

AGENDA ITEM 7

Pedestrian and Bicyclist Count Data

Research Project 0-6927

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Texas A&M Transportation Institute (TTI)

TxDOT Bicycle Advisory Committee -- October 27, 2017 -- Austin, TX



Problem Statement

- Currently very limited data on pedestrian and bicyclist use of the transportation system
- Why is the data needed?
 - Planning
 - Design
 - Operations
 - SAFETY



Project Objectives

- Create statewide database and monitoring process for pedestrian and bicyclist count data
 - Evaluate equipment types
 - Install equipment (2 permanent counters)
 - Compile existing counts from other agencies
 - Compile newly collected data
 - Explore crowdsourced data

TxDOT Research Advisory Committee

- Four MPOs
- Two Cities
- Four TxDOT Districts
- TxDOT - Transportation Planning & Programing
- TxDOT – Traffic Operations Division
- TxDOT - PTN Bicycle and Pedestrian Program

Project Schedule

Task #	FY 2017											FY 2018					
	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
Task 1. Project Management and Research Coordination	[Shaded]											[Shaded]					
Task 2. Identify and Document Existing Data and Processes	3 months																
Task 3. Develop Pilot Test Approach for Two Locations				3 months													
Task 4. Conduct and Evaluate Pilot Test Approaches and Processes						6 months											
Task 5. Develop Consolidated Database to Accept TxDOT, MPO and Local Agency Data									6 months								
Project Completion Date																	

Pilot Tests in Austin and Houston

- Select, procure, install 2 permanent counters



Pilot Tests in Austin and Houston

- MoPac/Loop 1 Pedestrian/Bicyclist Bridge over Barton Creek



Pilot Tests in Austin and Houston

- Install portable counters for 9-10 days



Pneumatic
tube
counter



Custom-Built, Vandal-Resistant
Lockable Utility Box

Counter Unit

Infrared Sensor

Passive
infrared
counter



Develop Statewide Database

- Consistent with FHWA Traffic Monitoring Guide format
- Gather and standardize existing data
- Develop simple summary & visualization tools

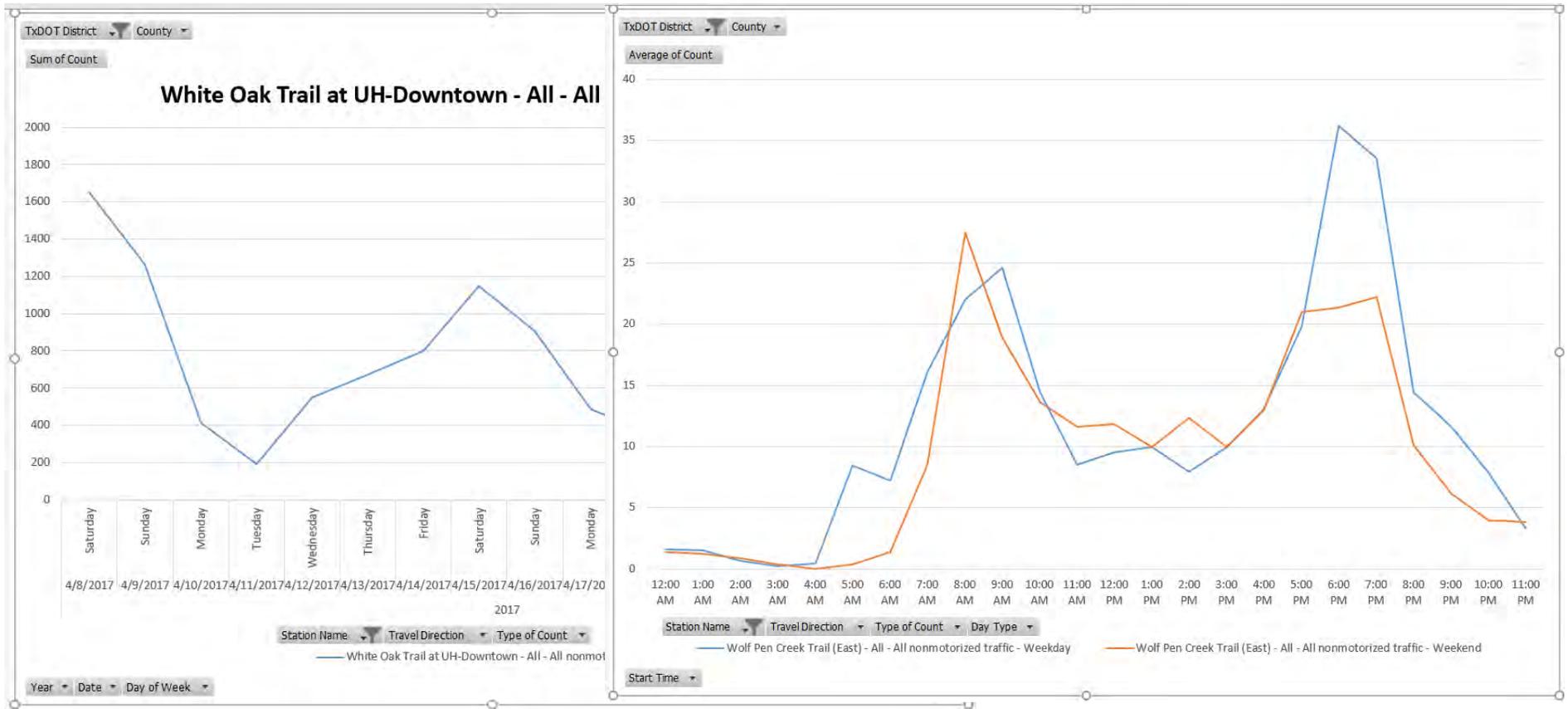
Summary/Visualization Tools

- Overall summaries (30,000 ft view)

				Year	Day Type	
				2017		2017 All Days
Station Name	Travel Direction	Type of Count	Weekday	Weekend		
☐ Battlefield Trail	☐ All	All nonmotorized traffic	730	812	753	
☐ Belden Trail	☐ All	All nonmotorized traffic	266	81	213	
☐ Rodd Field: Saratoga to Brooke	☐ NB	Bicycles only	41	24	35	
	☐ SB	Bicycles only	26	20	24	
☐ Terry Hershey Hike and Bike Trail (East of Eldridge Parkway)	☐ All	All nonmotorized traffic	587	948	690	
☐ White Oak Trail at UH-Downtown	☐ All	All nonmotorized traffic	539	1,375	852	

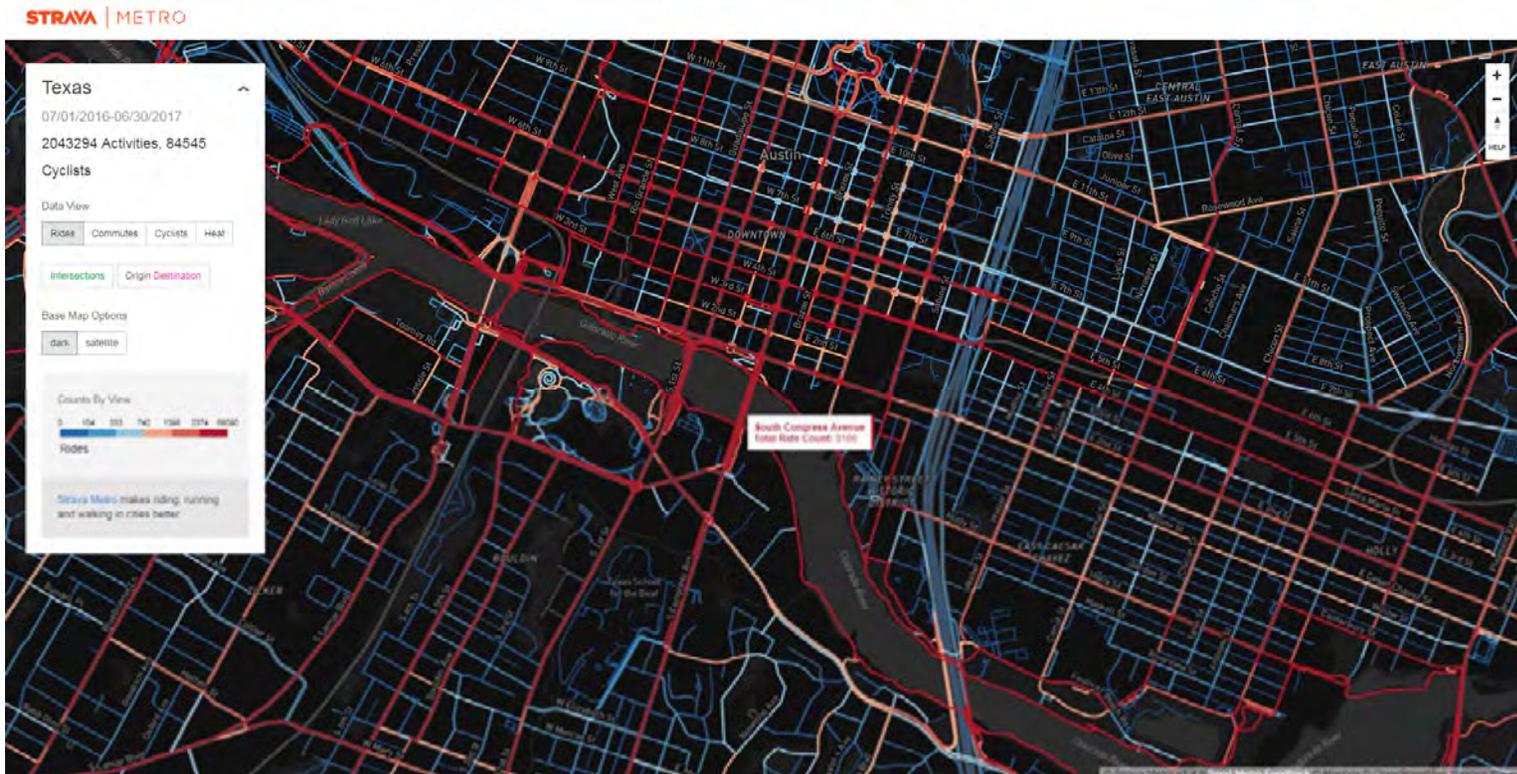
Summary/Visualization Tools

- Day-by day, time-of-day, day-of-week, etc.



Crowdsourced Data

- Strava in Austin, Houston: 3-19% of all cyclists
- RideReport in Austin: < 0.3% of all cyclists





STRAVA | METRO

**What did TXDOT buy? And how is Strava
Data going to help Texas?**

October 27 , 2017

Brian Riordan: Customer Success Lead

A stylized map of a city with a grid of blue and yellow lines. A prominent red line traces a winding path through the city, likely representing a Strava route. The text "What and Who is Strava?" is overlaid in white on the map.

What and Who is Strava?

What is Strava?

The social network for cyclists and runners.

The screenshot shows the Strava desktop website. At the top, there is a navigation bar with the Strava logo, a search bar, and links for Dashboard, Training, Explore, and Challenges. The main content area is divided into several sections:

- User Profile:** Brian Riordan's profile is shown, including a profile picture, name, and statistics: Following (417), Followers (404), and Activities (1317). It also lists the latest activity as "4 in a row - Yesterday" and a "Your Training Log" link.
- Activity Feed:** A "Morning commute" activity by Paul Hogan is featured. It includes a distance of 6.9mi, an elevation gain of 217ft, and a map showing the route through a park area.
- Activity Feed:** A "Morning Ride" activity by robb m. is shown below, with a distance of 0.7mi and 0ft elevation gain, accompanied by a map of a city street.
- Navigation and Tools:** A central column contains icons for various services like Amazon, Spotify, and POC, along with a "50" badge and a "View All Clubs" link.
- Privacy and Friends:** A "Try a Privacy Zone" notification is present, along with a "Suggested Friends" list featuring Bert Davis, Leo Romanovsky, and Jerett Gordon.
- Footer:** Links for Support, Premium, Terms and Conditions, and Privacy Policy are visible at the bottom.

