Texas State Transportation Innovation Council

December 5, 2019

Welcome
Darran Anderson, Director,
Strategy and Innovation, TxDOT

Wrap-Up from Value Capture Workshop

Rafael Aldrete, TTI

Crowdsourcing for Operations

Amelia Hayes, FHWA Texas Division

Center for Accelerating Innovation

On-Ramp to Innovation every day counts

U.S. Department of Transportation
Federal Highway Administration

Every Day Counts 5
Crowdsourcing for Operations

Amelia (Millie) Hayes, P.E., RSP$_1$
FHWA Texas Division

Source: Pixabay, Unsplash and FHWA

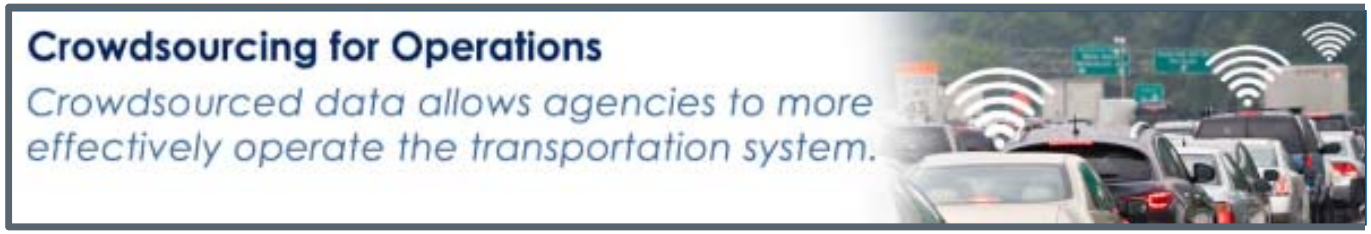
What is "Every Day Counts"(EDC)?

- **State-based model to identify and rapidly deploy proven but underutilized innovations to:**
  - Shorten the project delivery process,
  - Improve environmental sustainability,
  - Enhance roadway safety, and
  - Reduce congestion.
- **EDC rounds: 4 rounds, each 2-years, 40+ innovations to date.**
- **5th Round (2019-2020) - 10 innovations, many synergies:**
  - Weather-Responsive Management Strategies.
  - Virtual Public Involvement.

For more information: https://www.fhwa.dot.gov/innovation/
FAST Act, Sec.1444

FHWA EDC-5 Crowdsourcing Innovation Goal

To increase the number of agencies that use crowdsourcing to better operate the transportation system through new, cost-effective, and proactive operational strategies and applications.



Source: FHWA

30+ States are pursuing Crowdsourcing for Operations.

Transportation Systems Management and Operations (TSMO)

- Optimizing use of existing facilities.
- Maximizing performance of the system.
- Buying the most mobility for the least cost.
- Treating capacity as an asset to manage.
- Getting you there – people and goods.
- Targeted solutions to congestion causes.
- Complement to capacity projects.
- Approaches to match demand to supply.

Effective operations is built on a foundation of monitoring current conditions.

Real-Time Monitoring: A Weakness in the Foundation of Operations

There are 4 primary limitations in our typical approach to real-time monitoring:

1. Big gaps in geographic coverage.
2. Lags in timeliness of information.
3. Cost to build-out and maintain field equipment.
4. Jurisdictional stovepipes.

Source: FHWA

Source: FHWA

These limitations reduce the ability to efficiently and (cost) effectively operate the system.

Crowdsourcing: A Potential Solution

When integrated with an agency's existing efforts, crowdsourcing helps agencies:

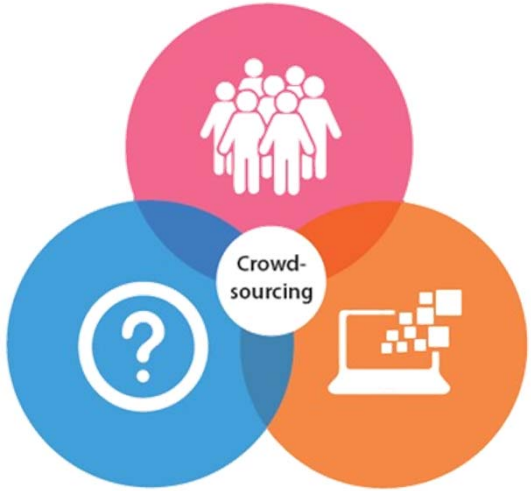
- Expand geographic coverage and resolution.
- Reduce information time lags for improved real-time situational awareness.
- Reduce dependence on and cost associated with roadside sensors and systems.
- Overcome jurisdictional stovepipes.
- Implement proactive operations strategies.

Crowdsourcing is a proven lower-cost solution to improving safety and operations.

What Exactly is Crowdsourcing?

Crowdsourcing is the practice of addressing a need or problem by enlisting the services of a large number of people via technologies. Crowdsourcing:

- ✓ Addresses a need or problem outside of an organization's resources or means by distributing the workload across a large group of people.
- ✓ Leverages the collective wisdom and unique insights of a crowd.
- ✓ Uses technology and new forms of communication and interaction to document, share, and reflect on the world.



Crowdsourcing Examples

Source: K W Reinsch

1906: UK Weight Judging Competition

- British scientist held competition @ Fat Stock & Poultry Exhibition.
- 787 took part in steer weight-guessing contest.
- Average 2 lbs. off; best guess 10 lbs. off.

Source: Pixabay

1995: Amazon Reviews

- Customers offer reviews & comment/vote on others' reviews.
- Rating, based on machine learning, and affect product visibility.
- Reports of review tampering surfaced in 2004.

Crowdsourcing is Everywhere

- Airbnb
- Best Buy
- Citizenscience.gov (GSA)
- Department of Defense
- Eucrowd (EU)
- Facebook
- Federal Bureau of Investigation
- General Electric
- Google
- Harley Davidson
- Kraft Foods
- Lego
- Mattel
- McDonalds
- Microsoft
- NASA
- Netflix
- New York City Simplicity
- Paypal
- Procter & Gamble
- Sony
- Starbucks
- • Wikipedia

Sources of Crowdsourced Data

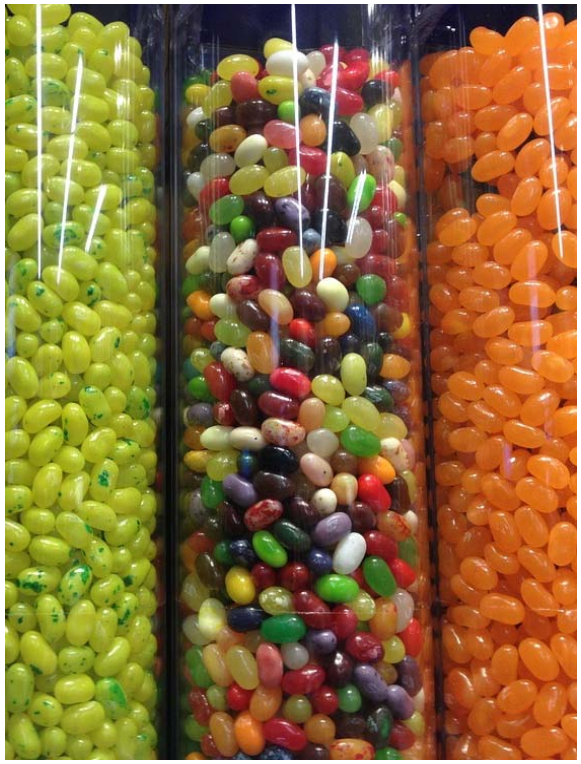
- Data extracted from social media platforms.
- Data acquired from third-party crowdsourced data.
- Data collected from specially developed mobile apps.

Data is sourced whenever and wherever people travel.

Source: Pixabay

Types of Crowdsourced Data

- **Probe** – Speed and travel time.
- **Event** – Crashes, stalled vehicles, potholes, snow, rain, etc.
- **Travel Behavior** – Where, when, how (mode used) people travel.
- **Social media** – Capture sentiment on road and agency performance.
- **Vehicular** – Heavy braking, wiper on/off, temperature, and more from connected vehicles.
- **Mobile Infrastructure / Internet of Things** – For example, work zone cones sharing location, surrounding speed.

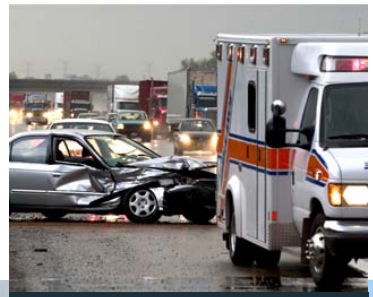


Source: Pixabay

Crowdsourcing for Operations Application Areas

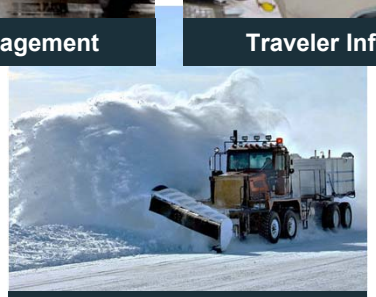
- Most common applications of crowdsourced data are for traveler information and incident management.
- Agencies are now expanding its use across application areas ranging from maintenance to integrated corridor management.

Traffic Signal Management


Incident Management

Traveler Information

Freeway Management


Road Weather Management

Maintenance Management

Crowdsourcing:
Opportunities for Advancing Operations

Crowdsourcing benefits Transportation Operations:

- Expands & improves real-time monitoring
- Enables more targeted and timely response
- Enables strategic/programmatic operational improvements

Benefits beyond Transportation Systems:

- Promotes legitimization & acceptance if public decisions
- Improves transparency and efficiency of public expenditures
- Promotes a sense of community & greater citizen satisfaction

Louisville Metro – Assessing Signal Retiming Effectiveness

Background: Shared real-time road closures data through apps like Waze, Google, and Apple Maps.

Goal/Action: Built a tool that allows Metro employees to quickly and easily conduct traffic studies, on-demand.

Outcome: Applied Microsoft ***Power BI*** with **Waze** database. Within 5 minutes, showed effects of signal retiming on corridor:

- 30% drop in the overall congestion (Waze jam count metric).
- 38% drop in PM Peak congestion.

Other uses: monitoring for faulty equipment and traveler information to public.

Source: Unsplash

Port Authority of New York and New Jersey (PANYNJ)

Source: PANYNJ

Goal: Agency Operations Center strives to balance demand across and within mode (especially bridges).

Action: Partnerships with 3rd party navigation apps.

Outcome: PANYNJ mitigates traffic delays and queues, and improve safe operations around work zones.

- *Crowdsourced data offers greater situational awareness.*
- *Crowdsourced data improves traveler information to commuters.*
- *Data sharing (work zone and incidents) with 3rd party navigation apps improves traveler routing, shifting commuters away from work-zones and balancing bridge demand.*

Indiana DOT – Managing Traffic with Probe Data

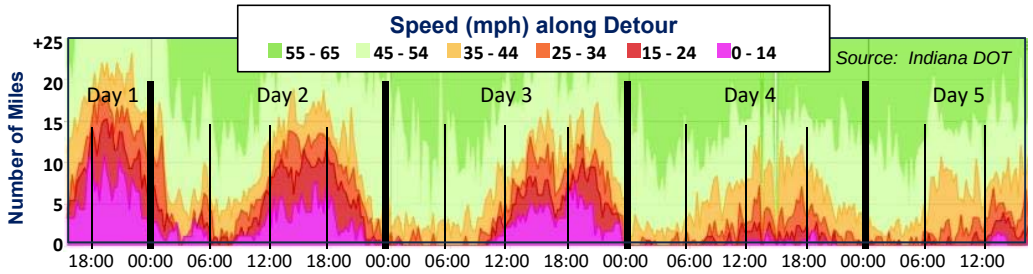
Background: INDOT purchases real-time probe data. Data downloaded every 60 seconds. Created ***Traffic Ticker***, to process, visualize and use data (Purdue University).

Goal: Use ***Traffic Ticker*** to guide operations changes and assess system performance.

Event: Unplanned I-65 bridge closure caused reroute –took 4 hours on day 1.

Outcome: Operations changes over five days based on ***Traffic Ticker*** data helped stabilized travel to 64 minutes.

Tool is used within INDOT and among broader TIM stakeholders for training.



Source: Indiana DOT

Utah DOT – Citizen Reporter Program

Background: Accurate road conditions are a critical part of traveler information and route planning, given Utah's high mountain passes and rural routes.

Goal: Enlist volunteers (e.g., UDOT employees, law enforcement, truck drivers, plow drivers, commuters) to improve completeness and accuracy of data.

Action: Created Citizen Reporting app in 2013.

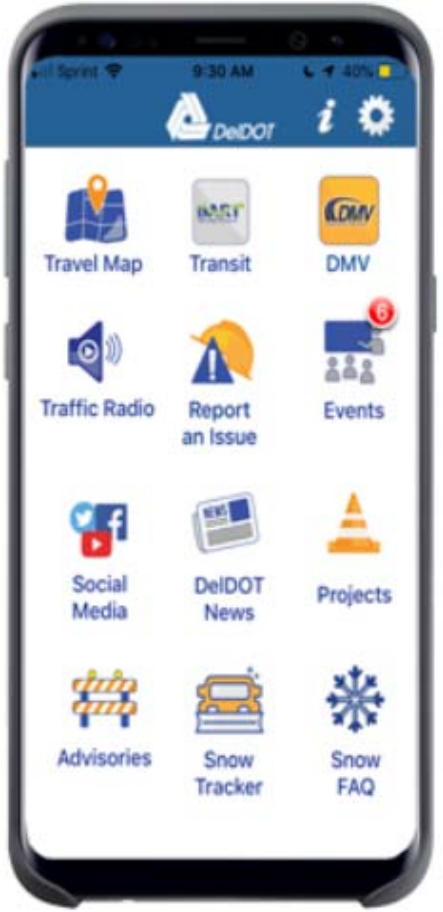
Outcome: Highly accurate data on road conditions on highway and major arterial segments from 1K+ 'trained' reporters.

Utah DOT

Delaware DOT App for reporting issues in real-time

A single source for all things traffic related.

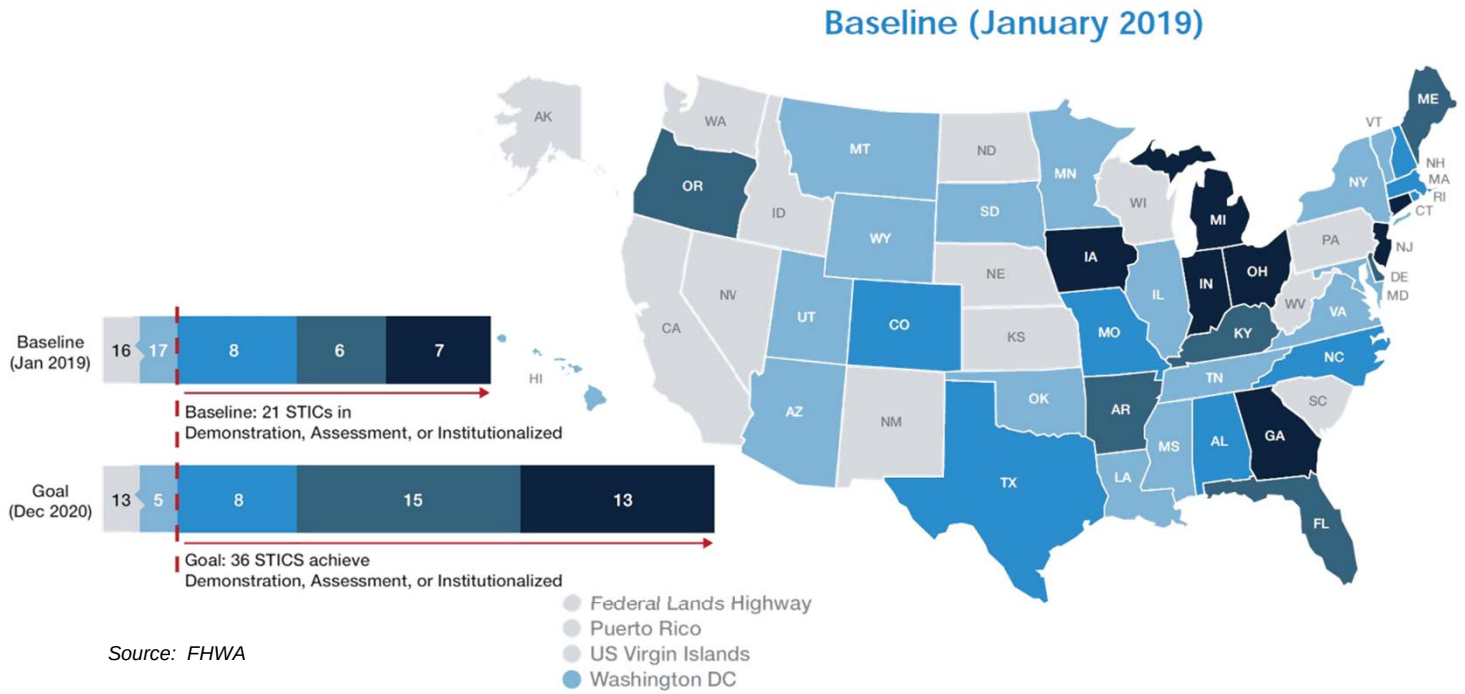
- Travelers can report roadway issues from potholes to non-functioning signal lights.
- DelDOT shares the report to District-level maintenance crews.
- Traveler can obtain real-time information and track the movement of snow plows.
- They can also access other DOT services including transit information, advisories, and DMV information.



Source: Delaware DOT

FHWA Every Day Counts Round Five (EDC-5) Crowdsourcing Innovation Goal

To increase the number of agencies that use crowdsourcing to better operate the transportation system.



Source: FHWA

EDC-5 Crowdsourcing State Advancement Goals

Stage	Leap (9 states)		Jump (17 states)				Walk (6 states)	Stand (21 states)
Institutionalized		CO, RI				DE, KY, ME	MI, OH, UT	CT, GA, IA, IN, NJ, PA
Assessment	AZ, MN, NY, OK, TN, VA, WY				AL, MO, NC, NH, TX		OR	AR, FL
Demonstration				DC, IL, LA, MD, MT, VT			MA	
Development			PR, WI				HI	MS, SD
Not Implementing								AK, CA, FLH, ID, KS, ND, NE, NM, NV, SC, VI, WA, WV

Leap = advance two stages in any application
Jump = advance one state in any application
Walk = make progress within a stage for an application

Initiative Resources

- Webinars
  - *Adventures in Crowdsourcing: Engaging Navigation Providers*
    - *Tuesday, November 5 1:30-3:00 ET*
  - *Adventures in Crowdsourcing: Vendor Engagement*
    - *Early December 2019*
  - *Adventures in Crowdsourcing: Data Management and Use*
    - *January 2020*
- Workshops
- Peer exchanges
  - *Validation and Filtering of "Free" Crowdsourced Data*
    - December 10-11, Nashville, TN
  - *Making the Most of Real-Time Vehicle Probe Data*
    - February 2020 (date and location TBD)
- On-site technical assistance
- Training materials/training
- Case studies

Contact Information

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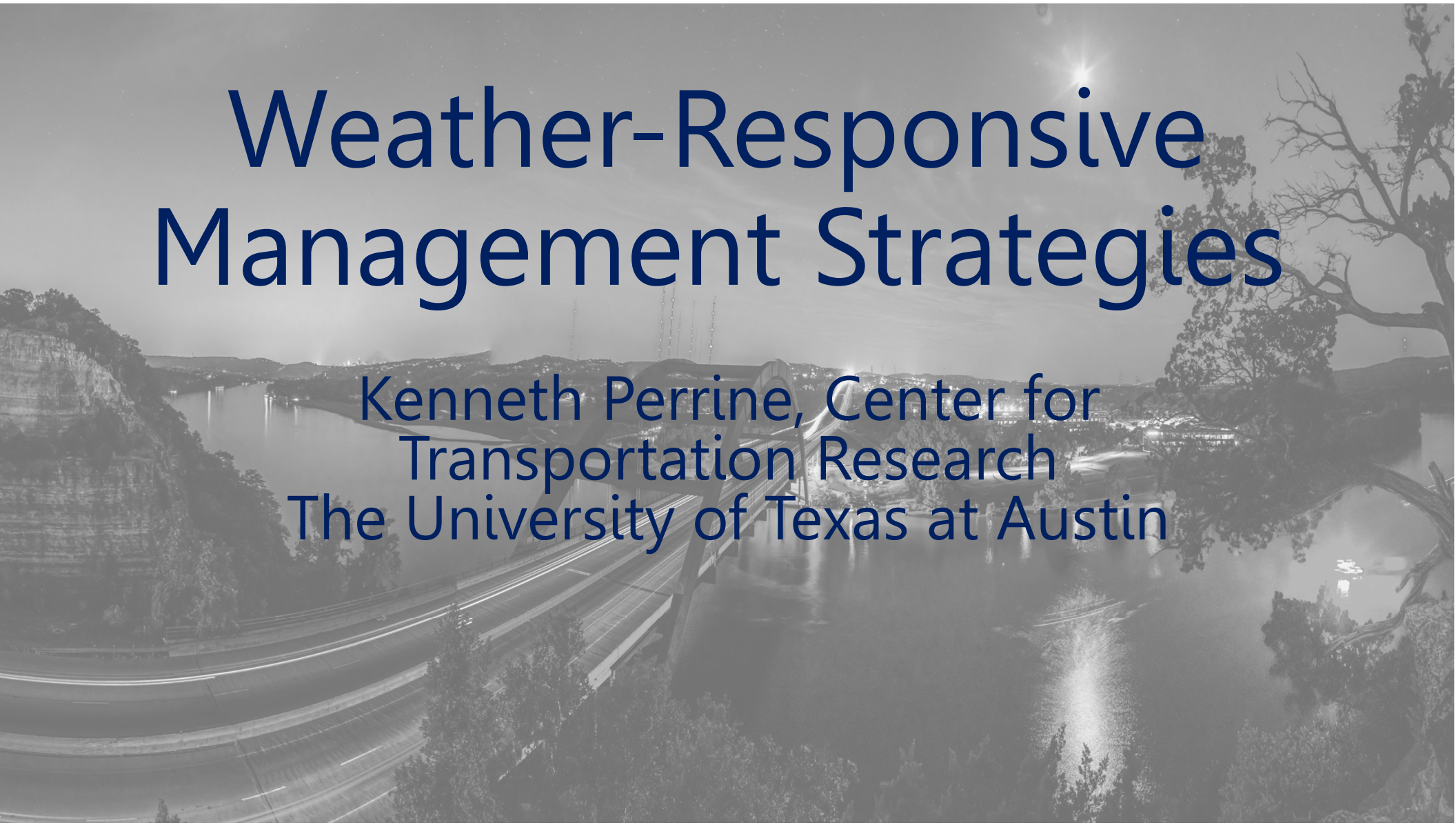
Question & Answer



Weather-Responsive Management Strategies

Kenneth Perrine, Center for Transportation Research
The University of Texas at Austin

Weather-Responsive Management Strategies

CENTER FOR TRANSPORTATION RESEARCH

THE UNIVERSITY OF TEXAS AT AUSTIN

PROJECT TEAM

» TxDOT RTI

Wade Odell (RS)

» TxDOT ADVISORY

Daniel Richardson (Dir. Traffic Ops., Abilene)

John Nevares (District Traf. Engr., Austin District)

David McDonald (Traffic Incident Mgmt. Coord.)

» CTR – UT AUSTIN

Chandra Bhat (PI)

Christian Claudel (Co-PI)

Kenneth Perrine (PM, Researcher)

Brandy Savarese (Researcher)

Aupal Mondal (Graduate Research Assistant)

Hassan Iqbal (Graduate Research Assistant)

Jonathan Butler (Undergraduate Research Assistant)

EDC-5 OBJECTIVES

» DEVELOP A DEMONSTRATION WRMS

Demonstrate a weather-responsive maintenance/management strategy (WRMS) in a *relevant environment*: TRL 6

» INCREASE EFFECTIVENESS AND REDUCE COSTS

What are effective ways to reach the public today? How can agencies intercommunicate better?

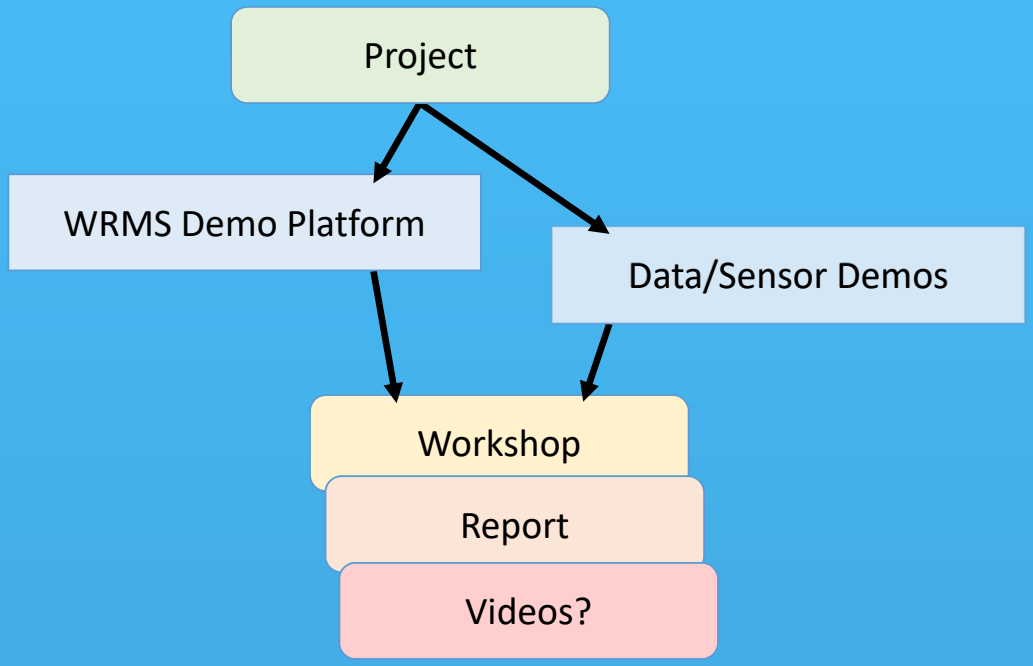
PLANS

» THE DEMO PLATFORM: A FREEZING RWIS

- Use mobile, connected vehicle data, and sensors in a roadway information system that yields measureable benefits.
- Reduce anti-icing and de-icing (brine) usage.
- Optimize fleet mileage and personnel time.
- Track weather conditions on vulnerable roadway.
- Improve information reporting to travelers.
- Apply to other extreme weather types.

