


Greater Houston Freight Committee


January 16, 2025

Regional Collaboration • Transportation Planning • Multimodal Mobility

Houston-Galveston Area Council

Agenda

- **Opening and welcome**
  - Bruce Mann, Port Houston, and Richard Zientek, Union Pacific
- **H-GAC RGMP Project Selection**
  - Vishu Lingala, Manager, H-GAC
- **Self-Driving Trucks Presentation**
  - Daniel Goff, Director of External Affairs, Kodiak Robotics
- **East End District Rail Crossing Improvements Presentation**
  - Jack C. Hanagriff, Manager, Road and Rail Safety Program, East End District
- **RGMP Lessons Learned Workshop**
  - Sydni Ligons, Senior Planner, HGAC
- **Announcements**

Introduction to Kodiak

Autonomous Trucking in Texas

January 16, 2025

Kodiak

Building the world's safest driver.™

Autonomous Tech Solves Trucking's Biggest Pain Points

Traditional Trucking

Preventable Accidents

7 Hours a Day

61,000 Driver Shortage

Significant Emissions

kodiak

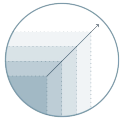
Sources:

[a]MIT Freight Lab: https://ctl.mit.edu/news/latest-us-driver-shortage-requires-long-term-solutions
[b]ATA Driver Shortage Report 2021

kodiakDriver

Increased Safety

All Day

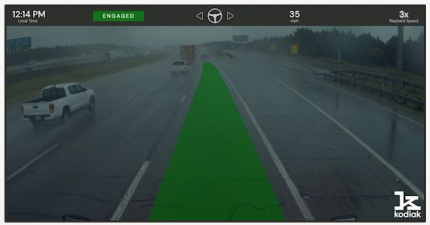


Scalable Capacity

Improved Sustainability

The Kodiak Driver: Cutting edge AI.

40 deep neural networks form a single virtual driver
that operates in various complex environments



Highways

Surface Streets

Industrial

Off-road

Daily autonomous deliveries in Texas and across the South.

Loads Delivered

6,000+

Loads per Week

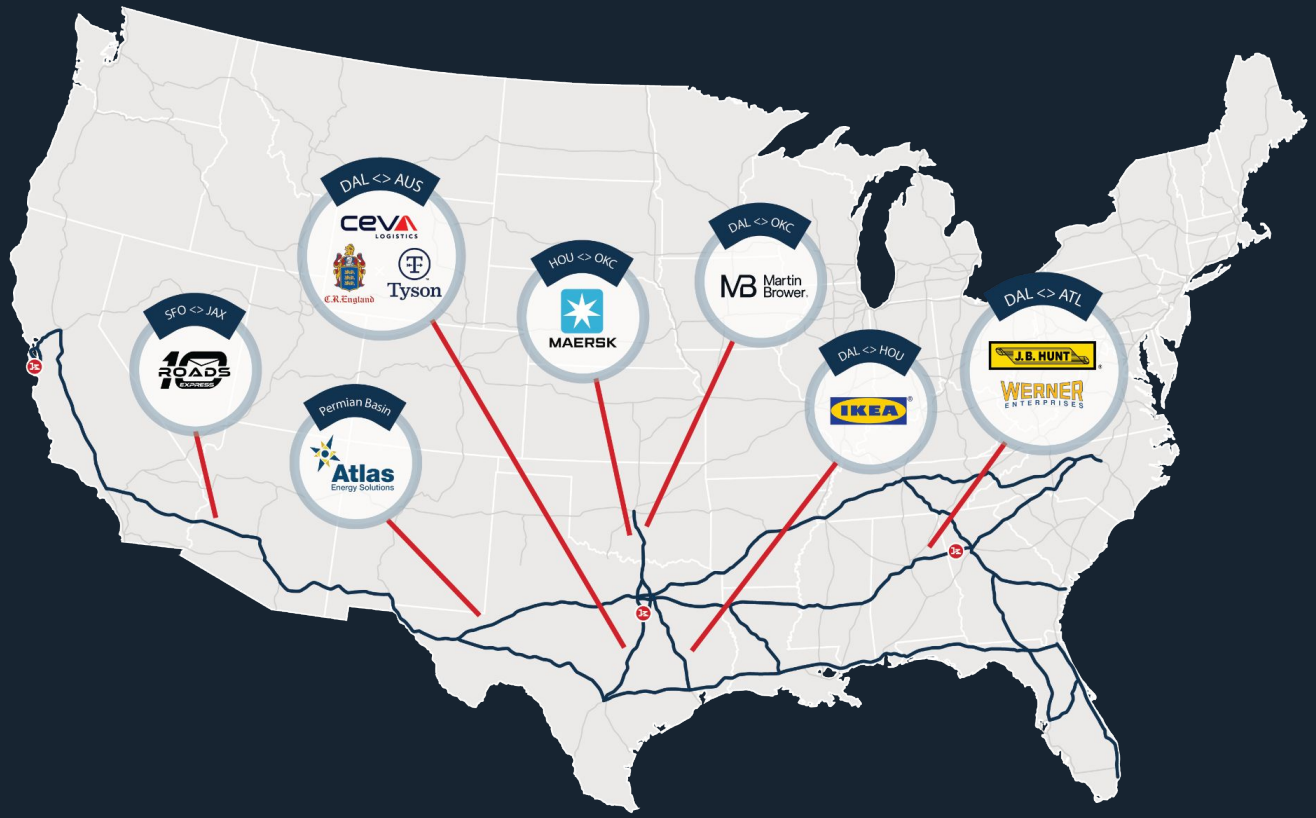
50+

Miles Driven

3.5M+

Operational Miles

20K



kodiak

Launching in the Permian Basin

Sand Hauling

Specialized trucking that delivers large amounts of sand to hydrofracking wellsites

Why Sand?

- Great Product Market Fit
- Large & growing market
- High Margins

Strong Technology Fit

- Driverless-ready
- Private roads
- Isolated locations
- Low speed (15mph)
- No warning triangles

Partnering with Textron Systems

Kodiak's Core Value: Safety First and Always!

Safety First and Always

Pillars of Kodiak's Safety Case Framework

<u>Top Safety Claim:</u> The Kodiak Driver is acceptably safe (free from unreasonable risk of harm to humans) to operate within our ODD.

Safety Culture & SMS

Implementing the four pillars of SMS

Safety culture to facilitate feedback from all employees

Continually strengthen the way safety is perceived, valued, and prioritized internally.

Engineered to Drive Safely

Safe nominal behavior

Safe faulted behavior

Extensive design, analysis, verification, and validation

Vehicle regulatory compliance

Manufacturing and Quality

Implementing quality management system

Manufacturing control processes for upfit and commissioning vehicles

Supplier quality management

Design for manufacturing

Operationally Safe

Driver selection, training, monitoring, HMI, and regulatory compliance

Calibration, inspection, and maintenance processes

Grounding and incident response processes

24/7 asset monitoring

Vigilant on Cyber Security

Secure on-board infrastructure

Secure off-board cloud infrastructure

Secure all communications to/from fleet

Field Monitoring & Continuous Improvement

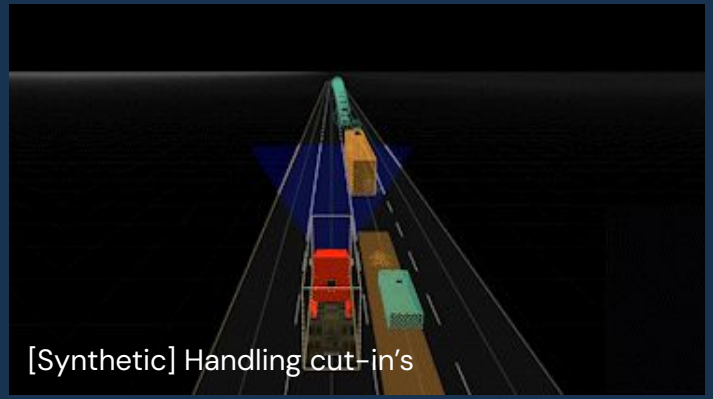
Daily software releases tested in simulation and structured testing

Data pipeline to monitor field performance

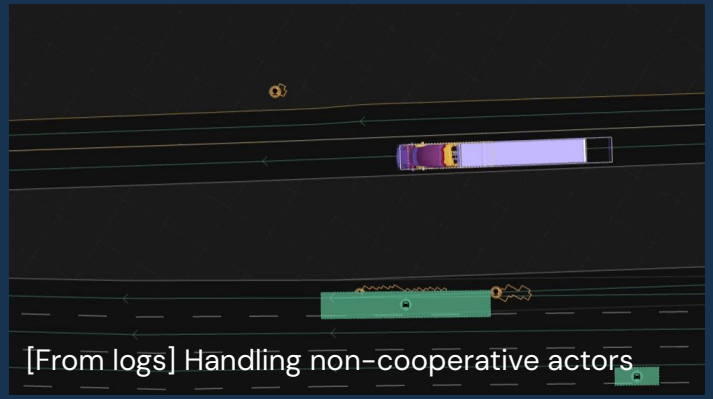
Regular assessment of risk and timeliness of corrective actions

Simulating AV Behavior – Evidence

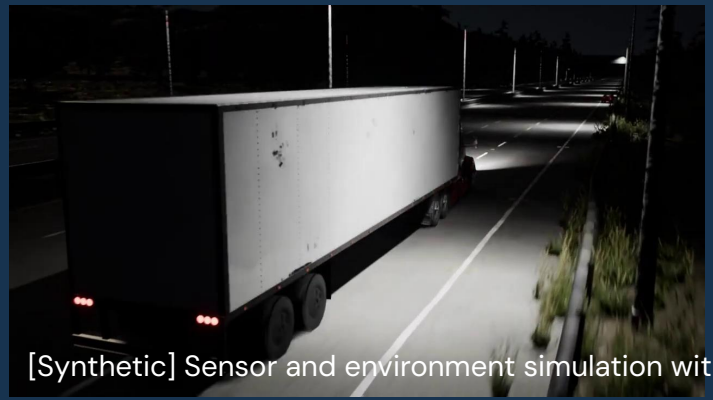
We use statistical analysis to assess the truck's behavior in 10,000s of scenarios



[Synthetic] Handling cut-in's

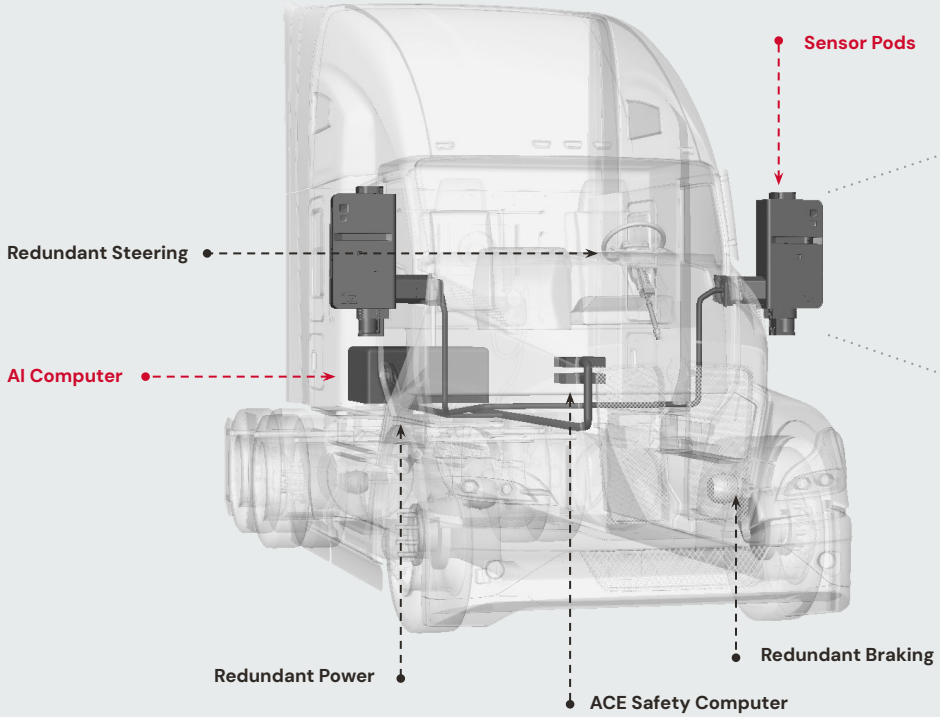


[From logs] Handling non-cooperative actors



[Synthetic] Sensor and environment simulation with full rendering engine

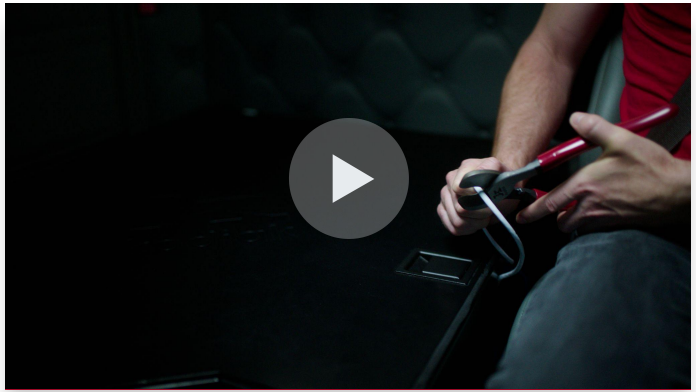
Built on driverless-ready modular hardware.



