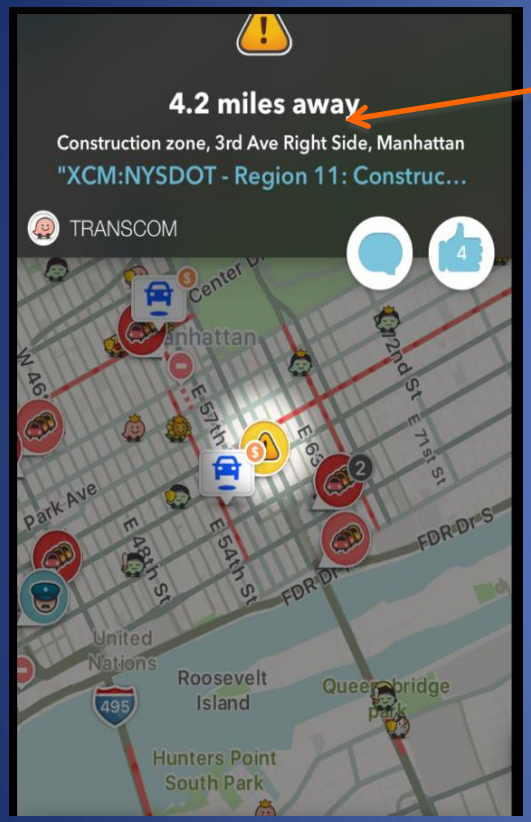
TRANSCOM Data to Waze

- Initial datafeed provided all content (planned and active Events)
  - Subject to observed significant durations, planned events removed from datafeed.
    - Thanksgiving's day parade was being posted for 2017 in April 2017.
- Event Message updated per agency feedback as part of Penn Station support activities
  - Cut down from 160 characters to 70

TRANSCOM Data to Waze

- Per Waze configuration, a designated keystroke required to address data recursion on the Waze -> TRANSCOM interface.

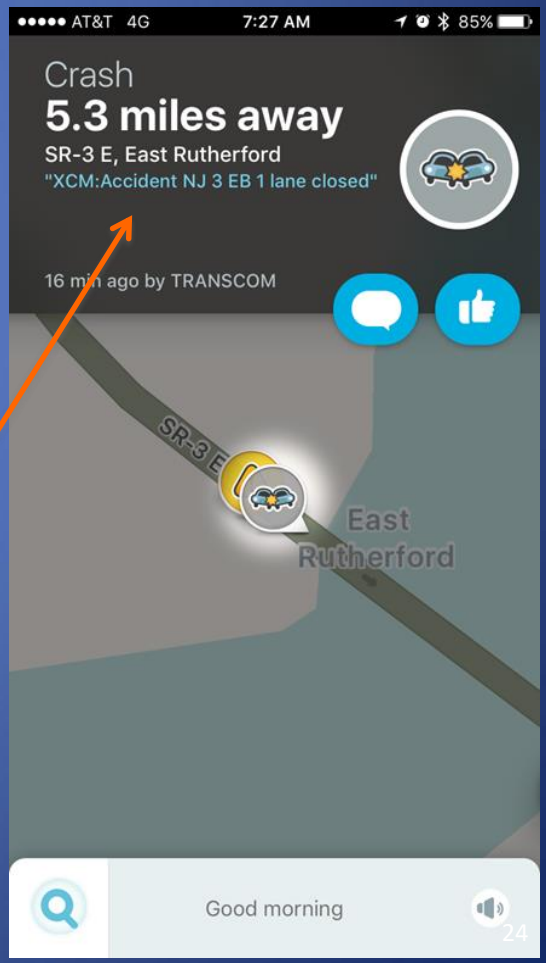
Waze Use of TRANSCOM Data



Original configuration based on existing Datafeed structure

Based on character limitation – message Description was being cut off and/or truncated

- Per request from agencies as part of Penn Station Maintenance, message customized for Waze to focus on event description

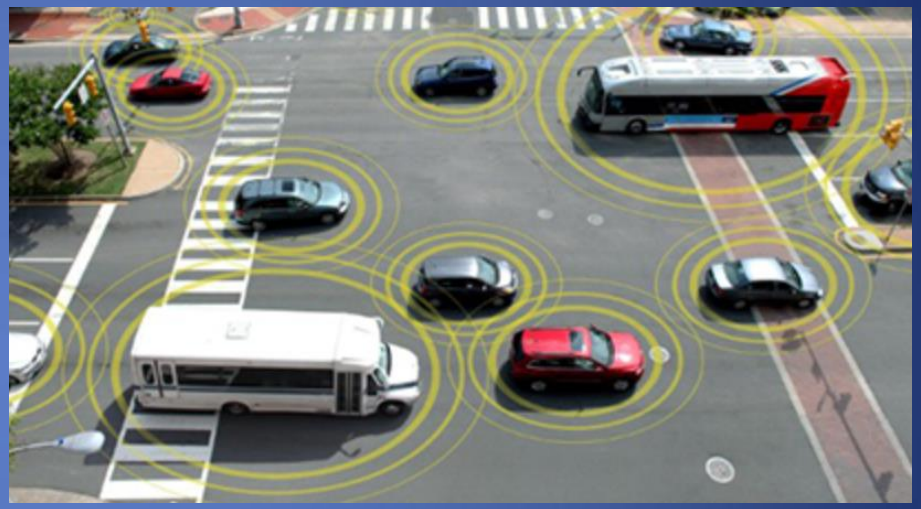


TRANSCOM 3rd Party Data - Next Steps

UBER Movement

- Working to secure feed for assessment/review by TRANSCOM Member Agencies
  - Offers alternative to Waze
  - Another data source that can be integrated into TRANSCOM Data Fusion Engine

TRANSCOM 3rd Party Data - Next Steps



As part of TRANSCOM Regional Architecture, 2018 update to include CV data elements

- Support data exchange
- Specification source for Member Agency procurements/assessments

Questions?

Rob Bamford
TRANSCOM
bamford@xcm.org

Clifton Curtis
Maine Department of Transportation

Maine Waze

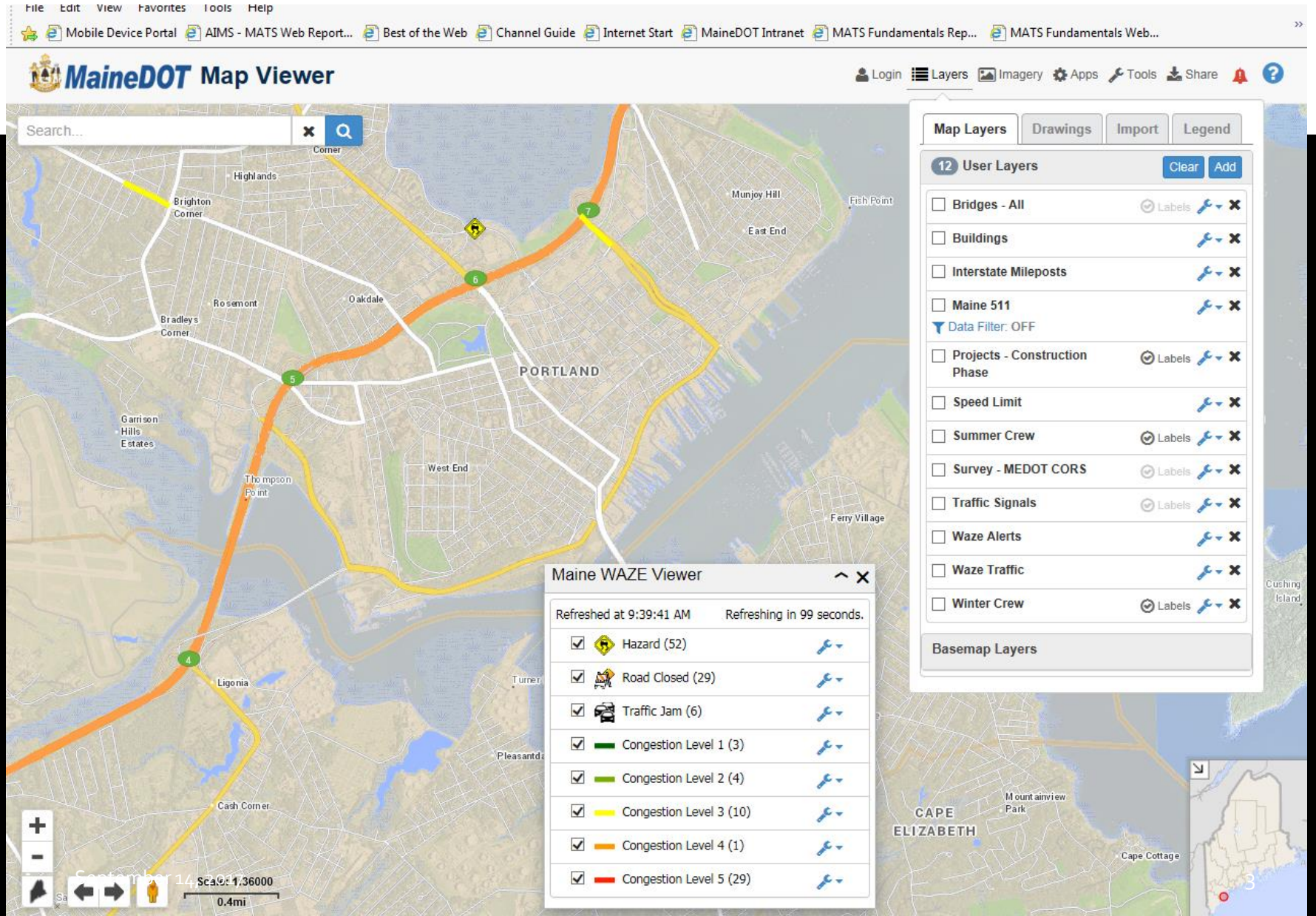
MAINE WAZE

I-95 Corridor Coalition Crowdsourcing Summit

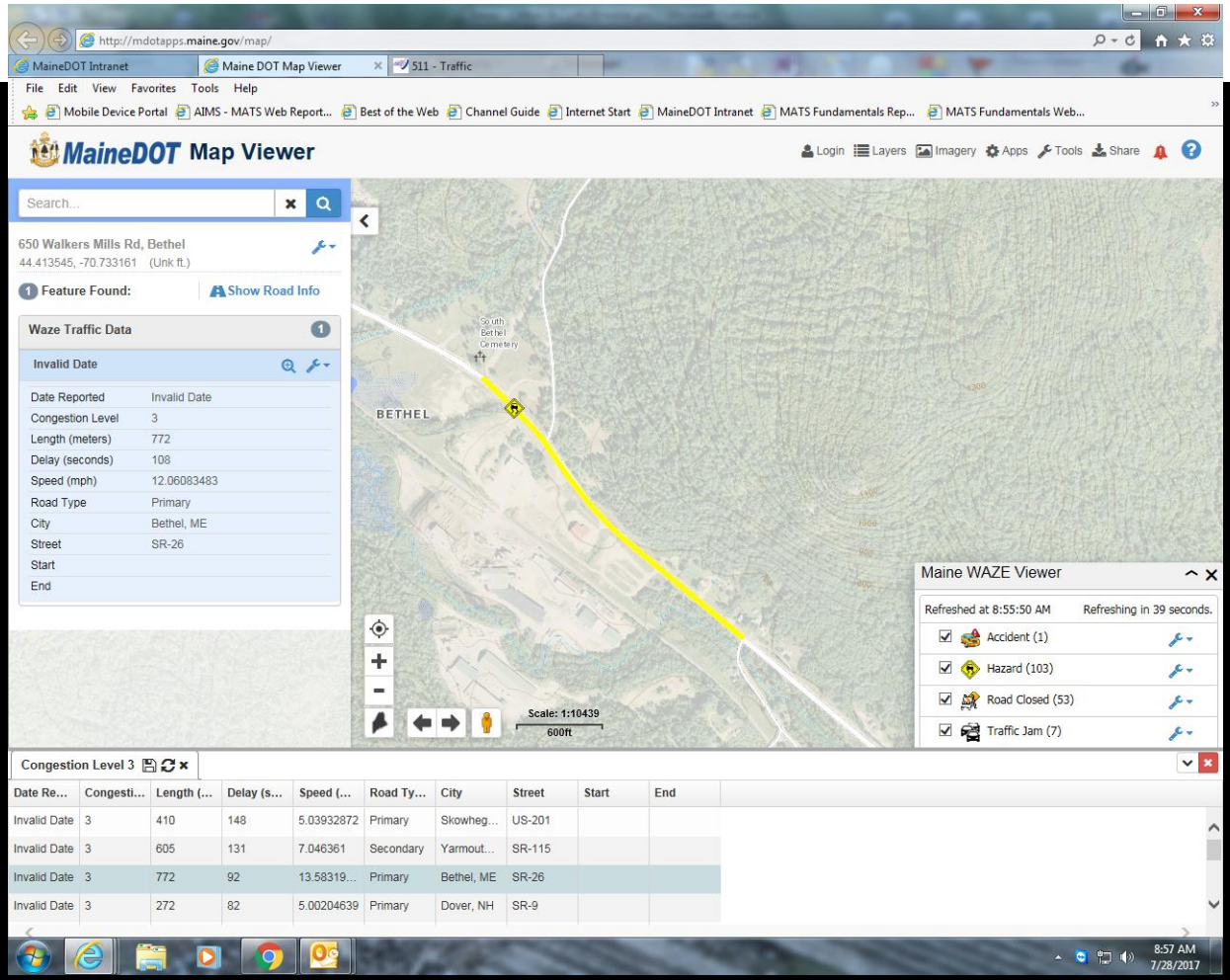
September 14, 2017

MaineDOT

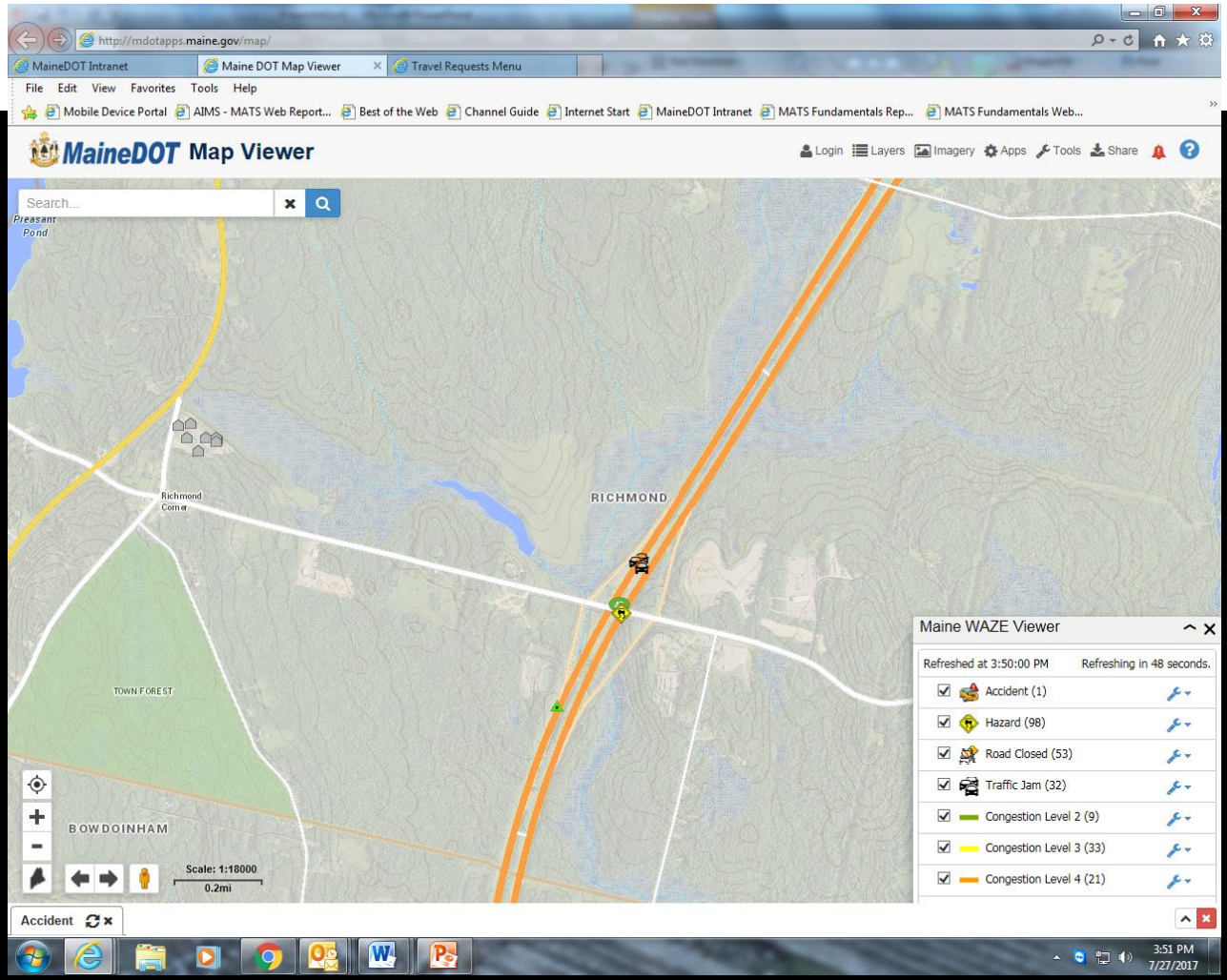
HTTP://WWW.MAINE.GOV/MDOT/MAPVIEWER/



MONITOR – INTERNAL APP



ALERT


http://mdotapps.maine.gov/map/
MaineDOT Intranet
Maine DOT Map Viewer
Travel Requests Menu
File Edit View Favorites Tools Help
Mobile Device Portal
AIMS - MATS Web Report...
Best of the Web
Channel Guide
Internet Start
MaineDOT Intranet
MATS Fundamentals Rep...
MATS Fundamentals Web...
MaineDOT Map Viewer
Login
Layers
Imagery
Apps
Tools
Share
Search...
Pleasant Pond
Richmond Corner
RICHMOND
TOWN FOREST
BOWDOINHAM
Scale: 1:18000
0.2mi
Maine WAZE Viewer
Refreshed at 3:50:00 PM
Refreshing in 48 seconds.
Accident (1)
Hazard (98)
Road Closed (53)
Traffic Jam (32)
Congestion Level 2 (9)
Congestion Level 3 (33)
Congestion Level 4 (21)
Accident
3:51 PM
7/27/2017