» TECH DEMOS

- Identify and demonstrate technologies and their potential use



DEMO LOCATION

- Target: ~10 mi^2 around **Abilene, TX**
- Population: 117,463 (2010 census)
- Rank: TX 27th-most populous city
- Surrounding area: rural
- Routine winter ice Nov.-Mar. with occasional snowfall

Bing Maps

Google StreetView

DATA SOURCES

SENSORS & DATA

5 weather stations

3 on-vehicle road surface characterization

Maintenance logs: brine application

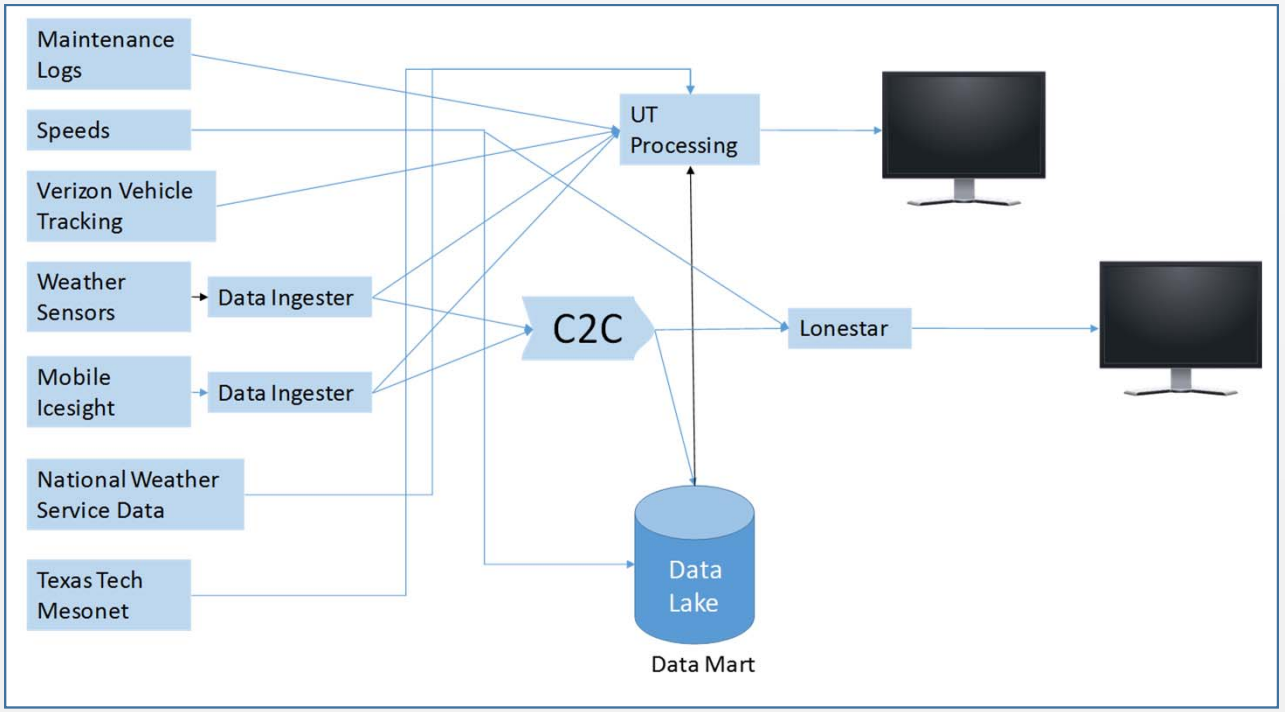
Live speeds

Verizon fleet vehicle tracking

National Weather Service: history and predictions

Texas Tech Mesonet

PLATFORM ARCHITECTURE



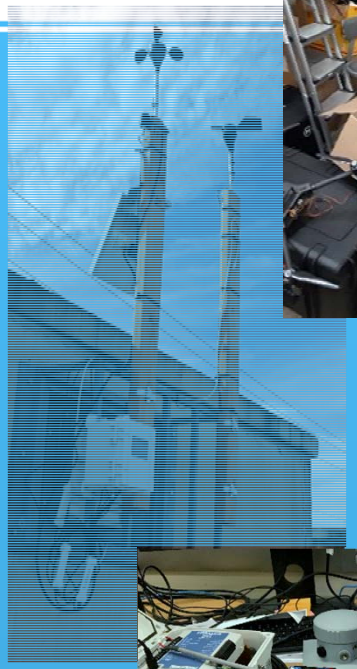
ACTIVITES & OUTCOMES

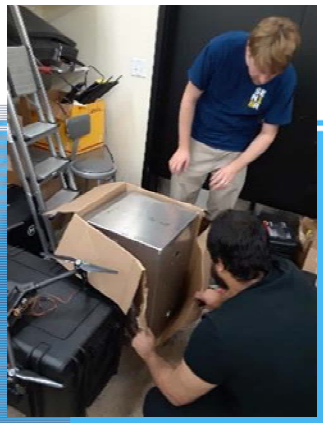
» GATHERING BEST PRACTICES

- Research best practices across the country.
- Understand how to plug into existing TxDOT workflows and procedures.
- Map out how to integrate with Lonestar ATMS and TxDOT data archiving efforts.

» MAPPING FORWARD

- Get Lonestar up and running with speed data
- Dashboard of multiple data sources
- (And look at machine learning on data for optimization and prediction)





ACTIVITES & OUTCOMES

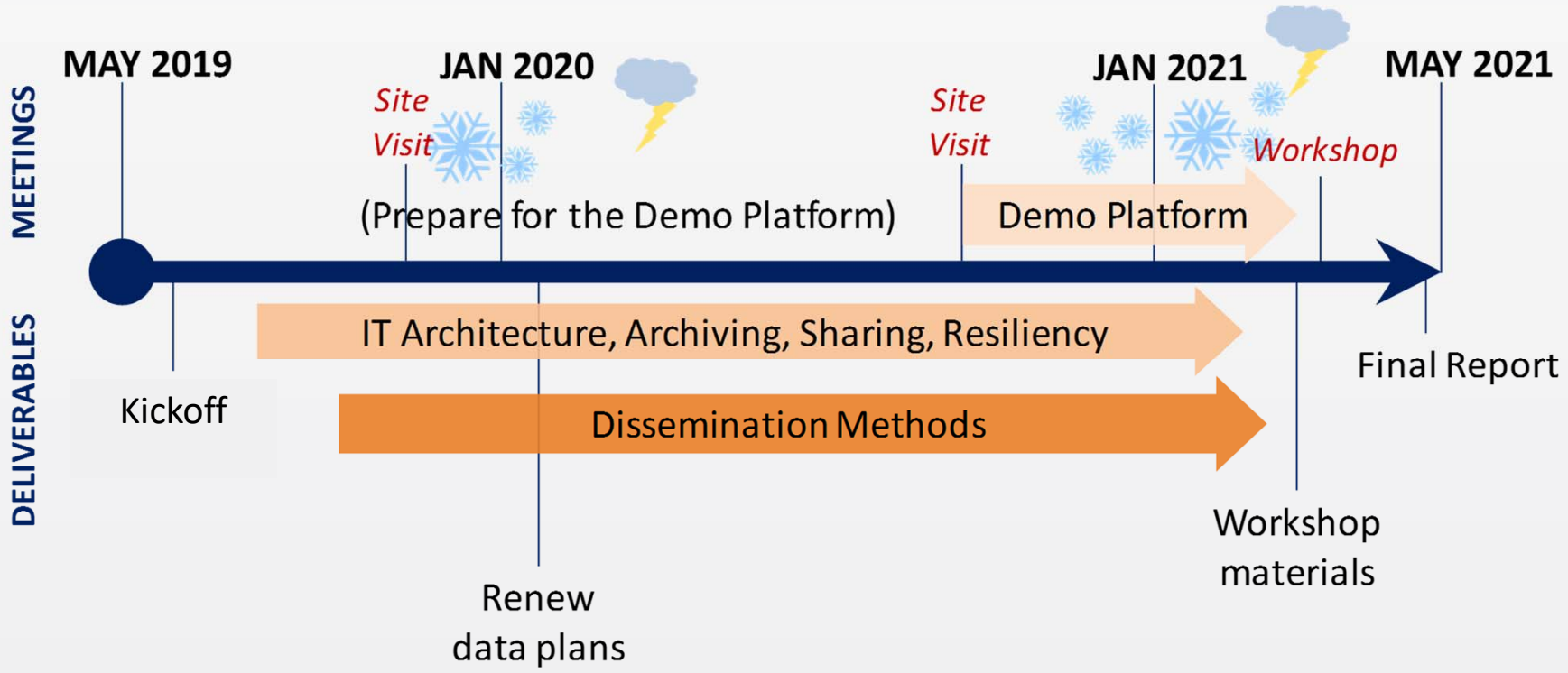
» OVERARCHING GUIDANCE

- Fit within the current processes as much as possible
- Focus on technologies that are the most useful now

» CHALLENGES

- Vendor delays in product support and servicing
- Understanding mounting requirements: doing the homework
- Working through data integration and visualization: don't reinvent the wheel

SCHEDULE


MAY 2019
JAN 2020
JAN 2021
MAY 2021
MEETINGS
Site Visit
Site Visit
Workshop
(Prepare for the Demo Platform)
Demo Platform
DELIVERABLES
IT Architecture, Archiving, Sharing, Resiliency
Final Report
Kickoff
Dissemination Methods
Workshop materials
Renew data plans

ACTIVITES & OUTCOMES

» JOURNAL

- EDC-4 (TxDOT 5-9053-01) project completion: Jan. 2019
- EDC-5 (TxDOT 0-7007) kickoff: June 2019
- Road Weather Management Stakeholder Meeting: Aug. 2019
- Background lit. search (TM #2): Sept. 2019
- EDC exhibition at TxDOT Short Course: Oct. 2019
- Preliminary demo platform scope (TM #3): Nov. 2019
- Abilene site visit: Dec. 2019

THANK YOU

Kenneth Perrine, Center for Transportation Research, The University of Texas at Austin

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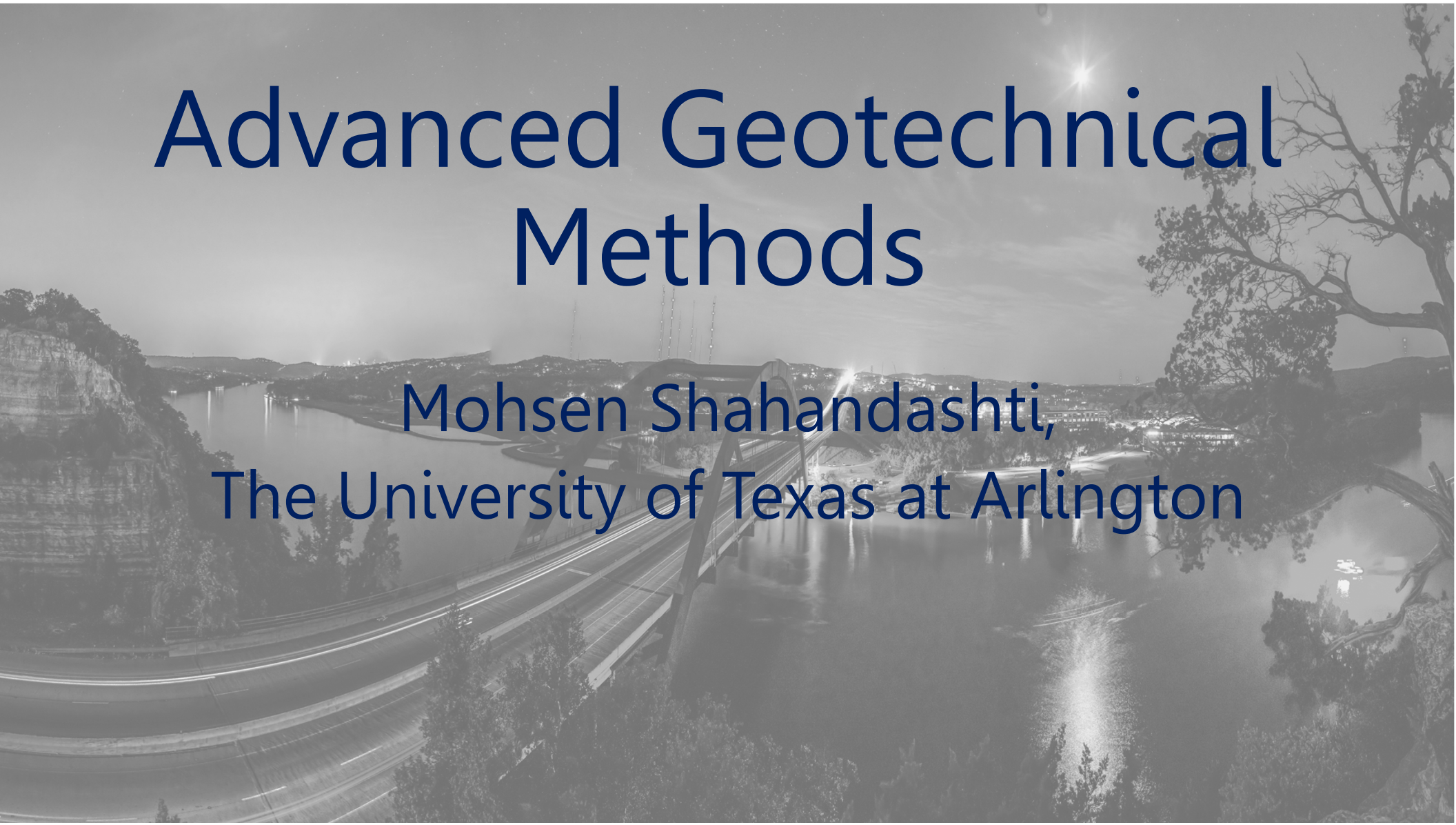
Related project materials: http://weather19.utnmc.org



Advanced Geotechnical Methods

Mohsen Shahandashti,
The University of Texas at Arlington

Advanced Geophysical Tools for Geotechnical Analysis

Principal Investigator

Mohsen Shahandashti, Ph.D., P.E.

Co-Principal Investigator

Sahadat Hossain, Ph.D., P.E.

Project Manager

Chris Glancy

Student Researchers

Mina Zamanian, Ph.D. Student

Md Asif Akhtar, Ph.D. Student

UNIVERSITY OF TEXAS ARLINGTON

Department of Civil Engineering

Presentation Outline

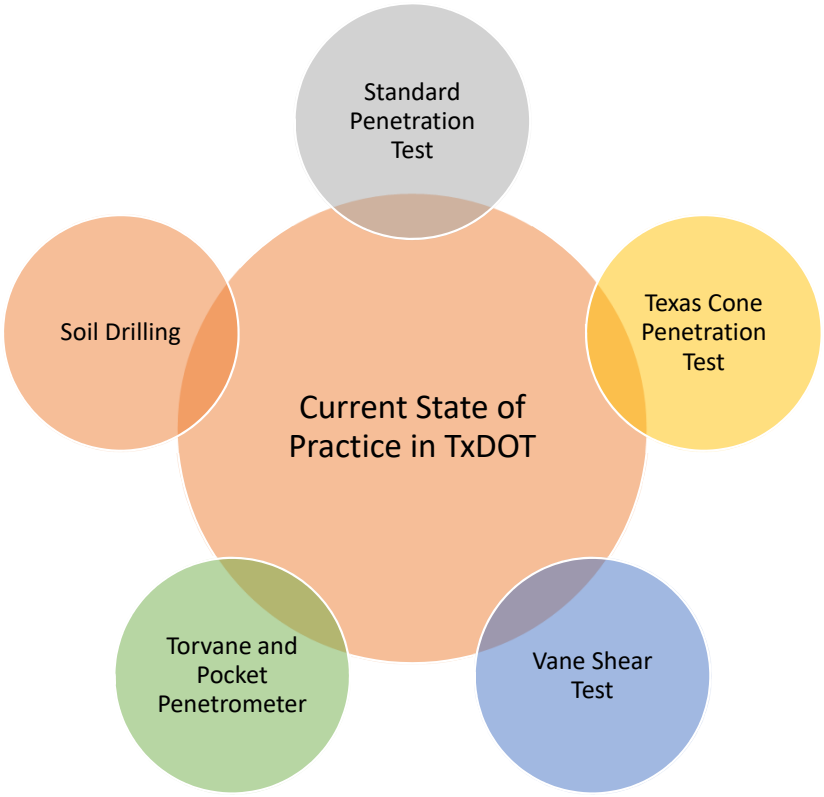
- Project Schedule & Deliverables
- Project Progress Update
- Future Plan

Project Schedule & Deliverables

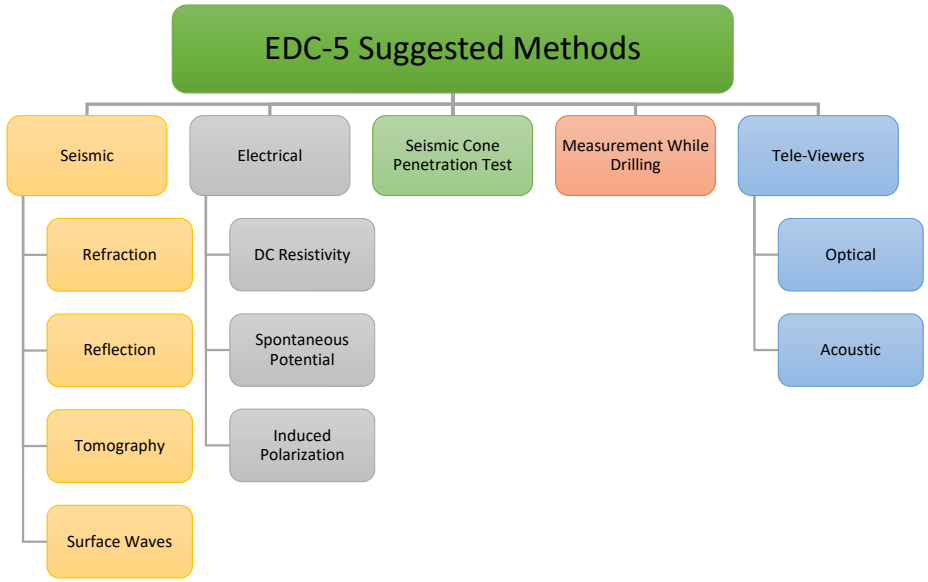
Tasks	FY 2019			FY 2020												FY 2021								
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Task 1. *Identify and conduct an overview analysis of the FHWA EDC-suggested geophysical tools*																								
Task 2. *Develop Recommendations for Improvements of TxDOT Geotechnical Practices*																								
Task 3. *Create Electrical Resistivity Profiling Manual*																								
Task 4. *Perform Demonstrative Electrical Resistivity Profiling*																								
Task 5. *Conduct detailed TRL Assessment to Achieve a TRL 9*																								
Task 6. *Create Text and Video Training Materials*																								
Task 7. *Perform a Series of Training Workshops*																								
Task 8. *Determine the Value of Research*																								
Task 9. *Draft the final report*																								
Task 10. *Revise and Finalize the Final Report*																								
Deliverables	MPR	MPR	TM1 & MPR	MPR	MPR	MPR	MPR	MPR	MPR	MPR	MPR	TM2 & MPR	MPR	MPR	TM3 & MPR	MPR	MPR	MPR	MPR	MPR	MPR, TM4, TM5, TM6,VTM	MPR, EM, VP, TM7, TM8, VOR, DFR	R1, SR, MPR	Close Out

MPR	Monthly Progress Report	**EM**	Educational Material	**DFR**	Draft Final Report
TM	Technical Memorandum	**VP**	Video Presentation	**R1**	Revised Final Report
VTM	Video Training Material	**VOR**	Value of Research	**SR**	Summary Report

Subsurface Investigation Methods



(TxDOT Geotechnical Manual, 2018)

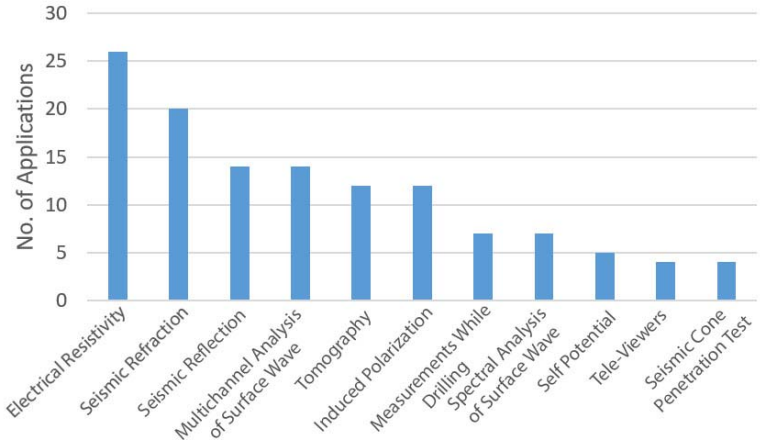


(FHWA, 2018)

Subsurface Investigation Using Electrical Resistivity Imaging

- Main benefits of electrical resistivity over other geophysical methods:

  - ✓ Applicable to various cases to determine subsurface features and soil properties
  - ✓ Rapid in terms of collection and interpretation of the data
  - ✓ High accuracy in terms of results
  - ✓ Cost-effective process
  - ✓ Straightforward field measurement

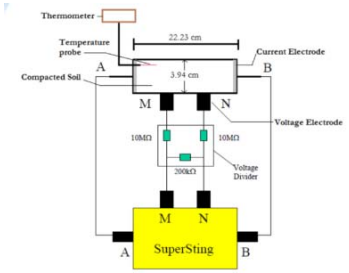


Common Applications of Geophysical Methods

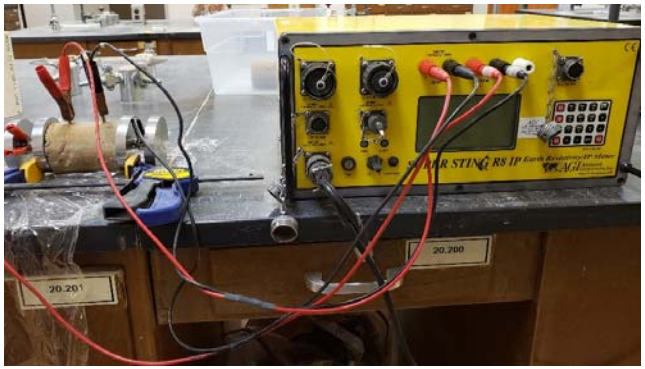
- **Soil layers**
- **Rock layers**
- **Depth of bedrock**
- **Mapping bedrock topography**
- **Lithology**
- **Mapping sub-bedrock structure**
- **Delineating steeply dipping geologic contacts**
- **Depth of water table**
- **Fractures and fault zones**
- Fracture orientation
- **Voids and sinkholes**
- **Soil and rock properties**
- **Locating shallow sand and gravel deposits**
- **Landfill leachate**
- **Contaminant plumes**
- **Saltwater intrusion**
- **Soil salinity**
- **Drums and UST**
- **Abandoned mine**
- **Landfill and trench boundaries**
- **Landslide site evaluation**
- Organic material
- **Clay content**
- **Near-surface anomalous conditions**
- **Archeological features**
- **Forensics**
- **Abandoned well**
- **Location of aquifer**

(ASTM D6429-99, 2011; Anderson et al., 2008; Wightman et al., 2004; Edet, 2009; Sirles, 2006; ASTM Standard D6285-99, 1999; British Standards Institution, 2010)

Electrical Resistivity Imaging



Circuit diagram for laboratory setup For soil resistivity tests.

