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Planning Data from Paper to Bits/Bytes

Bob Frey
Director of Planning and Innovation

Data and Transportation Decision-Making

- Agencies can be innovative and still lack in data for decision making.
- How can transportation agencies (especially small ones) keep up with data advancement?
- Can today's technology's exponentially robust datasets close the gap?
- How can they leverage data today to be laser-focused in improving safety and mobility?

The Evolution of Planning Data – a Continuum

Yesterday

- Manual, labor intensive collection
- Spreadsheet analysis, storage

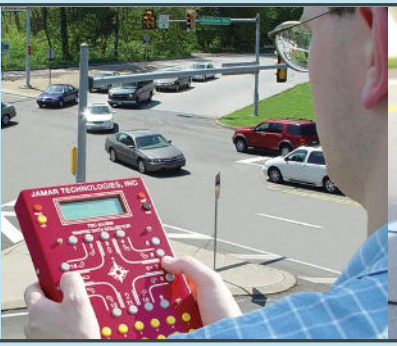
Today

- Initiating tech-based automation
- Integrating 3rd party sources

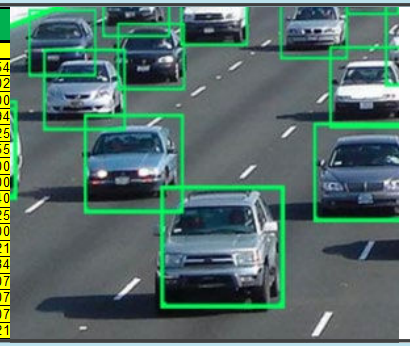
Tomorrow/Future…

- Integrating constant, real-time data and new tech
- Establishing data governance, structure, systems
- Data-driven agency decisions and processes

Move from Data Collection to Data Validation Focus/Emphasis



Mode	Average Car	Compact Car	Electric Car	Van or Pickup
verage Occupancy	1.5	1.5	1.5	1.5
ehicle Ownership	0.272	0.239	0.341	0.354
ehicle Operation	0.144	0.104	0.202	0.202
perating Subsidy	0.000	0.000	0.000	0.000
ravel Time	0.094	0.094	0.094	0.094
iternal Crash	0.125	0.138	0.125	0.125
xternal Crash	0.055	0.053	0.055	0.055
iternal Health Ben.	0.000	0.000	0.000	0.000
xternal Health Ben.	0.000	0.000	0.000	0.000
iternal Parking	0.040	0.037	0.040	0.040
xternal Parking	0.025	0.024	0.025	0.025
ongestion	0.000	0.000	0.000	0.000
oad Facilities	0.016	0.016	0.038	0.021
and Value	0.034	0.034	0.034	0.034
raffic Services	0.007	0.007	0.007	0.007
ransport Diversity	0.007	0.007	0.007	0.007
ir Pollution	0.004	0.003	0.001	0.007
HG	0.015	0.012	0.004	0.021



RITIS

INRIX

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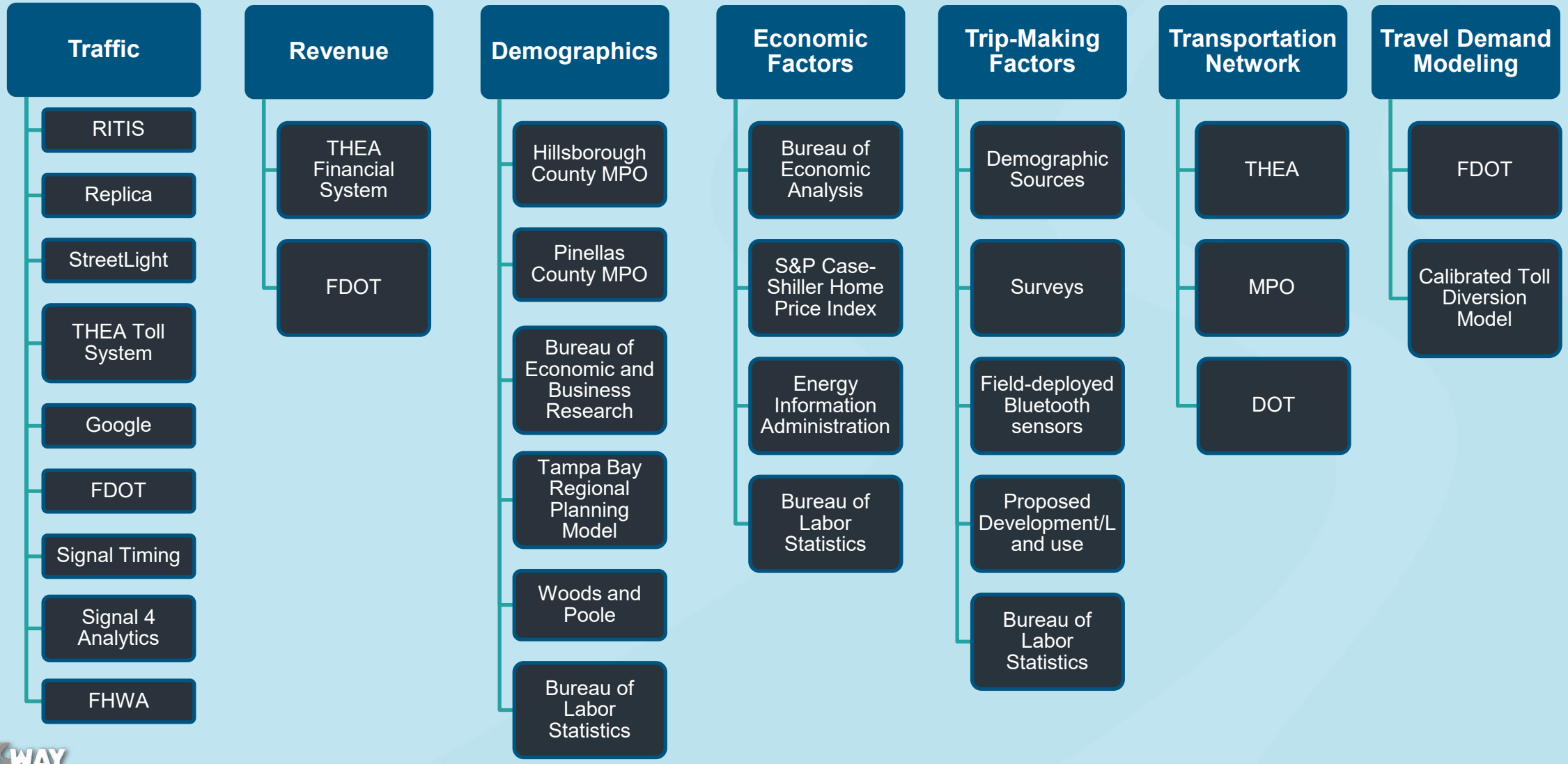
Today's Data – Overwhelming!

- **Mobility Data**
  - Travel Demand Models
  - GPS (Personal & Commercial)
  - O/D Data (Bluetooth, Mobile)
  - Connected Vehicles
  - Location Based Services (LBS)
  - Telecommunications
- **Sensor Data**
  - Video Cameras
  - CCTV
  - MVDS
  - THEA Toll Transactions
- **Florida Traffic Online (FTO)**
  - AADT
  - Truck Data
  - Traffic Factors (K, D, PSCF, SF)
  - Historical Data
- **Contextual Data**
  - Roadway Characteristics Inventory (RCI)
  - Straight-Line Diagrams (SLD)
  - Census Data
  - Controllers Data
- **Florida Geographic Data Library (FGDL)**
  - System Maps
  - Land Use
  - Sociodemographic
  - Property Appraiser
- **Probe Data**
  - RITIS
  - INRIX
  - HERE
  - Replica
  - StreetLight
- **Crash Data**
  - State and Local Government's Crash Databases
  - Signal 4 Analytics
    - Florida DHSMV
    - Florida Court Clerks & Comptrollers (FCCC)
  - CDMS
  - CARS
  - Connected Vehicles (BSM, RSU)

Today's Data – How do we make the best use?



THEA Data – Opportunities and Activities

Overall goal: Leverage data to enable laser-focus on addressing *real* transportation needs.

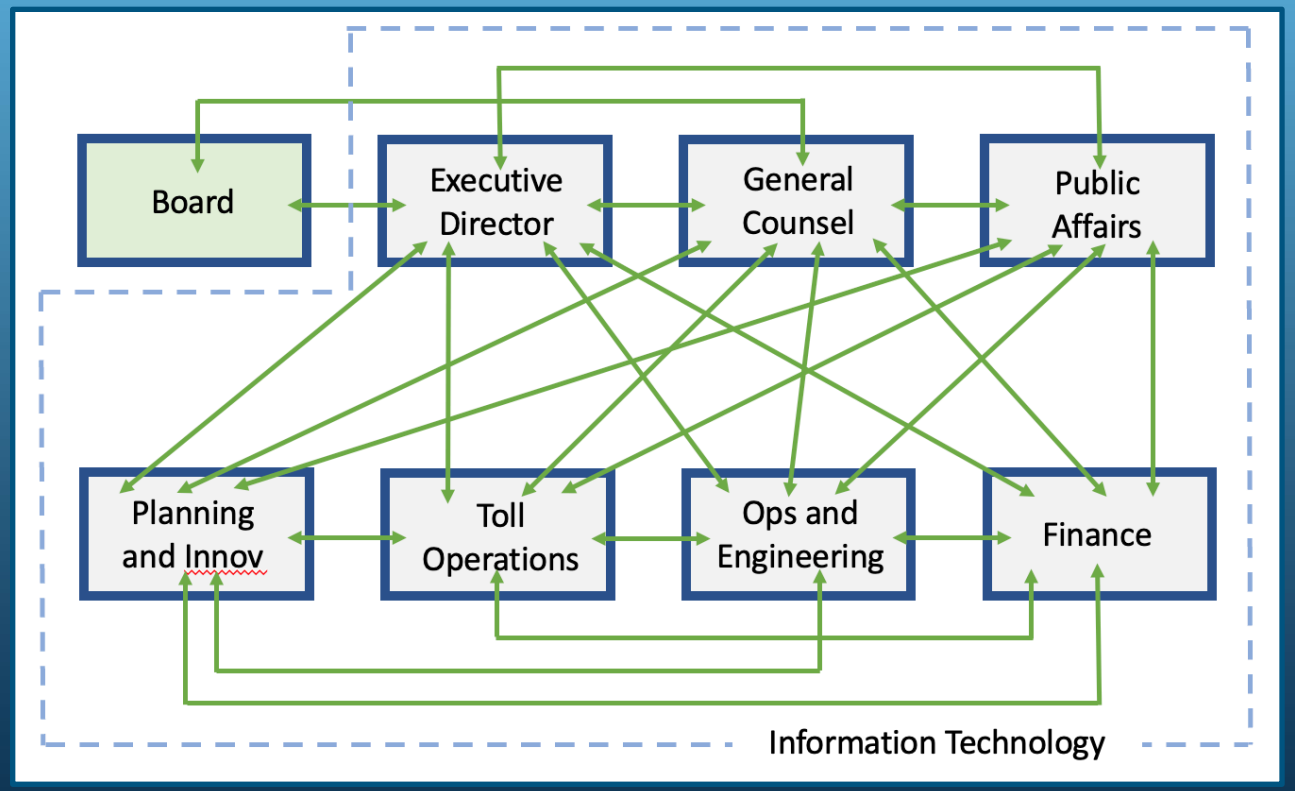
- Precise, needs-based, targeted improvements
- Resulting in deployment efficiencies, cost savings, customer service

Some catching up to do → opportunity to establish a solid foundation for today and the future.

