



RECENT BORDER ADVISORY SYSTEM DEPLOYMENTS

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AGENDA

1. Canada
2. Michigan
3. San Diego



CANADA



BORDER ADVISORY MESSAGE SIGNS

CLICK TO ADD SUBTITLE

BORDER Advisory signing

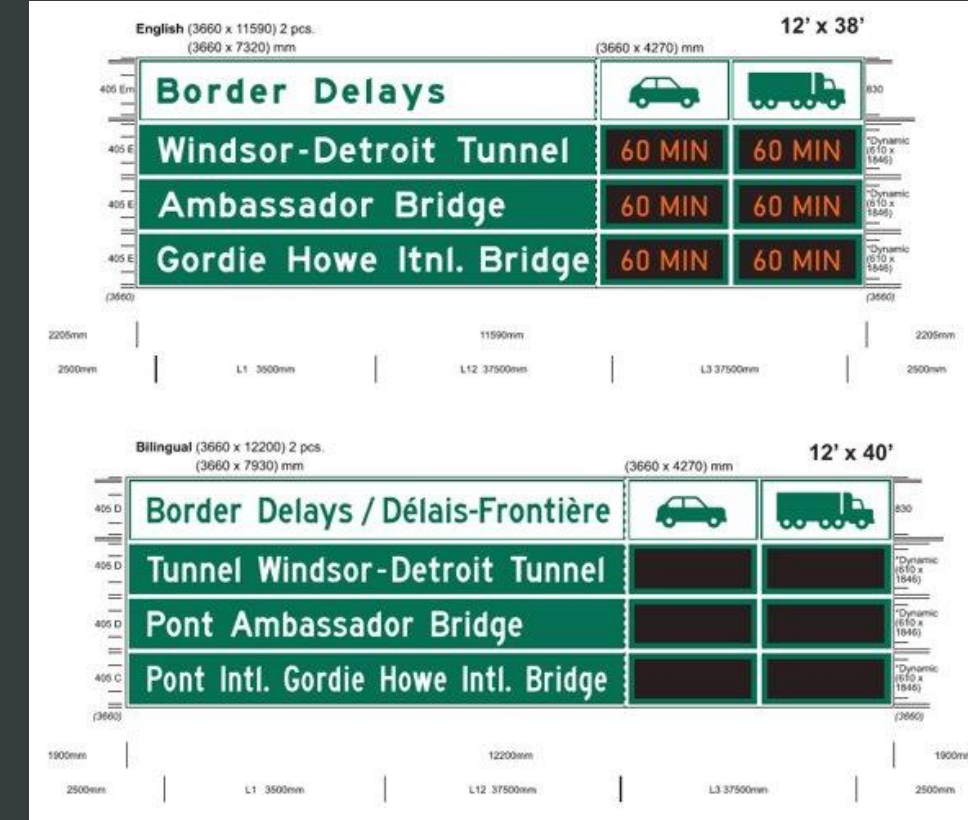
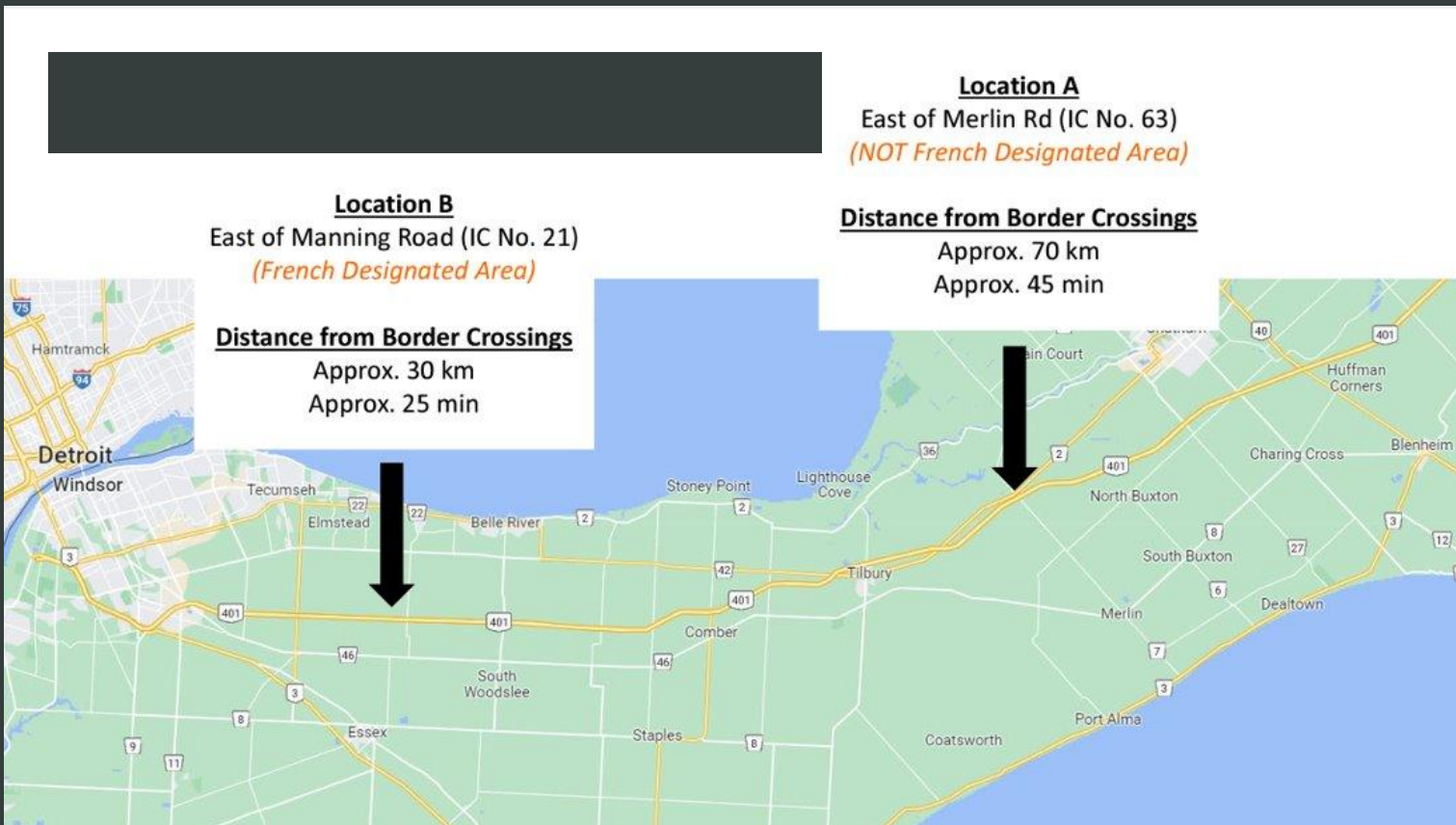


