

# AGENDA ITEM 3

## **MINUTES FOR ADOPTION**

Bicycle Advisory Committee – Teleconference Meeting  
200 E. Riverside Drive, Austin TX, Classroom E  
January 26, 2015

### **BAC Committee Members Present and Participating:**

Billy Hibbs, Chair  
Howard Peak  
Margaret Charlesworth  
Robert Gonzales  
Ann-Marie Williamson  
Ramiro Gonzalez  
David Steiner  
Allison Blazosky  
Karla Weaver  
Jason Fialkoff

### **BAC Committee Members Participating Telephonically:**

Russ Frank, Vice-chair

### **TxDOT Present and Participating:**

Eric Gleason, Director, Public Transportation Division (PTN)  
Teri Kaplan, Statewide Bicycle / Pedestrian Coordinator (PTN)  
Donna Roberts, Program Services Manager (PTN)  
Josh Ribakove, Communications Manager (PTN)  
James Koch, Director, Transportation Planning and Program Division (TPP)

### **Also Present:**

Genevieve Bales, FHWA  
Steve Ratke, FHWA  
Jesse Blouin, CH2M Hill  
Stephanie Lind, CH2M Hill  
Anita Bradley, Texas Transportation Commission Assistant (Participating via teleconference)  
Robin Stallings, BikeTexas

### **AGENDA ITEM 1: Call to Order.**

Billy Hibbs called the meeting to order at 10:00 A.M.

### **AGENDA ITEM 2: Safety Briefing.**

Josh Ribakove provided a safety briefing at 10:01 A.M.

### **AGENDA ITEM 3: Approval of Minutes from October 20, 2014 Meeting (Action).**

**MOTION** Robert Gonzales moved to approve the October 20, 2014, meeting minutes, subject to a few minor corrections.

**SECOND** David Steiner seconded the motion.

The motion passed unanimously at 10:04 A.M.

**AGENDA ITEM 4: Report from BAC Chair.**

Billy Hibbs gave a brief report and then asked all committee members to introduce themselves and provide some background on their strengths and interests related to BAC at 10:05 A.M.

Comments from Billy Hibbs, Howard Peak, Margaret Charlesworth, Robert Gonzales, Ann-Marie Williamson, Ramiro Gonzalez, David Steiner, Allison Blazosky, Karla Weaver, Jason Fialkoff and Russ Frank.

**AGENDA ITEM 5: TxDOT's Public Transportation Division Director's report to the BAC regarding statewide bicycle and pedestrian matters.**

Eric Gleason began his report at 10:47 A.M. During Mr. Gleason's report, James Koch gave a presentation focused on Proposition 1 funding, and consultants Jesse Blouin and Stephanie Lind were introduced.

Questions and comments from Billy Hibbs, Ramiro Gonzalez, Ann-Marie Williamson, David Steiner, Robert Gonzales and Karla Weaver.

**AGENDA ITEM 6: Discussion of TxDOT's 2015 Transportation Alternatives Program Call for Projects, including timeline, eligible activities, eligible project sponsors, and funding available (Action).**

Teri Kaplan, TxDOT's Statewide Bicycle and Pedestrian Coordinator, gave a report on all of the above at 11:08 A.M.

Questions and comments from Billy Hibbs, Eric Gleason, Karla Weaver, Ann-Marie Williamson, Margaret Charlesworth, Donna Roberts, Jason Fialkoff and Genevieve Bales.

**AGENDA ITEM 7: Discussion of TxDOT's bicycle and pedestrian strategic direction initiative (Action).**

Discussion of this item, led by Eric Gleason, began at 11:38 A.M.

Questions and comments from Billy Hibbs, Margaret Charlesworth, Jesse Blouin and Jason Fialkoff.

**AGENDA ITEM 8: Update from committee members on local and statewide issues.**

Discussion of this item, led by Billy Hibbs, began at 12:08 P.M. Each committee member was given an opportunity to discuss issues in their regions.

Comments from Robert Gonzales, Jason Fialkoff, Teri Kapln, Karla Weaver, Ramiro Gonzalez, Eric Gleason, Margaret Charlesworth, Ann-Marie Williamson, David Steiner, Allison Blazosky and Howard Peak.

**AGENDA ITEM 9: Public Comment.**

Robin Stallings of BikeTexas commented regarding bicycle and pedestrian funding in Texas as well as various specification manuals for bicycle and pedestrian projects, including AASHTO, NACTO and the MUTCD beginning at 1:15 P.M.

Questions and comments from Billy Hibbs, Karla Weaver, Jason Fialkoff, Ramiro Gonzalez, Teri Kaplan and Eric Gleason.

**AGENDA ITEM 10: Discussion of BAC 2015 meeting schedule and agenda items for future BAC meetings; confirm date of next BAC meeting (Action).**

Discussion of this item, led by Teri Kaplan, began at 1:32 P.M. The date of the next meeting is still to be determined.

**AGENDA ITEM 11: Adjourn**

**MOTION** Ann-Marie Williamson moved to adjourn the meeting at 1:33 P.M.

**SECOND** Howard Peak.

Meeting adjourned at 1:33 P.M.

Prepared by:

Approved by:

\_\_\_\_\_  
Josh Ribakove  
Public Transportation Division

\_\_\_\_\_  
Billy Hibbs  
Chair, Bicycle Advisory Committee

# AGENDA ITEM 4

# Hub-and-Spoke Tyler Bike Lane Study

## Spoke #1

**Prepared By:**

**Dr. Mena Souliman  
Assistant Professor  
Department of Civil Engineering  
The University of Texas at Tyler**

**Undergraduate Research Assistants  
Pedro Zavagna  
Bruno Hamdan**

**April 30, 2015**



**Department of Civil Engineering  
College of Engineering  
The University of Texas at Tyler**

## **INTRODUCTION**

In recent years, the city of Tyler has experienced substantial development across the city. A growth in population has increased the number of bicyclists present in the city. The increase of bicyclists has given incentive to the city to implement a much friendlier environment towards bicyclists. The city intends to implement bicycle lanes into the transportation system to provide the community with an efficient mode of transport. The bike network will extend to the exterior part of the city, and reach downtown. To elaborate further, consider the structure of a bicycle wheel. The spokes are the bicycles lanes, with the center hub being downtown Tyler. The Transportation Engineering research team in the Civil Engineering Department at the University of Texas at Tyler has been given the opportunity to study methodologies which will generate an efficient bike network. This report outlines the procedure taken, data collected, and the engineering approach behind producing an efficient bike network for the city of Tyler.

## **OBJECTIVE**

Designing a dynamic bike lane network for the City of Tyler. The design process comprised of attentive planning, progressive development and a collective effort by our design team to design an exceptional bike network. Providing the community with an alternative means of transportation will increase development. Present bike networks were implemented into the design to increase accessibility. Route options require accommodation due to the diversity of users present in Tyler. The bike spoke attempts to incorporate multiple factors to facilitate travel and compliment present transit systems.

## **DATA COLLECTION**

The selection of potential bike spokes required extensive analysis of the City of Tyler. Literature review was assigned to individual group members to expand our knowledge of bike networks. The literature was presented amongst the group, and evaluated accordingly. It was determined that a map of the city of Tyler was required to analyze potential routes. The map provided our team with a new design perspective. Restrictions indicated that, Loop 323 and Broadway Ave, were not to be used in our network. The bike network require downtown (hub) accessibility. Generating a criteria to compare possible spokes was determined by the design group. The criteria consisted

of user safety, traffic analysis, lane width, grade, and proximity. Various other factors were involved in our analysis of potential spokes and a safety overview of the area was important to ensure the route provides users with security when riding. Traffic analysis consisted of the group using a Micro Tally to measure traffic at intersections where riders would have to cross. Readings were taken at three key one hour time intervals when traffic is most active (7:00 a.m., 12:00 p.m., and 4:00 p.m.). The data gathered can be found in the appendix section of the report. Lane width was measured to ensure addition of bike lane will not interfere with present traffic. Grade was considered to accommodate for the diversity of riders present.

### Spoke Introduction

The University of Texas at Tyler, also referred to as UT Tyler, is located on the eastern limits of the city of Tyler, Texas, the university has a student body of more than 8,000 students and offers 42 undergraduate bachelor's degrees, 33 graduate master's degrees, and 3 Doctoral degrees. Because of this high concentration of students and professionals working or involved with UT Tyler, there was a need to connect it with other important branches of the city. Because of the closer presence of Tyler Junior College, a junior college with more than 9,000 students, it was more than necessary to create a spoke connecting both centers.

With this possibility, it was developed two options, Option A –McDonald Rd and Option B – Old Omen Rd. The starting point for both options were at Old Omen & Old Bascom Rd; Old Omen was selected as the starting point for Spoke #1 because of its good geography localization, the good possibilities for the continuity of the spoke, and the presence of a bike lane.

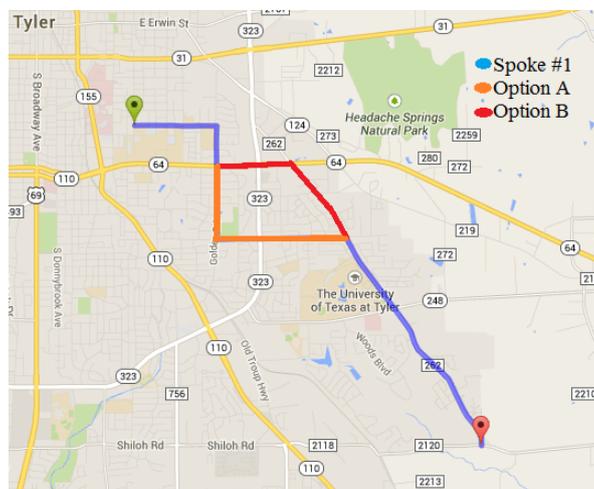
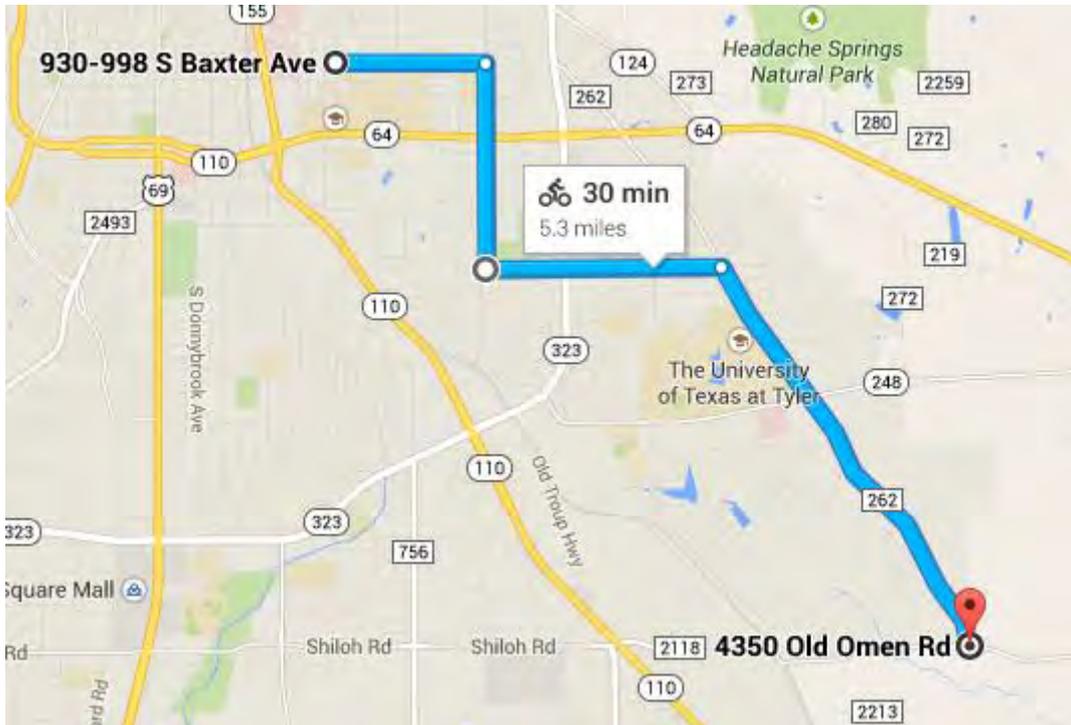


Figure 1. Spoke #1

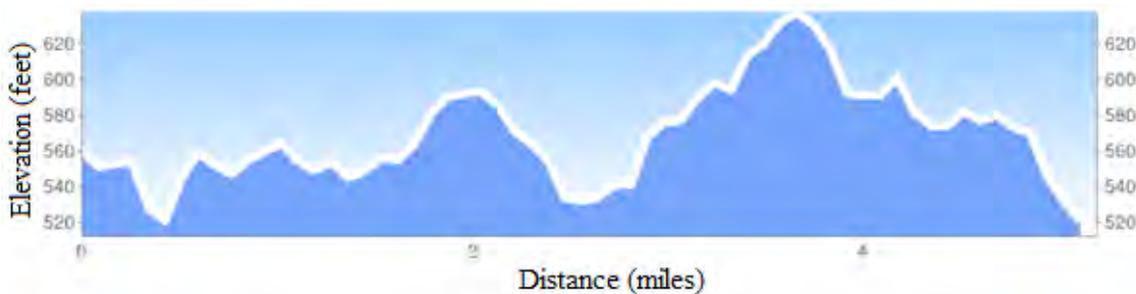
**Option A –McDonald Rd.**

The starting point of Spoke #1 – Option A –McDonald Rd. is at Old Omen & Old Bascom Rd. and the spoke total distance is 5.3 miles. This option is composed of four different roads, Old Omen, McDonald Rd., Golden Rd., and E. Devine Rd. as shown on the Figure 2. Option A –McDonald Rd.



**Figure 2.** Option A –McDonald Rd.

The elevation map for the Option A –McDonald Rd. can be seen on Figure 3. Option A –McDonald Rd. Elevation



**Figure 3.** Option A –McDonald Rd. Elevation

**A.1 Old Omen Rd.**

Old Omen until University Blvd. is a 1.5 mile part of Old Omen where there is a Bike Lane, the pavement of this segment of Old Omen Rd. is excellent, parking is

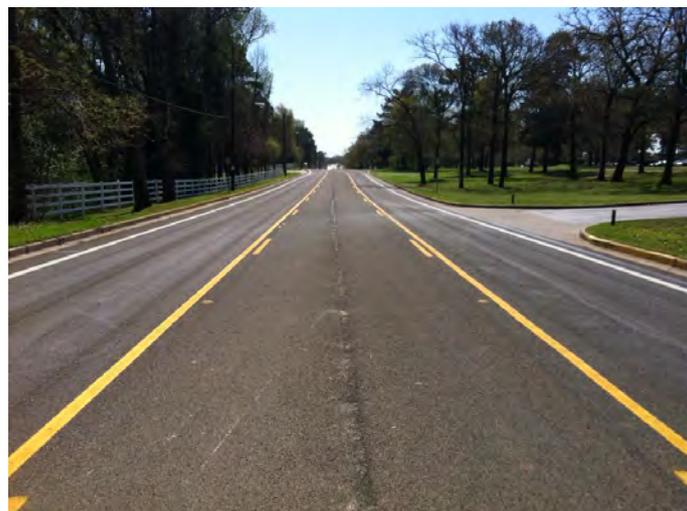
prohibited on any time, there is a presence of light poles, the road has one bike lane per direction with width of 5ft, two vehicle lanes per direction with widths of 13ft and 11.5ft, separated by an raised median with crossing islands, for a total width of 59ft. No changes should be made on this part of the spoke.



**Figure 4.** Old Omen

*A.2 Old Omen Rd. after University Blvd.*

Old Omen until Varsity Dr. is a 0.6 mile part of Old Omen where there is a Bike Lane, the pavement of this segment of Old Omen Rd. is excellent, parking is prohibited on any time, there is a presence of light poles, the road has a bike lane per direction with widths of 3ft, one vehicle lane per direction with width of 11.5ft, a turning lane on the middle with width of 12.5ft, adding to a total width of 54ft.