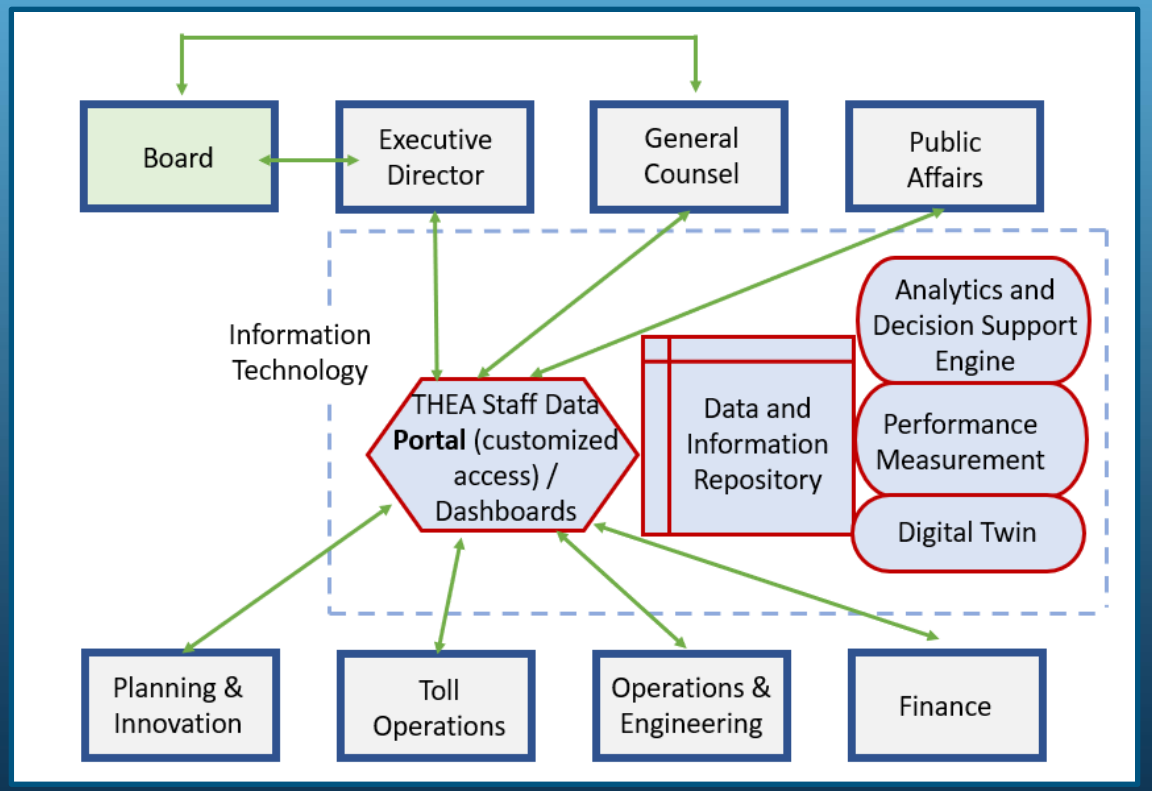
- Data governance
- Incrementally developed Decision Support System (DSS)
- Embrace, promote technology for data collection, analysis, reporting

THEA DSS Development — Inter-Dept Data Flows

From this:



To this:



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Preliminary THEA DSS System Architecture

Planning Data Sources

Agency Specific Data
Toll & Finance
Capital Program

Sensor Data
(Volumes, Counts, Speed)
THEA Infrastructure

CV & OEM Data
(RSU BSMs, TIMs, SPaT)
THEA RSU Infrastructure

Traffic Data
(Crashes, Incidents, Warnings, Probe Vehicles)
INRIX, Streetlight, HERE

GIS Data
(System Maps, Land Use, Sociodemographic)
ESRI, Property Appraiser, US Census Bureau

Weather Data
(Conditions, Alerts, Forecasts)
NOAA, 3rd Party

Other Data Sources

Data Ingestion

- Data Lake
- Data Structuring
- Data Hub

Data Analytics

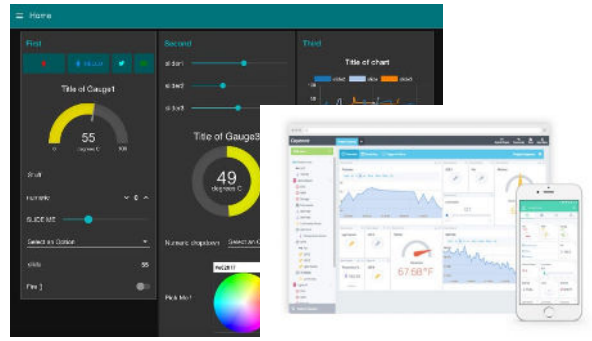
- Data Analytics
- ML Engine
- GIS Engine

Data Management

- Data Extractor
- Data Catalog
- Data APIs

Business Intelligence

- **Operations**
- **Planning**
- **Revenue Forecasting**
- **Decision Support**
- **Executive Decision Making**
- **Traffic Analysis**



Data Consumers

- Executive Director
- Planning
- Operations
- Tolling
- THEA Customers
- Local & Regional Partners
- News & Social Media
- Ext. Data Subscribers

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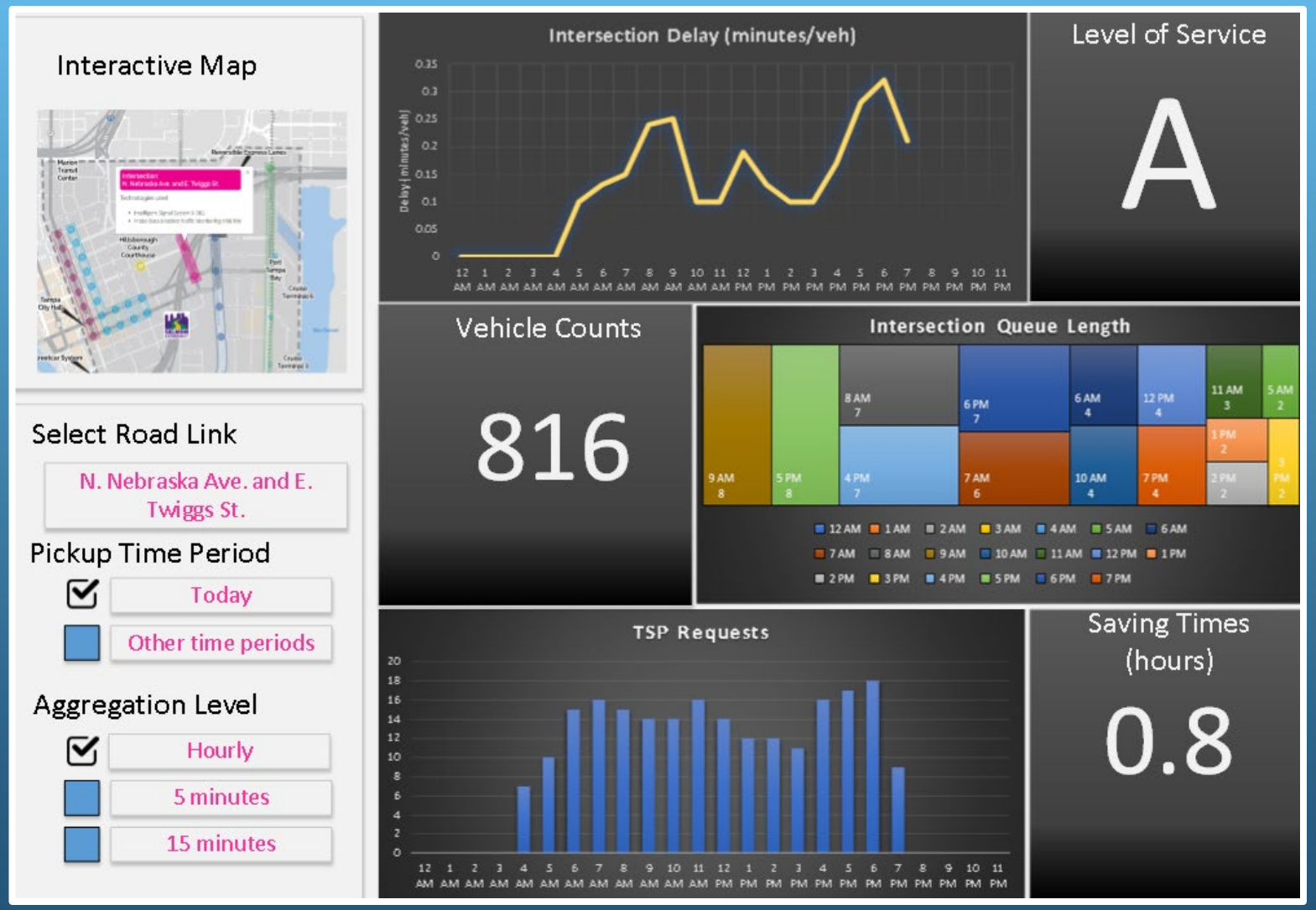
THEA DSS – Sample Planning Outputs

Level of Service Data Visualization



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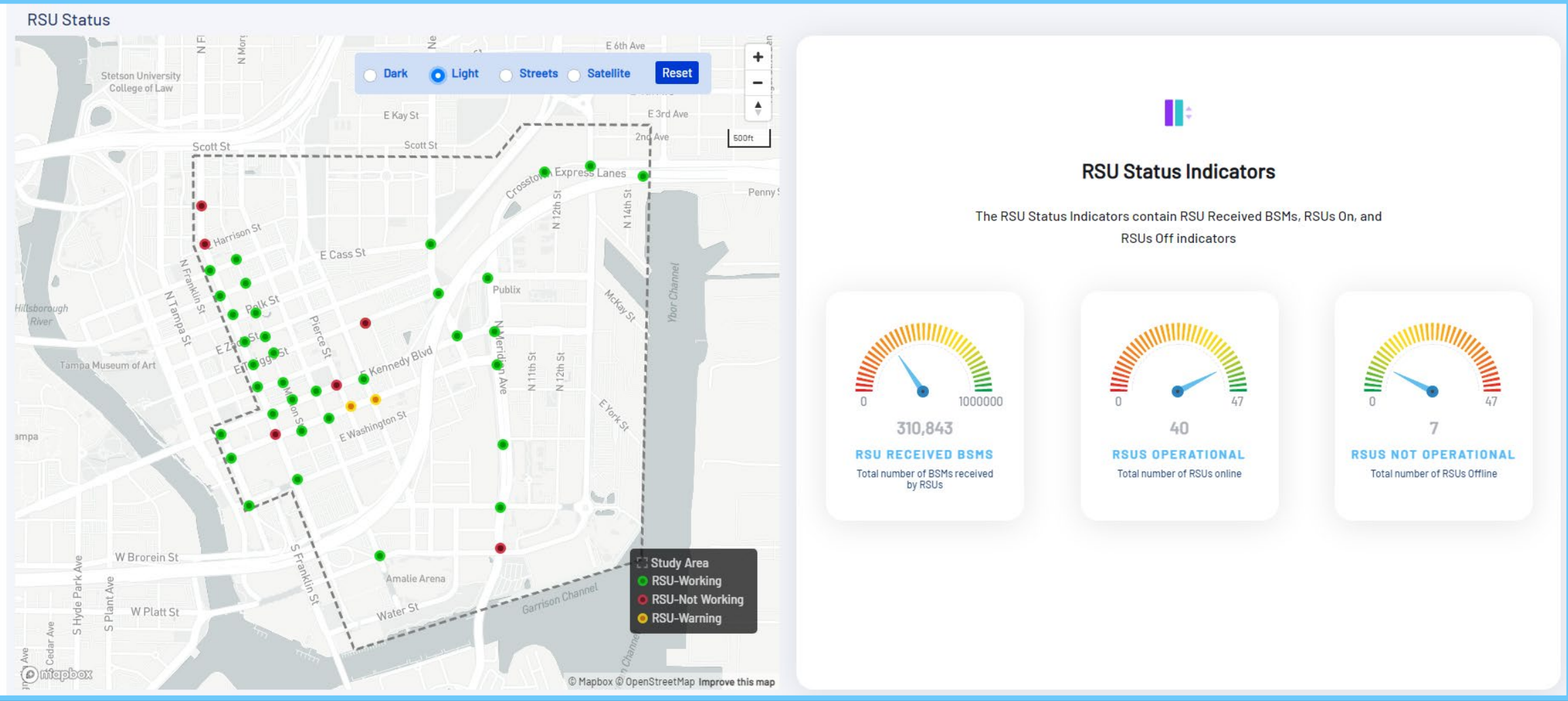
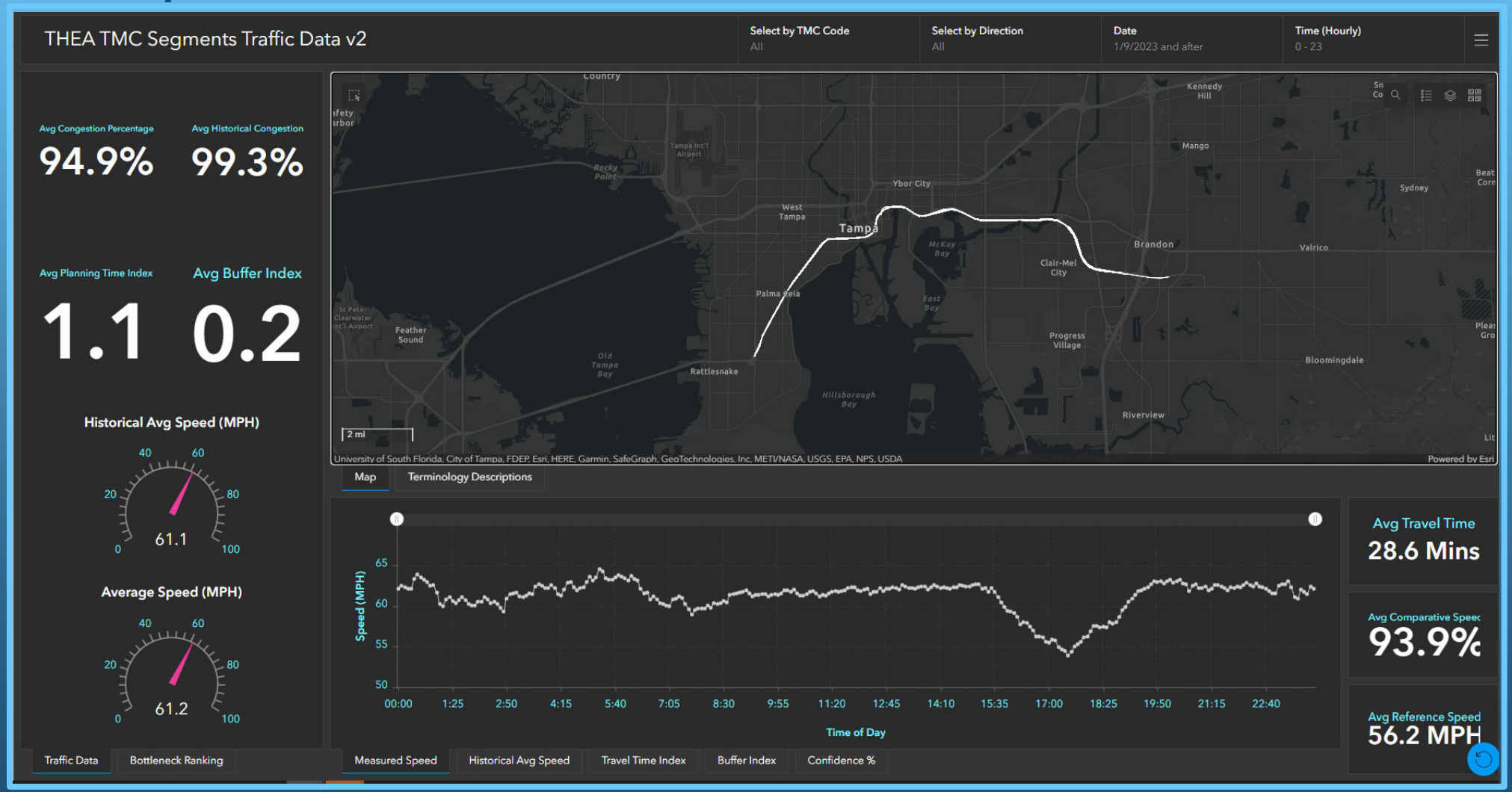
THEA DSS – Sample Planning Outputs