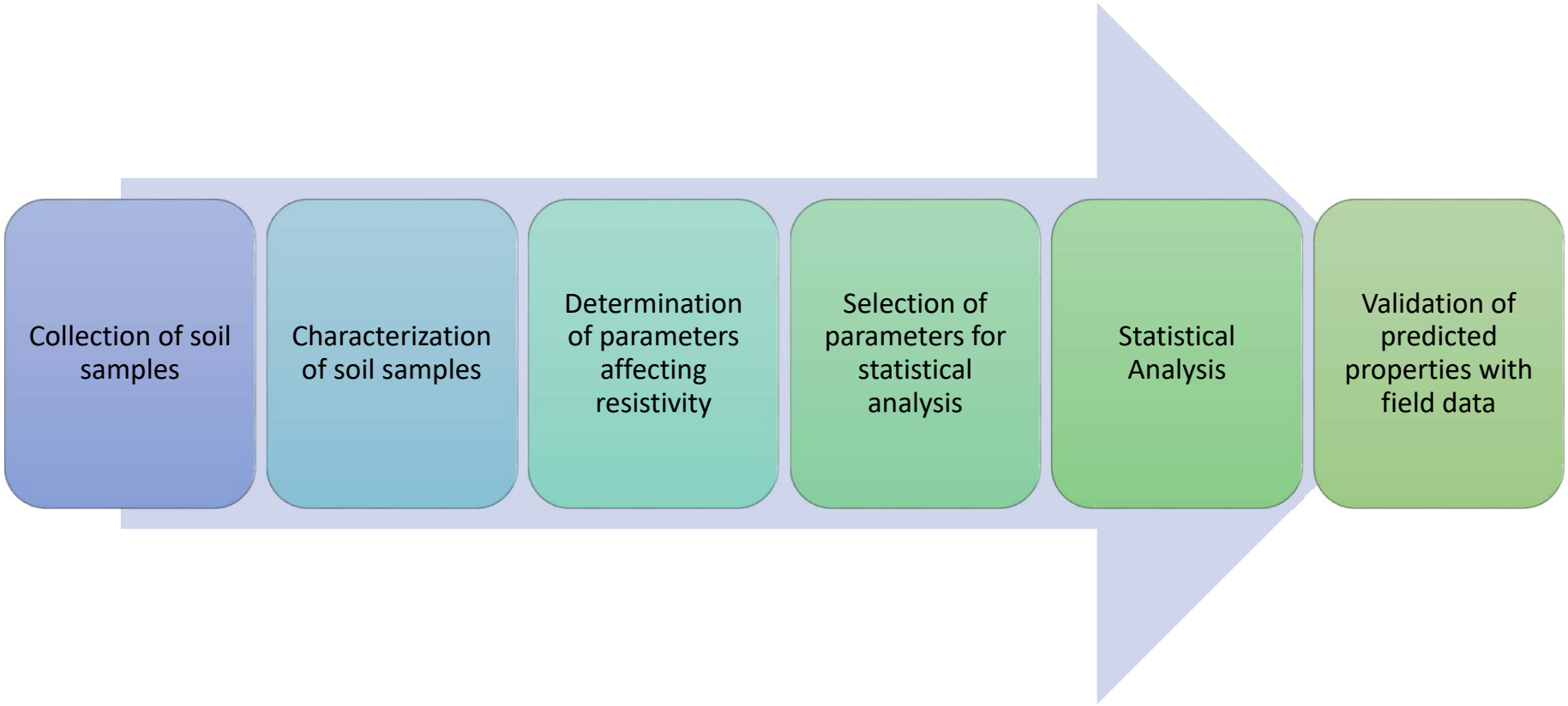


Laboratory Electrical Resistivity Imaging
(UTA Laboratory)

Field Electrical Resistivity Imaging
(US69-SH73 project in Beaumont District)

Procedures to Create Correlation

(Correlation between geotechnical and geophysical parameters)



Characterization of Soil Samples

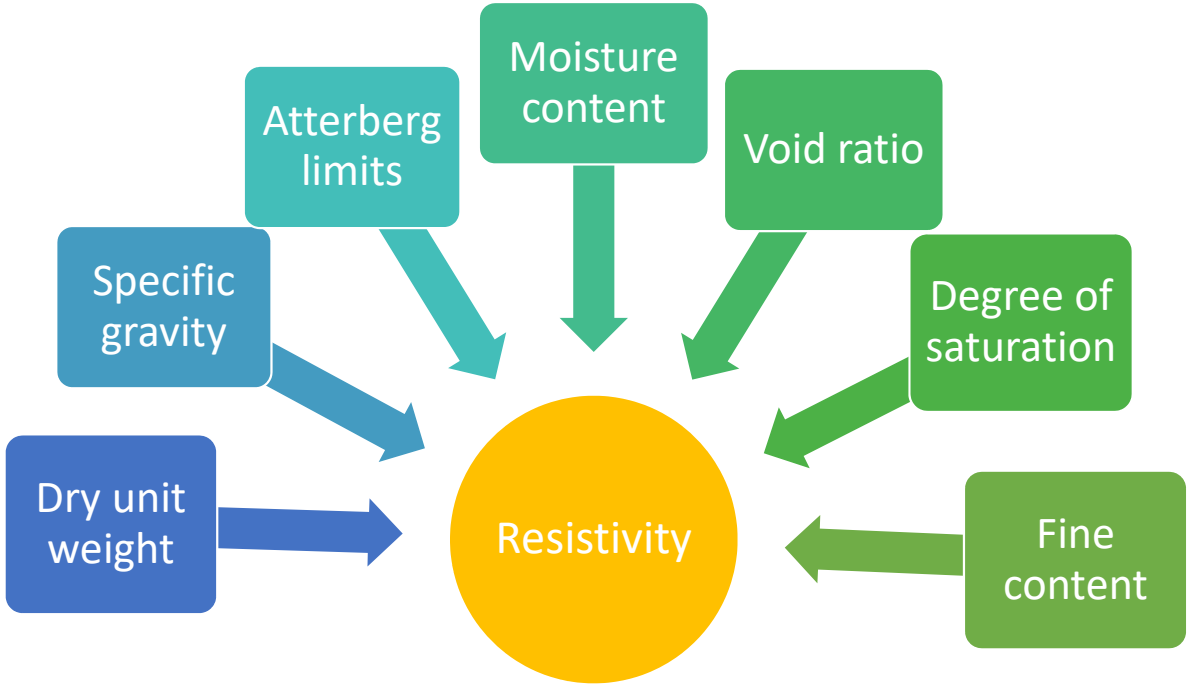
Physical Properties Tests:

- Atterberg limits (ASTM D-431)
- Specific gravity (ASTM D-854)
- Moisture content (ASTM D-2216)
- Unit weight (ASTM D-2937)

Soil Mineralogy Tests:

- Scanning Electron Microscopy (about topography, morphology, composition, and crystallographic info.)
- Energy Dispersive X-ray Spectrometry (about compositional elements)
- X-Ray Diffraction (about atomic structure and minerals)
- Colorimetric Method (sulphate Content)

Determination of Parameters Affecting Resistivity



Statistical Analysis of Collected Data

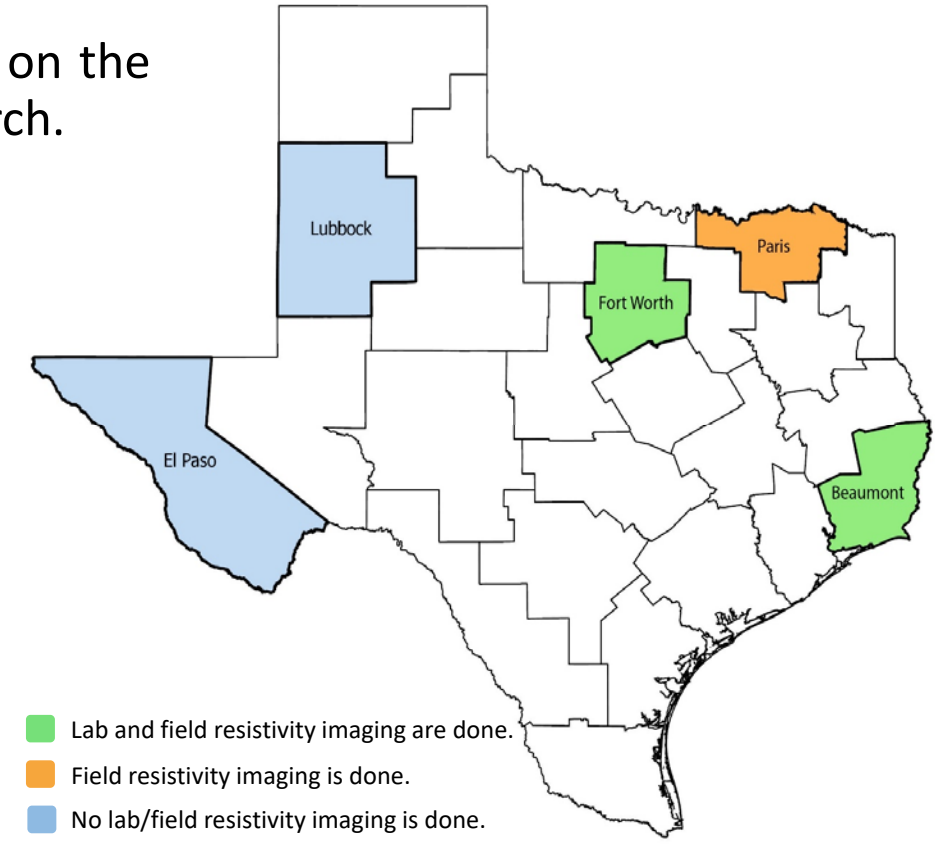
- The method used for statistical analysis:
  - ✓ Multiple Linear Regression (MLR)
    - ✓ Box-Cox method is used as variance-stabilizing transformation.

- The predictor variables used for statistical analysis:
  - ✓ Moisture content (w) which is correlated with degree of saturation.
  - ✓ Dry unit weight (γ_d) which is correlated with void ratio and specific gravity.
  - ✓ Plasticity Index (PI) which is correlated with liquid limit.
  - ✓ Specific gravity (G_s).

Proposed Districts for Electrical Resistivity Profiling

- Five TxDOT districts were selected based on the following criteria to be focus of this research.

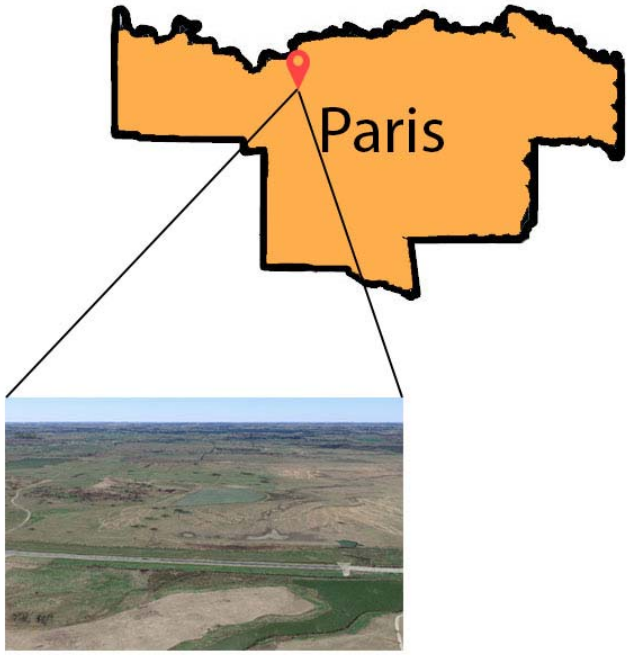
  - ✓ Geotechnical characteristics
  - ✓ Precipitation or frequent wetting and drying cycles
  - ✓ Most recent challenging projects
  - ✓ Limited experience in using geophysical methods



Electrical Resistivity Implementation in Paris District

- The electrical resistivity survey was implemented on July, 2019 on the recent “US 82” project.

- The survey was conducted in two lines:
  - ✓28 electrodes with 3 feet spacing for a length of 81 feet.
  - ✓56 electrodes with 3 feet spacing for a length of 165 feet.



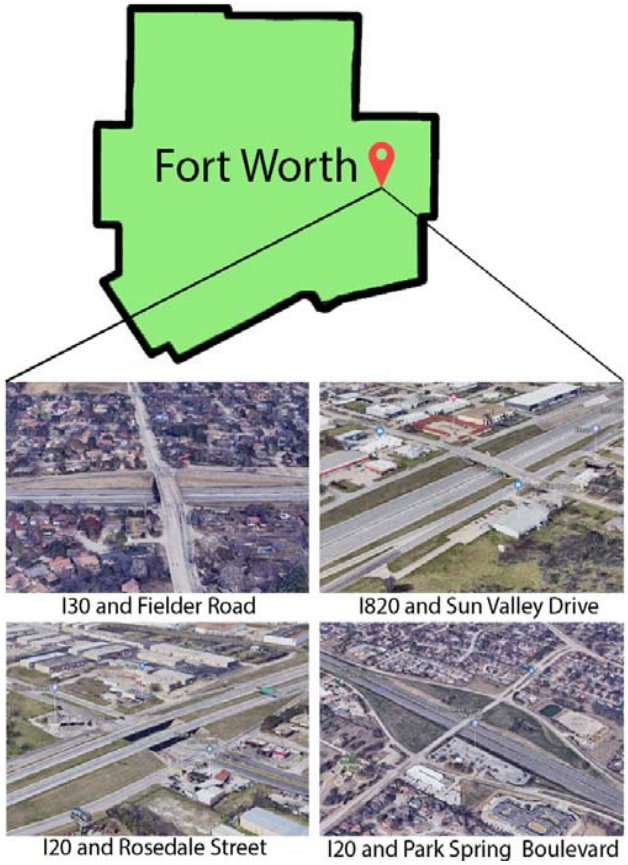
US 82

Electrical Resistivity Implementation in Fort Worth District

- The electrical resistivity surveys were implemented on July, 2019 on the five different locations.

- The surveys were conducted in five lines:
  - ✓26 electrodes with 3 feet spacing for a length of 75 feet.
    - Two lines at I30 and Fielder Road
    - A line at I20 and Park Spring Boulevard
    - A line at I820 and Sun Valley Drive
  - ✓28 electrodes with 4 feet spacing for a length of 100 feet.
    - A line at I20 and Rosedale Street

- Soil samples were collected at different depths for each location.



Electrical Resistivity Implementation in Beaumont District

- The electrical resistivity surveys were implemented on October, 2019 on the four different locations.

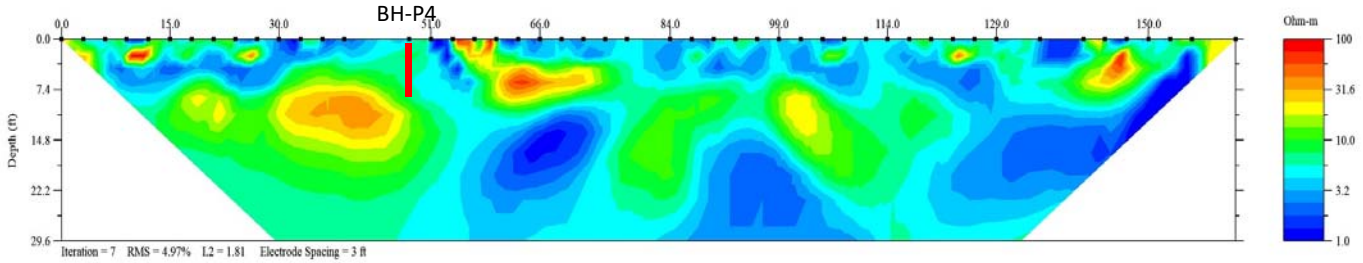
- The surveys were conducted in seven lines:
  - ✓28 electrodes with 3 feet spacing for a length of 81 feet.
    - Two lines at P-1 borehole
    - Two lines at P-4 borehole
    - Two lines at P-6 borehole
    - A line at P-17 borehole

US69 and SH73

- Soil samples were collected at different depths at the borehole locations.

The Use of Electrical Resistivity Profiles

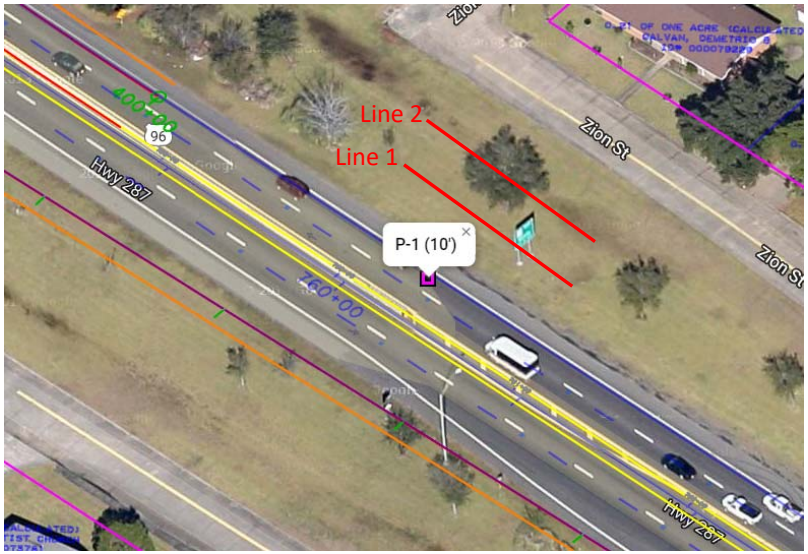
- The electrical resistivity survey is used to evaluate:
  - ✓ Continuous soil profiling
  - ✓ Soil type
  - ✓ Geotechnical properties of soil (moisture content, degree of saturation, void ratio, and dry unit weight)

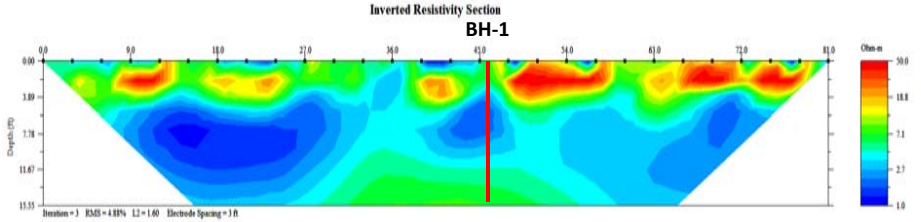


US 82 – Paris District

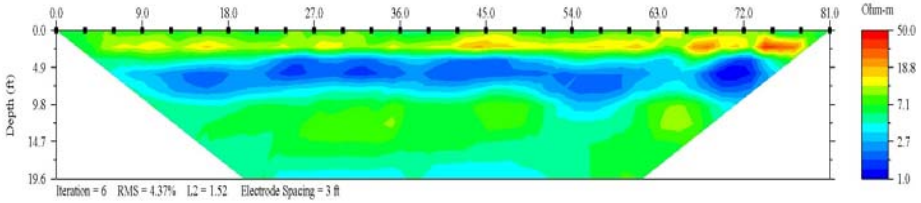
Software: Earth-Imager

Continuous Subsurface Soil Profiles





Line 1: 15 ft from the P-1 borehole– Beaumont District

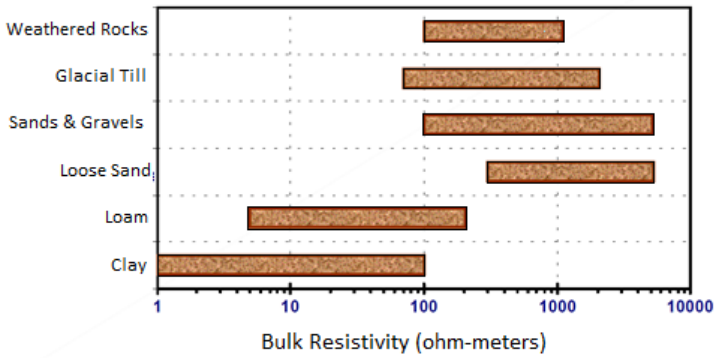


Line 2: 20 ft from the P-1 borehole– Beaumont District

Software: Earth-Imager

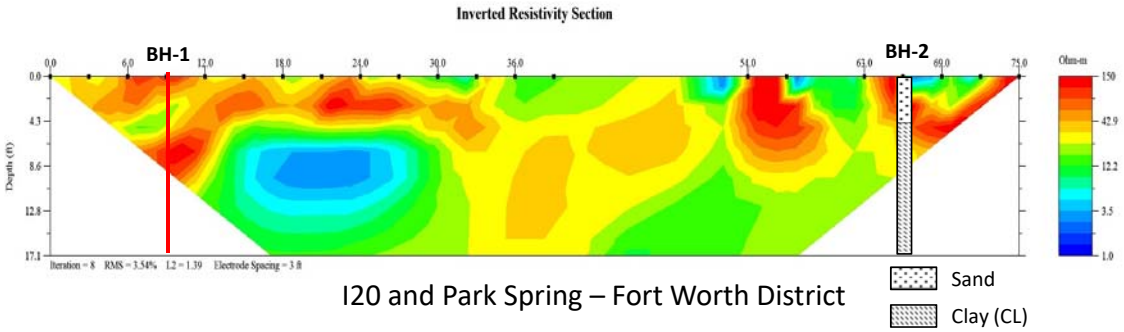
Soil Type

Resistivity values for different geomaterials (Adapted from Mayne et. al., 2002)



Variation of resistivity values with depth at BH-2

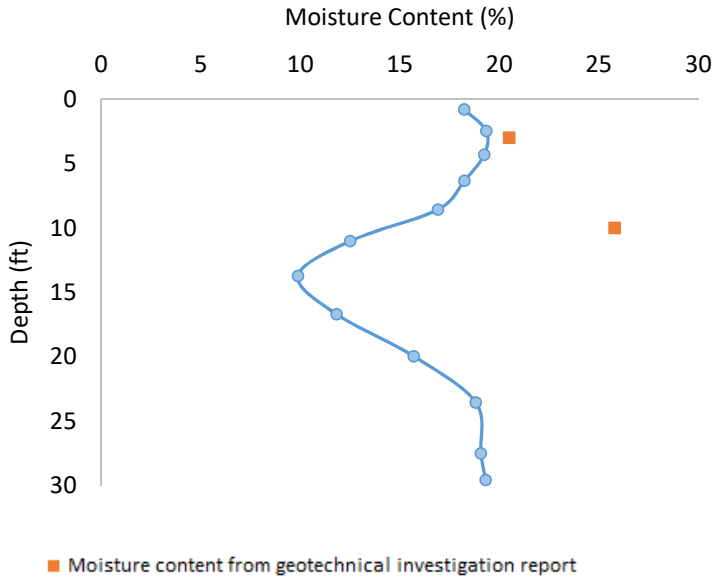
Depth (Feet)	Resistivity (Ohm-m)
0.9	6.7
2.8	114.3
4.9	85.5
7.2	31.7
9.7	28.4
12.5	24.5
15.5	24.6
17.1	24.6



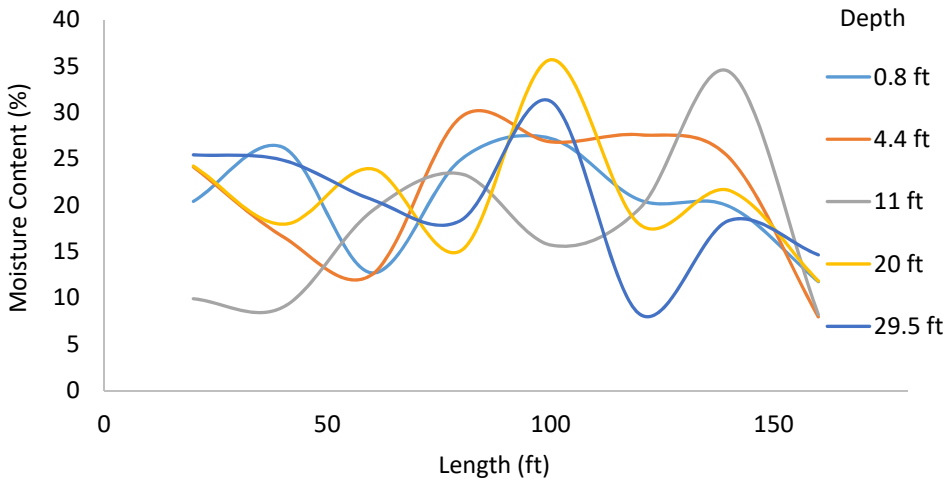
I20 and Park Spring – Fort Worth District

Software: Earth-Imager

Geotechnical Properties



Variation of moisture content with depth at the borehole location – Paris District



Variation of moisture content along the profile length

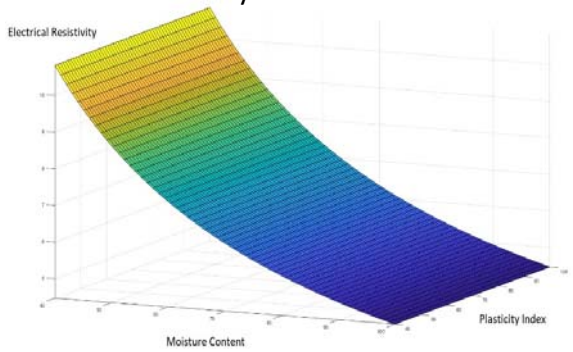
(Note: Equations of moisture content, dry unit weight, degree of saturation, and void ratio based on electrical resistivity are developed by Hossain et al., 2018)

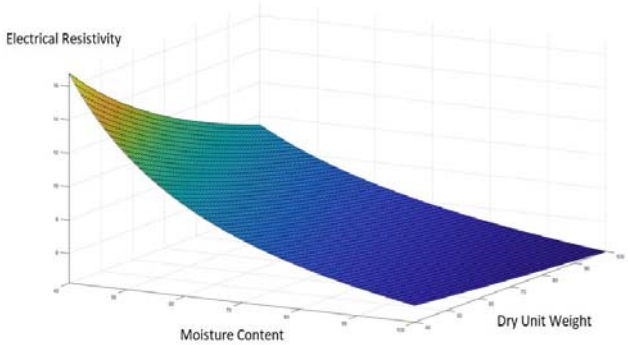
Preliminary Correlation Between Electrical Resistivity and Soil Properties

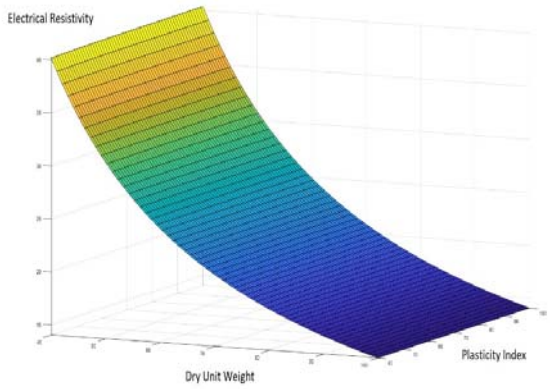
- For clay soils:

$$R^{-1} = -0.0606 + 0.00219 \times w + 0.00077 \times \gamma_d + 2.8909\, PI^{-2.5} \qquad (R^2 = 0.77)$$

R : Electrical Resistivity
w: Moisture Content
γ_d: Dry Unit Weight
PI: Plasticity Index







Future Plan

- Implement electrical resistivity imaging on proposed projects by the El Paso, Lubbock, and Paris district offices.
- Suggest instructions to interpret the electrical resistivity profiles.
- Create correlations for predicting the soil properties using electrical resistivity values.
- Prepare electrical resistivity profiling manual.

Thank You!

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Automated Traffic Signal Performance Measures

Kevin Balke, TTI

Implementation of Automated Traffic Signal Performance Measures

Srinivasa Sunkari, P.E., PMP, Research Engineer
Kevin N. Balke, Ph.D., P.E., PMP, Senior Research Engineer
Texas State Transportation Innovation Council
December 5th 2019

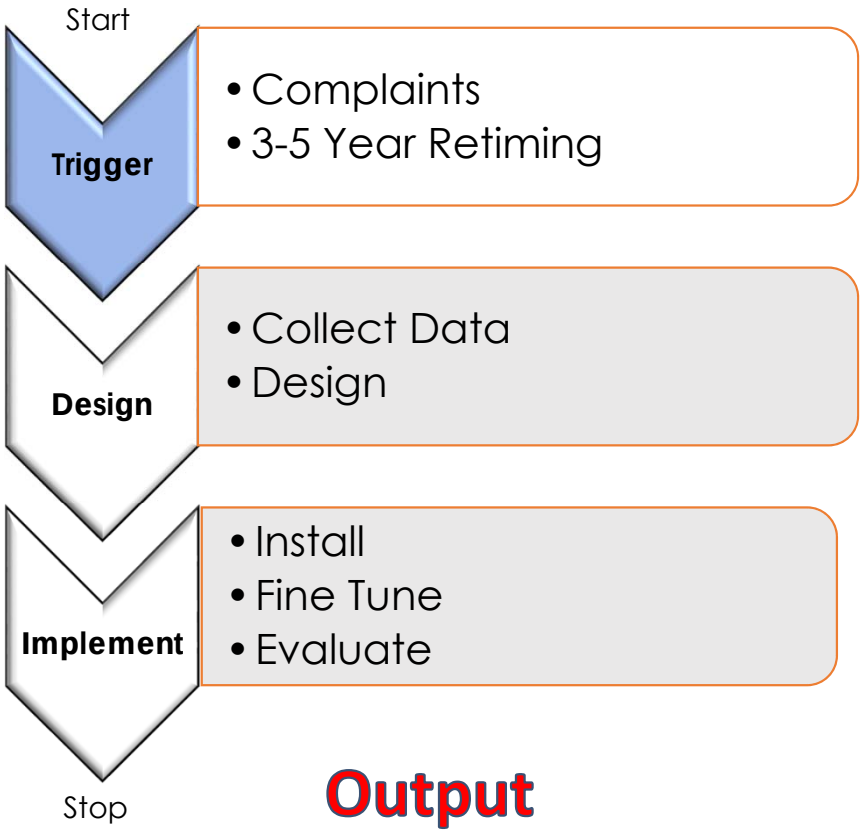
What is ATSPM?