VERIFY

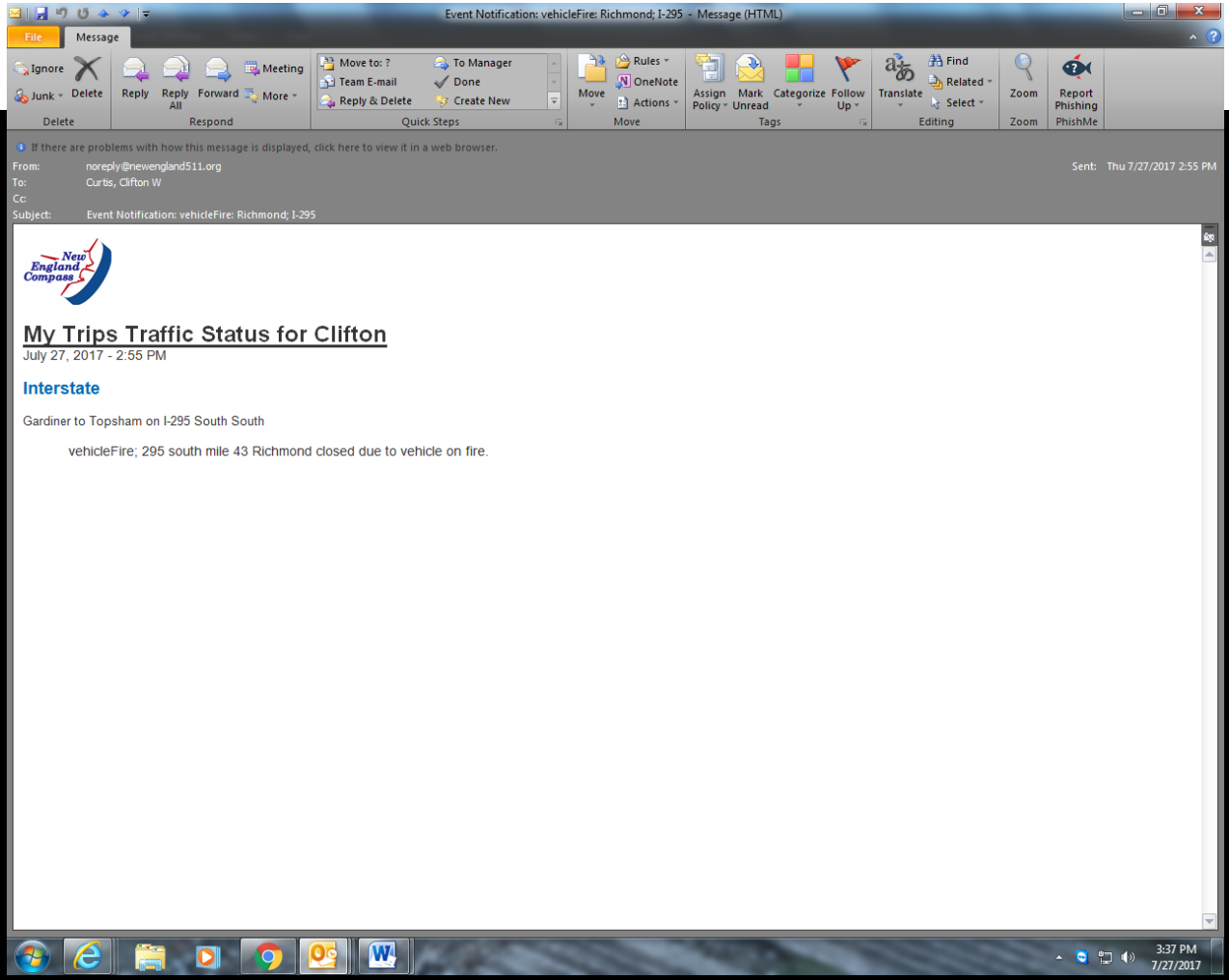
From: MaineDOTRadioRoomDispatchers@maine.gov
Sent: Thu 7/27/2017 2:57 PM
To:
Cc:
Subject: 295 south mile 43 closed

MAINE SAGADAHOC RICHMOND 2
VEHICLE ON FIRE 295 SOUTH MILE 43 RICHMOND CLOSED DUE TO VEHICLE ON FIRE.

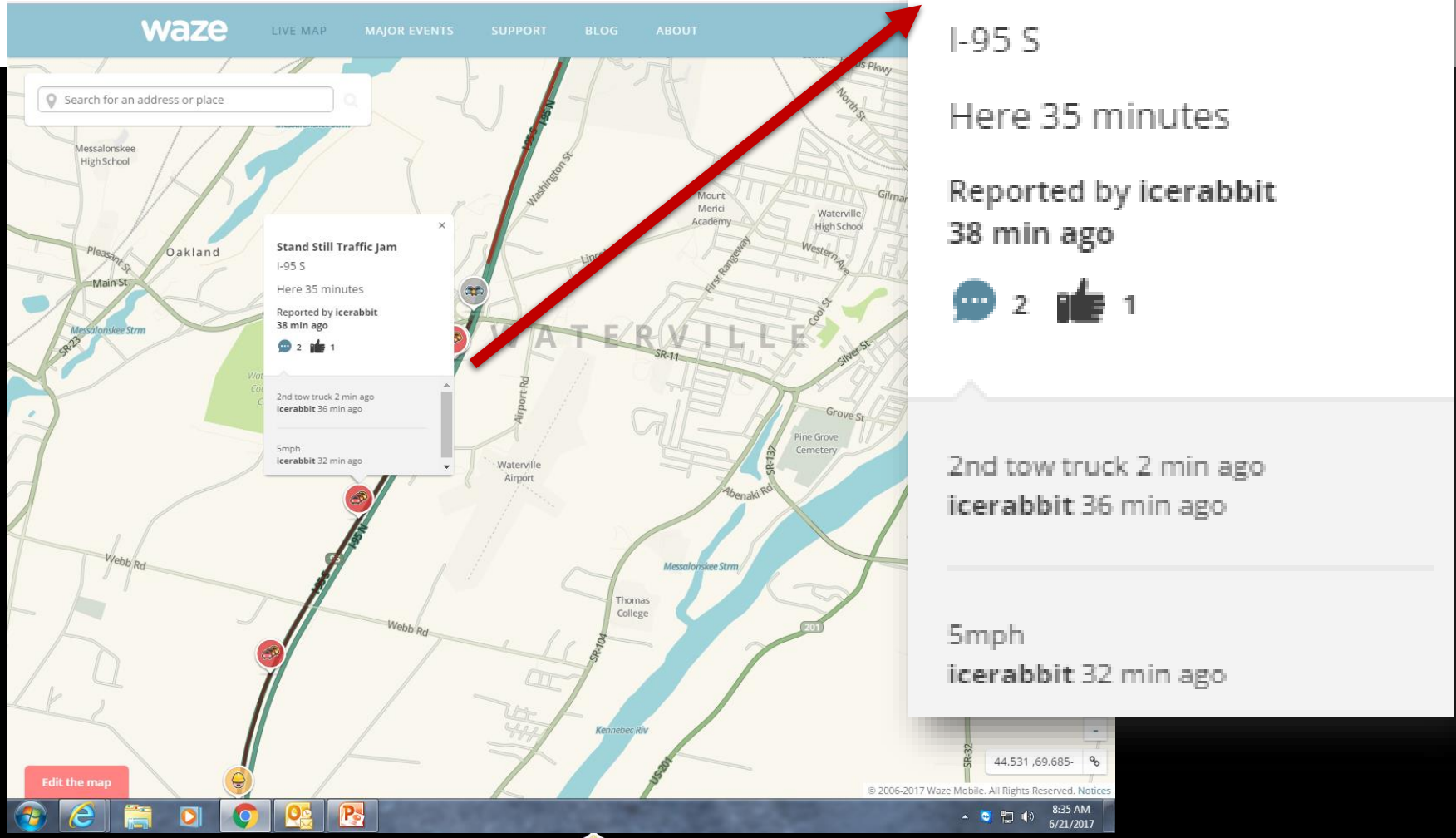
295 mile 43 closed due to camper on fire and has propane on trailer.
DOT CREW BEEN CALLED 214 heading that way.