CV Infrastructure Data Visualization



THEA DSS – Sample Planning Outputs

System Performance Data Visualization



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Conclusions and Lessons for Small Agencies

1. Don't attempt to "drink from the (data) firehose". Start small.
2. Don't fight the natural evolution of your data-related systems, analysis, and processes. Build upon them.
3. Recognize that *innovation* cross-cuts many aspects of your agency and not exclusively data. Continue to embrace and promote technology for planning, operations, and other agency functions.
4. Remember that the *outcome* matters! Safety, Mobility Efficiency, Cost Savings, Environmental.

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Ensuring Value for Your Tolls Dollar

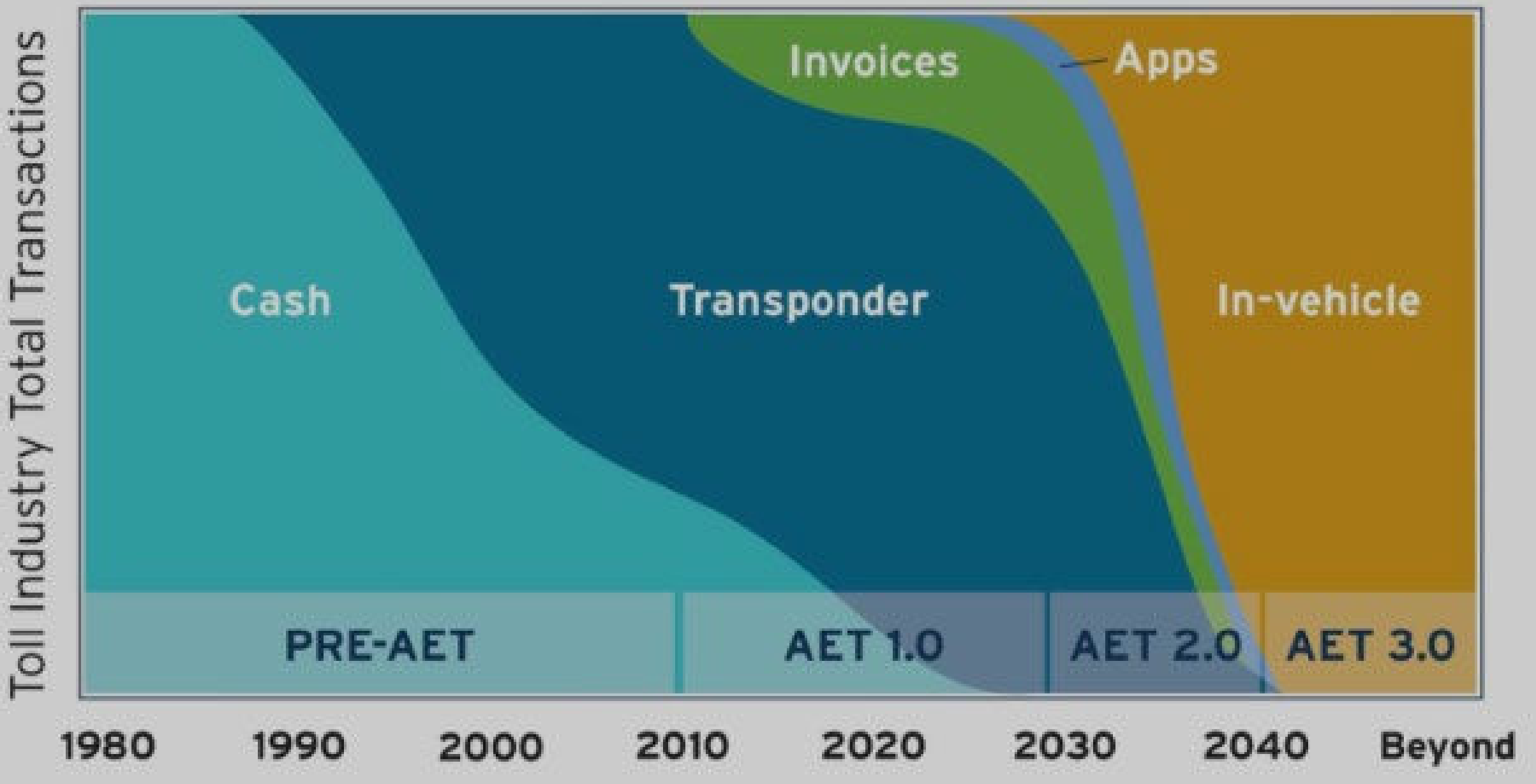
Felipe Velasco,
THEA Systems Architect, Tolling

AGENDA

- THEA's Toll System Today
- Providing Value for Your Toll Dollar
- Moving to the Future

TAMPA

Evolution of Tolling



THEA's Toll System Today

THEA's Toll System Today

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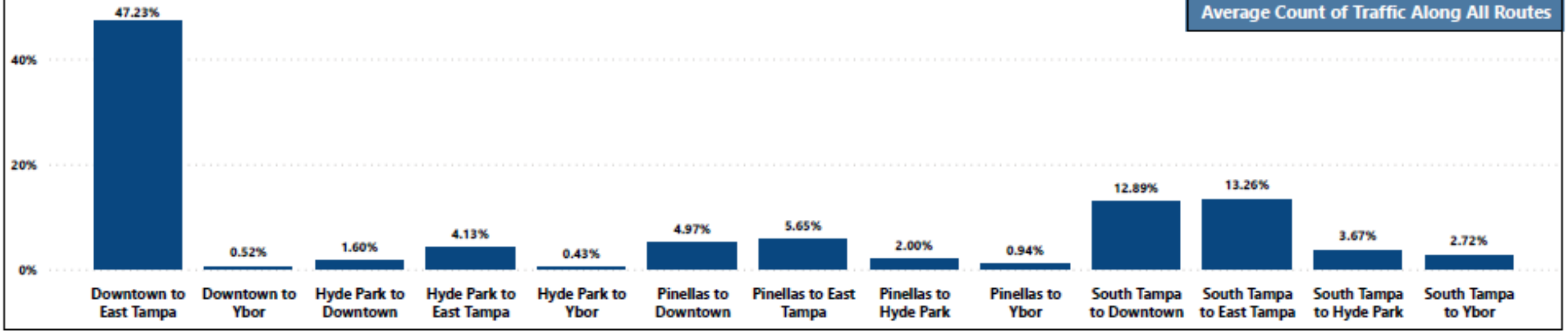
Rush Hour Traffic Percentages

