



WELCOME

Why Am I Here?

- Learn and ask questions about the study
- Review the project material
- Provide comments and feedback

Future NEPA studies, environmental review, consultation and other actions required by applicable Federal environmental laws for projects associated with the I-45N: Beltway 8 North to Loop 336 South (Conroe) Planning and Environmental Linkages Study are being, or have been carried out by TxDOT pursuant to 23 USC 327 and a MOU dated December 16, 2014 by FHWA and TxDOT.



What is a Planning and Environmental Linkages (PEL) Study?

PEL provides:

- An approach to decision making
- Early consideration of environmental, community, and economic goals
- A way to carry goals through future project phases

PEL benefits:

- Identification of efficient and cost-effective solutions
- Fewer delays in project implementation
- Information for use in future project phases, including the environmental review process

Who participates in a PEL?

PUBLIC

LOCAL AGENCIES



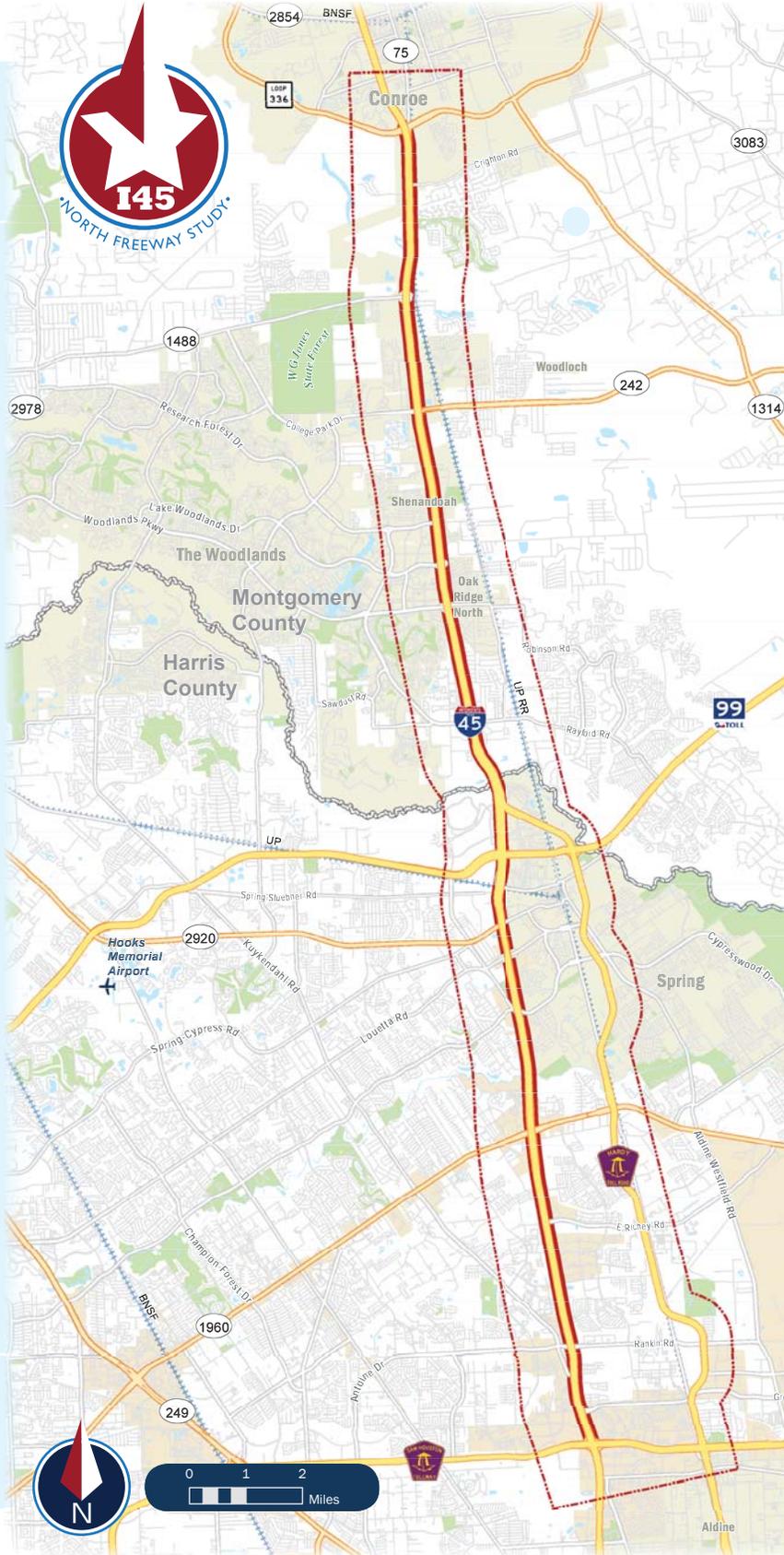
OTHER STAKEHOLDERS

RESOURCE AGENCIES





I-45N Study Area



I-45N PEL Study Area

STUDY LIMITS:

Beltway 8 North to Loop 336 South

PROJECT LENGTH:

24 Miles

COUNTIES:

Harris, Montgomery

PLACES:

Houston, Aldine, Spring, Oak Ridge North, The Woodlands, Shenandoah, Conroe

- Study Corridor
- Study Area
- Parks
- Houston
- City
- Class I RR

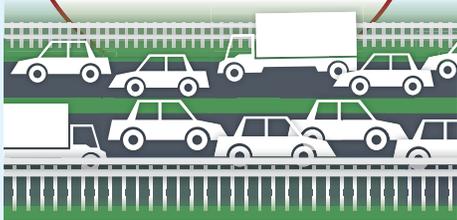




Public Outreach Findings (2018)

93%

believe reducing congestion is important to promoting economic development



Top concerns include impacts on nearby residences, businesses, floodplains, noise, and air quality

89%

support the I-45N PEL Study



31%

regularly use the HOV lane



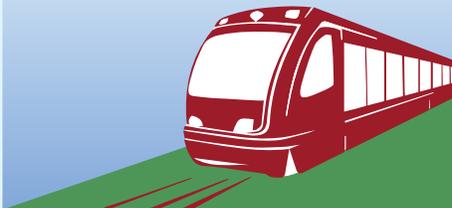
Bus and rail

are perceived as multimodal opportunities that would improve I-45N



Top Priorities for Improvements:

- build a new commuter rail line
- improve frontage road intersections
- reconstruct existing interchanges
- complete SH 99 connections
- add more east-west crossings of I-45N



62%

would find 5 minutes of delay for a 10-mile trip as acceptable on I-45N



Top 4 goals for the I-45N PEL Study:

- reduce congestion
- improve connections with I-45N
- provide alternative modes of travel
- improve safety

Who participated?

Members of the public, including residents, business owners, and elected officials participated in this survey at three public meetings held on February 27, March 1, and March 8, 2018.

83%

agree that improvements are needed to better accommodate **traffic during hurricane** evacuations