**Figure 5.** Old Omen after University Blvd.

### *A.3 Old Omen after Lexington Dr. until Lexington Rd.*

Old Omen until Lexington Dr. is a 400ft part of Old Omen where cars can park on the south side of the road, the road has one vehicle lane per direction with width of 19.5ft on the north direction and 20.5ft on the south direction, and total width of 40ft. It is a residential area, with the presence of light poles providing a sufficient illumination, the pavement quality is excellent.

The provided solution for this part of the spoke would be to prohibit parking at any time, and implement a bike lane with 5ft width per direction, and one vehicle lane with width of 15ft per direction.



**Figure 6.** Old Omen after Lexington Dr. until Lexington Rd.

### *A.4 Old Omen after Lexington Rd. until McDonald Rd.*

After Lexington Rd., Old Omen changes, and gets wider, for a distance of 0.1 mile until it reaches McDonald Rd., the road has two vehicle lanes per direction with widths of 12.7ft, 12ft, 12.5ft, 11ft, and a total width of 48 ft. It is a residential area, with parking prohibited on any time, presence of light poles, and the pavement quality is excellent.

The provided solution for this part of the spoke would be to restripe the road with a bike lane with 5ft width per direction, one vehicle lane with width of 12ft per direction and a turning lane with width of 14ft.



**Figure 7.** Old Omen after Lexington Rd. until McDonald Rd

#### *A.5 McDonald Rd.*

McDonald Rd. starts after turning left from Old Omen, this part of the spoke has a length of 1.2 miles, the road has one vehicle lane per direction with width of 18ft, a total width of 36ft. Because it is a residential area, parking is allowed on both sides, but not many cars were observed to be parking along the road, there is a presence of light poles, and the pavement quality is good. It is important to notice that this road has the presence of a Bike Route, but not many signs are used to inform its presence.

The provided solution for this part of the spoke would be to remove parking on both sides of the road, implement a bike lane of 5ft width on both directions, and one vehicle lane per direction with 13ft width. Or, remove parking from one of the sides of the road, stripe a parking line with width of 8ft, implement a bike lane of 7ft width on the eastern direction, a bike route with share the road signs on the western direction, and one vehicle lane per direction with 10.5ft width.



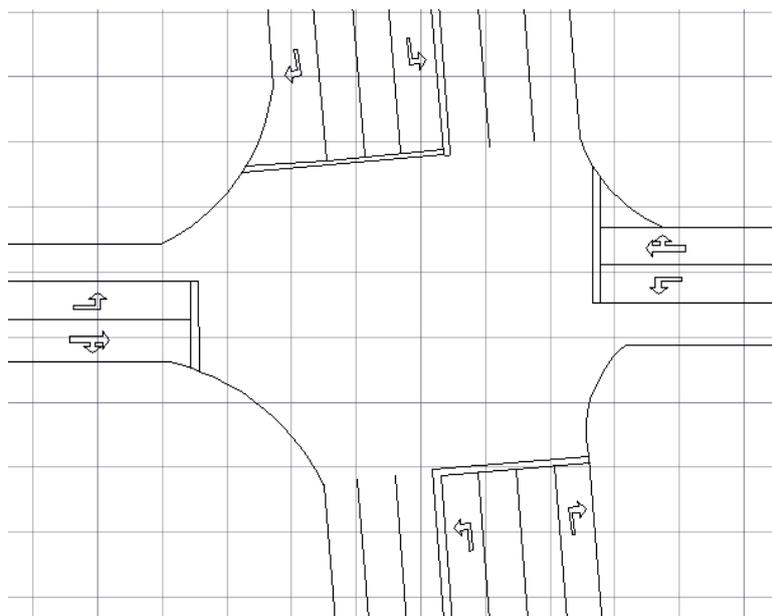
**Figure 8.** McDonald Rd.

*A.5.1 Intersection of McDonald & Loop*

After 0.8 miles, McDonald Rd. intersects Loop 323 in a high dense intersection. At the intersection, McDonald Rd. has two vehicles lanes going west, one vehicle lane going east, and a small demarked area for bicyclists to wait until the green sign. On the Loop 323 direction, there are two vehicles lanes going thru, one vehicle lane turning left, and one vehicle lane turning right. The intersection uses a smart stopping sign, detecting the presence of cars and changing the time of the green sign. Because of the presence of this intersection, a traffic study was performed into three different times, and the data is displayed on the appendix.



**Figure 9.** McDonald Rd. & Loop 323 Intersection.



**Figure 10.** McDonald Rd. & Loop 323 Intersection.

### A.6 Golden Rd. with Bike Lanes

Golden Rd. starts after turning right from McDonald Rd., this part of the spoke has a length of 0.7 miles, the road has one vehicle lane per direction with width of 14ft on both sides, and there is a designed bike lane with 4.5ft width per direction, this width changes constantly because of a bad striping, the road has a total width of 37ft. It is a residential area located by the Golden Road Park, along the road parking is prohibited on any time, the presence of light poles is low, the pavement quality is not good, as noticed on the pictures below. It is noticed the presence of Bicycle Signs along the bike lanes noticing vehicle drivers about the presence of the bike lane.

The provided solution for this part of the spoke would be to fix the pavement quality, adding another layer of asphalt, better stripe the road with a specific width for the bike lanes of 6ft per direction, and one vehicle lane per direction with width of 12.5ft.





**Figure 10.** Golden Road with Bike Lanes

#### *A.7 Golden Rd.*

After 0.3 miles the bike lane ends, and it becomes a bike route, because of it, the road changes its configuration into a one vehicle lane with width of 17.5ft going north and 18.5ft width going south, for a total of 36ft. It is a residential area, parking is prohibited on any time, the presence of light poles is low, the pavement quality gets better comparing with the quality from the past part of Golden Rd. but it still has some areas where the pavement suffered soil erosion and grass is growing closer to the curb. It is noticed the presence of a bike route after the bike lane reached an end, this bike route is signalized.

The provided solution for this part of the spoke would be to restripe the road, creating a bike lane per direction with 5ft width, and one vehicle lane per direction with width of 13ft.



**Figure 11.** Golden Road

### *A.8 Golden Rd. after 5<sup>th</sup> Street*

Continuing on Golden Rd. after the intersection with 5<sup>th</sup> Street, Golden Rd. becomes a School Zone, with a length of 0.3 miles, the road has one vehicle lane per direction with width of 26ft, a total width of 52ft. Because it is a Residential Area and a School Zone, parking is allowed on both sides, there is a presence of light poles, and the pavement quality is good. It is important to notice that this road has the presence of a Bike Route.

The provided solution for this part of the spoke would be to implement a bike lane of 5ft width on both directions, and one vehicle lane per direction with 13ft width.



**Figure 12.** Golden Road after 5<sup>th</sup> Street

### *A.9 E Devine St.*

E Devine St. starts after turning left on Golden Rd. and it is divided into three segments because of the road width. The first segment is just 0.1 mile long, where parking is allowed on both directions, it is a School Zone and Residential Area, lights are present and the lane width is 17.5ft on both directions, adding to a total width of 35ft.

The provided solution for this part of the spoke would be to remove parking on both directions, implement a bike lane of 5ft width on both directions, and one vehicle lane per direction with 12.5ft width.

The second segment of E Devine St. is the subsequent block, and it is also just 0.1 mile long, with the presence of lights, parking is prohibited on any time, and lanes width of 12ft and 16ft, adding to a total of 28ft.

The provided solution for this segment of the spoke would be to create a Bike Route with share the lane signs for vehicles and bicyclists with width of 14ft width, it is important to notice that the volume of cars on E Devine St. is low, so for this segment, with a short length and low volume of cars, a presence of a Bike Route with proper signals would be the best solution.

The last segment of E Devine St. is 0.5miles long, and is positioned behind TJC, completing the spoke when it heads until Baxter Rd. This segment has one lane per direction, with widths of 14ft on both sides, adding to a total length of 28ft, parking is prohibited on any time, and there is a presence of lights.

The provided solution for this segment is to create a bike lane per direction with width of 4ft, and a vehicle lane per direction with width of 10ft, or to continue with a bike route and share the road between bicyclists and vehicles.



**Figure 13.** E Devine St.

### *Data Analysis*

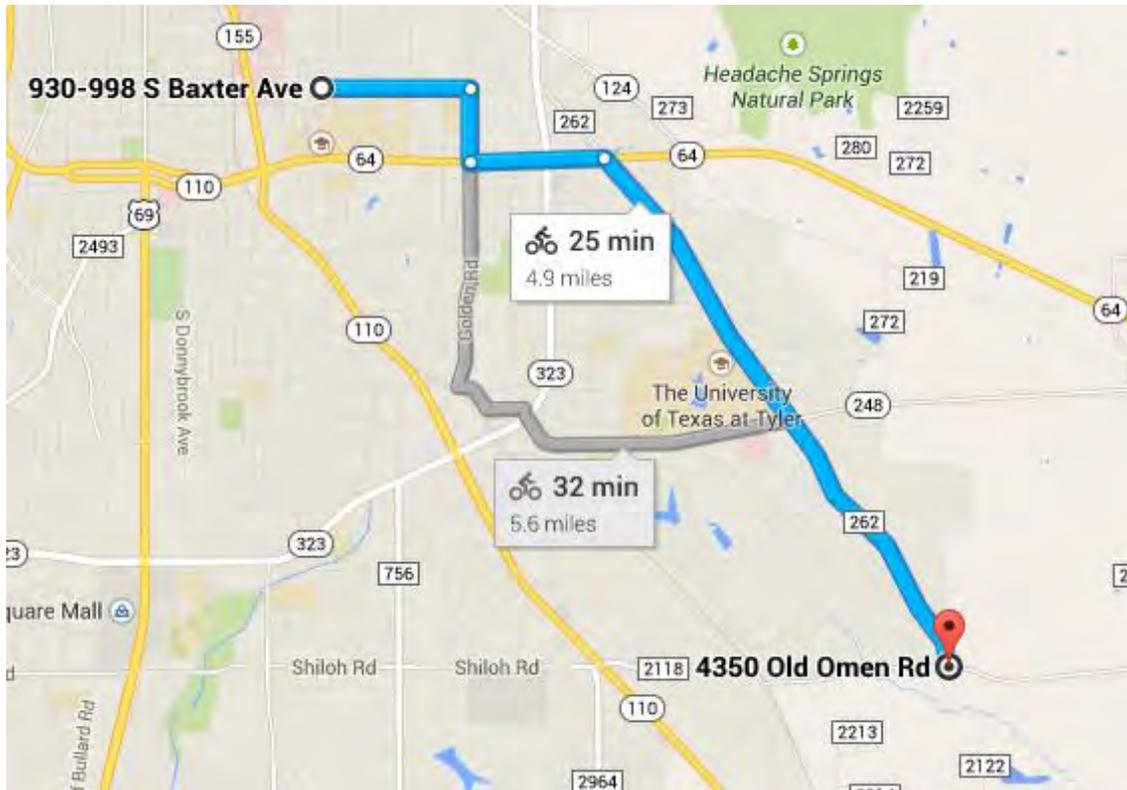
Analyzing the collected data, the route was evaluated and some important facts were noticed about it: The grade is high in some segments, but the length of those segments are short, and for that reason, the grade is not an impediment for bicyclist to use the spoke; lights were present in every segment of the route, creating a good illumination during the night time; the pavement can be considered good on average, but in some segments it is recommended a reconstruction of the entire pavement section; the road width is not a problem, except in one block of E Devine St., but because of the low volume of cars in that segment, there are solutions for it; the last fact

is the presence of the intersection between Loop 323 and McDonald Rd. and on this intersection, the crossing can be considered safe for bikers.

	Points						
	3	2	1	0	-1	-2	-3
<b>Number of Lanes per Direction</b>	3 or more			2			1
	-3						
<b>Turning Lane</b>		Yes				No	
	-2						
<b>Average Lane Width</b>	> 13ft		13ft to 12ft		12ft to 11ft		< 11ft
	3						
<b>Parking</b>	Both Sides			One Side			None
	3						
<b>Traffic Volume</b>	Low			Normal			High
	3						
<b>Max Grade</b>	0% to 5%		5% to 8%		8% to 11%		> 11%
	0						
<b>Average Grade</b>	0% to 1%		1% to 2%		2% to 3%		> 3%
	1						
<b>Streets Lighting</b>	Good			Gapped			None
	3						
<b>Total Per Column (TPC)</b>	12	0	1	0	0	-2	-3
<b>Total Per Group (TPG)</b>							
<b>Total</b>	8						

**Option B – Old Omen Rd.**

The starting point of Spoke #1 – Option B – Old Omen Rd., is at Old Omen & Old Bascom Rd. and the spoke total distance is 4.9 miles. This option is composed of four different roads, Old Omen, 5<sup>th</sup> Street, Golden Rd., and E Devine St. as shown on the Figure 14. Option B – Old Omen Rd.



**Figure 14.** Option B – Old Omen Rd.

The elevation map for the Option B –Old Omen Rd. can be seen at Figure 15.  
Option B –Old Omen Rd. Elevation



**Figure 15.** Option B –Old Omen Rd. Elevation

*B.1 Old Omen Rd.*

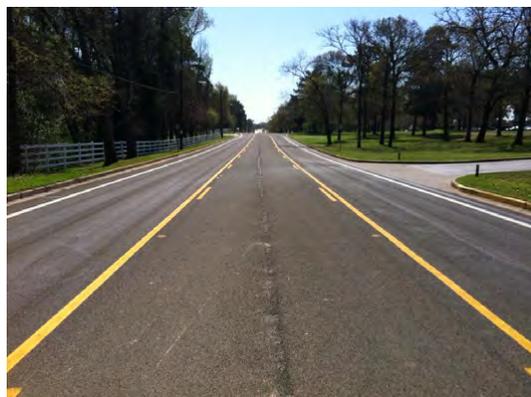
Old Omen until University Blvd. is a 1.5 mile part of Old Omen where there is a Bike Lane, the pavement of this segment of Old Omen Rd. is excellent, parking is prohibited on any time, there is a presence of light poles, the road has one bike lane per direction with width of 5ft, two vehicle lanes per direction with widths of 13ft and 11.5ft, separated by an raised median with crossing islands, for a total width of 59ft. No changes should be made on this part of the spoke.



**Figure 16.** Old Omen

*B.2 Old Omen Rd. after University Blvd.*

Old Omen until Varsity Dr. is a 0.6 mile part of Old Omen where there is a Bike Lane, the pavement of this segment of Old Omen Rd. is excellent, parking is prohibited on any time, there is a presence of light poles, the road has a bike lane per direction with widths of 3ft, one vehicle lane per direction with width of 11.5ft, a turning lane on the middle with width of 12.5ft, adding to a total width of 54ft.



**Figure 17.** Old Omen after University Blvd.

### *B.3 Old Omen after Lexington Dr. until Lexington Rd.*

Old Omen until Lexington Dr. is a 400ft part of Old Omen where cars can park on the south side of the road, the road has one vehicle lane per direction with width of 19.5ft on the north direction and 20.5ft on the south direction, and total width of 40ft. It is a residential area, with the presence of light poles providing a sufficient illumination, the pavement quality is excellent.

The provided solution for this part of the spoke would be to prohibit parking at any time, and implement a bike lane with 5ft width per direction, and one vehicle lane with width of 15ft per direction.



**Figure 18.** Old Omen after Lexington Dr. until Lexington Rd.

### *B.4 Old Omen Rd.*

After Lexington Rd., Old Omen changes, and gets wider, for a distance of 0.9 miles until it reaches 5<sup>th</sup> Street, the road has two vehicle lanes per direction with widths of 12.7ft, 12ft, 12.5ft, 11ft, and a total width of 48 ft. It is a residential area, with parking prohibited on any time, presence of light poles, and the pavement quality is excellent.