The screenshot shows the Strava mobile app's "Feed" screen. At the top, there is a status bar with "VZW Wi-Fi", "11:24 AM", and "43%" battery. The navigation bar includes a "+" icon, "Feed", a profile icon, and a notification bell. The main content area shows a post from Liam Stewart titled "Morning Ride #commutemarker.com". The post details include a distance of 5.1 mi, an elevation gain of 114 ft, and a time of 0h 22m. Below the text is a map of Minneapolis showing the ride route in orange. At the bottom, there is a "You gave kudos" notification and a thumbs-up icon. The bottom navigation bar contains icons for Feed, Explore, Record, Profile, and More.

The screenshot shows the Strava mobile app's "Ride" screen. At the top, there is a status bar with "VZW Wi-Fi", "11:25 AM", and "43%" battery. The navigation bar includes "Settings", "Ride", and a "Close" button. The main content area is a map showing the current ride route in orange. A "Send Beacon Text" button is overlaid on the map. At the bottom, there is a navigation bar with icons for a location pin, a bicycle, a person, and a circular target icon.

What is Strava Metro?

Data-driven bike and pedestrian planning

- Aggregated, anonymized activity data from Strava's millions of users
- Analyze popular or avoided routes, peak commute times, intersection behavior times, and origin/destination zones
- Processed for compatibility with Geographic Information System (GIS) and relational database environments

Apples to Apples Cycling Data Across the State

Opening up data for deep collaboration across city, state and private groups

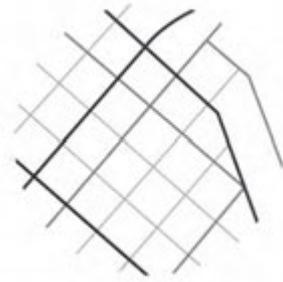
TX-DOTs investment opens the door for groups across the state to have access to the data. But what does this really mean?

- Sub-license agreement to use the data through Strava (adobe sign)
 - Sign-Up sheet available
- Strava will provide the data out through a FTP link to subgroups
- Data can be used for all planning purposes
- DataView for state is available.
 - Rebuild of localized regions is available



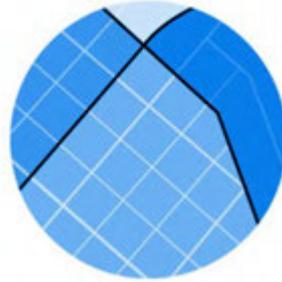
Metro Products

Strava Metro Data



Streets (Polylines)

Minute-by-minute counts
across your entire network



Origin / Destination (Polygons)

Understand activity starting
and ending points, by region



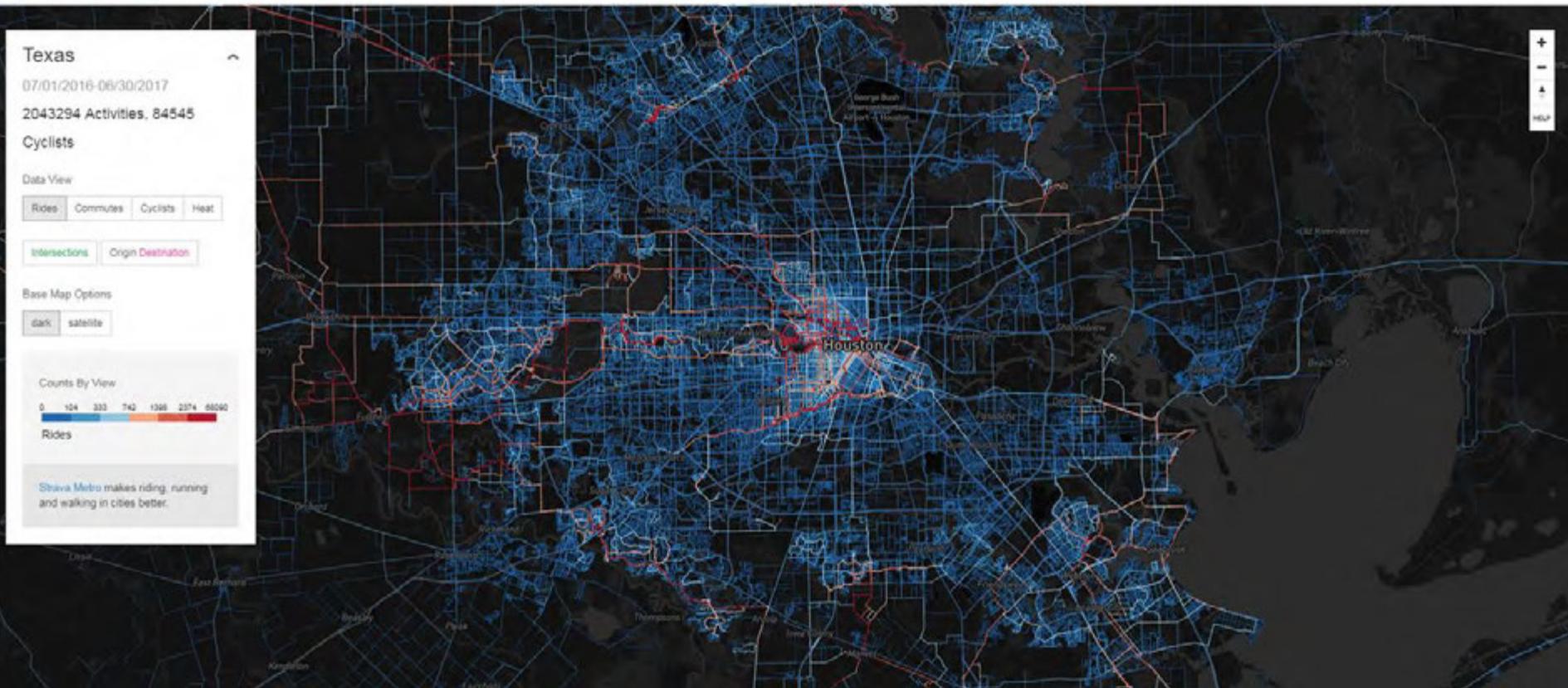
Intersections (Nodes)

Activity counts and wait
times at every intersection

Strava Metro DataViewer

DataView - Big data <-> Easy to Use

STRAVA | METRO

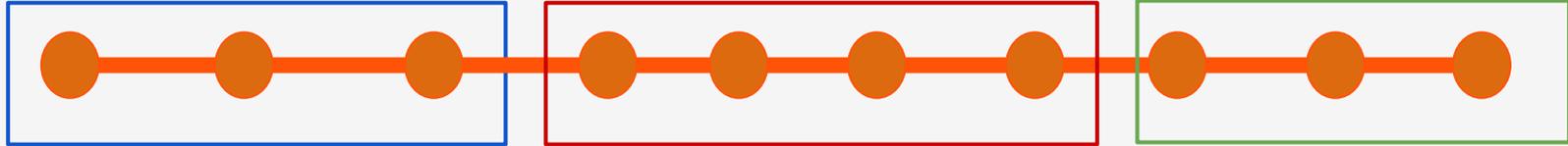


Metro Data Covers the Spectrum for Bike/Ped Planning Actions

Discovery

Implementation

Prediction



Justification that people ride bikes

When and what changes riding frequency

Locating Intersection Hot Zones and possible route conflicts

Identify top Origin and Destination pockets

Isolate speed and volumes to begin to locate slow down regions

Evaluate the impact of new cycling investments

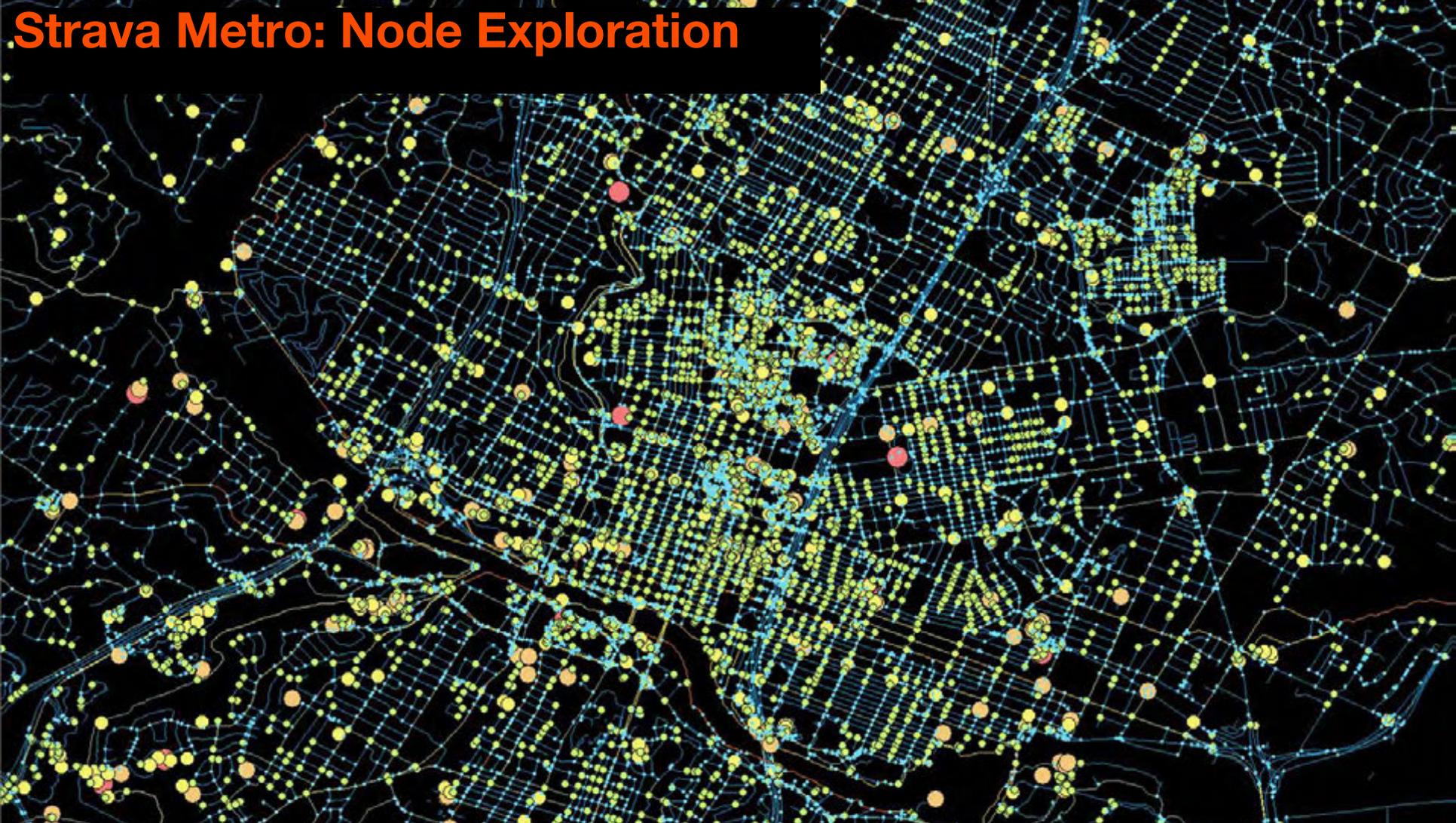
Blending of count data with path data to correlate and extrapolate

Safety prediction modeling

Building routing engines to isolate cycling habitat fragmentation

Generate cycling traffic demand models and employ ITS solutions

Strava Metro: Node Exploration



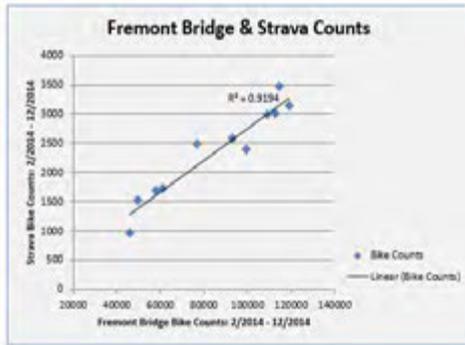
Strava Metro: Correlation to Counting Programs

Case Study: Seattle, Washington

Fremont Bridge Bike Counts



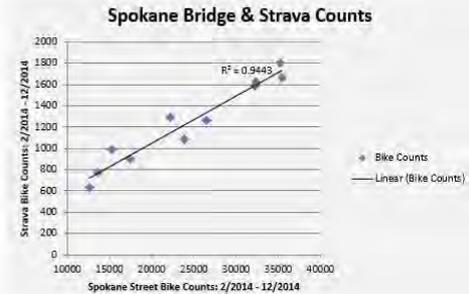
Strava: 25,980
Fremont Counter: 939,386
Percent of Strava to Population: 2.77%
R2: 0.9194



Spokane Bridge Bike Counts



Strava: 13,602
Fremont Counter: 266,850
Percent of Strava to Population: 5.10%
R2: 0.9443



Using counting programs with the Metro data allows the data to become even more useful. Strava correlation with counting programs is statistically amazing, with r-squared values typically around 0.8.