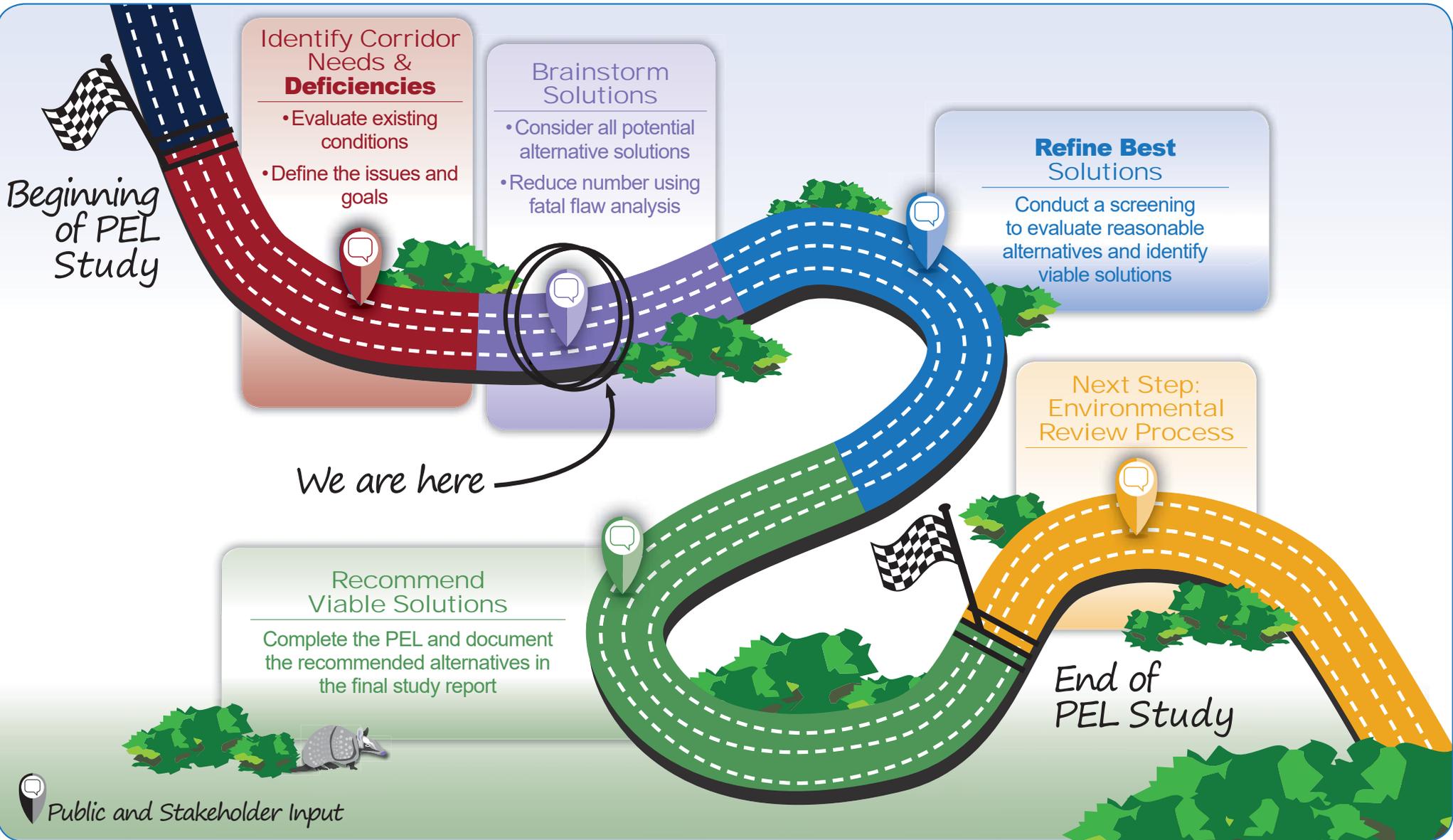


54 Number who participated in survey





PEL Process

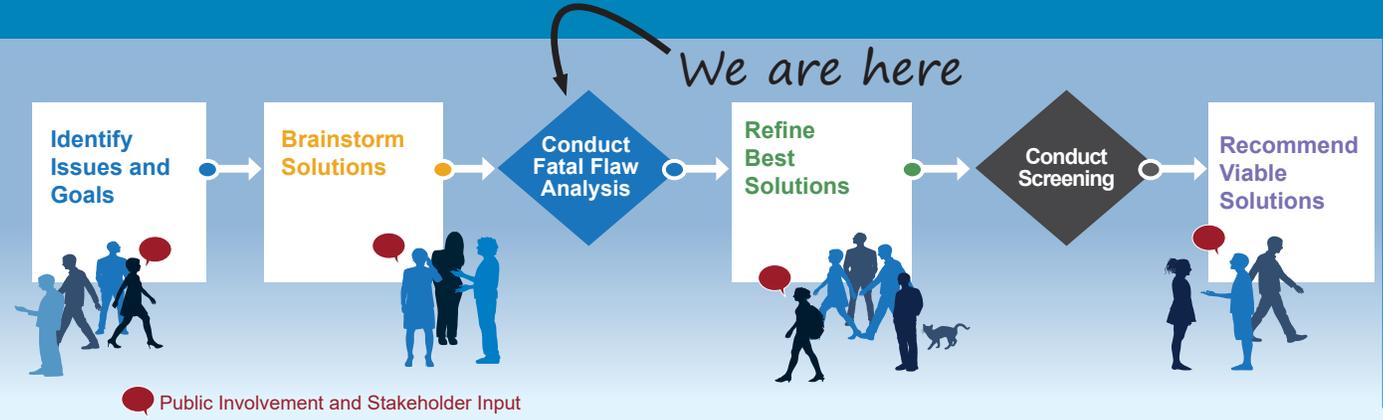




Current Step

PEL Study: Now - Spring 2021

Identify and prioritize possible solutions



Future Steps (if build solutions are identified)

Environmental Review Process

Refine projects to avoid, minimize, or mitigate environmental impacts

- Refine Purpose & Need from PEL Study
- Refine range of alternatives
- Compare alternatives and identify a preferred alternative
- Collaborate with agencies to determine mitigation efforts
- Complete environmental documents
- More public involvement
- Secure funding and incorporate into the Regional Plan

Design and Land Acquisition

How are we going to make improvements?

- Prepare detailed engineering and design
- Make utility adjustments
- Gather detailed field survey data
- Acquire right-of-way property if needed

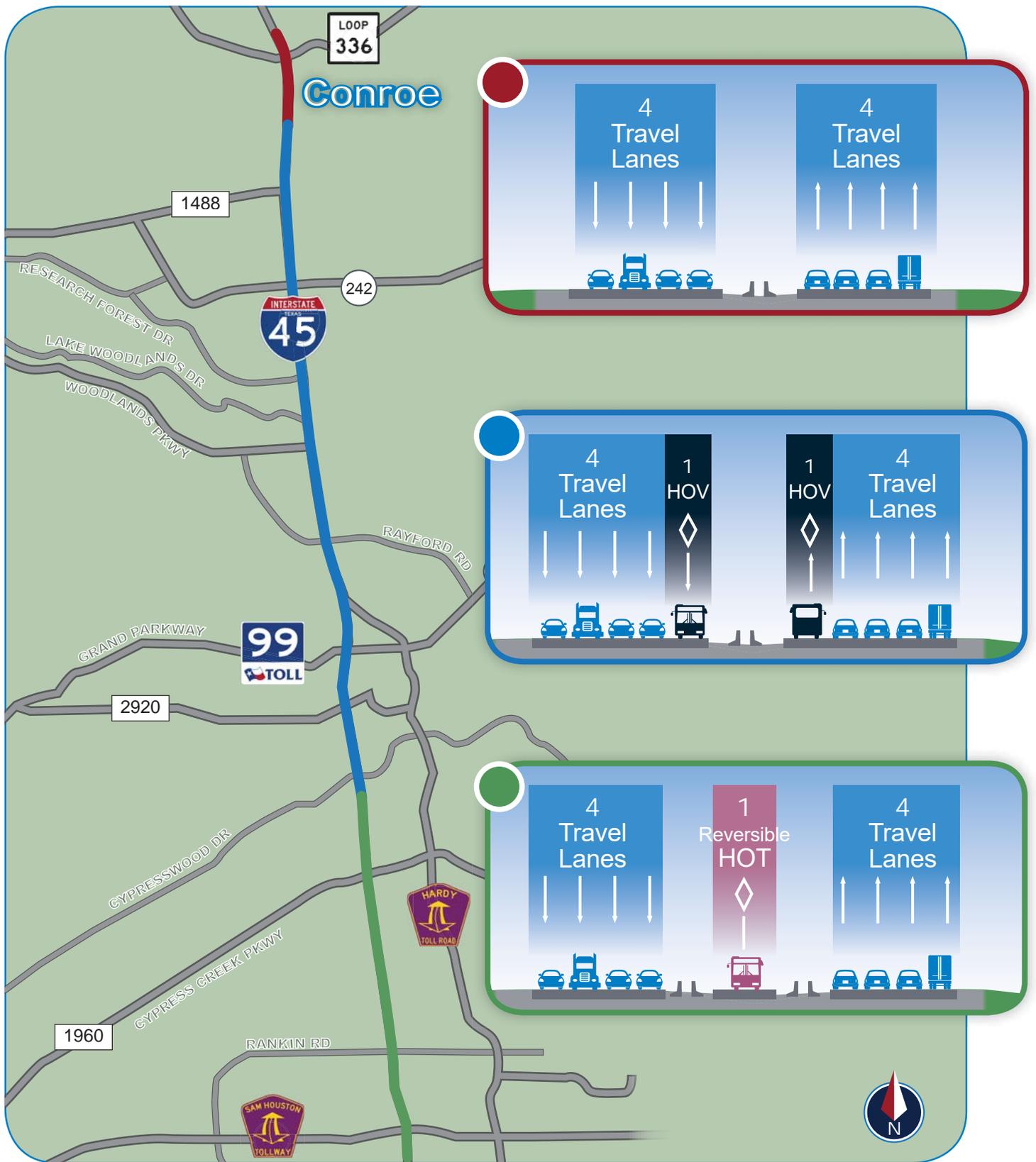
Construction

Build proposed improvements

- Staging & moving traffic
- Construction activities
- Opening of completed project



Existing I-45N Travel Lanes





What are the needs?

Inadequate Mobility

- Congestion on mainlanes, frontage roads, intersections
- Delays and unreliable travel times

Safety Issues

- High crash rates on mainlanes, frontage roads, intersections
- Gaps in the multimodal network, posing danger for pedestrians and bicyclists

Poor System Connectivity

- Limited accessibility and connections to other roadways and between travel modes
- Inadequate interchanges



What are we trying to do?

Improve mobility and reduce congestion

Improve safety

Improve connections across the roadway system & modes



How Do We Forecast Traffic?

1 How many vehicles use the road today?



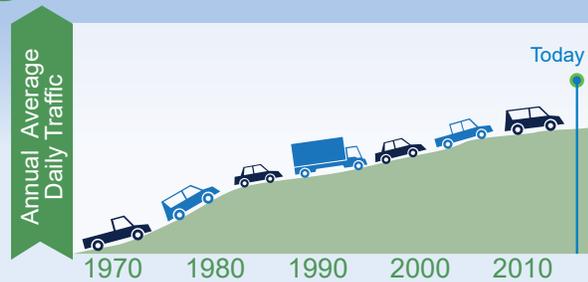
Traffic counts are taken to monitor traffic conditions. In some locations, automatic traffic recorders continuously count vehicles 365 days a year.