Distinct border wait times for cars and trucks



Signing to guide vehicles to the appropriate lanes

BORDER Advisory signing





BLUETOOTH-BASED BORDER WAIT TIME MEASUREMENT

CLICK TO ADD SUBTITLE

BLUETOOTH travel Time Measurement

Technological Principles

- Bluetooth devices within moving vehicles regularly emit a unique identifier
- Readers installed at the roadside detect these identifiers as vehicles pass by
- Cloud-based analytics collect identifiers from the readers and use this data to compute real-time travel times along routes
- Computed travel times are provided to the subscribing agencies

Technical Standards

- Bluetooth Classic – increasingly rare
- Bluetooth Low Energy – now the prevalent standard

Current Industry Standard

- Reader can detect both Bluetooth Classic and Bluetooth Low Energy
- Reader supports 4G communication



Bluetooth Reader in Solar Powered Configuration (per TPA North America)

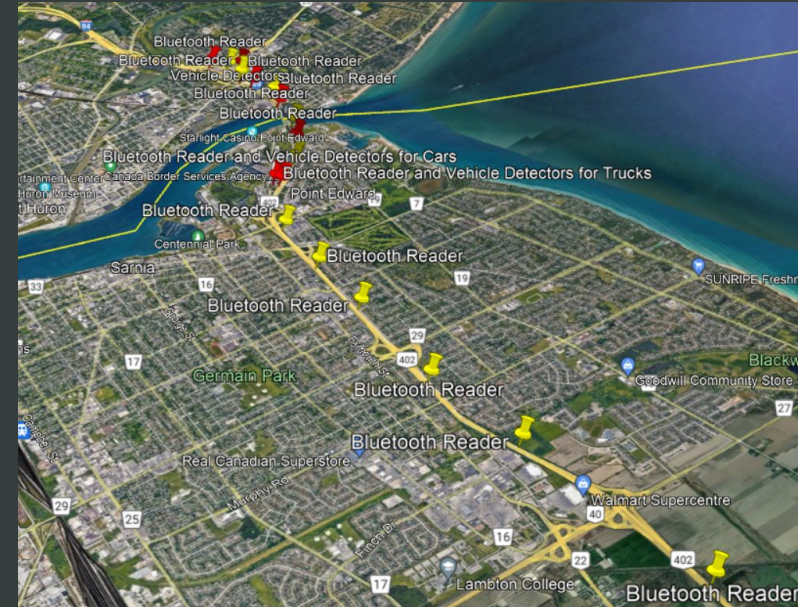
Border wait Time Measurement

Readers are placed along the route to the border and at exit from primary inspection

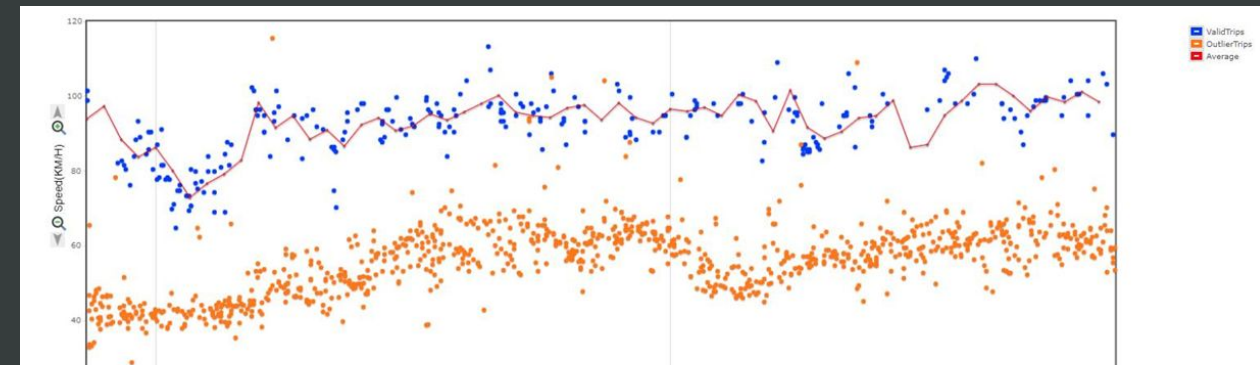
- Along the approaching highway; and, if applicable, along the primary route through the urban signaled network
- Capturing vehicles exiting from primary inspection on the US side of the bridge or tunnel

Specialized analytics differentiate passenger vehicles from commercial vehicles

- Trucks are speed-limited and have a different freeway travel time distribution than cars
- Trucks may follow a different route through inspection facilities
- These effects can be leveraged to provide independent travel time for cars and trucks



Reader locations at the Blue Water Bridge crossing



Distinct travel time distributions by vehicle class (per TPA North America)

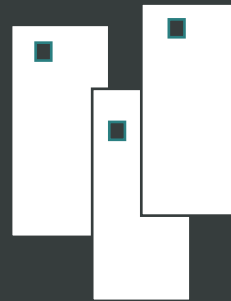


BORDER WAIT TIME PROCESSING, MONITORING, AND DISSEMINATION

CLICK TO ADD SUBTITLE

Border wait Time Measurement

COMPASS ATMS



Monitoring and Decision Support (Data Center/Cloud)

Field Traffic Master



Traffic Management (Edge)

Roadside Equipment/External Feeds



EXPRESS MOVING WELL
COLLECTOR MOVING SLOWLY
BEYOND NEXT TRANSFER



Sensing and Advising Traffic (Endpoints)

Border Crossing Event processing enables MTO ATMS operators to manually override border delays or to close individual border crossings.