Sensing + Thinking Safety + Redundancy

Safety Always

Fallback: Coming to a Safe Stop, Every Time



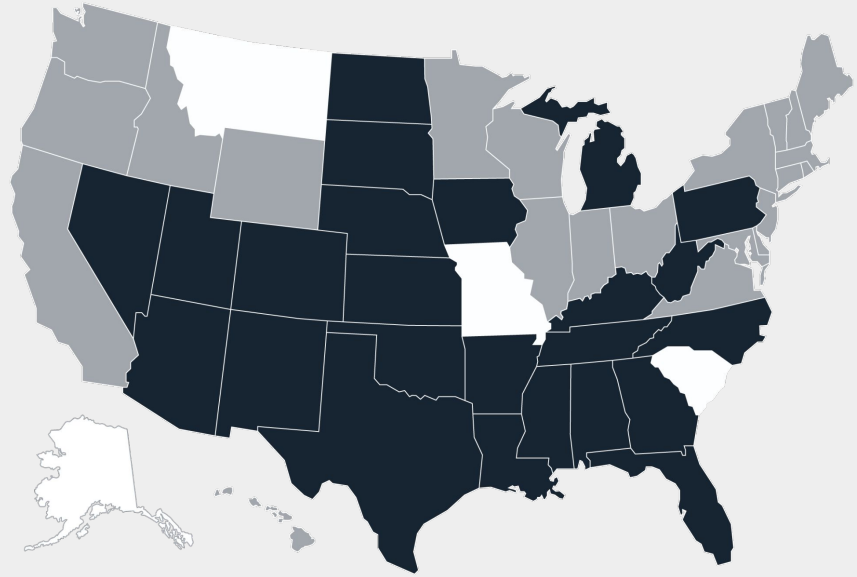
- Kodiak was the first AV trucking company to demonstrate fallbacks on public roads
- The kodiak*Driver* checks for 1,000+ fault conditions, 10 times a second
- The system always plans ahead, creating a new fallback plan every cycle

"But can you handle a blown tire?"

Prepared for the most dangerous situations

- Kodiak was the first AV trucking company to demonstrate a safe response to a catastrophic tire blowout.
- The kodiak*Driver* can maintain precise control of a truck even after a steer tire blows
- This demonstration gives confidence in how the system behaves in even the most difficult scenarios

Supportive State regulatory environment enables expansion.



Driverless Ready
States with lawful driverless deployment

Testing Ready
States enabling driver-in testing

No explicit AV policy
States without AV policies

Half of all states have AV laws in place

25 states have passed legislation allowing for driverless deployment, while most of the others allow for driver-in AV testing. The I-10, I-20, and I-40 corridors all enable driverless deployment.

Driver-in bills have stalled

Teamster efforts to pass “driver-in mandate” bills received zero traction in Delaware, Florida, Illinois, Indiana, Massachusetts, Nebraska, New Mexico, and Texas. In California, Gov. Newsom has twice vetoed teamster-backed driver-in bills.

Texas considers updated legislation

In response to 2023’s Cruise issue, Texas is considering updated AV legislation that would give the state DMV the authority to order AV developers to cease operations.

Enhanced Inspections: Partnering with Law Enforcement

Kodiak led industry efforts to to develop a framework for AV truck inspections and enforcement, allowing us to bypass weigh stations.

- Traditional commercial vehicle enforcement mostly occurs at **roadside weigh stations**: AV trucks cannot comply with roadside inspection regimes.
- Kodiak led industry efforts to develop **Enhanced Inspections** – a new **inspections framework** specific to **AV trucks**.
- CVSA approved Enhanced Inspections in 2022, creating a path for **AV truck deployment**.
- Kodiak is **piloting Enhanced Inspections with Texas DPS**, and **USDOT is drafting rules** that will likely adopt the Enhanced Inspections standard.

CVSA Launches Enhanced Inspection Program for Autonomous Trucks

October 5, 2022 • By David Cullen •


12:14 PM
ENGAGED
35
3x
kodiak


1:01 PM PST
ENGAGED
15
10x
kodiak


4:11 AM
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61
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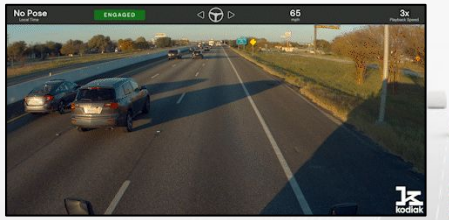
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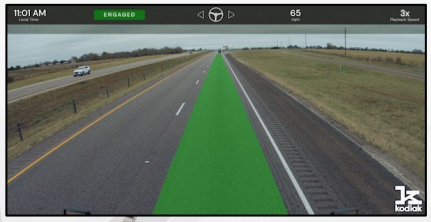
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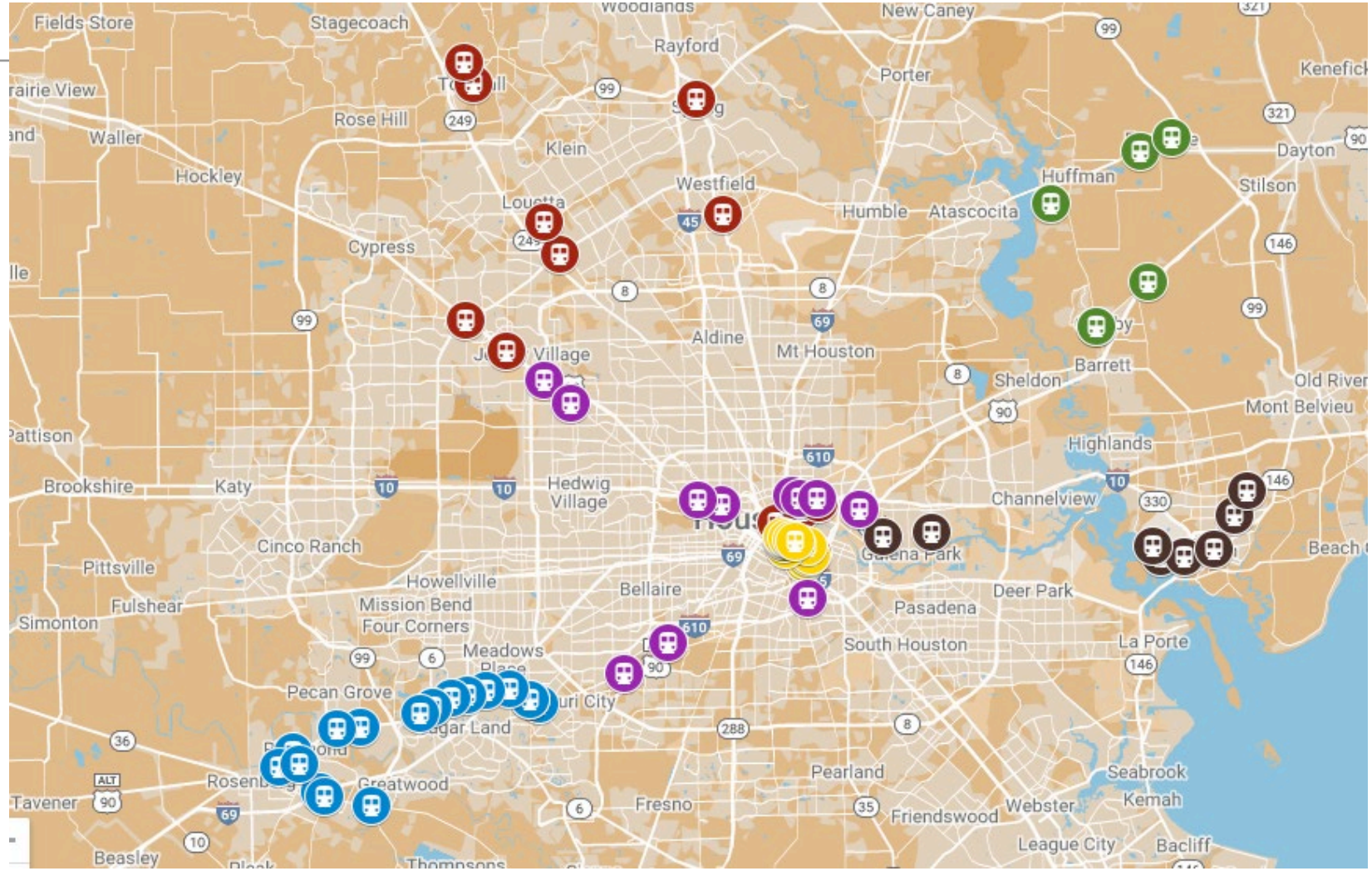
Transportation System Initiatives

Veronica Chapa Gorczynski
President
East End District

Jack C. Hanagriff, Manager
Road & Rail Safety Program
East End District

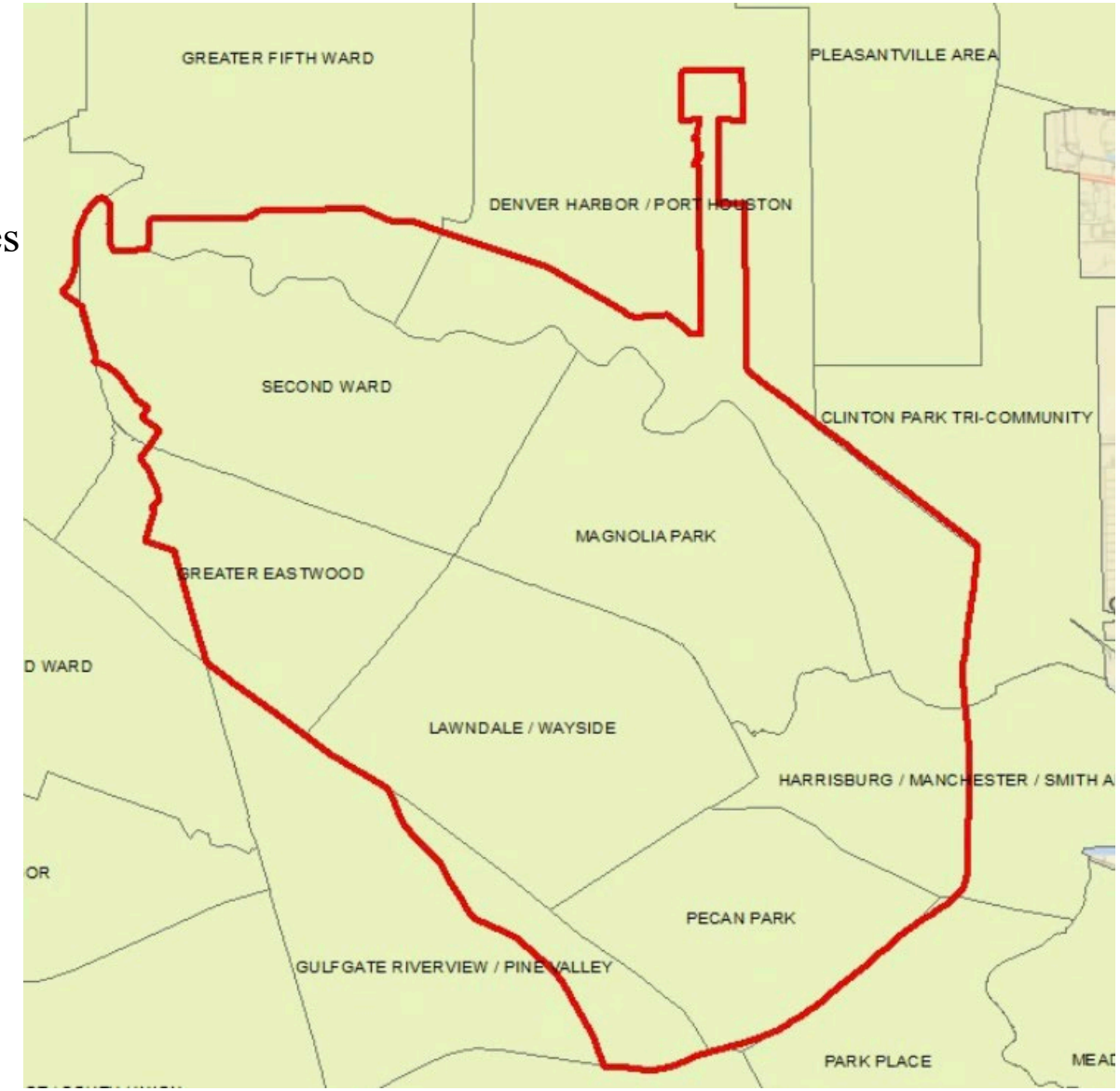
Regional Critical Crossings

- Delay First Responders
- Delay Vehicle, Pedestrian, Bicycle
- Affect Essential Services