2 Determine forecast year.



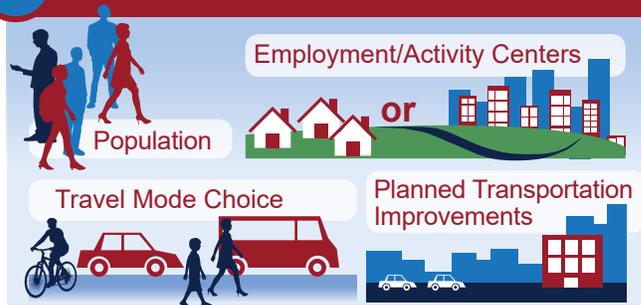
Traffic projections are usually made for at least 20 years beyond the estimated time of construction. This is done to ensure that public investments in new roadway improvements will efficiently handle traffic for decades after construction.

3 Look at historic trends.



Historic annual average daily traffic volumes are reviewed to determine how traffic for the roadway has changed over time.

4 Look to the future.



Determine anticipated future changes in travel demand and patterns using H-GAC regional travel demand model.

5 Calculate growth rate.



Consider both historic trends (step 3) and future travel changes (step 4), to determine growth rate for future traffic.

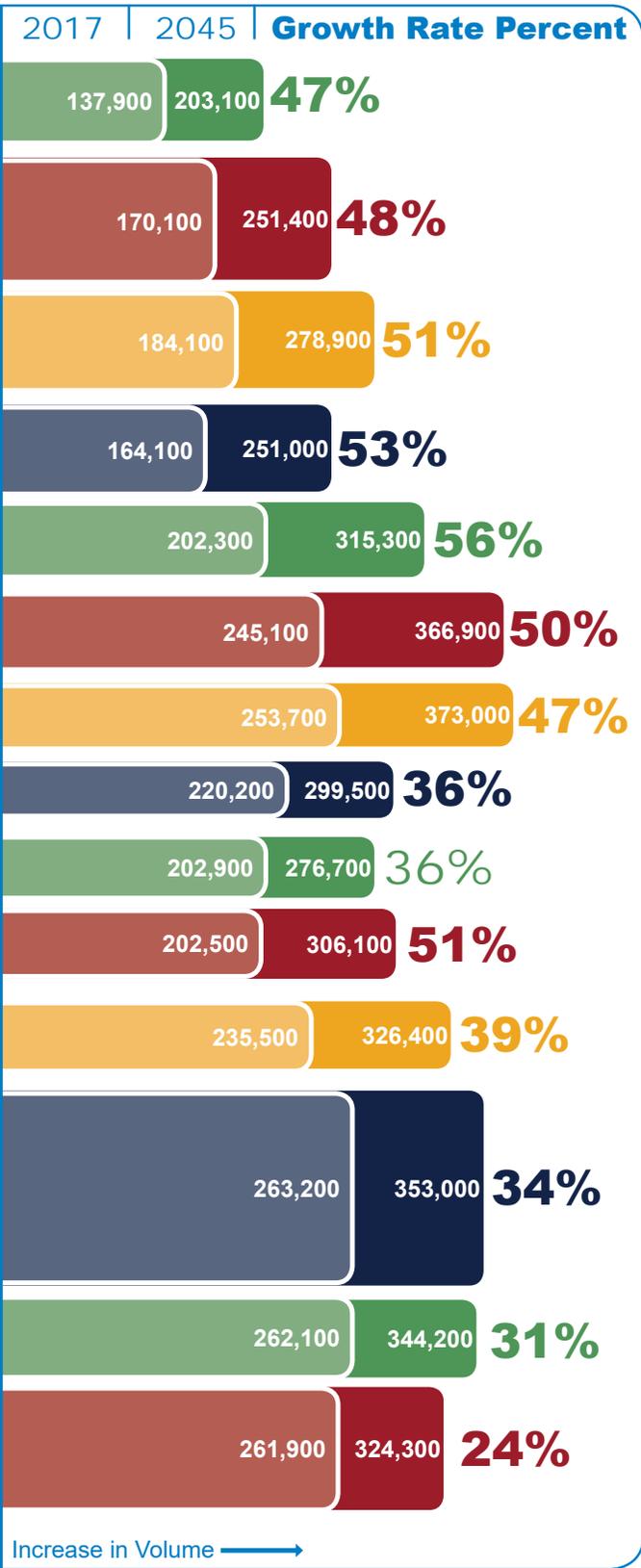
6 Determine future traffic volume.



Future traffic volume is estimated by multiplying the current traffic volume by the calculated growth rate.