Strava Metro: Correlation to Counting Programs

Case Study: Seattle, Washington



16,297 Strava Bike Trips
X 27 Multiplier
= **440,019** year bike trips
(199,476 6- 9am)



How far can we push this? ---> Total Miles Traveled in SDOT by Bike in 2014: **63,253,198**

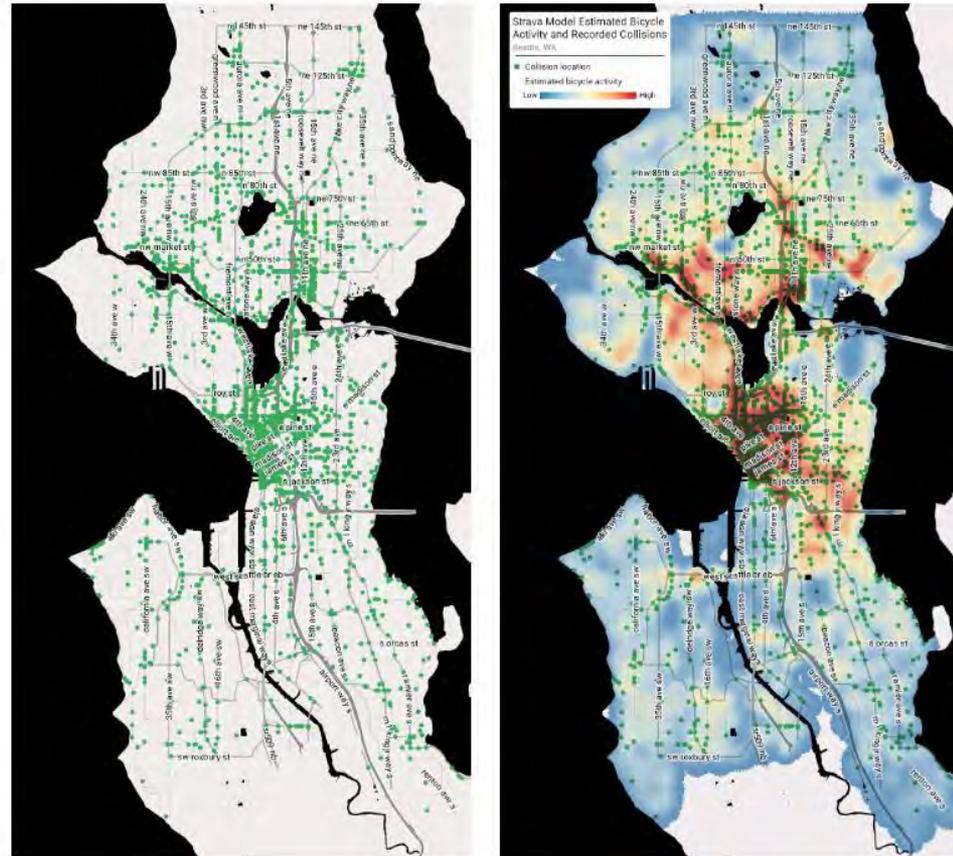
Strava Metro: SDOT Crash Report

Case Study: Seattle, Washington

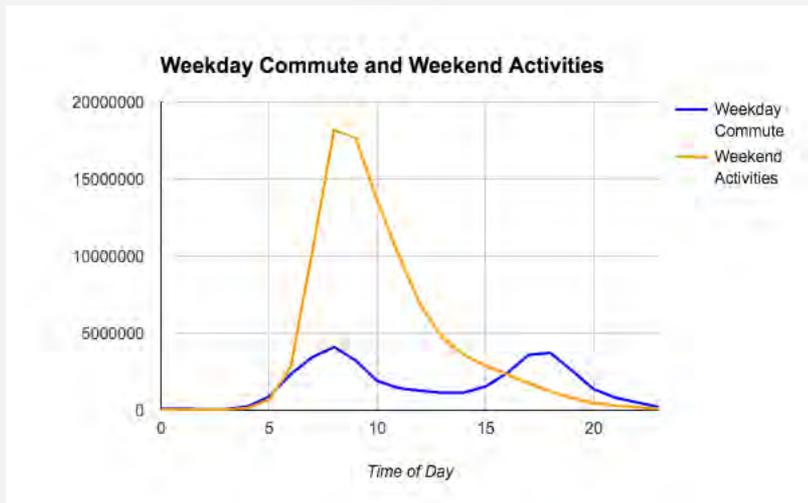
Modeling for Safety

Enhancements ([Seattle DOT](#)) - Overlaying Metro data with crash data to model for dangerous characteristics and prioritize improvements.

FIGURE 11: BICYCLE CRASHES AND BICYCLE VOLUME ESTIMATES

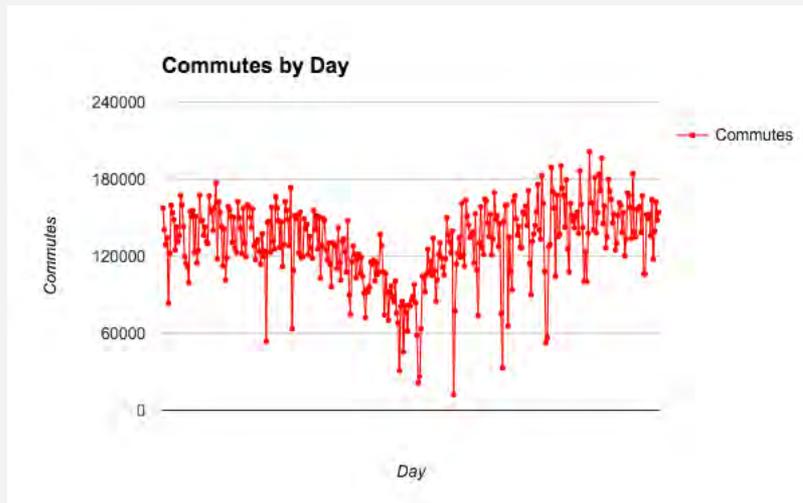


Using Metro to Gain Temporal Movement Trends



Week to Week Trends

Explore the two distinct user groups on Strava: weekday commuters and weekend recreation cyclists

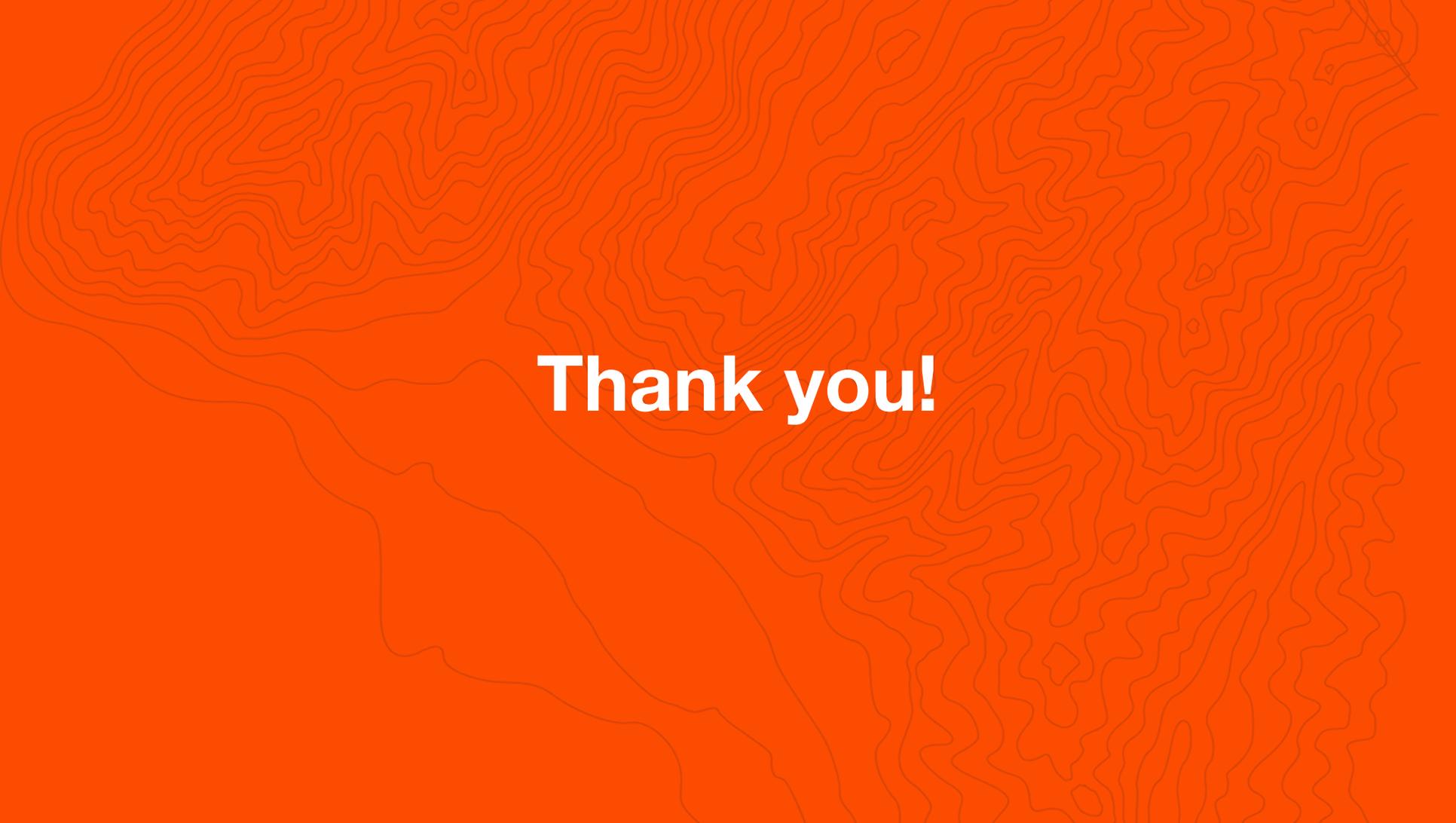


Yearly Commute Trends

Explore seasonality patterns - bike to work month, summer lulls, holidays, etc.

Questions?



The background of the slide is a solid orange color with a white topographic map pattern overlaid. The map consists of numerous irregular, wavy contour lines that create a sense of depth and texture, resembling a mountain range or a complex terrain.

Thank you!