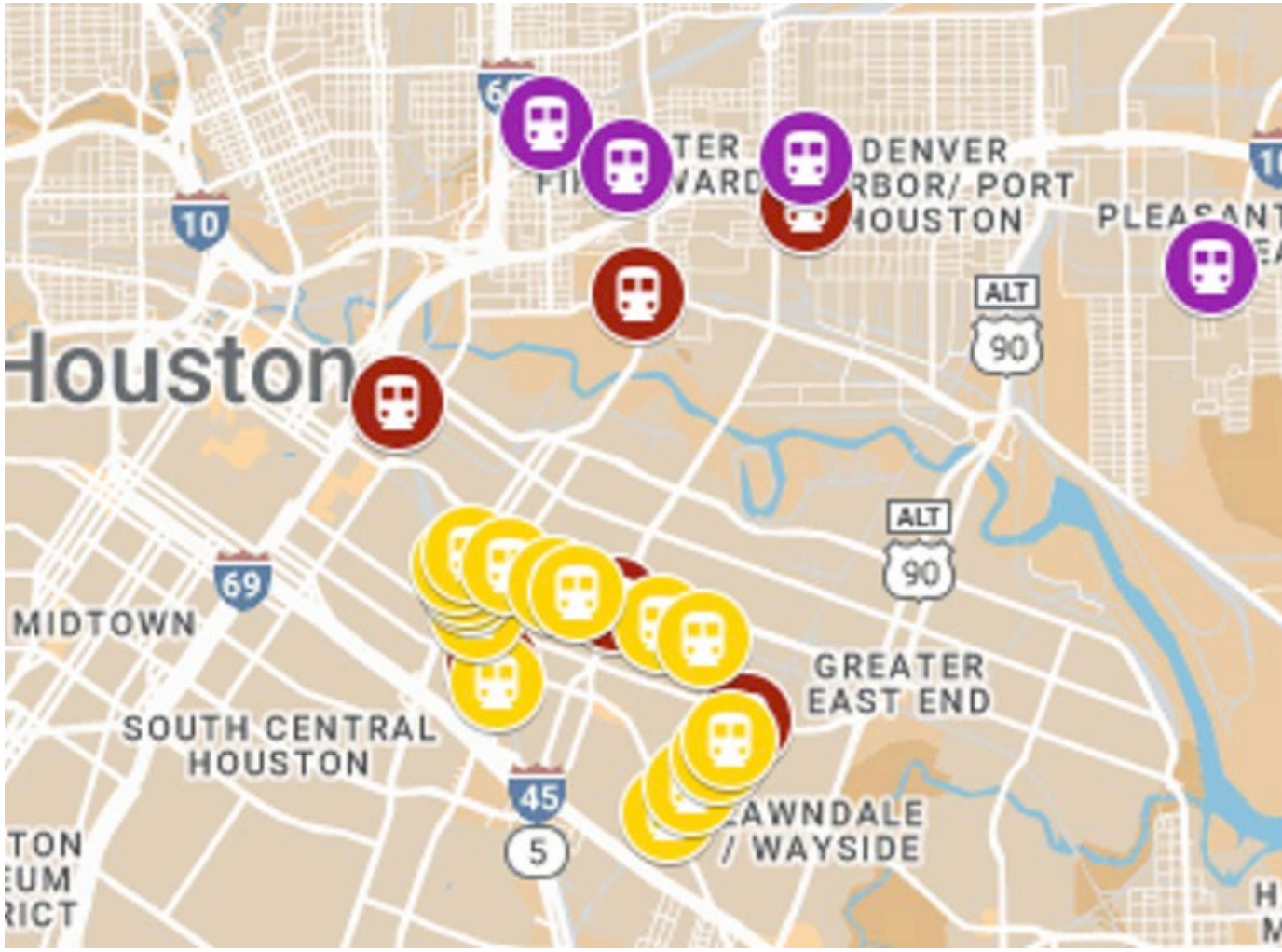
East End District

- Special District under the State of Texas to provide services for community safety, improvements, and sustainment
- 16 Square miles just East of Downtown Houston
- 80,000 Residence
- 3,500 Businesses



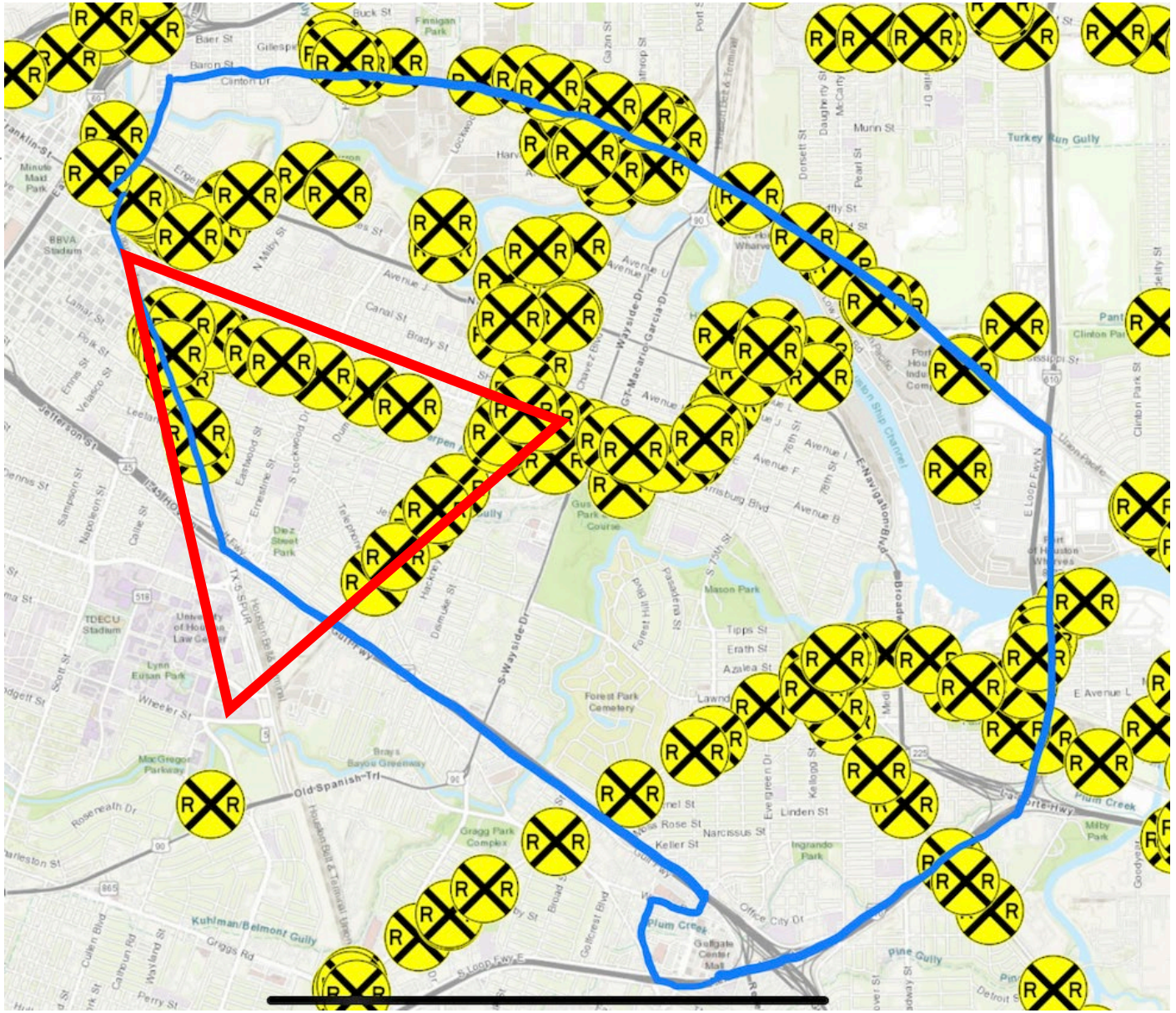
EED Critical Crossings

- Nationally- Top 12 of the Most Reported Blocked Crossings
- 15 of Houston's Critical Crossing List
- Most reported blocked crossings in the Nation



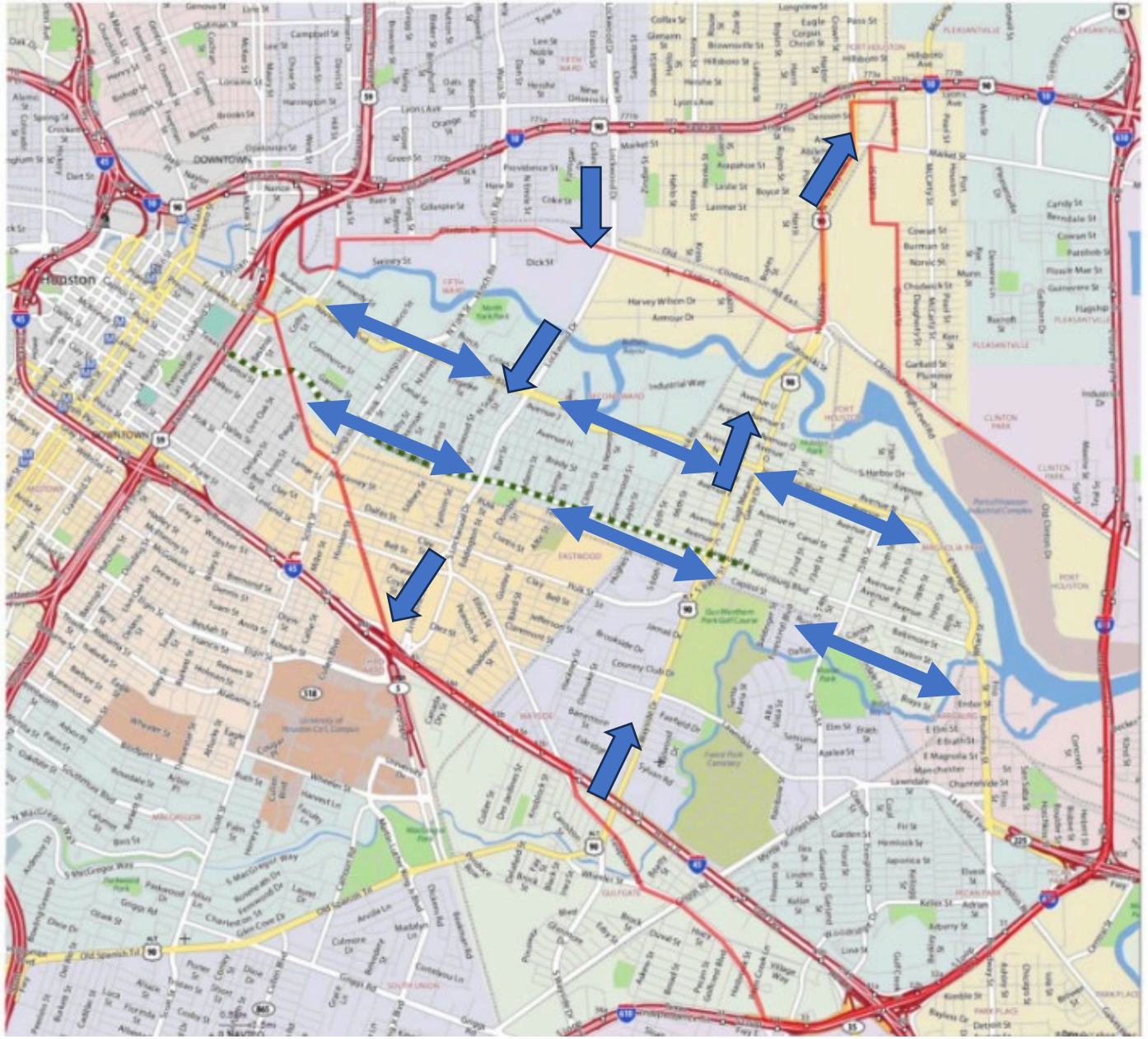
Railroad Commodity Flow

- 115 Railroad Crossings
- Four Railroads Operate in this area
- Part of two Gulf Coast Commodity Flows (BNSF & UPRR)
- Train Triangle