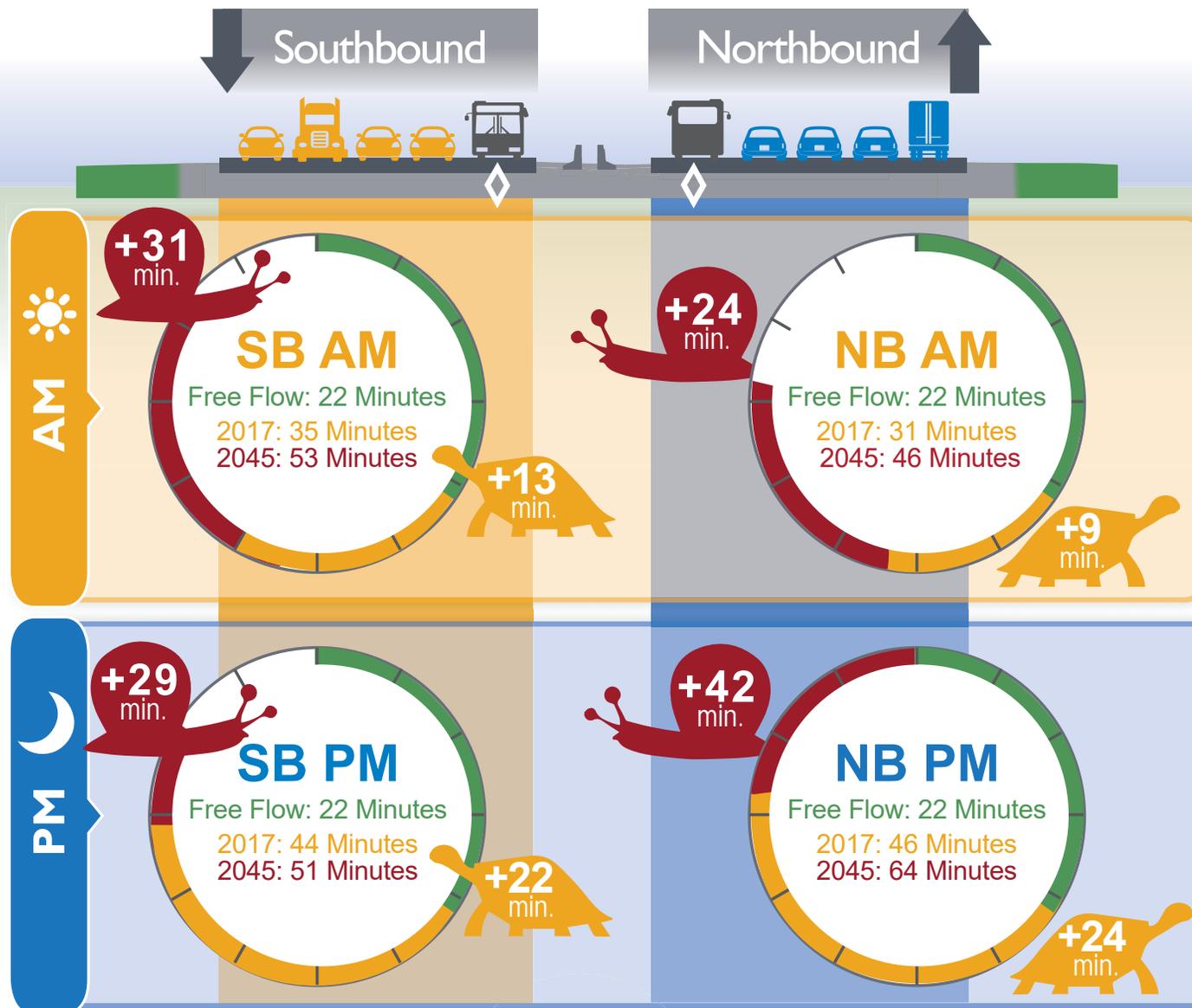


Traffic Volumes





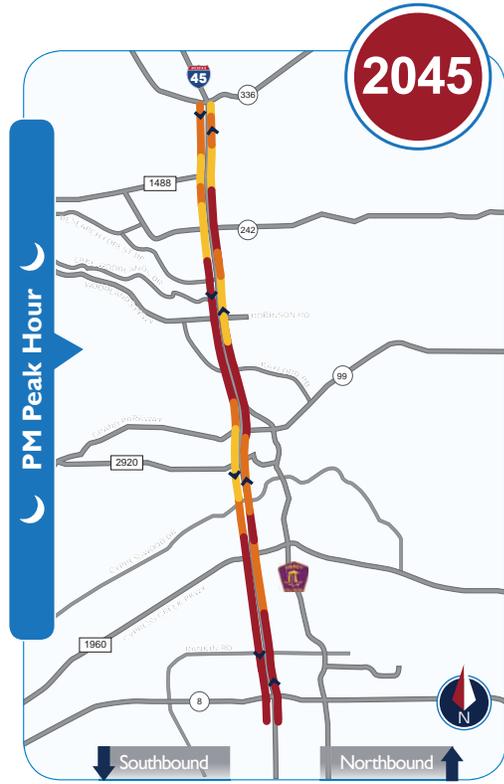
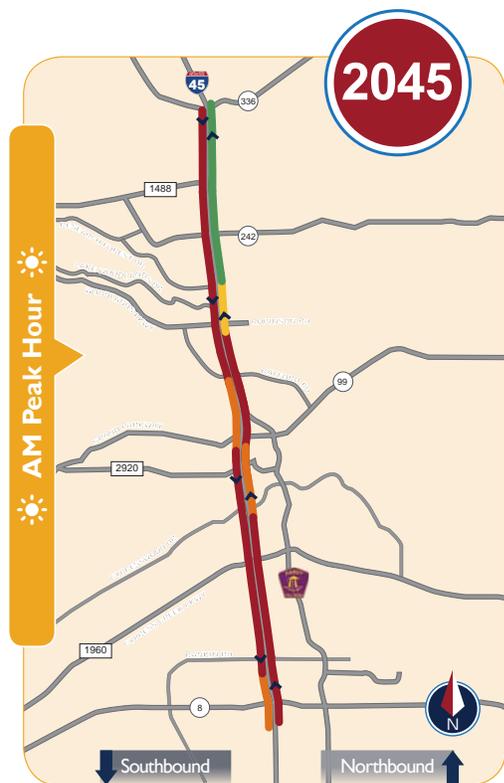
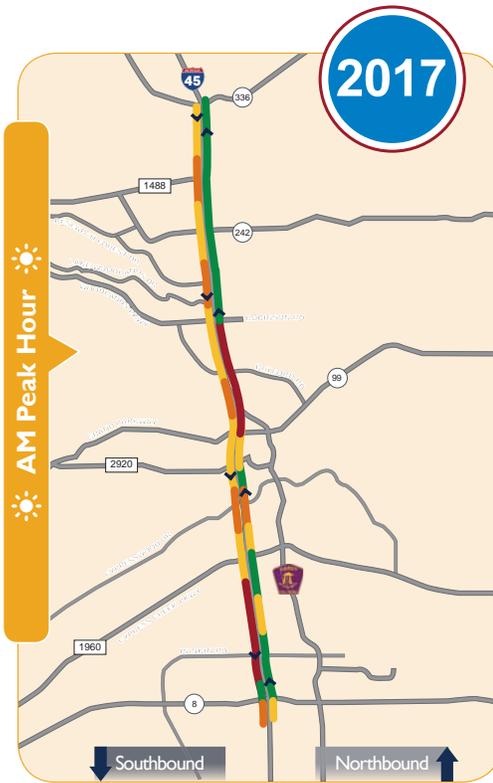
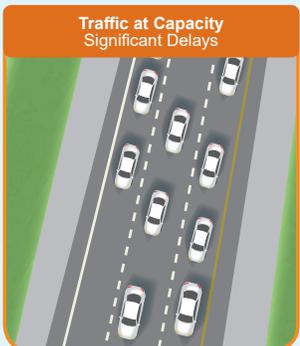
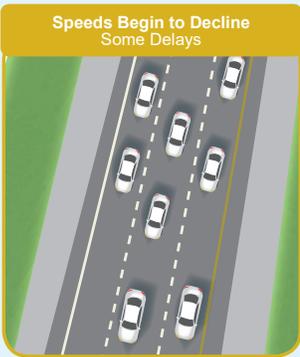
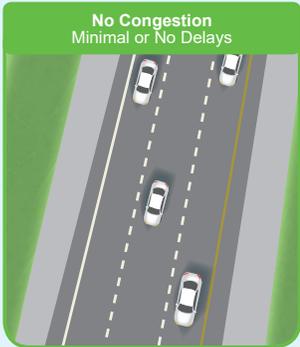
Growing Mobility Needs





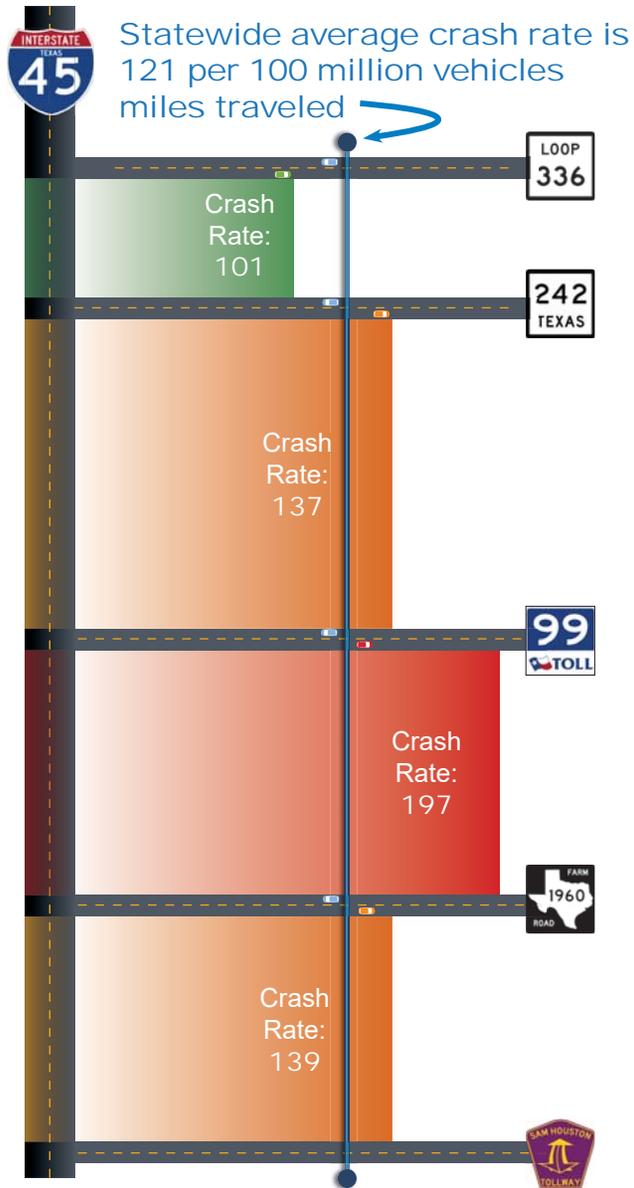
Growing Mobility Needs

Level of Service (LOS) Ratings Scale:



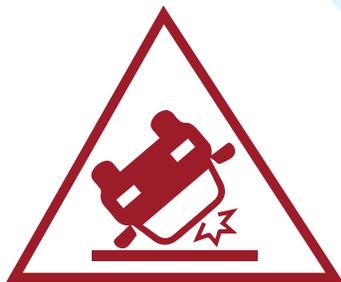


Growing Safety Needs



On I-45N from 2012-2016 there have been....

11,992
Total Crashes



average of 6 crashes per day

2,832
Injury Crashes



crashes per week
result in injury

228
Fatal or Incapacitating
Crashes



crashes per month
are fatal or incapacitating

1,357

of 11,992 crashes
are truck-related



Statistics represent the total number of
crashes on I-45N mainlanes and frontage roads

We can do
Better!

33
Crashes
Involving
Pedestrians



12
Crashes
Involving Bicyclists

19 of these crashes have resulted in a fatality or
incapacitating injury



Growing Connectivity Needs

There are insufficient bicycle and pedestrian facilities in the I-45N corridor

12 out of 25 I-45N crossings have



Pedestrian Facilities

2 out of 25 I-45N crossings have



Bicycle Facilities

33 Crashes Involving Pedestrians

Bicycle and pedestrian crashes from 2012-2016:



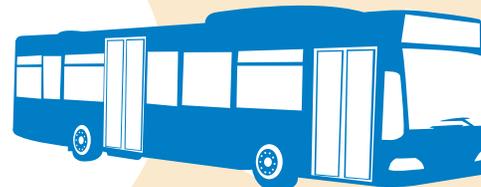
12 Crashes Involving Bicyclists



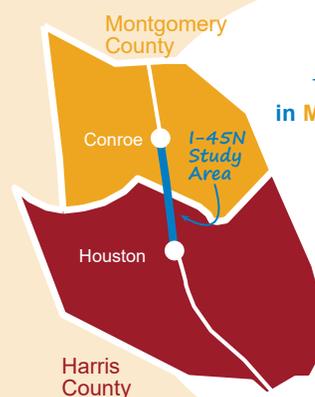
19 of these crashes have resulted in a fatality or incapacitating injury

There is insufficient transit service throughout the I-45N corridor

14 transit routes in the I-45N corridor



6 park & ride bus routes provide service during peak hours only



1 transit route in Montgomery County...

7 transit routes in Harris County...