Automated Traffic Signal Performance Measures

A suite of performance measures, High Resolution Data collection tools, and data analysis tools to support an objective and performance based approach to managing a traffic signal program*

* Source FHWA

An Opportunity To Transform the Practice



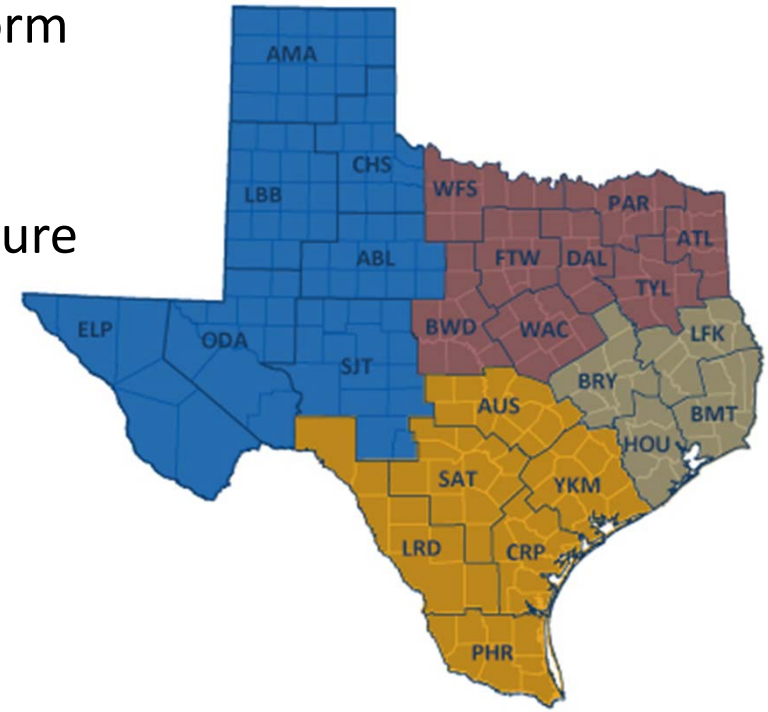
Output

Outcome

* Source FHWA

How Will This Project Help TxDOT?

- Initiate the creation of a statewide ATSPM platform
  - 25 districts
  - Varying traffic signal infrastructure and user-needs
- Support TxDOT districts in prioritizing infrastructure to support the statewide ATSPM initiative
- Enhance the practice of operating, maintaining, and managing traffic signal systems
- Support TxDOT's core objectives:
  - Focus on customer
  - Foster Stewardship
  - Optimize System performance



What Are We Doing In This Project?

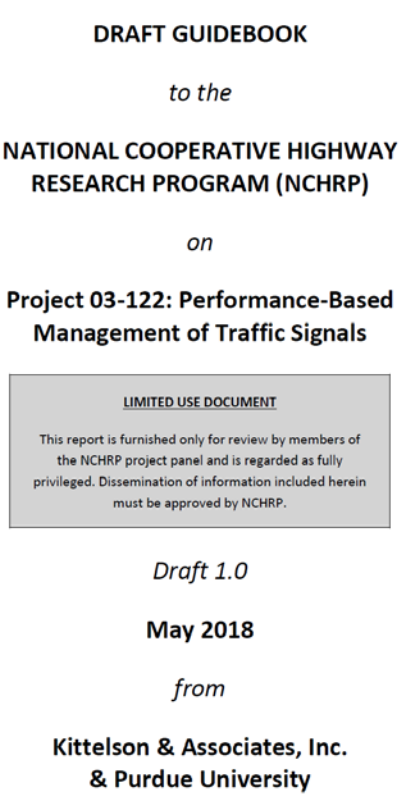
- Review ATSPM platforms
- Survey other statewide deployments of ATSPM
- Identify performance metrics appropriate for TxDOT
  - Decision makers
  - Operators
- Investigate enhancements to the performance metrics

Project Deliverable

- System requirements for statewide deployment
  - TxDOT can use to develop bid documents
- Guidelines for districts to implement
  - Identify enhancements necessary to meet objectives
  - Prioritize infrastructure to be integrated into the ATSPM system

What We Have Done So Far?

- Reviewed literature to identify issues related to ATSPMs implementation
  - Including, NCHRP 03-122 guidelines
- Conducted preliminary assessment of state of ATSPM deployment at TxDOT



DRAFT GUIDEBOOK

to the

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP)

on

Project 03-122: Performance-Based Management of Traffic Signals

LIMITED USE DOCUMENT

This report is furnished only for review by members of the NCHRP project panel and is regarded as fully privileged. Dissemination of information included herein must be approved by NCHRP.

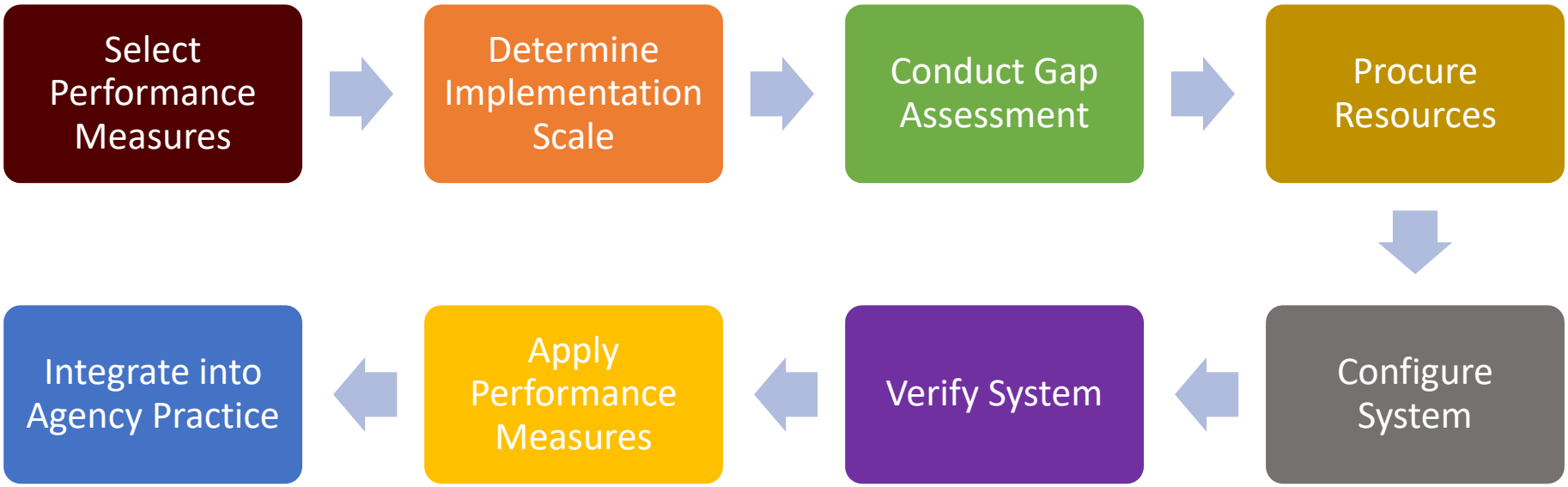
Draft 1.0

May 2018

from

Kittelson & Associates, Inc. & Purdue University

Methodology To Implement an ATSPM System



Building Blocks Of An ATSPM System

- Human Capital
  - Senior Management
  - Mid-level Management
  - Staff
- Equipment and Software
  - Communication
  - Detection
  - Data Logging Equipment (TSC)
  - Data Storage
  - Software

Looking for a Champion

Success Stories

- Utah DOT's ATSPM System
  - Have a high rate of return on investment
  - Implemented at 96% of the 1,223 state maintained signals
  - "We no longer go out to retime signals every three to five years. Now, we do it only when it's needed, after we've looked at performance measurements."
- Georgia DOT
  - Implemented at 59% of the 6,500 state maintained signals
  - "With ATSPM, we have a snapshot of the health of our entire system and the ability to quickly diagnose and focus resources across the whole system."

What Has TxDOT Done So Far?

- Pilot deployment of Utah ATSPM
  - Server at TRF
  - Signal systems in San Antonio, Austin, Brownwood and several other districts configured
  - Challenges include lack of internal resources for system maintenance/use
- Miovision SPM pilot deployments in Fort Worth and Houston
- Centracs SPM in Houston area
- Iteris SPM demonstration at a few intersections

Next Steps

- Reach out to districts that have implemented pilot ATSPM systems about their experiences
- Reach out to other districts about user-needs and gap assessment for an ATSPM system
- Detailed evaluation of at least 3 ATSPM options
  - Hardware-software requirements
  - Initial and recurring resource needs
  - Cost-benefit analysis
  - Extension capability
  - Compatibility with, and ability to integrate with, other systems

Questions

Wrong Way Driving

Greg Mack, CTRMA

Wrong Way Driver Pilot Project

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

Greg Mack, Assistant Director of IT & Toll Systems

December 5, 2019

Who We Are

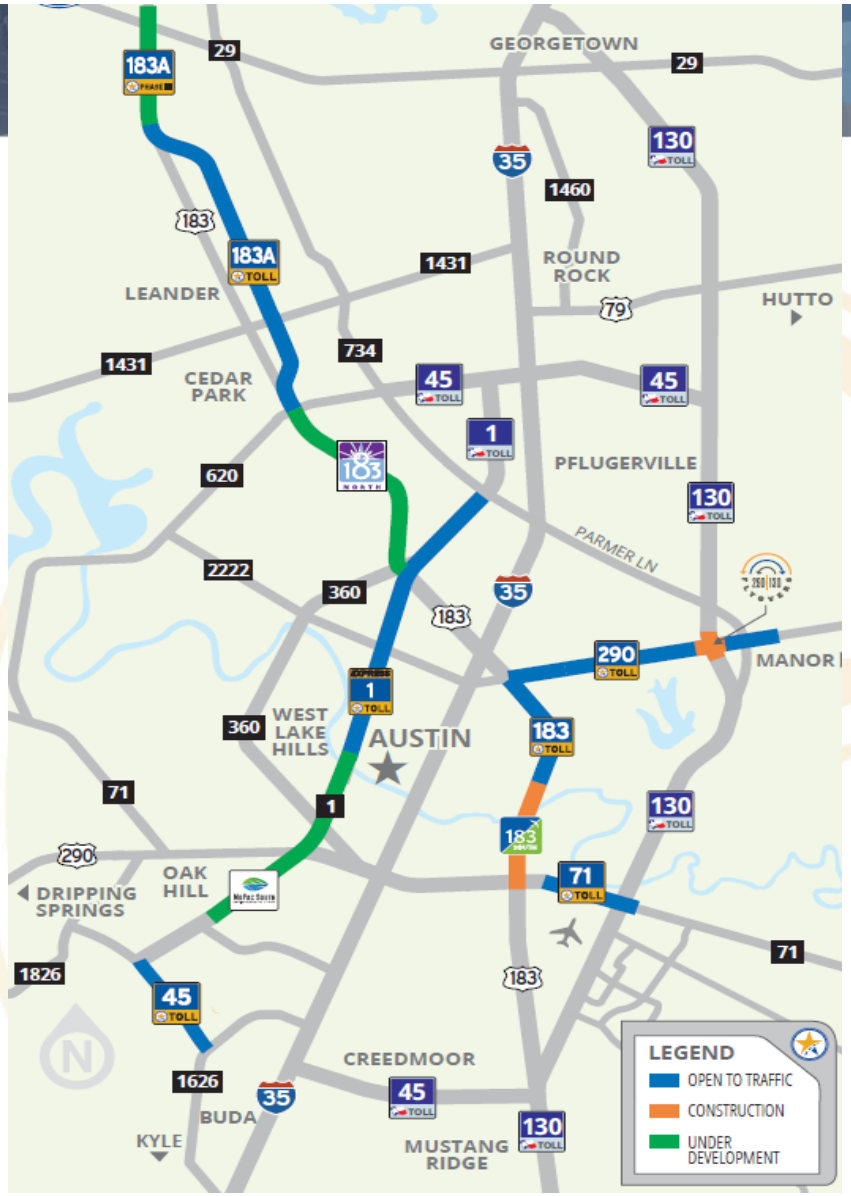
- The Central Texas Regional Mobility Authority is a multi-modal transportation agency authorized under 2001 State legislation
- A bi-county agency created in 2002 by Williamson and Travis counties
- Overseen by a seven member board of local volunteers appointed by the respective counties and Governor
    - 3 appointed by Travis County
    - 3 appointed by Williamson County
    - Board Chair appointed by the Governor

CTRMA Roadways

- **Open to Traffic**
- 183A
- 290
- SH71 Toll
- Mopac Express Lanes
- 45SW
- 183 South

Under Review

- 183 North Express Lanes
- Mopac South Express Lanes



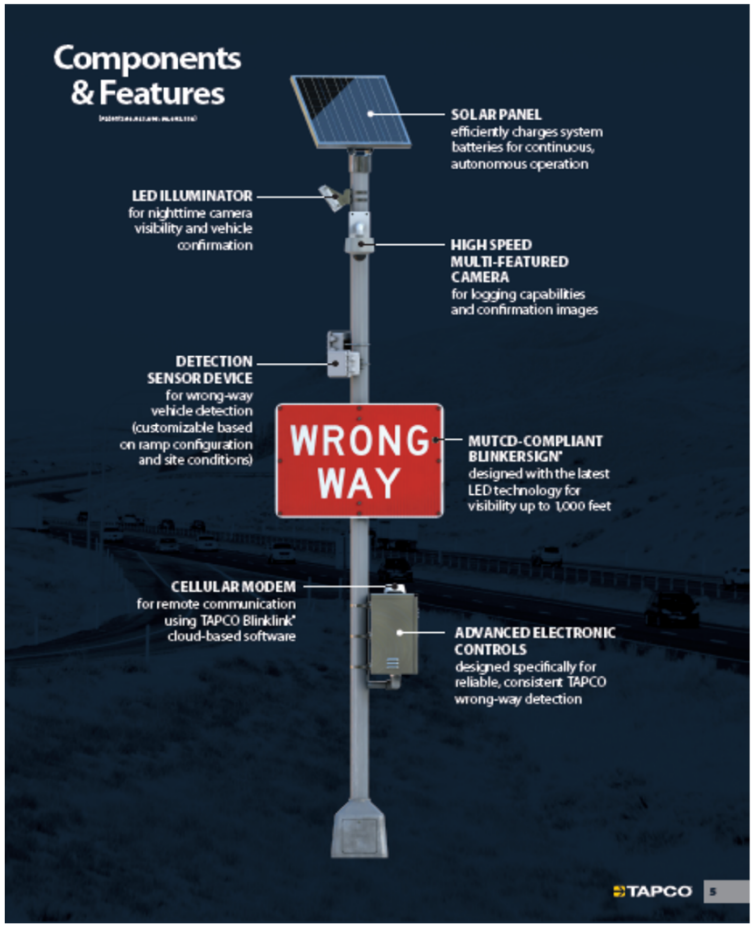
Wrong Way Driver Trends

- In the United States, WWD crashes result in 350 fatalities per year.
- In terms of factors associated with wrong-way crashes, key findings from the indicate that:

  - wrong-way collisions tend to have higher fatality rates than other accidents;
  - drivers impaired by alcohol and older drivers are over-represented in wrong way crashes;
  - the primary origin of wrong-way movements is entering an exit ramp.
  - wrong-way collisions occur more frequently at night; and
  - a disproportionate number of wrong-way collisions occur on the weekends.

National Transportation Safety Board report (NTSB, 2012)

Countermeasure



The primary purposes of a Wrong Way Driver Detection System are to:

- Detect
- Notify
- Quantify
- Enforce

Wrong Way Detection System

System Components

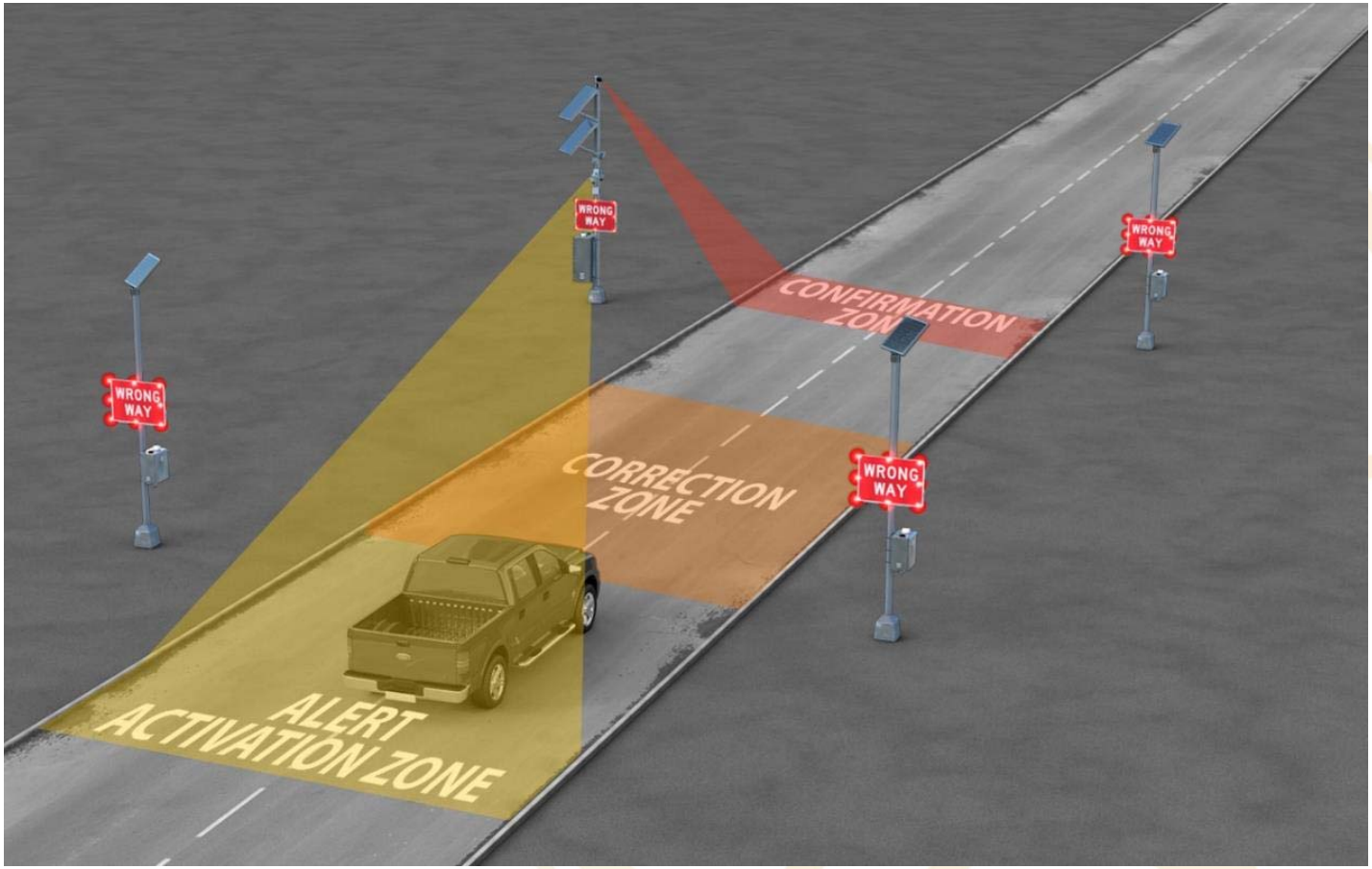
- 1 - Sensors
  - *Confirming Technology*
  - *Radar and Thermal Imaging (FLIR)*
- 2 - Illuminator
- 3 - High-speed camera
- 4 - LED-enhanced Warning Alerts
- 5 – Control Cabinet

Wrong Way Alert Zones

1. **Alert Activation Zone:** Initial wrong way detection triggers alerts to flash

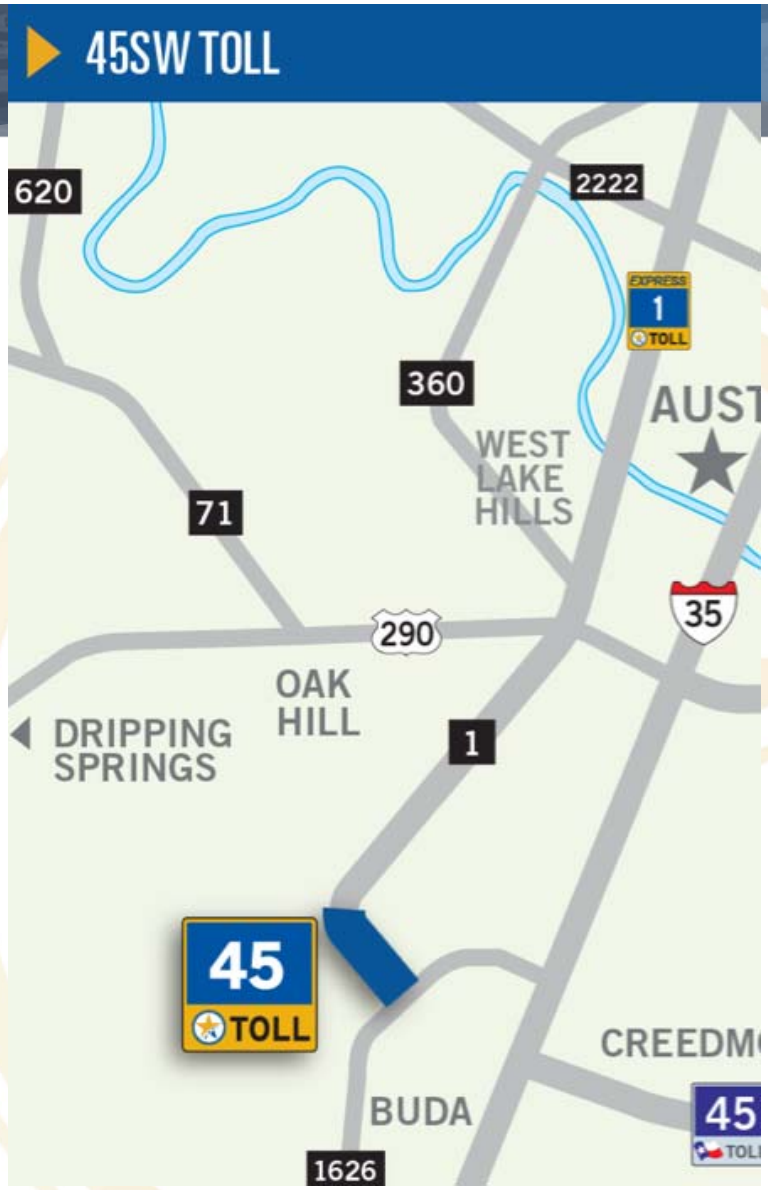
2. **Correction Zone:** Opportunity for driver to self correct

3. **Confirmation Zone:** Confirming wrong way detection triggers camera and high priority alert sent to the TMC

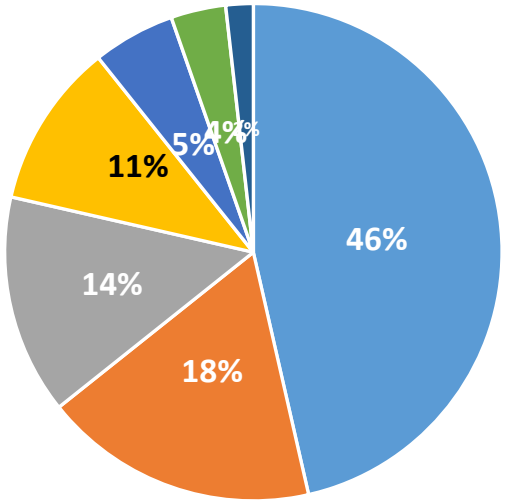


45 SW Toll Overview

- **Project Limits**: FM 1626 to Loop 1/ MoPac
- **Project Length:** 3.6 miles
- **Total Project Cost:** $108 Million
- **Project Status**: Opened to traffic on June 1st
- **Environmentally sensitive design:**
  - Water quality protection measures
  - Bicycle and pedestrian accommodations
    - 4.5-mile long, 10-foot wide shared use path that extends from FM 1626 to Escarpment Blvd.