Eastbound Weekday Traffic Patterns

2023

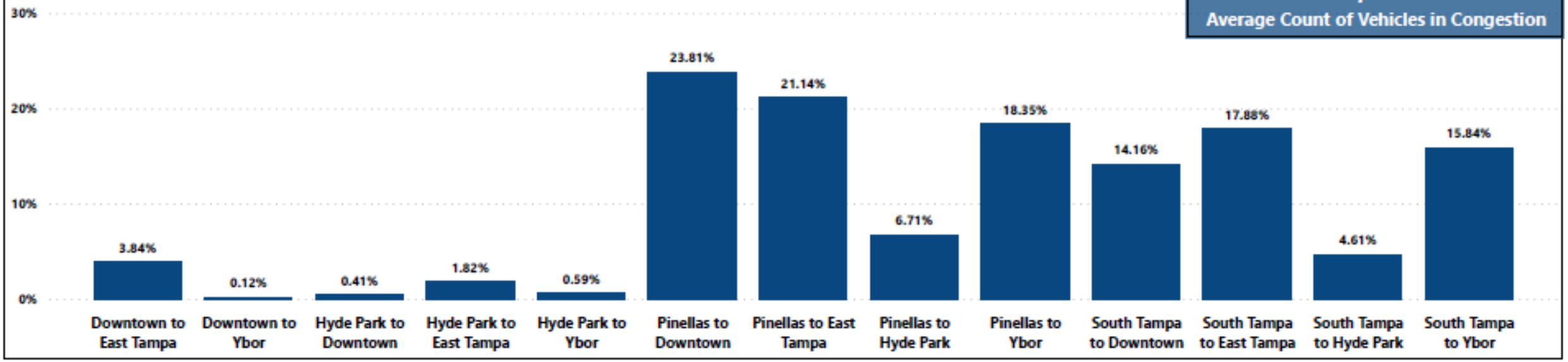
Percentage of Overall Traffic Per Route

53,923
Average Count of Traffic Along All Routes



Percentage of Vehicles in Congestion Per Route

5,042
Average Count of Vehicles in Congestion



Eastbound Weekday Traffic Patterns

2023

Pinellas to Hyde Park

6.71%
Vehicles in Congestion

Detailed Route Possibilities:
Selmon West Extension --> Willow Avenue Off Ramp

South Tampa to Hyde Park

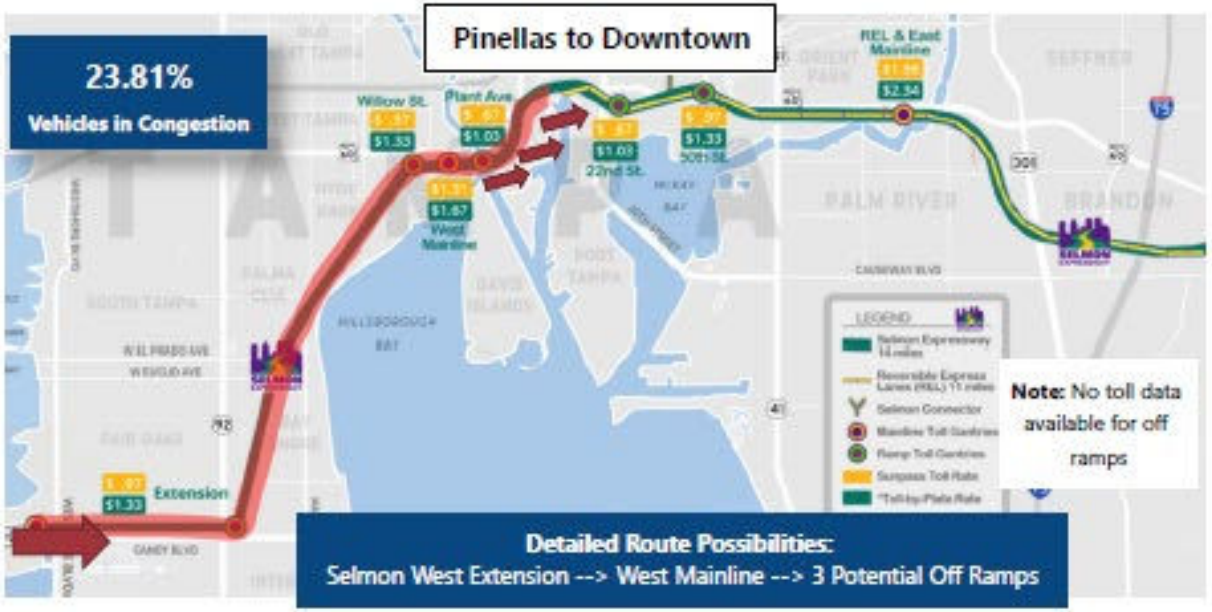
4.61%
Vehicles in Congestion

Note: No toll data available for on ramps

Detailed Route Possibilities:
3 Potential On Ramps --> Willow Avenue Off Ramp

Pinellas to Downtown

23.81%
Vehicles in Congestion



Note: No toll data available for off ramps

Detailed Route Possibilities:
Selmon West Extension --> West Mainline --> 3 Potential Off Ramps

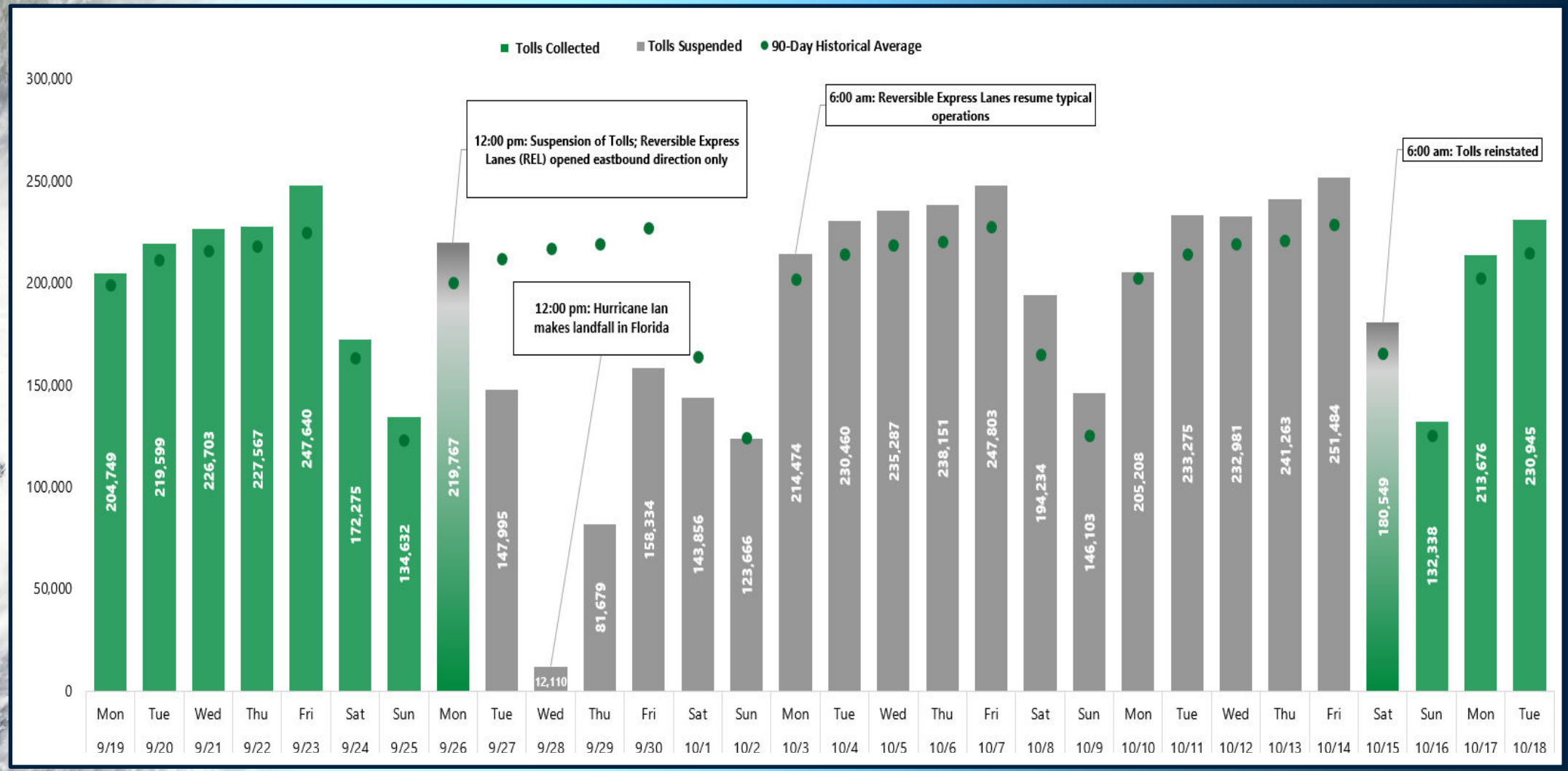
South Tampa to Downtown

14.16%
Vehicles in Congestion

Note: No toll data available for off ramps

Detailed Route Possibilities:
4 Potential On Ramps --> West Mainline --> 3 Potential Off Ramps

Providing Value for Your Toll Dollar



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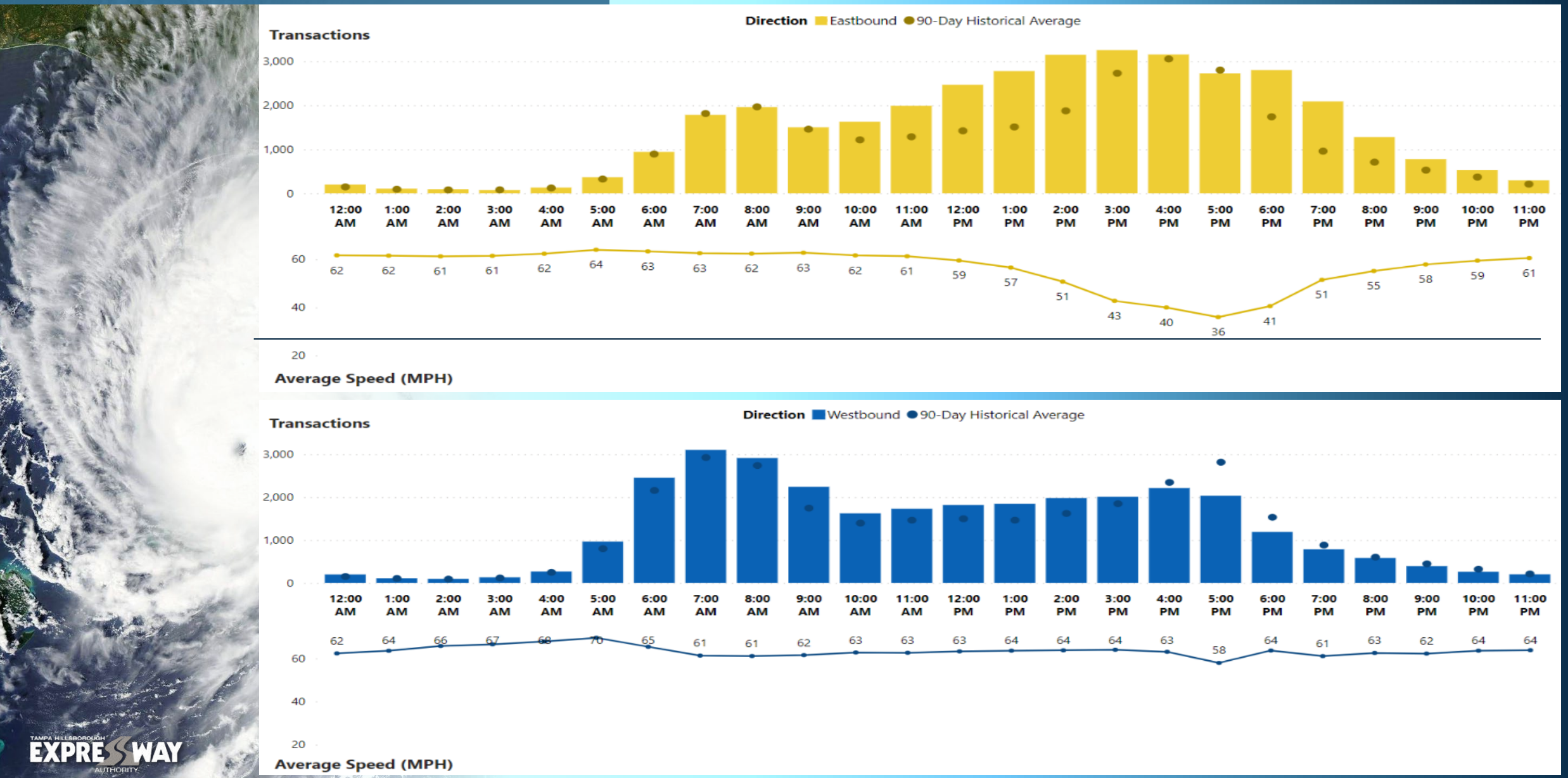
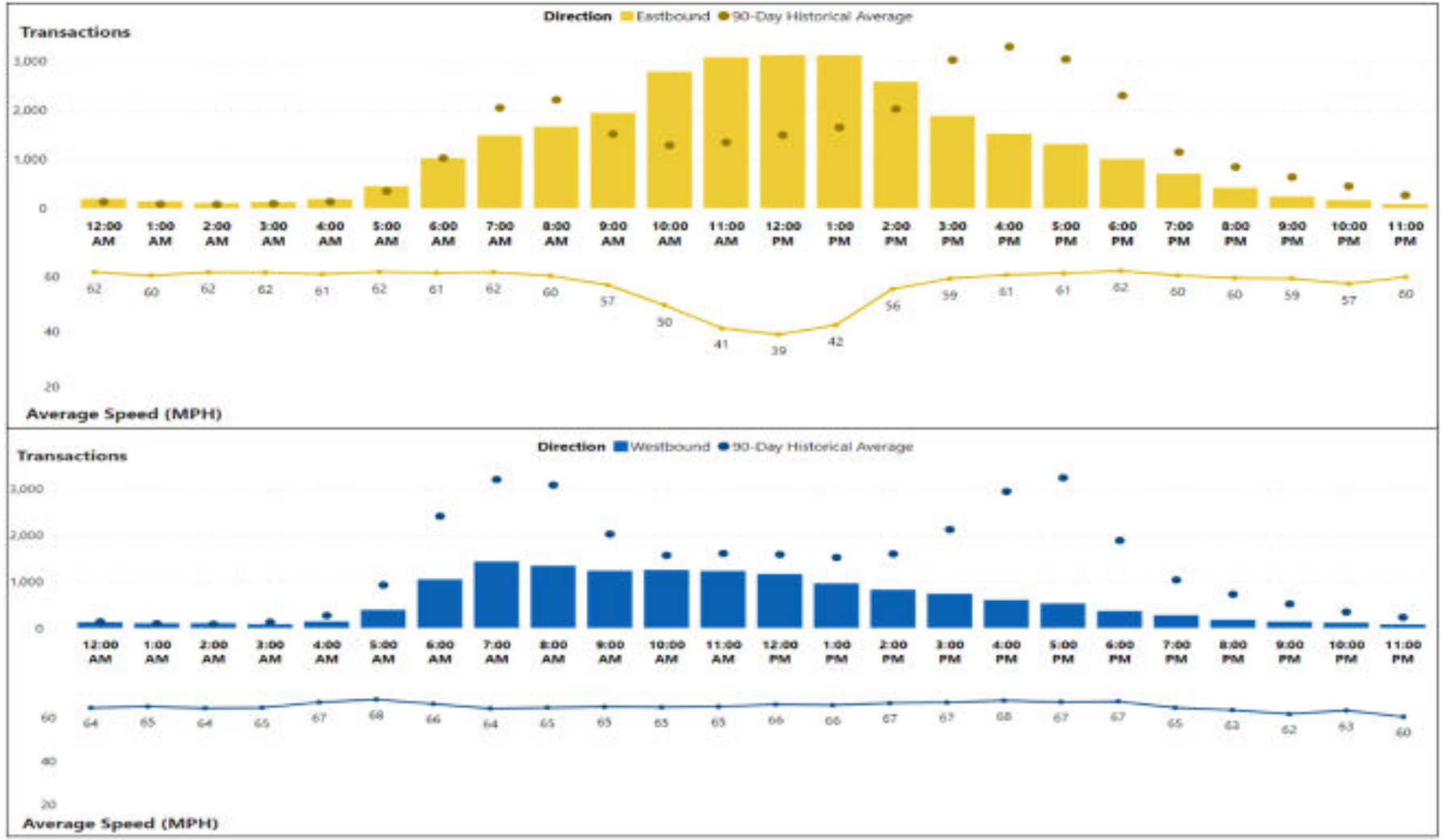
Providing Value for Your Toll Dollar