Sent from Compass user t_whitman:DOT-CT1ADTMO001:5816

DISSEMINATE

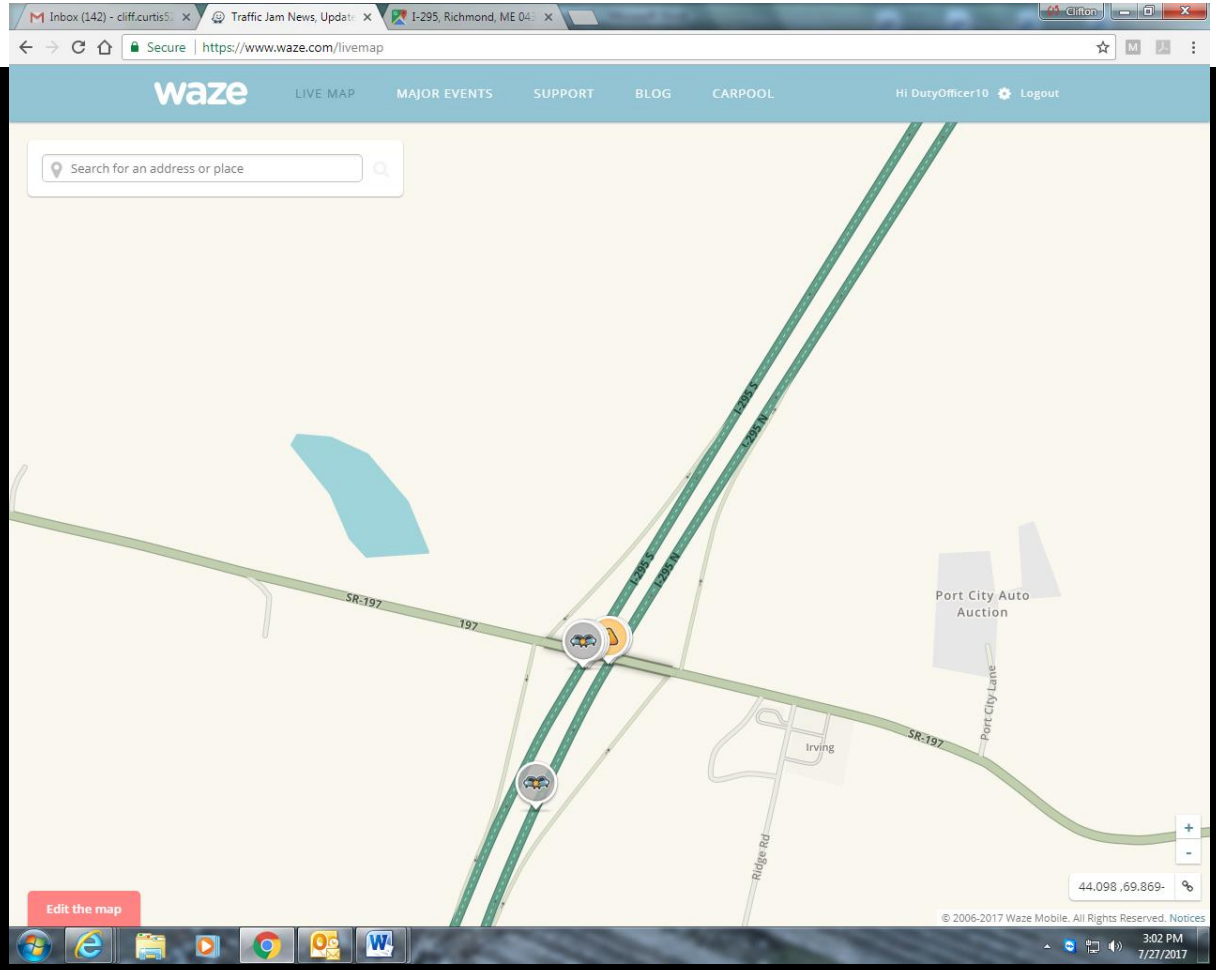


WAZE LIVE MAP



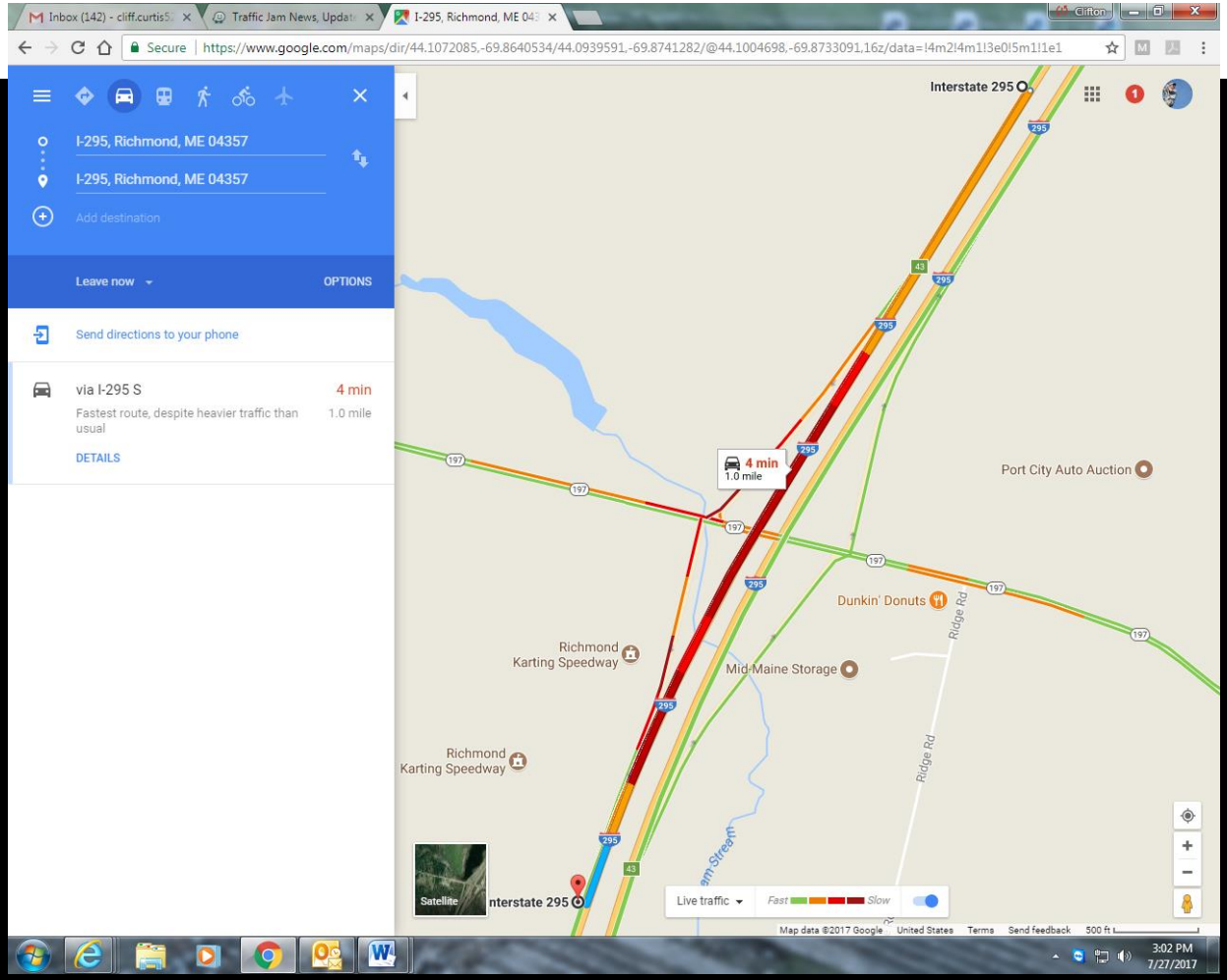
INITIAL TRAVEL TIME - WAZE

Shows crashes, but no travel time information for the first few minutes



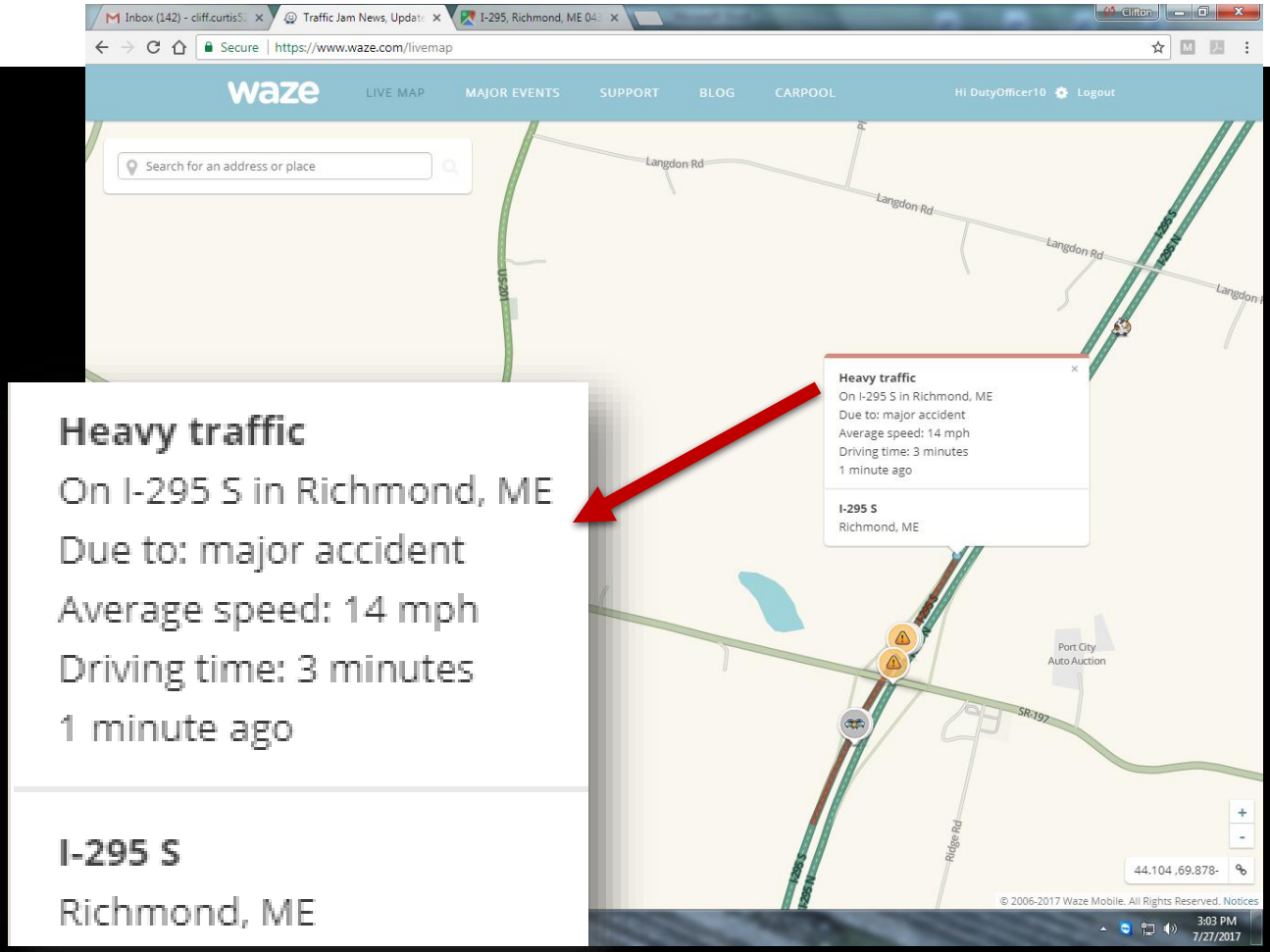
MONITOR – GOOGLE MAPS

Google is showing information faster, but need to refresh screen to get updated information



MONITOR - WAZE

After a few minutes, delay shows up in system and reports real-time impacts. Automatically stays updated.



FUTURE

- Exploring Google Map's API for speed information.
- Will record "normal" travel times using Waze's Traffic View, and perform fuzzy math to identify delays along corridors.
- Need to find real-time updated reporting. Currently, still need to refresh webpage to collect updated information.
- Add Waze reports to TIS for general public awareness.
- DOT will continue reporting events missed by crowdsourced data.

SUCCESSFUL PROJECTS ARE USING TOOLS, BEING CREATIVE AND HAVING THE WILL POWER TO SUCCEED.

QUESTIONS?

Clifton Curtis

Maine Department of Transportation

Clifton.W.Curtis@maine.gov

MaineDOT

Lunch including - Roundtable Data Discussion (45min)

Please note that we will be muting the conference call line at DVRPC during this break – you may stay on the line & we will resume after the break

Chester Osborne
Massachusetts Department of Transportation

Highway Operations Center Traffic Desk - Using Crowdsourcing Applications for Traffic Incident Management

Highway Operations Center
Traffic Desk
(17Q3)

Using Crowdsourcing Applications for Traffic Incident Management

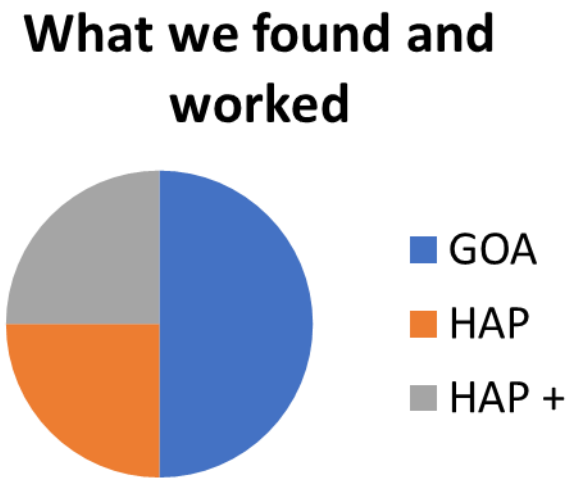
massDOT
Massachusetts Department of Transportation

Overview

- MassDOT Highway Operations Center
  - Statewide Ops
  - Roads and tunnels
- Conducted a year-long Crowdsourcing Pilot to understand if and how Social Media can be leveraged for Event Detection to compress the TIM Continuum and support safe-quick clearance.
- Phase 1: 10-mile segment of road.
- Phase 2: Five, 10-mile segments of road.
- Monitored Waze, Radio, Twitter Deck, TV, News Sites, others.
- HOC Operators, no automation, did not hire staff, utilized the Connected Citizen Program.

Quantitative Lessons learned from the pilot

- 614 detected events between 1 Aug 2016 and 6 Sept 2017
- Phase 1 (10 mi.) one new incident per hour!
- 90% of pilot Waze earliest channel of detection for social media channels on observed routes for low level events.
- 40/60 split between Crashes and Hazards Icons
- Phase 2 (50 mi.) diminishing returns: 1 per hour



Qualitative Lessons learned from the pilot

- Waze supplements traditional methods of detection
  - Requires patrons to be active reporters
- Waze works but has limitations and challenges
  - Missing key map icons such as Mile Makers, Exit #'s and cross street names.
  - We don't own it
  - Cannot deploy it
  - What is under the hood?
  - Will they one day charge for it?

- The CCP interface has limitations to the geographic area an Operator can monitor.
  - Must automate with machine learning to be successful at a larger scale.
- Only detects low level events.
- High GOA rate. Must be able to understand the "watershed" moment.
- The life cycle of a Waze event? What does the 40/60 really mean?

Life Cycle of a Waze event

PM Commute Time
Crash (-) I min

Speed 55mph

Life is good, no reports

Life Cycle of a Waze event

Time
Time of Crash

Speed
55mph

Patrons react to crash, most likely do not report as they maneuver and are <u>not directly impacted.</u>

Life Cycle of a Waze event

Time
(+) 2-5 Min
Crash

Speed
35-
45mph

Patrons begin to be impacted, the most active users will report, but speeds are too high to understand the event, many users will not report due to low impacts, they will be “lurkers”

Life Cycle of a Waze event

Time
(+) 5-10 Min
Crash

Speed
15-
25mph

Patrons report heavily now since there are large impacts, speed drops sub 20mph, patrons can discern that the event is a crash, not a DMV, ***this is the time of detection!***

The Way Forward…

- Develop Pilot 3, focus on understanding automation:
  - Filters
  - Trigger points
  - Machine Learning
  - Test under camera to better understand GOA-watershed.
  - Review MassDOT RTTM Go-Time data to search for incident throughput patterns and early event indicators
- Share 1.0 Lessons Learned with municipalities and venues to leverage small scale CCP use.
- **Consider integration into ITMS**

Questions?

Chester Osborne

MassDOT Highway Operations Center

Chester.Osborne@dot.state.ma.us

Russell Allen
Florida Department of Transportation

Waze – FDOT Integration

FDOT - Waze Integration

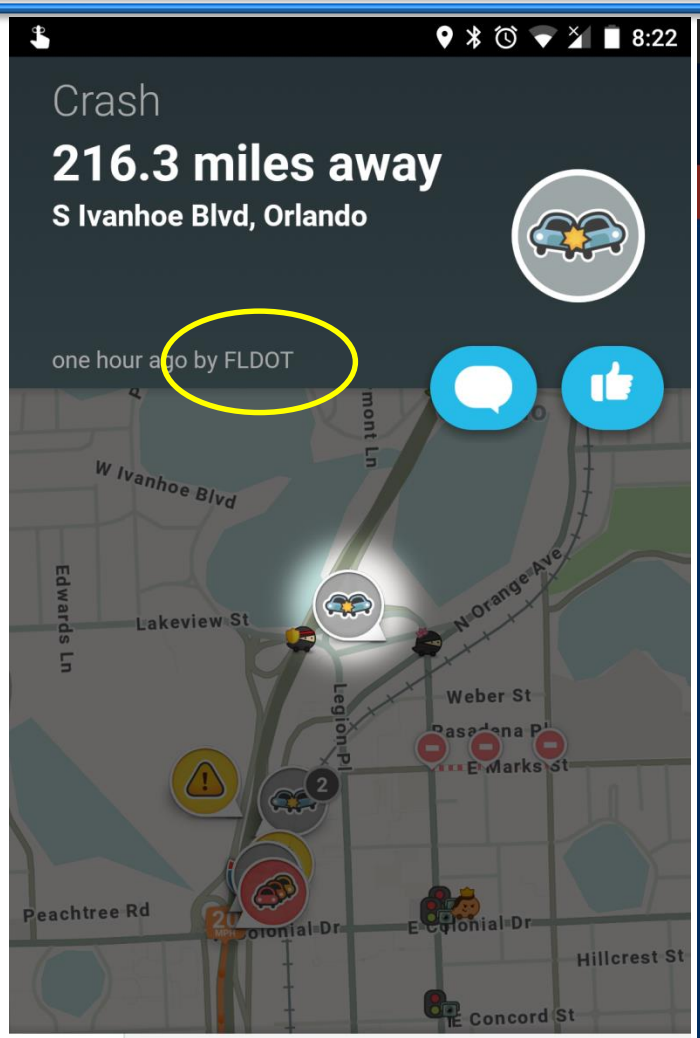
Russell Allen, P.E.
ITS Program Development Engineer
Florida Department of Transportation

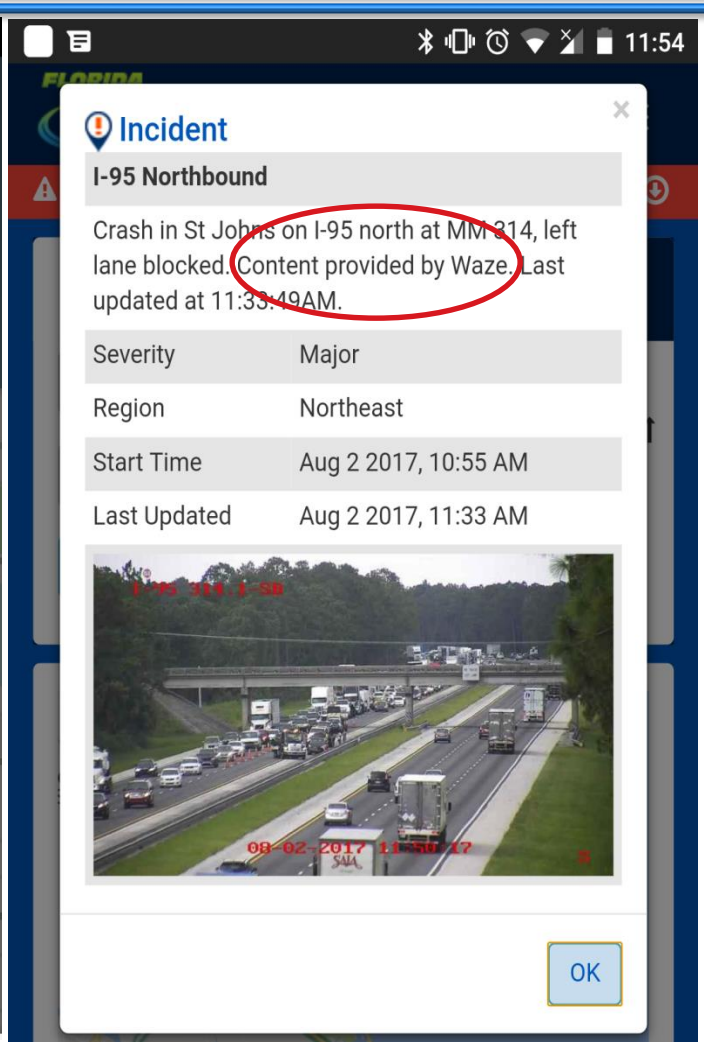
Objectives

- Obtain incident data on Florida's state arterial roadways
  - Deployments on most limited-access highways
- Provide data to a third party to reach more motorists

Agreement

- Data sharing agreement effective 3/28/2014
- Requires attribution by both parties





Data Sharing – FDOT to Waze

FDOT Regional Transportation Management Centers (TMC)

- TMC receives planned closures
- TMC Operators produce incident data
- Intelligent transportation systems (ITS) detectors produce traffic conditions data