45SW Wrong Way Driver System

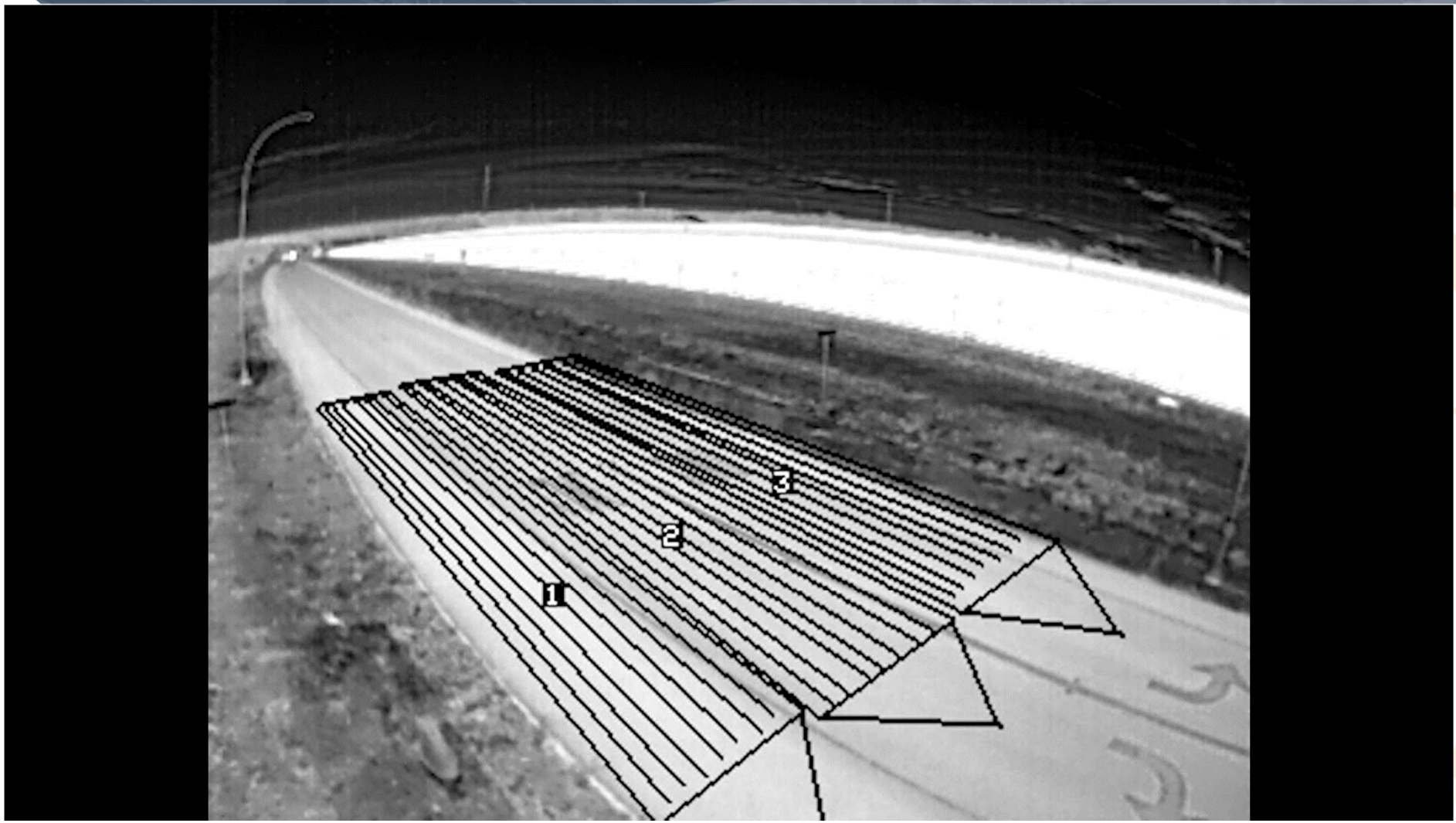


WWD Resolution Classification	Count	%
Vehicle Backed Up	26	46%
Wrong Way Vehicle	10	18%
Maintenance Vehicle	8	14%
False Positive	6	11%
Emergency Response Vehicle	3	5%
Pedestrian Detection	2	4%
Vehicle Made a Median Crossing	1	2%

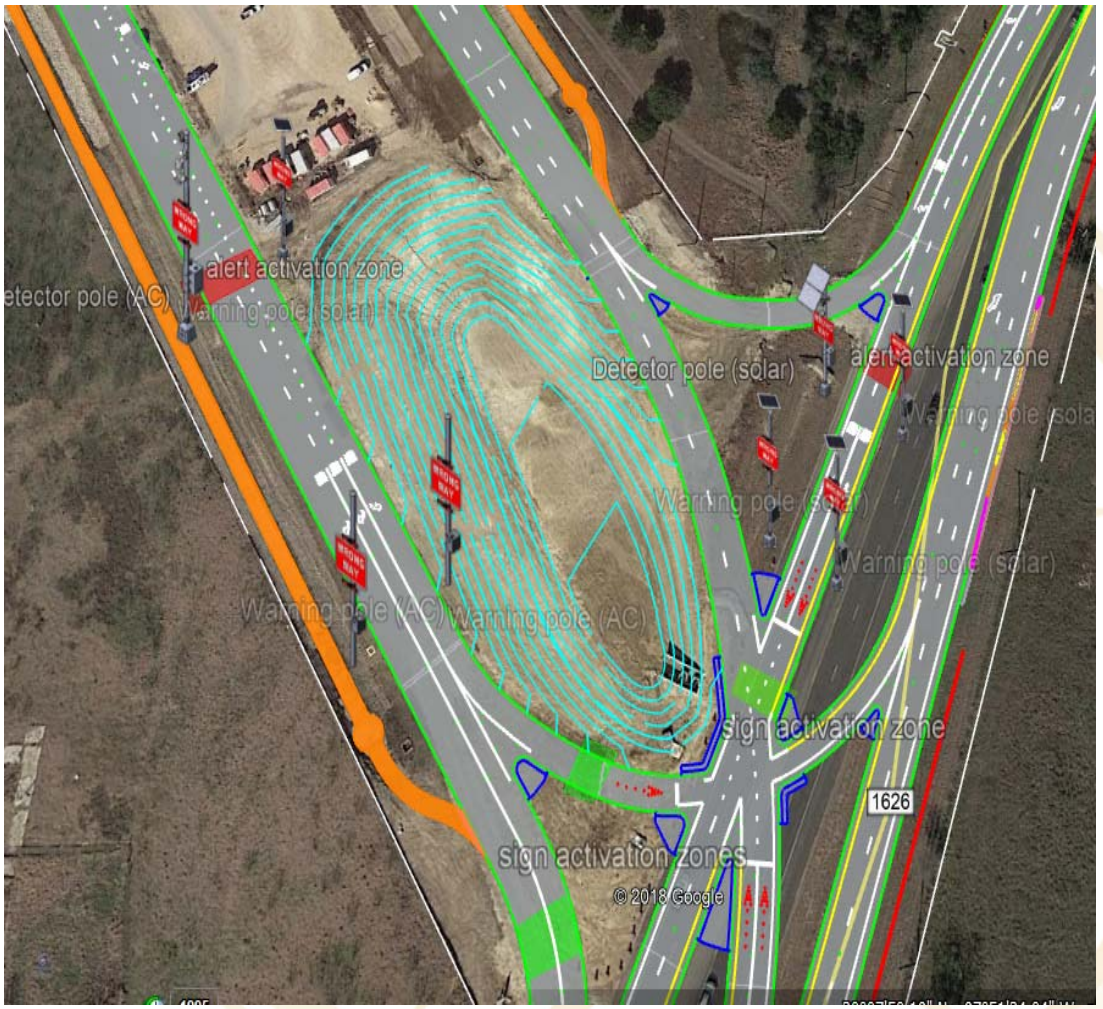
Since June1, 2019, there have been 56 wrong-way events:

- 10 confirmed wrong way movements
- All self-corrected

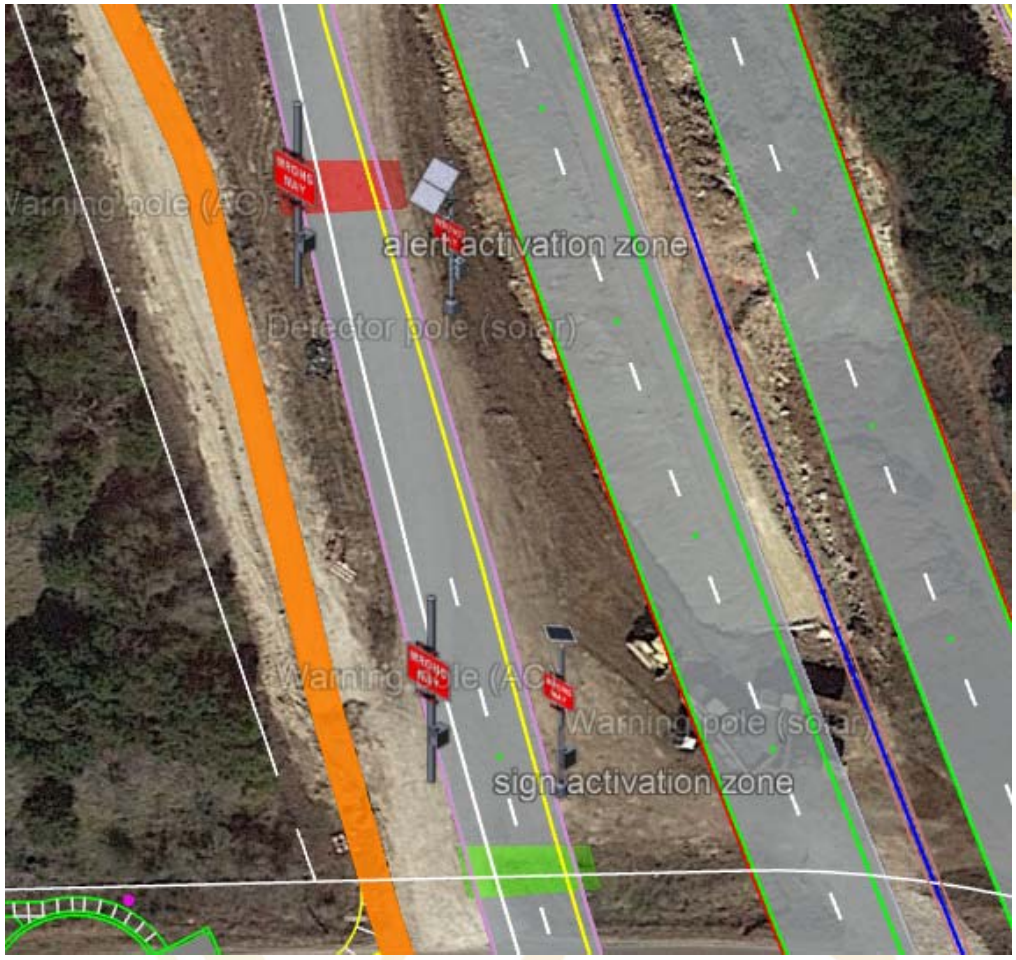
FLIR view



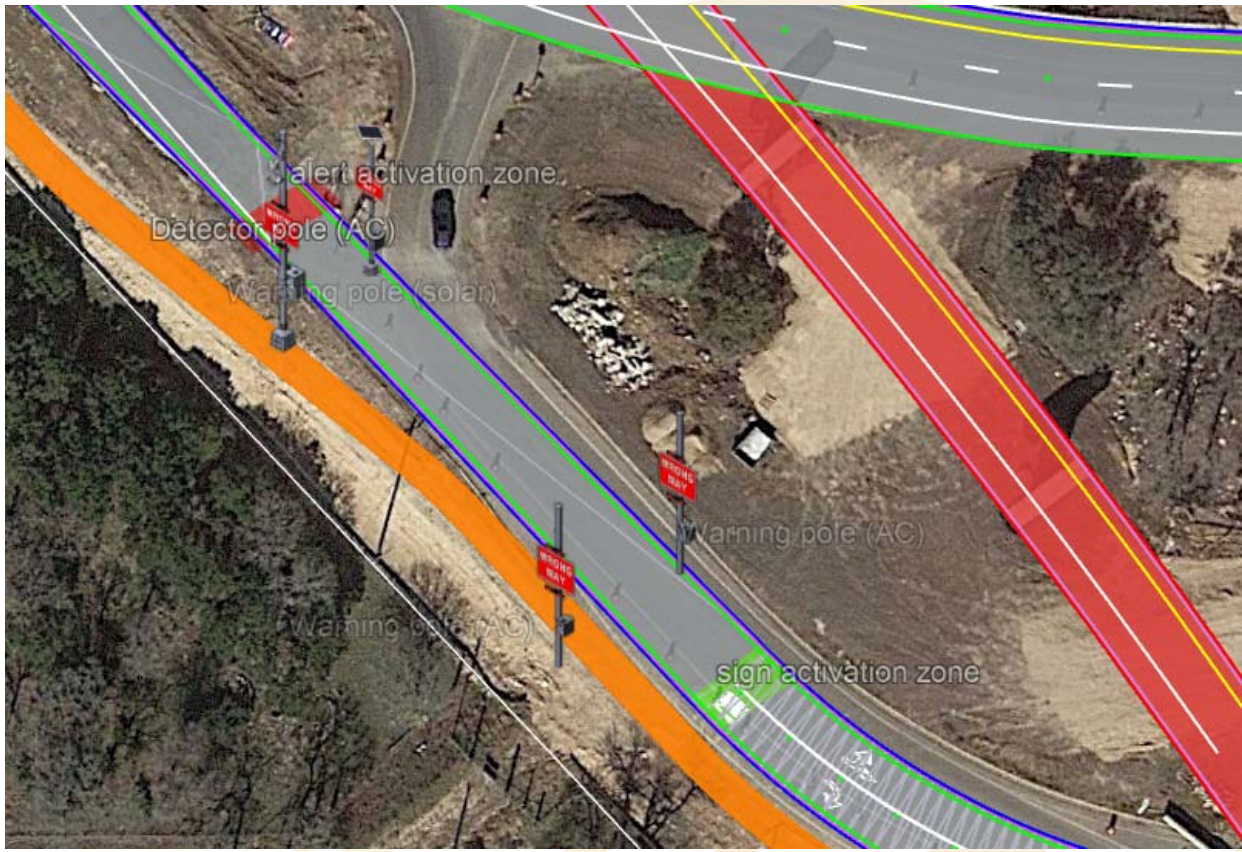
Sites 1 & 2 – 45SW @ 1626



Site 3 – Bliss Spillar Rd.



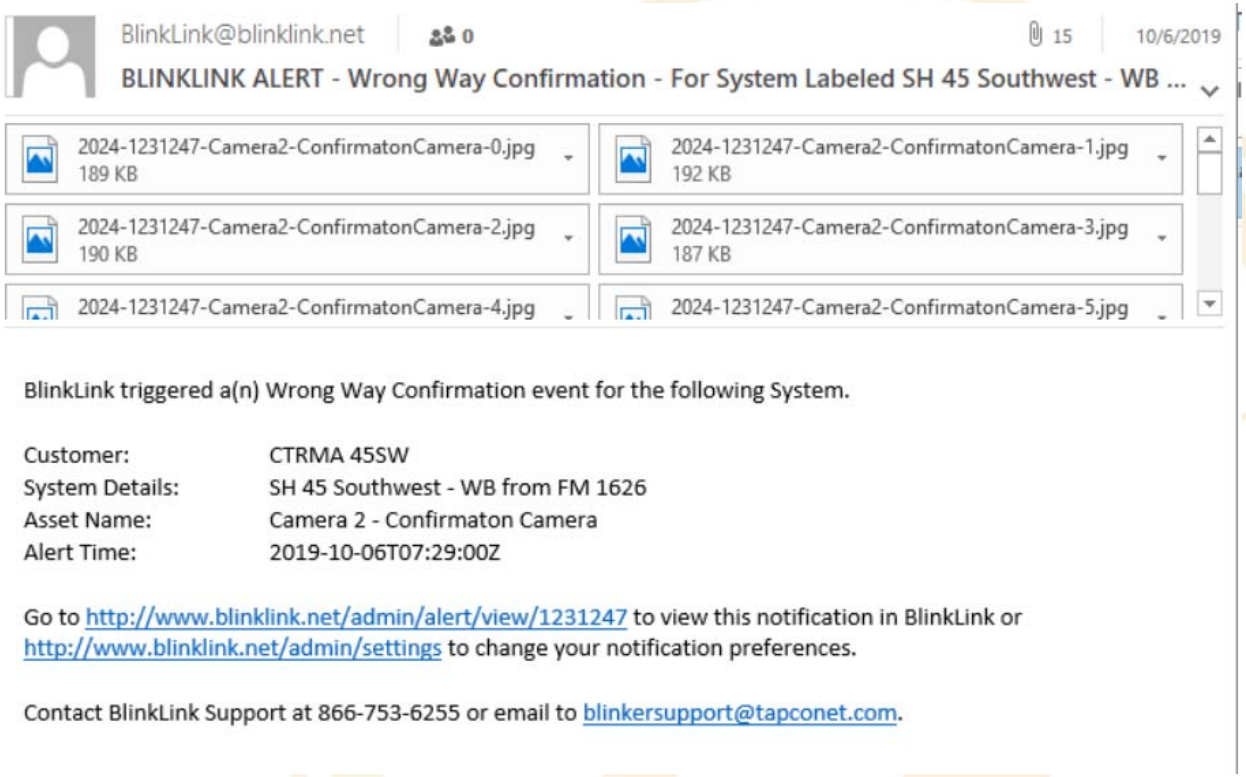
Site 4 – Archeleta Blvd.



Wrong Way POV

Wrong Way Notifications

- **Notify Local Authorities via email notification**
  - Images of wrong-way vehicle
  - Location
  - Alert time



BlinkLink@blinklink.net 0 15 10/6/2019

BLINKLINK ALERT - Wrong Way Confirmation - For System Labeled SH 45 Southwest - WB ...

2024-1231247-Camera2-ConfirmatonCamera-0.jpg 189 KB

2024-1231247-Camera2-ConfirmatonCamera-1.jpg 192 KB

2024-1231247-Camera2-ConfirmatonCamera-2.jpg 190 KB

2024-1231247-Camera2-ConfirmatonCamera-3.jpg 187 KB

2024-1231247-Camera2-ConfirmatonCamera-4.jpg

2024-1231247-Camera2-ConfirmatonCamera-5.jpg

BlinkLink triggered a(n) Wrong Way Confirmation event for the following System.

Customer:	CTRMA 45SW
System Details:	SH 45 Southwest - WB from FM 1626
Asset Name:	Camera 2 - Confirmaton Camera
Alert Time:	2019-10-06T07:29:00Z

Go to http://www.blinklink.net/admin/alert/view/1231247 to view this notification in BlinkLink or http://www.blinklink.net/admin/settings to change your notification preferences.

Contact BlinkLink Support at 866-753-6255 or email to blinkersupport@tapconet.com.

Wrong Way Event Management

Wrong Way Detection

06/14/2019 02:30:58 AM CDT (SH 45 Southwest - EB exit to Bliss Spillar Rd)

10 of 15

Click thumbnail to view

Prev Alert | Next Alert

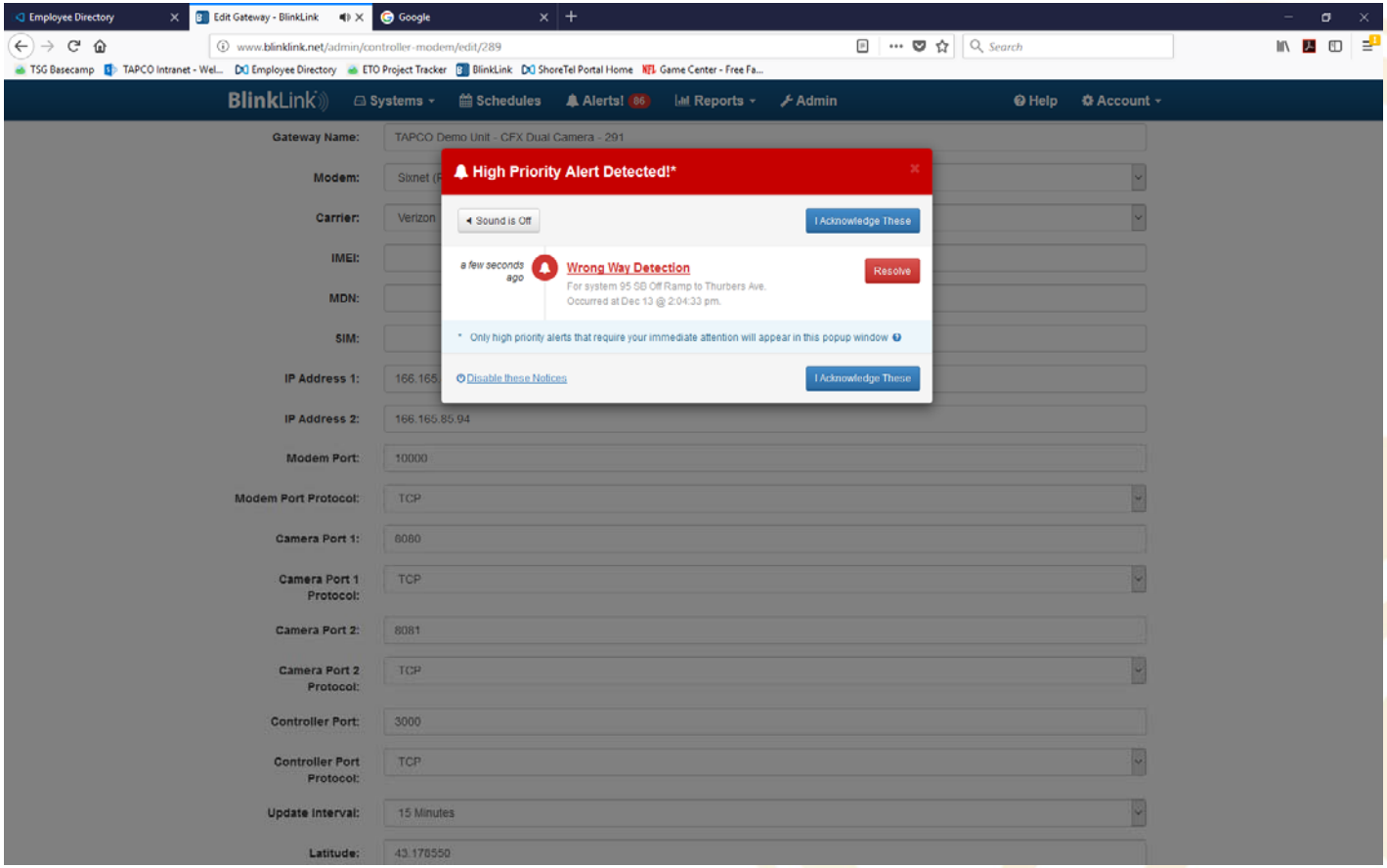
Alert Resolution

Resolution:	Wrong Way Vehicle
Notes:	Motorcycle

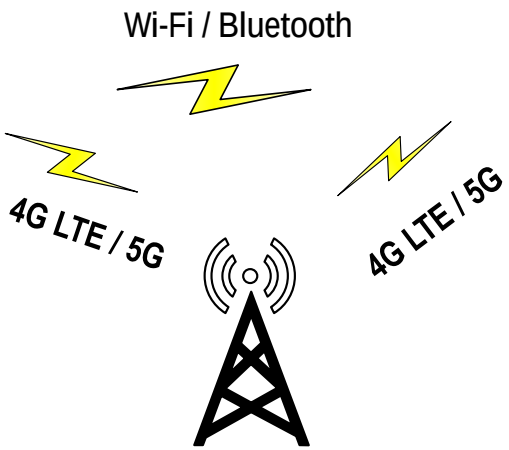
Full Alert Details

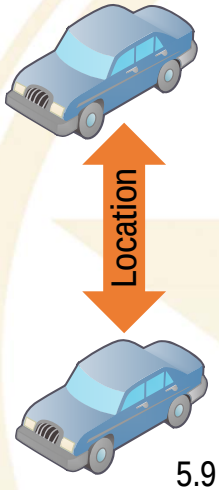
System:	SH 45 Southwest - EB exit to Bliss Spillar Rd
Controller:	Camera 1 - Wrong Way Alert Camera
Company:	CTRMA 45SW
Type:	Wrong Way Detection
Date:	06-14-2019 02:30:58 AM CDT
Alert ID:	1087946

Traffic Center Alerts



Connected Vehicle Integration





GM

TOYOTA

LEXUS

HYUNDAI

Ford

Connected Vehicle Message

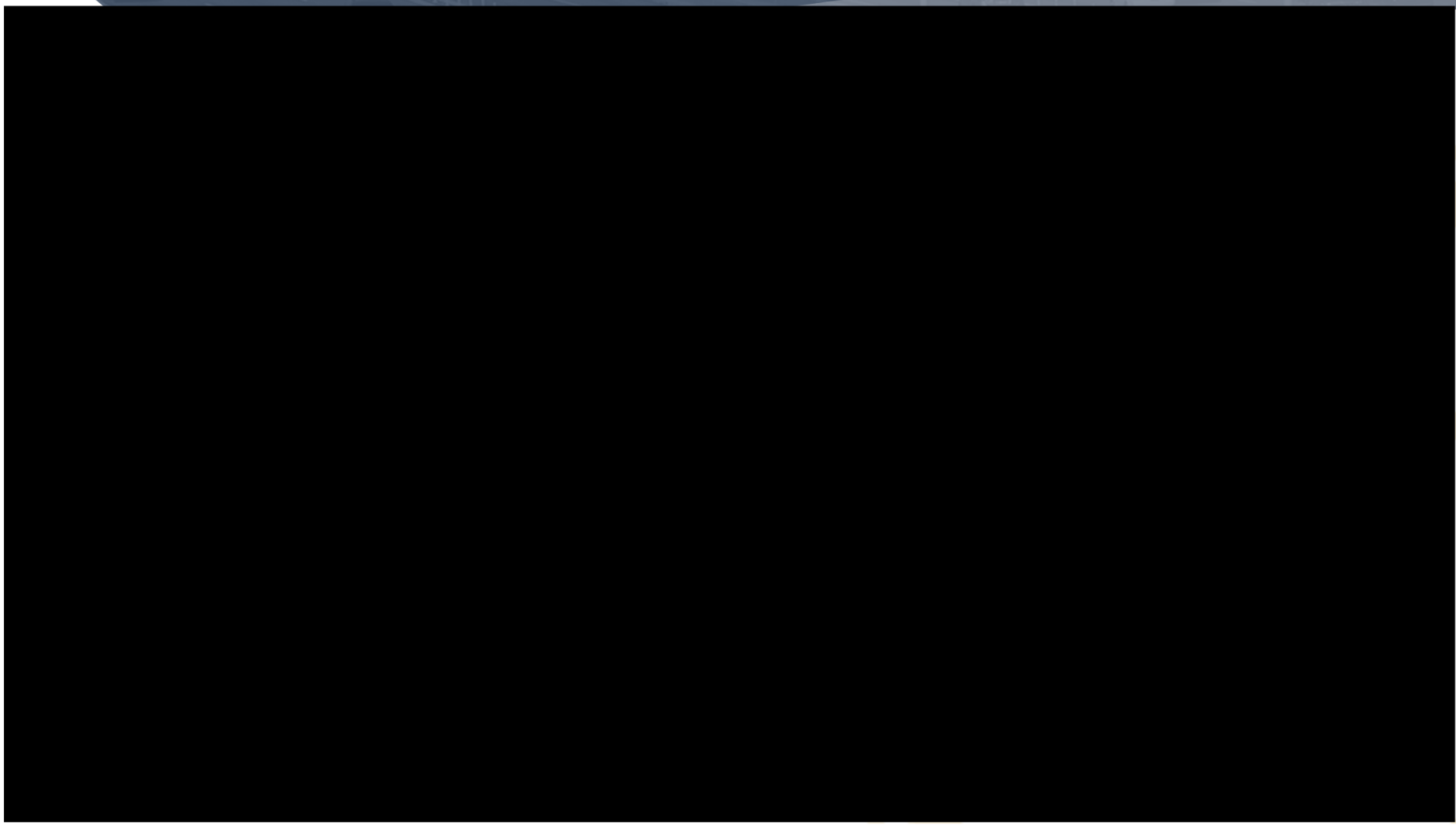
Wrong Way Travel Warning

Wrong Way Driver Ahead Warning

Next Steps

- What is next?
  - TTI is studying our new and existing corridors for candidate locations using:
    - 911 call data
    - Intersection design
    - Proximity to entertainment areas
  - Public Awareness