AGENDA ITEM 8

TxDOT Bicycle Tourism Trails Study Update

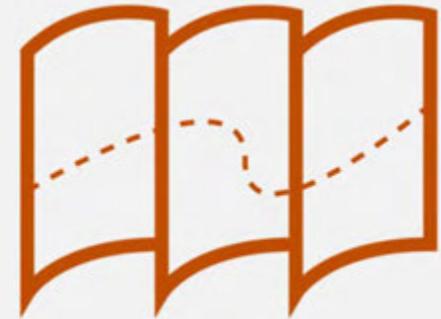
October 2017 BAC Meeting

October 27, 2017

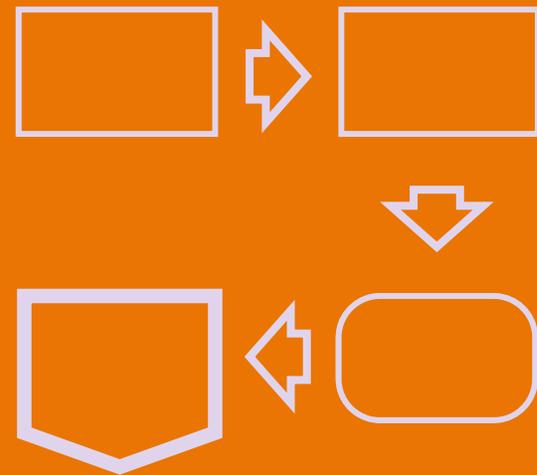


Agenda

- BTTTS Progress Overview
- Route Development
- Bikeway Types and Bikeway Criteria
- Benefits Research Update
- Stakeholder Outreach



Project Progress Overview



BTTS Vision, Goals and Objectives



Texas Bicycle Tourism Trails Study

Vision
A network of bicycle tourism routes collaboratively developed to provide safe, non-motorized access to and connectivity between statewide/regional destinations and support economic development across Texas.

Goal 1: Identify bicycle tourism trail routes
Objectives:

- 1.1. Establish criteria for route locations
- 1.2. Connect existing bicycle, transit, rail, vehicle, and pedestrian networks with potential tourism trails
- 1.3. Identify statewide/regional destinations and annual bicycling events
- 1.4. Identify existing and potential routes
- 1.5. Map routes

Goal 2: Foster the development of safe bicycle tourism trails
Objectives:

- 2.1. Establish design criteria for various bikeway accommodations
- 2.2. Provide estimated costs associated with development of various bikeway accommodations
- 2.3. Establish procedures for considering state-maintained roadways for inclusion in the USBRS
- 2.4. Provide guidance for local jurisdictions and other agencies to develop proposed bicycle tourism trails

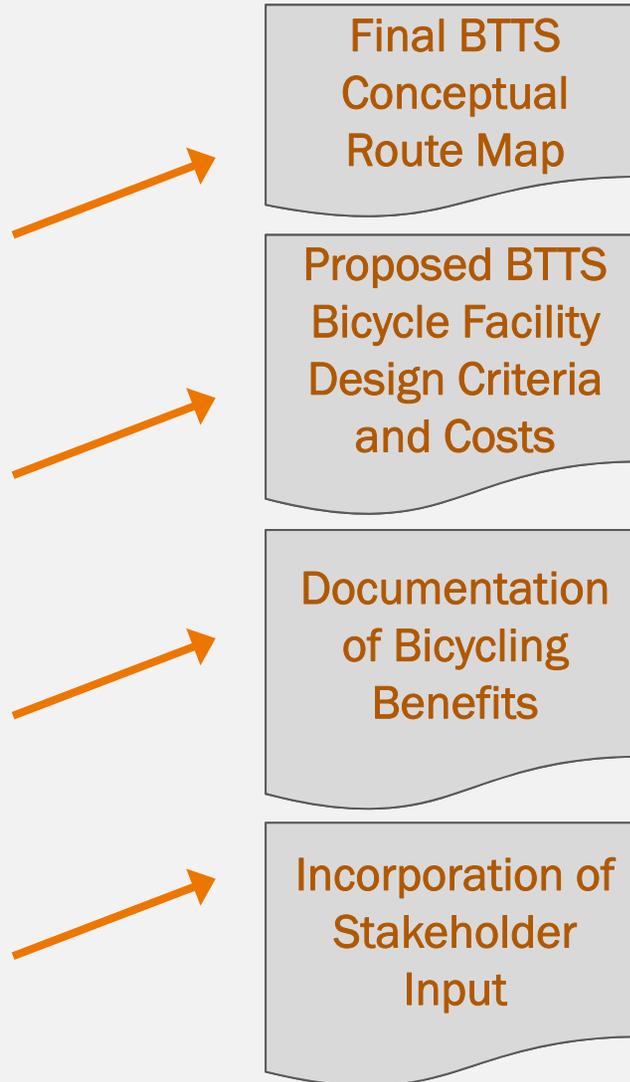
Goal 3: Identify benefits of bicycle tourism trails
Objectives:

- 3.1. Identify economic benefits
- 3.2. Identify health benefits
- 3.3. Identify environmental benefits
- 3.4. Identify transportation/travel benefits

Goal 4: Engage stakeholders
Objectives:

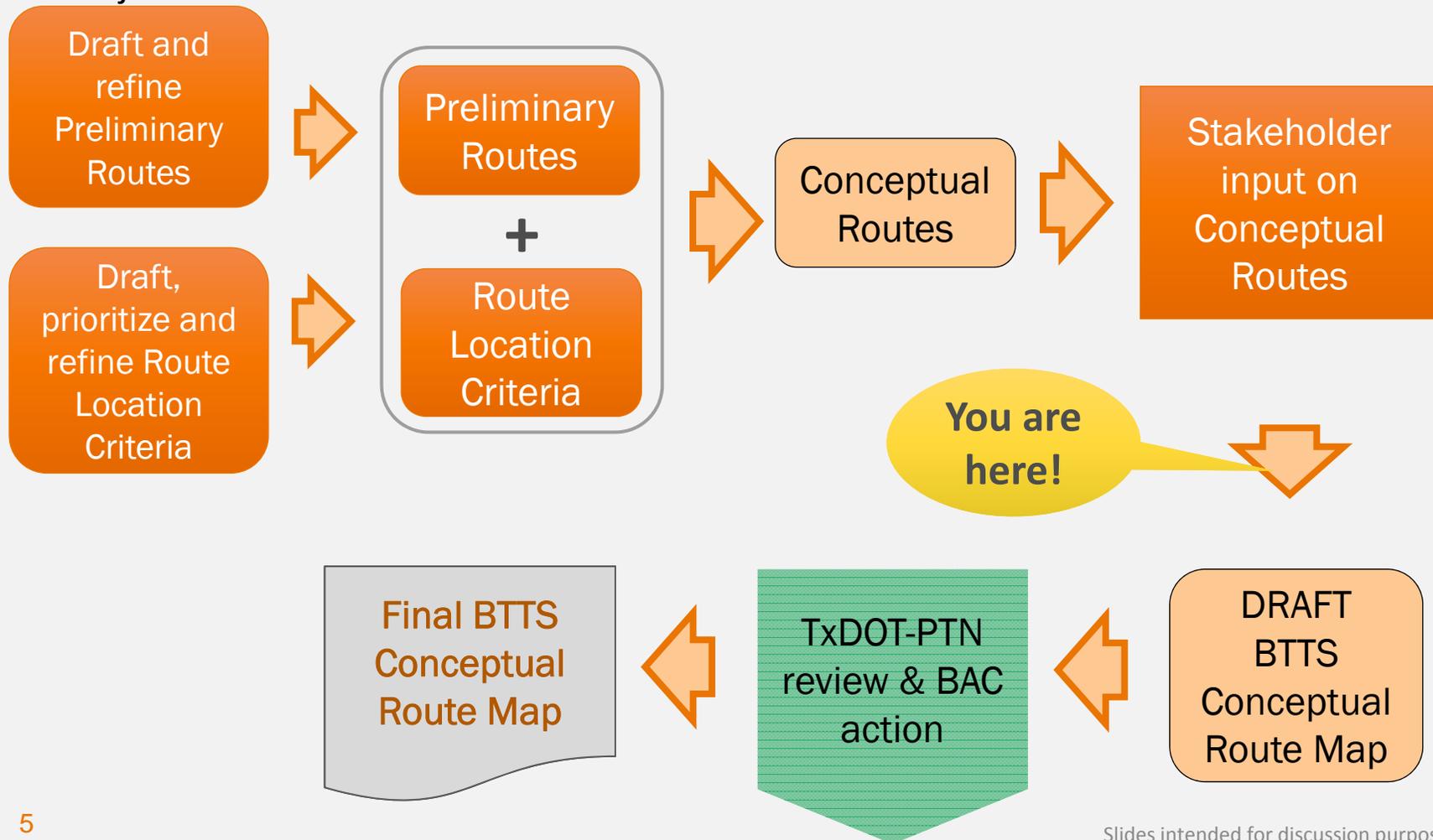
- 4.1. Consult and coordinate with state agencies (including Texas Economic Development and Tourism Office and the Texas Parks and Wildlife Department)
- 4.2. Coordinate with other government entities
- 4.3. Engage statewide bicycle interest groups

Interim Products



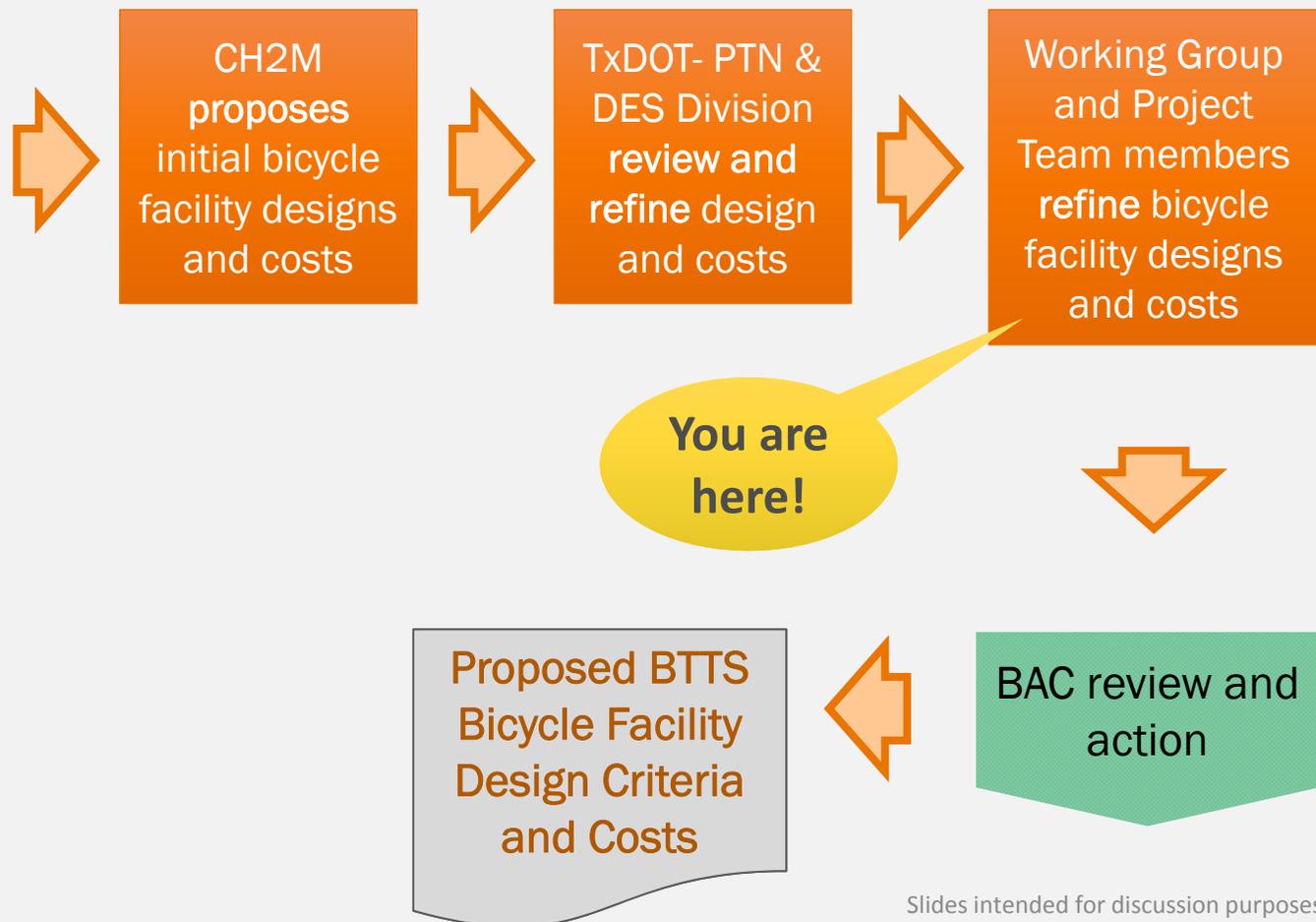
Interim Product Overview – Final BTTS Conceptual Route Map