...provide service all day



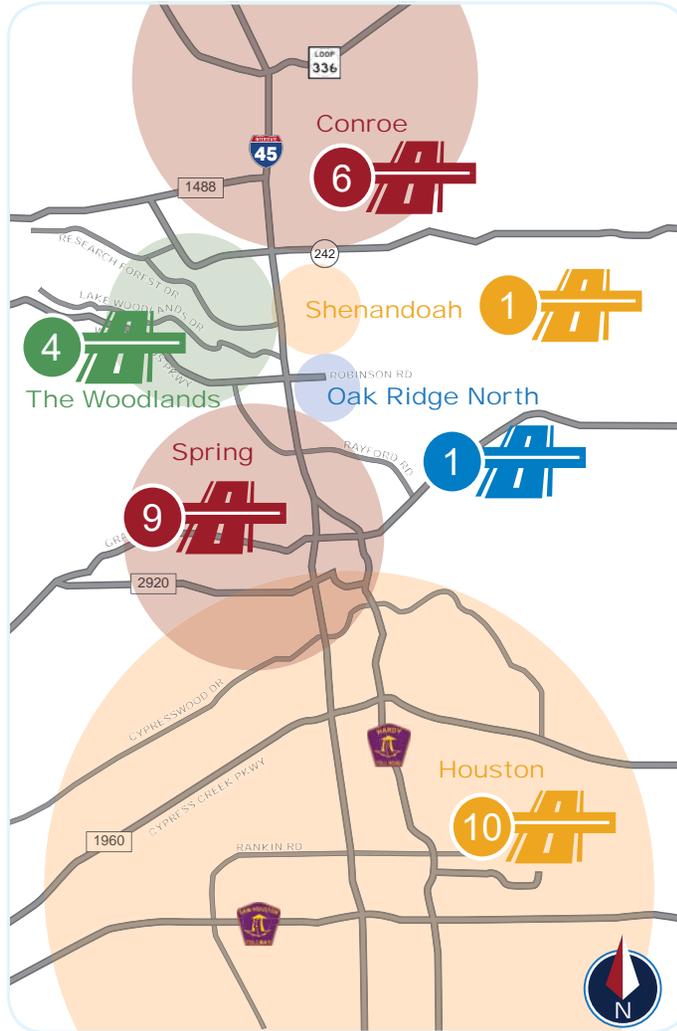
Growing Connectivity Needs



Total number of east-west crossings in each area

As a major north-south roadway, I-45N can be a barrier to east-west movement.

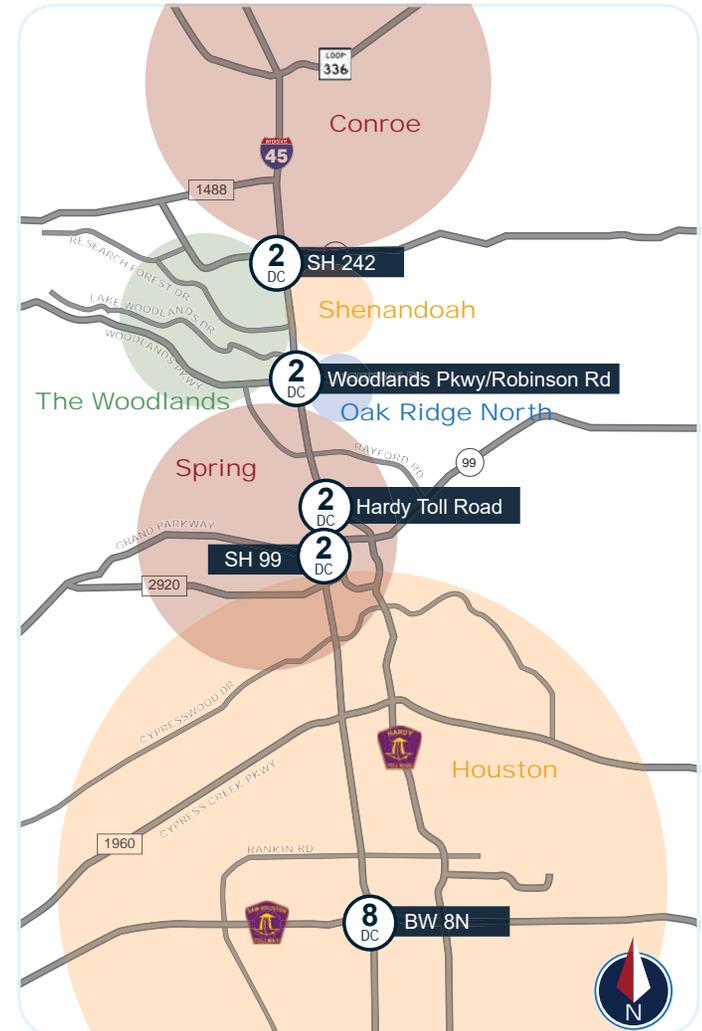
Growing communities on either side of I-45N would benefit from more—or better—east-west crossings.



Total number of direct connectors along I-45N

Direct connectors provide smooth access between I-45N and the crossing road.

I-45N doesn't have enough direct connectors, which limits accessibility and increases traffic on frontage roads.





Corridor Goals

What is a Goal?

A “goal” guides the solutions developed to improve conditions and address the corridor’s needs

These goals were created based on input received from the public, stakeholders, and agencies earlier in the study process



Improve mobility and travel time reliability

Improve system connectivity and accessibility:



- Enhance east-west connections
- Improve interchanges and access to/from the I-45N mainlanes
- Improve connections to parallel facilities



Improve bicycle and pedestrian facilities



Enhance economic development and strong regional economic competitiveness



Maximize use of existing right-of-way



Reduce roadway flooding



Maintain and preserve existing I-45N infrastructure



Incorporate cost-effective solutions



Reduce frequency and severity of crashes



Improve transit accessibility and connections to I-45N



Improve accommodation of freight traffic



Minimize impacts to natural and built environments



Accommodate future technology to promote sustainability



Improve functionality and resiliency of I-45N as a hurricane and emergency evacuation route



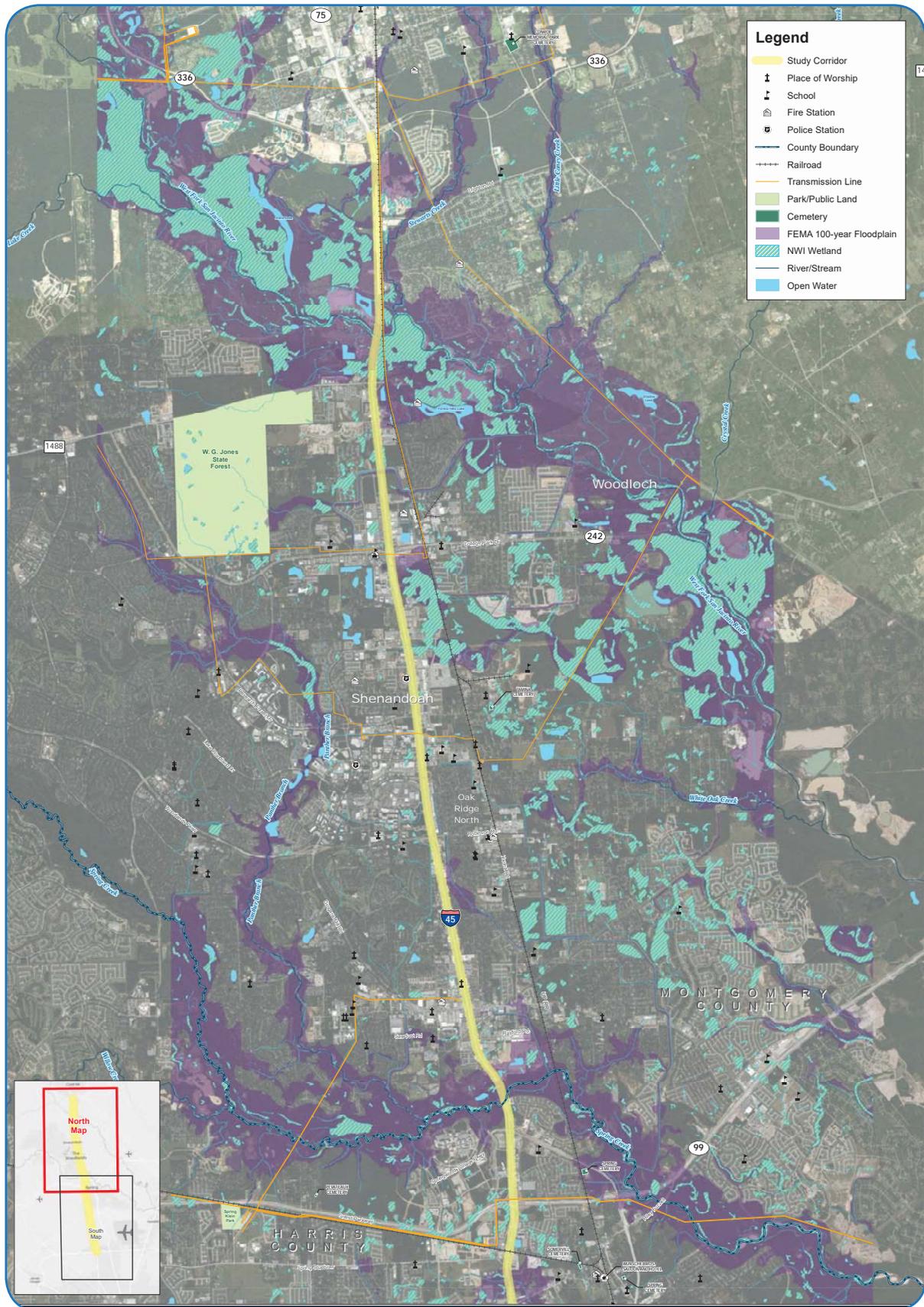
Identify and prioritize short-term solutions for quicker implementation of improvements