Wrong Way PSA



Other Proposed Technologies

- Wrong Way Detection Systems
- Bluetooth/Wi-Fi Reader/Dedicated
- CCTV cameras
- Automated Incident Detection (AID)
- Radar Vehicle Sensing Devices
- (RVSD)
- Dynamic Message Signs (DMS)
- Connected Vehicles
- Roadway Weather Information Systems (RWIS)
- Air Quality and Noise Pollution Sensors
- Proposed Technologies
- Pedestrian Detection and Safety
- Automated License Plate Recognition (ALPR)
- Vehicle Detection and Classification (VDC)

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

Thank You

www.MobilityAuthority.com

Traffic Safety Improvements at Low Water Crossings

Kevin Balke, TTI

Traffic Safety Improvements at Low Water Crossings

- **Chris Glancy, TxDOT Project Director**
- **Chiara S. Dobrovolny, TTI, Project Supervisor**
- **Kevin Balke, TTI, Co-PI**

Texas State Transportation Innovation Council
December 5h, 2019
Austin, Texas

Project Team Members /Introductions

Adam Jack – BMT
Chris Cowen – BRY
John Bassett – CST

Chris Glancy, PM

Joseph Muck – AUS
Kenneth Mora – DES

John Gionatti – SAT
Jianming Ma – TRF
Steve Chu – HOU

Chiara Dobrovolny, RS

Kevin Balke
Roger Bligh
Adam Pike
Stefan Hurlebaus
Subasish Das

David Florence
Geza Pesti
Timothy Barrette
Hassan Charara
Richard Zimmer

John Esposito
Cameron Mott
Darin Parish
Purser Sturgeon, II

Texas A&M Transportation Institute

Southwest Research Institute

Synopsis

- Texas leads Nation in flood-related deaths
- Majority of deaths caused by motorists driving through moving water (Low Water Crossing, Nighttime)
- 18-24 inches of moving water sweep away truck, 6 inches for small car
- Impractical to raise /remove all low water crossings
- Low-cost means to better alert driving public to these risks

Objectives

Investigate low-cost approaches to improve low water crossings, focusing at:

- Reflective pavement markings and markers

- Flood-detection sensors

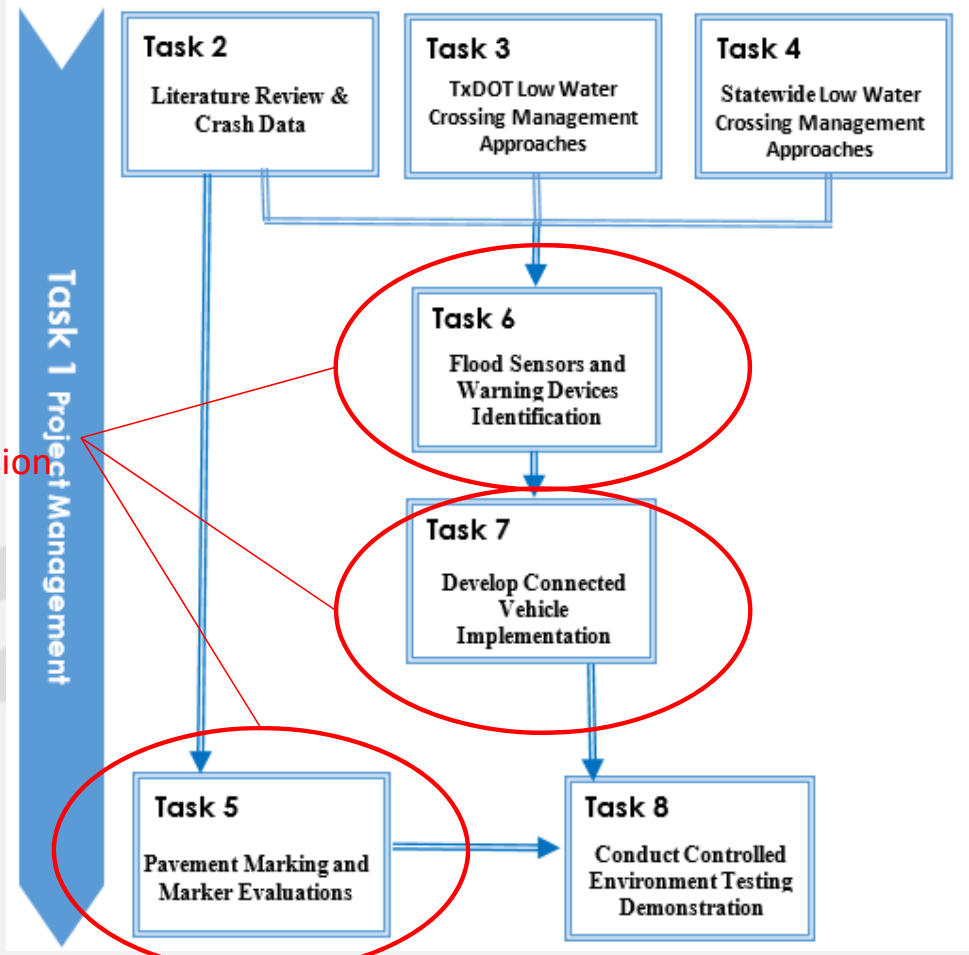
- Active/passive warning devices

- Infrastructure-to-Infrastructure (I2I) and Infrastructure-to-Vehicle (I2V) technologies

http://its-uk.org.uk

Approach

Highlighted in Today's Discussion



Objectives

1) Evaluate visibility of markings and markers in dry and flooded conditions to determine if they provide adequate visibility to indicate the flooded condition
2) Evaluate impact of various factors on the treatment visibility
    1) Day vs night
    2) Water depth
    3) Water clarity
    4) Treatment type (standard markings, wet-weather markings, RRPMS, IIRPMS)

Texas A&M Transportation Institute

Pavement Marking /Marker Evaluations for Low Water Crossings

Small-Scale Testing

Pavement Marking /Marker Evaluations for Low Water Crossings

Small-Scale Testing

Pavement Marking /Marker Evaluations for Low Water Crossings

Full Scale Testing

SwRI

Texas A&M Transportation Institute

Findings

- *Long Range Nighttime Visibility:*
  - Install RRPMs throughout potential flooded area and at least 500 feet outside that area.
  - Use minimum spacing allowed for speed and roadway type.
  - Use both white and yellow as allowed.
- *Short Range Day and Night Visibility:*
  - Install standard TxDOT markings throughout potential flooded area and at least 500 feet outside that area.
  - Use both white and yellow markings.
- Consider application of yellow IIRPMs at center line areas where shallow water sections are regularly crossed at night.
- Consider applications of red (closed condition) or yellow (warning condition) IIRPMs in conjunction with an active warning system. IRRPMs could be placed across lane prior to flooded area. (Would require FHWA approval)

Objectives

1) Review of existing sensors and devices
2) Evaluate flood sensors and flood warning devices for roadways
3) Assess their cost/benefit
4) Conduct lab testing of selected sensors/sensor combinations

Texas A&M Transportation Institute

Flood Sensors and Warning Devices Identification

Sensors

Ultrasonic Sensor:
Senix ToughSonic 14

Wave Gauge:
Akamina AWP-24-SP

Radar Sensor:
Endress & Hauser FMR20

Pressure Sensor:
Seametrics PT2X

Ultrasonic Sensor:
Endress & Hauser FDU91

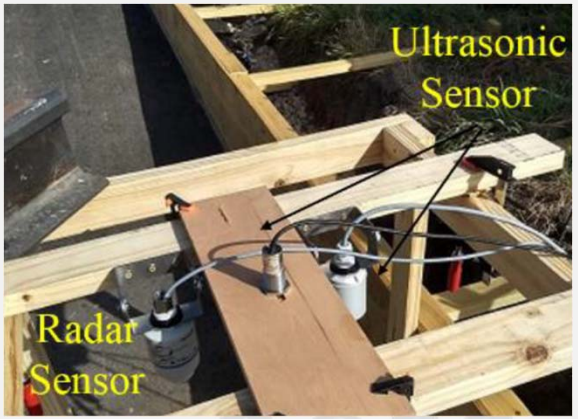
Texas A&M Transportation Institute

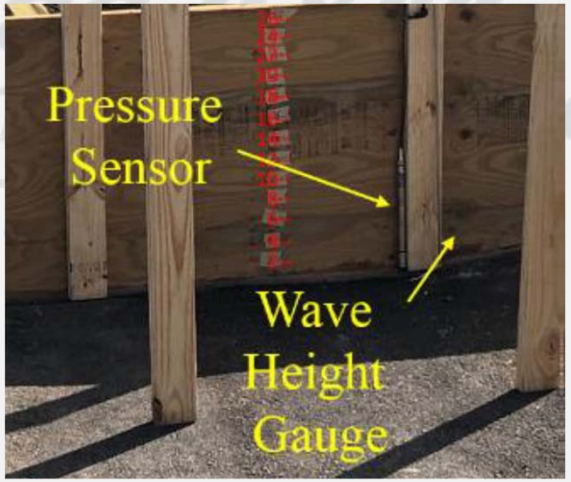
Flood Sensors and Warning Devices Identification

Field Test

Low Water Crossing at RELLIS

Non-contact Sensors





Wave Height Gauge and Pressure Sensor

Conclusions

- Senix ToughSonic 14 ultrasonic sensor and Endress & Hauser FMR20 radar sensor performed well except where debris or foam is present.
- Endress & Hauser FDU91 ultrasonic sensor dealt very well under all different conditions but is more costly.
- Seametrics PT2X pressure sensor produced accurate results in any conditions but is submersible. Sensor can be clogged from dirty water and cables be affected by wildlife.
- Akamina AWP-24-SP wave height gauge is able to predict the water depth with great accuracy, but failed under the presence of foam.
- To increase reliability a combination of sensors (SR2X pressure sensor and FDU91 ultrasonic sensor) is recommended.

Develop Connected Vehicle Implementation

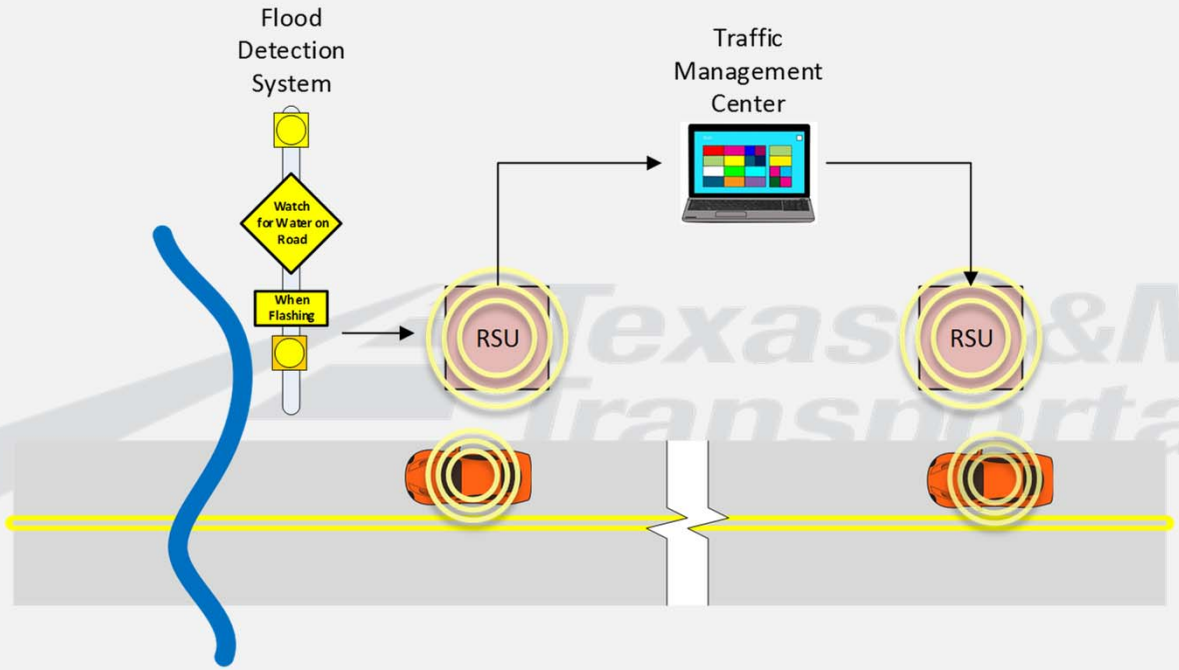
Objectives

- Design, build and test a prototype Connected Vehicle System for providing alerts and warnings at low-water crossings.
- Approach:
  - Two different architectures
    - Integrated with TxDOT Lone Star Traffic Management System
    - Standalone system
  - Similar approach used in TxDOT Wrong-way Driving in a Connected Vehicle Environment
  - Integrate existing low-water detection and notification system
- Assisted by Southwest Research Institute (SwRI)

Texas A&M Transportation Institute

Develop Connected Vehicle Implementation

Low-Water Crossing Connected Vehicle Concept



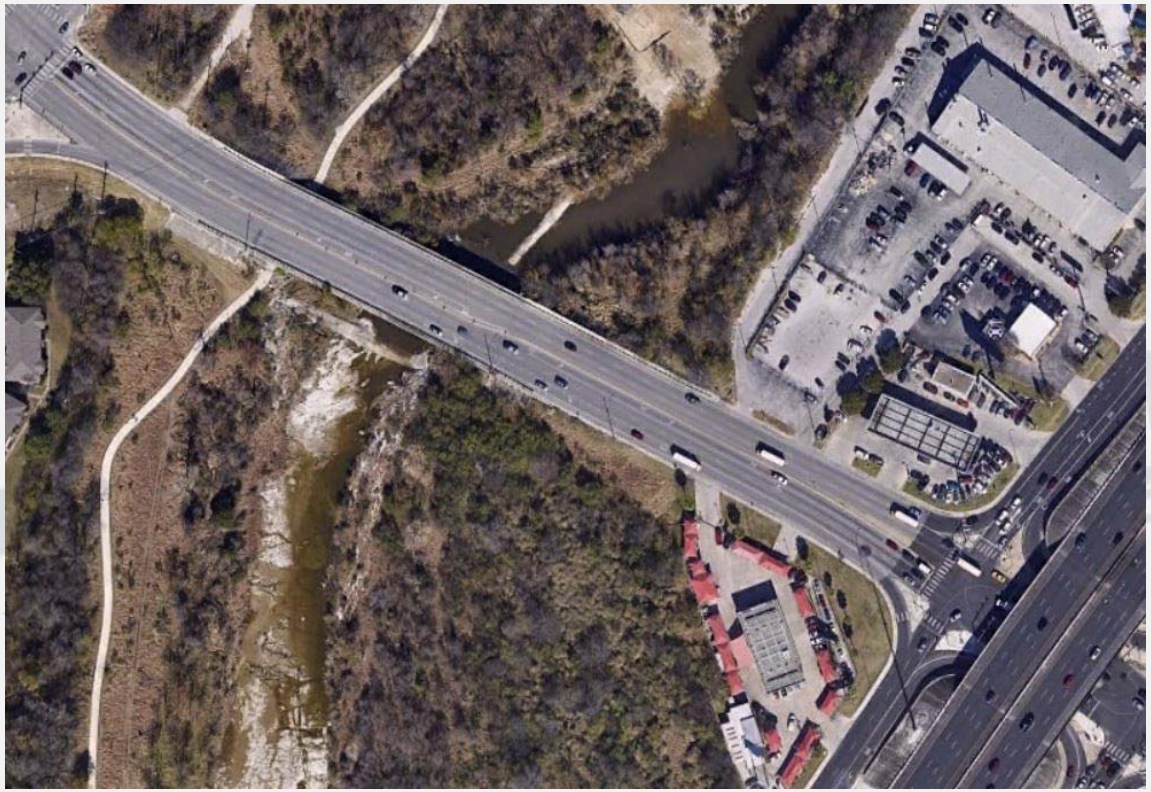
Message Designs for CV Low Water Crossing Alerts

- Utilize SAE J2735 Roadside Safety Message (RSM)
- RSMs are broadcast from RSUs near Low Water Crossing
- Provide simple alert message – not a stream of text
- Similar to information from DMS signs

Texas A&M Transportation Institute

Develop Connected Vehicle Implementation

RSM Visualization



Low Water Crossing along Culebra Road in San Antonio

Develop Connected Vehicle Implementation

RSM Visualization

Regions are defined within Lonestar that would be affected by a Low Water Crossing

Develop Connected Vehicle Implementation

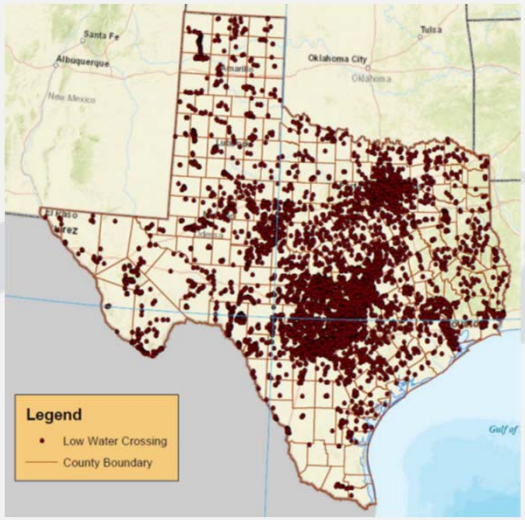
RSM Visualization

Vehicles that enter this region receive the alert, vehicles approaching the region can receive a warning

Texas A&M Transportation Institute

Next Steps

- Conduct proof-of-concept testing at TTI RELLIS
- Field testing at actual low-water crossing in Texas



Low Water Crossings in Texas
(Source: https://tnris.org/data-catalog/entry/low-water-crossings/)

Questions /Comments

Chiara Dobrovolny, Ph.D.
Associate Research Scientist
Texas A&M Transportation Institute
Ph.: 979-845-8971
E-mail: c-silvestri@tti.tamu.edu

Daily and Seasonal Movements of Brown Pelicans

Andrew Birt, TTI

Daily and Seasonal Movements of Brown Pelican in the Bahia Grande Wetland Complex

December 5th 2019

Andrew Birt, Texas A&M Transportation Institute

Research sponsored by:

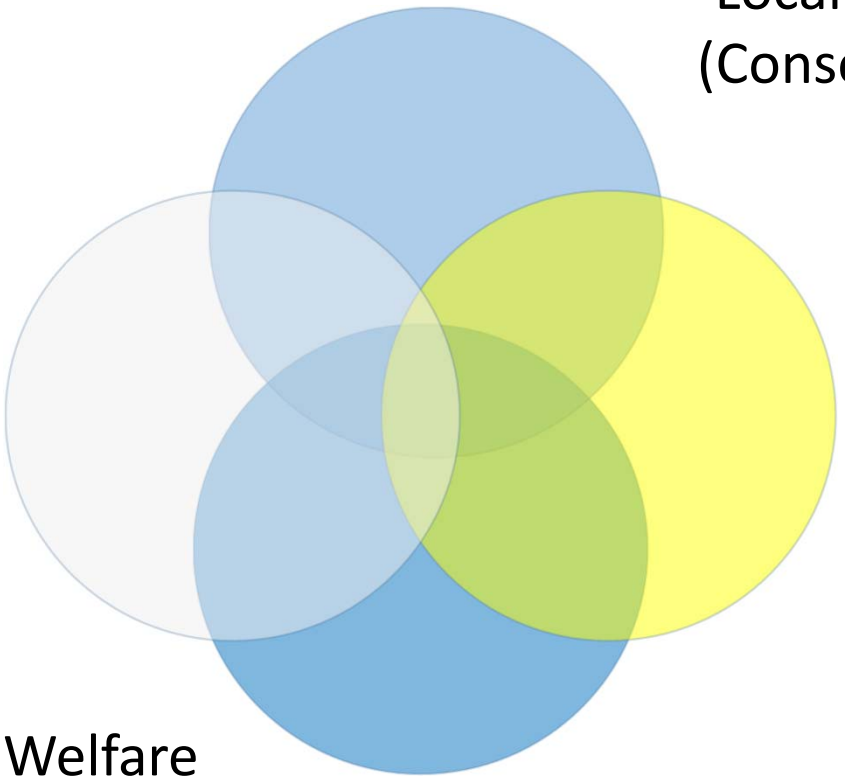
Texas Department of Transportation

Pulsed, Episodic Pelican Mortality

Laguna Madre and Bahia Grande Wetlands

Transportation Problem

Local Ecology
(Conservation)

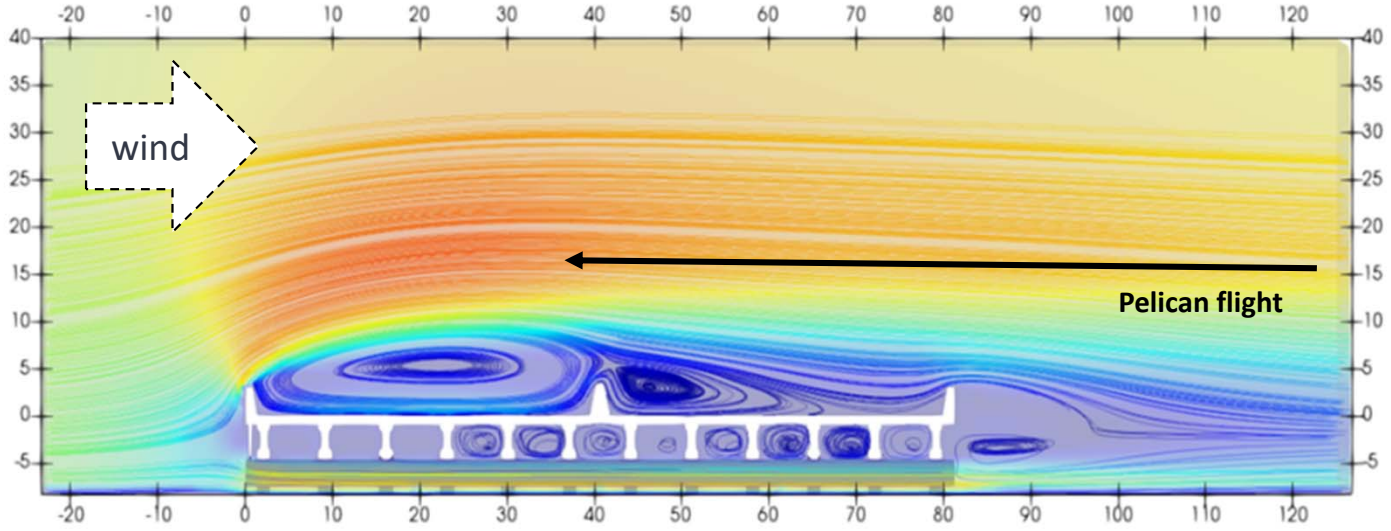


Public safety
(Pelican rescuers)

Traveler safety

Animal Welfare

Airflow over SH-48

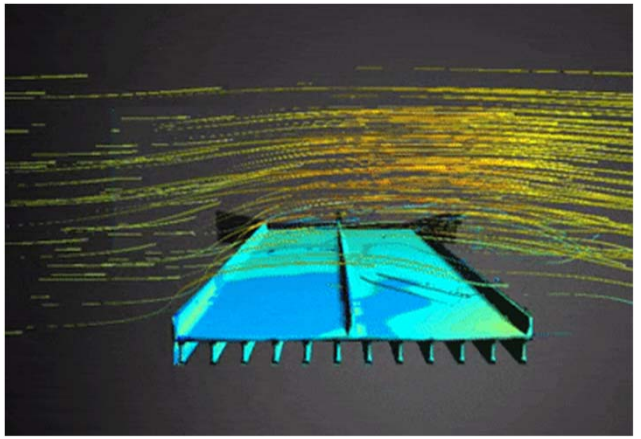


Bahia Grande

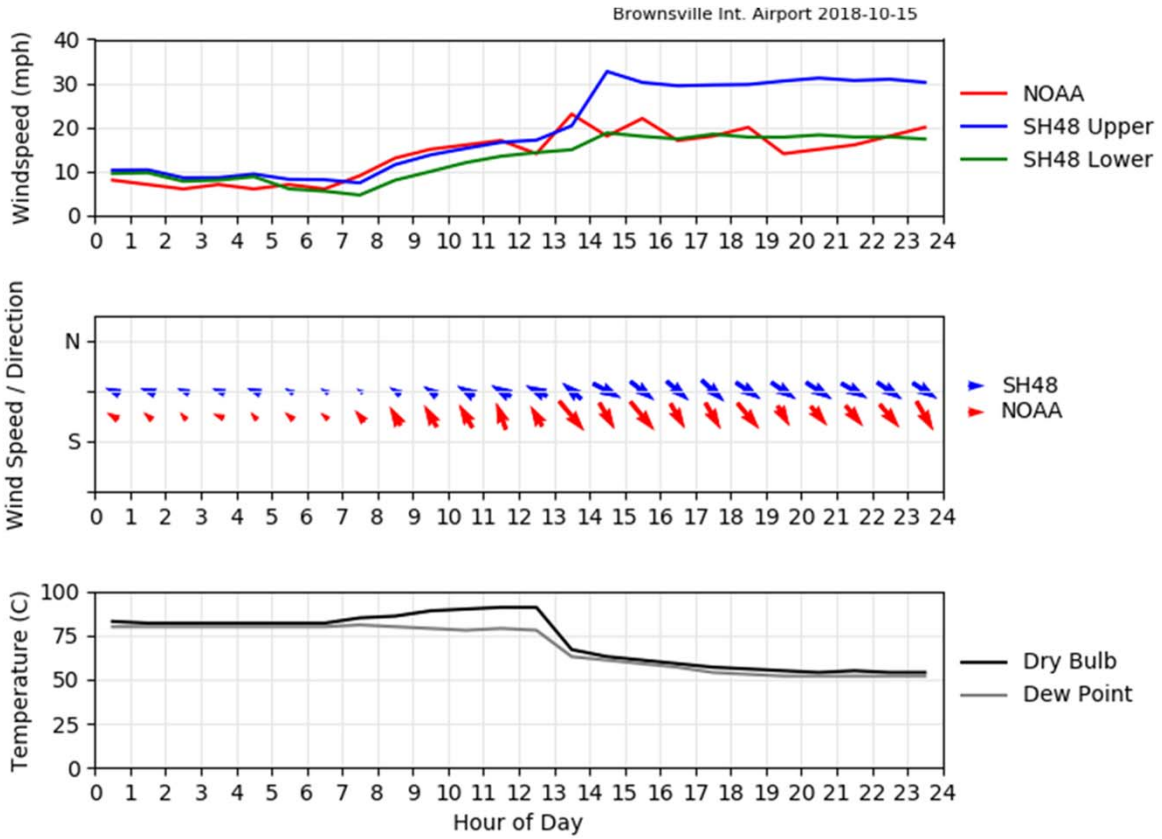
Ship Channel

Fly High – Faster wind

Fly Low – lower wind speed, difficult air



Mortality Event (Cold front)