Working Group
and Project Team



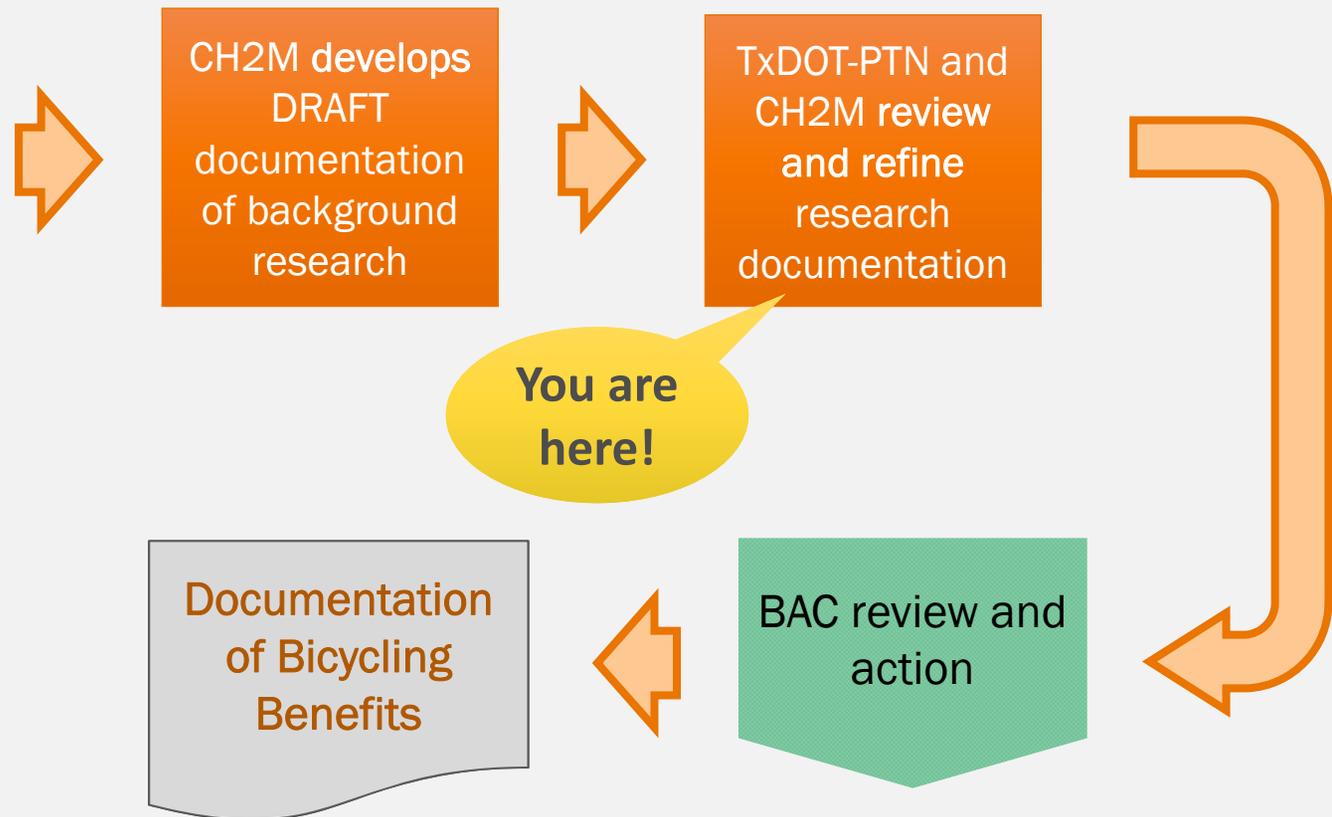
Interim Product Overview – Bicycle Facility Design Criteria

BACKGROUND DATA



Interim Product Overview – Bicycle Benefits Research

BACKGROUND DATA



Interim Product Overview – Incorporation of Stakeholder Input

CH2M develops
DRAFT
stakeholder
engagement
strategy



TxDOT-PTN and
CH2M refine
stakeholder
engagement
strategy



ENGAGE STAKEHOLDERS

TxDOT Division
and Districts

Other Texas
state agencies

BikeTexas

MPOs and
COGs

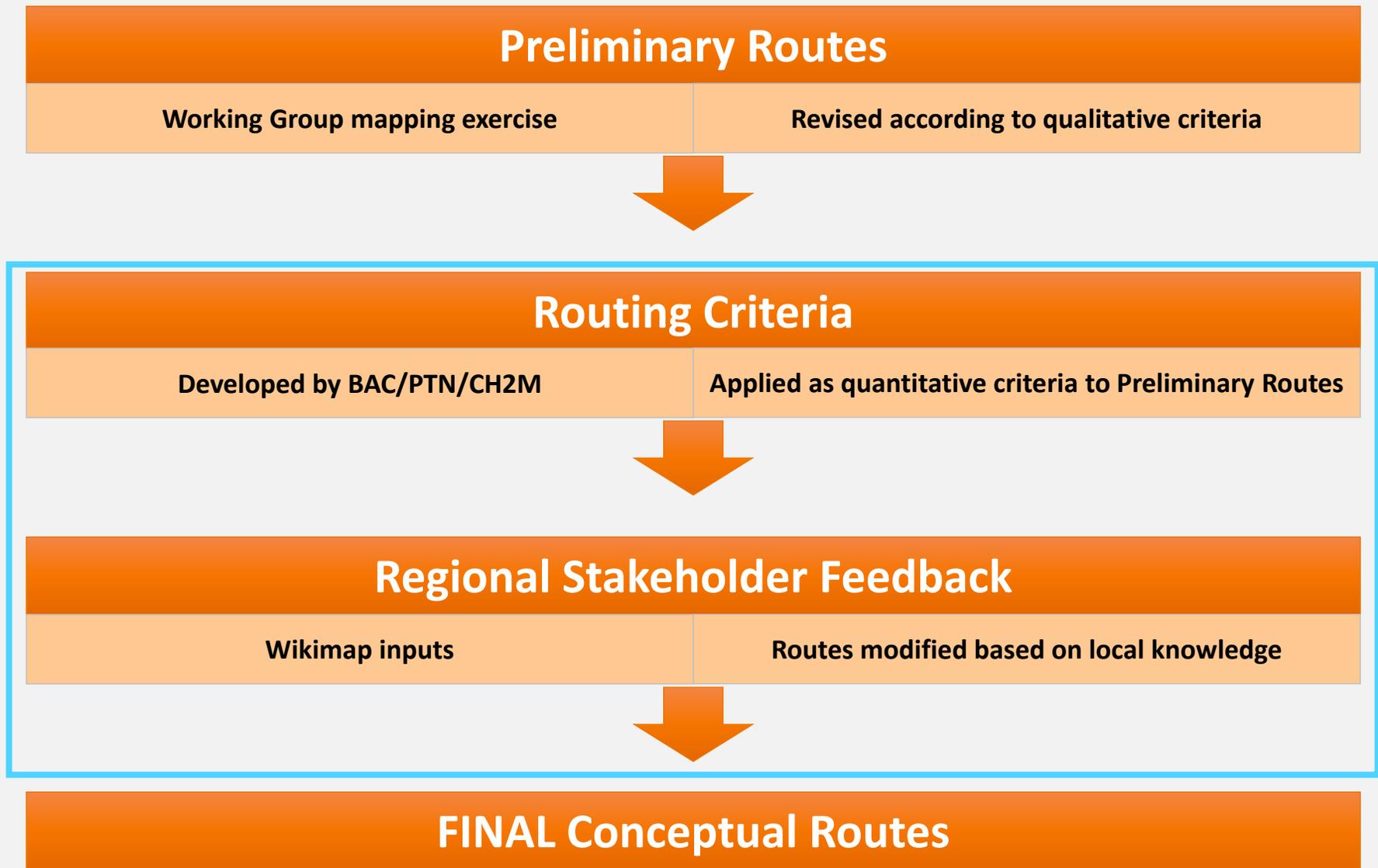
You are
here!