LCIS

- Lane Closure Information System

FL511 System's Third Party Data Feed

- Collects data from TMCs statewide
- Packages data as single data feed

Waze

- Receives FDOT Data
- Provides Crowd-Sourced Data

Providing Road Closure Data

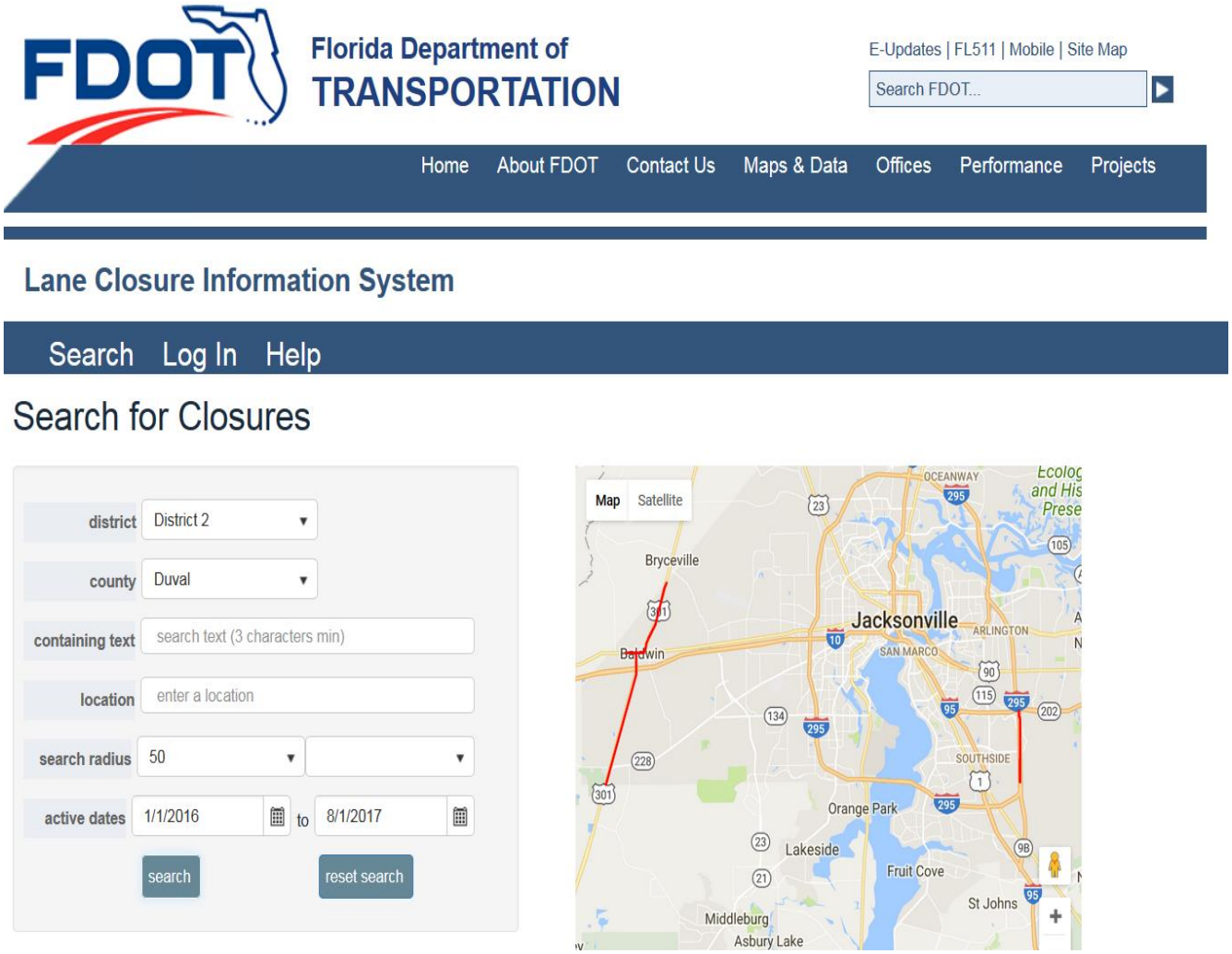
- Waze was looking for planned road closures
  - They had a manual process for submitting these
- FDOT created a planned road closure feed, that incorporated regular updates from the Districts into a JSON feed that automatically updates subscribers

Lane Closure Information System (LCIS)

- Statewide database of scheduled road closures
- Expands on an earlier effort by FDOT District 6 (Miami area)
- Also provides a web service interface that can be queried by partners, such as Waze

Lane Closure Information System (LCIS)

- Searchable public web site, displays results on map



Attribution – Phase 2

FLORIDA 511 Connect. Know. Go.

CALL 511 | TWITTER | FREE APPS | TEXT ALERTS | Statewide | English | Register | Login

Home | Traffic | My Florida 511 | Construction Info | Emergency Info | Transit / Airports | Links | Newsroom

ALERTS Wet roads and rainy conditions may cause intermittent slow traffic in Broward County. Please use caution.

TRAFFIC EVENTS

Filter

Region: Northeast | County: None selected | Roadway: None selected

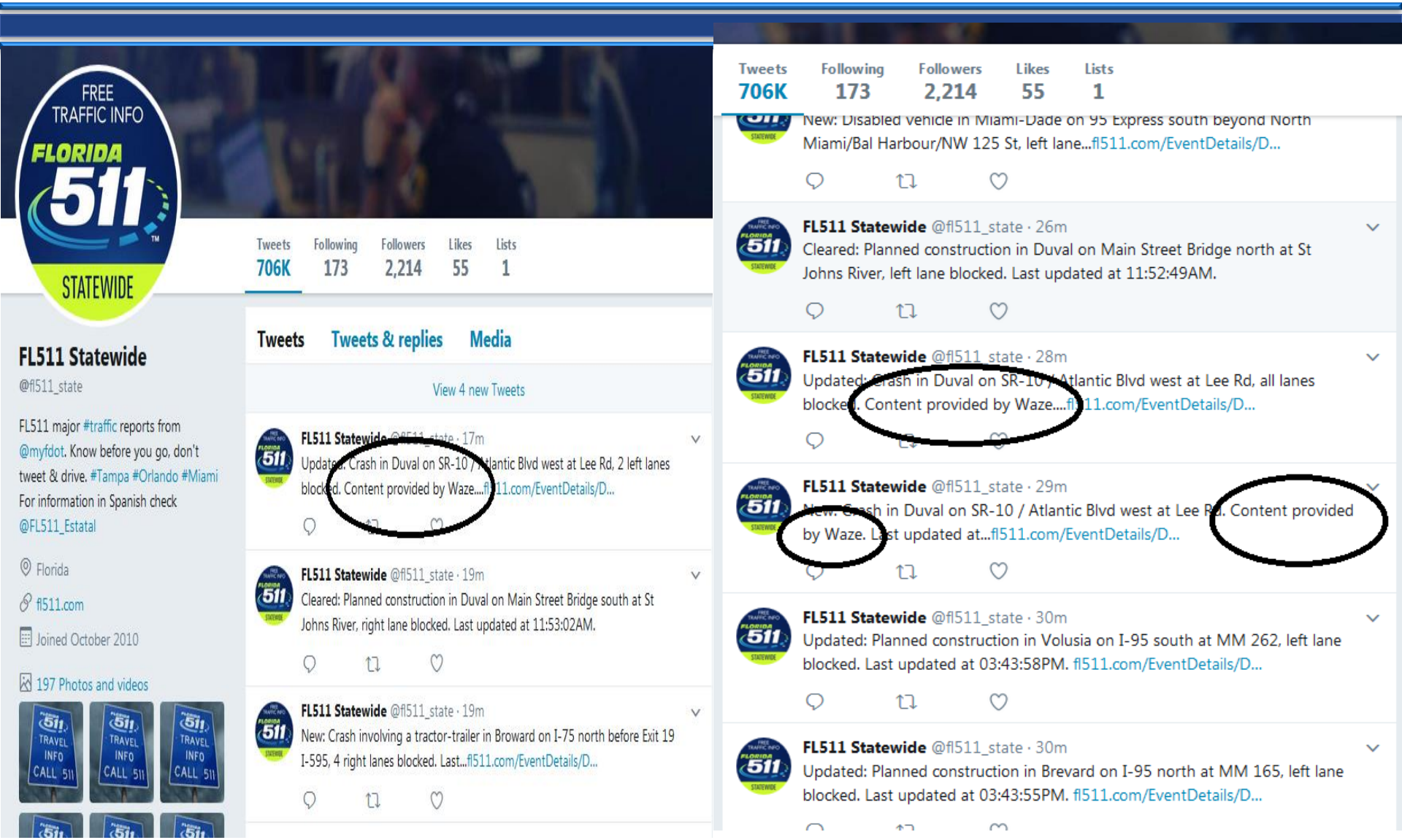
Direction: None selected | Type: None selected | Severity: None selected

Clear Filters

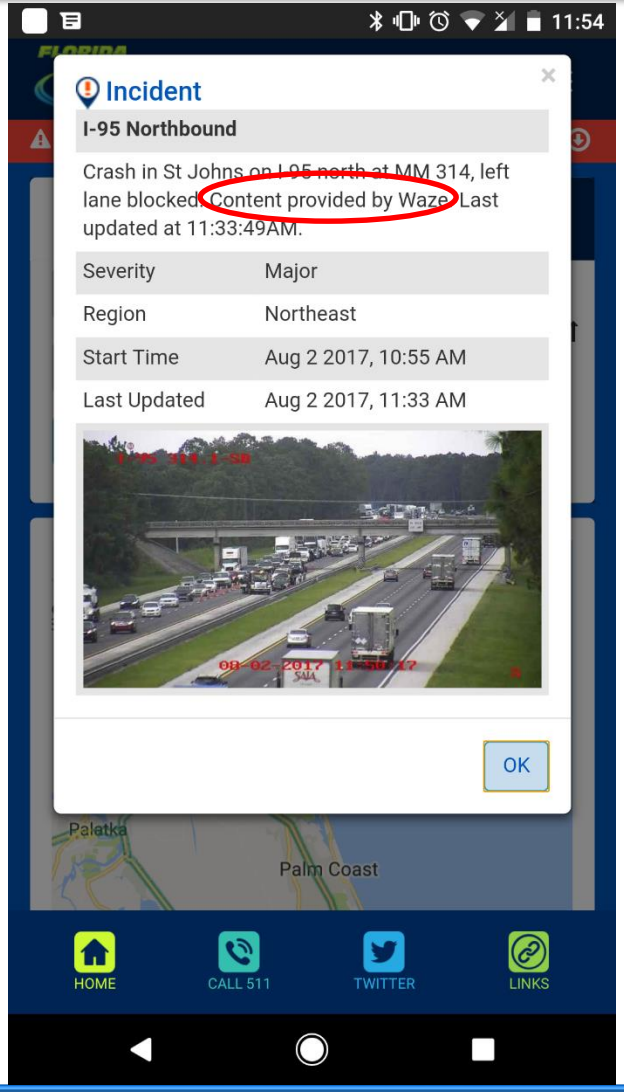
Show 25 entries Search:

Region	County	Roadway	Direction	Type	Severity	Description	Start Time	Last Updated	Camera Image
Northeast	Duval	I-10	E	Incidents	Major	Crash involving truck in Duval on I-10 east before Exit 358 I-295 W, 2 right lanes blocked. Content provided by Waze. Last updated at 08:02:16AM.	8/28/17, 6:45 AM	8/28/17, 8:02 AM	

Attribution – Phase 2



Attribution Phase 2 – 511 App



FDOT Third-Party Data Feed

- Provides statewide real-time data
  - Sent by TMCs to FL511
- Feed updated every one minute
- Data types Include:
  - Floodgates
  - Traffic events
  - Camera images
  - Dynamic message sign messages
  - Traffic speed
  - Travel times

The Waze Feed

Basics

- JSON – Javascript Object Notation
- Updated every 2 minutes
- Three primary types of data
  - Alerts: Crashes, Abandoned Vehicles, etc.
  - Jams: Stalled or slow moving traffic
  - Irregularities: Similar to Jams, but with wider impact
- We're only using Alerts today

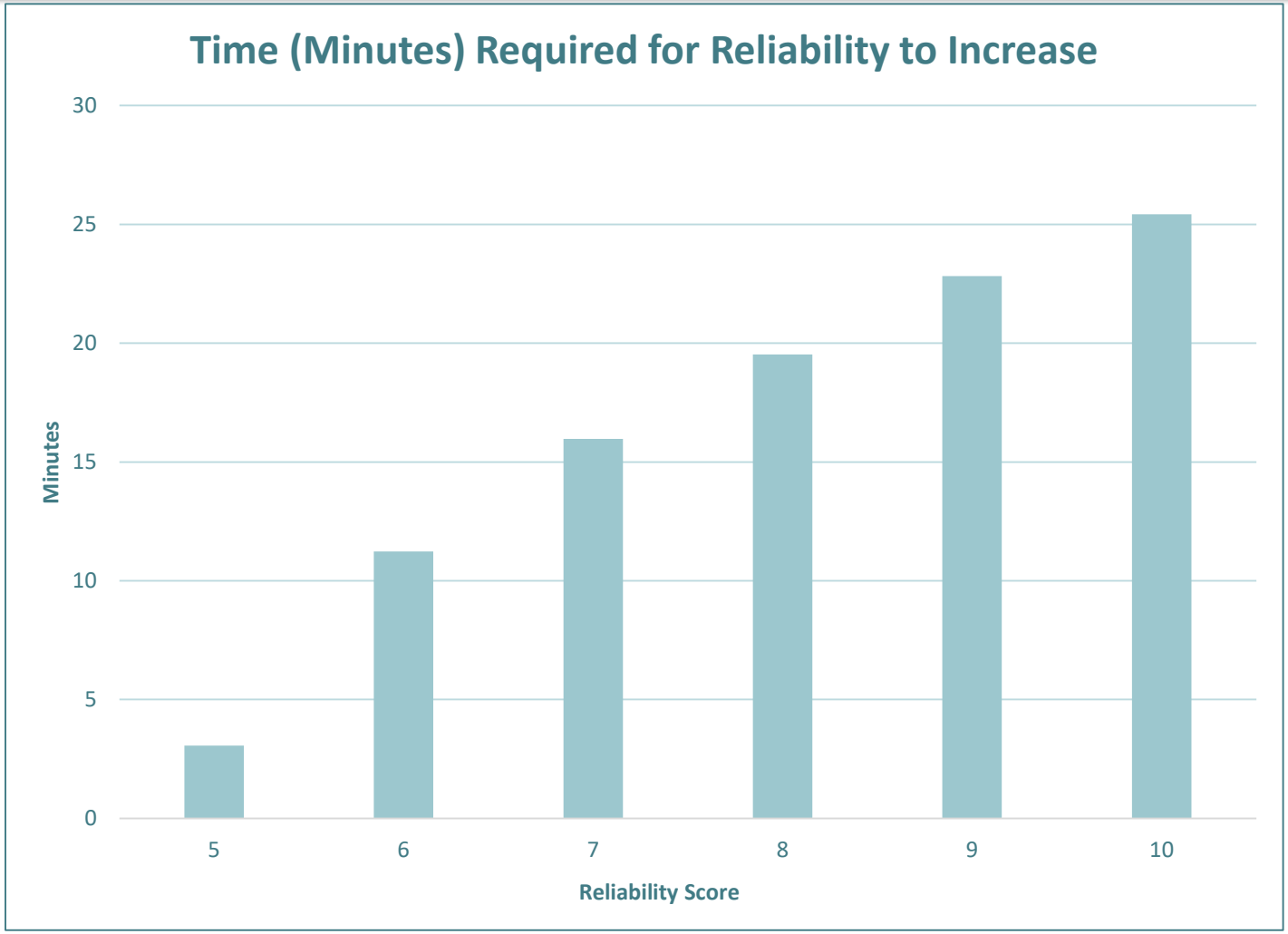
Feed Filters

- Request geo-fenced data
  - We request data for the entire state
- Exclude alerts that originated in SunGuide®

Alert Quality Measures

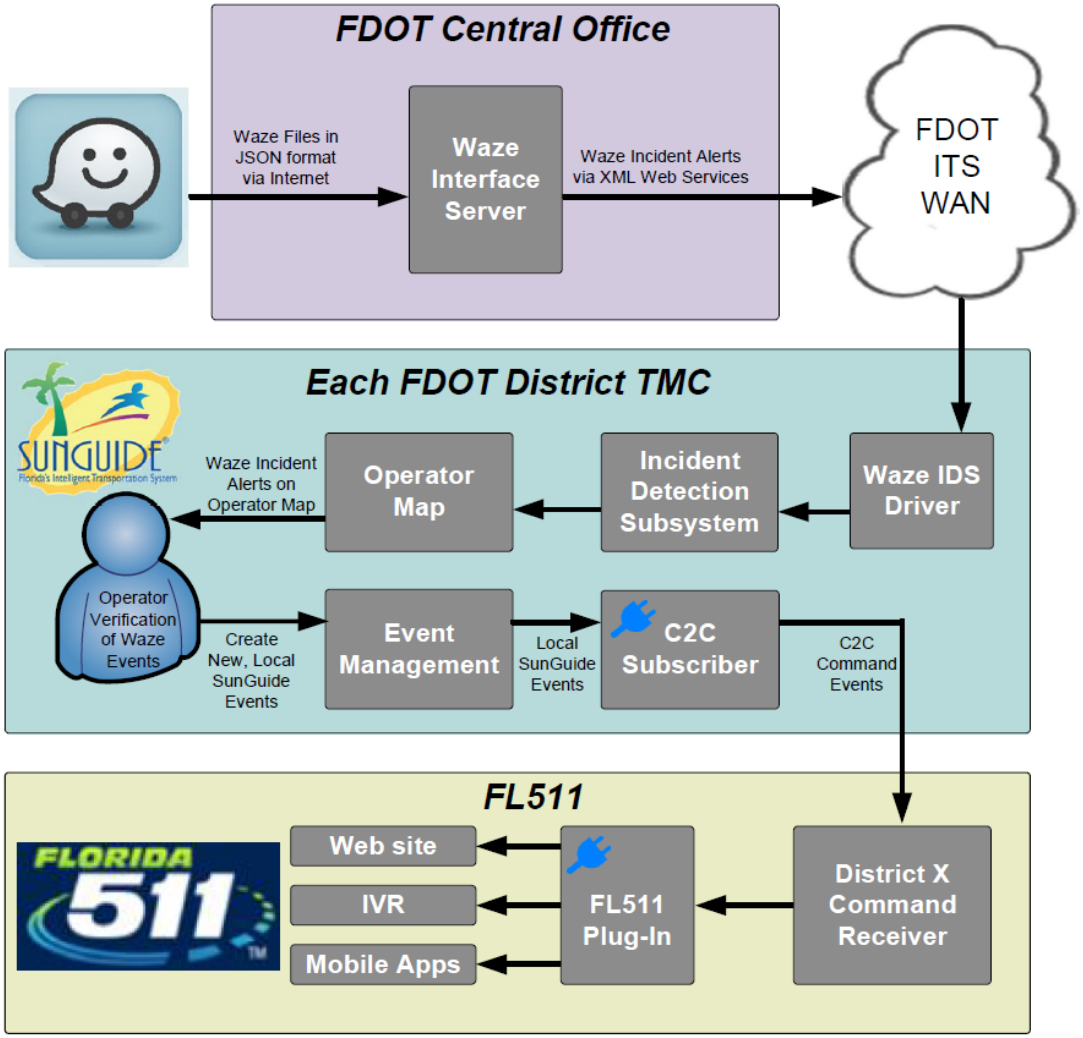
- Report Rating: how “experienced” is the Wazer who originally reported the alert?
- “Thumbs Up”: how many Wazers have used the Waze app to give the alert a “thumbs up”
- Reliability: similar to “Thumbs Up”, but also takes into account Wazers who give the alert a negative rating
- Confidence: similar to Reliability in that it’s based on feedback from Wazers