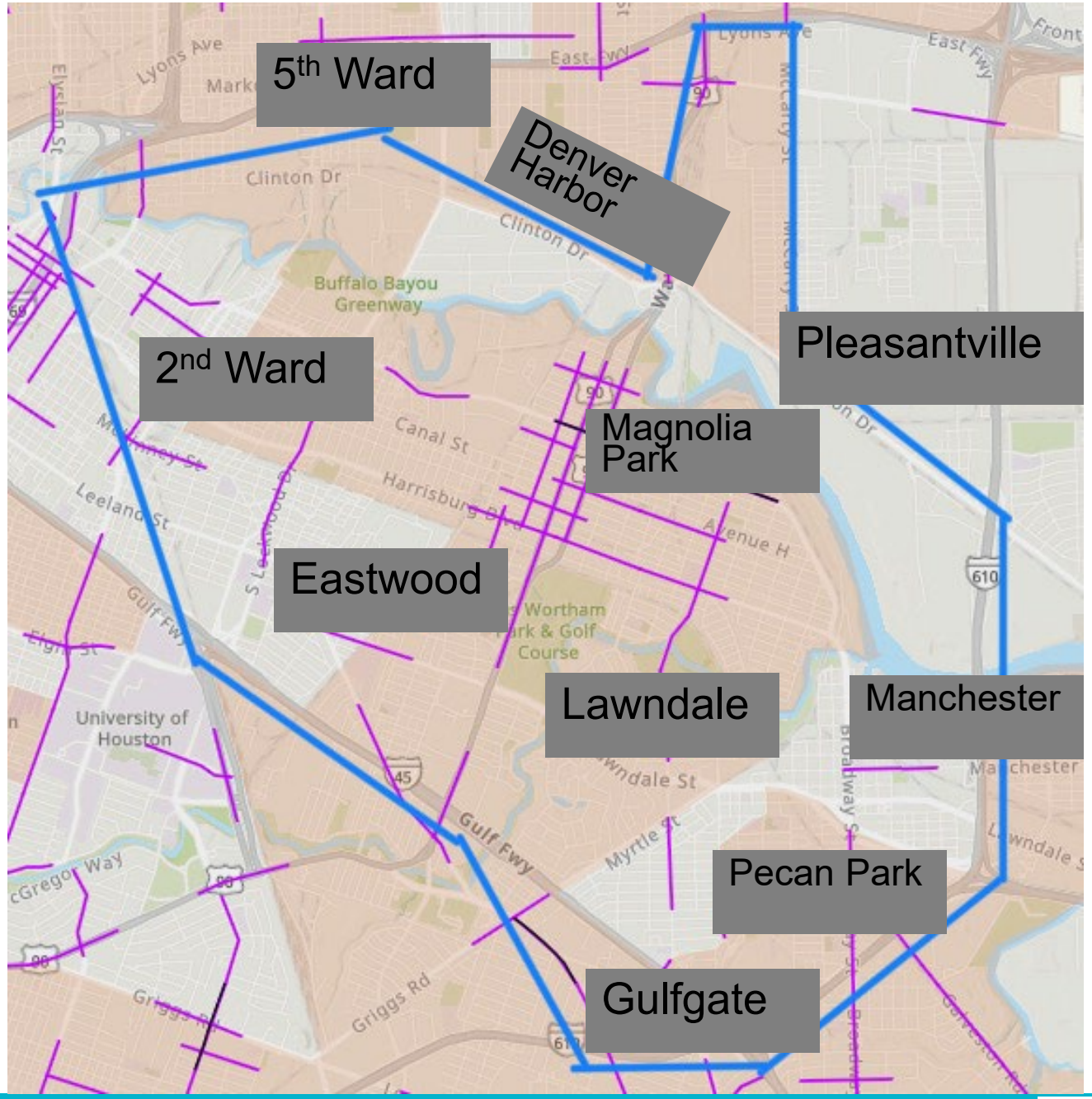
Through Put

- Traffic will cut through the District to avoid congestion
- Congestion = Surge = Risk



EED Injury Network

The High Injury Network (HIN) represents 9% of Houston streets which account for 58% of traffic deaths and serious injuries



Transportation Safety Initiatives 2022 - 2028

A collaborated effort with transportation safety organizations and academia to implement a road and rail safety awareness strategy for the East Houston Area

- Develop a Safety Action Plan
- Analyze Transportation System
- Safe Road Technology Study
- Conduct Feasibility studies to identify treatments to reduce crashes
- Develop a Web Based Community Dashboard
- Study Business Impacts caused by congestion
- Conduct Feasibility Studies

FY22 Safe Streets For All

The East End District received $600,000 from the Federal Highway Administration to conduct a two-year planning effort on Transportation Safety in Houston's East End. The goal is to develop a comprehensive strategy focusing on public safety, quality of life, and mobility.

- Community Engagement
- Safer People
- Safer Roads
- Safer Vehicles
- Safer Speeds
- Post Crash Care
- Equity & Transparency

Community Engagement

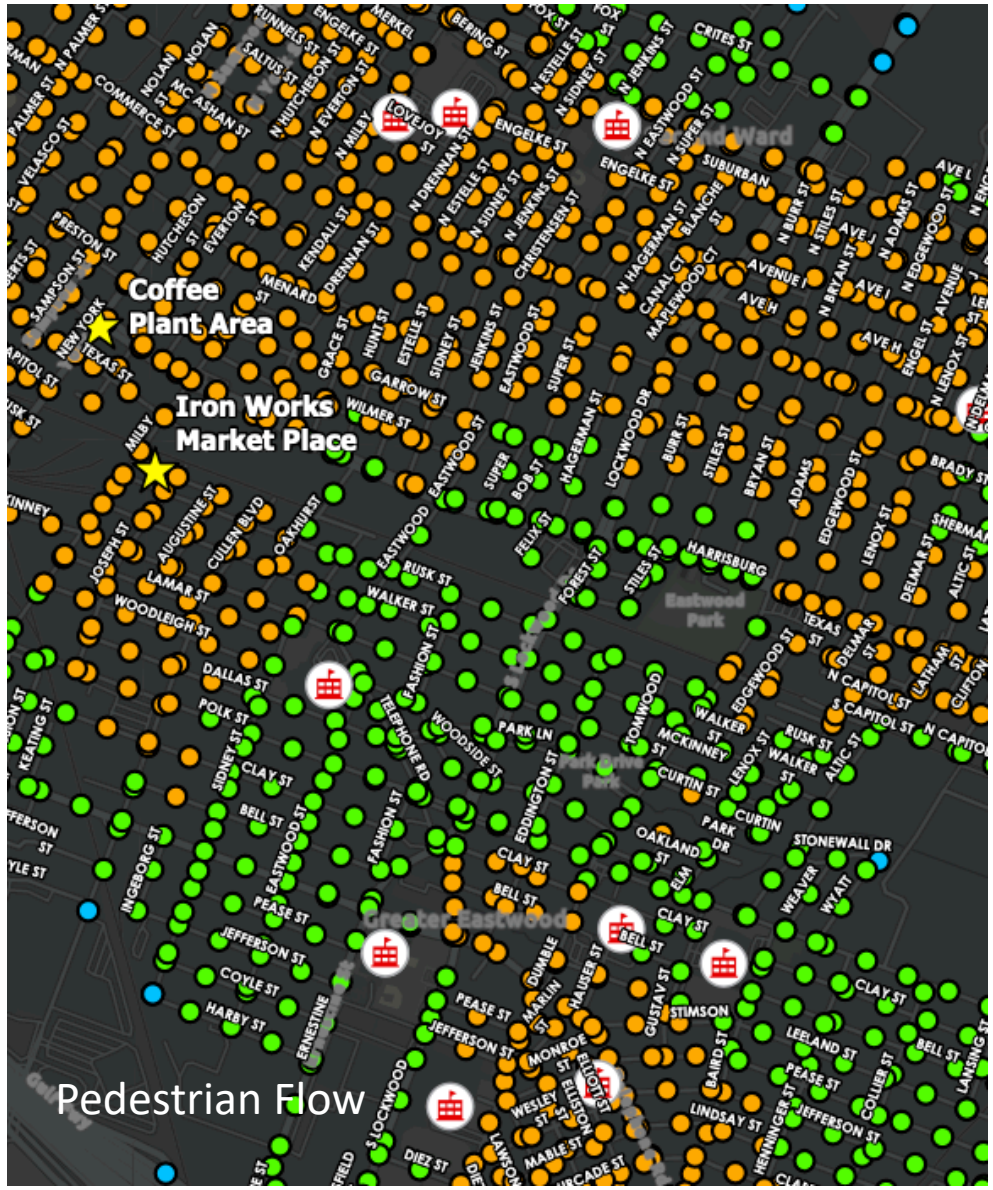
- Rail Corridor Collaborative
- Technical Advisory Group – assisting in the development of a Safety Action Plan
- Pedestrian Safety Group – identify access and pedestrian hazards in the EED
- Rail Safety Task Force – communicate as “one voice” on railroad safety concerns
- Bicycle and Trails Advocacy Group – support the creation of better bicycle access
- Community Dashboard in 2026 – web-based portal to communicate and receive data on transportation safety

US Road Assessment Program

A collaborative effort with the Roadway Safety Foundation and Iowa State University to assess the 300 consecutive miles of primary and secondary roads in the District.

This process of using innovative and proactive toll will assist in generating data-driven solutions for reducing hazards and crashes throughout the entire East End District.