Providing Value for Your Toll Dollar

West Mainline Transactions Pre-Hurricane Ian (Tuesday – 9/27/22)

Increase in Eastbound transactions due to evacuations



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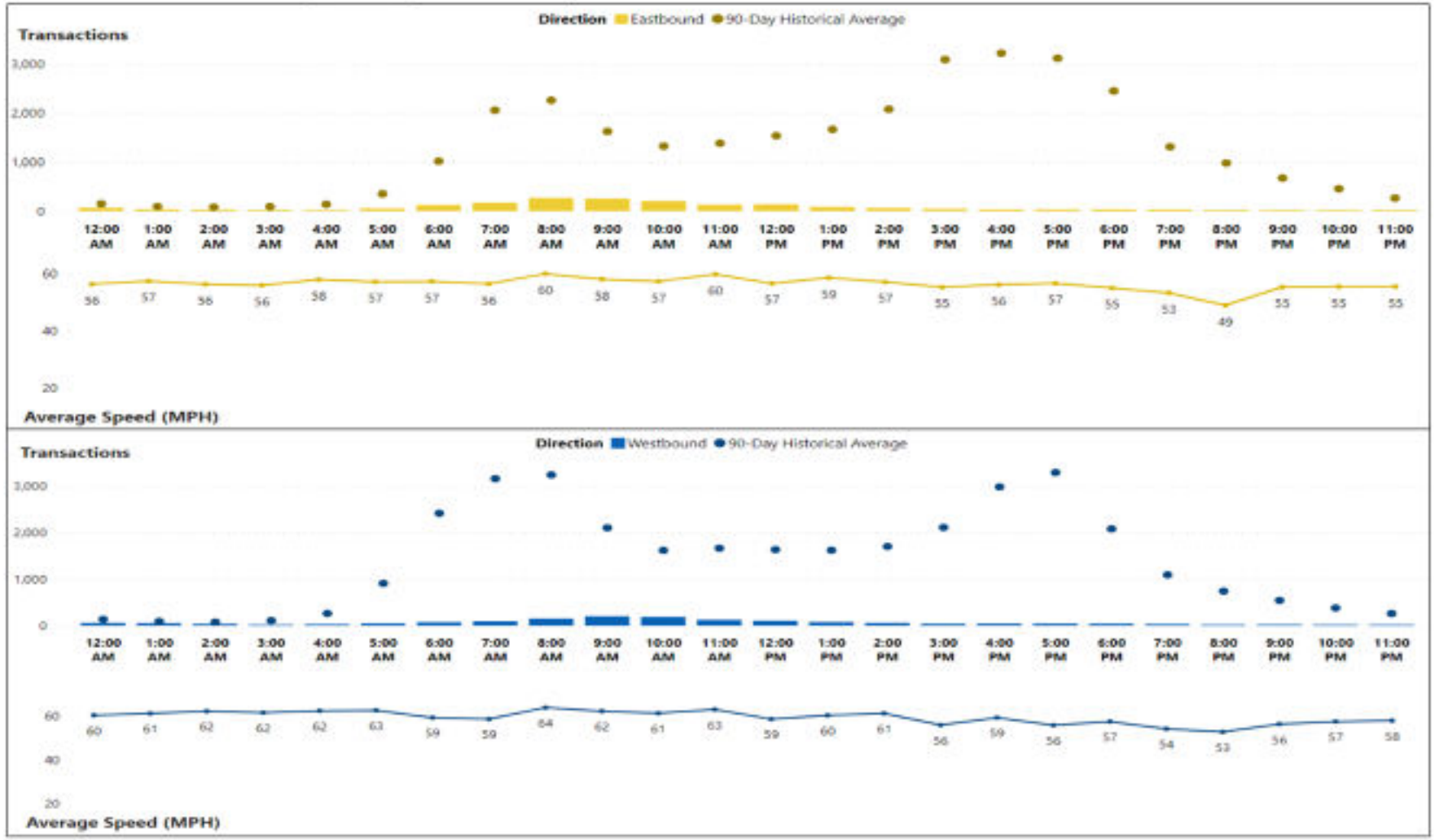
Providing Value for Your Toll Dollar

West Mainline Transactions Hurricane Ian Landfall (Wednesday – 9/28/22)

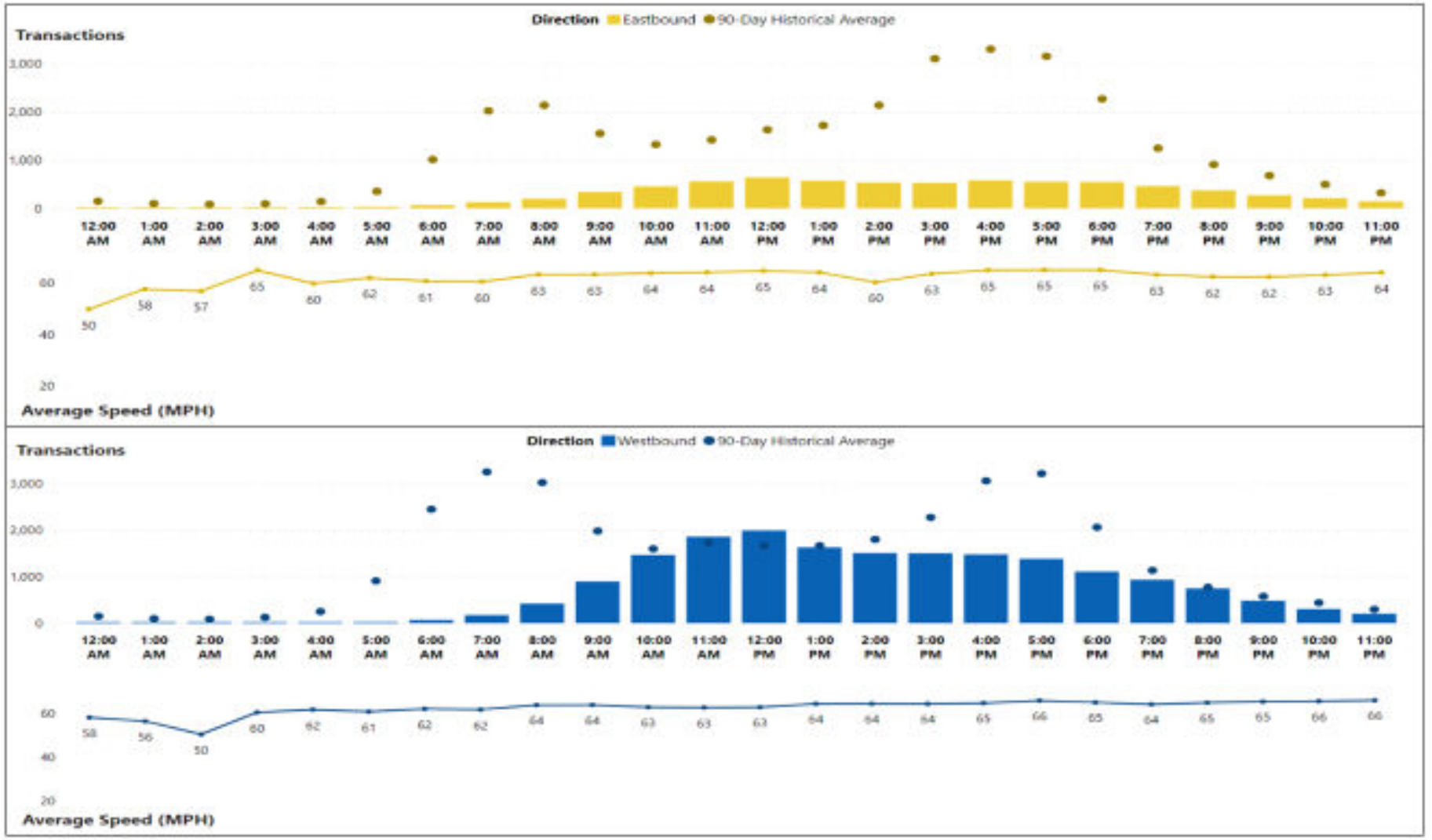
Very few transactions occurring throughout the day



Providing Value for Your Toll Dollar

West Mainline Transactions Post-Hurricane Ian (Thursday – 9/29/22)