Reliability Score Delay



The FDOT Waze Reader

Phase 2 Integration – Incident Detection System Diagram



Defensive Code

- Recommendations
  - Check feed for consistency and have e-mail notifications
  - Changes in the feed should not adversely affect program's operation

Decisions – Data Filtering

- What do we need to provide?
  - Sending data to operations
  - Some data filtered out, starting with
    - Weather conditions
    - Other / chit-chat
    - Miscellaneous

Decisions – Data Filtering

- Other filtering decisions
  - Decentralized with seven Districts and a Turnpike Enterprise.
  - Districts do not need statewide data
  - Districts monitor the state roadway system
  - How many alerts can staffing handle

Decisions – Data Filtering

- Filtered out Debris on roadway
  - Could not verify debris on cameras because it was too small
  - Sent Road Rangers, but debris already moved itself off the road
- Filtered out all vehicles on shoulder
  - Typically not motorist in need (sent Road Rangers)
  - Could be construction crews, surveyors, etc.
  - Too many to handle when we don't know if someone needs assistance
- Should filter out vehicle on roadway
  - Typically the vehicle is actually on the shoulder.

Decisions – Data Filtering

- Filter out missing signs – not needed in the TMC
- Filter out weather – get this through other means
- Filter out potholes – we don't have potholes
- Filter out construction (unless it is road closure)
  - Too many times it was not an active construction zone, i.e. barrels on the shoulder, not construction staff

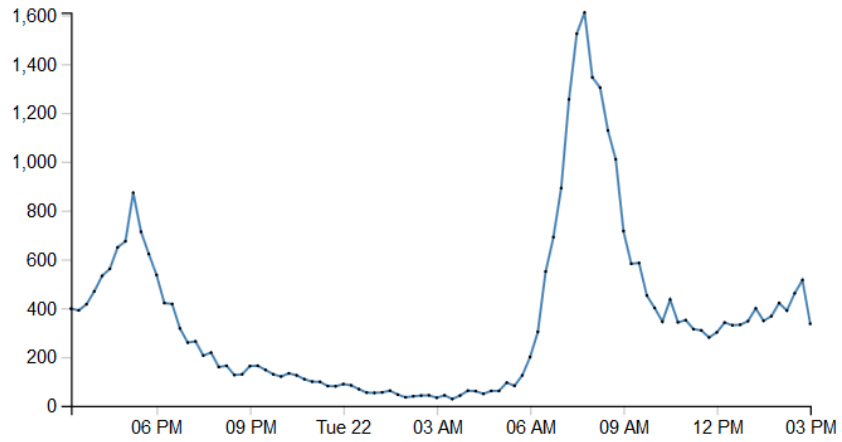
Decisions – Data Filtering

- The few things we allow through
  - Crashes – not filtered based on reliability score
  - Road Closures (complete closure)

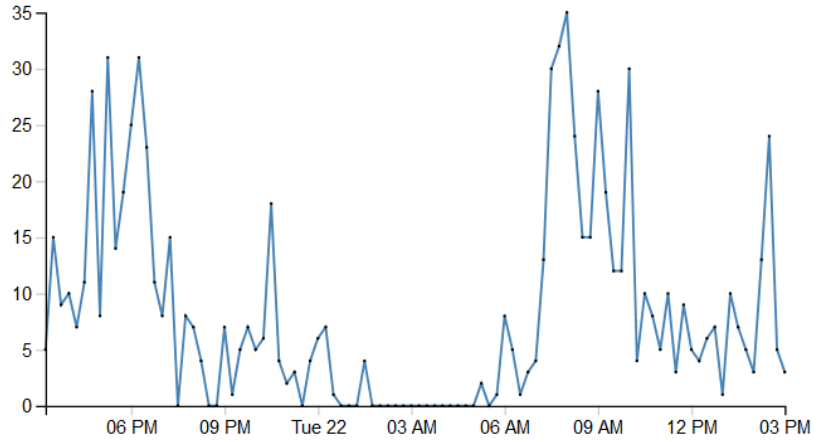
Decisions – Data Filtering

- Over 90% of all alerts are filtered out

Inbound Waze Alerts



Outbound Waze Alerts



Integration with SunGuide®

SunGuide® Software

- FDOT's statewide advanced traffic management systems (ATMS) software
  - Integrates ITS devices and TMC operations
- Waze data integrated into SunGuide software
- Two phases:
  - Quick integration (Phase 1)
  - Long-term integration (Phase 2)

Communications Infrastructure

- Statewide private fiber and microwave network – ITS wide area network (ITS WAN)
- SunGuide software uses this network to communicate between TMCs
  - Phase 1 – SunGuide's Center-to-Center module
  - Phase 2 – Direct XML feed

Phase 2 Integration

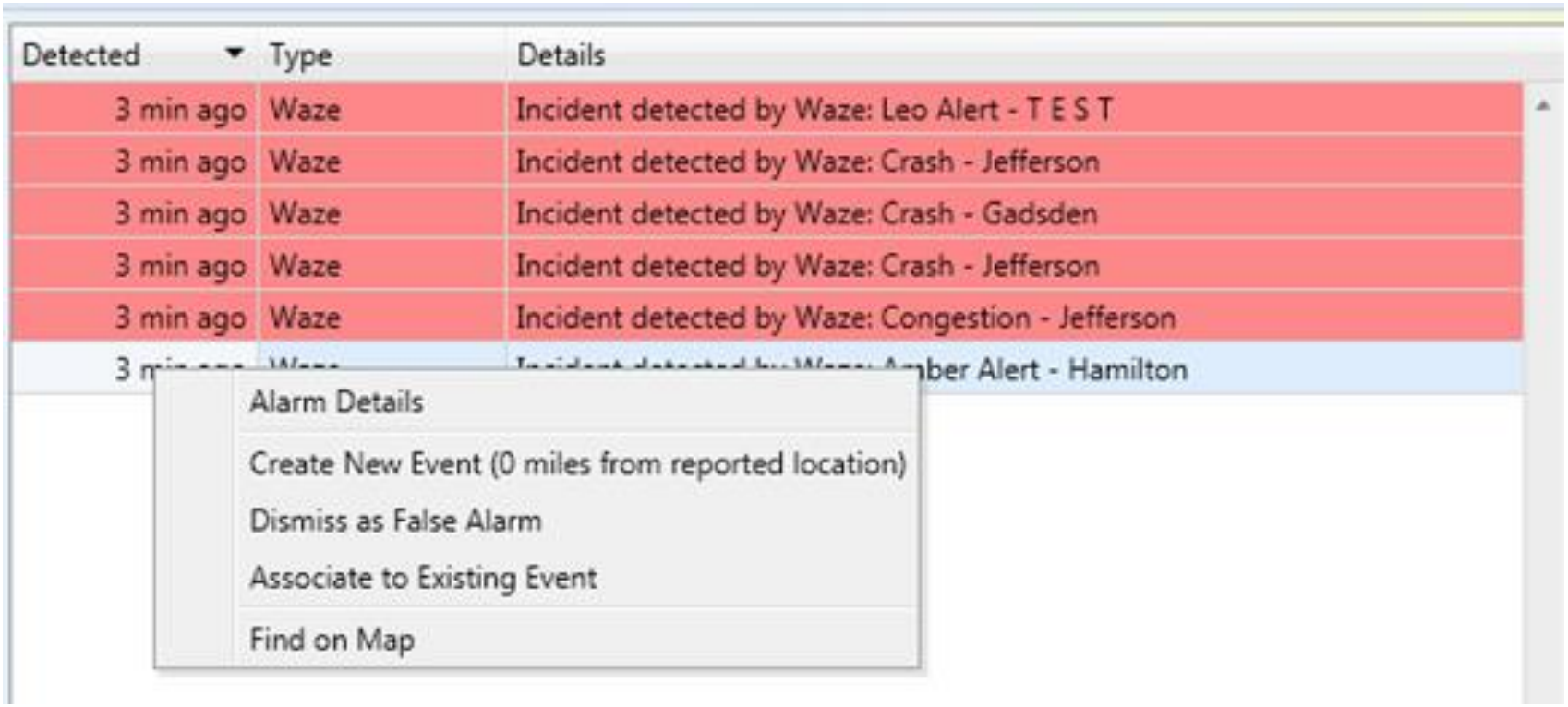
- **Goal** – make processing Waze events more efficient for operators
- Use SunGuide software Incident Detection Subsystem (IDS) instead of Center-to-Center
- IDS will retrieve data using a web services interface

Phase 2 Integration

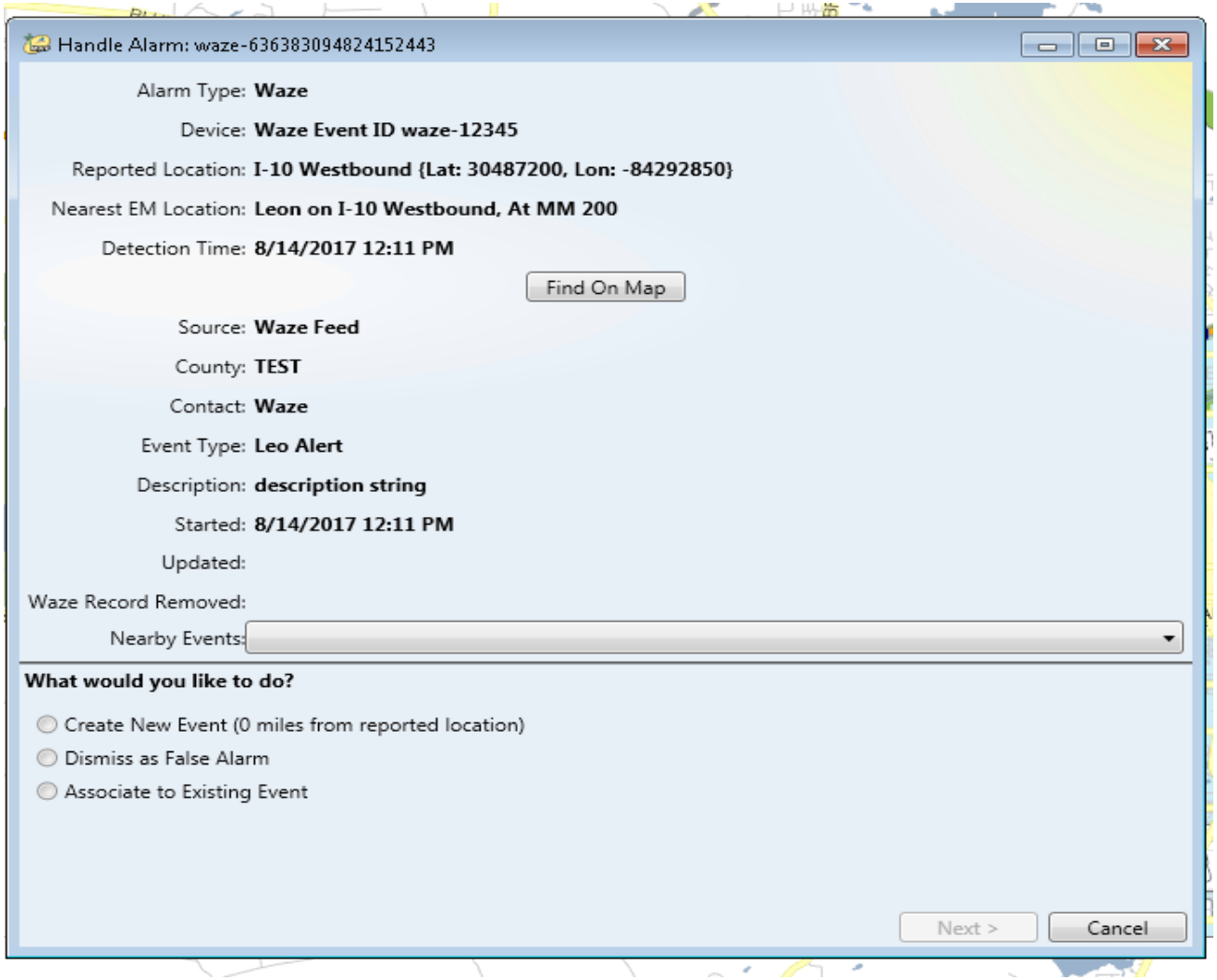
- Operator no longer needs to monitor map for new Waze events
- Waze events generate an alert box
  - Operator can select alert for further action
- Some Waze alert information automatically populated
  - Event location
  - Notifying agency and contact

Receiving Alerts – Alert List

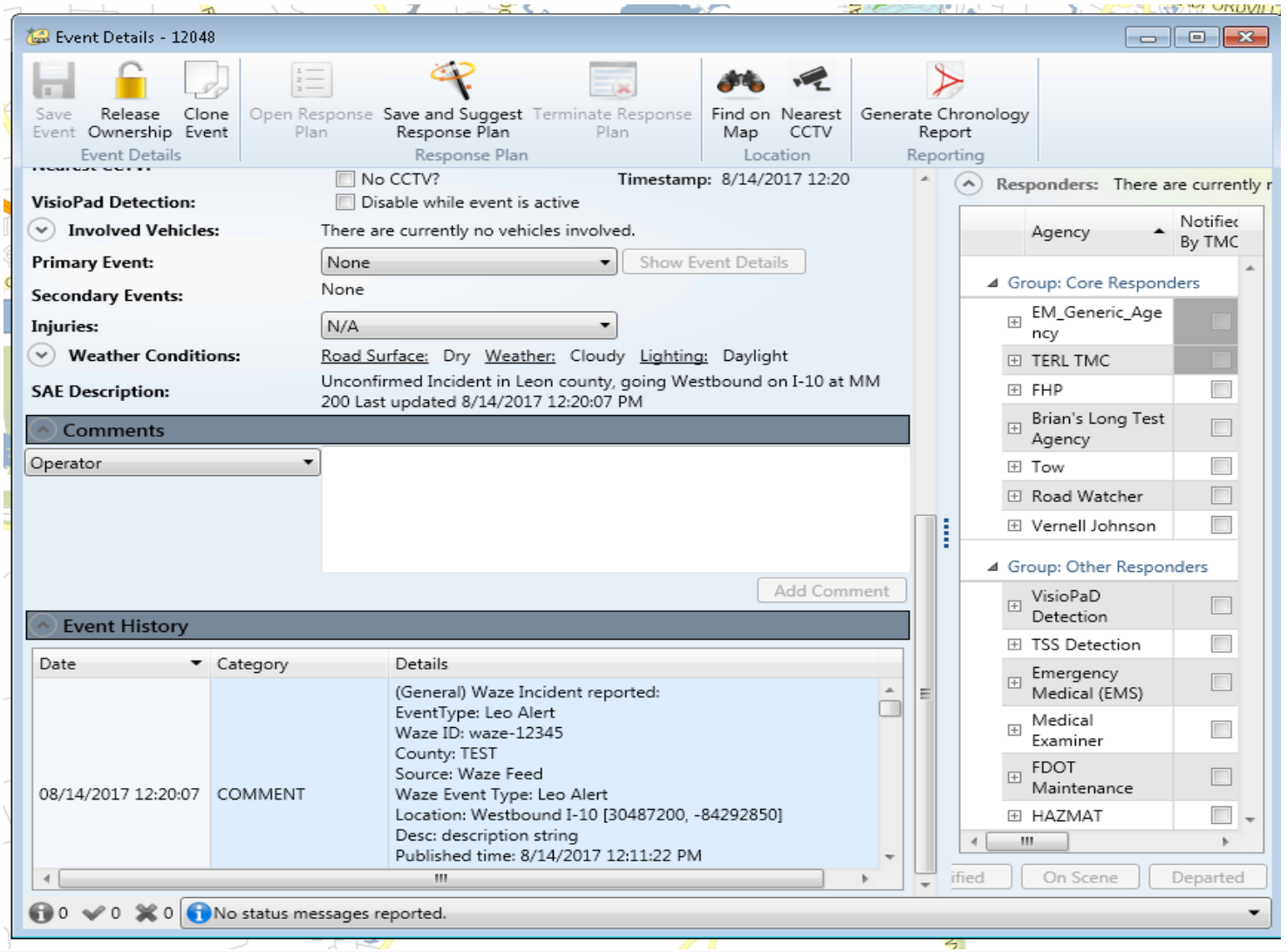
- Alerts reported by SunGuide's Incident Detection Subsystem (IDS)