- Analyzed 300 consecutive miles of primary and secondary roads
- Proactive risk assessment: Using video data and predictive risk models developed through decades of global research, usRAP allows transportation departments to focus

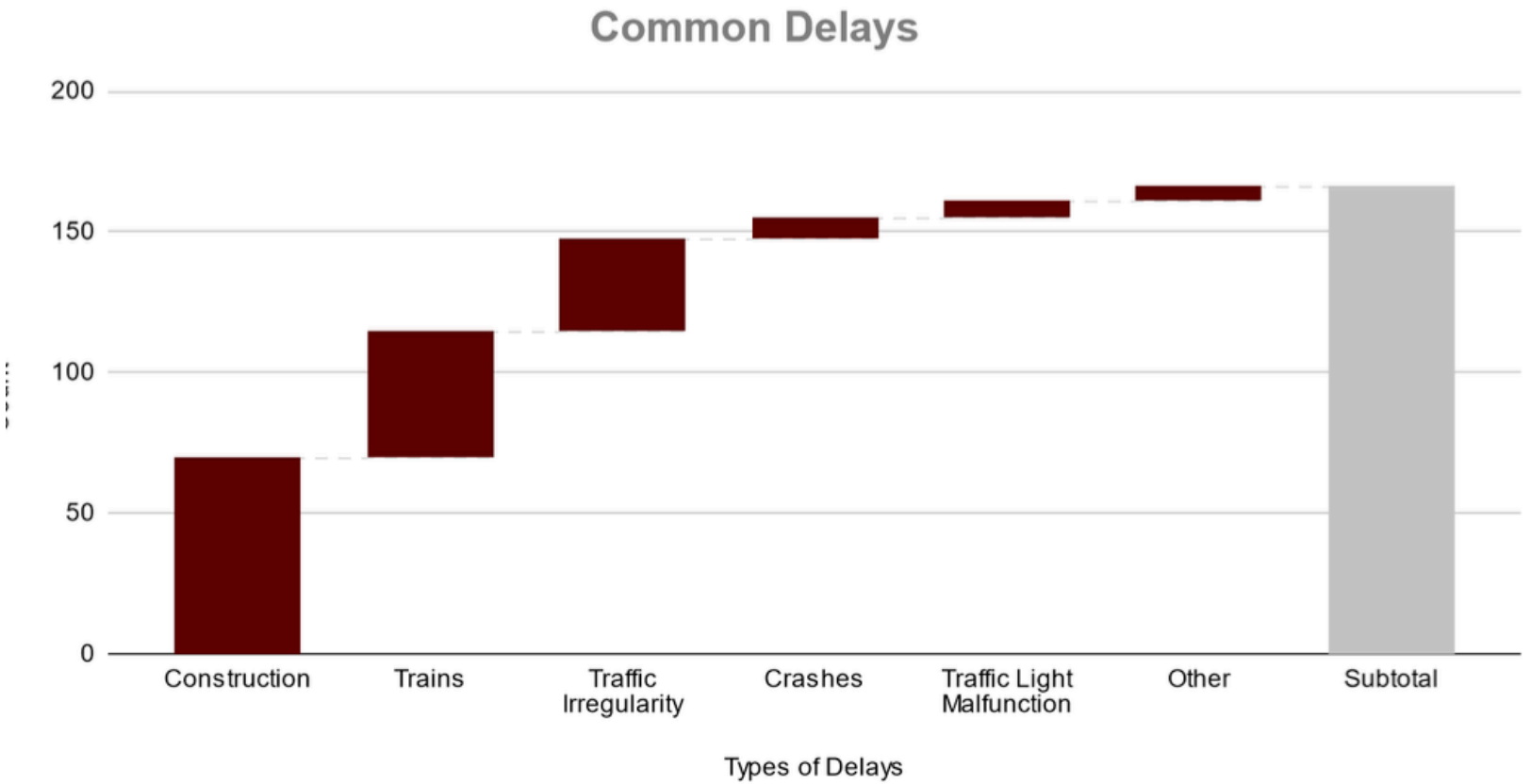


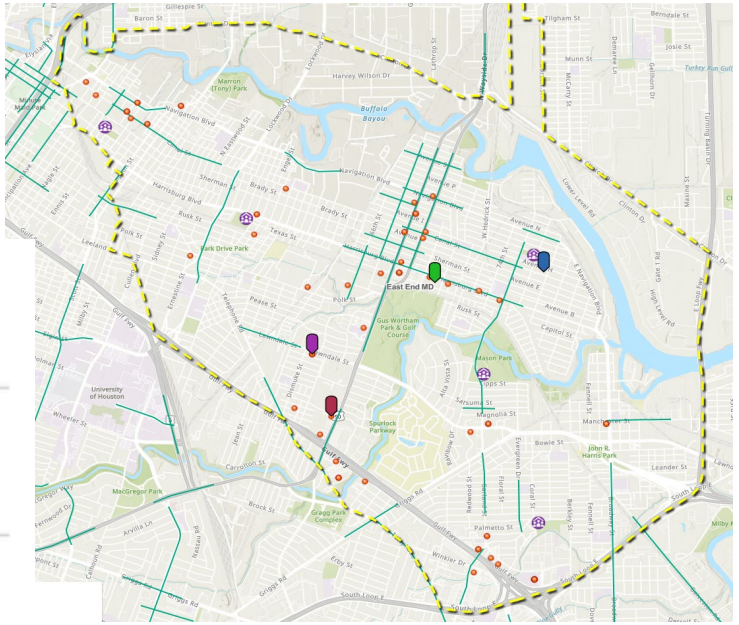
Safer People

Implement a series of assessments, studies, and programs to improve transportation system to support a healthier and safer lifestyle.

- Park Rx
- Traffic Conflict Tool Kit
- Star Rating for Schools
- Walk Audit
- Smart Lighting Assessment in 2025

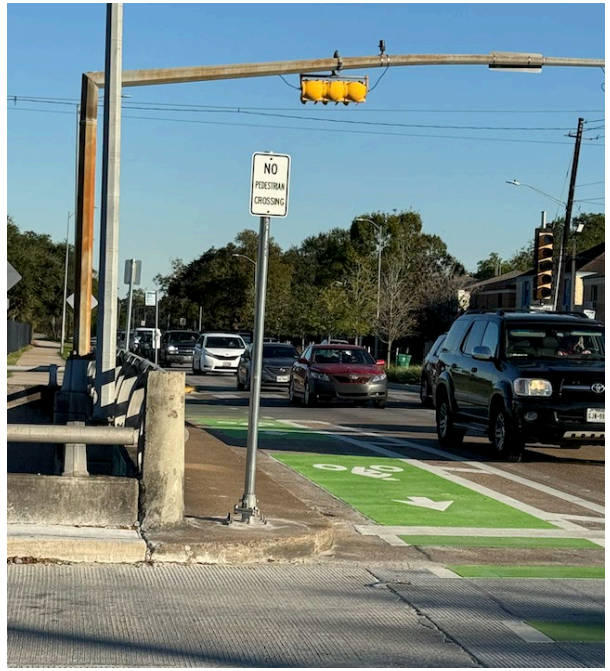
Safe Route to Clinic Study

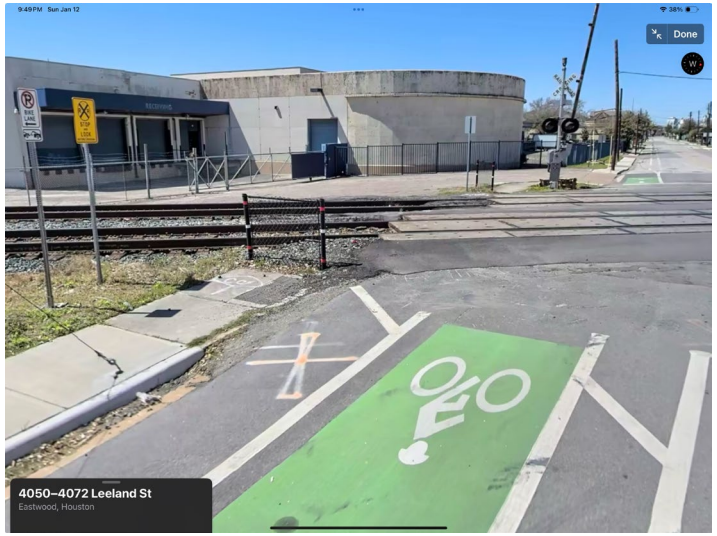




Traffic Conflict Toolkit

- Improve road safety by holistically analyzing conflict between vehicle, pedestrian, cyclist, and train
- Use analysis-based methodology to review crash data, traffic patterns, interview the community and conduct site observations.
- Recommend both quick treatments and long-term solutions to reduce crash





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Texas A&M Chapter

EAST END DISTRICT

Pedestrian Safety

		Apr-24	24-May	24-Jun	24-Jul	20-Aug	24-Sep	24-Oct	"Nov 2024
location	Street								
859527H	Altic St		1	20	2		1	1	10
288221A	Cullen blvd	9	15	21	8	3	7	2	7
859524M	Dumble st	6	3	21	8		2	2	9
859522Y	Eastwood	16		27	6	8	3	3	8
755640L	Hirsch	1		14	5	3	2		
288224V	Leeland St	10	13	23	8	4	7	3	7
859523F	Lockwood St	8	3	26	12		5	2	10
288227R	McKinney St	9	12	17	6	3	5	3	7
859518J	Milby St	2		20	3		2		12
288227R	Milby St			2					
288226J	Milby St	4	9	19	6	3	8	3	6
859521S	Oakhurst St	7		21	5		3	1	9
859519R	Sampson St			2					6
859516V	Sampson St	4		13			2		2
288229E	Sampson St	3	9	17	8	1	3	2	
758545B	Silver St	4			8	3			3
288228X	York St	4	8	17	7	1	3	2	6
859517C	York St	4		13	1		2		2

Hobby School Capstone

HOBBY SCHOOL OF PUBLIC AFFAIRS UNIVERSITY of HOUSTON

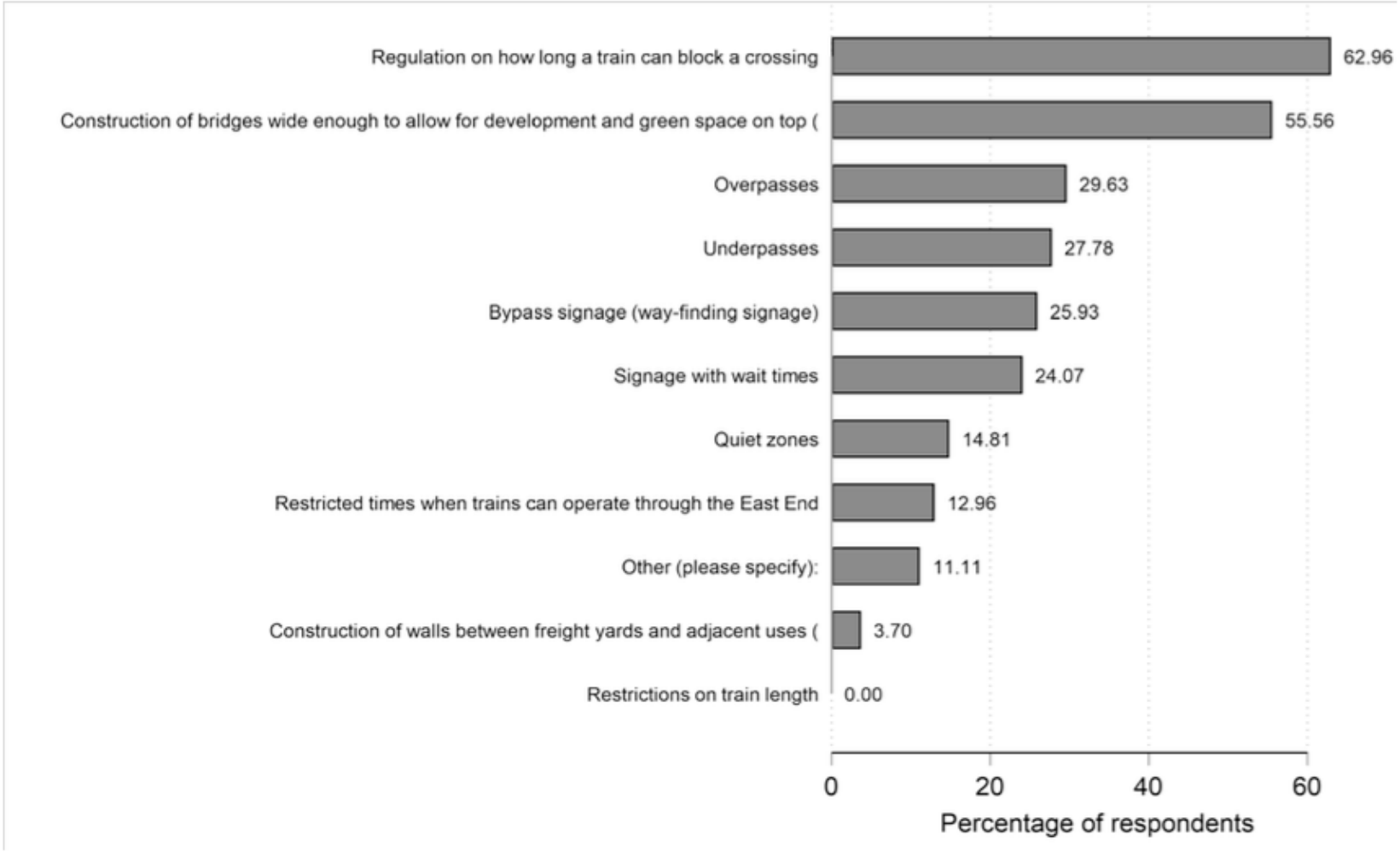
Railroad Impact Study

- Compile transportation data related to crossing delays
- Analyze emergency service data impacted by train operations
- Evaluate business and residential concerns related to delays caused by trains
- Illustrate how a single event affects multiple modes of transportation