Border Wait Time processing collects real-time car and truck border route travel times from Bluetooth data sources, converts these values to border delays, and posts these messages to advisory signs.

Border wait Time MANAGEMENT

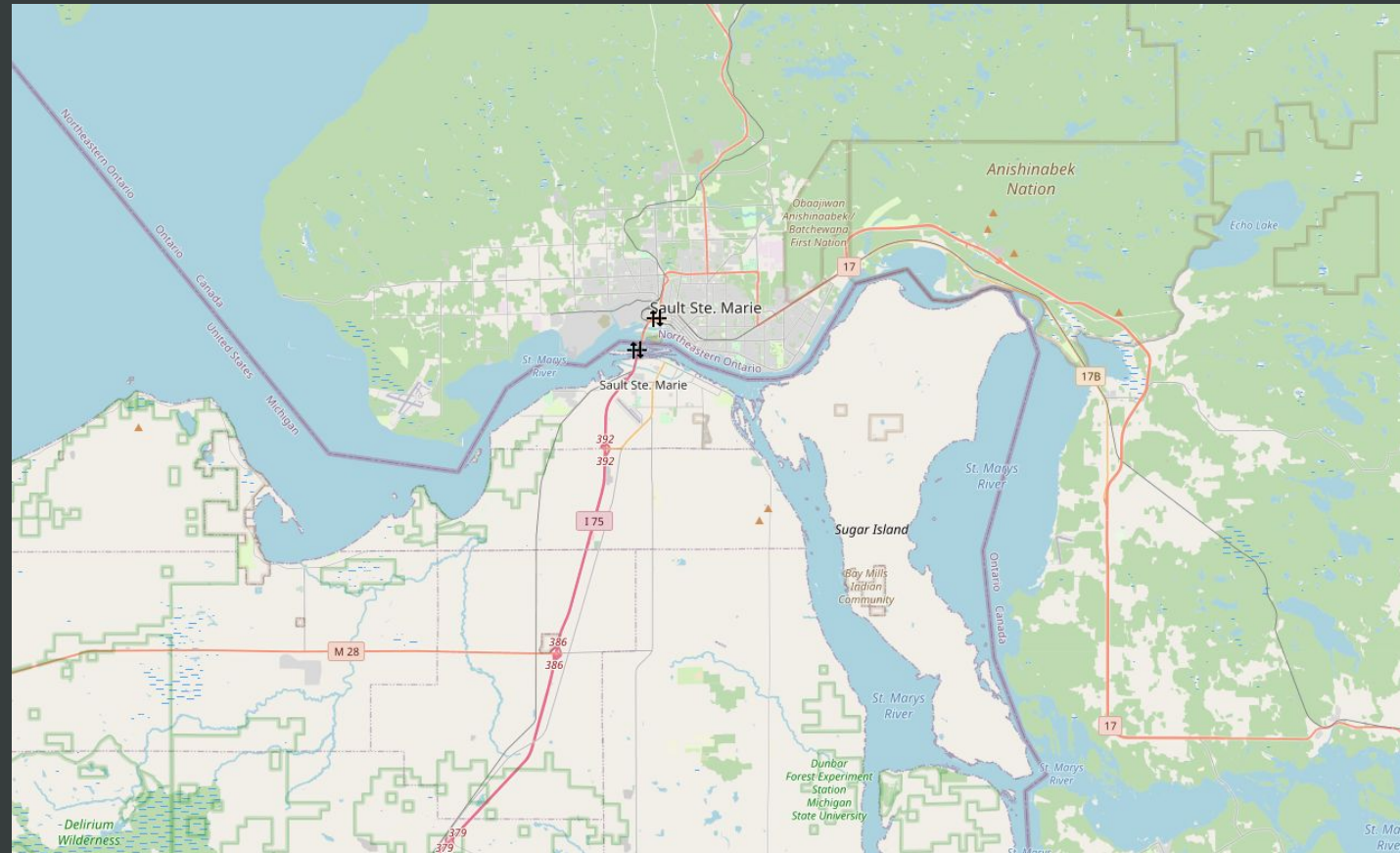
The screenshot displays the Ontario COMPASS web application. The top navigation bar includes links for CommLog, Active Events, DMS, DMS Config, Crossing, RSS, CCTV, WAZE, LMS Config, Administration, Report, and Help. The user is logged in as h.hong. The main content area is split into two panels. The left panel, titled 'Map', shows a map of the Greater Toronto Area with various locations marked. The right panel, titled 'Active Events', contains a table of active events. The table has columns for Start Time, Event ID, Event Type, Sub Type, Reason, State, and Domain. The events listed are:

Start Time	Event ID	Event Type	Sub Type	Reason	State	Domain
2022-04-05 19:30:32	322260	Wind Advisory	User Managed	High	New	Central Region COMPASS Traffic Manager
2022-09-07 10:29:37	372460	Border Event	Border Delay/Closure	Delay	New	Central Region COMPASS Traffic Manager
2022-09-07 10:28:05	059886	Border Event	Border Delay/Closure	Closure	New	Central Region COMPASS Traffic Manager

Ministry TMC operators can manually override messaging in the event of incidents or border closures

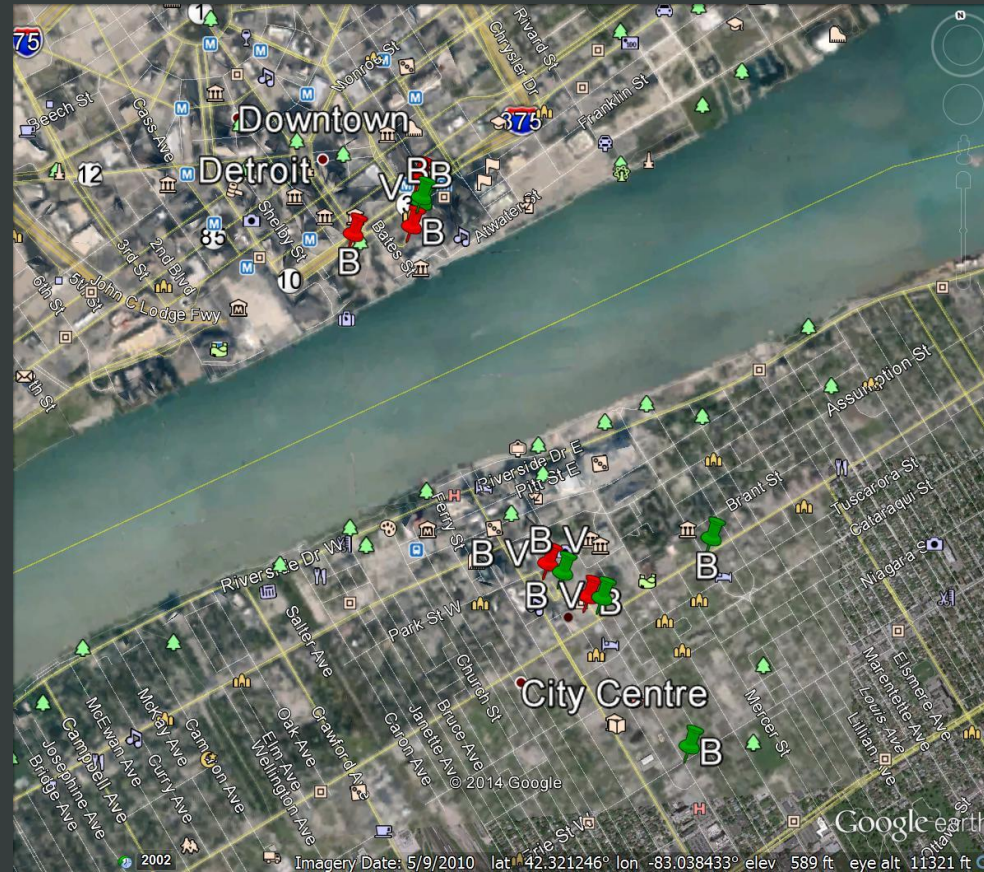
MICHIGAN

Northern Crossing – International Bridge



[illegible]

Detroit Crossing



Auto Response

?