Alert Handling



Event Management



Event Management

Event Details — Save

FHP Incident #:		**Waze Incident #:**	425416807
Event Type:	Disabled Vehicle ☐ HAZMAT ☐ Fire ☐ Rollover	Clone event	
Nearest CCTV:	007_BoschMIC7000 Preset: 0 Timestamp: 3/23/2015 14:09 ☐ No CCTV		
	☐ Disable VisioPaD detection while event is active		

Event History

Date	Category	Details
03/23/2015 14:09:08	STATUS	Unconfirmed
03/23/2015 14:08:50	TMC NOTIFIED	Waze
03/23/2015 14:05:14	LOCATION	Leon County on I-10 Westbound. At SR-61/US-319/Thomasville Rd

Policies

- Instrumented state roads:
  - Confirm Waze event prior to posting to Florida's 511 (FL511) system
- Non-instrumented state roads covered by FL511 system:
  - Post Waze event as "unconfirmed"
- Non-instrumented state roads not covered by FL511 system:
  - Post "floodgate" message for road closures

Analysis

Performance Measures

- Analysis showed that some alert types were not being used in the centers. The filtering was updated to prevent these types from being sent to the Districts

Alert Type	% Converted
ACCIDENT:	5
ACCIDENT:ACCIDENT_MAJOR	5
ACCIDENT:ACCIDENT_MINOR	6
ROAD_CLOSED:ROAD_CLOSED_EVENT	5
WEATHERHAZARD:	1
WEATHERHAZARD:HAZARD_ON_ROAD	1
WEATHERHAZARD:HAZARD_ON_ROAD_CAR_STOPPED	4
WEATHERHAZARD:HAZARD_ON_ROAD_CONSTRUCTION	0
WEATHERHAZARD:HAZARD_ON_ROAD_LANE_CLOSED	0
WEATHERHAZARD:HAZARD_ON_ROAD_OBJECT	4

Next Steps

Evaluate the following as potential performance measures:

- False alarms - instrumented vs. non-instrumented?
- Confidence level correlation- does it correlate to false alarms or confirmed events?
- Event closure comparison
  - When did we close event?
  - When was Waze alert removed from feed?

Next Steps

- How many events have multiple Waze reported crashes associated with one SunGuide crash?
  - Difficult to filter
- Incidents consumed by another third party that partners with Waze?

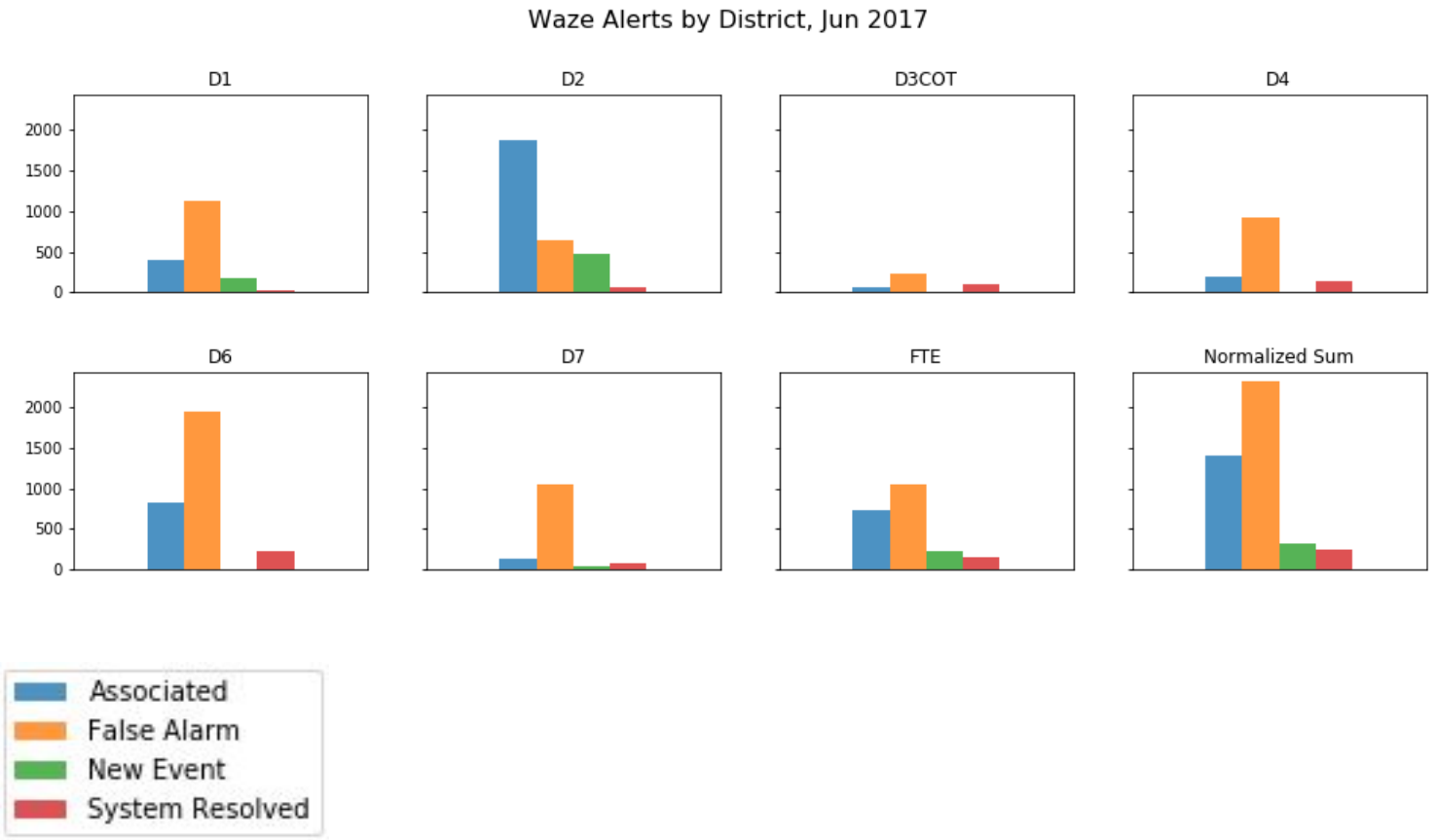
Conversion

- Alerts are presented to the districts and either dismissed or converted to events

	8/1/16	7/3/17
Alerts in Feed	28648	28280
Sent to Districts	988	781
Conversions	10	68

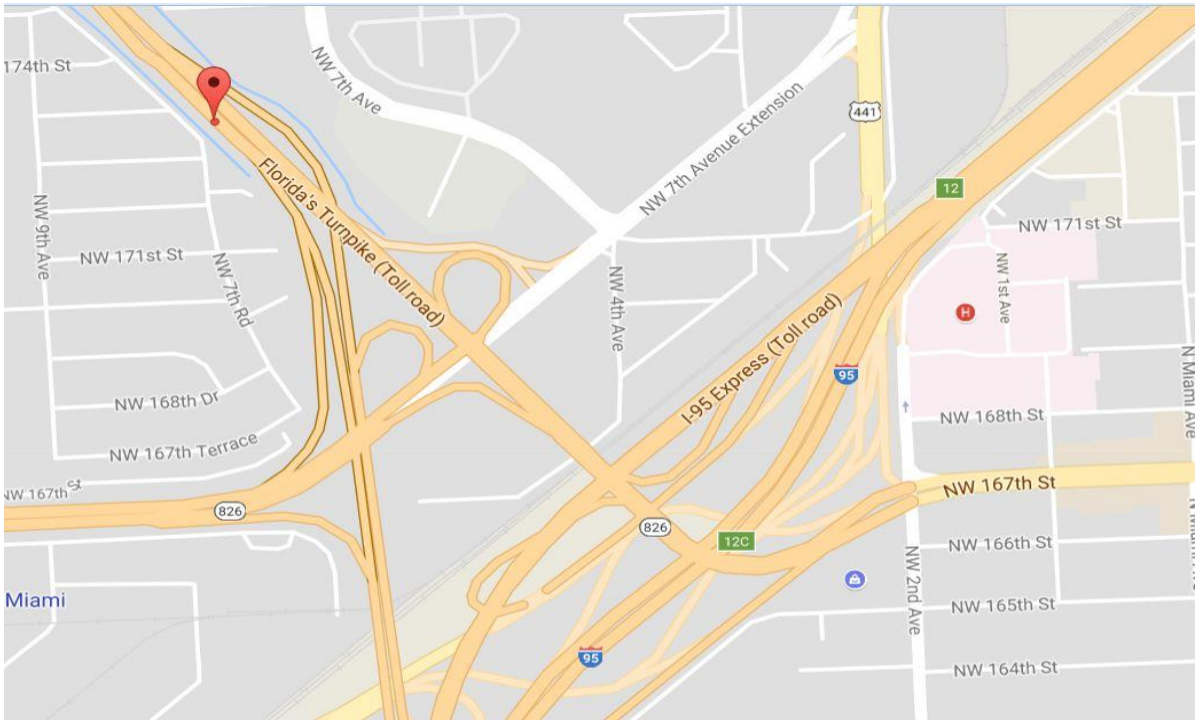
Conversion

- Alert handling varies between Districts



Complex Road Geometry

- Waze (more-or-less) correctly reports “Florida’s Turnpike”
- SunGuide unable to determine roadway, so alert not sent to District



Complex Road Geometry - Future

- Possible Improvements
  - More frequent updates to map shape files
  - Enhanced algorithm that identifies the roadway to look at more properties of the originating alert
    - We already look at latitude, longitude, and magVar

Recap

- SunGuide Software Integration Phase 1:
  - Quick implementation
  - Burdensome for operators
- SunGuide Software Integration Phase 2:
  - Released Spring 2016
  - Automated population of event data
  - Improve ease of use for operators
- FDOT data provided to Waze via FL511 third-party data feed and lane closure feed

Questions?

Thank you!

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Mike Fontaine
Virginia DOT/VTRC

Evaluation of Waze Data

VTRC
Virginia Transportation Research Council

We bring innovation to transportation.

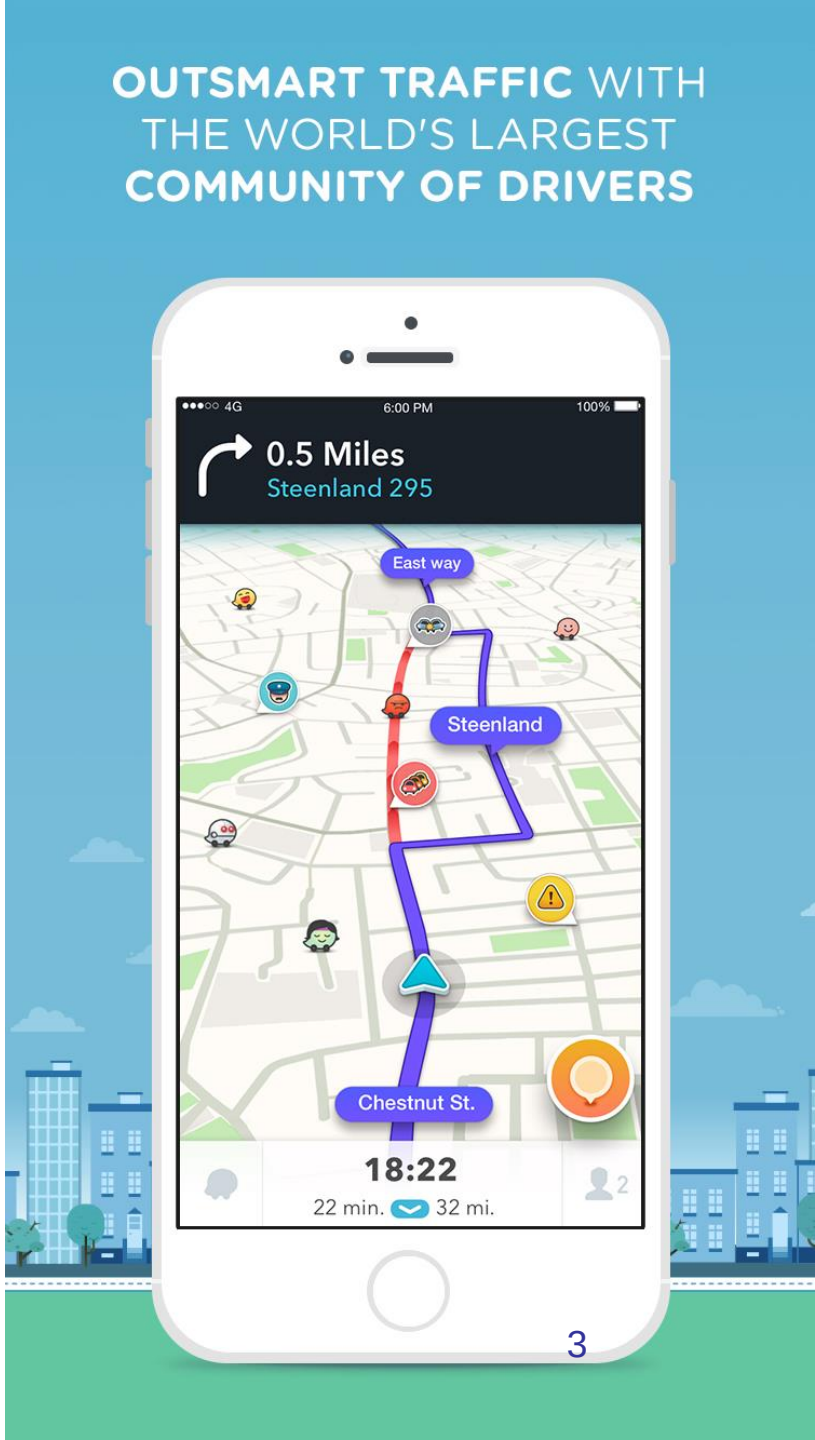
Evaluation of Waze Data

Michael D. Fontaine, Ph.D., P.E.
Noah J. Goodall, Ph.D., P.E.