The provided solution for this part of the spoke would be to restripe the road with a bike lane with 5ft width per direction, one vehicle lane with width of 12ft per direction and a turning lane with width of 14ft.



**Figure 19.** Old Omen

*B.5 5<sup>th</sup> Street before Loop*

5<sup>th</sup> Street starts after turning left from Old Omen Rd., this part of the spoke has a length of 0.3 miles, the road has two vehicle lanes per direction with widths of 12.5ft, 11.5ft, 11.5ft, 12ft, and a turning lane on the middle with width of 14ft, adding to a total width of 62ft. This part of 5<sup>th</sup> Street is a business area, parking is prohibited on any time, there is a high presence of light poles, and the pavement quality is excellent.

The provided solution for this part of the spoke would be to implement a bike lane with 5ft width per direction, and two vehicle lanes per direction with width of 13ft per direction.



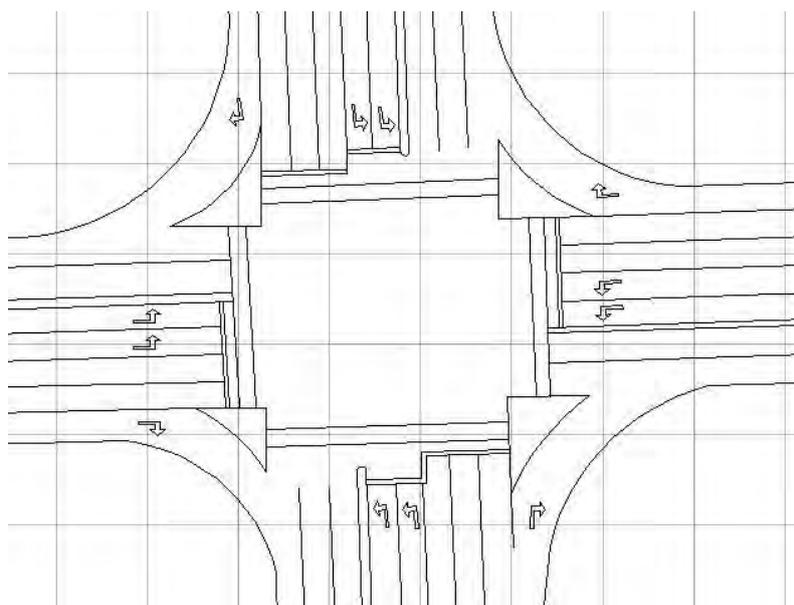
**Figure 20.** 5<sup>th</sup> Street

### B.5.1 5<sup>th</sup> Street & Loop 323 Intersection

5<sup>th</sup> Street intersects Loop 323 in a high dense intersection. At the intersection, 5<sup>th</sup> Street has two vehicles lanes going thru, two vehicle lanes turning left, and one vehicle lane turning right. On the Loop 323 direction, there are two vehicles lanes going thru, two vehicle lanes turning left, and one vehicle lane turning right. The intersection uses a smart stopping sign, detecting the presence of cars and changing the time of the green sign. Because of the presence of this intersection, a traffic study was performed into three different times, and the data is displayed below on the appendix.



**Figure 21.** 5<sup>th</sup> Street. & Loop 323 Intersection.



**Figure 22.** 5<sup>th</sup> Street. & Loop 323 Intersection.

### *B.6 5<sup>th</sup> Street until Golden Rd.*

Continuing after the intersection, this segment of 5<sup>th</sup> Street has a length of 0.4 miles, the road has two vehicle lanes per direction with widths of 13ft, 12ft, 12ft, 13ft, a turning lane with width of 14ft, adding to a total width of 64ft. This part of 5<sup>th</sup> Street is a business area, parking is prohibited on any time, there is a high presence of light poles, and the pavement quality is good.

The provided solution for this part of the spoke would be to implement a bike lane with 6ft width per direction, and two vehicle lanes per direction with width of 13ft per direction.



**Figure 22.** 5<sup>th</sup> Street

### *B.7 Golden Rd. after 5<sup>th</sup> Street*

Continuing on Golden Rd. after the intersection with 5<sup>th</sup> Street, Golden Rd. becomes a School Zone, with a length of 0.3 miles, the road has one vehicle lane per direction with width of 26ft, a total width of 52ft. Because it is a Residential Area and a School Zone, parking is allowed on both sides, there is a presence of light poles, and the pavement quality is good. It is important to notice that this road has the presence of a Bike Route.

The provided solution for this part of the spoke would be to implement a bike lane of 5ft width on both directions, and one vehicle lane per direction with 13ft width.



**Figure 23.** Golden Road after 5<sup>th</sup> Street

#### *B.8 E Devine St.*

E Devine St. starts after turning left on Golden Rd. and it is divided into three segments because of the road width. The first segment is just 0.1 mile long, where parking is allowed on both directions, it is a School Zone and Residential Area, lights are present and the lane width is 17.5ft on both directions, adding to a total width of 35ft.

The provided solution for this part of the spoke would be to remove parking on both directions, implement a bike lane of 5ft width on both directions, and one vehicle lane per direction with 12.5ft width.

The second segment of E Devine St. is the subsequent block, and it is also just 0.1 mile long, with the presence of lights, parking is prohibited on any time, and lanes width of 12ft and 16ft, adding to a total of 28ft.

The provided solution for this segment of the spoke would be to create a Bike Route with share the lane signs for vehicles and bicyclists with width of 14ft width, it is important to notice that the volume of cars on E Devine St. is low, so for this segment, with a short length and low volume of cars, a presence of a Bike Route with proper signals would be the best solution.

The last segment of E Devine St. is 0.5 miles long, and is positioned behind TJC, completing the spoke when it heads until Baxter Rd. This segment has one lane per direction, with widths of 14ft on both sides, adding to a total length of 28ft, parking is prohibited on any time, and there is a presence of lights.

The provided solution for this segment is to create a bike lane per direction with width of 4ft, and a vehicle lane per direction with width of 10ft, or to continue with a bike route and share the road between bicyclists and vehicles.



**Figure 24.** E Devine St.

#### *Data Analysis*

Analyzing the collected data, the route was evaluated and some important facts were noticed about it: The grade is low and constant; lights were present in every segment of the route, creating a good illumination during the night time; the pavement is good on average; the road width is not a problem, except in one block of E Devine St., but because of the low volume of cars in that segment, there are solutions for it; the last fact is the presence of the intersection between Loop 323 and 5<sup>th</sup> Street, and because of the high volume of cars on this intersection, the crossing can be considered dangerous.

	Points						
	3	2	1	0	-1	-2	-3
<b>Number of Lanes per Direction</b>	3 or more			2			1
				0			
<b>Turning Lane</b>		Yes				No	
		2					
<b>Average Lane Width</b>	> 13ft		13ft to 12ft		12ft to 11ft		< 11ft
			1				
<b>Parking</b>	Both Sides			One Side			None
							-3
<b>Traffic Volume</b>	Low			Normal			High
							-3
<b>Max Grade</b>	0% to 5%		5% to 8%		8% to 11%		> 11%
			1				
<b>Average Grade</b>	0% to 1%		1% to 2%		2% to 3%		> 3%
			1				
<b>Streets Lighting</b>	Good			Gapped			None
	3						
<b>Total Per Column (TPC)</b>	3	2	3	0	0	0	-6
<b>Total Per Group (TPG)</b>	5		3			-6	
<b>Total</b>	2						

## CONCLUSION

After reviewing data collected in the field, and using the data from the **Table 1**. It was determined that Option A –McDonald Rd. would serve as a much more appealing option as opposed to Option B – Old Omen Rd. Option A was selected over Option B using the comparing table, where Option A received 8 points, and Option B received 2 points, a total difference of 6 points. The difference came from mainly due to the traffic volume, the presence of parking that can be removed in order to create more width for the lane diet. It is also important to notice that it is important to maintain the LOS of the roads, and Option A is the one that would maintain it in a better way than the opposing option. As last point, Option A will provide access to Golden Road Park, to Moore MST Magnet School, and will connect the University of Tyler at Texas with Tyler Junior College. Option A was also selected due to the presence of bike routes on the region, absorbing the familiarity of the surrounding community with the presence of bicyclists on the neighbor.

**Table 1. Comparing Options**

	<b>Spoke</b>	
	<b>Option A</b>	<b>Option B</b>
<b>Number of Lanes per Direction</b>	-3	0
<b>Turning Lane</b>	-2	2
<b>Average Lane Width</b>	3	1
<b>Parking</b>	3	-3
<b>Traffic Volume</b>	3	-3
<b>Max Grade</b>	0	1
<b>Average Grade</b>	1	1
<b>Streets Lighting</b>	3	3
<b>Total Points</b>	8	2

APPENDIX A – Traffic Data for the Intersection of Loop 323 & McDonald Rd.

Table A-1 – Displays Traffic Movement between 6:45 AM – 7:45 AM

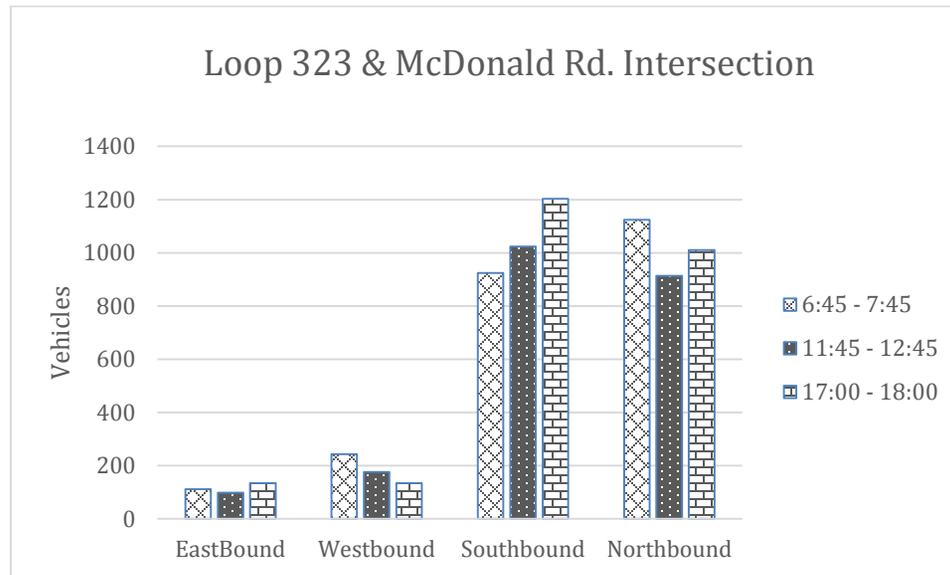
Time	Eastbound			Southbound			Westbound			Northbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
6:45 - 7:00	9	7	2	17	190	9	20	9	14	4	292	4	577
7:00 - 7:15	16	15	5	20	175	7	26	11	14	10	255	5	559
7:15 - 7:30	7	25	4	28	265	6	32	27	28	8	321	3	754
7:30 - 7:45	2	18	2	15	184	8	34	12	16	17	204	1	513
<b>Total</b>	34	65	13	80	814	30	112	59	72	39	1072	13	2403
<b>PHF</b>	0,53	0,65	0,65	0,71	0,77	0,83	0,82	0,55	0,64	0,57	0,83	0,65	<b>0,80</b>

Table A-2 - Displays Traffic Movement between 11:45 AM – 12:45 PM

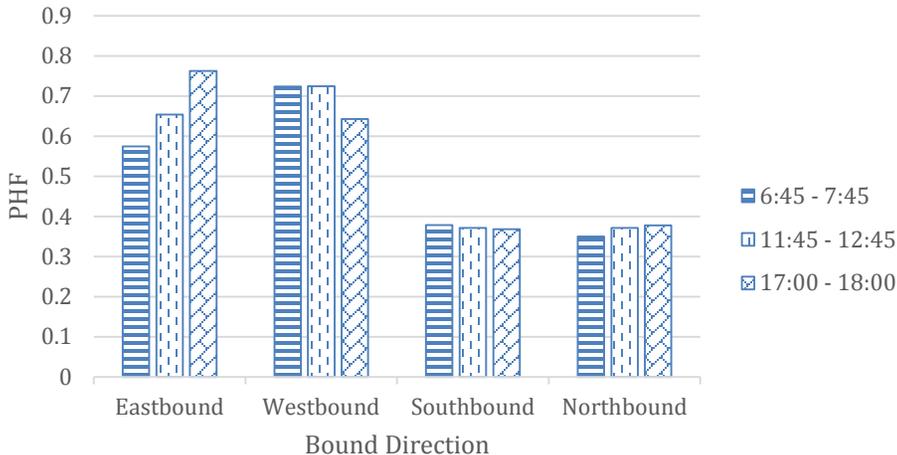
Time	Eastbound			Southbound			Westbound			Northbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:45 - 12:00	13	7	8	17	249	7	23	6	9	7	211	14	571
12:00 - 12:15	16	6	7	13	246	12	22	9	25	12	203	20	591
12:15 - 12:30	9	7	1	16	237	11	24	9	18	15	220	6	573
12:30 - 12:45	12	5	7	9	187	19	12	6	13	5	187	14	476
<b>Total</b>	50	25	23	55	919	49	81	30	65	39	821	54	2211
<b>PHF</b>	0,78	0,89	0,72	0,81	0,92	0,64	0,84	0,83	0,65	0,65	0,93	0,68	<b>0,94</b>

Table A-3 - Displays Traffic Movement between 5:00 PM – 6:00 PM

Time	Eastbound			Southbound			Westbound			Northbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17:00 - 17:15	12	15	4	20	253	10	14	10	10	4	209	17	578
17:15 - 17:30	17	12	9	17	301	10	20	3	8	9	239	19	664
17:30 - 17:45	11	18	9	22	332	14	22	8	6	5	247	28	722
17:45 - 18:00	9	14	5	14	203	7	14	14	6	14	197	23	520
<b>Total</b>	49	59	27	73	1089	41	70	35	30	32	892	87	2484
<b>PHF</b>	0,72	0,82	0,75	0,83	0,82	0,73	0,80	0,63	0,75	0,57	0,90	0,78	<b>0,86</b>



### PHF Intersection Loop 323 & McDonald Rd.



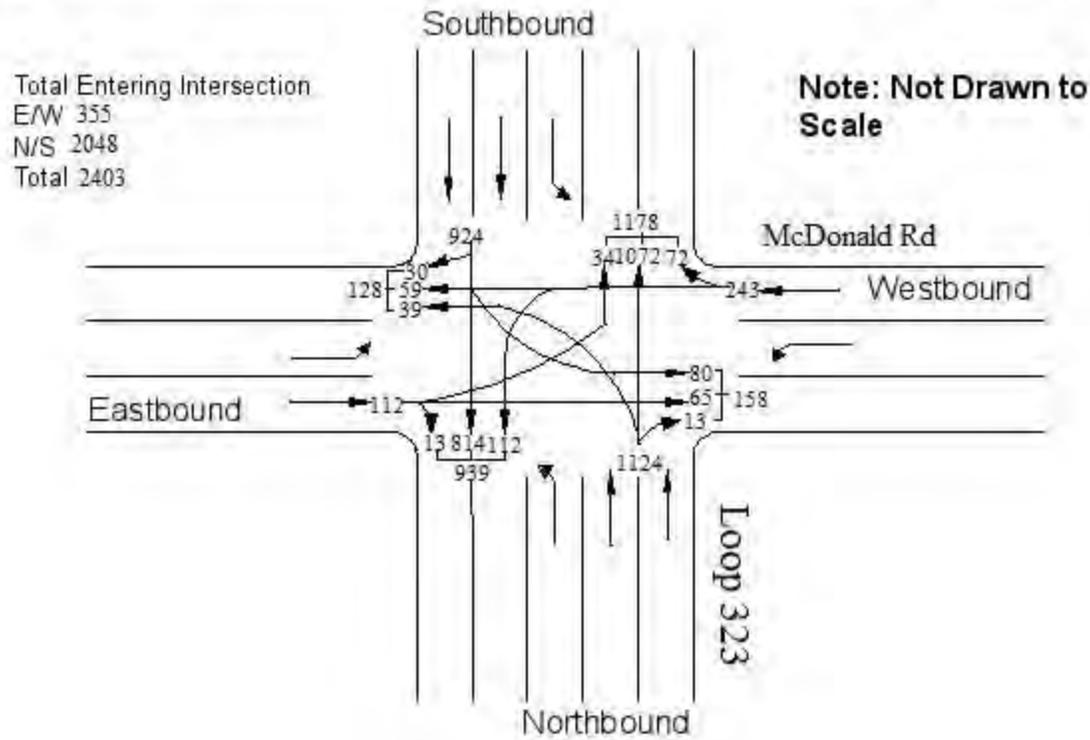
**Graphic Summary of Vehicle Movements**