—

×

Edit Privilege

Select Automated Response

Condition Setup

Type

ID

Field

Condition

Threshold

AndOr

Add

Type	ID	Field	Operand	Threshold	AndOr
BWTMS	International Bridge - CA Bound	Wait Time - Cars	>	10	<div>Delete</div>

Library Response Plan Category

all purpose

Library Response Plan Title

Type

SubType

Automated Response Name

Delay Time (Minutes)

2

Clear Time (Minutes)

2

Auto Activate

Time

All Times	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Start Time	00:00	00:00	00:00	00:00	00:00	00:00	00:00
End Time	23:59	23:59	23:59	23:59	23:59	23:59	23:59

New

Save

Save As New

Delete

AVL

ATM-CDR

ATM-GTY

BWTMS

CCTV

CONTACTS

DMS

DSS

ESS

PARKING

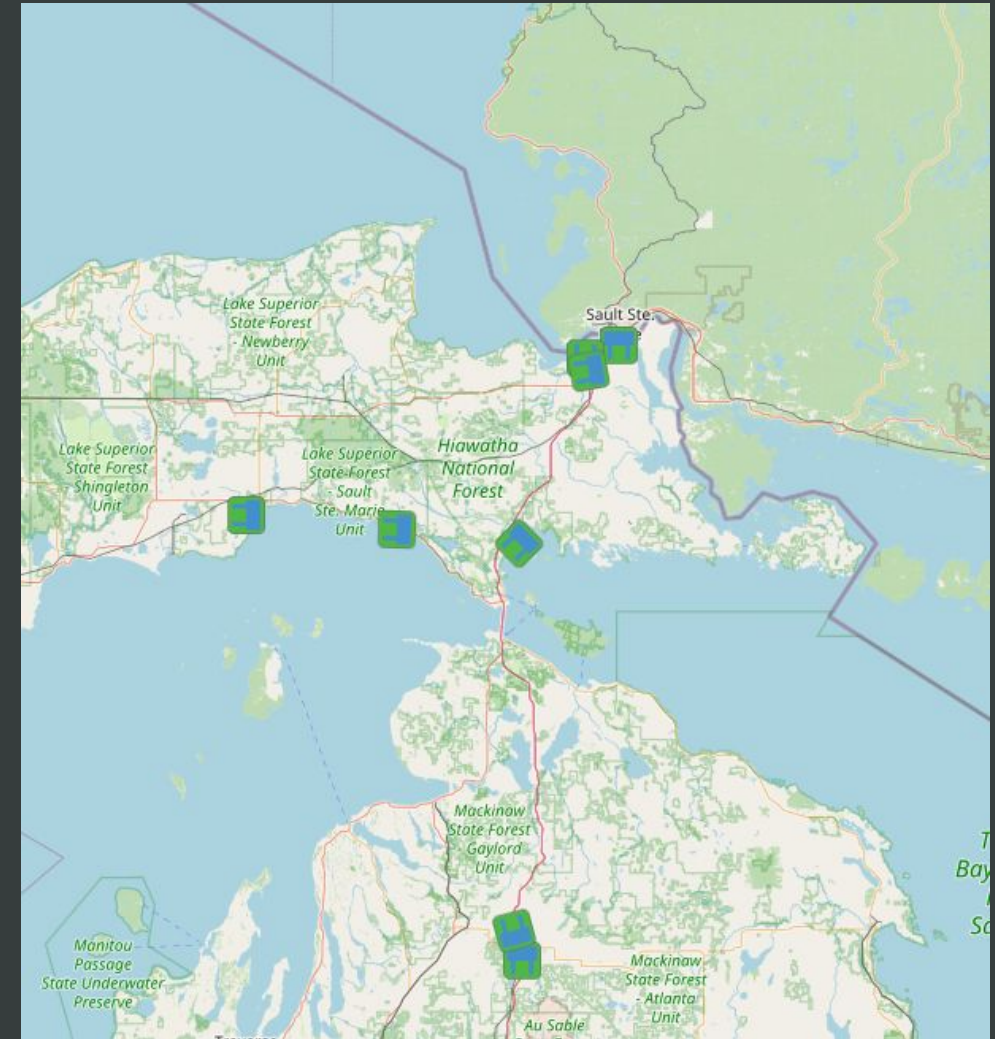
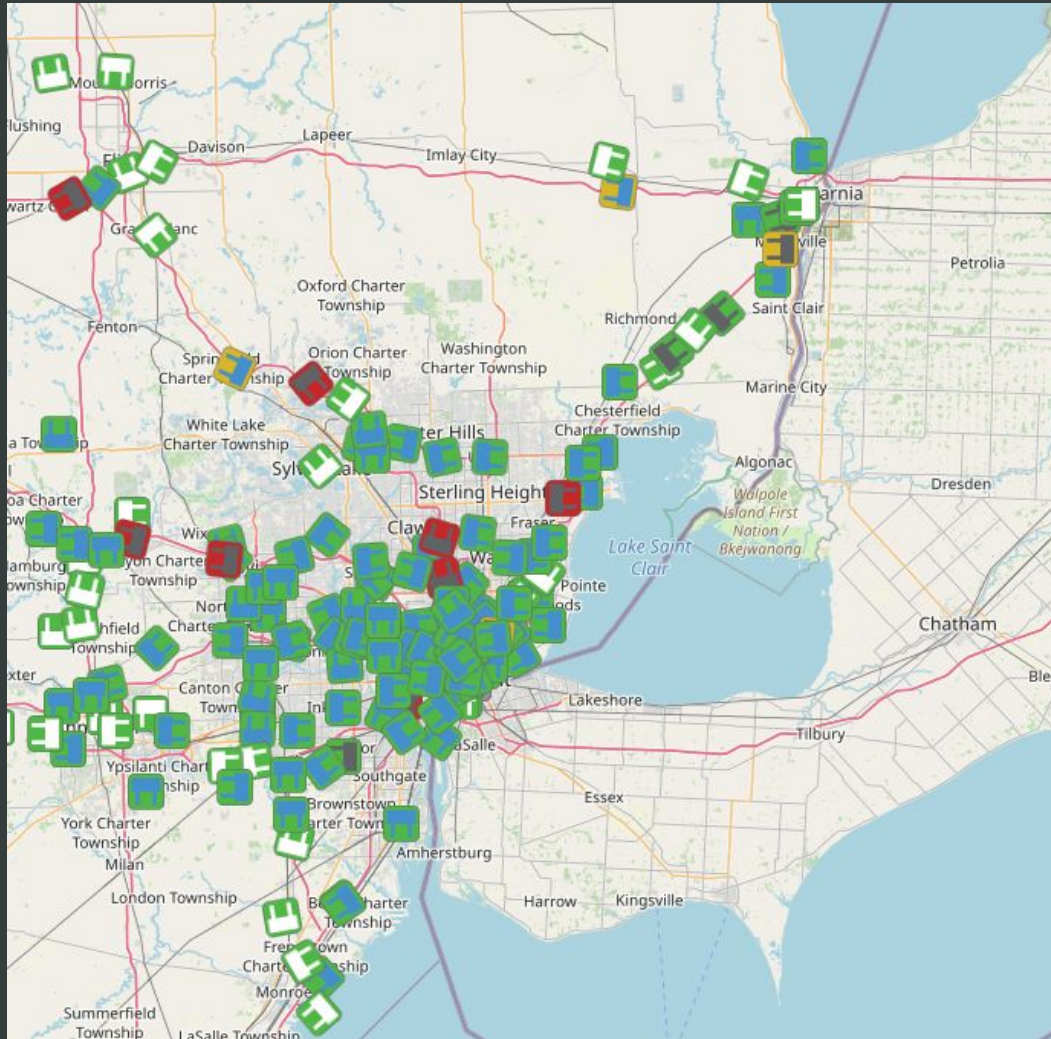
SCADA