I-95 Corridor Coalition Crowdsourcing Summit
Philadelphia, Pennsylvania, September 14, 2017

Waze

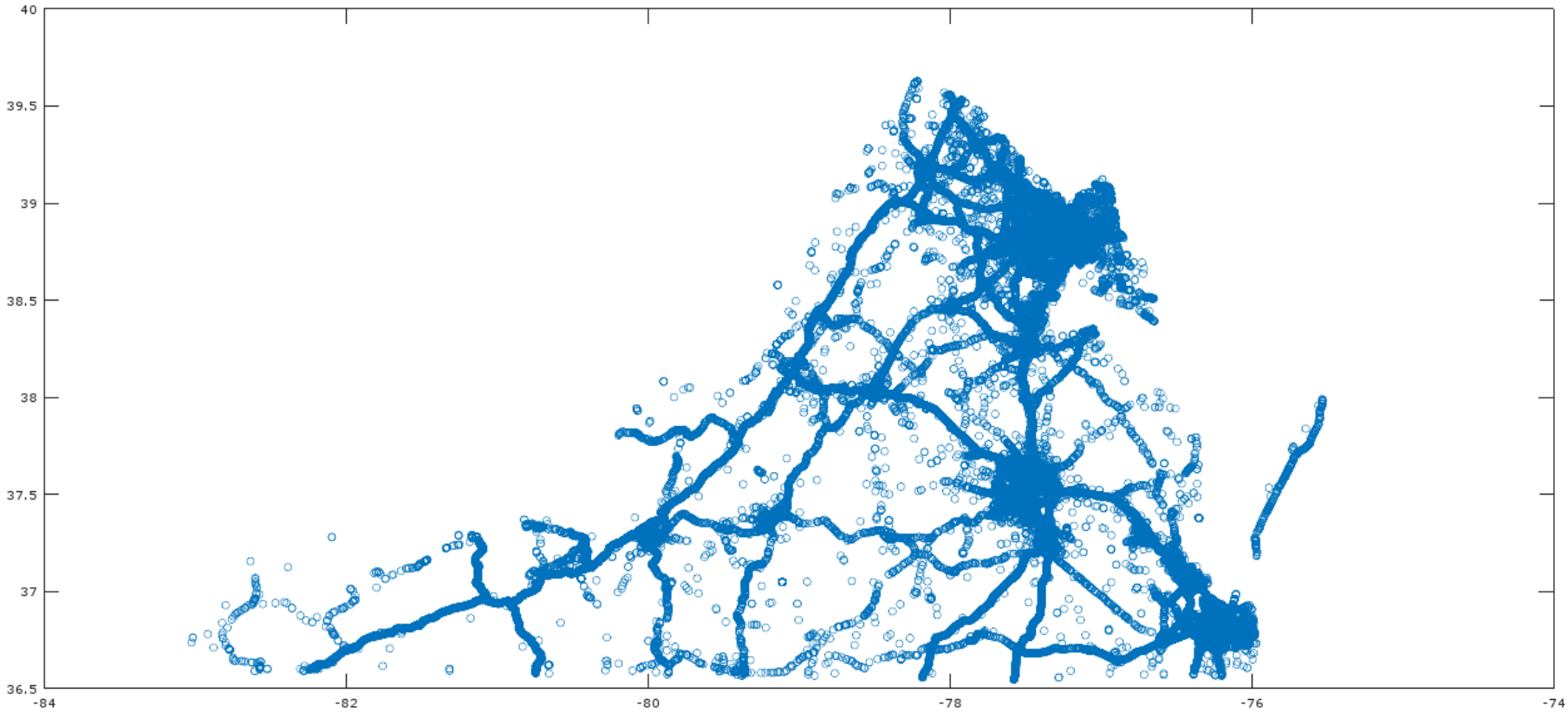
- Navigation app that allows users to report road conditions
- 55 million active users
- 360 thousand crowd sourced map editors
- 55 municipal/government partners



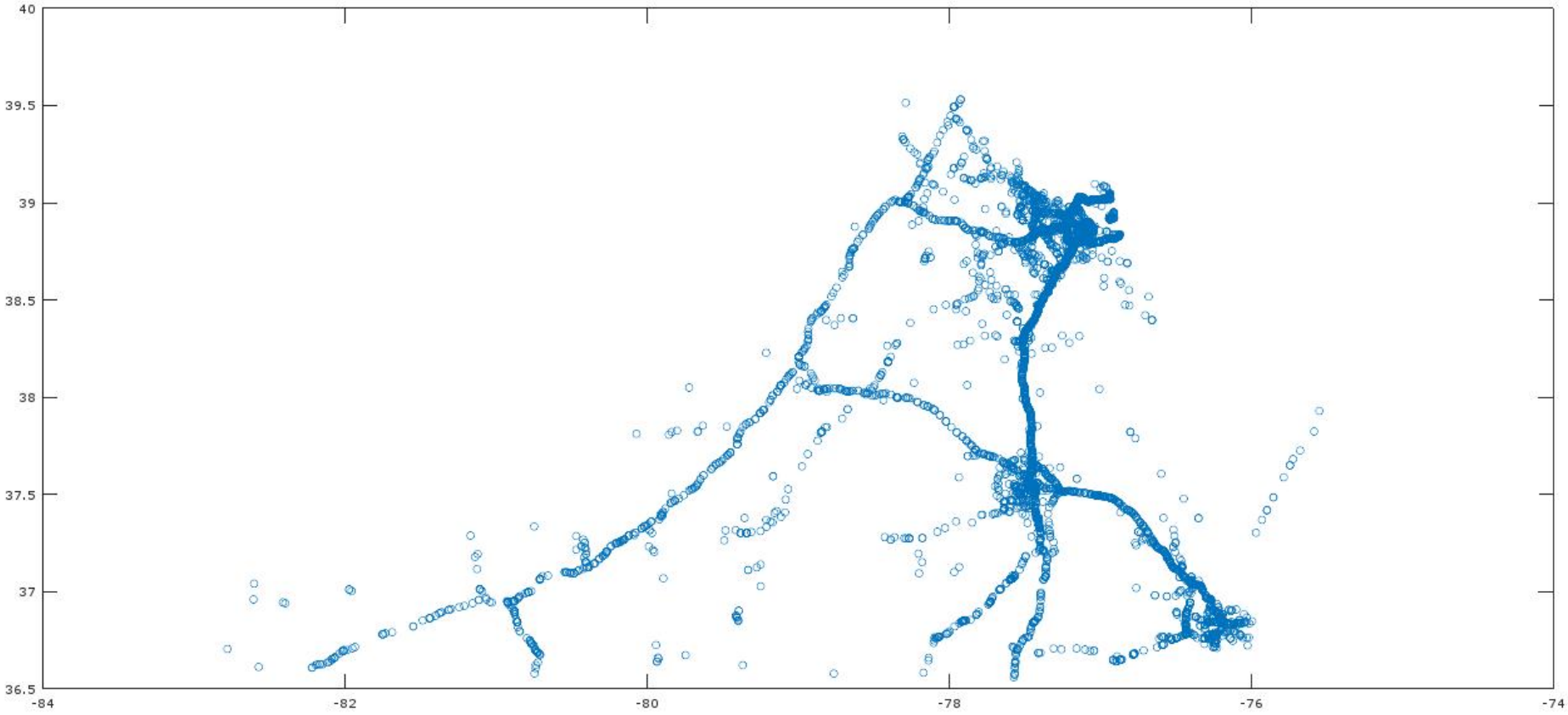
Initial Analysis

- Analysis period February 5 – 25, 2017
- All roadways in Virginia, all types of Waze data
- 329,368 incidents during this time, or ~16,000 per day.
  - About 20 times more incidents than VaTraffic over the same roads and incident types