October 10th 2018

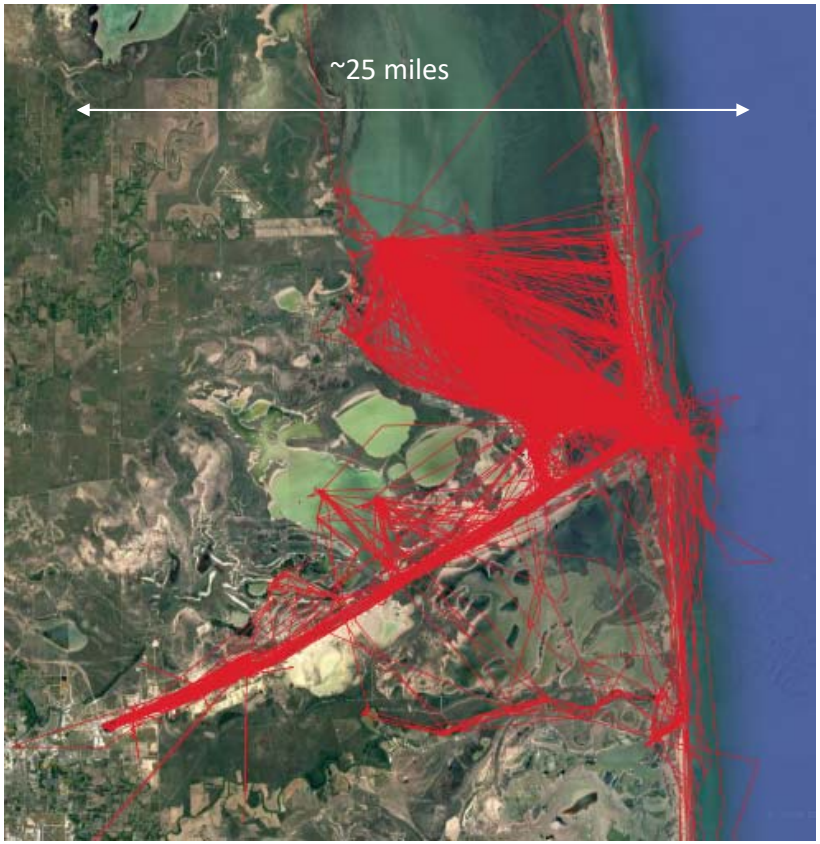
54 dead pelicans

(~150 downed)

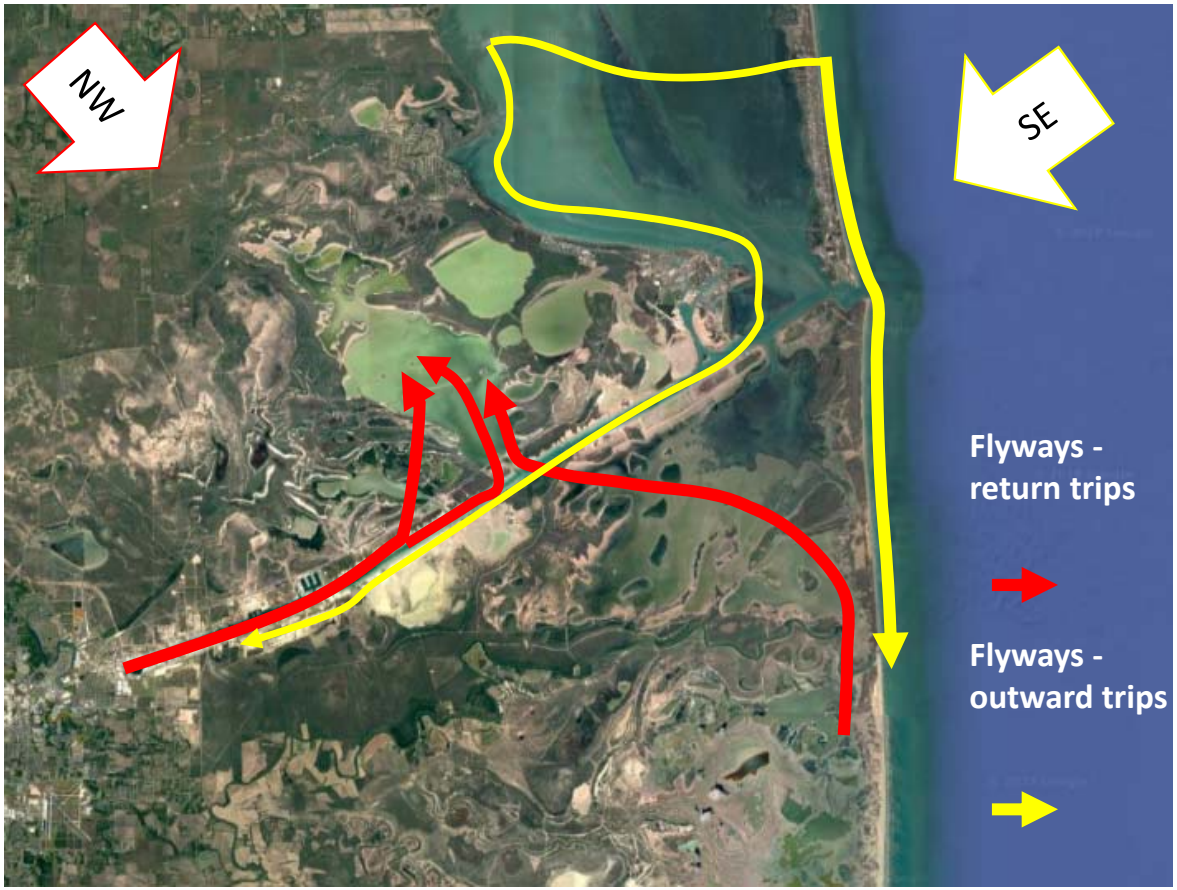
Daily and Seasonal Pelican Movements

Daily Movements – Roost Sites

Daily Movements



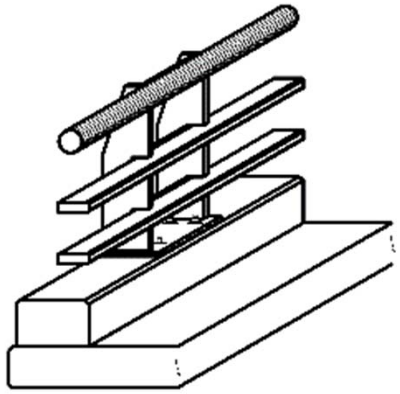
Flight and Landscape Ecology



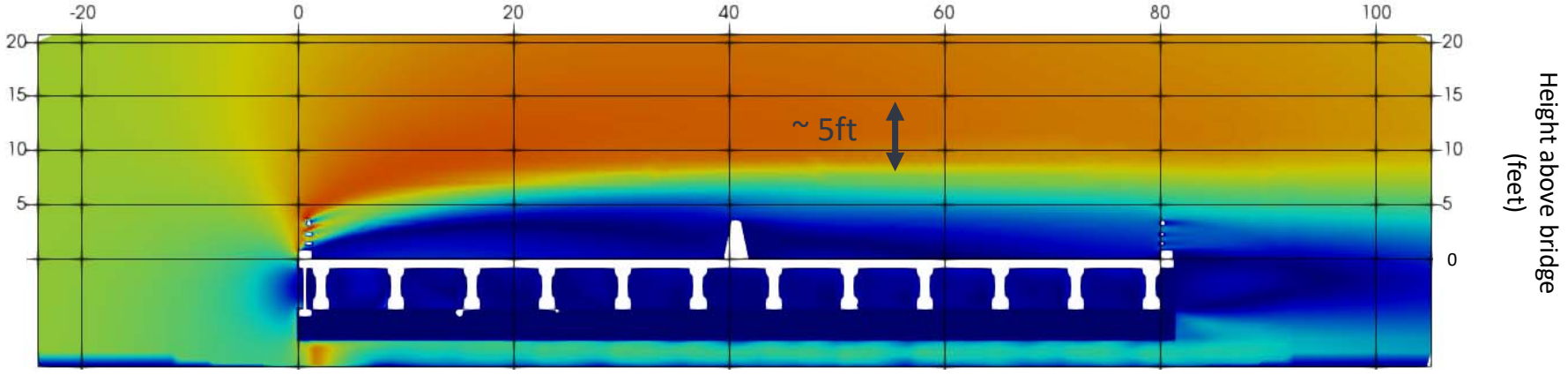
Causes of Pelican Mortality / Vehicle Conflicts

- Cold fronts bring strong winds from the North
- SH48 design causes difficult airflow for successful flight
- Bahia Grande is an important roost site for Pelicans
- Ship Channel and southern wetlands important feeding / loafing sites

Mitigation



West SH 48
17:48 Monday 8/26/2019


-20
0
20
40
60
80
100
20
15
10
5
0
~ 5ft
Height above bridge (feet)

Mitigation

- Understand each part of the problem:
  - **Wildlife:** ecology, animal behavior
  - **Transportation:** road design, safety (pedestrian, traffic)
  - **Societal:** conservation, welfare, value of wildlife

Acknowledgements:

- Chris Glancy, RTI Project Manager
- John Young, John Maresh, Stirling Robertson - TxDOT ENV.
- Robin Gelston – TxDOT Pharr District
- Angelica Tamayo – TTI field worker
- Lianne Koczur – TTI Postdoctoral Researcher

TxLTAP Yearly Report

Bryan Sims, TxLTAP,
The University of Texas at Arlington

-TxLTAP-

TxLTAP
Serving the State of Texas

2019 Year in Review

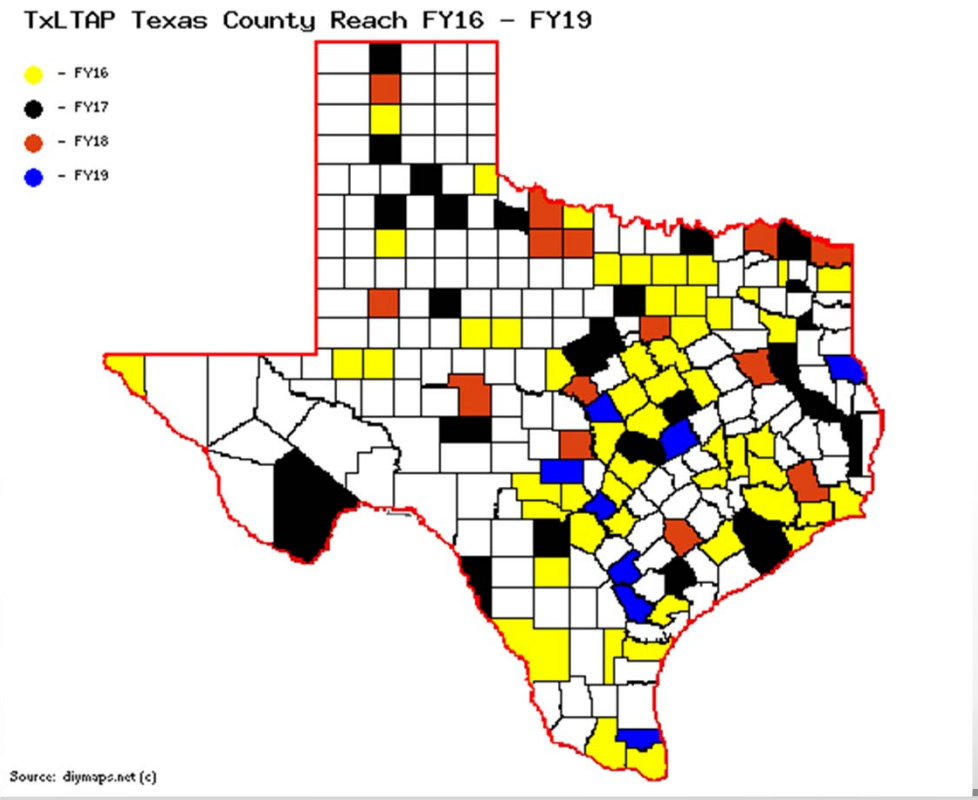
Goals

- Provide assistance to all 254 Texas Counties
- Provide instructor-led classes
- Provide technical assistance
- Host website, to include mobile website
- Develop instructional curriculum
- Produce quarterly newsletter

Texas Counties Served (FY16 – FY19)

County	To Date	County	To Date	County	To Date	County	To Date	County	To Date
Anderson	8	Childress	2	Gregg	2	Liberty	4	Refugio	1
Angelina	1	Collin	58	Grimes	4	limestone	4	Schleicher	6
Archer	1	Comal	5	Guadalupe	13	Llano	1	Scurry	2
Bandera	3	Comanche	2	Hale	6	Lubbock	12	Shelby	2
Baylor	3	Coryell	1	Harris	36	Maverick	3	Sherman	1
Bee	5	Dallas	62	Hays	12	McLennan	12	Smith	10
Bell	8	Dawson	2	Hidalgo	28	Medina	4	Tarrant	102
Bexar	52	Denton	10	Hill	2	Midland	4	Taylor	33
Bosque	4	Ector	13	Jack	3	Milam	1	Tom Green	1
Bowie	2	El Paso	47	Jasper	1	Mills	1	Travis	49
Brazoria	5	Ellis	8	Jefferson	6	Montgomery	5	Victoria	1
Brazos	16	Erath	3	Jim Wells	4	Moore	1	Walker	7
Brewster	1	Falls	3	Johnson	2	Motley	1	Washington	2
Briscoe	3	Foard	1	Karnes	1	Nolan	2	Webb	14
Brown	3	Fort Bend	23	Kaufman	18	Nueces	10	Wharton	7
Burnet	13	Franklin	2	Kendall	14	Parker	2	Wichita	2
Cameron	6	Frio	5	Kerr	15	Potter	21	Wilbarger	1
Camp	4	Galveston	14	Lamar	1	Rains	11	Willacy	2
Cass	7	Gillespie	1	Lampasas	1	Randall	2	Williamson	15
Chambers	3	Grayson	3	Lavaca	1	Red River	1	Wise	3
Cherokee	5								

TxLTAP Geographic Reach – FY16 to FY19



- New Counties Reached in FY16
- New Counties Reached in FY17
- New Counties Reached in FY18
- New Counties Reached in FY19

Instructor-Led Classes

Safety Focus Courses

- Confined Space Safety
- Electrical Safety
- Excavation Safety
- Fall Safety
- Heavy Equipment for Wildfires
- Planning Work Zone Traffic Control
- Qualified Flagger
- Snow and Ice Control Techniques
- Traffic Management for First Responders
- Traffic Control Supervisor
- Tree Trimming Safety
- TMUTCD Update & Work Zone Refresher
- Vehicle Backing Safety
- Work Zone Construction Site Safety
- Work Zone Safety: Temporary Traffic Control
- Work Zone Traffic Control/Qualified Flagger

FY19 – Delivered 128 Courses to 2,309 Participants

Instructor-Led Classes

Infrastructure Management Focus Courses

- Advanced Utility Locator Training
- Aerial/Scissor Lift
- Asphalt Distributor
- Designing Pedestrian Facilities for Accessibility
- Guardrail Installation
- Gravel Roads Academy
- Installation and Maintenance of Signs and Pavement Markings
- Local Government Project Procedures Qualification
- Pipeline Locating, Marking & Damage Prevention
- Rough Terrain Forklift
- Storm Drainage Pipe Installation
- Storm Drainage Pipe and Precast Box Culvert Installation
- Subsurface Utility Locating and Marking Workshop
- Telescopic Hydraulic Excavator

FY19 – Delivered 48 Courses to 670 Participants

Instructor-Led Classes

Workforce Development Focus Courses

- Articulating Boom Excavator
- Backhoe/Front End Loader
- Bucket Truck/Digger Derrick
- Compactor
- Dozer
- Equipment Load and Tie Down
- Forklift
- Heavy Equipment Rodeo
- Mini-Excavator
- Motor Grader – Beginner, Intermediate, Advanced
- Roller
- Skid Steer
- Sweeper
- Track Loader
- Wheel Loader

FY19 – Delivered 84 Courses to 640 Participants

Technical Assistance

2016 – 2019

46 Instances

Special Training Event Opportunities

- Heavy Equipment for Wildfire
- Heavy Equipment Rodeo
- Snow and Ice Control Techniques
- Gravel Roads Academy
- Pavement Recycling Academy

Federal Highway Administration Every Day Counts (EDC 4&5) Innovations

Estimated 560 Attendees at EDC Booths

620 Attendees at EDC Presentations

Hosted EDC Booths at the 93rd Transportation Short Course in College Station, TX on October 15-16, 2019

Advanced Geotechnical Methods in Exploration

Crowdsourcing for Operations

Data-Driven Safety Analysis

Reducing Rural Roadway Departures

Road Weather Management

Safe Transportation for Every Pedestrian

Unmanned Aerial Systems

Value Capture

Virtual Public Involvement

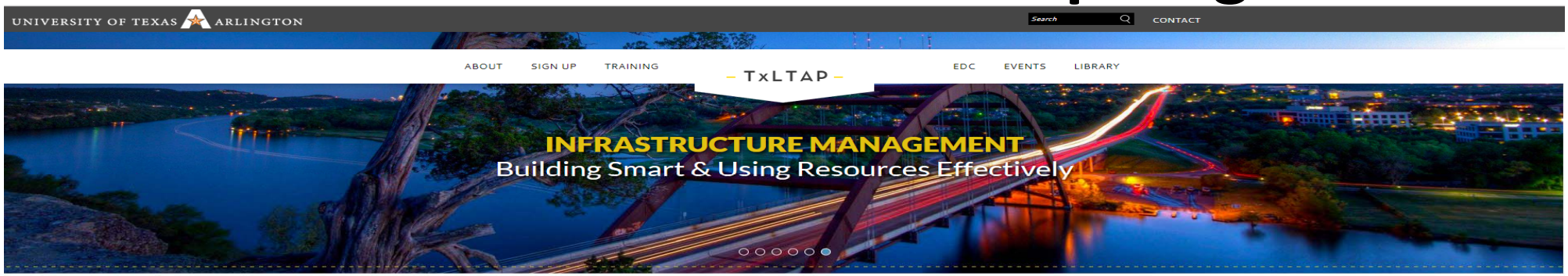
Weather Responsive Management Strategies

Hosted Regional LTAP Meeting – March 2019

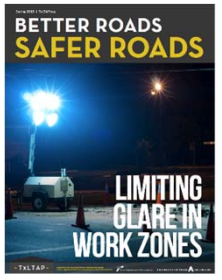
- FHWA & FHWA Texas Division representatives
- Oklahoma DOT and Texas DOT representatives
- NLTAPA President
- LTAP's in attendance: Indiana, Louisiana, New Mexico, Michigan, Minnesota, Oklahoma, Texas, Wisconsin
- Additional LTAP's online: Arkansas and Illinois

Hosting a joint Regional LTAP Meeting with the Great Lakes region – March 2020

TxLTAP Website – www.txltap.org



RECENT NEWSLETTERS



On-Ramp to Innovation
every day counts

TRAINING OPPORTUNITIES

UPCOMING EVENTS

LIBRARY

- Equipment Checkout
- Technical Briefing Papers
- Texas Resources
- National Resources
- Transportation News
- TxLTAP Video Resources
- Video Checkout

TxLTAP Mobile Website

Equipment Lending Library

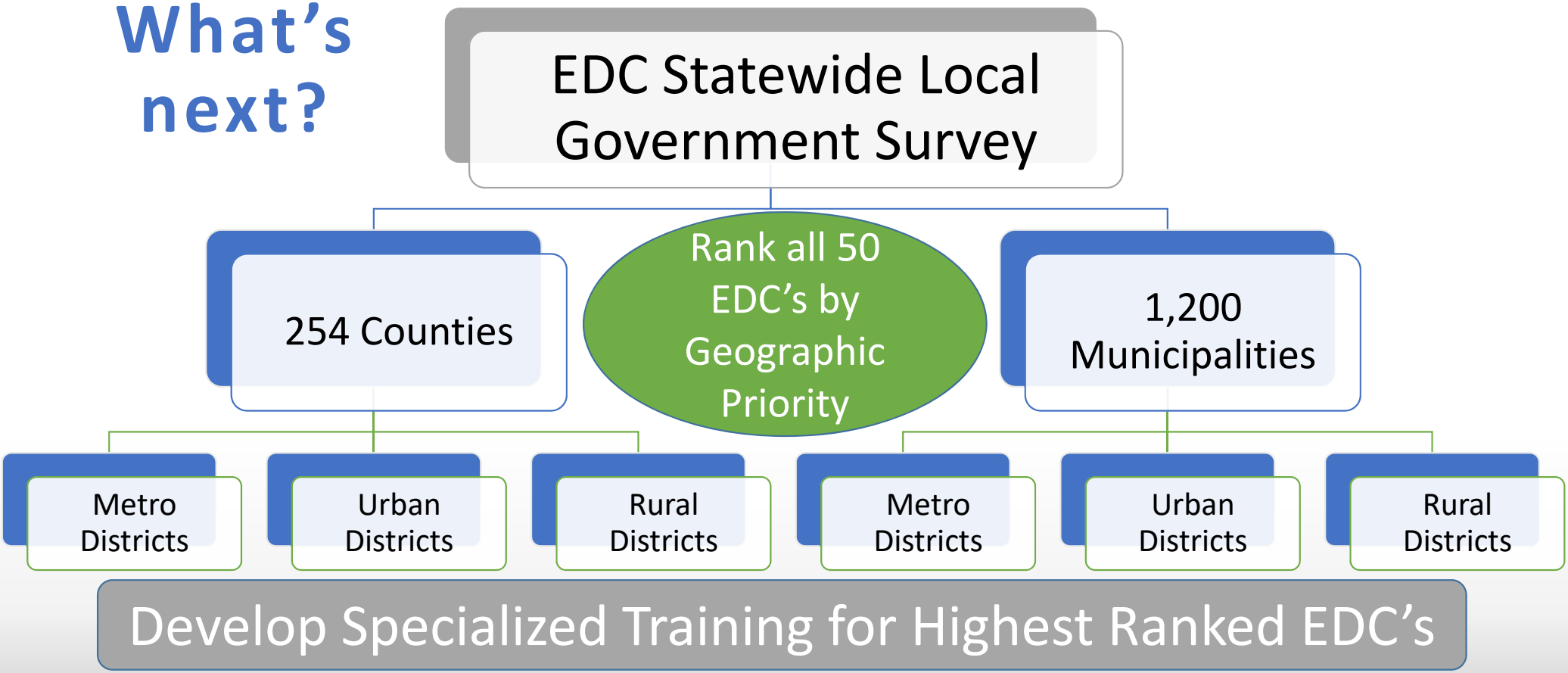
You can find these items on our website http://www.txltap.org/.

2018 Advisory Board Survey Results

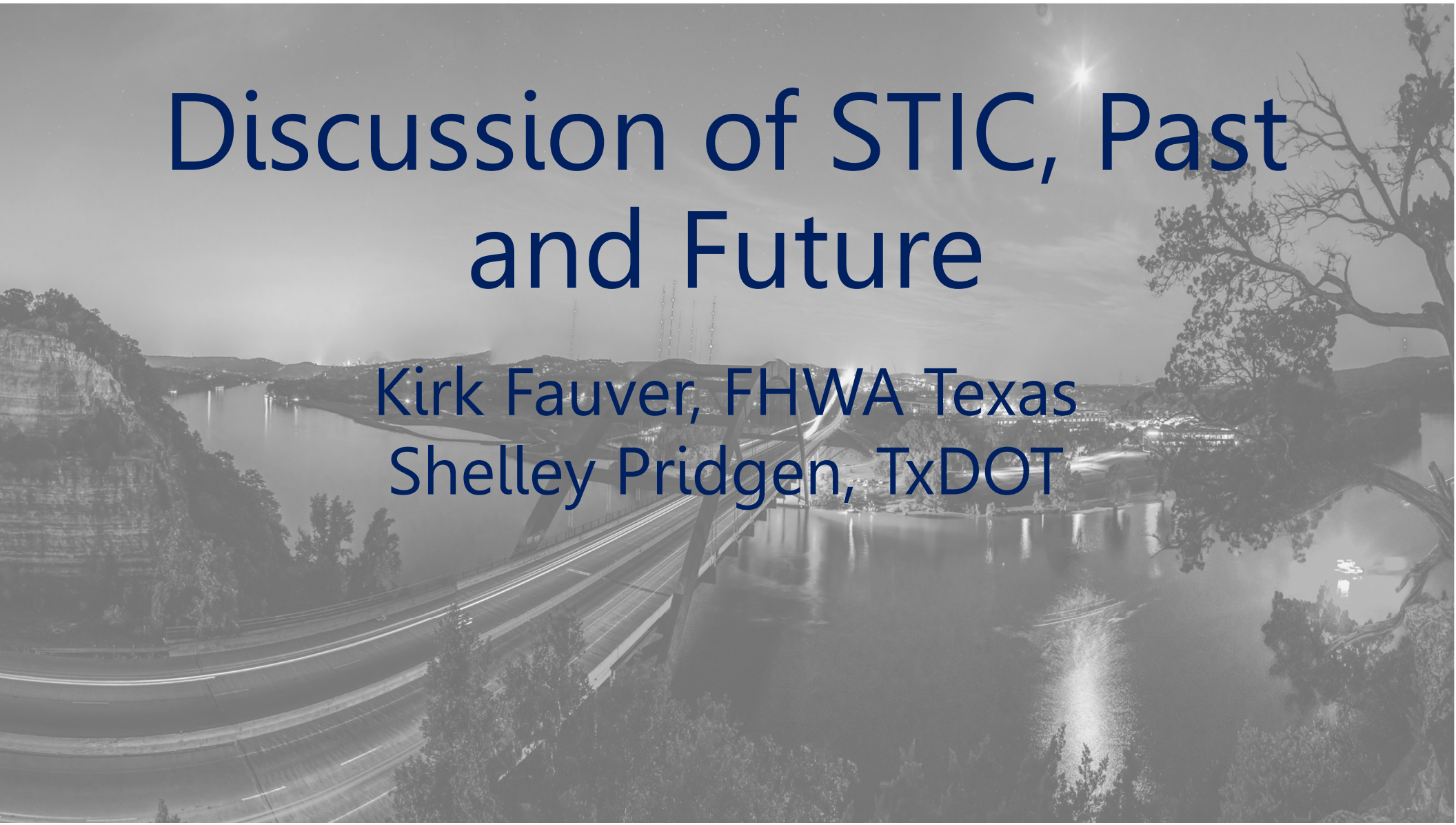
- Priority of training topics:

- What type of training events would be most beneficial to your organization:
  - Emergency Response
  - Heavy Equipment
  - Wild Fire Training
  - Ice and Winter Storm Maintenance
  - Supervisor Training

What's next?