TTPATHS

VDS

Auto Response

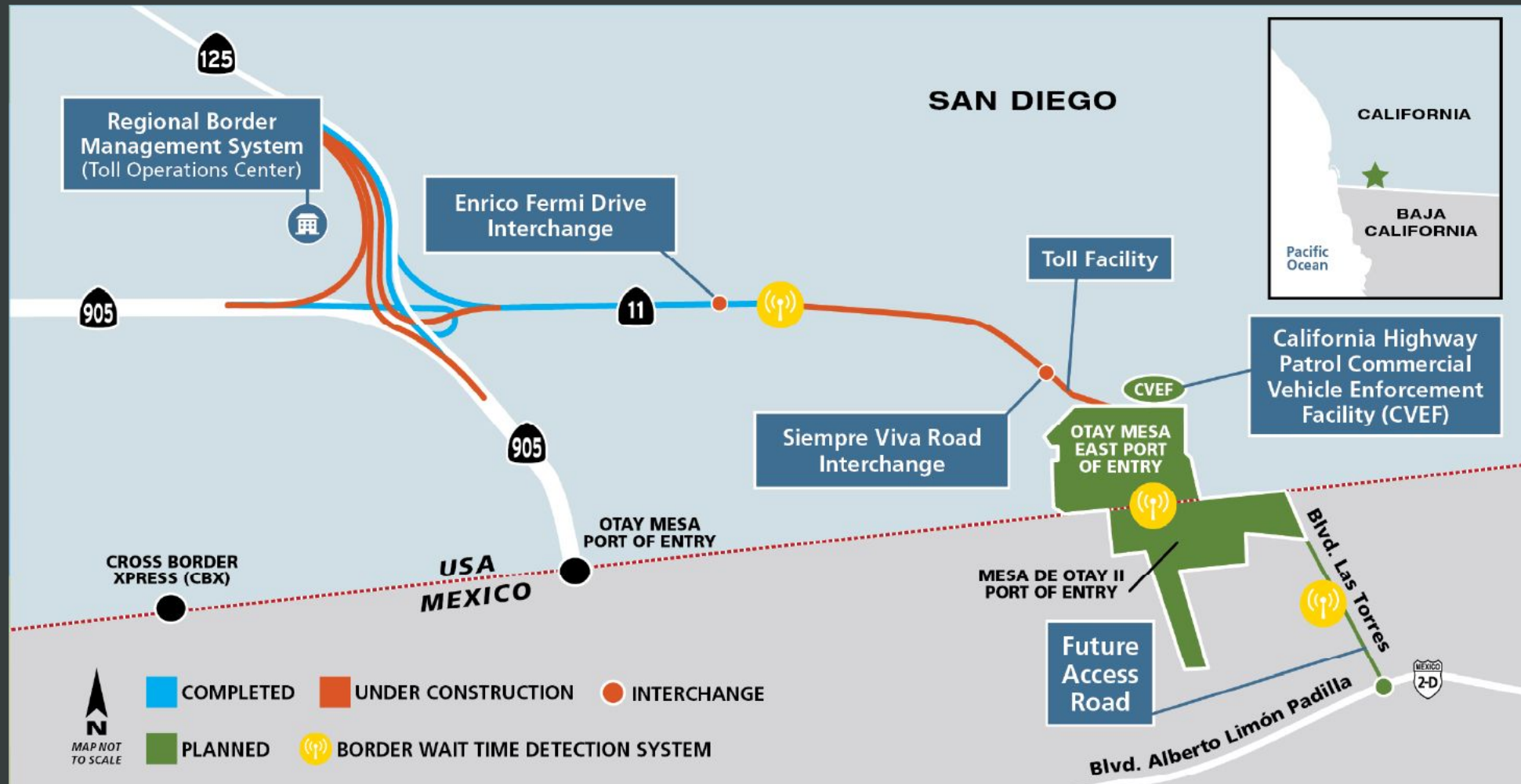
Signs used for advance alerting



SAN DIEGO

ABC Project
Advancing Border Crossing

ABC Project Location and Overview



Two main elements for iNET™ Development

- Expansion and version upgrade of existing I-15 ICM for use on SR 905 and SR 11
- Replace iNET™ ICMS simulation with real-time information

- Border wait times and lane management
- Border dynamic-pricing
- Border lane management

SANDAG RBMS Concept



Leverage I-15 ICMS with Enhanced Capabilities

- En-route traveler information
- Pre-trip traveler information
- Automatically detects congestion events
- Dynamic Rerouting
- Regional arterial management
- Freeway coordinated adaptive ramp metering
- Signal coordination on arterials with freeway ramp metering
- Real-time multimodal decision support