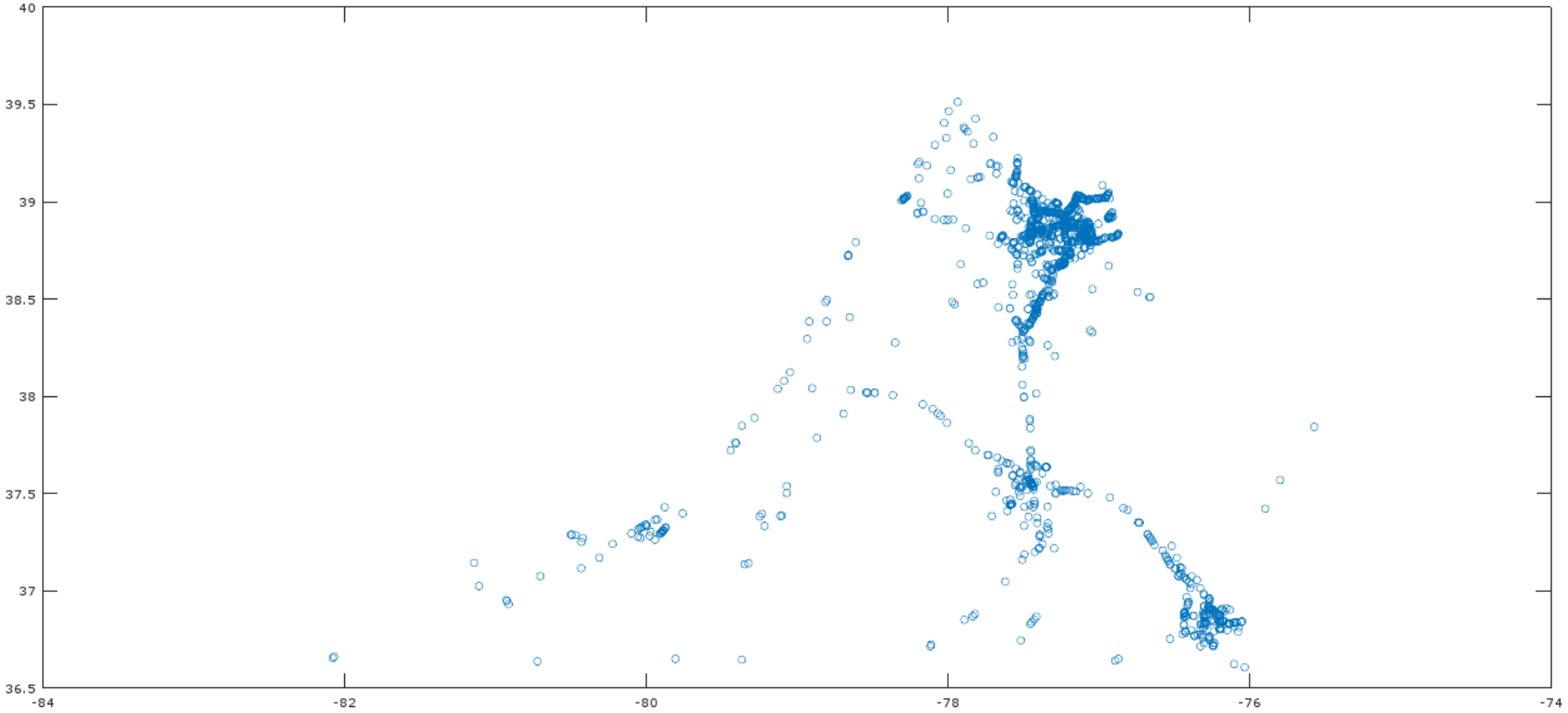
All Three Weeks



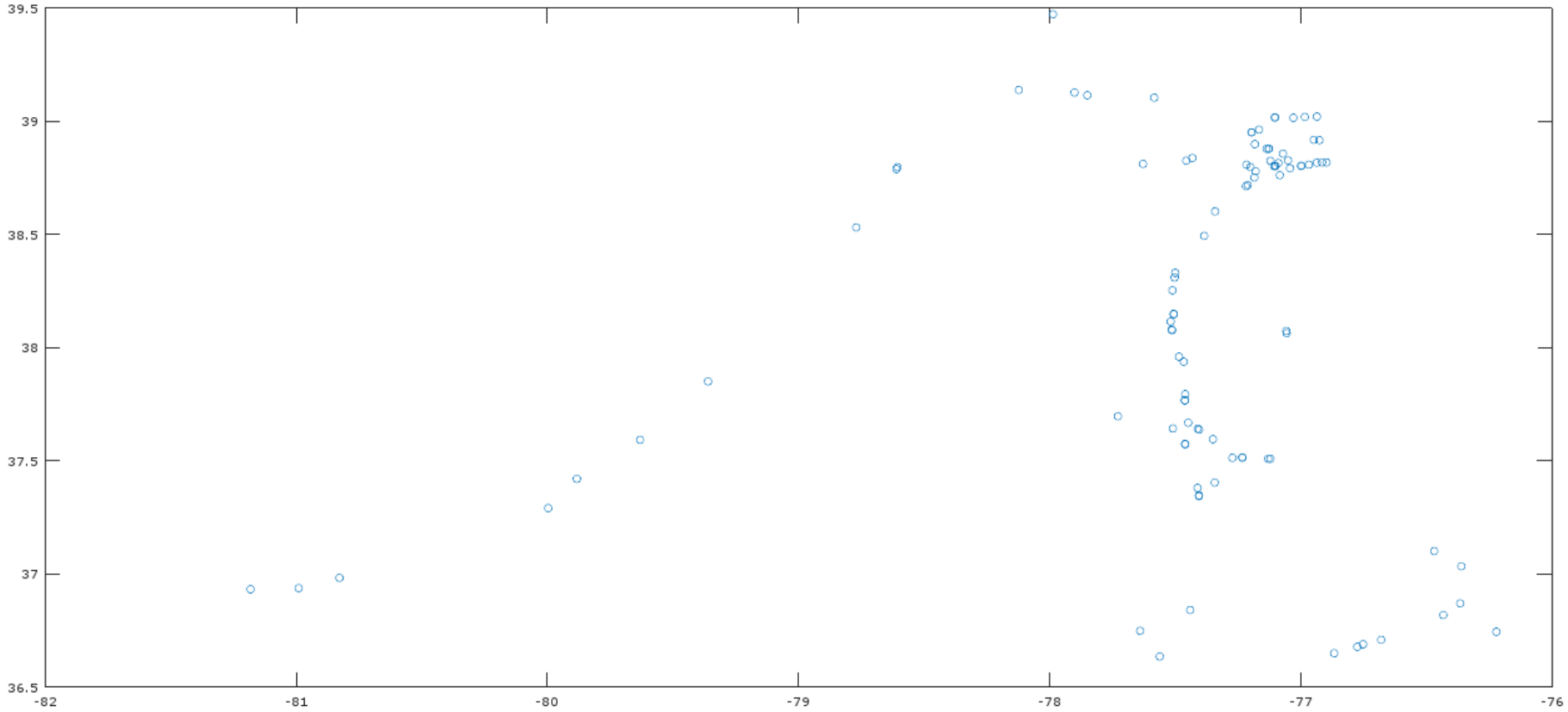
One Full Weekday

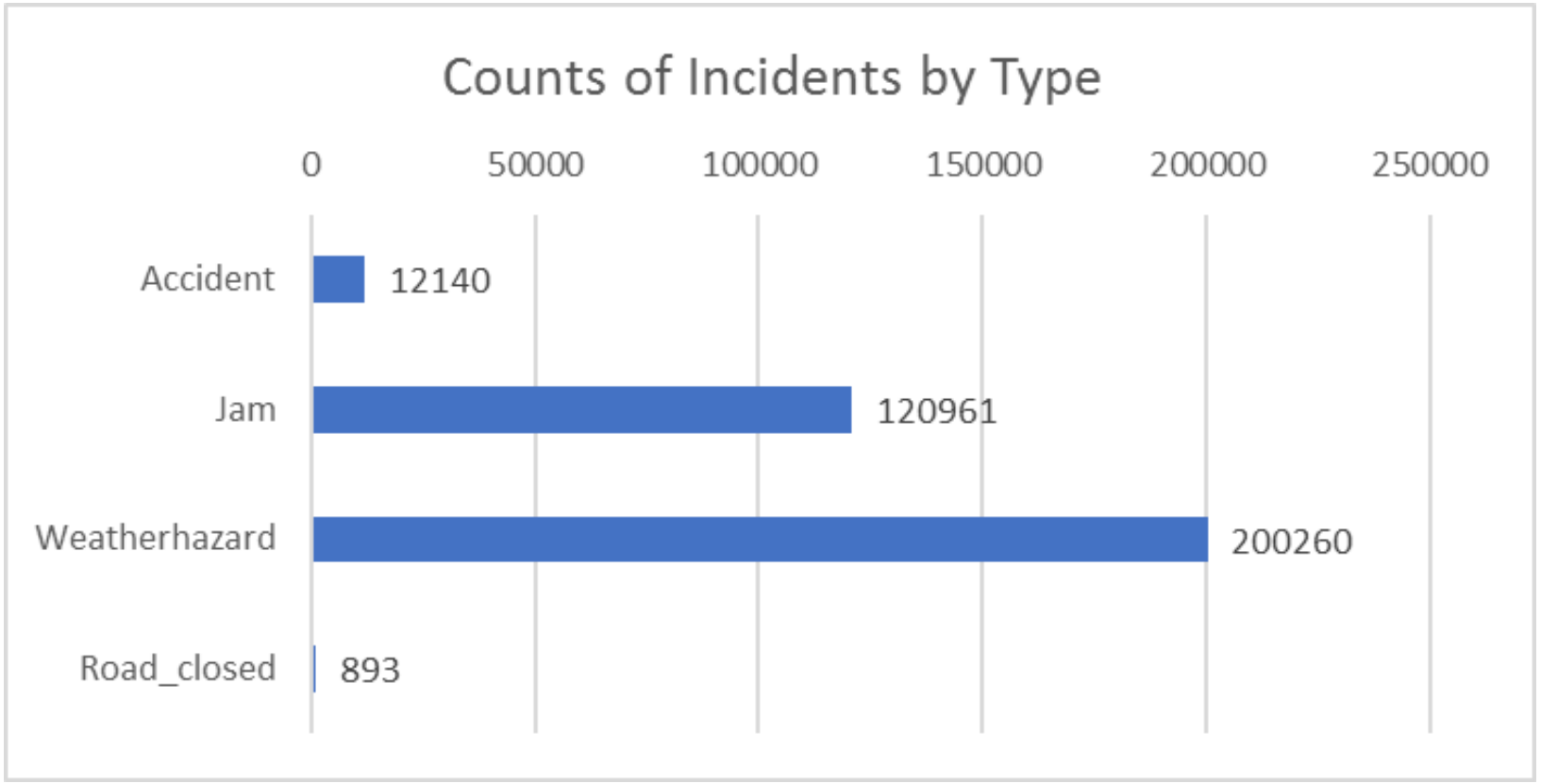


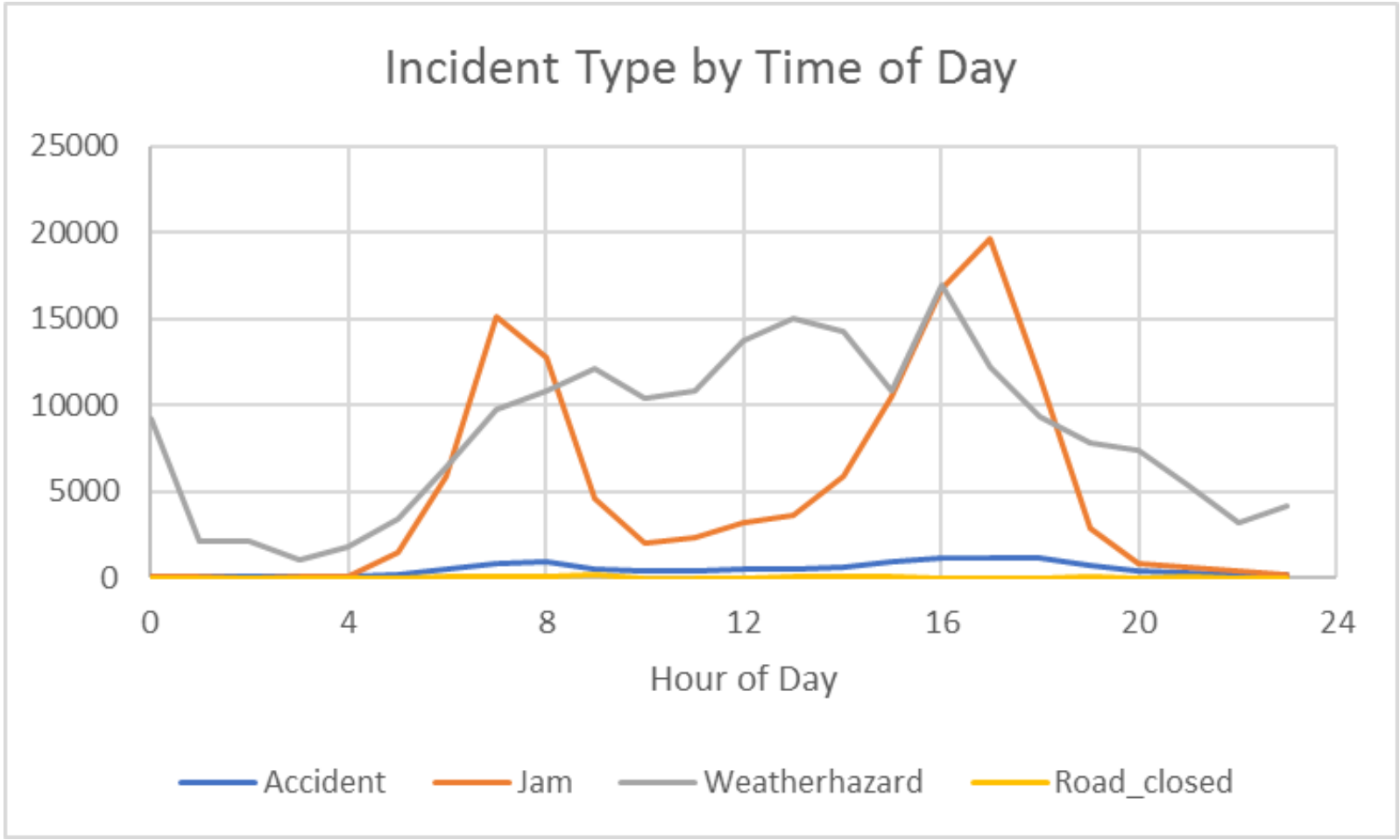
One Hour, Peak Period

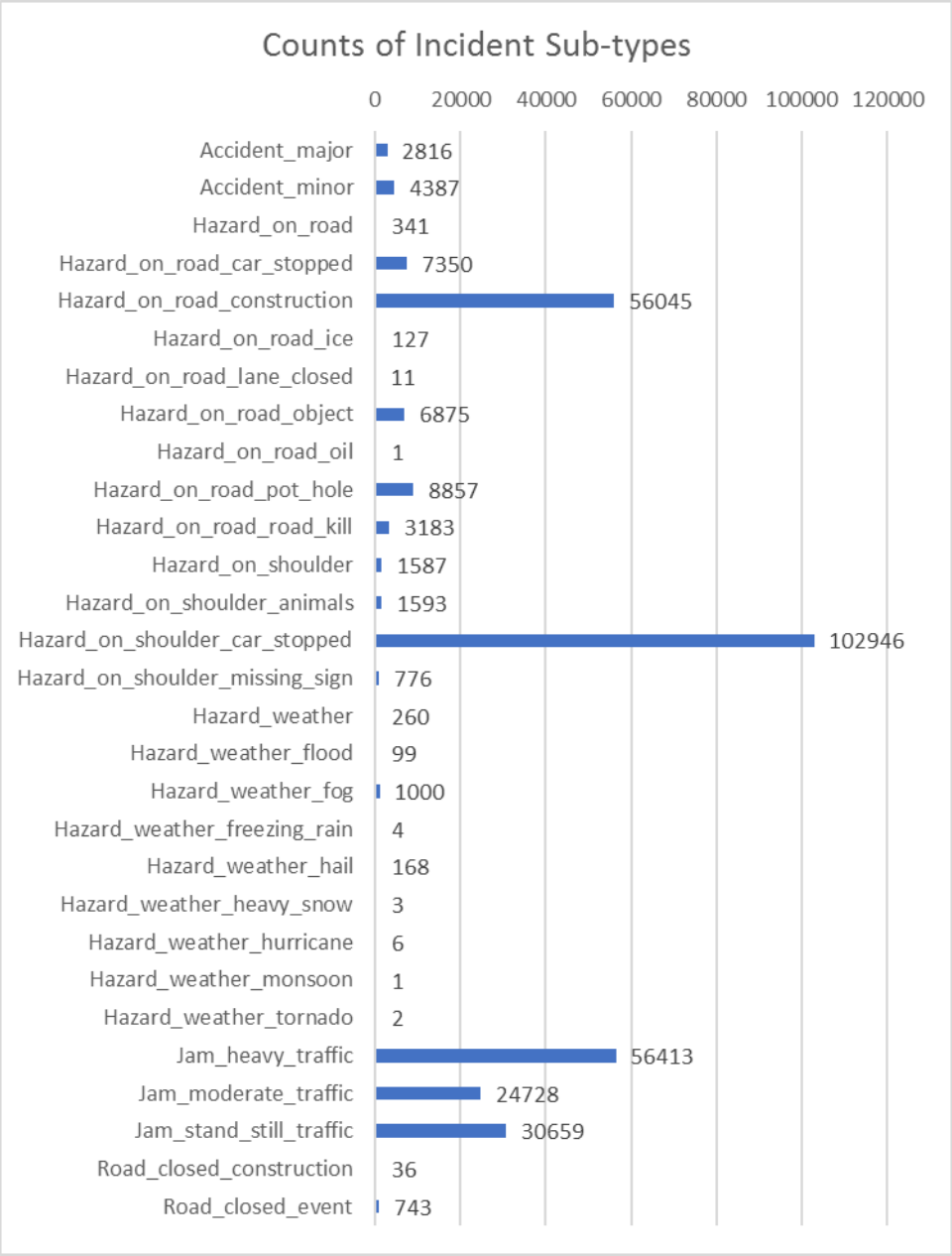


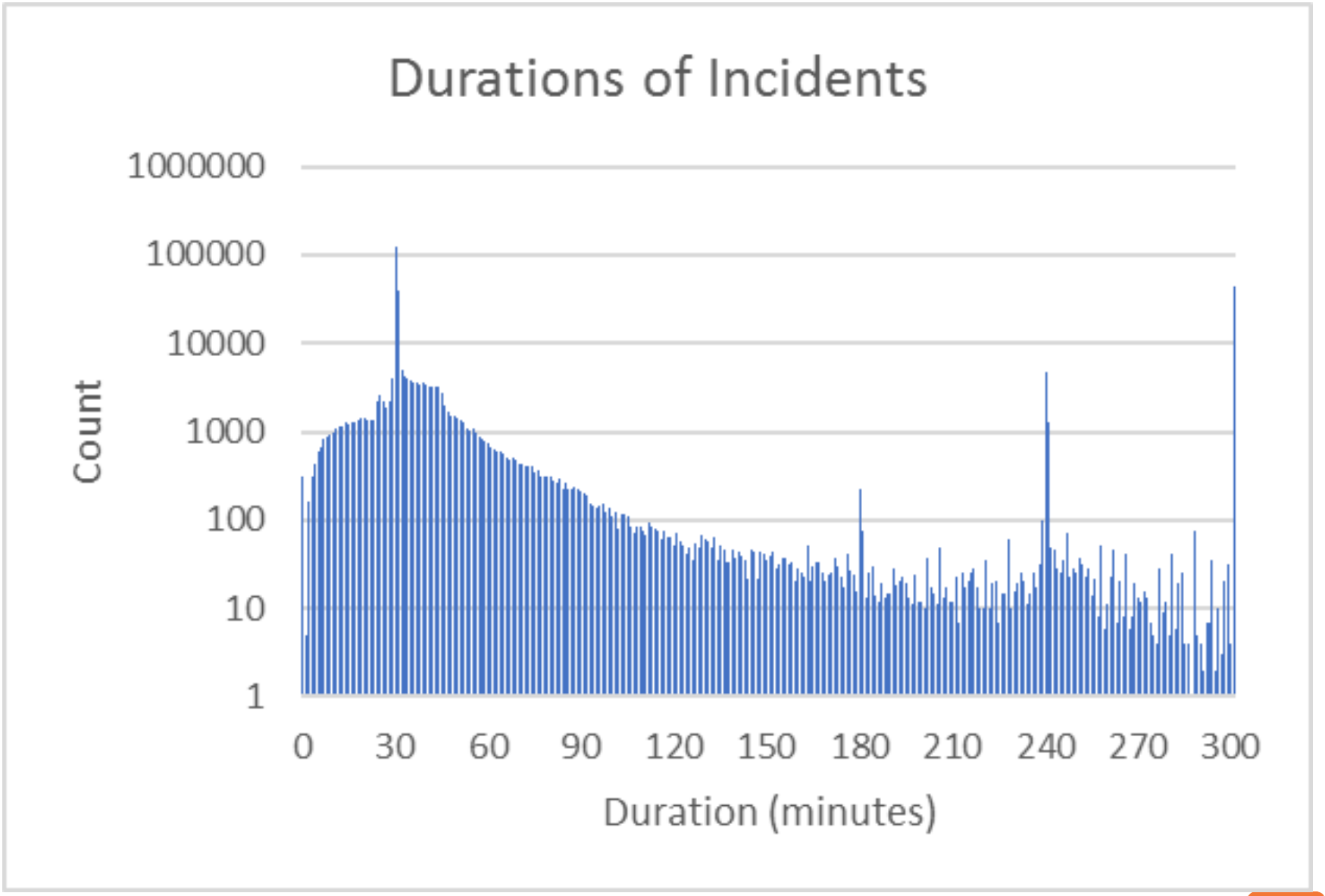
One Hour, Off Peak




Counts of Incidents by Type
0
50000
100000
150000
200000
250000
Accident
12140
Jam
120961
Weatherhazard
200260
Road_closed
893


Incident Type by Time of Day
25000
20000
15000
10000
5000
0
0
4
8
12
16
20
24
Hour of Day
Accident
Jam
Weatherhazard
Road_closed


Counts of Incident Sub-types
0
20000
40000
60000
80000
100000
120000
Accident_major 2816
Accident_minor 4387
Hazard_on_road 341
Hazard_on_road_car_stopped 7350
Hazard_on_road_construction 56045
Hazard_on_road_ice 127
Hazard_on_road_lane_closed 11
Hazard_on_road_object 6875
Hazard_on_road_oil 1
Hazard_on_road_pot_hole 8857
Hazard_on_road_road_kill 3183
Hazard_on_shoulder 1587
Hazard_on_shoulder_animals 1593
Hazard_on_shoulder_car_stopped 102946
Hazard_on_shoulder_missing_sign 776
Hazard_weather 260
Hazard_weather_flood 99
Hazard_weather_fog 1000
Hazard_weather_freezing_rain 4
Hazard_weather_hail 168
Hazard_weather_heavy_snow 3
Hazard_weather_hurricane 6
Hazard_weather_monsoon 1
Hazard_weather_tornado 2
Jam_heavy_traffic 56413
Jam_moderate_traffic 24728
Jam_stand_still_traffic 30659
Road_closed_construction 36
Road_closed_event 743

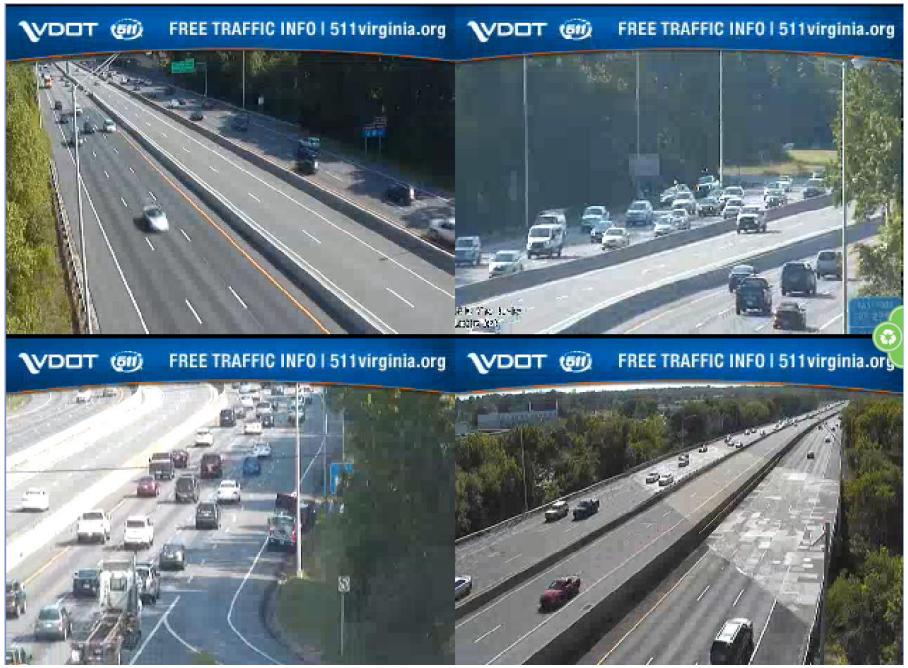

Durations of Incidents
1000000
100000
10000
1000
100
10
1
Count
0
30
60
90
120
150
180
210
240
270
300
Duration (minutes)

Incident Reliability Rating

- Waze users are ranked based on reporting accuracy, from 1-6.
- Based on ranks of reporting Waze users and other factors, Waze assigns a 1-10 reliability score to an incident.
  - No scores below 5
  - 98% of incidents were either 5 or 6

Ground Truth

- To assess ground truth incident timelines, captured screenshots at one minute intervals from four traffic cameras on I-64 in Norfolk, VA for three weeks



Ground Truth

- Important to consider both the time the incident is logged into TOC database, as well as time when camera repositions onto the incident
  - TOC operator is often aware of an incident several minutes before entering it into the database

Roadkill and Potholes

- Ongoing analysis of Waze roadkill and pothole reports
  - Daily drive-by confirmation of all reports within previous 24 hours in Charlottesville area

VTRC
Virginia Transportation Research Council

We bring innovation to transportation.

Questions?

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Additional Questions?

Remaining Questions from the CHAT Box

Open Discussion

Reminder

- ***All Participants – in-person and via webcast***
  - Please give your name and agency before asking your question (at least the first time)
- ***Participation in-person***
  - Please get the attention of a support staff member for a roving microphone
- ***Participation via webcast***
  - Your phone line has now been opened.
  - Please keep your phone muted until asking a question or speaking (press *6 to mute/unmute individual phone lines)
  - Please do not place call “on hold” as your hold music will be heard by the group

Wrap Up

Contact Information

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Thank You!

I-95 CORRIDOR COALITION