EDC Statewide Local Government Survey
254 Counties
Rank all 50 EDC's by Geographic Priority
1,200 Municipalities
Metro Districts
Urban Districts
Rural Districts
Metro Districts
Urban Districts
Rural Districts
Develop Specialized Training for Highest Ranked EDC's

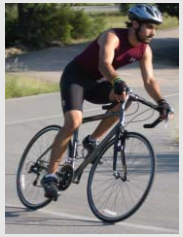
Questions?



Discussion of STIC, Past and Future

Kirk Fauver, FHWA Texas
Shelley Pridgen, TxDOT

TEXAS DEPARTMENT OF TRANSPORTATION



FUTURE DIRECTION OF THE STIC FOR THE STATE OF TEXAS

December 5, 2019

STIC Background

- In 2010, FHWA implemented the Every Day Counts (EDC) initiative
  - ❑ shorten project delivery
  - ❑ expedite the deployment of proven technologies
- FHWA introduced the STIC concept to state DOTs and industry partners as a process to facilitate the EDC initiatives.

STIC Charter Signed

March 22, 2016 - TxDOT and FHWA Texas Division signs the Texas STIC charter as the 51st STIC in the country.

STIC Meeting Dates

- March 22, 2016 (Initial STIC Charter signing)
- October 24, 2016 (1st STIC inaugural meeting)
- February 14, 2017 (2nd)
- June 20, 2017 (3rd)
- October 24, 2017 (4th)
- March 6, 2018 (5th)
- November 6, 2018 (6th)
- April 8, 2019 (7th)
- August 1, 2019 (8th)
- December 5, 2019 (9th)

Original STIC Organizational Chart

Co-Chairs: Darran Anderson – TxDOT Co-Chair & Al Alonzi– FHWA Co-Chair

Coordinators: Rocio Perez– TxDOT & Sonya Badgley– TxDOT; Michael Leary– FHWA & Kirk Fauver - FHWA

Proposed Council Membership

1. American Council of Engineering Companies of Texas
2. American Public Works Association, Texas Chapter
3. American Road and Transportation Builders Association
4. American Society of Civil Engineers, Texas Chapter
5. Association of Texas MPOs (TEMPO)
6. Bike Texas
7. Central Texas Regional Mobility Authority
8. Harris County Toll Road Authority
9. Institute of Transportation Engineers, Texas District
10. Associated General Contractors of Texas, Austin Chapter
11. Intelligent Transportation Systems of America, Texas Chapter
12. North Central Texas Council of Governments
13. North Texas Turnpike Authority, Fort Worth, Texas
14. Texas Commission on Environmental Quality
15. Texas Department of Agriculture
16. Texas Department of Motor Vehicles
17. Texas Department of Parks and Wildlife
18. Texas Department of Public Safety
19. WTS International (Women in Transportation)
20. Comptroller of Public Accounts Historically Underutilized Business
21. Texas Association of County Engineers and Road Administrators
22. Texas Freight Advisory Committee
23. Texas Aviation Advisory Committee
24. Texas General Land Office
25. Texas Local Technical Assistance Program
26. Texas Ports Association
27. Texas Railroad Commission
28. U.S. Army Corps of Engineers (Fort Worth District)
29. U.S. Environmental Protection Agency, Region 6
30. U.S. Fish & Wildlife Service, Southwest Region

Committees: Construction & Maintenance; Planning & Environmental; Safety & Operations; Structure & Hydraulics; Strategy & Innovation; Texas Technology Task Force (TTTF)

STIC Background

MISSION

- Our mission is to facilitate the rapid implementation of innovative technology, tactics and techniques among transportation program delivery professionals **at all levels of state government** and throughout the private and non-profit sector to ensure smart, efficient investment in Texas highway and transportation infrastructure.

VISION

- Our vision is to foster a collaborative culture for the rapid implementation of **ready to deploy** and beneficial innovations and technologies to efficiently deliver a safe and effective transportation system to the citizens of Texas.

GOALS

- The TxSTIC's primary purpose is to provide a **forum for transportation leadership** to review and collaborate on specific initiatives that best align to the transportation goals of the State of Texas.
- The TxSTIC will **discuss and respond** to key issues and challenges that impact the transportation system.

STIC Benefits and Relevancy

Reasons to participate in the STIC program:

- Provides agencies and businesses with an opportunity to participate in the decisions that establish the transportation system within the State of Texas
- Increases the awareness and knowledge of existing innovations and benefits of innovative technologies at all levels of government and the private industry
- Facilitates a forum for the public and private sectors to share best management practices, innovative tools and techniques, and processes that move people and goods in a safe, cost-effective, and efficient manner
- Identifies strategic goals and performance measures in order to identify and monitor key social, economic, and environmentally sustainable opportunities and metrics related to the transportation system
- Identifies new and emerging innovative technologies that serve to save lives, reduce congestion levels, decrease project development times, and provide cost savings
- Provides agencies and businesses new opportunities made available through Every Day Counts (EDC) and Strategic Highway Research Program (SHRP-2) initiatives

STIC Subcommittees (Current)

Functional Area Committee	Name
Structures and Hydraulics Chair	Curtis Rokicki
Planning and Environmental Chair	David Freidenfeld
Strategy and Innovation Chair	Zeke Reyna
Maintenance and Construction Chair	Miles Garrison
Traffic and Operations Chair	Ken Mora

Purpose of Subcommittees

- The TxDOT Functional Area Committees (FACs), composed of transportation SMEs, will be responsible for reviewing, prioritizing and presenting proposed initiatives to the STIC for review, discussion and action.

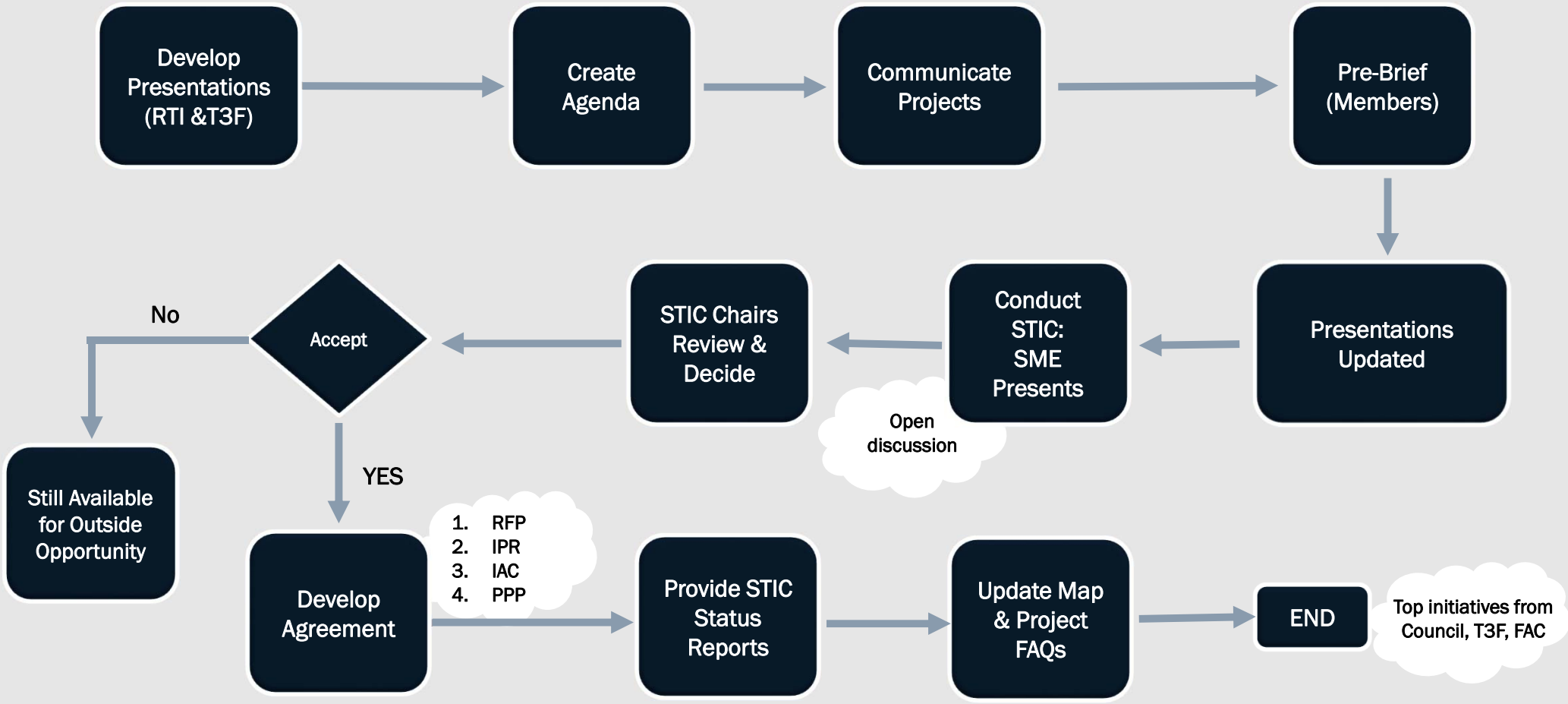
- TxDOT's Research and Technology Implementation Division (RTI) will be responsible for monitoring transportation research initiatives and implementation efforts (as well as other innovations) within the State of Texas, and will provide reports and briefings to the STIC on project status.

- RTI will also be responsible for sharing this information with transportation sector stakeholders.

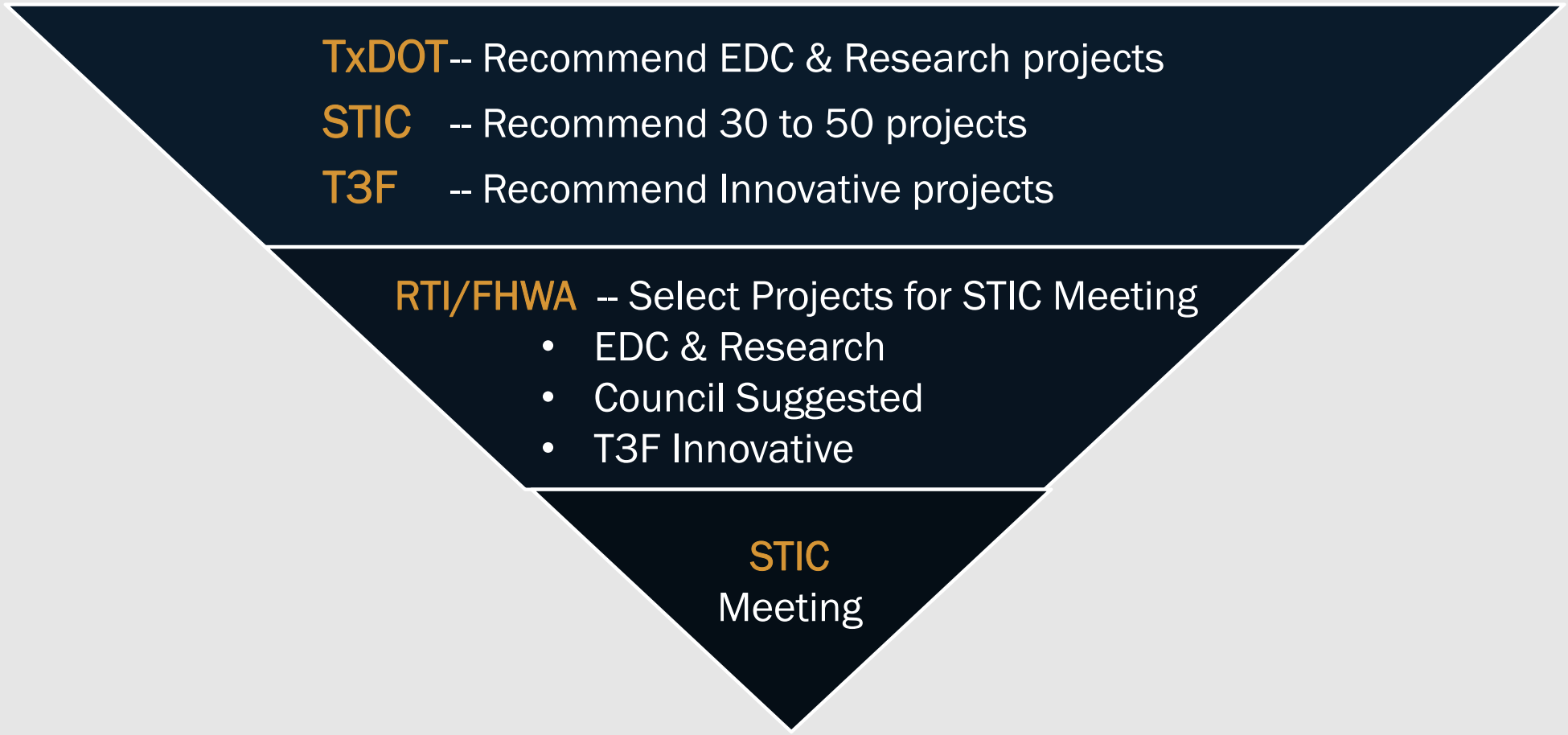
Other Interrelated Efforts (Subcommittees)

- Texas Technology Task Force
  - The TTTF or “T3F” was established to develop a strategic vision for the future of Texas Transportation.
  - Collaboration between the T3F and industry experts enables TxDOT to work toward the vision to be a forward-thinking leader delivering mobility, enabling economic opportunity, and enhancing the quality of life for all Texans.
- Texas Innovation Alliance
  - The TIA is a collaboration among regions in Texas to develop innovative applicable transportation infrastructure

STIC Meeting Operations – Agenda Creation

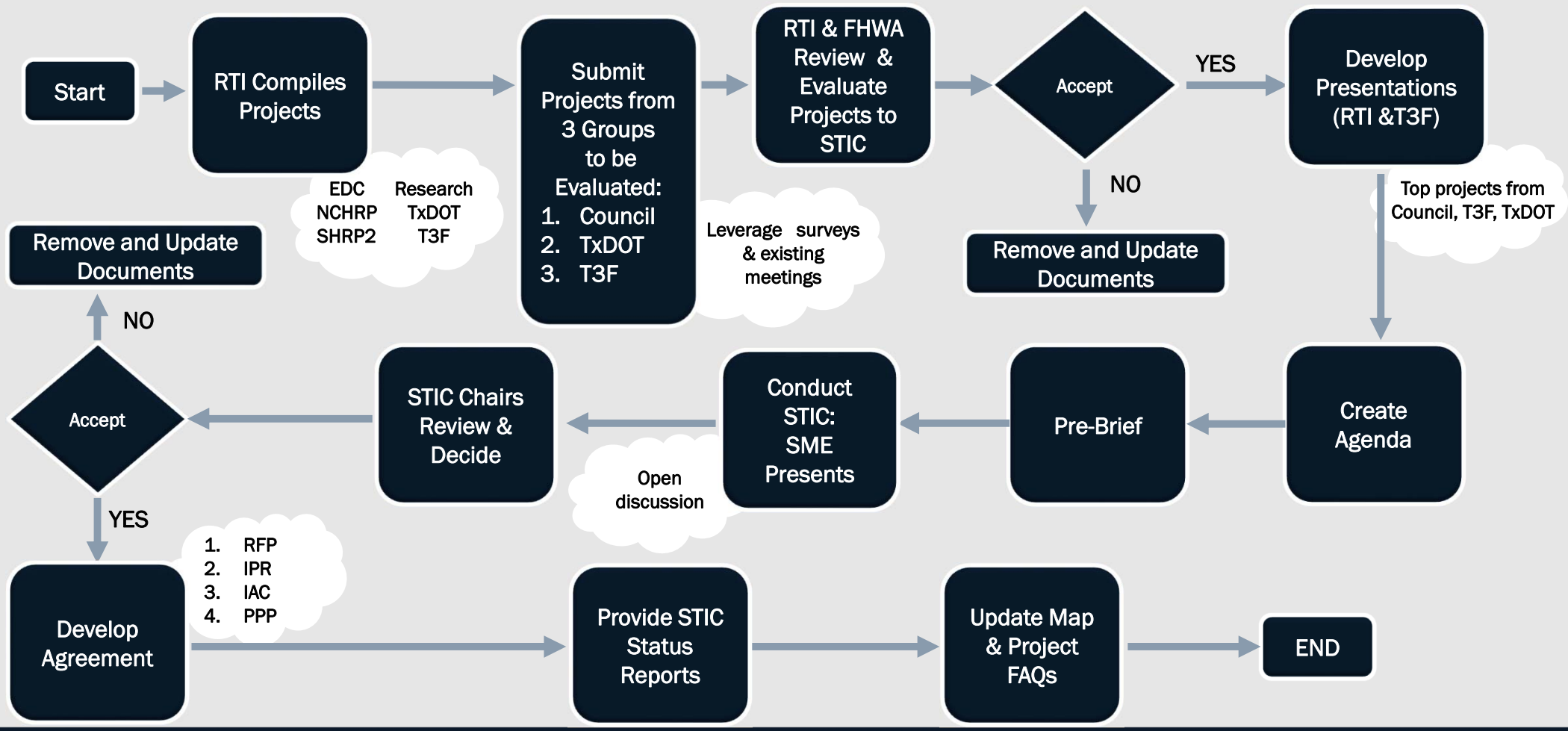


Original STIC Process



STIC Project Selection Process

SP5



Slide 170

SP5 Shelley Pridgen, 11/8/2019

AASHTO STIC Excellence Award (FY 2018 & FY 2019)

-Proactive Traffic Signal Control System*

-Unmanned Aerial Systems (UAS)**

-Exploring Rapid Repair Methods for Embankment Slope Failure (will give poster session at TRB)

* **Selected as a High Value Research (Sweet 16) project at AASHTO RAC/TRB Representative Annual Meeting in 2018. Reduction of traffic queue lengths by 60 percent and wait times by 50 percent where it was installed. TxDOT is now implementing at 30 intersections in Houston, TX.**

** **Developed new Flight Operations Manual for TxDOT in 2017.**

STIC Executive Committee Members (Current)

FY 2019-2020 STIC Membership Roster		
Darran Anderson	Texas Department of Transportation	Co-Chair
Al Alonzi	Federal Highway Administration	Co-Chair
Brannan Hicks	Harris County Engineering Department	
Natalie Bettger	North Central Texas Council of Governments	
Jackie Sartor	Women in Transportation Seminar	
Bryan Sims	Local Technical Assistance Program	
Dave Carter	Intelligent Transportation Society of America TX Chapter	

N= 21 Members

STIC Executive Committee Members (Current)

SP8

FY 2019-2020 STIC Membership Roster	
Brian Moen	Institute of Transportation Engineers, Texas District
Jessica Davisson	Texas Department of Parks and Wildlife
Isidro Martinez	Alamo Area MPO
Roger Williams	El Paso MPO
Gary Raba	American Council of Engineering Companies of Texas
Jennifer Woodard	Associated General Contractors
Mario Delgado	Texas Transit Association

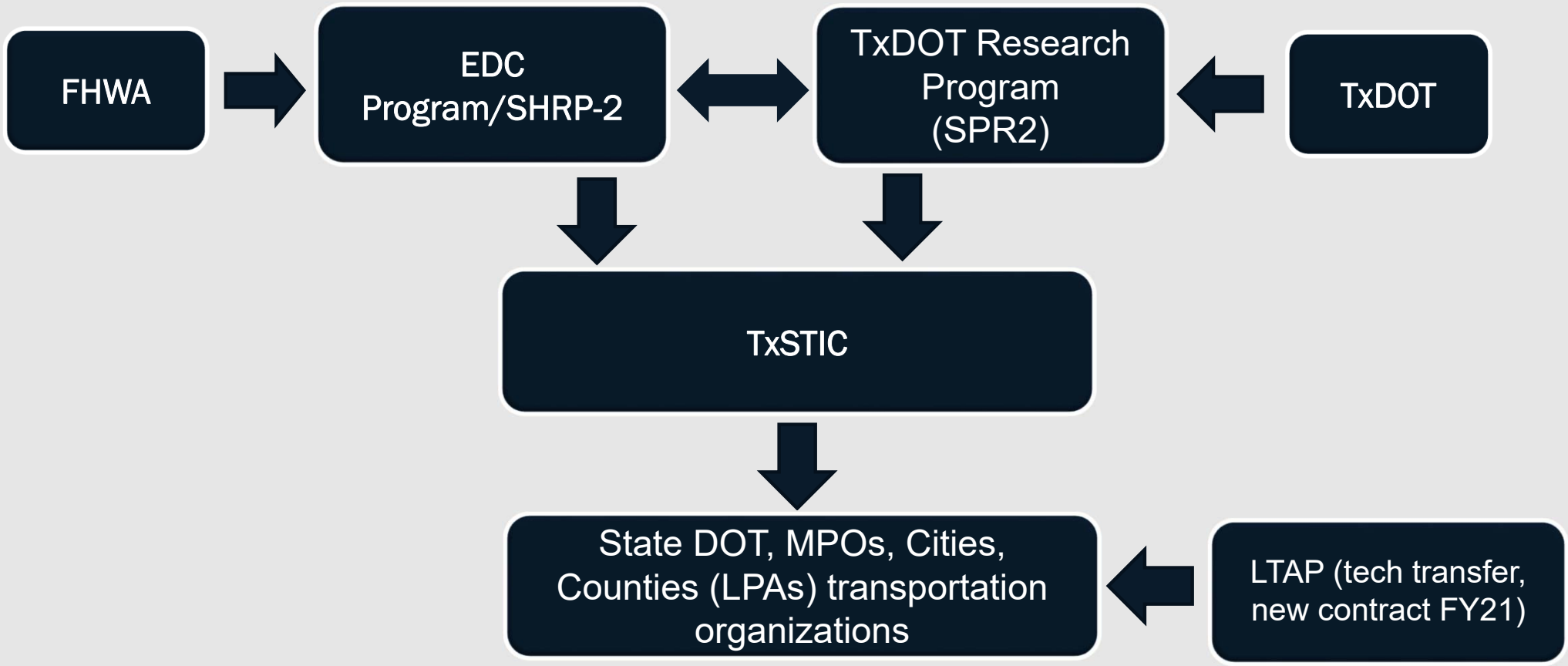
Slide 173

SP8 Not a big deal, but why are the tables so different between slides 15, 16, and 17?
Shelley Pridgen, 11/8/2019

STIC Executive Committee Members (Current)

FY 2019-2020 STIC Membership Roster	
Tiffany Villarreal	American Society of Civil Engineers, Texas Chapter
David Palmer	Texas Highway Patrol, Highway Safety Operations Center, TxDPS
Michael Heiligenstein	Central Texas Regional Mobility Authority
Ashby Johnson	Association of Texas MPOs (TEMPO) / CAMPO
Elizabeth Mow	North Texas Tollway Authority
Alan McWilliams	Texas General Land Office
Chad Davis	Texas Association of County Engineers and Road Administrators

Future STIC Process- Flow of Innovations to Local Public Agencies, State



STIC Benefits and Relevancy

Reasons to participate in the STIC program:

- Identifies new and emerging innovative implementation technologies that serve to save lives, reduce congestion levels, decrease project development times, and provide cost savings
- Provides agencies and businesses new opportunities made available through Every Day Counts (EDC), Strategic Highway Research Program (SHRP-2) initiatives, and Local Technical Assistance Program (LTAP)

Key Enabler:

- Expanded STIC opportunities (need more money)
- Strategic Plan for LTAP and STIC

Next Steps- Where Do We Go From Here?

Potential Items for Consideration:

- How can we determine if the current STIC goals and objectives are meeting the needs of TxDOT and FHWA as well as other key interagency partners?
  - ✓ On-Line Survey (e-mail, virtual survey monkey)?
  - ✓ Open up conversation/discuss at the next meeting?

Next Steps- Where Do We Go From Here?

Potential Items for Consideration:

- Revisit STIC voting membership
  - Base on active participation?
  - Base on end-goals, being determined now?
- What changes are needed in format and content of the STIC meetings?
  - Informal vs. formal? Allow STIC membership to generate/contribute their concerns & issues, both now and in the future
  - Virtual meetings vs. on-site?
  - Empower the STIC membership?
  - Less on EDCs?
  - Have more RTI research? Have universities propose novel topics?

Next Steps- Where Do We Go From Here?

- Should we establish a long-range strategic plan?
  - Could LTAP develop the strategic plan and be used to perform periodic program reviews?
- How do we do a better job of marketing and advertising the accomplishments/benefits of the STIC effort?
  - LTAP supported presentations at member organizational meetings?
- What changes do Al and Darran (Co-Chairs) consider reasonable and necessary to maintain its relevancy and what is the future focus or vision of the STIC?

Questions

Where would you like to see the TxSTIC focus efforts in the future?

Start the presentation to see live content. Still no live content? Install the app or get help at **PollEv.com/app**

What are areas of interest we have not explored that may be beneficial?

Start the presentation to see live content. Still no live content? Install the app or get help at **PollEv.com/app**

How can we more effectively relate EDC content to benefit other agencies?

Start the presentation to see live content. Still no live content? Install the app or get help at **PollEv.com/app**

What resources should we provide to STIC members for them to successfully take STIC ideas back to their organizations?

Start the presentation to see live content. Still no live content? Install the app or get help at **PollEv.com/app**