**Intersection:** Loop 323 & McDonald Rd

**Observers:** Pedro Zavagna & Bruno Hamdan

**City:** Tyler

**Time:** 6:45 AM – 7:45 AM



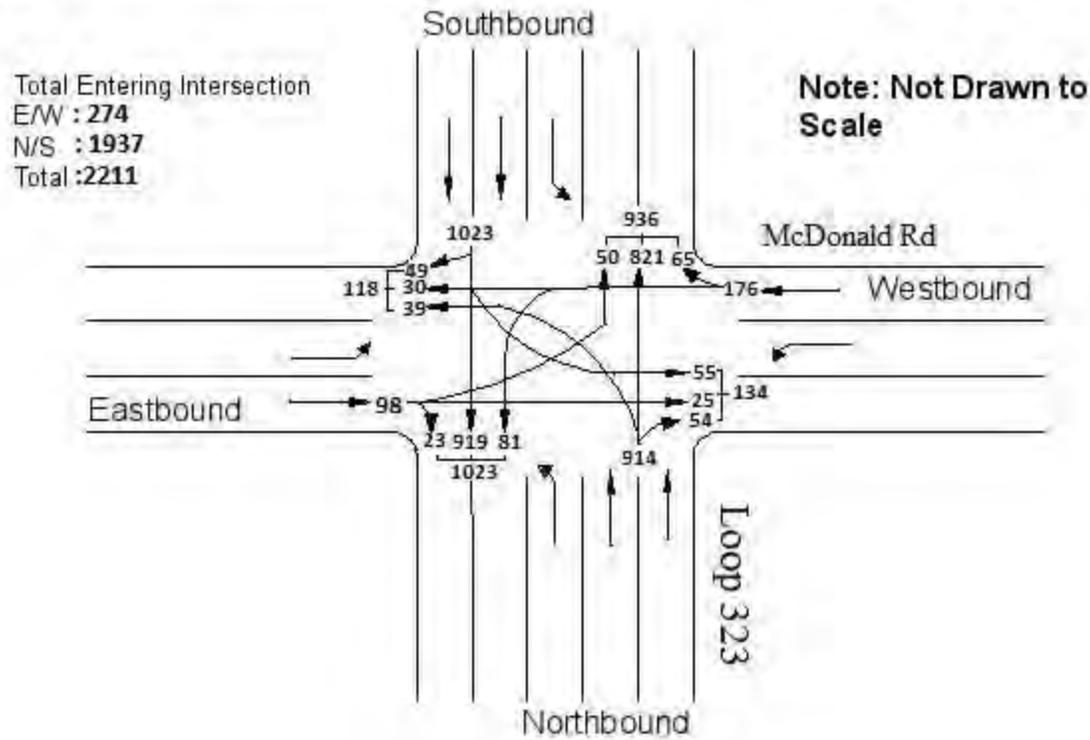
**Graphic Summary of Vehicle Movements**

**Intersection:** Loop 323 & McDonald Rd

**Observers:** Pedro Zavagna & Bruno Hamdan

**City:** Tyler

**Time:** 11:45 - 12:45



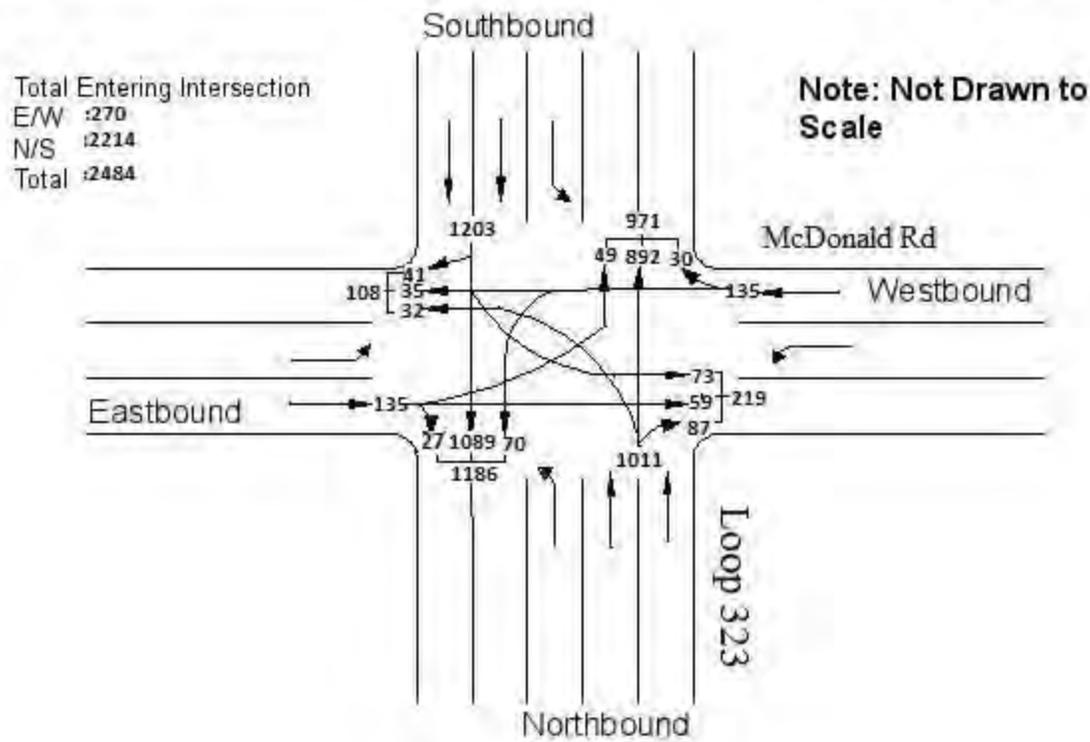
**Graphic Summary of Vehicle Movements**

**Intersection:** Loop 323 & McDonald Rd

**Observers:** Pedro Zavagna & Bruno Hamdan

**City:** Tyler

**Time:** 17:00 - 18:00



**APPENDIX B – Traffic Data for the Intersection of Loop 323 & Old Omen Rd.**

Table B-1 – Displays Traffic Movement between 6:45 AM – 7:45 AM

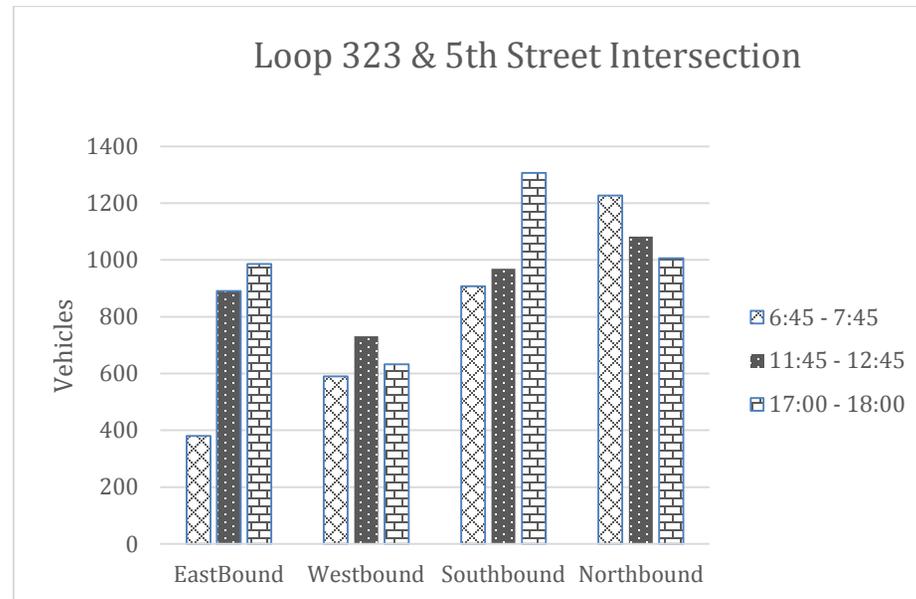
Time	Eastbound			Southbound			Westbound			Northbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
<b>6:45 - 7:00</b>	12	31	12	20	158	26	27	59	20	22	220	36	643
<b>7:00 - 7:15</b>	23	55	12	17	131	22	25	63	22	26	199	36	631
<b>7:15 - 7:30</b>	27	74	23	25	193	25	30	106	16	43	239	58	859
<b>7:30 - 7:45</b>	18	61	32	29	219	42	66	132	24	66	240	42	971
<b>Total</b>	80	221	79	91	701	115	148	360	82	157	898	172	3104
<b>PHF</b>	0,74	0,75	0,62	0,78	0,80	0,68	0,56	0,68	0,85	0,59	0,94	0,74	<b>0,80</b>

Table B-2 - Displays Traffic Movement between 11:30 AM – 12:30 PM

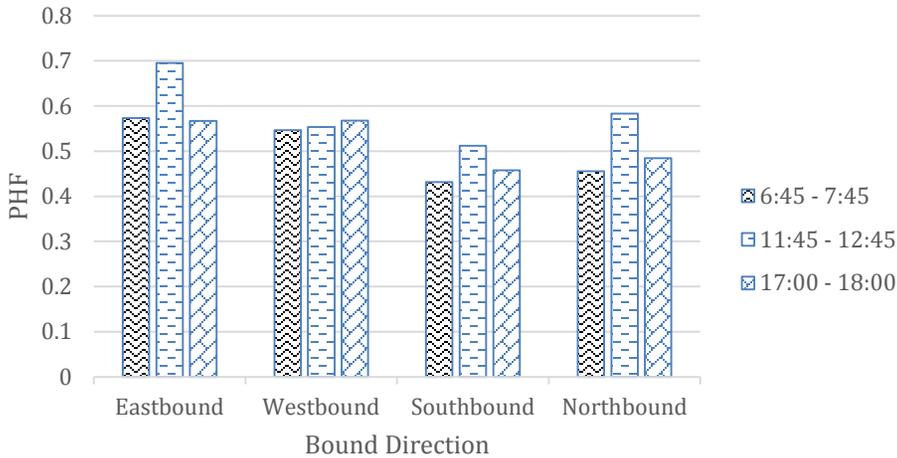
Time	Eastbound			Southbound			Westbound			Northbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
<b>11:45 - 12:00</b>	40	102	74	45	153	45	62	76	16	61	144	41	859
<b>12:00 - 12:15</b>	54	117	71	57	170	56	52	132	27	74	127	41	978
<b>12:15 - 12:30</b>	43	100	80	54	180	36	52	116	27	84	189	46	1007
<b>12:30 - 12:45</b>	51	108	51	27	128	18	37	116	18	80	159	37	830
<b>Total</b>	188	427	276	183	631	155	203	440	88	299	619	165	3674
<b>PHF</b>	0,87	0,91	0,86	0,80	0,88	0,69	0,82	0,83	0,81	0,89	0,82	0,90	<b>0,91</b>

Table B-3 - Displays Traffic Movement between 5:00 PM – 6:00 PM

Time	Eastbound			Southbound			Westbound			Northbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17:00 - 17:15	67	166	58	63	268	33	46	97	14	47	226	34	1119
17:15 - 17:30	42	154	70	73	268	34	55	87	13	68	221	45	1130
17:30 - 17:45	45	168	52	65	238	21	70	115	11	52	181	45	1063
17:45 - 18:00	40	92	32	36	178	30	44	72	8	48	198	35	813
<b>Total</b>	194	580	212	237	952	118	215	371	46	215	826	159	4125
<b>PHF</b>	0,72	0,86	0,76	0,81	0,89	0,87	0,77	0,81	0,82	0,79	0,91	0,88	<b>0,91</b>



### PHF Intersection Loop 323 & McDonald Rd.



**Graphic Summary of Vehicle Movements**

**Intersection:** Loop & Fifth Street

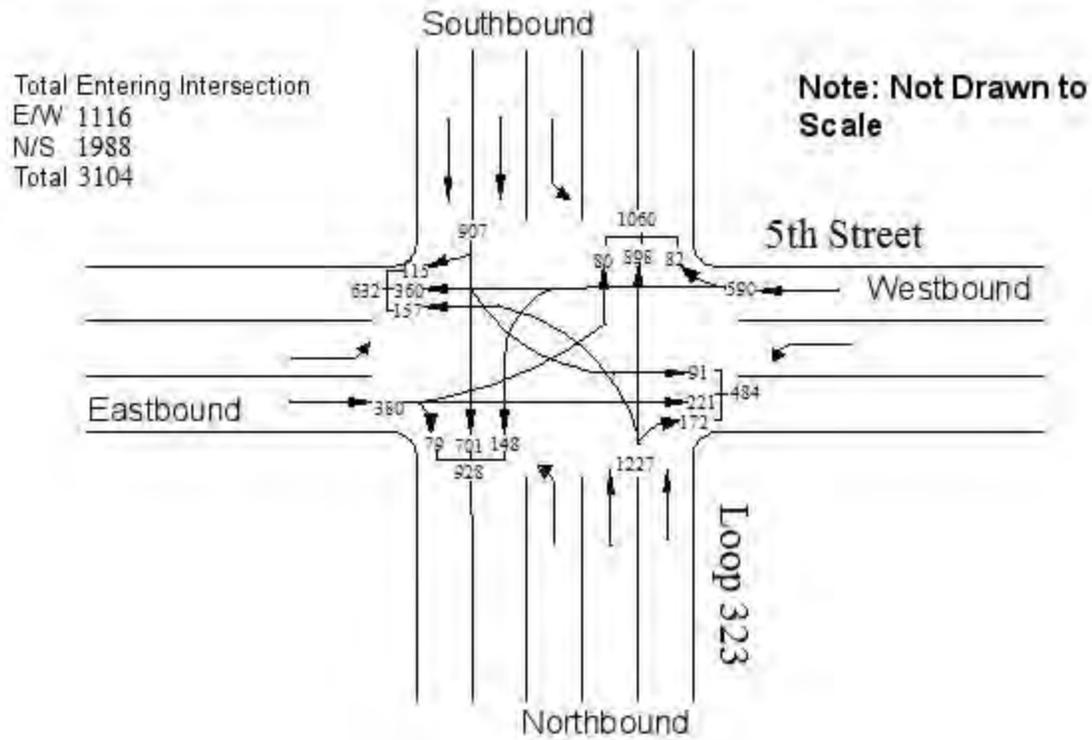
**Observers:** Pedro Zavagna & Bruno Hamdan