Increase in westbound transactions as residents return home



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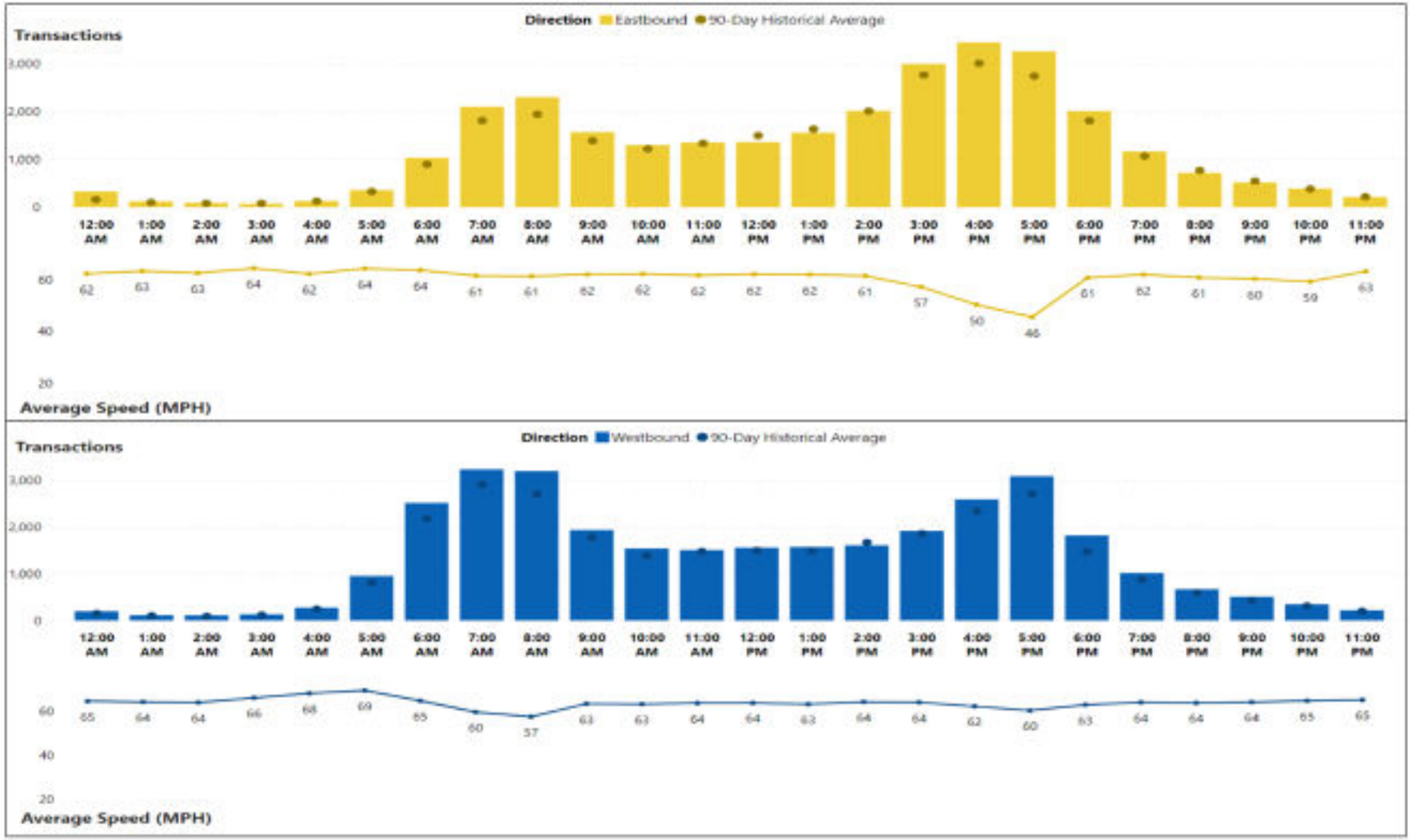
Providing Value for Your Toll Dollar

West Mainline Transactions Post-Hurricane Ian (Monday – 10/3/22)

Transactions resume typical weekday behavior



Moving to the Future

Roadside Toll Collection System (RTCS)

THEA Operational Back Office (OBOS)
System of Record

- License Plate Image Review / Audit
- E-ZPass and Central Hub
- SunPass & Toll-by-Plate Transactions
- THEA Programs CV Pilot Selmon Discount Program
- THEA Collections
- Tax Collector (Registration Holds)
- System Reports & Audit

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Moving to the Future

Moving to the Future

- Cloud based storage and services
- Migration to new vehicle classification system
- Accommodation of National Interoperability
- Reduced toll variance
- Adaptable to future tolling concepts
- Greater flexibility in Commercial Back Office Processing

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National Interoperability

E-ZPass Hub

- Hosted by to be determined
- 29+ member agencies

SE Hub

- Hosted by Florida's Turnpike Enterprise (FTE)
- 12+ agencies

Western Hub

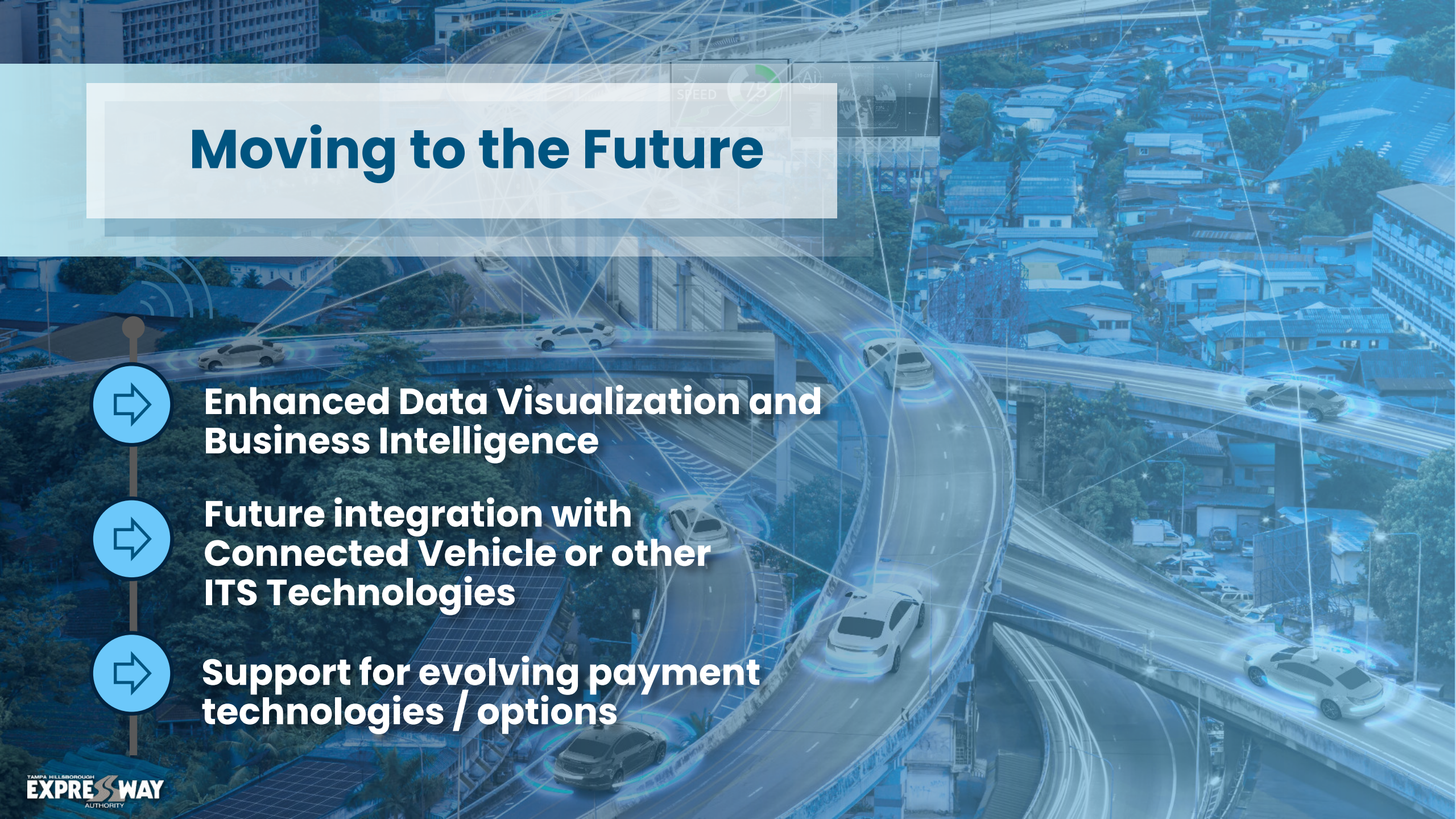
- Hosted by Transportation Corridor Agencies (TCA)
- 13+ agencies

Central Hub

- Hosted by North Texas Tollway Authority (NTTA) and Harris County Toll Road Authority (HCTRA)
- 8+ agencies

Moving to the Future

- Enhanced Data Visualization and Business Intelligence
- Future integration with Connected Vehicle or other ITS Technologies
- Support for evolving payment technologies / options



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Questions?

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THEA's Roadmap to Innovation for Operations

Brian Pickard
Director of Operations and Engineering

Roadmap to Innovation

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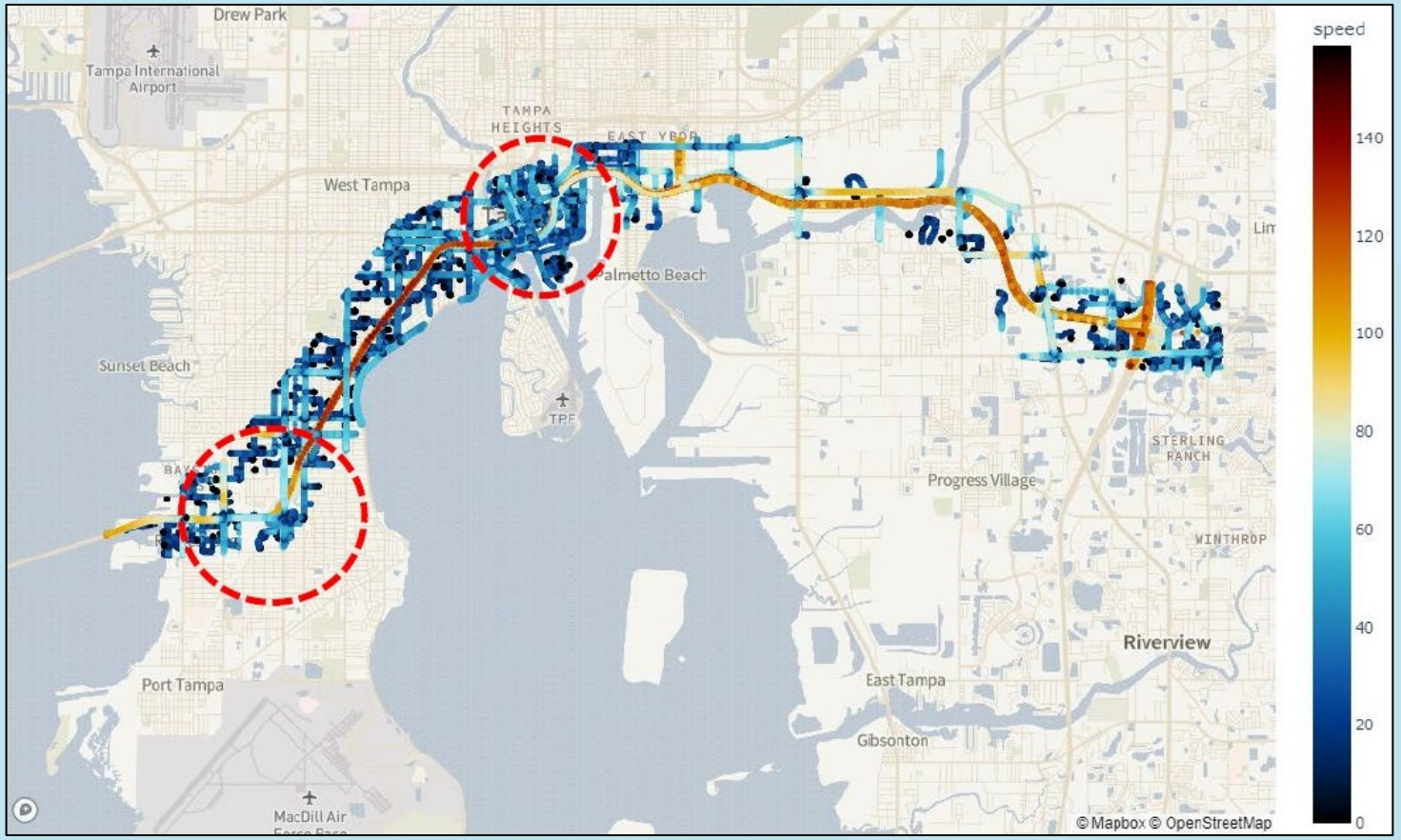
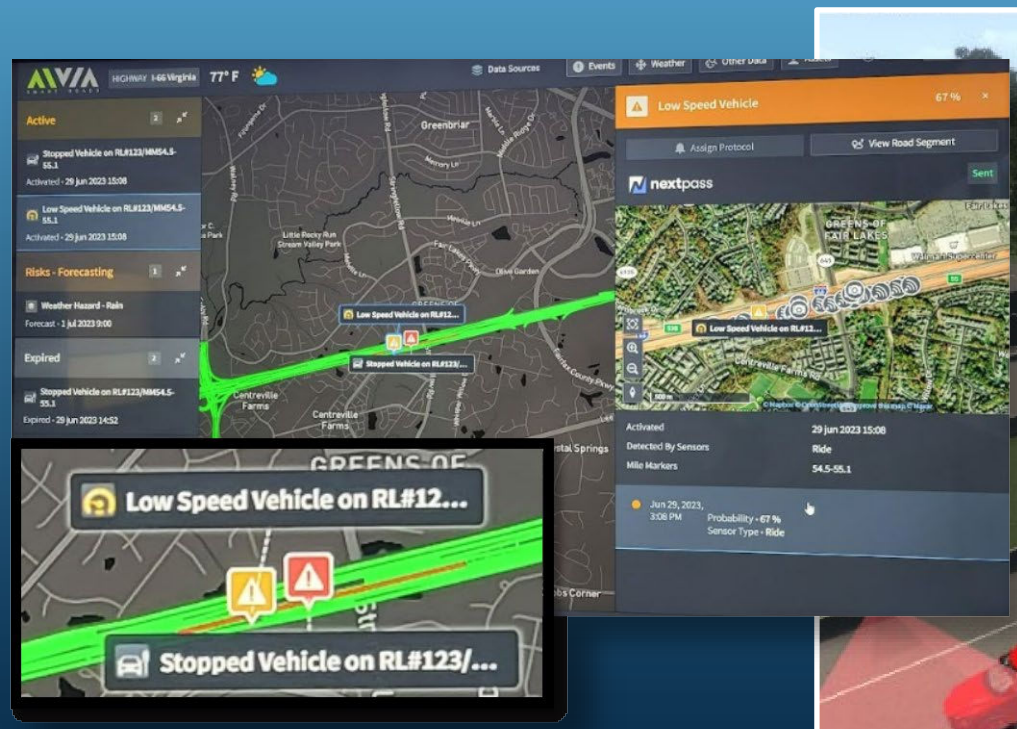
AGENDA