Incorporation of
Stakeholder
Input

BTTS Route Development



Route Development Process

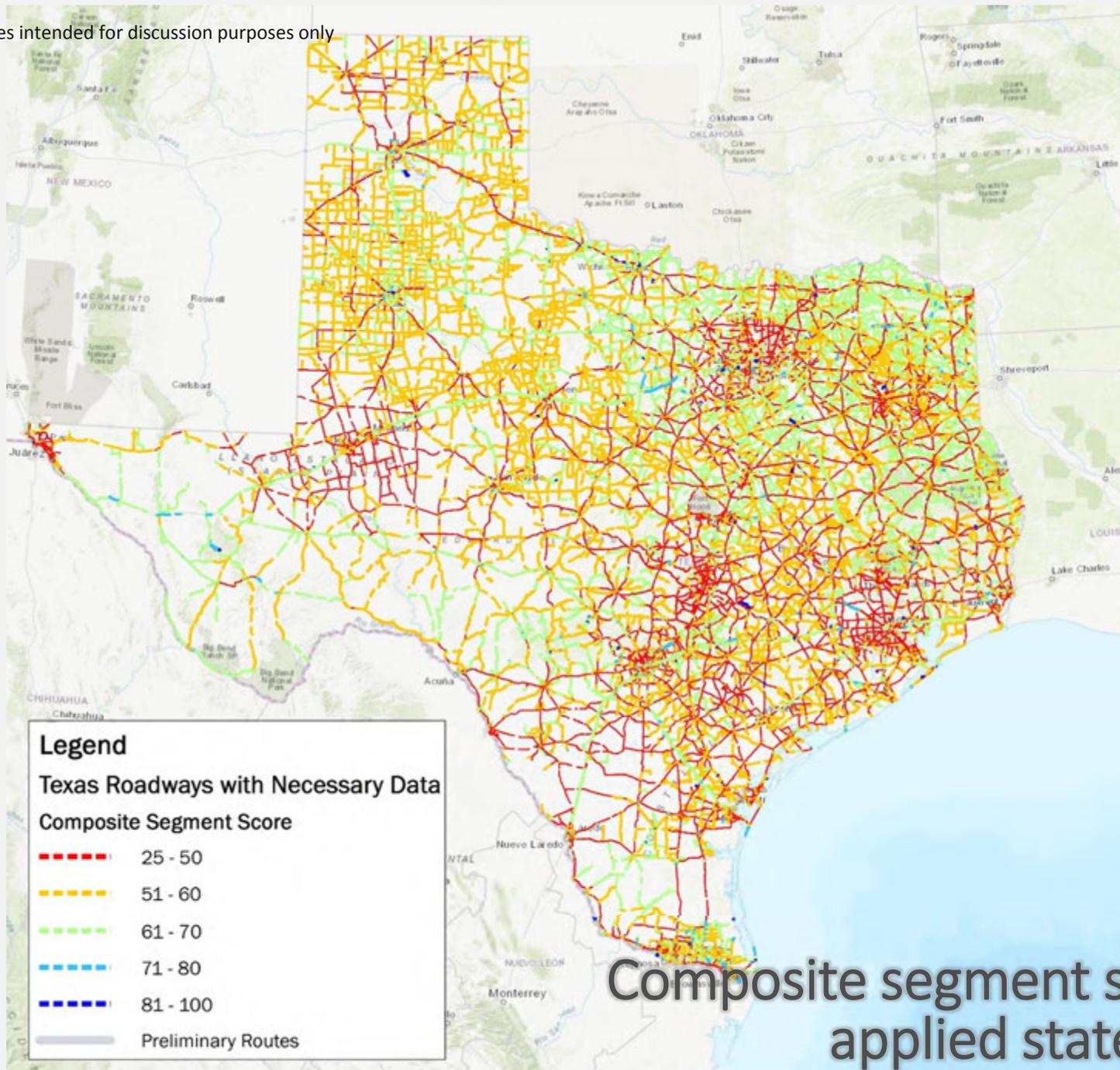


Roadway Ranking Criteria and composite segment score example

#	Ranking Criteria	Metric	Type	Score	
1	Lower speed roadways are more compatible with bicycling	55+ MPH	Weak	2	2 x 5
		35-55 MPH	Moderate	4	
		<35 MPH	Strong	8	
2	Low volume roads	5,000+ vehicles/lane	Weak	2	8 x 2.5
		3,000 – 5,000 vehicles/lane	Moderate	4	
		<3,000 vehicles/lane	Strong	8	
3	Avoid truck routes	350+ trucks/lane	Weak	2	8 x 2.5
		100- 350 trucks/lane	Moderate	4	
		<100 trucks/lane	Strong	8	
4	Roads with wide shoulders	0 – 5' shoulder width	Weak	2	8 x 2.5
		6 - 8' shoulder width	Moderate	4	
		>8' shoulder width	Strong	8	

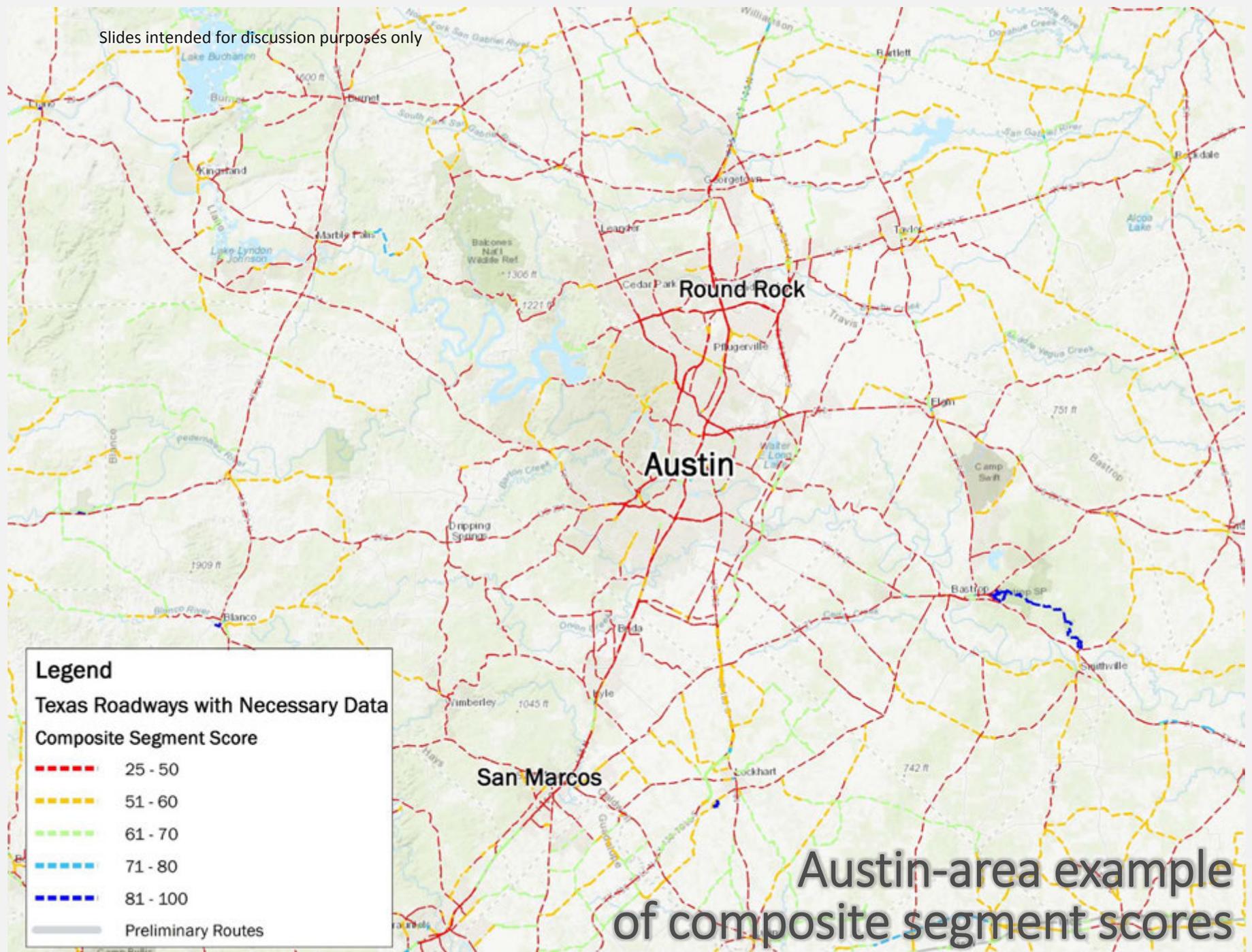
Example Composite Score = 70

Slides intended for discussion purposes only



Composite segment scores
applied statewide

Slides intended for discussion purposes only



Austin-area example of composite segment scores

Slides intended for discussion purposes only

July 17, 2017
BAC Meeting



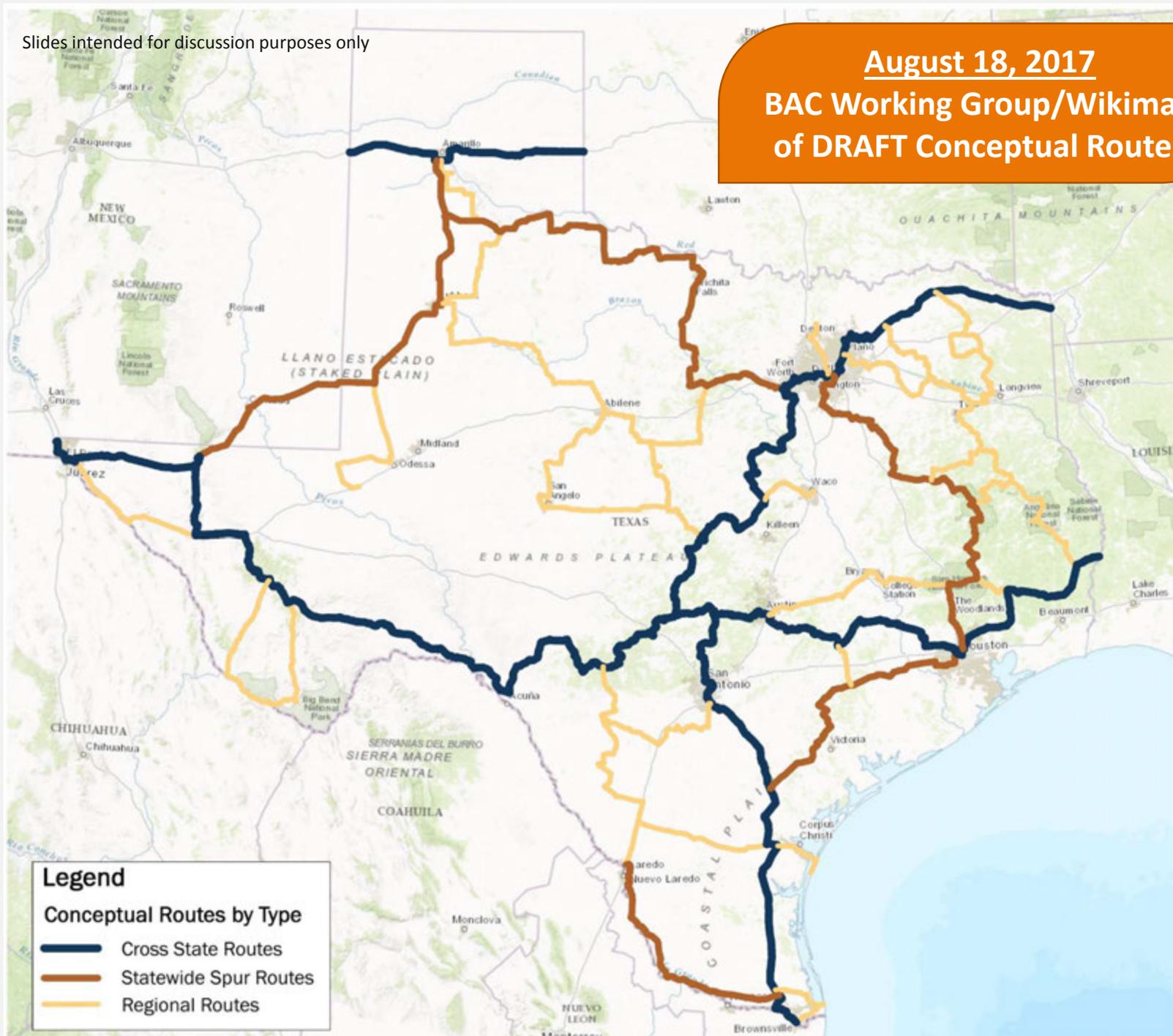
Legend

Type

-  Spine Routes
-  Spur Routes
-  Regional Routes
-  WG Alternative

Slides intended for discussion purposes only

August 18, 2017
BAC Working Group/Wikimap
of DRAFT Conceptual Routes



Slides intended for discussion purposes only

October 27, 2017
DRAFT Conceptual Routes

PLACEHOLDER

Legend

Conceptual Routes by Type

-  Cross State Routes
-  Statewide Spur Routes
-  Regional Routes

Bikeway Types and Design Criteria



BTTTS recommended bikeway types and design criteria

- 8' or wider outside shoulders
- Shared use path/ Sidepath
- Bicycle lane
- Buffered bike lane