**Date:** 03/03/2015

**City:** Tyler

**Day:** Tuesday

**Time:** 6:45am-7:45am



### Graphic Summary of Vehicle Movements

**Intersection:** Loop & Fifth Street

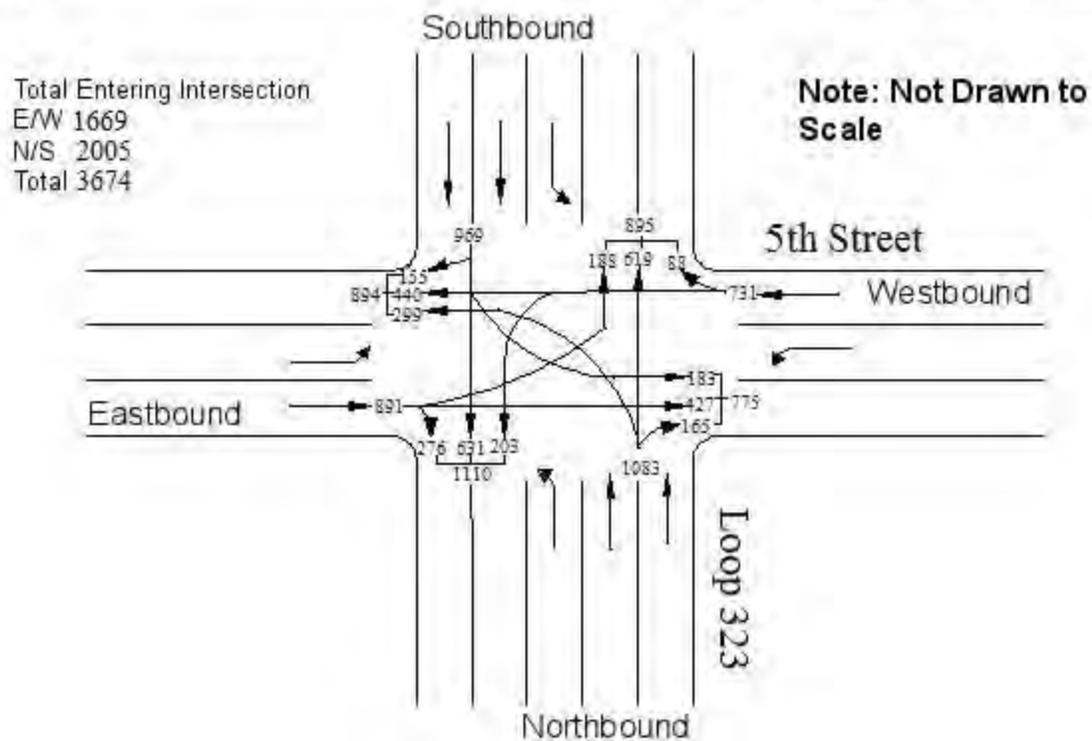
**Observers:** Pedro Zavagna & Bruno Hamdan

**Date:** 03/03/2015

**City:** Tyler

**Day:** Tuesday

**Time:** 11:45am - 12:45pm



**Graphic Summary of Vehicle Movements**

**Intersection:** Loop & Fifth Street

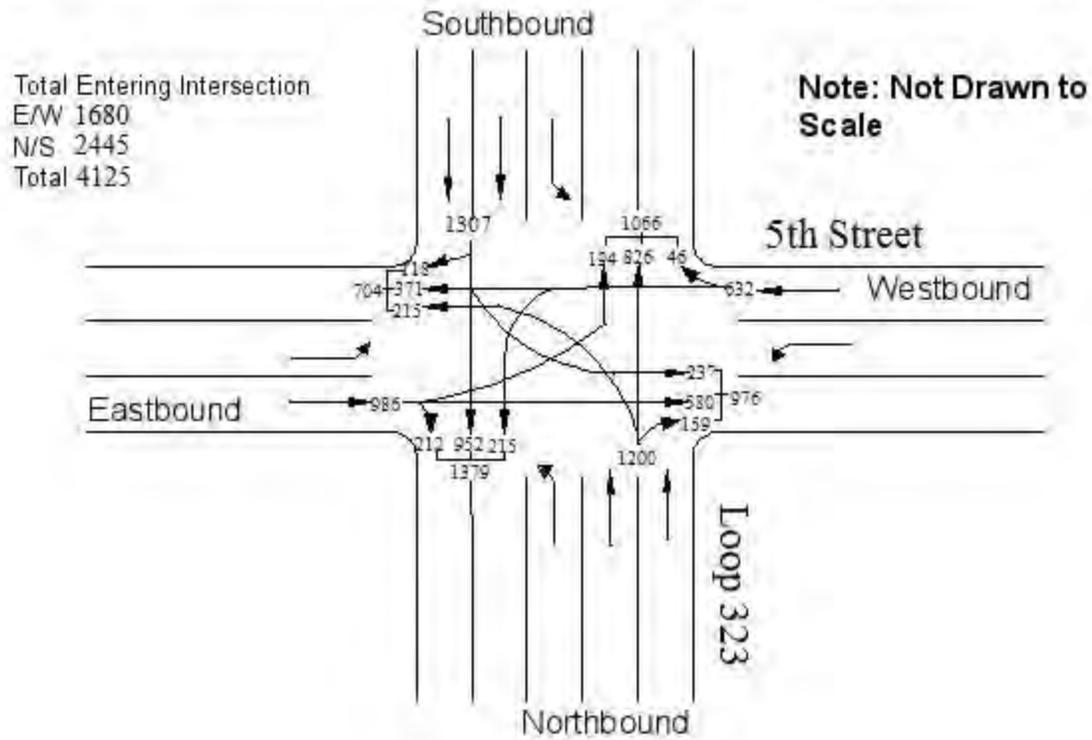
**Observers:** Pedro Zavagna & Bruno Hamdan

**Date:** 03/03/2015

**City:** Tyler

**Day:** Tuesday

**Time:** 5:00pm - 6:00pm



**APPENDIX C – Grades Elevations for Option A (see page attached)**

**Option A –McDonald Rd.**

Elevation	560.8 ft									E Divine Street
Elevation	554.0 ft	Last Point Elevation:	560.8 ft	Change:	-6ft	Total Distance:	0.1 mi	Grade:	1%	E Divine Street
Elevation	555.1 ft	Last Point Elevation:	554.0 ft	Change:	1ft	Total Distance:	0.2 mi	Grade:	0%	E Divine Street
Elevation	546.4 ft	Last Point Elevation:	555.1 ft	Change:	-8ft	Total Distance:	0.3 mi	Grade:	1%	E Divine Street
Elevation	519.8 ft	Last Point Elevation:	546.4 ft	Change:	-26ft	Total Distance:	0.4 mi	Grade:	5%	E Divine Street
Elevation	531.4 ft	Last Point Elevation:	519.8 ft	Change:	11ft	Total Distance:	0.5 mi	Grade:	2%	E Divine Street
Elevation	559.8 ft	Last Point Elevation:	531.4 ft	Change:	28ft	Total Distance:	0.6 mi	Grade:	4%	E Divine Street
Elevation	547.3 ft	Last Point Elevation:	559.8 ft	Change:	-12ft	Total Distance:	0.7 mi	Grade:	1%	E Divine Street
Elevation	553.3 ft	Last Point Elevation:	547.3 ft	Change:	5ft	Total Distance:	0.8 mi	Grade:	1%	Golden Road after 5th
Elevation	560.5 ft	Last Point Elevation:	553.3 ft	Change:	7ft	Total Distance:	0.9 mi	Grade:	1%	Golden Road after 5th
Elevation	563.2 ft	Last Point Elevation:	560.5 ft	Change:	2ft	Total Distance:	1.0 mi	Grade:	0%	Golden Road after 5th
Elevation	554.4 ft	Last Point Elevation:	563.2 ft	Change:	-8ft	Total Distance:	1.1 mi	Grade:	1%	Golden Road after 5th
Elevation	549.5 ft	Last Point Elevation:	554.4 ft	Change:	-5ft	Total Distance:	1.2 mi	Grade:	1%	Golden Road
Elevation	554.2 ft	Last Point Elevation:	549.5 ft	Change:	4ft	Total Distance:	1.3 mi	Grade:	1%	Golden Road
Elevation	545.4 ft	Last Point Elevation:	554.2 ft	Change:	-8ft	Total Distance:	1.3 mi	Grade:	2%	Golden Road
Elevation	549.1 ft	Last Point Elevation:	545.4 ft	Change:	3ft	Total Distance:	1.4 mi	Grade:	0%	Golden Road
Elevation	556.7 ft	Last Point Elevation:	549.1 ft	Change:	7ft	Total Distance:	1.5 mi	Grade:	1%	Golden Road
Elevation	555.2 ft	Last Point Elevation:	556.7 ft	Change:	-1ft	Total Distance:	1.5 mi	Grade:	0%	Golden Road
Elevation	564.7 ft	Last Point Elevation:	555.2 ft	Change:	9ft	Total Distance:	1.6 mi	Grade:	2%	Golden Road
Elevation	581.0 ft	Last Point Elevation:	564.7 ft	Change:	16ft	Total Distance:	1.6 mi	Grade:	7%	Golden Road
Elevation	590.1 ft	Last Point Elevation:	581.0 ft	Change:	9ft	Total Distance:	1.7 mi	Grade:	3%	Golden Road
Elevation	592.9 ft	Last Point Elevation:	590.1 ft	Change:	2ft	Total Distance:	1.7 mi	Grade:	1%	Golden Road
Elevation	593.4 ft	Last Point Elevation:	592.9 ft	Change:	0ft	Total Distance:	1.8 mi	Grade:	0%	McDonald
Elevation	585.3 ft	Last Point Elevation:	593.4 ft	Change:	-8ft	Total Distance:	1.8 mi	Grade:	7%	McDonald

Elevation	571.3 ft	Last Point Elevation:	585.3 ft	Change:	-14ft	Total Distance:	1.8 mi	Grade:	7%	McDonald
Elevation	564.5 ft	Last Point Elevation:	571.3 ft	Change:	-6ft	Total Distance:	1.9 mi	Grade:	2%	McDonald
Elevation	555.8 ft	Last Point Elevation:	564.5 ft	Change:	-8ft	Total Distance:	1.9 mi	Grade:	3%	McDonald
Elevation	534.3 ft	Last Point Elevation:	555.8 ft	Change:	-21ft	Total Distance:	2.0 mi	Grade:	6%	McDonald
Elevation	532.7 ft	Last Point Elevation:	534.3 ft	Change:	-1ft	Total Distance:	2.0 mi	Grade:	0%	McDonald
Elevation	535.0 ft	Last Point Elevation:	532.7 ft	Change:	2ft	Total Distance:	2.1 mi	Grade:	0%	McDonald
Elevation	541.7 ft	Last Point Elevation:	535.0 ft	Change:	6ft	Total Distance:	2.2 mi	Grade:	1%	McDonald
Elevation	542.0 ft	Last Point Elevation:	541.7 ft	Change:	0ft	Total Distance:	2.3 mi	Grade:	0%	McDonald
Elevation	568.6 ft	Last Point Elevation:	542.0 ft	Change:	26ft	Total Distance:	2.3 mi	Grade:	8%	McDonald
Elevation	576.4 ft	Last Point Elevation:	568.6 ft	Change:	7ft	Total Distance:	2.4 mi	Grade:	2%	McDonald
Elevation	577.4 ft	Last Point Elevation:	576.4 ft	Change:	0ft	Total Distance:	2.5 mi	Grade:	0%	McDonald
Elevation	590.3 ft	Last Point Elevation:	577.4 ft	Change:	12ft	Total Distance:	2.6 mi	Grade:	1%	McDonald
Elevation	598.5 ft	Last Point Elevation:	590.3 ft	Change:	8ft	Total Distance:	2.8 mi	Grade:	1%	McDonald
Elevation	594.3 ft	Last Point Elevation:	598.5 ft	Change:	-4ft	Total Distance:	2.9 mi	Grade:	0%	McDonald
Elevation	613.2 ft	Last Point Elevation:	594.3 ft	Change:	18ft	Total Distance:	3.0 mi	Grade:	3%	McDonald
Elevation	614.4 ft	Last Point Elevation:	613.2 ft	Change:	1ft	Total Distance:	3.0 mi	Grade:	0%	Old Omen
Elevation	621.2 ft	Last Point Elevation:	614.4 ft	Change:	6ft	Total Distance:	3.1 mi	Grade:	2%	Old Omen
Elevation	632.3 ft	Last Point Elevation:	621.2 ft	Change:	11ft	Total Distance:	3.2 mi	Grade:	2%	Old Omen
Elevation	638.5 ft	Last Point Elevation:	632.3 ft	Change:	11ft	Total Distance:	3.3 mi	Grade:	2%	Old Omen UT
Elevation	632.2 ft	Last Point Elevation:	638.5 ft	Change:	-6ft	Total Distance:	3.4 mi	Grade:	1%	Old Omen UT
Elevation	626.3 ft	Last Point Elevation:	632.2 ft	Change:	-5ft	Total Distance:	3.5 mi	Grade:	1%	Old Omen UT
Elevation	610.8 ft	Last Point Elevation:	626.3 ft	Change:	-15ft	Total Distance:	3.6 mi	Grade:	3%	Old Omen UT
Elevation	591.9 ft	Last Point Elevation:	610.8 ft	Change:	-18ft	Total Distance:	3.7 mi	Grade:	3%	Old Omen UT
Elevation	592.2 ft	Last Point Elevation:	591.9 ft	Change:	0ft	Total Distance:	3.8 mi	Grade:	0%	Old Omen UT
Elevation	585.1 ft	Last Point Elevation:	592.2 ft	Change:	-7ft	Total Distance:	3.9 mi	Grade:	1%	Old Omen
Elevation	601.3 ft	Last Point Elevation:	585.1 ft	Change:	16ft	Total Distance:	4.0 mi	Grade:	2%	Old Omen
Elevation	587.3 ft	Last Point Elevation:	601.3 ft	Change:	-14ft	Total Distance:	4.0 mi	Grade:	2%	Old Omen
Elevation	574.0 ft	Last Point Elevation:	587.3 ft	Change:	-13ft	Total Distance:	4.2 mi	Grade:	2%	Old Omen

Elevation	574.5 ft	Last Point Elevation:	574.0 ft	Change:	0ft	Total Distance:	4.3 mi	Grade:	0%	Old Omen
Elevation	572.7 ft	Last Point Elevation:	574.5 ft	Change:	-1ft	Total Distance:	4.4 mi	Grade:	0%	Old Omen
Elevation	580.0 ft	Last Point Elevation:	572.7 ft	Change:	7ft	Total Distance:	4.5 mi	Grade:	1%	Old Omen
Elevation	576.6 ft	Last Point Elevation:	580.0 ft	Change:	-3ft	Total Distance:	4.7 mi	Grade:	0%	Old Omen
Elevation	581.8 ft	Last Point Elevation:	576.6 ft	Change:	5ft	Total Distance:	4.7 mi	Grade:	1%	Old Omen
Elevation	574.4 ft	Last Point Elevation:	581.8 ft	Change:	-7ft	Total Distance:	4.9 mi	Grade:	1%	Old Omen
Elevation	560.2 ft	Last Point Elevation:	574.4 ft	Change:	-14ft	Total Distance:	5.0 mi	Grade:	2%	Old Omen
Elevation	539.3 ft	Last Point Elevation:	560.2 ft	Change:	-20ft	Total Distance:	5.1 mi	Grade:	3%	Old Omen
Elevation	513.1 ft	Last Point Elevation:	539.3 ft	Change:	-26ft	Total Distance:	5.2 mi	Grade:	3%	Old Omen