Achieve active stakeholder and public participation throughout study

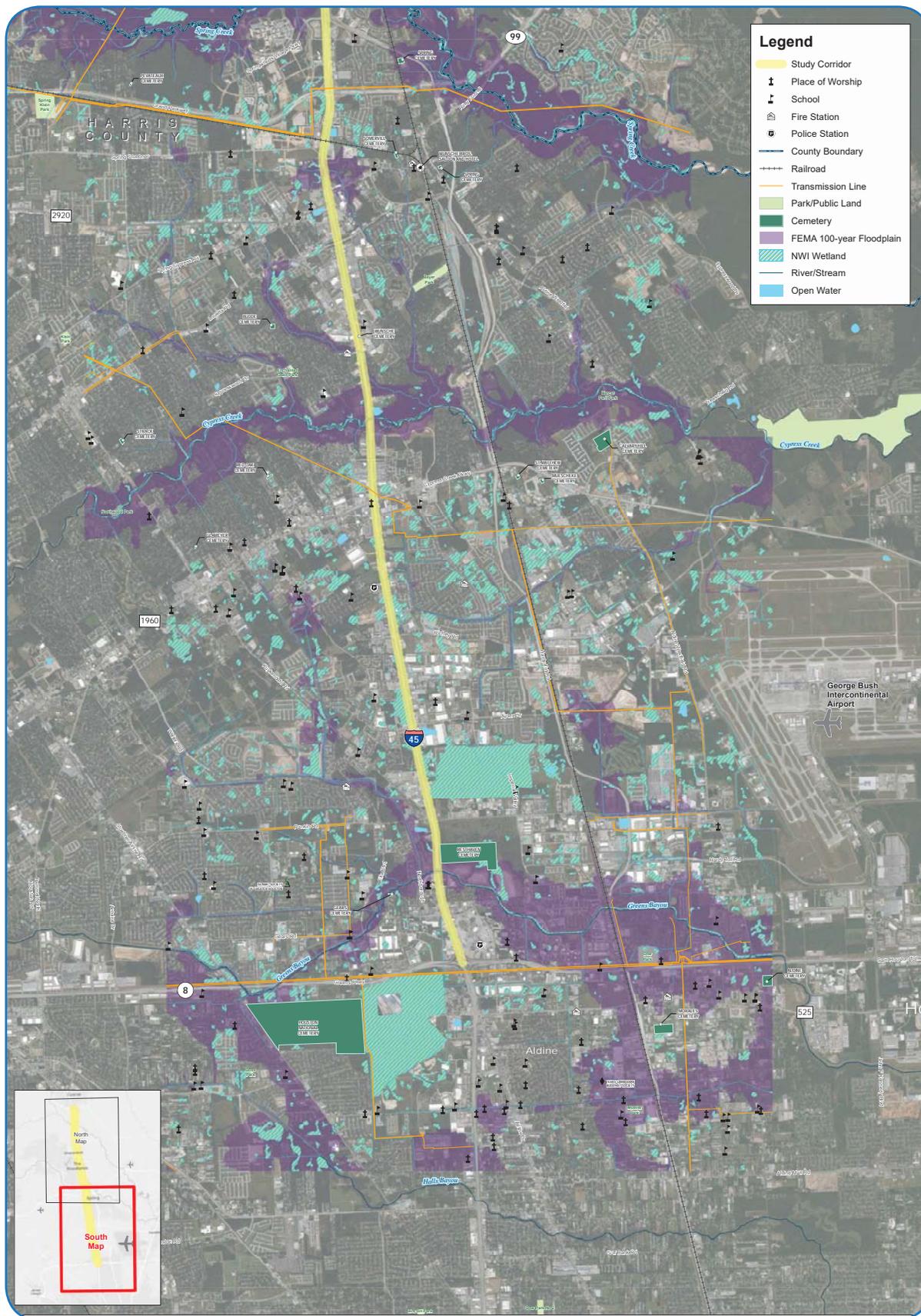


Environmental Constraints Map - North



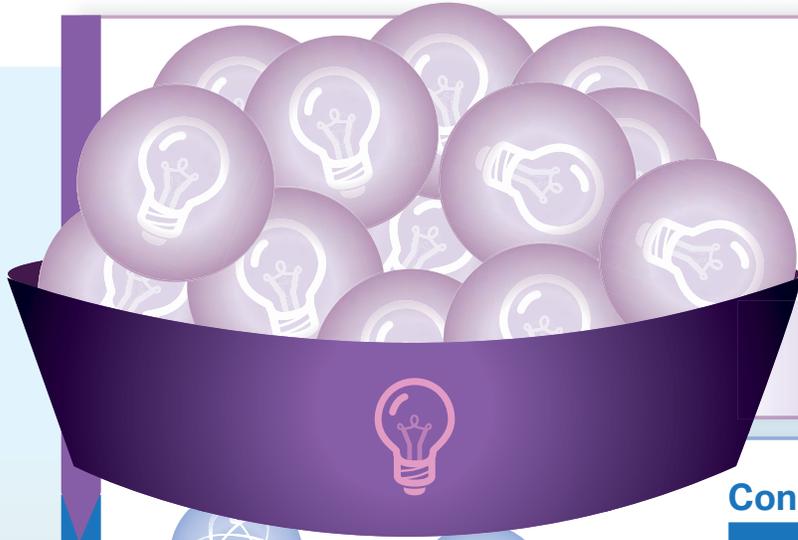


Environmental Constraints Map - South





Alternatives Screening Process

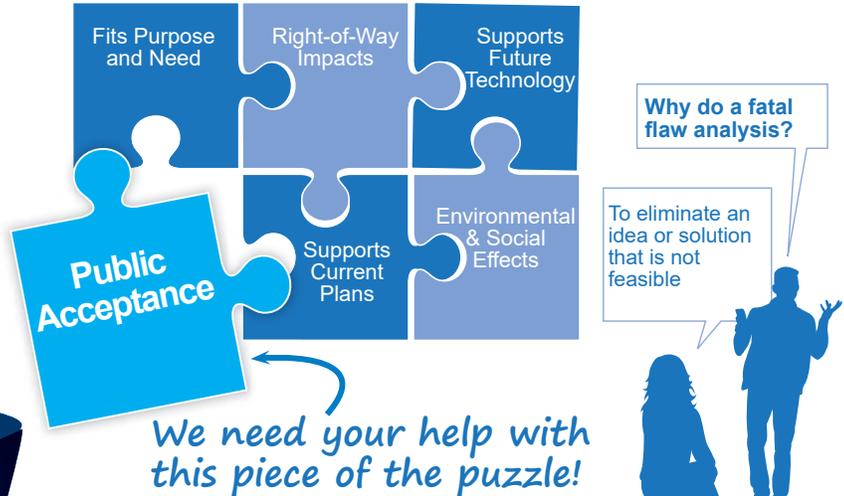


Who Contributes Ideas?

- The Public
- Study Team
- Stakeholders
- Elected Officials
- Planning Agencies
- Federal/State Agencies
- Local Governments
- TxDOT

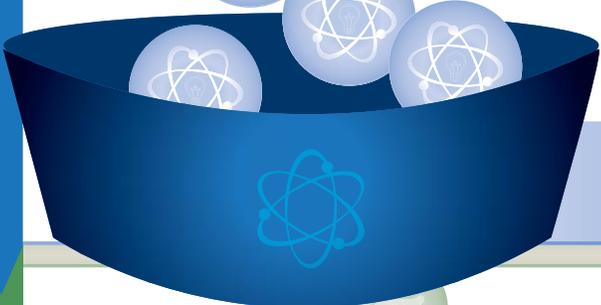
Universe of Alternatives

Conduct Fatal Flaw Analysis to Gauge:



We need your help with this piece of the puzzle!

Reasonable Alternatives



Engineering Analysis



Environmental Analysis

Recommended Alternatives



Next Step:
Environmental Review Process





Universe of Alternatives

Categories and Alternatives



No Build



Existing Corridor

- Use Technology
- Rehabilitation
- Interchanges / Ramps / Direct Connectors
- Improve East-West Connections
- Add New East-West Connections
- Collector-Distributor Systems (between mainlanes & frontage roads)
- Frontage Road Improvements / Access Management / Ramps



Add Lanes

- Within Existing Pavement (Restriping)
- At-Grade (New Pavement)
- Elevated (New Pavement)



High Capacity Transit

- Expand Bus Routes / Transit Services
- Light Rail
- Commuter Rail
- High Speed Rail



Multimodal

- Microtransit
- Pedestrian / Bicycle Improvements
- Park & Ride Improvements / Multimodal Hub



Parallel Routes

- Improve Hardy Toll Road (including connections)
- Extend Hardy Toll Road North
- Kuykendahl Improvements