- Connected Vehicle (CV) Data for Incident & Maintenance Management
- 3D Project Delivery
- Smart Work Zones
- Asset Management

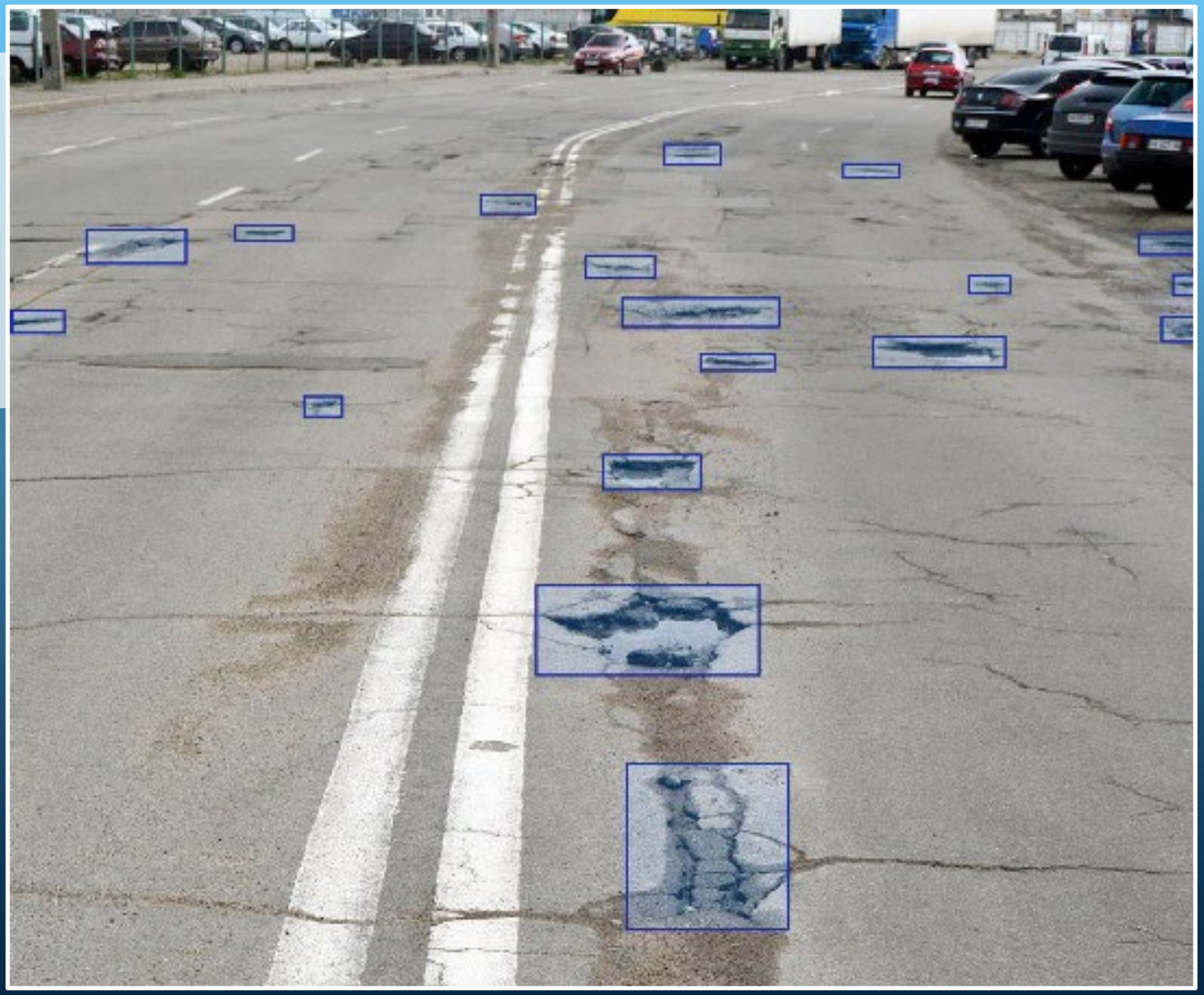
Connected Vehicle (CV) Data for Incident & Maintenance Management



Technology and Asset Maintenance



Technology and Asset Maintenance



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3D Project Delivery

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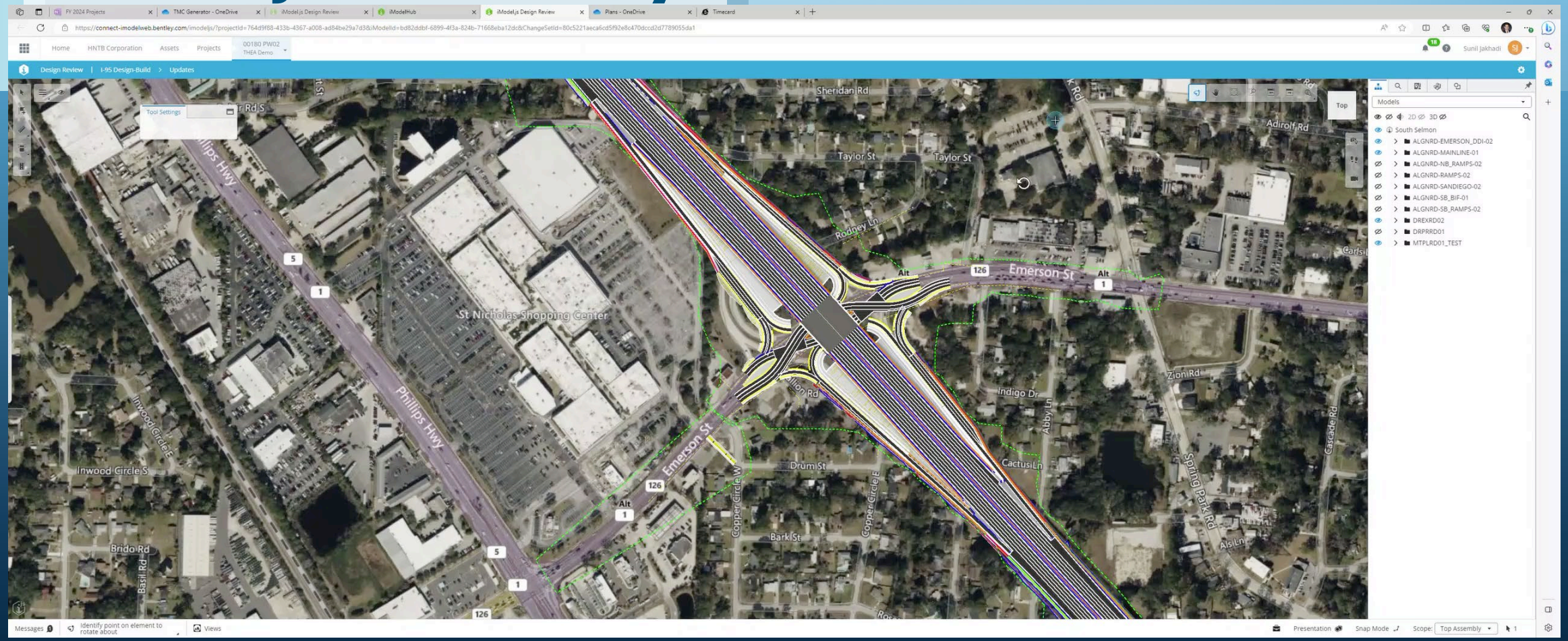
3D Project Delivery



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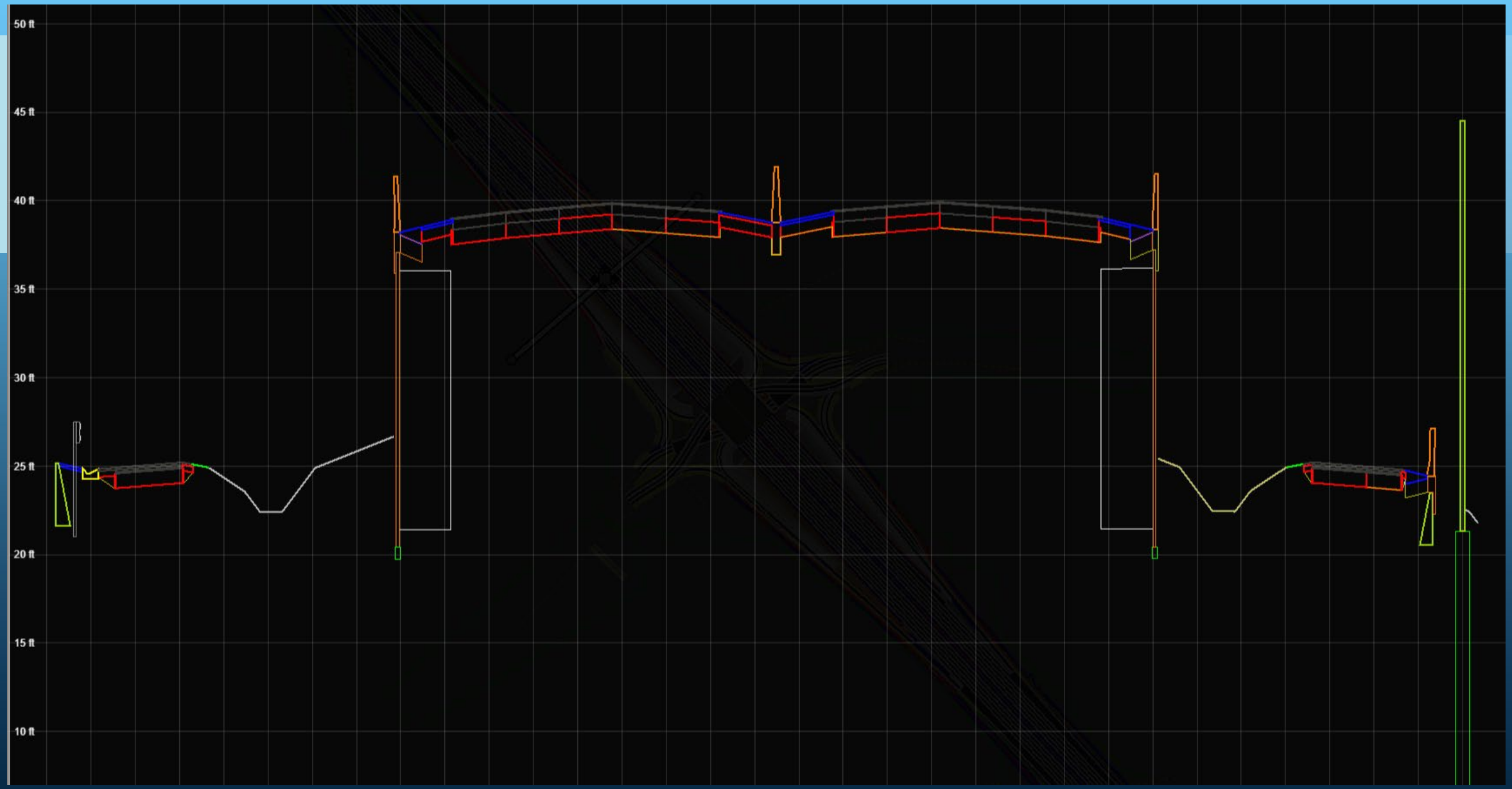