**Option B –Old Omen Rd.**

Elevation:	560.8 ft								E Divine Street	
Elevation:	554.0 ft	Last Point Elevation:	560.8 ft	Change:	-6ft	Total Dist:	0.1 mi	Grade:	1%	E Divine Street
Elevation:	555.1 ft	Last Point Elevation:	554.0 ft	Change:	1ft	Total Dist:	0.2 mi	Grade:	0%	E Divine Street
Elevation:	546.4 ft	Last Point Elevation:	555.1 ft	Change:	-8ft	Total Dist:	0.3 mi	Grade:	1%	E Divine Street
Elevation:	519.8 ft	Last Point Elevation:	546.4 ft	Change:	-26ft	Total Dist:	0.4 mi	Grade:	5%	E Divine Street
Elevation:	531.4 ft	Last Point Elevation:	519.8 ft	Change:	11ft	Total Dist:	0.5 mi	Grade:	2%	E Divine Street
Elevation:	559.8 ft	Last Point Elevation:	531.4 ft	Change:	28ft	Total Dist:	0.6 mi	Grade:	4%	E Divine Street
Elevation:	547.3 ft	Last Point Elevation:	559.8 ft	Change:	-12ft	Total Dist:	0.7 mi	Grade:	1%	E Divine Street
Elevation:	553.3 ft	Last Point Elevation:	547.3 ft	Change:	5ft	Total Dist:	0.8 mi	Grade:	1%	Golden Road
Elevation:	560.5 ft	Last Point Elevation:	553.3 ft	Change:	7ft	Total Dist:	0.9 mi	Grade:	1%	Golden Road
Elevation:	563.2 ft	Last Point Elevation:	560.5 ft	Change:	2ft	Total Dist:	1.0 mi	Grade:	0%	Golden Road
Elevation:	554.4 ft	Last Point Elevation:	563.2 ft	Change:	-8ft	Total Dist:	1.1 mi	Grade:	1%	Golden Road
Elevation:	543.7 ft	Last Point Elevation:	554.4 ft	Change:	-10ft	Total Dist:	1.2 mi	Grade:	3%	5th Street
Elevation:	528.2 ft	Last Point Elevation:	543.7 ft	Change:	-15ft	Total Dist:	1.3 mi	Grade:	3%	5th Street
Elevation:	516.1 ft	Last Point Elevation:	528.2 ft	Change:	-12ft	Total Dist:	1.4 mi	Grade:	2%	5th Street
Elevation:	537.5 ft	Last Point Elevation:	516.1 ft	Change:	21ft	Total Dist:	1.5 mi	Grade:	2%	5th Street
Elevation:	539.9 ft	Last Point Elevation:	537.5 ft	Change:	2ft	Total Dist:	1.6 mi	Grade:	0%	5th Street
Elevation:	544.2 ft	Last Point Elevation:	539.9 ft	Change:	4ft	Total Dist:	1.8 mi	Grade:	0%	Old Omen
Elevation:	553.1 ft	Last Point Elevation:	544.2 ft	Change:	8ft	Total Dist:	1.9 mi	Grade:	2%	Old Omen
Elevation:	566.9 ft	Last Point Elevation:	553.1 ft	Change:	13ft	Total Dist:	2.0 mi	Grade:	3%	Old Omen
Elevation:	574.2 ft	Last Point Elevation:	566.9 ft	Change:	7ft	Total Dist:	2.1 mi	Grade:	1%	Old Omen
Elevation:	581.8 ft	Last Point Elevation:	574.2 ft	Change:	7ft	Total Dist:	2.2 mi	Grade:	1%	Old Omen
Elevation:	588.3 ft	Last Point Elevation:	581.8 ft	Change:	6ft	Total Dist:	2.2 mi	Grade:	1%	Old Omen
Elevation:	598.3 ft	Last Point Elevation:	588.3 ft	Change:	10ft	Total Dist:	2.4 mi	Grade:	1%	Old Omen
Elevation:	603.8 ft	Last Point Elevation:	598.3 ft	Change:	5ft	Total Dist:	2.5 mi	Grade:	1%	Old Omen
Elevation:	615.1 ft	Last Point Elevation:	603.8 ft	Change:	11ft	Total Dist:	2.6 mi	Grade:	1%	Old Omen
Elevation:	613.0 ft	Last Point Elevation:	615.1 ft	Change:	-2ft	Total Dist:	2.7 mi	Grade:	0%	Old Omen

Elevation:	626.7 ft	Last Point Elevation:	613.0 ft	Change:	13ft	Total Dist:	2.8 mi	Grade:	2%	Old Omen
Elevation:	638.5 ft	Last Point Elevation:	626.7 ft	Change:	11ft	Total Dist:	2.9 mi	Grade:	2%	Old Omen UT
Elevation:	632.2 ft	Last Point Elevation:	638.5 ft	Change:	-6ft	Total Dist:	3.0 mi	Grade:	1%	Old Omen UT
Elevation:	626.3 ft	Last Point Elevation:	632.2 ft	Change:	-5ft	Total Dist:	3.1 mi	Grade:	1%	Old Omen UT
Elevation:	610.8 ft	Last Point Elevation:	626.3 ft	Change:	-15ft	Total Dist:	3.2 mi	Grade:	3%	Old Omen UT
Elevation:	591.9 ft	Last Point Elevation:	610.8 ft	Change:	-18ft	Total Dist:	3.3 mi	Grade:	3%	Old Omen UT
Elevation:	592.2 ft	Last Point Elevation:	591.9 ft	Change:	0ft	Total Dist:	3.4 mi	Grade:	0%	Old Omen UT
Elevation:	585.1 ft	Last Point Elevation:	592.2 ft	Change:	-7ft	Total Dist:	3.5 mi	Grade:	1%	Old Omen
Elevation:	601.3 ft	Last Point Elevation:	585.1 ft	Change:	16ft	Total Dist:	3.7 mi	Grade:	2%	Old Omen
Elevation:	587.3 ft	Last Point Elevation:	601.3 ft	Change:	-14ft	Total Dist:	3.7 mi	Grade:	2%	Old Omen
Elevation:	574.0 ft	Last Point Elevation:	587.3 ft	Change:	-13ft	Total Dist:	3.9 mi	Grade:	2%	Old Omen
Elevation:	574.5 ft	Last Point Elevation:	574.0 ft	Change:	0ft	Total Dist:	4.0 mi	Grade:	0%	Old Omen
Elevation:	572.7 ft	Last Point Elevation:	574.5 ft	Change:	-1ft	Total Dist:	4.1 mi	Grade:	0%	Old Omen
Elevation:	580.0 ft	Last Point Elevation:	572.7 ft	Change:	7ft	Total Dist:	4.2 mi	Grade:	1%	Old Omen
Elevation:	576.6 ft	Last Point Elevation:	580.0 ft	Change:	-3ft	Total Dist:	4.4 mi	Grade:	0%	Old Omen
Elevation:	581.8 ft	Last Point Elevation:	576.6 ft	Change:	5ft	Total Dist:	4.4 mi	Grade:	1%	Old Omen
Elevation:	574.4 ft	Last Point Elevation:	581.8 ft	Change:	-7ft	Total Dist:	4.6 mi	Grade:	1%	Old Omen
Elevation:	560.2 ft	Last Point Elevation:	574.4 ft	Change:	-14ft	Total Dist:	4.7 mi	Grade:	2%	Old Omen
Elevation:	539.3 ft	Last Point Elevation:	560.2 ft	Change:	-20ft	Total Dist:	4.8 mi	Grade:	3%	Old Omen
Elevation:	513.1 ft	Last Point Elevation:	539.3 ft	Change:	-26ft	Total Dist:	4.9 mi	Grade:	3%	Old Omen

# AGENDA ITEM 6

# Texas Guide to Safe Bicycling

Safety Tips for Bicycling in Texas



Texas Department of Transportation  
Bicycle/Pedestrian Program



1st Edition

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This guide is based on information that was available at the time of publication. It is your responsibility to be in compliance with current state and local laws and regulations.



## Texas is a Great Place to Live, Work and Play.

Riding a bicycle is a healthy and fun option for experiencing and exploring Texas. Bicycling is also an attractive transportation choice for getting to and from work, running errands and going to school. **Bicycles are legally considered vehicles on Texas's roadways**, so be sure you know the rules of the road and are respectful of all road users.

The Texas Department of Transportation (TxDOT) encourages you to take a few minutes to review this booklet and share information with family and friends. This bicycling safety guide explains the rules of the road, provides tips about biking and shares with you the basic guidelines about cycling on Texas roadways.

Bicycle safely and share the road!

## Safety Tips for Bicycling in Texas

In Texas, a bicyclist has the same rights and responsibilities as a driver of a motorized vehicle. Bicyclists, like motorists, can be ticketed or penalized for not obeying vehicular traffic laws.

- Wear a helmet
- Dress appropriately for the type of riding you are planning; whenever possible, wear bright clothing
- Obey traffic signs and signals
- Ride with traffic, never against traffic
- Ride as far to the right, in the right lane, as practicable
- Use paved shoulders and bike lanes when available and always be on the lookout for road hazards or debris
- On narrow roads without bike lanes or shoulders, play it safe and ride single-file
- Ride no more than two abreast when traveling in a shared roadway lane; return to riding single-file if riding two abreast impedes the flow of traffic
- Use hand signals (discussed in detail on page 6) to indicate what you intend to do: left or right turns, slowing or stopping
- When riding early in the morning or at night, use a headlight, taillight and reflectors
- Use caution when riding at sunrise and sunset; the bright sunlight can make bicyclists difficult to see
- Make eye contact with drivers whenever possible; never assume motorists see you or that you have the right-of-way
- Never catch a ride by holding onto or attaching your bicycle to another vehicle
- Keep at least one hand on the handlebars at all times
- Do not wear headphones - they block other sounds you need to hear
- Always expect the unexpected; stay aware and remain focused on your surroundings - your safety and the safety of those around you is your first responsibility

## Rules of the Road

### Ride on the right

Riding on the right doesn't mean hugging the curb or edge of the road. It means riding as far right as practicable and still being safe from obstacles, debris and traffic.

### When to take a lane

A bicyclist may take the travel lane in the following situations:

- If traveling the same speed as other traffic
- When passing another vehicle moving in the same direction
- When preparing for a left turn
- To avoid a hazard
- When traveling in a lane that is too narrow for a bicycle and motor vehicle to travel safely side by side (share the lane)

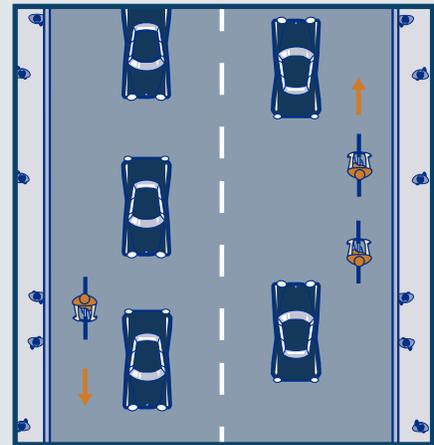
Always look first before taking a lane.

When you move to the center of the lane, it establishes your position and prevents motorists from passing until there's enough room. Be considerate of others.

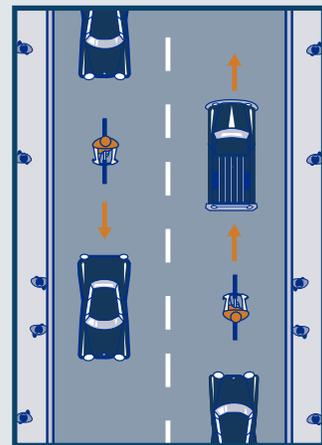
### Ride Single File

Play it safe and ride single file. This provides more room to avoid hazards and allows other bicyclists and motorists to pass. However, you may ride two abreast if you are not impeding the normal flow of traffic; or when you are riding on a designated bikeway.

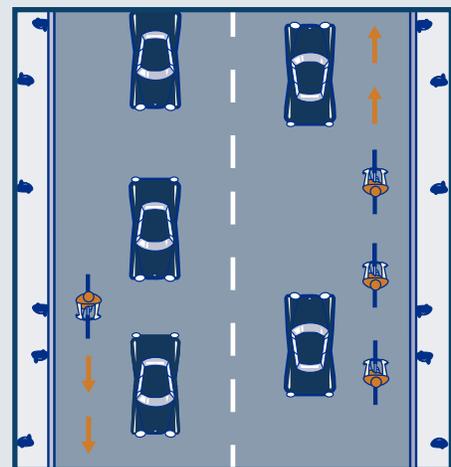
Review Texas laws on pages 21 - 23 of this guide.



Ride in straight line.



Know when it is appropriate to take a lane.



Play it safe, ride single file.

## Use Hand Signals

Use the proper hand signals for left or right turns and for slowing or stopping.

When turning, you must signal continuously at least 100 feet before the turn and while you are stopped waiting to turn, unless use of your hand is needed to control your bicycle.

## Making Left Turns

### 1. Vehicular-style left turn

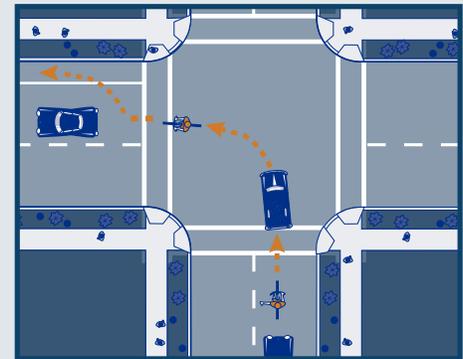
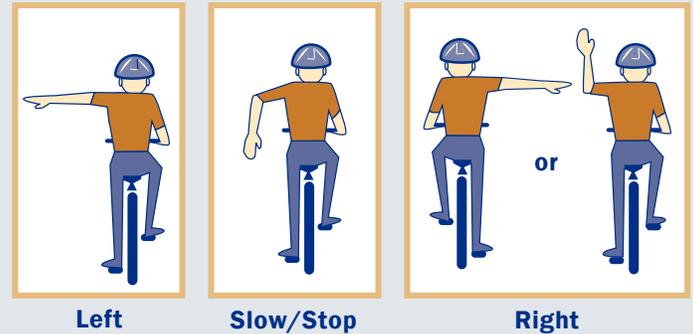
- Signal left
- Look behind you
- Move into the left lane or the center turn lane
- Yield to oncoming cars before turning
- Where a bike lanes exists, move to the bike lane

### 2. Pedestrian-style left turn:

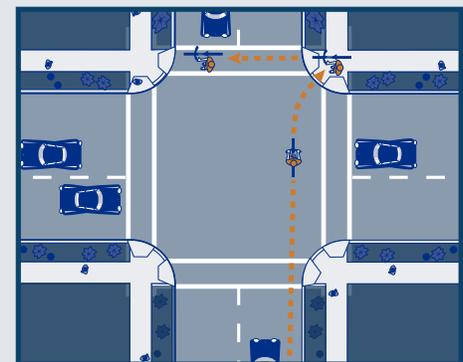
- Ride straight through the intersection to the far crosswalk
- Stop, dismount and position your bicycle in the new direction
- Yield to oncoming traffic or if you are at a signalized intersection, wait for the green or WALK signal before crossing
- Walk your bicycle across the crosswalk

### 3. 90 Degree or inverted L:

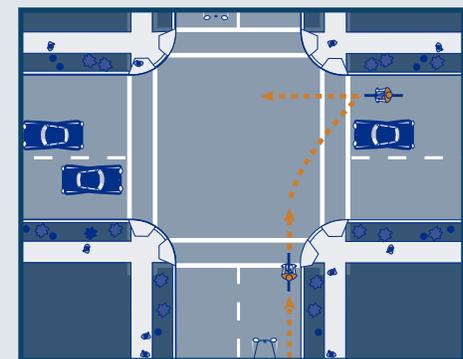
- Ride straight through the intersection to the far corner of the right travel lane
- Stop and position your bicycle in the new direction
- Yield to oncoming traffic or if you are at a signalized intersection, wait for the green signal before crossing
- Ride your bicycle across the intersection



Vehicular-style left turn



Pedestrian-style left turn



Left turn at 90 degrees or inverted L

## Right-of-Way

Never assume you have the right-of-way. Your first responsibility is to avoid a crash.

When approaching a non-signalized intersection at the same time as another vehicle, the operator of the vehicle on the left must yield the right-of-way to the vehicle on the right. Don't change lanes if another vehicle must slow down for you to enter the lane. Always look behind you and signal before changing lanes.

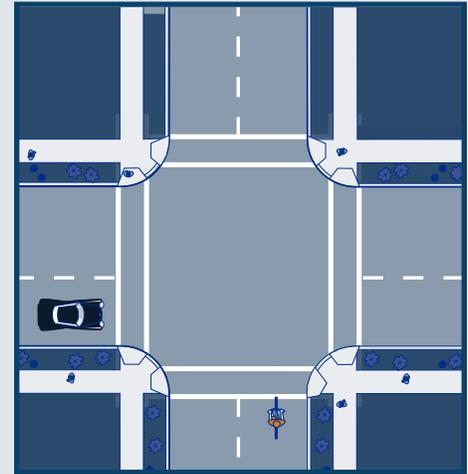
Bicyclists should yield to pedestrians.