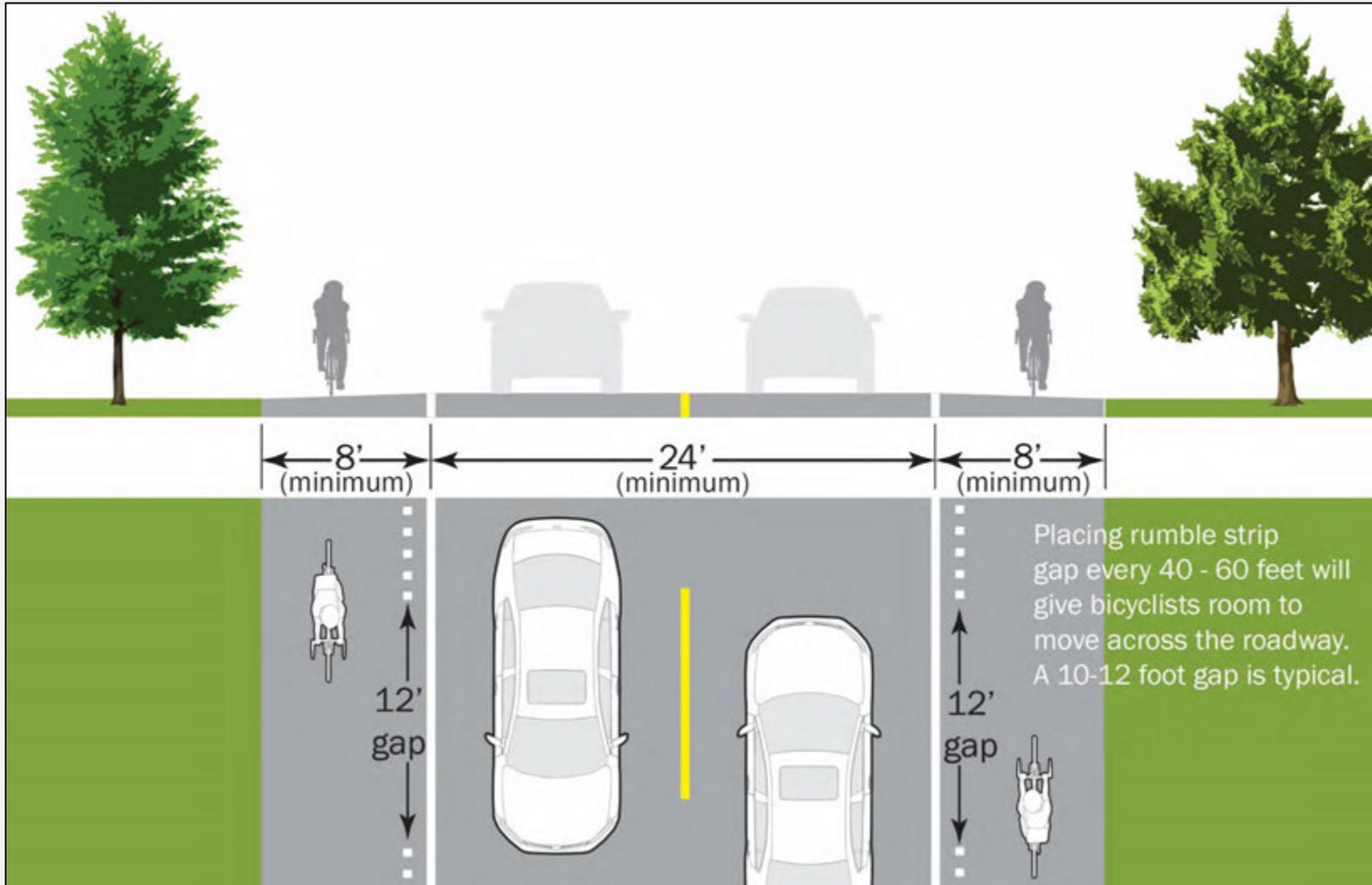


All proposed design standards follow TxDOT's Roadway Design Manual, AASHTO's Guide for the Development of Bicycle Facilities (2012) and the Texas MUTCD.

All on-road bicycle accommodations within state-maintained right-of-way must meet or exceed minimum requirements in TxDOT's Roadway Design Manual for the functional classification of that roadway segment.