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3D Project Delivery

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Smart Work Zones

SAVE A LIFE
SLOW DOWN
IN WORK ZONES

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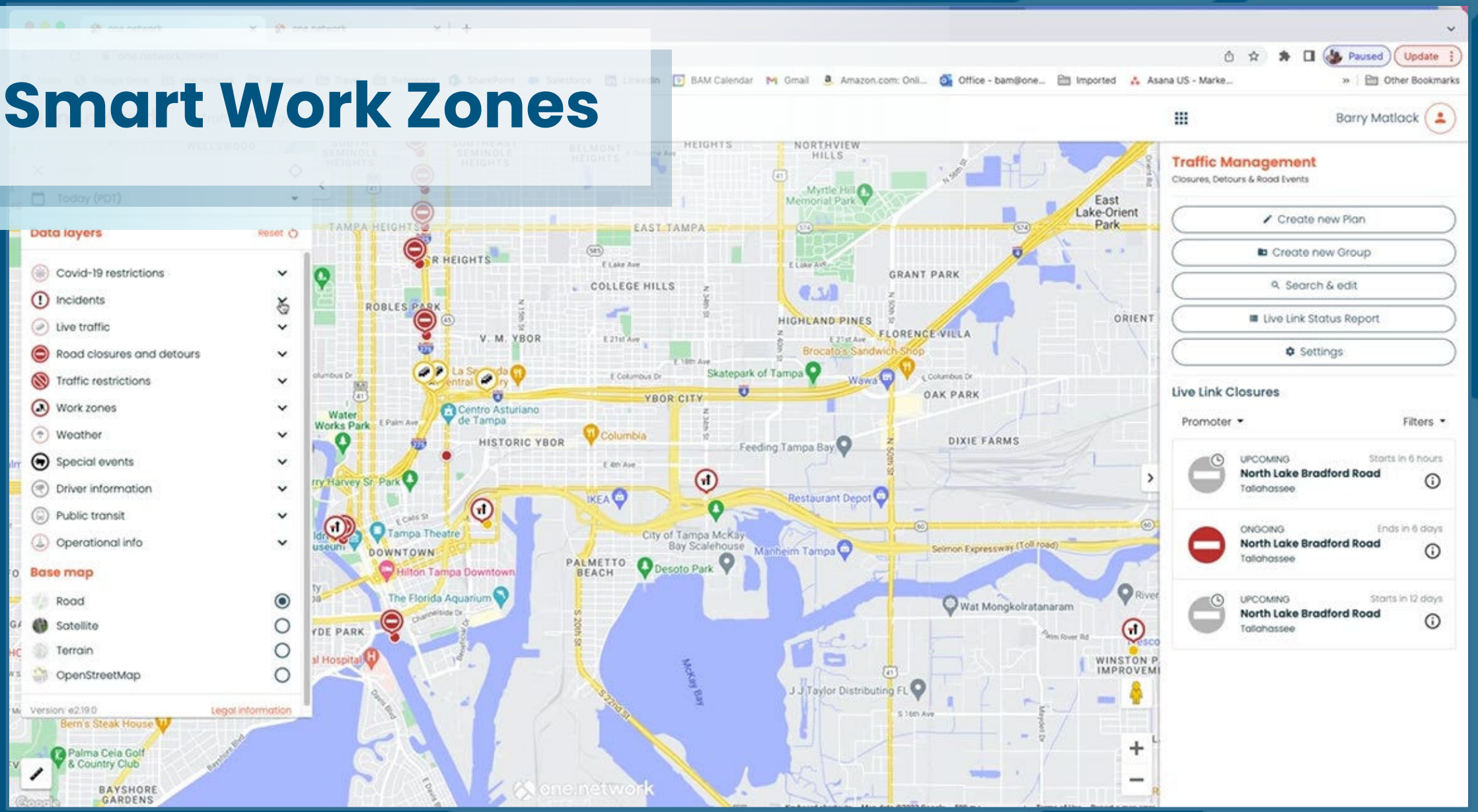
Smart Work Zones



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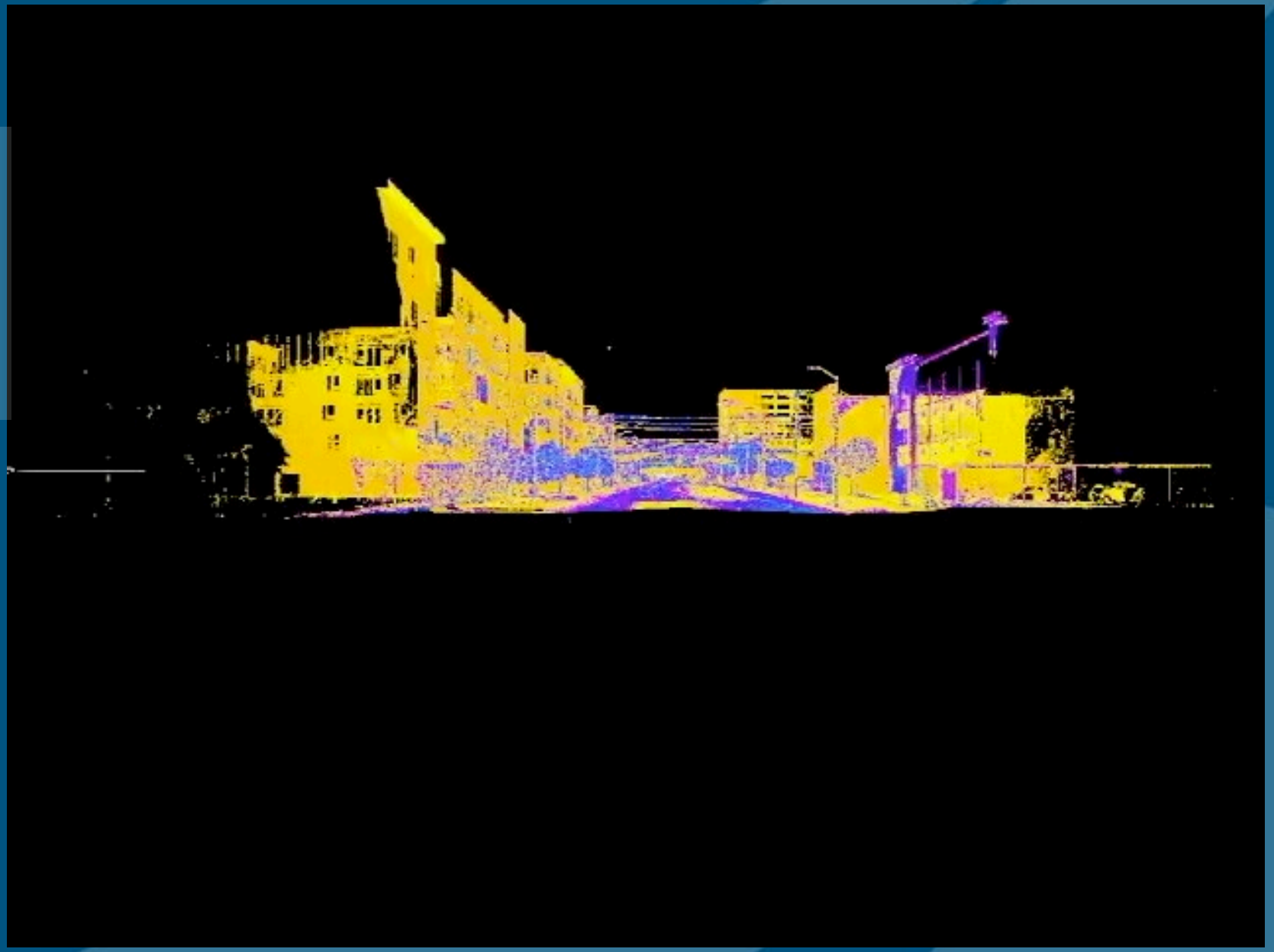
Asset Management



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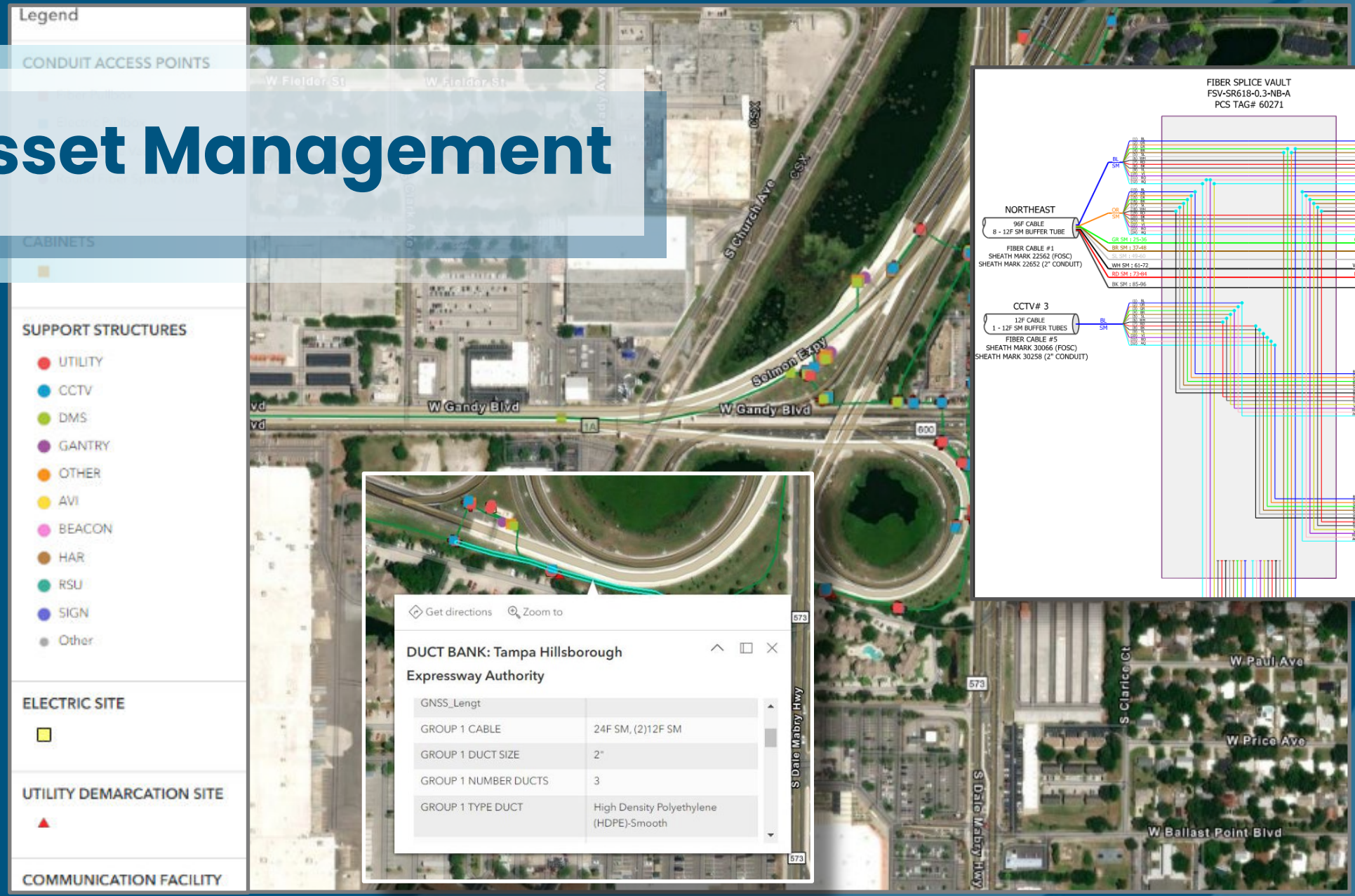
Asset Management



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The Evolution of Data Storage

Questions?