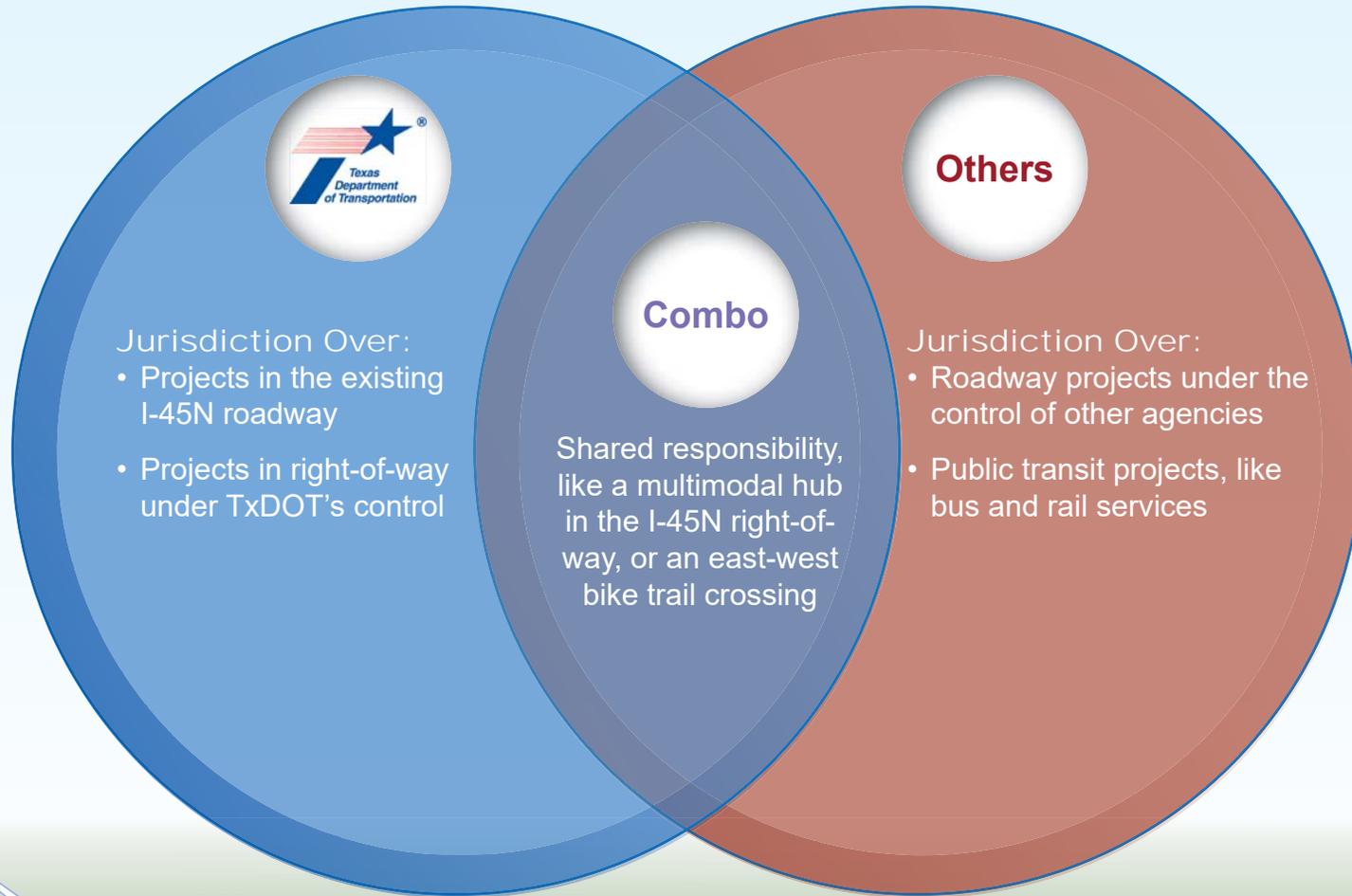


The Universe of Alternatives is made up of options to improve conditions in the Study Area





Who can implement these improvement projects?



Different agencies have jurisdiction over different types of projects



Project funding comes from the agency with jurisdiction—though other agencies can still support the project!





Existing Corridor Alternatives



Existing Corridor

Use Technology

TxDOT Jurisdiction

- Use technology to increase the efficiency of the transportation system
- Transportation Demand Management (TDM) manages demand with strategies like flexible work hours, ridesharing, and telecommuting
- Intelligent Transportation System (ITS) uses smart technology to manage congestion and traffic flow



Improve East-West Connections

TxDOT Jurisdiction

- Improve existing east-west arterials that connect to I-45N
- Add lanes, install signals, and/or rehabilitate pavement



Frontage Road Improvements / Access Management / Ramps

TxDOT Jurisdiction

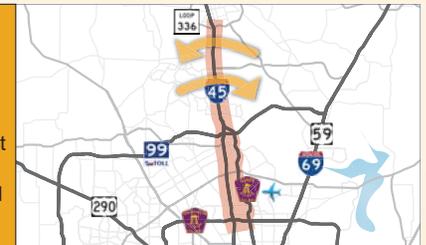
- Implement frontage road and ramp improvements
- Improve traffic flow and safety, while reducing travel delays
- Improve signing, signal timing, pavement markings, driveway locations, and intersection improvements along frontage roads



Add New East-West Connections

Other Jurisdictions

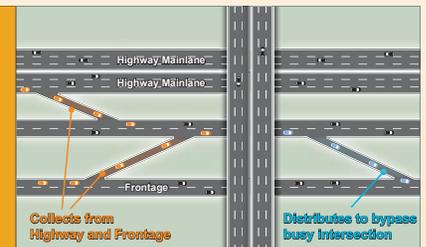
- Construct new east-west arterial roadways that intersect with I-45N
- Enhance community connectivity on both sides of I-45N and to I-45N



Collector-Distributor Systems (between mainlanes and frontage roads)

TxDOT Jurisdiction

- Construct new collector-distributor roads near interchanges to improve traffic flow and access
- Improve safety by reducing freeway merging and lane changes



Rehabilitation

TxDOT Jurisdiction

- Rehabilitate the pavement and infrastructure along the existing I-45N corridor



Interchanges / Ramps / Direct Connectors

TxDOT Jurisdiction

- Construct new interchanges, ramps, or direct connectors; or
- Reconfigure the existing interchanges / ramps / direct connectors
- Improve connectivity within the roadway network





Parallel Routes & Added Capacity Alternatives

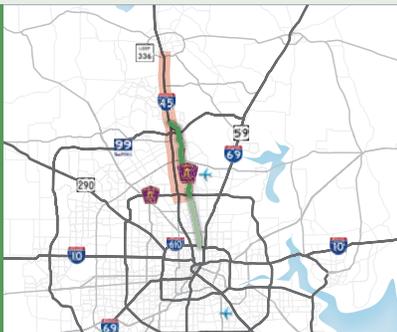


Parallel Routes

Improve Hardy Toll Road (including connections)

Combo of TxDOT & Other Jurisdictions

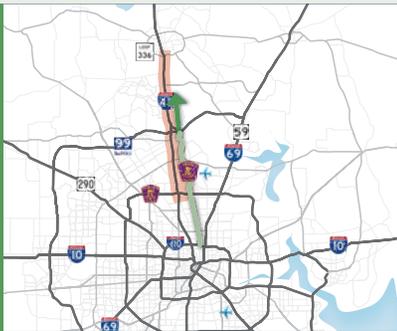
- Provide additional roadway capacity on Hardy Toll Road to alleviate congestion on I-45N corridor
- Additional improvements may include ramp and connectivity improvements, or others as deemed feasible



Extend Hardy Toll Road North

Other Jurisdictions

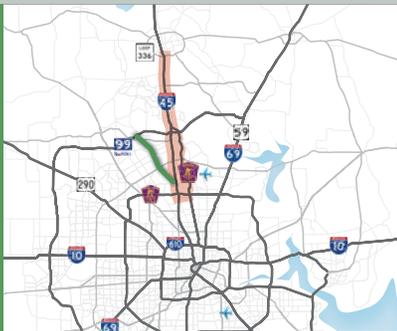
- Extend Hardy Toll Road from SH 99 to Loop 336S
- Provide an alternate north-south corridor



Kuykendahl Improvements

Other Jurisdictions

- Provide additional roadway capacity on Kuykendahl to improve north-south mobility on parallel routes
- Example improvements to manage increased traffic volumes could include: roadway expansion, intersection improvements, transit operations, multimodal facilities, and other improvements as deemed feasible



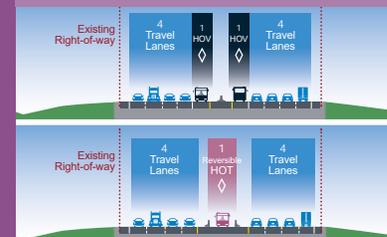
Added Capacity

Within Existing Pavement (restriping)

TxDOT Jurisdiction

- Restripe I-45N corridor lanes to increase capacity without increasing the amount of pavement and/or re-purpose existing lane usage

Potential Restriping Example



Existing Configuration Example

At-Grade (new pavement)

TxDOT Jurisdiction

- Construct additional at-grade lanes to add capacity to I-45N
- New lane types could include general purpose, express, high-occupancy vehicle (HOV), managed, truck, etc.



Elevated (new pavement)

TxDOT Jurisdiction

- Construct new elevated lanes along I-45N to expand capacity and improve mobility
- New lane types could include general purpose, express, high-occupancy vehicle (HOV), managed, truck, etc.