## Follow Lane Markings

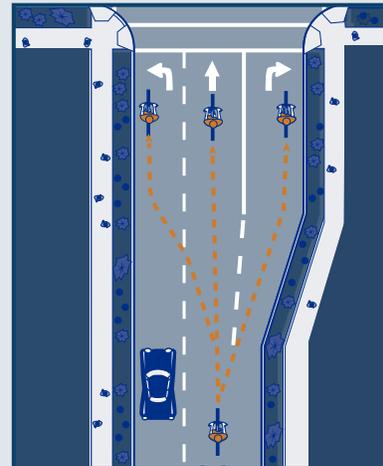
Like other vehicles, when you approach an intersection with several lane choices, choose the lane appropriate to your travel direction and follow the pavement markings.

## Roundabouts

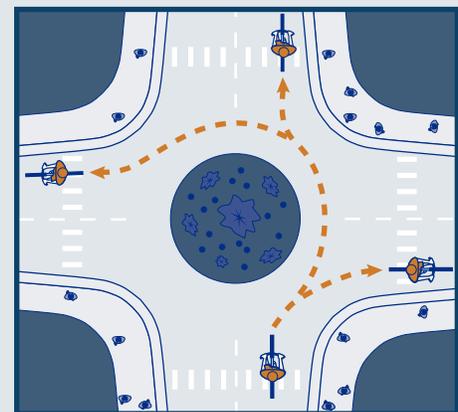
When approaching a roundabout, bicyclists should merge to the center of the lane (take the lane). Vehicles entering the circle yield the right-of-way to traffic already in the circle. Traffic proceeds in a counter-clockwise direction around the circle, even when making a left turn. All vehicles should yield to pedestrians in crosswalks. Motor vehicles should not speed up to pass bicyclists.



The vehicle on the left must yield the right-of-way to the bicyclist on the right



Follow lane markings



Navigate a roundabout by traveling in the center of the lane

## Road Hazards

Road hazards can cause you to lose control. Common road hazards to look out for:

### 1. SEWER OR CATTLE GRATES

Be aware of pavement conditions; your wheels can get caught in sewer/cattle grates.

### 2. PARKED CARS

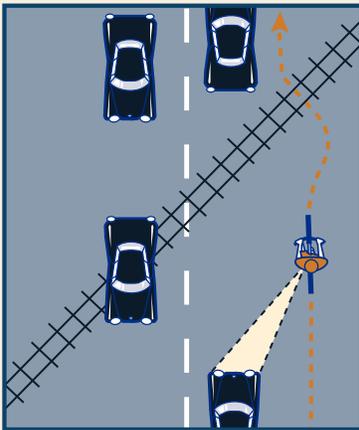
Whenever possible, ride a car door's width away from parked cars to avoid unexpected door openings and be alert.

### 3. SURFACE CONDITIONS

Be aware of ice, ponded water, loose gravel, uneven pavement and rumble strips.

### 4. RAILROAD TRACKS

Cross railroad tracks perpendicular to the rails (straight on) between 60 and 90 degrees.



Cross railroad tracks at a 60-90 degree angle

Always stop and move out of the roadway when using hand-held electronic devices, like cell phones.

## Equipment and Accessories

No matter how safely you ride, an unsafe bicycle can put you at risk.

The first step is knowing that your bicycle is mechanically sound; check your brakes, steering, tires and drivetrain regularly. Texas law states that the bicycle must be equipped with a working brake or brakes that will enable you to stop on dry, level, clean pavement.

Select a bicycle based on your primary use. There are many types and styles of bicycles to choose from. Visit your local bicycle shop and try different types/styles to find the right fit and function.

Make regular visits to your local bicycle shop for mechanical tune-ups. If you acquire a secondhand or used bicycle, take it to a bicycle shop for a safety check. A mechanic can advise you on what service your bicycle needs, to prevent damage to components and/or to enhance mechanical performance.

### CHECK YOUR BICYCLE REGULARLY

- Tire pressure, wear and damage
- Chain-drive cleanliness
- Brake and gear shifting performance
- Head and tail lamp batteries

Preventative maintenance is recommended to increase your satisfaction and confidence when you ride. If you like to do mechanical work, take a bicycle maintenance class. Maintaining your own bicycle can be very satisfying.

Always carry identification with you. Having appropriate identification will enable you to receive prompt medical care if you are involved in a crash and for others to contact your family when necessary. It is also wise to keep some cash on your bicycle in case of an emergency.

## Helmets

About sixty percent of all bicycle rider fatalities are the result of head injuries. The best protection is an approved bicycle helmet. Wearing a helmet will reduce head injury risk by 85 percent and could save your life. Helmets are inexpensive and come in a multitude of styles and colors.

The best helmets have a smooth plastic outer shell over a foam liner. The outer shell helps prevent sharp objects from penetrating the helmet and the foam liner protects your head by absorbing much of the force of an impact. The extra soft foam pads that come with your helmet are for exact fit and comfort. The very best helmet is one which the rider likes and wears on every ride.

Helmets that have several openings in the front and air channels inside allow for better air flow. Helmets also provide protection from the sun.

Take time to select a helmet that is the right size for your head. A helmet needs to fit snugly. A bicycle helmet should not move around on your head when riding or come off your head if you crash. Adjust the helmet straps to fit around your ears and under your chin. The helmet should be worn over the forehead and not tipped back. The front edge of the helmet should be positioned approximately one inch above the eyebrow. It is a good idea to have an experienced bicycle shop employee assist you in properly fitting you with a helmet.

Helmets have a limited life; check with the helmet manufacturer on when to replace your helmet

A crash can happen at any time.  
Wear your helmet every time you ride!



Some municipalities require the use of helmets. This could include requiring helmets for all bicyclists or only for children. Check the local ordinances.

### Tire Pressure

Tire pressure should be maintained as written on the tire sidewall. The correct tire pressure increases the life of your tires and decreases the effort needed to pedal. Check the tire tread and sidewalls for cuts and scrapes.

### Flat Prevention

To prevent flats, use tires that are appropriate for their intended use. Always carry a pump that fits your tire valve stem (Schrader or Presta), patch kit, spare inner tube - and know how to use them.

### Cleaning and Drying

Keeping the chain drive clean will reduce grime that causes destructive wear. A clean chain drive will help protect your clothing from stains and makes your bicycle easier to pedal. Select a quality lubricant designed to reduce grime attraction. Non-aerosol lubricants should be directed only to the part of the chain that requires lubrication. Wipe the chain down after lubrication to avoid accumulating damaging grime.

When you ride in the rain, it is important to allow your bicycle to dry completely (including the bearing assemblies).

Bicycle maintenance is relatively inexpensive compared to auto repairs. Don't put yourself at risk, always ride a well-maintained bicycle.

### Water Bottle and Cage

In Texas's hot climate, it is important to stay hydrated. Attach a water bottle and cage to your bicycle. Make it a habit to sip water throughout your trip, even if you are not thirsty.

### TOOLS FOR THE ROAD

There are few tools every bicyclist should have in their tool kit. They include:

- Tire levers (for changing a tire)
- Tire tube
- Tire pump
- Hex wrench
- Lubricant
- Clean-up rag

### NIGHT RIDING EQUIPMENT

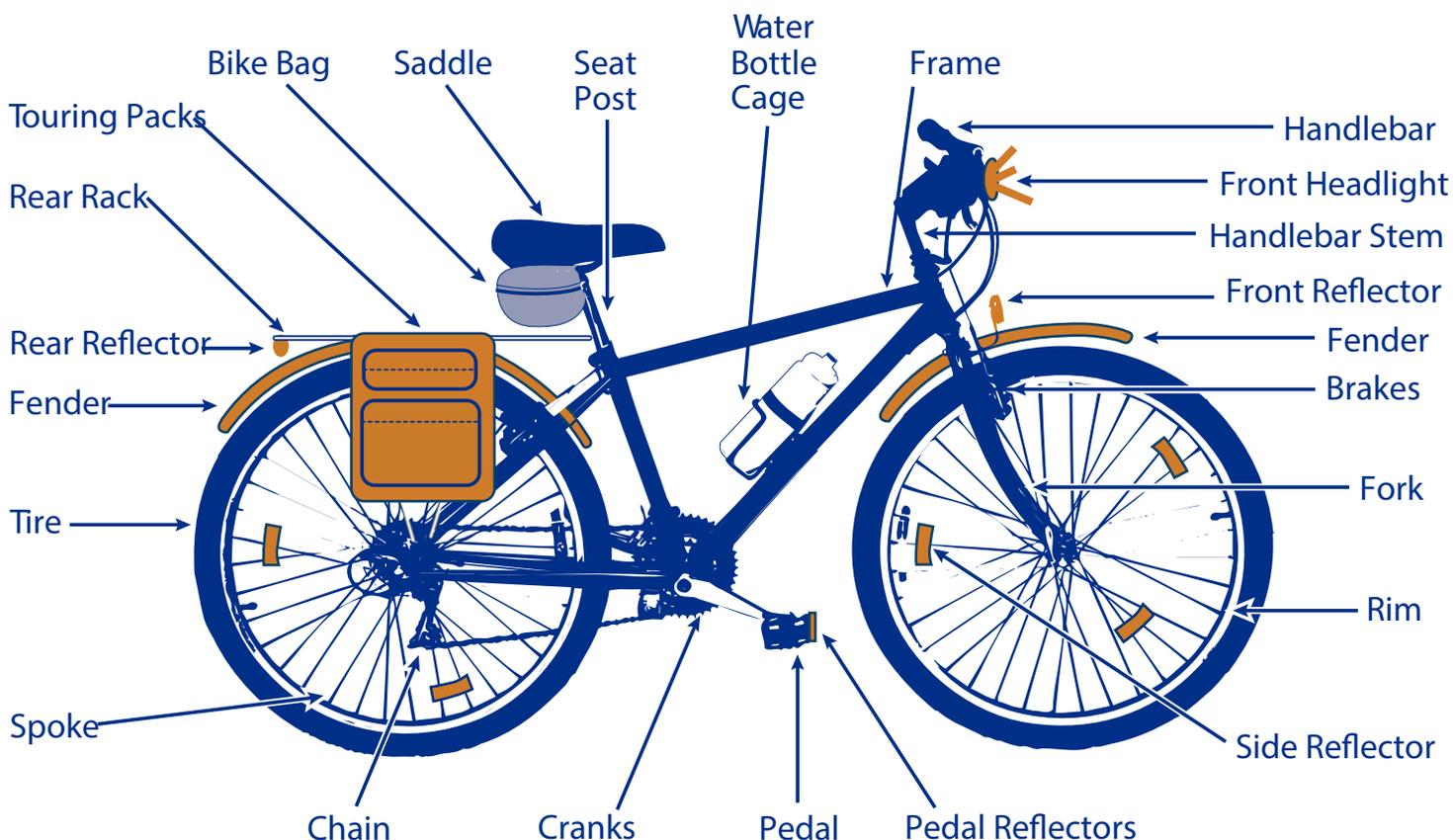
Lights and reflectors will help you see and be seen during night-time riding and times of poor visibility. Texas law states that if you are operating a bicycle at night you must have a lamp on the front of the bicycle that emits a white light that is visible at least 500 feet in front of you. You must also have either a rear red reflector or red light visible from at least 500 feet behind the bicycle.

### Bells and Horns

A good way to announce you are passing is with a bell or pleasant sounding horn that will not startle or anger anyone. Sound your horn or bell or say, "Hello up there, passing on your left," before you pass.

### Reflective Materials

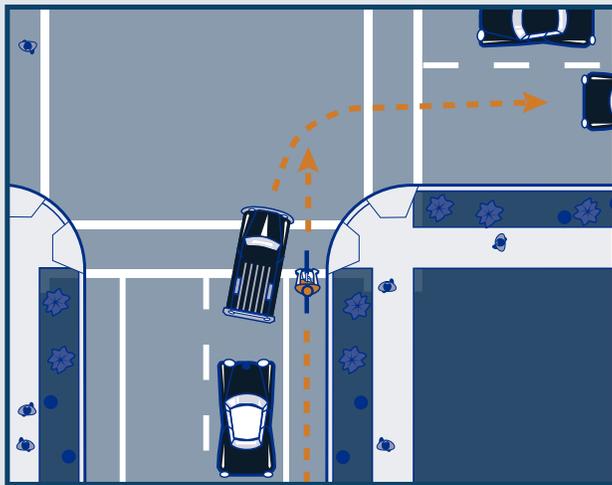
You cannot have too much reflective material, especially at night. Wear it on your helmet, shoes, arms, legs and torso. Reflectors and reflective materials are important even with good lighting because bicyclists are hard to see and motor vehicle drivers may not be thinking to look-out for you. Be safe. Be seen.



## Share the Road

In Texas, on most roadways, motorists and bicyclists are expected to share the road. Both have equal rights and responsibilities to obey all traffic laws.

Bicyclists who violate traffic laws will be subject to the same penalties as motor vehicle drivers.



Check for motorists making right turns.

### BICYCLE SHARE

Bicycle share programs exist in a number of Texas Cities. Bicycle share can be an excellent option for individuals who do not want to maintain their own bicycle. These programs generally offer annual or daily membership options and are great if you are visiting a city or commuting to work and don't want to bring your own bicycle. For more information on availability, do a Web search of your city and "bicycle share."



## Bicycling with Children

### What Parents Should Know

The first bicycle safety education children receive will be from their parents and other adults. Since children perceive traffic situations differently than adults, it is important for adults to teach children about the dangers of traffic. With proper training, bicycle riding can be a safe, healthy, fun activity for the whole family to share. Here are some things to keep in mind when educating children about bicycle safety within the roadway:

- Young children lack well-developed peripheral vision
- Children often have trouble determining the source of a sound; they may hear a car coming, but look the wrong way
- Until about eight years of age, children typically lack a sense of danger and they don't really understand how vulnerable they are
- Children have trouble evaluating cause and effect
- It's difficult for children to identify dangerous situations
- Children have trouble judging the speed and distance of oncoming vehicles
- Children are often restless and eager to go; it's hard for them to stop and wait for traffic
- Children focus on things that are most interesting to them; an ice cream truck may take their attention from another approaching vehicle

*(What parents should know cont.)*

- Children often mix fantasy with reality; they may see cars as friendly creatures or think they can ride faster than a car
- Children often believe grown-ups will look out for them; they may think that because they can see the car, the motorist can see them
- Children are very vulnerable to peer pressure and follow the lead of their friends; many crashes happen when one child takes a risk and a second follows and is hit by a vehicle

### When Should a Child Begin Riding a Bicycle?

Let the child's motivation and motor coordination be your guide. Schedule this event when you can provide the necessary time to train your child. Training wheels only support the rider. Balance is learned on two wheels.

There are many sources to help teach your child safe riding. Contact the League of American Bicyclists, BikeTexas or a certified trainer in your area. Several local service groups, schools and police departments may also provide bicycle training.

### One Size Does Not Fit All

In sizing bicycles for children, they should be able to comfortably straddle the top bar of the frame while standing flat-footed. This should provide a size for good control yet large enough to allow for growth.

### When is a Child Ready to Ride on the Street?

The most effective and fun way to teach your children safe bicycle riding habits is to ride with them. At first, let them follow you as in follow the leader. As they become more able, let them lead while you observe and instruct.

In most instances, a child is ready to ride on the street when they can demonstrate the necessary cycling skills, alertness to traffic and appropriate decision making skills. Until that time, bicycling should be limited to sidewalks, parks and bike paths.

When training your child, give special attention to children's high-risk behaviors.