High Injury Roadway Analysis

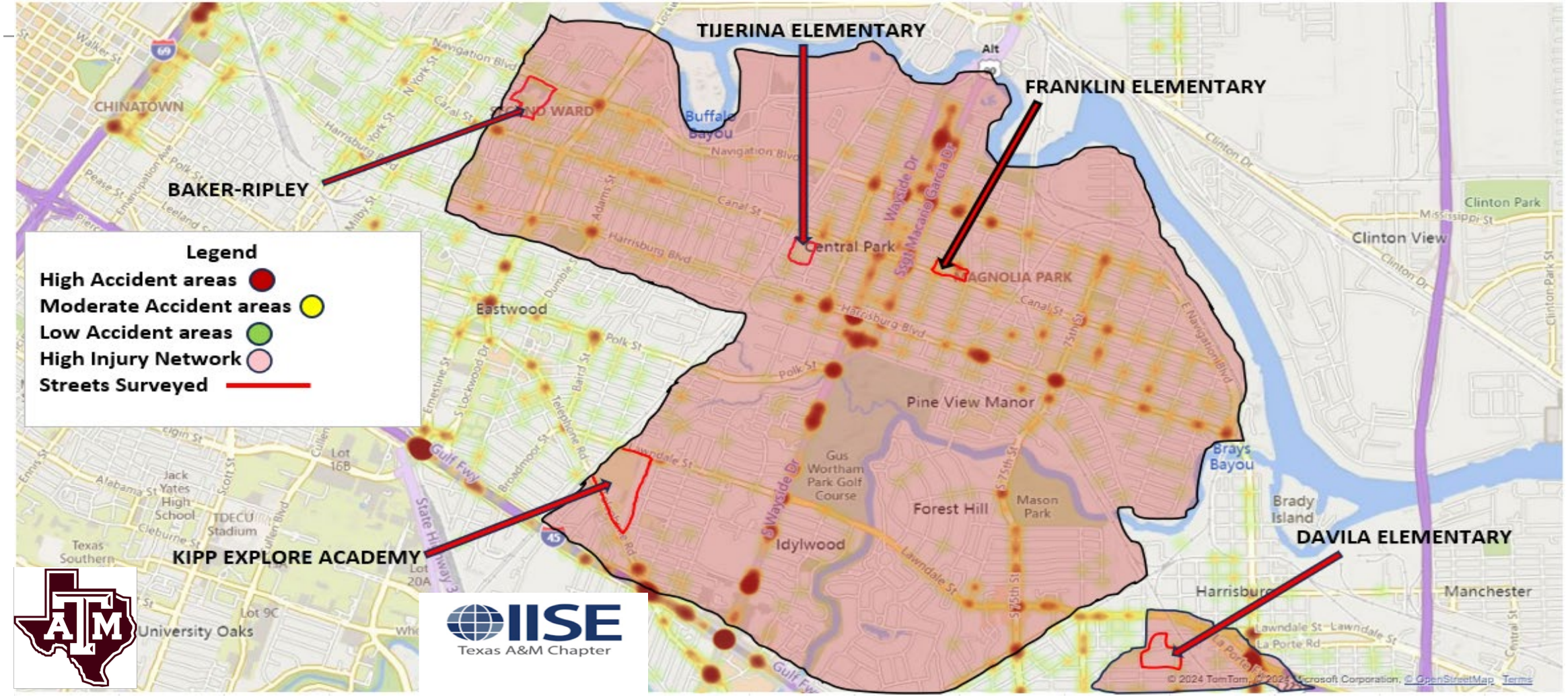
- Catalog and prioritize existing studies and plans
- Create a prioritized list of recommendations for improvements and treatments
- Provide analysis for supporting a safety awareness program

Hobby School Capstone



Star Rating for Schools

- Used SR4S to determine safety rating of roads
- Provide recommendations for safety improvements
- Knowledge transfer to East End District



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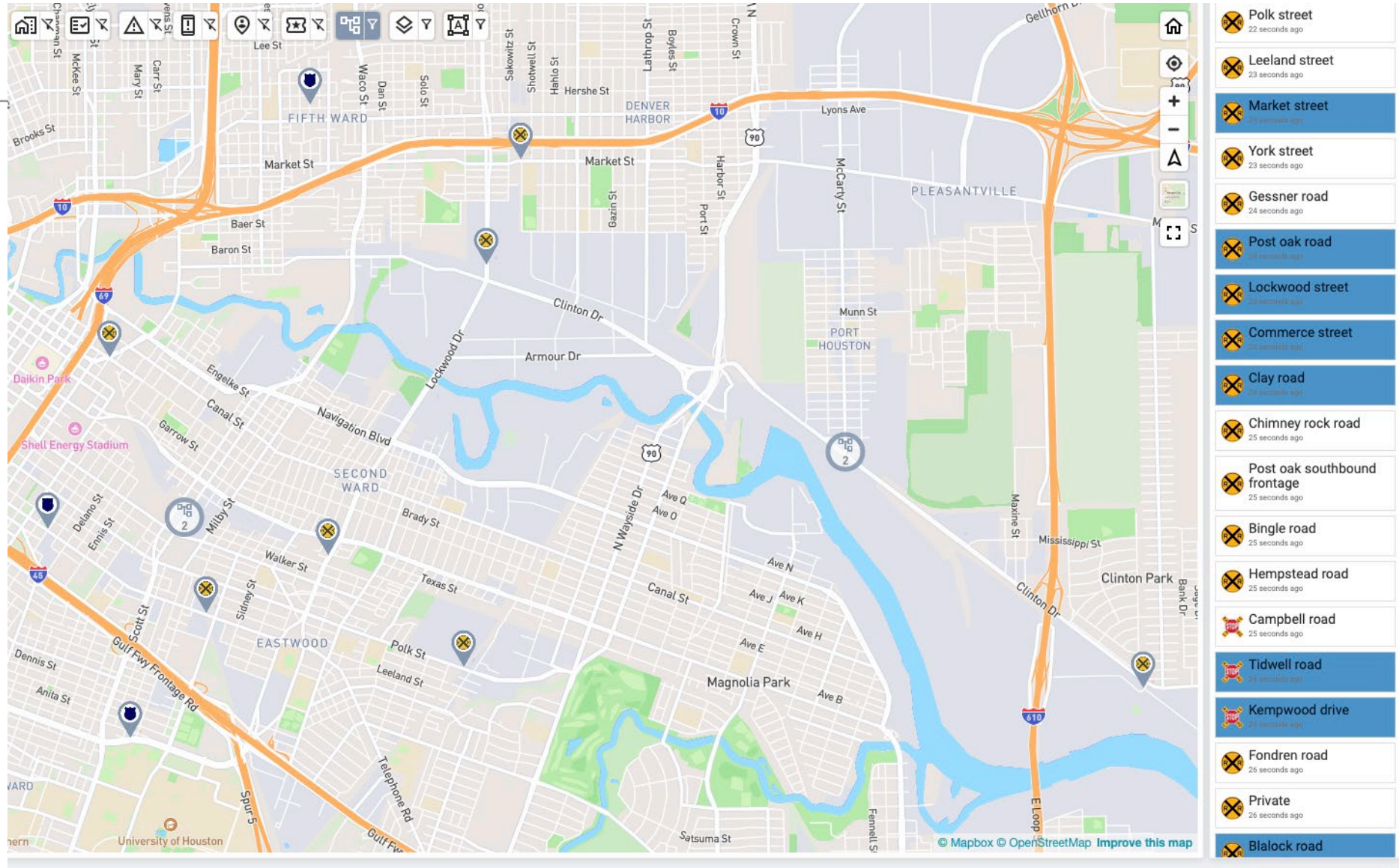
EAST END DISTRICT

Safe Vehicle

- Feasibility Study of Notification System to assess the impact of Blocked Railroad Crossings
- Assess safety related to environmental issues/conditions that affect safety and mobility
- Assess roads related to speed
- Identify technology to give advance warning to first responders



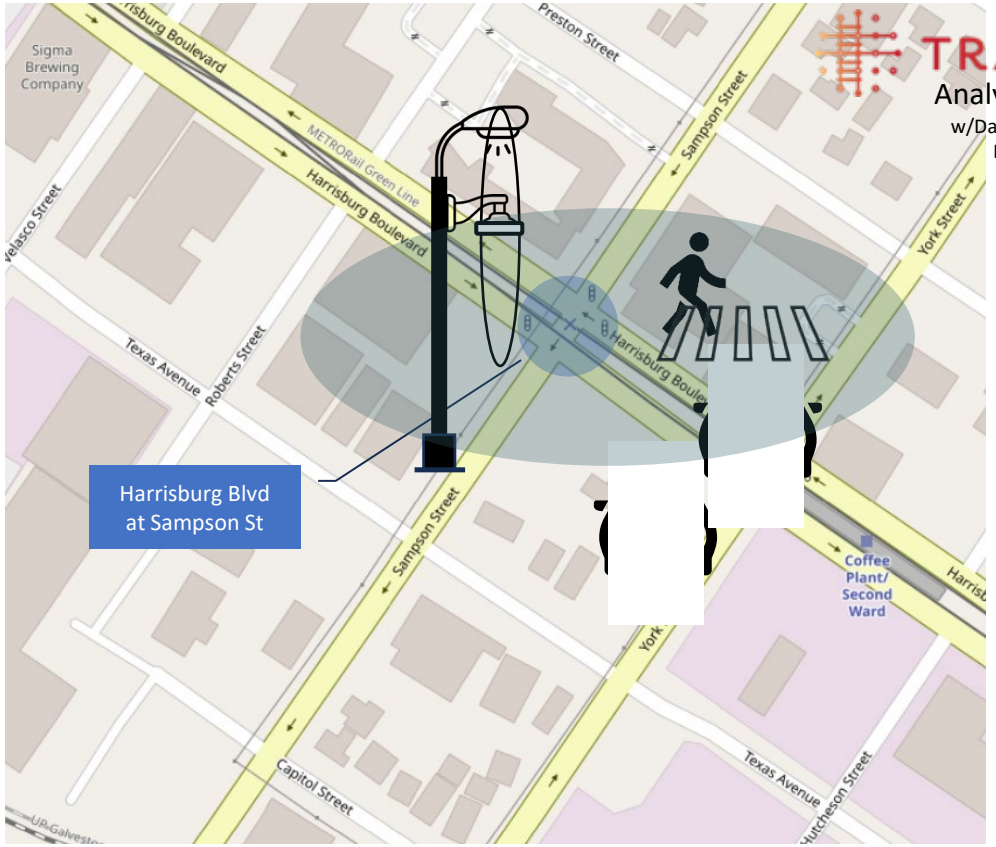
Trainfo/Bosch Solution

The Trainfo sensor and Bosch analytics camera deployed at this intersection are designed as an integrated solution to detect ***wrong-way driving, illegal turns (improper lane), speeding vehicles, and pedestrian and roadway activity.***

The solution utilizes cellular communications embedded in the Trainfo sensor to backhaul the video and camera analytics data from the Bosch camera to the Trainfo backend for analysis and distribution to the Bosch ITS Dashboard and Genetec VMS.

The analytics data is collected, analyzed, and displayed in the Trainfo and Bosch dashboards, respectively. The video from the camera is routed separately to the Genetec VMS for visual verification.