High Capacity Transit & Multimodal Alternatives



High Capacity Transit

Expand Bus Routes / Transit Services

Other Jurisdictions

- Expand bus service area
- Increase the number of buses to shorten wait times
- Reduce operational delays and improve on-time service
- Other improvements as deemed feasible



Houston METRO

Commuter Rail

Other Jurisdictions

- Transport high volume of commuters via passenger rail between suburbs and the city center
- Average travel speeds of 30 mph or higher, depending on station locations
- Can require new right-of-way or co-exist along an existing freight rail corridor



High Speed Rail

Other Jurisdictions

- Characterized by frequent service to major activity centers approximately 200-600 miles apart
- Express service has few stops and a top speed of at least 150 mph



Texas Central

Light Rail

Other Jurisdictions

- Typically operates along exclusive rights-of-way at low speeds
- Usually along an arterial with moderate density hubs easily accessible by pedestrians



Houston METRO



Multimodal

Microtransit

Other Jurisdictions

- Implement microtransit (on-demand, short-distance, flexible transit service) in communities along I-45N
- Provide first- and last-mile connections to support bus and rail transit service
- Prepare for automated microtransit vehicles in station area designs



Houston Chronicle

Pedestrian / Bicycle Improvements

Combo of TxDOT & Other Jurisdictions

- Increase the safety, comfort and convenience of walking and biking trips
- Improve intersections (ADA ramps, refuge islands, bicycle signals, etc.)
- Other improvements as deemed feasible



Park & Ride Improvements / Multimodal Hub

Combo of TxDOT & Other Jurisdictions

- Build or improve existing Park & Ride facilities to better support transit use
- Construct multimodal transportation hubs serving trips that include different modes
- Located in areas that provide multiple transportation options





Fatal Flaw Criteria

Purpose and Need

Any alternative that advances MUST meet the Purpose and Need



Connectivity

Safety

Mobility

Consistency with Regional Plans

Environmental & Social Effects

Right-of-Way Needed

Supports Future Technology

Support in Previous Studies

Public Acceptance

Positive

Neutral

Negative

Increases connectivity, be it east-west, interchange, transit, or bike/pedestrian

Expected to decrease vehicle and bike/pedestrian crash rates

Improves travel time and/or reliability, handles expected growth

Supports existing Regional Transit Plan strategies, recommendations

Positive effect on sensitive environment or under-represented communities

No additional right-of-way required

Supports future technology (like automated vehicles) and helps future corridor

Alternative is mentioned in previous studies

Strong support at this Public Meeting

Neutral impact on connectivity

Neutral impact on crash rates

Neutral impact on travel time and reliability

Neutral impact on existing strategies

Neutral effect on environment or under-represented communities

Minimal additional right-of-way required

Neither supports nor impedes emerging technology

No mention in previous studies

Neutral reception at this Public Meeting

Likely to decrease connectivity

Likely to increase crash rates

Alternative is insufficient to absorb expected growth

Impedes existing strategies, recommendations

Negative effect on environment or under-represented communities

Significant additional right-of-way required

Incompatible with emerging technology

Strong opposition at this Public Meeting

We need your input!





We Want Your Input!



Place your **3 green** stickers, **3 red** stickers, and **3 yellow** stickers to vote on which alternatives you **SUPPORT**, **OPPOSE**, or are **NEUTRAL** towards.

No Build	Keep as is	
Parallel Routes	Improve Hardy Toll Road	
	Extend Hardy Toll Road North	
	Kuykendahl Improvements	
Add Lanes	Within Existing Pavement (Restriping)	
	At-Grade (New Pavement)	
	Elevated (New Pavement)	
Existing Corridor	Use Technology	
	Rehabilitation	
	Interchanges / Ramps / Direct Connectors	
	Improve East-West Connections	
	Add New East-West Connections	
	Collector-Distributor Systems	
	Frontage Road / Access Management / Ramp Improvements	
High Capacity Transit	Expand Bus Routes / Transit Facilities	
	Light Rail	
	Commuter Rail	
	High Speed Rail	
Multi-Modal	Microtransit	
	Pedestrian / Bike Improvements	
	Park & Ride Improvements / Multimodal Hub	





We Want to Hear from *You!*

1 Provide input on our interactive board.

We Want Your Input!

Place your **3 green** stickers, **3 red** stickers, and **3 yellow** stickers to vote on which alternatives you **SUPPORT, OPPOSE, or are NEUTRAL** towards.

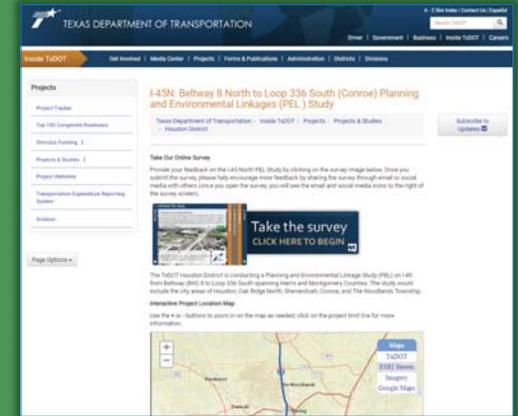
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High Capacity Transit	Expand Bus Routes / Transit Facilities	
	Light Rail	
	Commuter Rail	
	High Speed Rail	
Multi-Modal	Microtransit	
	Pedestrian / Bike Improvements	
	Park & Ride Improvements / Multimodal Hub	

I-45N: Beltway 8 North to Loop 336 South (Conroe) Planning and Environmental Linkages (PEL) Study

2 See website for more information:

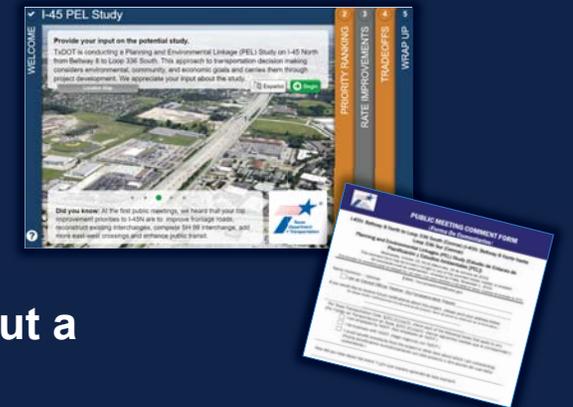
- I-45N Fact Sheet
- Published Study Materials
- Latest News & Events
- Participation Opportunities

www.TxDOT.gov
(Keyword search I-45N PEL)



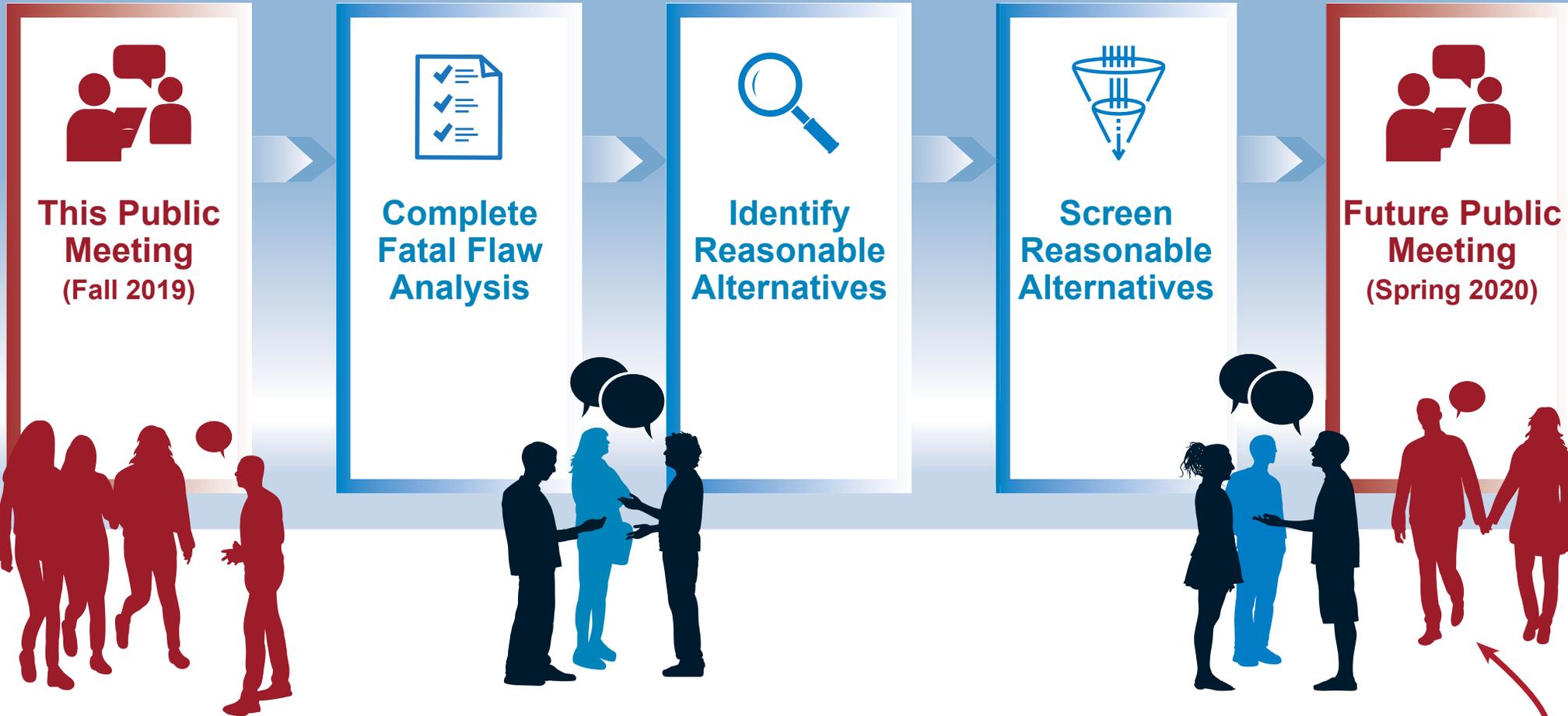
3 Take the online survey at the station tonight or at home.

You can also fill out a comment card.





Next Steps



- Public Meeting
- Stakeholder Meeting

See you at the next public meeting!





Engage Station: Take the Online Survey Here



Please help us gain more feedback and share the link via email or social media!

The official survey comment period will be open through November 1, 2019.



- Fill out the online survey here;
- Or use your phone to fill out the survey at:
www.TxDOT.gov

(Keyword search I-45N PEL)

- Or access the survey immediately by scanning this Quick Response (QR) code with your phone or tablet.