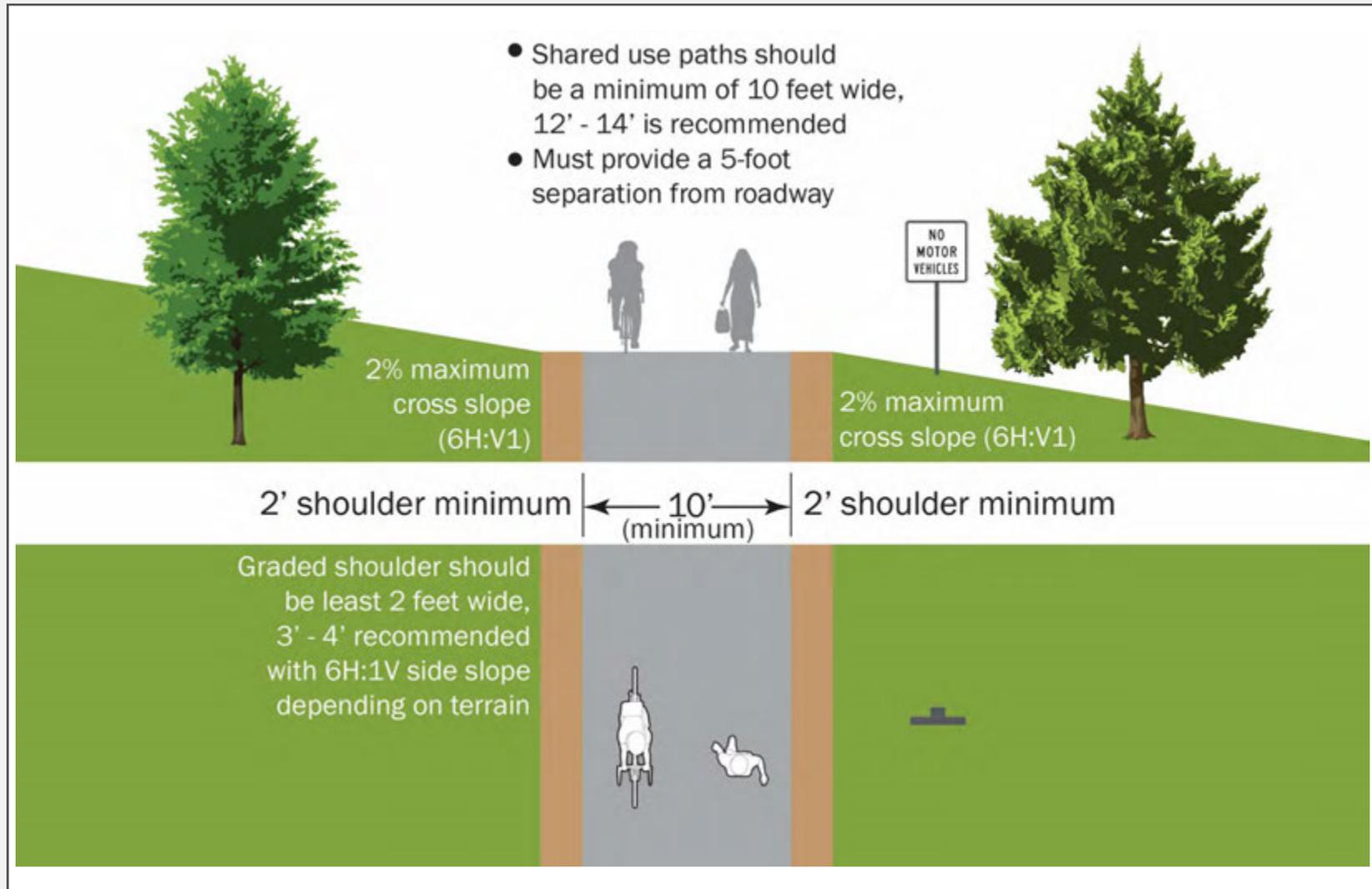
8' or wider outside shoulders

FOR DISCUSSION
PURPOSES ONLY



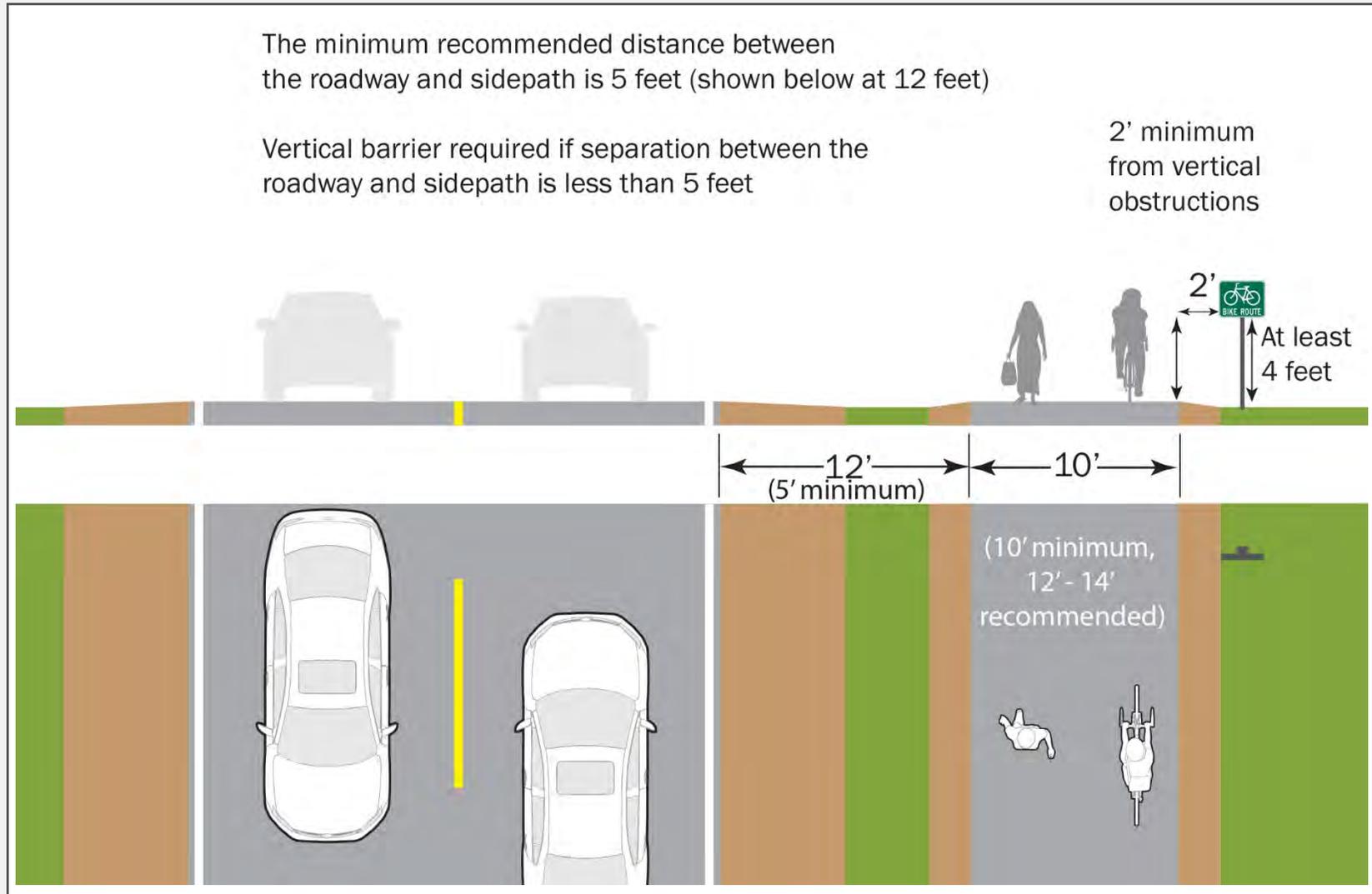
Shared Use Path

FOR DISCUSSION
PURPOSES ONLY



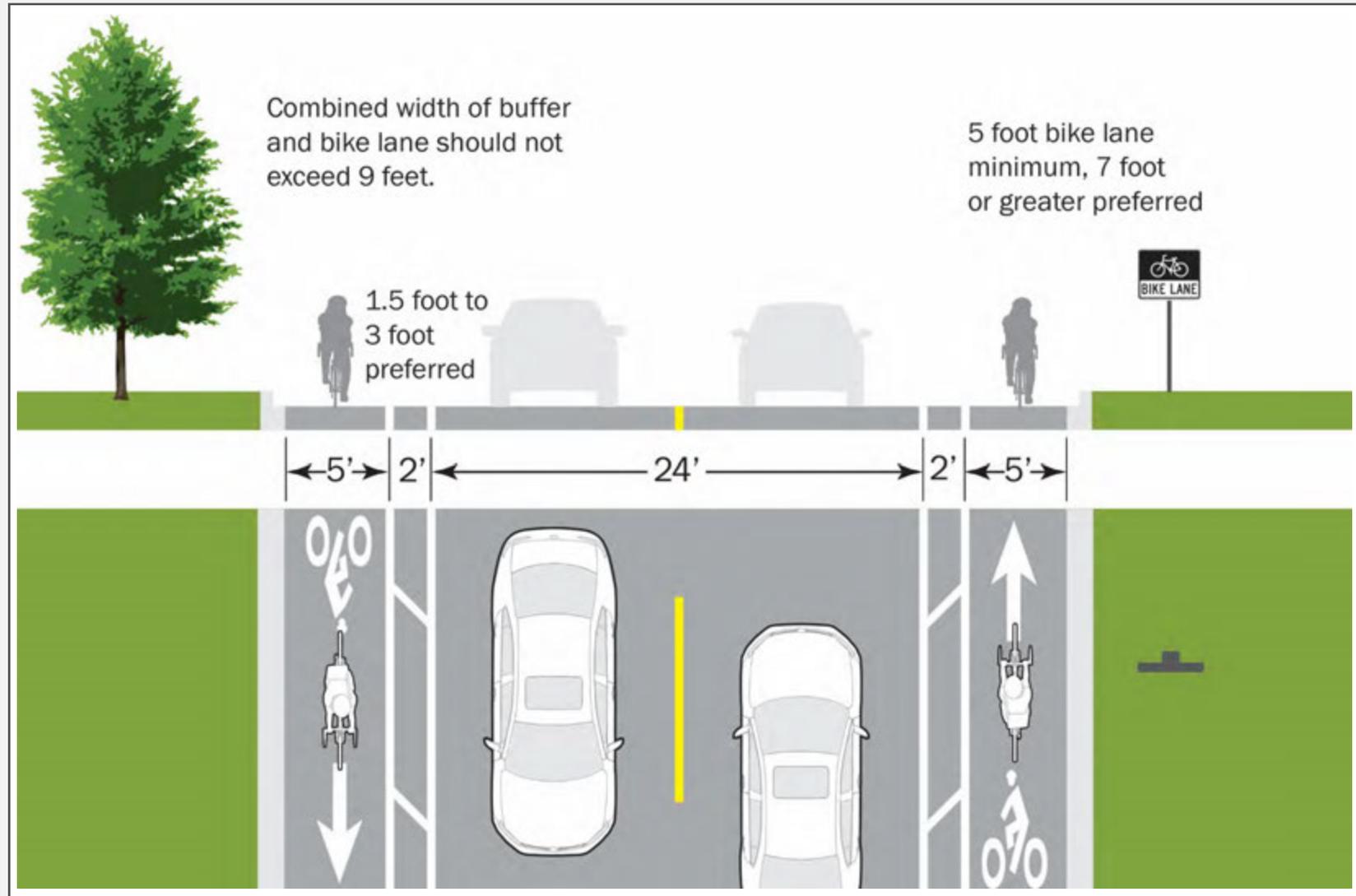
Sidepath

FOR DISCUSSION
PURPOSES ONLY



Buffered Bicycle lane

FOR DISCUSSION
PURPOSES ONLY



BTTS recommended bikeway surface types

Long-term:

- Hard surfaces preferred for ultimate network

Short to mid-term:

- Off-road shared use paths with various surface treatments may be included
 - Different surface treatments will attract different users from inside and outside of Texas



Benefits Research Update



Economic Benefits of Bicycle Tourism



- Variables for spending:

- Trip type
- Length of bicycle trip
- Household income
- Local vs. non-local
- Guided vs non-guided
- Type of accommodations

- Tourist consumer spending

- Analysis of state, regional, and local studies reveals

- Average of \$136/day
 - Ranging from \$78 to \$275/day

Economic Benefits of Bicycle Tourism (cont.)

- Local vs tourist bicyclists:

- Wisconsin study of trail usage revealed:

- Bicycling residents spent \$18/day vs.

- Bicycling tourists (multi-day) spent \$80/day

- Bicycling events and races:

- 2015 Minnesota Study found average visitor to bicycle event spent \$121/ day.

- Property Values:

- Property values in direct proximity to trails consistently increase between 1 and 6.5%.



Personal Physical Health Benefits of Bicycling

- Living near a shared use path
 - 50% more likely to exercise regularly
 - 73-80% more likely to exercise on bicycle regularly
- Mental Health and Social Benefits
 - Studies show being outdoors and exercising in nature
 - Reduces stress
 - Improves attention deficits
 - Correlates with improved social cohesion and reduced crime rates



Stakeholder Outreach



Stakeholder Outreach Update

Informational Outreach

MPO and Local Governments

- August 16th – Presentation to NCTCOG’s Bicycle and Pedestrian Advisory Committee
- September 13th – Presentation to AAMPO’s Bicycle Mobility Advisory Committee



Input Opportunities

MPO, COG, and TxDOT District

- Wikimap Online Input Tool ([LIVE from September 5th to October 4th](#))

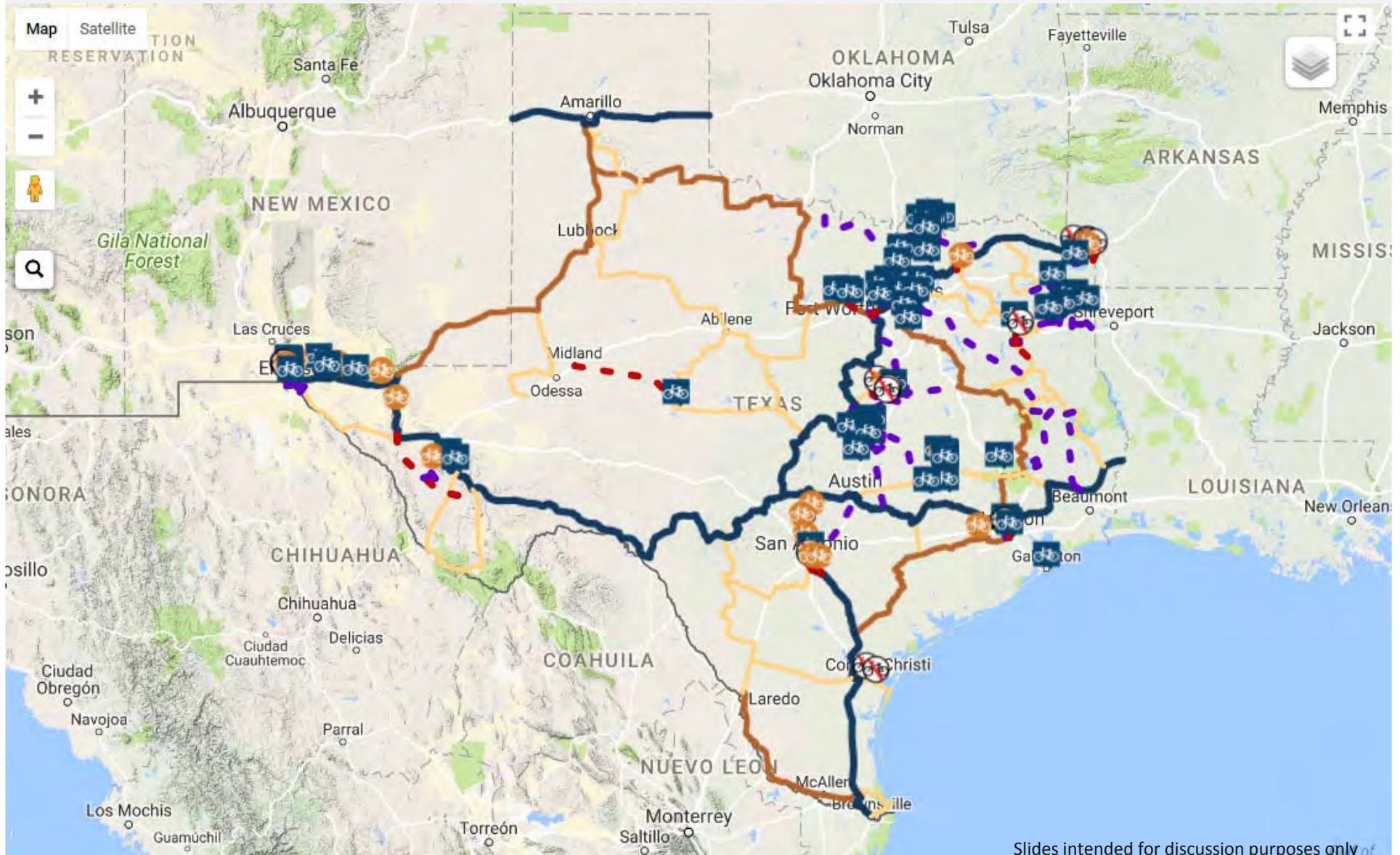
Wikimap Online Input Tool Update

Feedback heard from the following areas:

- Houston
- Corpus Christi
- Bryan/College Station
- Tyler
- Sherman-Denison
- Midland/San Angelo
- Longview
- San Antonio
- Lufkin
- El Paso
- Waco/Temple
- Texarkana
- Fort Worth



Wikimap Online Input Tool- *Feedback*



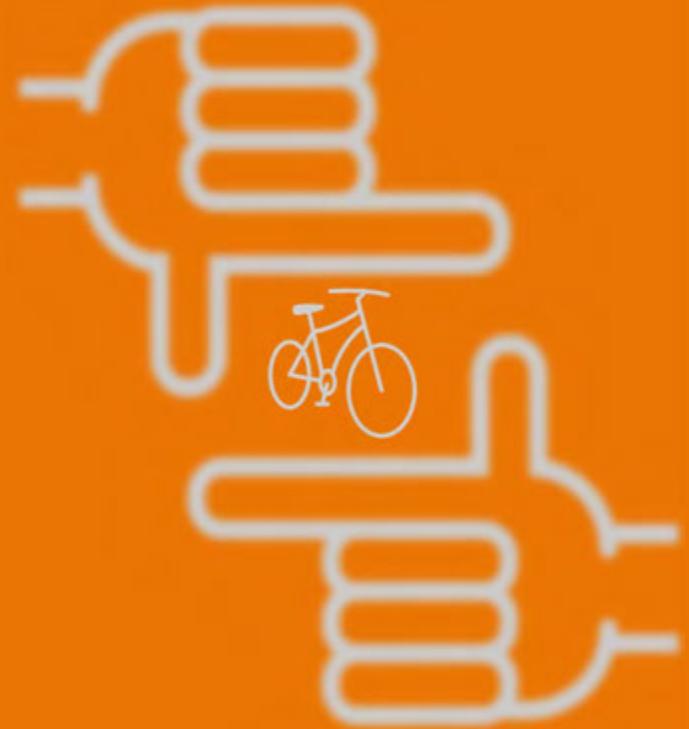
Slides intended for discussion purposes only

Wikimap Online Input Tool- *Written comments*

Comment Type	Comment Category	Number	Totals
Point	New bicycle destination	66	99
	Route not suitable for bicycle use	17	
	Route only for fearless cyclists	16	
Line	Recommended route change	27	107
	Significant route connection	80	

58 total users from 13 regions

Wrapping up



Looking forward to January's BAC Meeting

Anticipated discussion:

- Review Draft Final:
 - Conceptual Routes
 - Bikeway Accommodations and Costs
- Discuss next steps



Activities:

TxDOT-PTN & CH2M:

- Continue refining:
 - Conceptual Routes,
 - bikeway design criteria,
 - bikeway cost estimates, and
 - USBRS route development procedures



BAC:

- *Something to think about:*
How should TxDOT and partners prioritize BTTs Route Network development?

Thank You!!

**Bicycle Advisory
Committee**

Carl Seifert

Transportation Planner

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ch2mSM



Public Transportation (PTN)

Teri Kaplan

Bonnie Sherman