Congestion = Surge = Risk



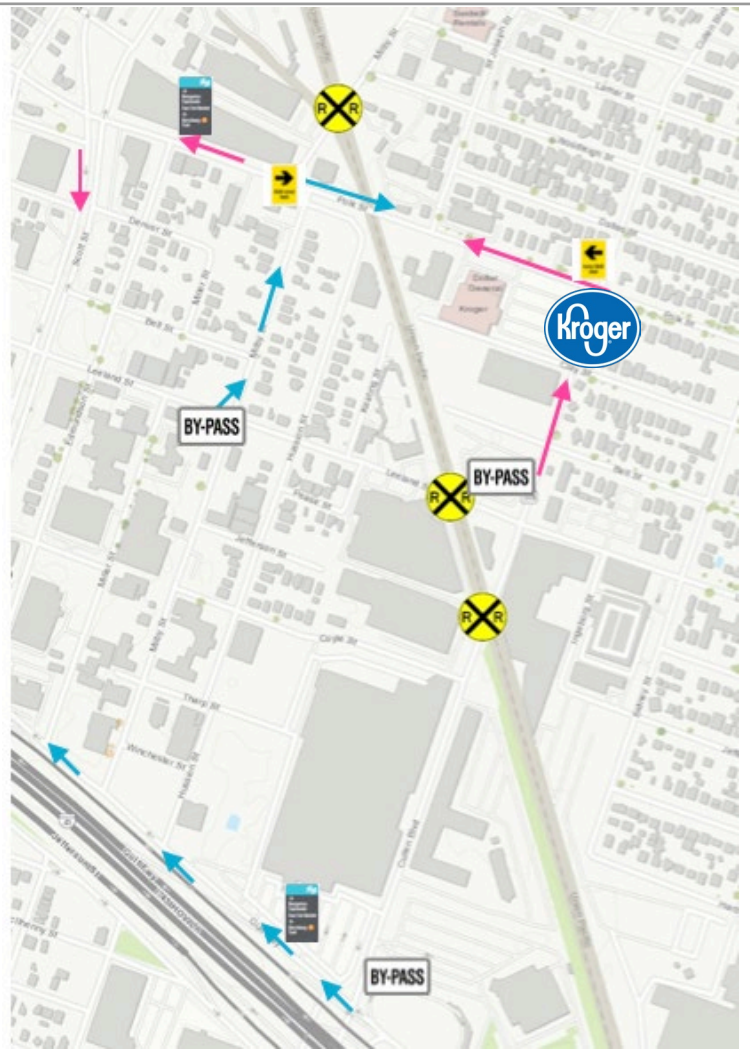
TRAINFO
Analytics Sensor
w/Data Visualization Dashboard

BOSCH
Camera Analytics
w/Data Visualization Dashboard

verizon
Cellular Wireless

Genetec
Security Center
Video Management Platform

Crossing Bypass – Wayfinding Project

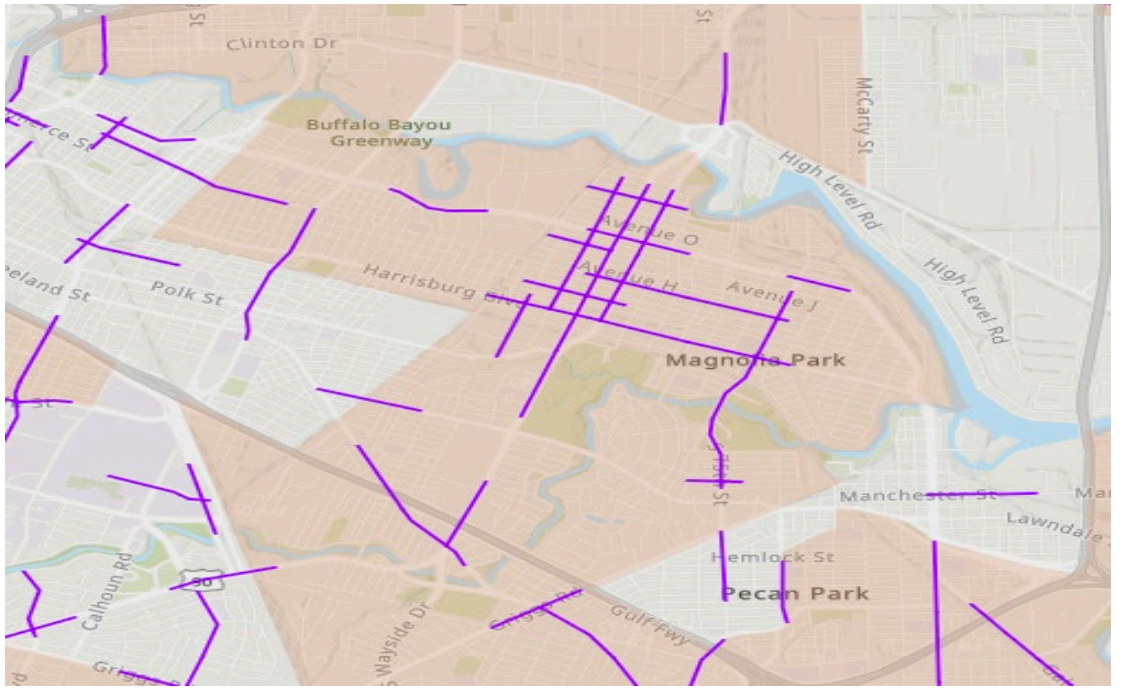


- Study 12 of the most congested RRXX
- Use signage to help guide traffic around blocked crossings
- Manage motorist expectations
- Reduce traffic congestion in affected area

Fall 2024 Capstone Projects

Progress Report

- Wayside Corridor Traffic Conflict Study - assess pre and post construction efforts to identify, measure, and recommend treatments to reduce crashes.
- Gulfgate Mobility Assessment -conduct a system Gap Analysis on existing traffic processes, plans, and studies. Use the Traffic Conflict approach to assess and evaluate conditions for the Gulfgate area.
- Lawndale/Magnolia Park Walk Audit- identify and implement a project scope for conducting a pedestrian audit in the Lawndale Neighborhood.
- Targeted Equity Assessment - review past studies and business studies to develop a process for evaluating risk to business operations caused by traffic congestion and environmental changes.
- Road Assessment Tool Development - support a Walk Audit effort by developing processes in a mobile application to measure pedestrian risk in identified neighborhoods.
- Road Impediment and Supply Chain Resilience - using a risk-based approach, identify and prioritize key businesses to assess Resilience for both business and designated routes



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EAST END DISTRICT

FY 24Safe Streets For All

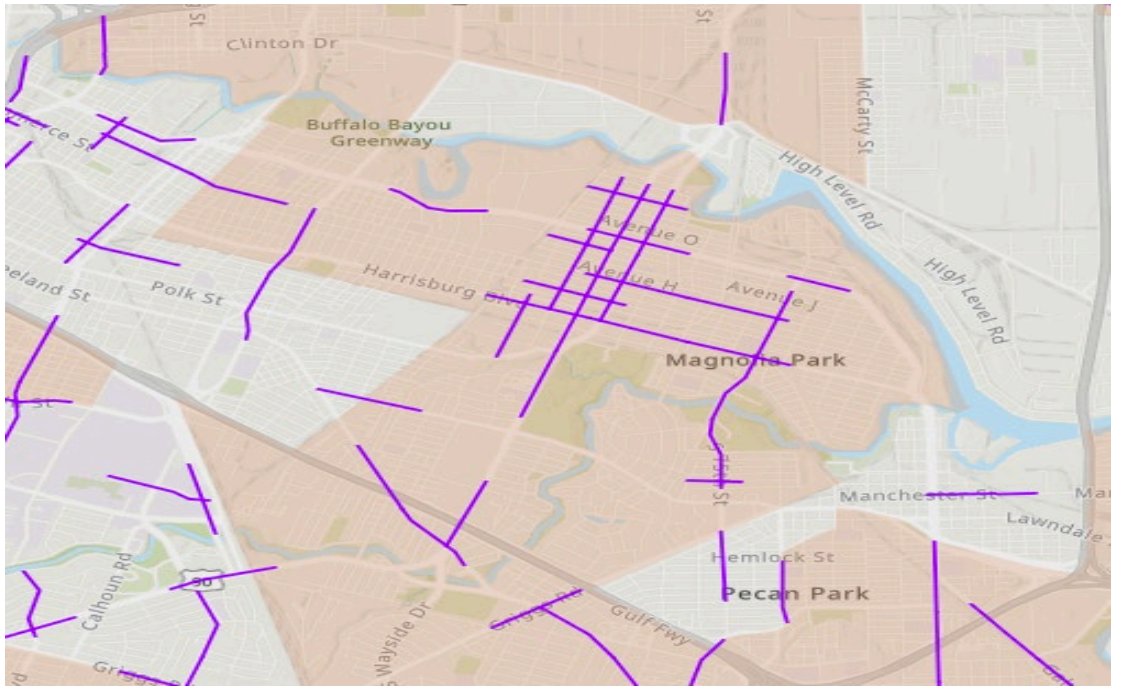
The East End District received **$895,000** from the Federal Highway Administration to conduct a three-year supplemental planning effort on Transportation Safety in Houston's East End.

The goal is to develop a demonstration models to put in practice finding from prevous studies.

- Update the Safety Action Plan to better inform the community
- Conduct a Transportation System Analysis to identify safety gaps
- Demonstrate Treatments to reduce Vehicle-Pedestrian Conflict
- Create a Web Base Community Dashboard to better foster safety awareness and identify community transportation safety needs

Winter 2025 Capstone Projects

- Transportation System Analysis – continue to catalog and analyze neighborhood studies and engineering project to better inform District Leadership of Gaps
- Pedestrian Conflict – review previous studies on selected areas identifying opportunities for risk and conflict. Run simulations models and identify treatments to reduce risk
- Gulfgate Mobility Phase 2 – identify high risk areas in a business/mall pad area, run simulation models to identify vehicle/pedestrian conflicts
- Business Resilience Study – develop a customized resilience metrics for food, communications and staffing. Model supply chain risks and identify local resources for redundance



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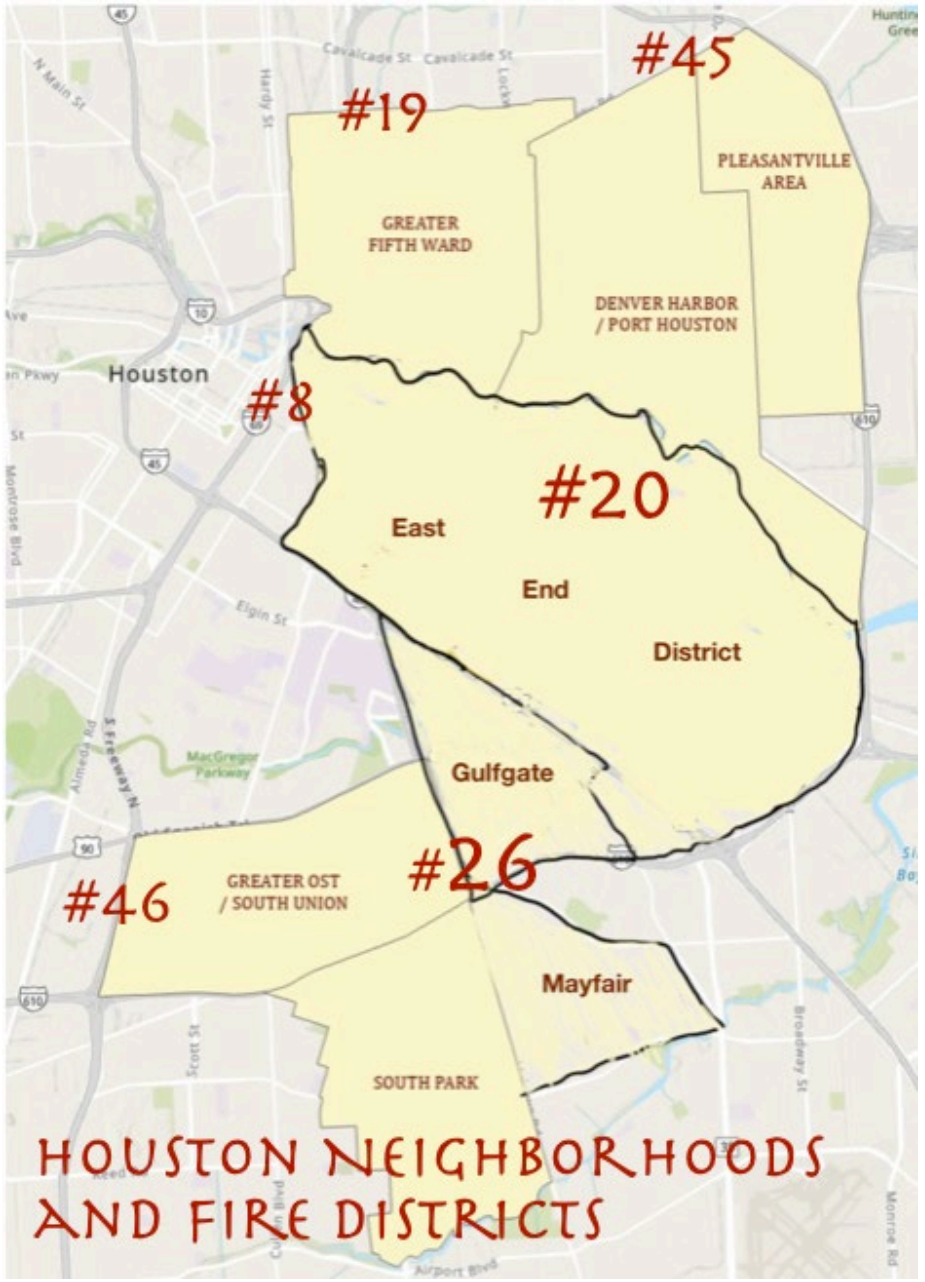
EAST END DISTRICT

City of Houston
Safe Streets Post Crash Care Demonstration

- $3.4 Million over a Four-Year Period
- Support Public Safety Efforts & Post Crash Care
- Improve Emergency Routing
- Reduce response time
- Assist motorist mobility and reduce unsafe behaviors
- Reduce crashes by identifying traffic anomalies



EAST END
DISTRICT

Regional Goods Movement Lessons Learned Workshop

Greater Houston Freight Committee

January 16, 2025

Regional Collaboration • Transportation Planning • Multimodal Mobility

Houston-Galveston Area Council

Lessons Learned Workshop

- Workshop date: September 30
- Previous Steering and Stakeholder Committee members
- Part 1: Overall RGMP evaluation
- Part 2: Policy and Programs Implementation Recommendations
  - Safety
  - Congestion
  - Emissions
  - Community Impact
- Implementation examples
- Initial consensus building

Regional Goods Movement Plan Lessons Learned Feedback Form

September Workshop Responses

RGMP Evaluation

- What did we get right
  - Identification of key freight corridors, Capturing second-trip truck movements, RTP project categorization, Identification of key issues to goods movement
- What did we miss
  - Freight Emissions, ten yr. STIP, corridor level fright movement.
- Next iteration of RGMP
  - Grade separation issue, multimodal freight movement analysis, Freight design guidance/policies, freight in the travel demand forecast.

Workshop Key Takeaways

1. Decreasing time between goods movement studies.
2. Collaboration with other committees to solve RGMP Policies and Programs
3. Need to develop alternative congestion management tools for freight.
4. Need to provide updated freight data through the RGMP dashboards.

Regional Goods Movement Plan

VISION

A multimodal freight transportation system that is efficient, reliable, and safe, that supports the economy, the environment, and equity.

GOALS

- Safety
- State of good repair
- Move people & goods efficiently
- Economic competitiveness
- Protect Natural Resources

2023 Study Deliverables

1) **H-GAC Freight Network**
   - RGMP generated approximately 520 miles of local freight network for H-GAC
2) **RTP project needs analysis and Future RTP Considerations**
   - Categorized 2040 RTP projects into high, medium, and low
3) **Policies and Programs**
   - Addressed emissions, congestion, safety, and residential mitigation
4) **Study Dashboards**
   - Truck OD Dashboard, Commodity flow dashboard, and Study data Dashboard
5) **CUFC Redesignation**
   - Designated 90.72 miles

Plan Recommendations

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Policies and Programs - Safety

1. Integrate truck safety initiatives into local and regional Vision Zero and Safety Plans
   - *Including safer truck standards in the city or county procurement policy*
2. Establish a Regional Truck Safety Task Force,
   - *Identify strategies to address commercial vehicle safety such as Driver Training, Education, Infrastructure Needs, and Policy Changes*
3. Increase the number of truck parking spaces in the region to ensure truck drivers have adequate rest facilities
   - *Encourage the development of truck rest stops*
4. Update the National Hazardous Materials Route Registry
5. Increase uptake of truck safety equipment not mandated by federal regulations, such as side guards and hi-vision truck cabs
   - *Advocate for ordinances aimed at improving safety*

Ex. Policy Changes

- Include safety requirements for large vehicles in the procurement process
- Advocate for ordinances aimed at improving safety
  - Ex City of Boston, all city-owned commercial trucks and city contracted to be equipped with
    - Convex mirrors
    - Side guards
    - Cross over mirrors
    - Blind spot awareness decals

Read more HERE

Ex. Education

NCTCOG 2023 Safety Campaign

Policies & Programs - Congestion

1. Encourage more off-peak truck activity
   - *Truck incentives and use restrictions*
2. Port transportation optimization and efficiency task force/working group
   - Work with Ports and assist where needed
3. Railroad crossing Conflicts
   - *Partner with GCRD*
   - *Grade separations*
   - *Advanced signaling systems*
   - *Eliminating redundant rail crossings*
   - *Public-private partnerships*

Ex. Off-Peak Deliveries

New York City OPD Pilot Program (2009-ongoing)

- Objective
  - Reduce congestion, lower emissions, and improve delivery reliability
- Results
  - 60% reduction in delivery times
  - 20% lower emissions
  - Businesses saw improved supply chain reliability
- Challenges
  - Noise, and staffing for night deliveries
- Success Factor
  - Financial incentive ($6M in incentive funding)
  - Business Collaboration

Source – New York Off-Peak Deliveries Program

Policies & Programs - Emissions

1. Freight facility emission reduction (rail yards, ports, warehouses)
   - Pilot/trial new technology
   - Promote pathways to replace older, most polluting equipment
2. Older truck's emission reduction
   - H-GAC and other grant programs
3. Increase the number of Zero Emission Vehicles (ZEV) operated in the region
   - Pilot fueling solutions for ZEV in the region
   - Identify "early adopter" fleets and work with them to explore ZEV uptake.
   - H-GAC and utilities to assess the local and regional electricity grid capacity to support electric truck charging.

Emission reduction Strategies taken by MPO

- Southern California Association of Governments Last Mile Freight Program
  - Phase 1: Commercial deployment of zero-emission or near-zero emission heavy and/or medium-duty on-road trucks
    - including ZE/NZE equipment and supporting infrastructure
    - Phase 1 implementation 2022-2024
  - Phase 2: Expanding Phase 1 projects to deploy broader innovative technologies
  - Approved $16,751,000 for Phase 1 project implementation using a portion of the motor vehicle registration fees

Source - Last Mile Freight Program

Policies & Programs - Residential & Community Impacts

1. **Develop a truck route map (including designated high and heavy corridors)**
   - Develop a regional truck route map with cities and other agencies
   - Share data with GPS mapping companies
2. **Mitigate the residential impact**
   - Define and identify residential impacts, e.g., pass-through truck traffic, access to commercial areas
   - Assess interventions, e.g., increased law enforcement, education, communication channels, review of ordinances, establishment of truck route networks

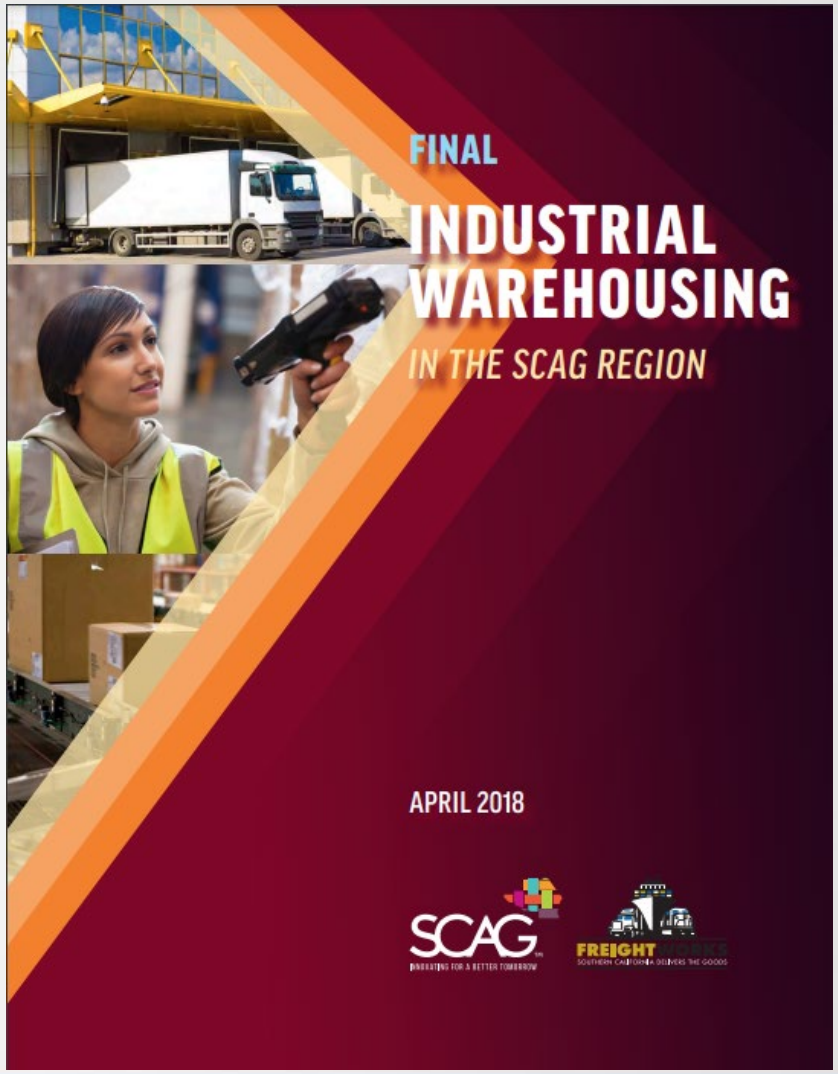
Strategies taken by MPOs

Freight Land Use Compatibility Analysis

A Freight North Texas Study

April 2022

A Product of the Transportation Department Freight Team



Discussion Questions

- What do you think will be some of the biggest barriers to implementing the RGMP policies and programs?
- Do you think any of the examples presented today would have a positive impact on freight movement in the H-GAC region?
- Do you think Off-Peak deliveries could be successful in our region?
- What are ways that your agency is implementing emissions improvements?
- What are ways that your agency is implementing community mitigation improvements?

Regional Goods Movement Plan
Lessons Learned Feedback Form

Next Steps

- Develop a timeline from the RGMP recommendations for action in the new year.
  - Programs, studies etc.
- Update data and project dashboard from the RGMP
- Including freight in various other H-GAC subcommittees, projects, and plans.

Announcements

- **RTP 2050: GHFC Feedback**
  - H-GAC requests GHFC member feedback on what should be included in the RTP 2050 freight survey.
  - Contact Stephen Keen at stephen.keen@h-gac.com
- **Houston-Galveston Establishment Survey**
  - Designed to collect detailed data on commercial vehicle trip activities across Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties in Texas.
- **H-GAC Zero Emissions Study**
  - The study seeks to assess regional infrastructure readiness for the ongoing expansion of zero-emission vehicles in the H-GAC region, including vehicle populations, existing/planned electric vehicle chargers, hydrogen fueling stations, etc.

Future Meetings

a. Transportation Policy Council – January 24, 2025
b. Transportation Advisory Committee – February 19, 2025
c. Safety Committee – TBD
d. Regional Air Quality Planning Meeting – January 30, 2025
e. Future GHFC Meetings – Tentatively April 17, 2025

Thank you for attending!