Make sure they:

- 1. Ride on the right in the same direction as traffic.**
- 2. Stop before riding out of the driveway into the street. Help your child understand that entering the roadway from your driveway can be dangerous.**
- 3. Stop at all stop signs and red traffic lights.**
- 4. Ride predictably. Ride in a straight line and signal all turning movements. Teach children to use hand signals (as shown on page 6), look to the rear and then turn.**

### Transporting Children

The two most common methods of transporting children by bicycle include a bicycle-mounted child seat and a bicycle trailer. Bicycle trailers may be a better choice for a number of reasons. Bicycle trailers are generally more stable than a child seat and tend to remain upright if the bicycle falls over. A trailer should be well reflectorized on the back and sides; a tall orange safety flag and two rear mounted red flashing lights will make a trailer more visible in traffic.

When using a child seat, a bicycle may become harder to manage because of the extra weight of the child and the higher center of gravity. Children risk having their feet caught in the rear spokes and must be taught to hold still because rocking back and forth in the seat makes balancing the bicycle difficult. Load and unload the child by leaning your bicycle against a fixed object. When stopped with a child on board, remember to hold on to the bicycle firmly and maintain good balance by straddling the bicycle.

## Crash Information

We hope that you are never involved in a crash; however, a crash is an unfortunate possibility to consider as a bicyclist.

### What To Do if a Crash Occurs

The instructions below apply to both cyclists and pedestrians in Texas. Consider clipping the crash checklist from the next page and tucking it in your tool kit or bike bag. If you are in a crash, pull out the checklist and follow the instructions.

### When to Call Police

Always call the police when:

- An injury or fatality is involved
- The vehicles cannot be moved
- You suspect one of the drivers is intoxicated
- One of the drivers has no insurance
- One of the drivers leaves the scene

### When to File a Crash Report

If a law enforcement officer is not investigating the crash, you must file a Driver's Crash Report (CR-2) with TxDOT within 10 days from the date of the crash if any of the following conditions apply:

- There are injuries or a fatality
- You suspect property damage of at least \$1,000

These procedures may be necessary to validate an insurance claim.

## Bicycle Crash Checklist

- Call (or ask someone to call) 9-1-1 and ask for the police. Do not hesitate to ask for an ambulance if you are hurt.
- Move your bicycle out of the roadway to a safer place.
- If a motor vehicle is involved, ask the driver to provide his or her address, phone number, vehicle identification number, vehicle license plate number, insurance information and drivers license information.
- Get names and phone numbers of any witnesses — the more the better. A business card is great.
- Stay at the scene until the police arrive. If the driver leaves, he/she may be guilty of hit and run, which is a serious crime. Be prepared to describe the driver.

### When the Police Arrive

- Request that the police take an accident report. A report is required if the crash involves serious bodily injury, death or if more than \$1,000 of total property damage occurs. Below that amount, a report is optional under the law, but you should insist that one be completed. Sometimes, the officer will give you the form to fill out and mail in.
- Get the reporting officer's name, badge number and department and agency.
- If you are hurt, go in an ambulance to a hospital or at least see a doctor to evaluate the severity of your injury.

## Bicycles and the Law

Below is a list of frequently asked questions (FAQ) regarding laws that apply to bicycles:

### What traffic laws apply to cyclists?

#### What traffic laws do not?

Generally, bicycles are entitled to all rights and obligated to all duties of the road that apply to a motor vehicle. (Texas Transportation Code § 551.101, see also Texas Transportation Code, § 541 - 600)

Unless a specific statutory right or duty is altered by Texas Transportation Code Chapter 551 or a right or duty applicable to a driver cannot by its nature apply to a person operating a bicycle, the same laws that apply to an operator of motor vehicle apply to a person operating a bicycle.

A person operating a bicycle, if moving slower than traffic, shall generally ride as near as practicable to the right curb or edge of the roadway. (Texas Transportation Code § 551.103) By definition, roadway does not include the shoulder of the roadway. (Texas Transportation Code § 541.302(11))

A person operating a bicycle shall ride only on or astride a permanent and regular seat attached to the bicycle. (Texas Transportation Code § 551.102(a))

A person may not use a bicycle to carry more persons than the bicycle is designed or equipped to carry. (Texas Transportation Code § 551.102(b))

A person operating a bicycle may not carry any object that prevents the operator from keeping at least one hand on the handlebars. (Texas Transportation Code § 551.102(c))

A person operating a bicycle, coaster, sled or toy vehicle or using roller skates may not attach either the person or the bicycle, coaster, sled, toy vehicle or roller skates to a streetcar or vehicle on a roadway. (Texas Transportation Code § 551.102(d))

Bicyclists must use hand signals to signal their intent to stop, turn left or turn right. (Texas Transportation Code § 545.104-.107)

Every bicycle must be equipped with a brake capable of making a braked wheel skid on dry, level, clean pavement. (Texas Transportation Code § 551.104(a))

A person may not operate a bicycle at nighttime unless the bicycle is equipped with the following:

- Headlamp – a lamp on the front of the bicycle that emits a white light visible from a distance of at least 500 feet in front of the bicycle
- Red Reflector/Red Lamp – A bicycle must be equipped with either a red reflector which is visible from a distance of 300 feet from the rear of the bicycle or a red lamp visible from a distance of 500 feet from the rear of the bicycle (Texas Transportation Code § 551.104(b))

### Is there a state law prohibiting riding a bicycle on sidewalks?

No. However, some local governments may have local ordinances prohibiting bicycles on sidewalks. Bicyclists should contact local law enforcement for more information and be aware of posted signs. Also, a person may stop, stand or park a bicycle on a sidewalk if the bicycle does not impede the normal and reasonable movement of pedestrians or other traffic on the sidewalk. (Texas Transportation Code § 545.302(d))

### Is it legal to park a car in a bike lane?

There is no general prohibition. Whenever parking a car, the driver should check local signs and ordinances. However, an operator may not stop, park or leave standing an attended or unattended vehicle on the main traveled part of a highway outside a business or residential district unless the following is true:

- Stopping, parking or leaving the vehicle off the main traveled part of the highway is not practicable
- A width of highway beside the vehicle is unobstructed and open for the passage of other vehicles
- The vehicle is in clear view for at least 200 feet in each direction on the highway

(Texas Transportation Code § 545.301)

### Does a city or state have a responsibility to maintain a bike lane, path or sidewalk (for example, street sweeping or trimming vegetation)?

Generally, it is the duty of the entity with authority over the highway or road to maintain the roadways on their system. The entity with authority over such lanes, paths or sidewalks should have the same duty.

TxDOT may remove personal property from the right-of-way or roadway of the state highway system if TxDOT determines the property blocks the roadway or endangers public safety. TxDOT may remove the personal property without the consent of the owner or carrier of the property. (Texas Transportation Code § 472.012)

### Are bicycles permitted on interstate highways in Texas?

The Texas Transportation Commission, by resolution or order recorded in its minutes, may prohibit the use of a limited-access or controlled-access highway under the jurisdiction of the commission by a parade, funeral procession, pedestrian, bicycle, electric bicycle, motor-driven cycle or non-motorized traffic.

If the commission adopts a rule prohibiting the use of bicycles on such a roadway, TxDOT shall erect and maintain official traffic-control devices on the portions of the limited-access or controlled-access highway to which the rule applies. (Texas Transportation Code § 545.065)

### If there is a bike path adjacent to the roadway, does a cyclist have to use it or can they use the roadway?

No, provided the bicyclist adheres to all the discussed rules of the road and bicycle laws, bicycles are entitled to all rights of the road that apply to a motor vehicle, including access.

### When is it allowable for a cyclist to “take the lane,” and when is it not?

A person operating a bicycle on a roadway who is moving slower than the other traffic on the roadway shall ride as near as practicable to the right curb or edge of the roadway. However, under the following conditions bicyclists

may take the full lane of travel:

- The bicyclist is passing another vehicle moving in the same direction
- The bicyclist is preparing to turn left at an intersection or onto a private road or driveway
- When there are unsafe conditions on the roadway, including fixed or moving objects, parked or moving vehicles, pedestrians, animals or surface hazards that prevent the bicyclist from safely riding next to the curb or edge of the roadway
- The lane is of substandard width (less than 14 feet in width and not having a designated bicycle lane adjacent to that lane) making it unsafe for a bicycle and a motor vehicle to safely travel side by side

Note: When on a one-way street you can ride to the far left instead of the far right.

Additionally, persons operating bicycles on a roadway may ride two abreast. Persons riding two abreast on a laned roadway shall ride in a single lane. (Texas Transportation Code § 551.103) Persons riding two abreast may not impede the normal and reasonable flow of traffic on the roadway. Also note, you can't make passage of traffic "unreasonably inconvenient." (Texas Penal Code § 42.03)

### **If there is a bike lane does a cyclist have to use it or can he or she use the general travel lane?**

See the previous answer. Because a bicycle is required to stay to as far right as practicable, this could be interpreted to mean if there is bike lane, a cyclist would be required to ride in it, as it would be the far right side of the road. However, if one of the exceptions listed in the previous answer exist, they would be excused from the 'far right' requirement.

### **Where is it appropriate to use shared lane markings (sharrows)? Where is it not?**

The use of sharrows are evaluated on a case by case and project basis by the entity with authority over the highway or road. The 2009 edition of the *Manual on Uniform Traffic Control Devices* (MUTCD) includes a provision for shared lane markings with guidance that the markings should be placed at least 11 ft from the curb face or the edge of the pavement on a street with parallel parking.

On streets with no parking and an outside lane less than 14 ft wide, the centers of the shared lane markings should be placed at least 4 ft from the curb or edge of the pavement. The MUTCD also states The Shared Lane Marking should not be placed on roadways that have a speed limit above 35 mph. Many cities and states have started implementing shared lane markings to encourage the safe coexistence of bicyclists and motorists.

### **What is TxDOT's policy on building sidewalks and bicycle accommodations?**

Sidewalks and bicycle accommodations are evaluated on a case-by-case and project basis. They are considered part of the highway system and will be evaluated by the district engineer in charge of any project.

## **Glossary of Terms**

### **BICYCLE**

A device that a person may ride that is propelled solely by human power and has at least two tandem wheels one of which is at least fourteen inches in diameter.

### **BIKE LANE**

A portion of a roadway or shoulder designated for preferential or exclusive use by bicyclists. A bike lane is distinguished using pavement markings and may include route signage.

### **BIKE ROUTE**

A system of bikeways designating preferred routes for bicycle use by signage, with appropriate directional and informational route markers.

### **BIKEWAY**

A generic term for any road, street, path or way which, in some manner, is designated as being available for bicycle travel.

### **CYCLE TRACK**

An exclusive bicycle facility that has elements of a separated path and an on road bike lane. A cycle track, while still within the roadway, is physically separated from motor traffic and is distinct from the sidewalk.

### **RIGHT-OF-WAY**

The right of one vehicle operator or pedestrian to proceed in a lawful manner in preference to another vehicle operator or pedestrian approaching under such circumstances of direction, speed and proximity as to give rise to danger of collision unless one grants precedence to the other.

### **ROADWAY**

The portion of a highway ordinarily used for vehicular travel, not including sidewalks or shoulders.

### **SHARED USE PATH**

A bikeway physically separated from motorized vehicular traffic by an open space or barrier. Shared-use paths will also be used by pedestrians, skaters, joggers or other non-motorized users (ex: bike path or trail).

### **SHOULDER**

The portion of roadway next to the travel lane that accommodates stopped vehicles, emergency use and provides roadway base. Shoulders, where paved, are used often by bicyclists.

### **TRAIL**

Any paved or unpaved off-street facility specifically designated as being open to bicycle travel and may be shared with other users such as pedestrians, equestrians, skaters, etc.

## Resource Directory

### **TxDOT Bicycle Pedestrian Program**

PTN\_PlanningandTechSppt@txdot.gov  
www.txdot.gov/inside-txdot/modes-of-travel/  
bicycle.html

### **BikeTexas**

512-476-RIDE(7433)  
mail@biketexas.org  
www.BikeTexas.org

### **Texas State Parks**

www.tpwd.texas.gov/state-parks/

### **League of American Bicyclists**

202-822-1333  
www.bikeleague.org

### **National Center for Biking and Walking**

973-378-3137  
www.bikewalk.org

### **Pedestrian and Bicycling Info Center**

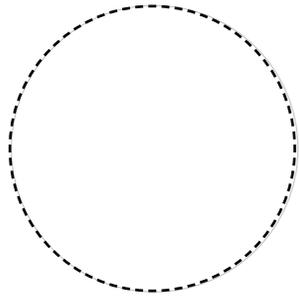
www.bicyclinginfo.org

### **Safe Routes to School National Information Clearinghouse**

1-866-610-SRTS  
www.saferoutesinfo.org

Texas Department of Transportation  
Bicycle/Pedestrian Program

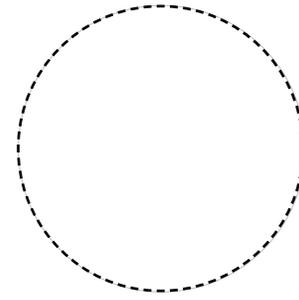




# Bike FRIENDLY. Bike SAFE.

In Texas, a bicyclist has the same rights and responsibilities as the driver of a motorized vehicle. Bicyclists, like motorists, can be ticketed or penalized for not obeying traffic laws.

-  Wear a helmet
-  Obey traffic signs and signals
-  Ride with traffic, never against traffic
-  Ride as far to the right as practicable
-  Use paved shoulders and bike lanes when available and always be on the lookout for road hazards or debris
-  On narrow roads without bike lanes or shoulders, play it safe and ride single-file
-  Ride no more than two abreast when traveling in a shared roadway lane; return to riding single-file if riding two abreast impedes the flow of traffic
-  Use hand signals to indicate what you intend to do
-  Wear bright clothing; when riding early in the morning or at night, use a headlight, taillight and reflectors
-  Use caution when riding at sunrise and sunset; the bright sunlight can make bicyclists difficult to see
-  Make eye contact with drivers whenever possible; never assume motorists see you or that you have the right-of-way
-  Never catch a ride by holding on to or attaching your bicycle to another vehicle
-  Keep at least one hand on the handlebars at all times
-  Do not wear headphones - they block other sounds you need to hear
-  Always expect the unexpected; stay aware and remain focused on your surroundings - your safety and the safety of those around you is your first responsibility

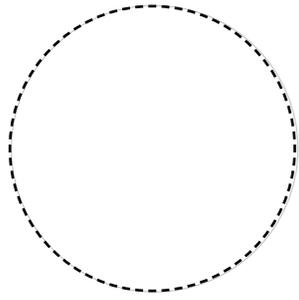


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### Make Sure Your Helmet Fits



Correct Fit

Wrong

Wrong

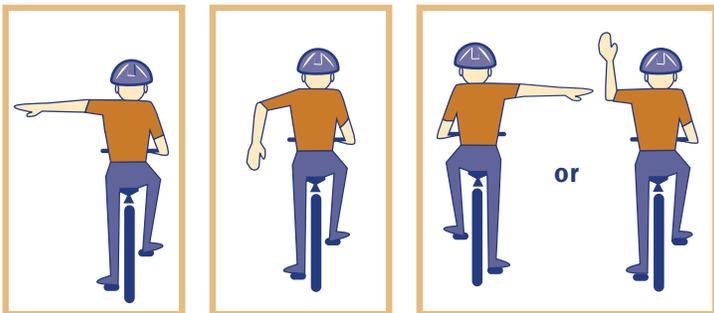
Remember a crash can happen at any time. Wear your helmet every time you ride.

### Night Riding Equipment

Lights and reflectors will help you see and be seen during night-time riding and times of poor visibility. Texas law states that if you are operating a bicycle at night you must have a lamp on the on the front of the bicycle that emits a white light that is visible at least 500 feet in front to you. The bicycle must also have either a rear red reflector or red light visible from at least 500 feet.

### Use Hand Signals

Use the proper hand signals for left or right turns and for slowing or stopping. When turning, you must signal continuously at least 100 feet before the turn and while you are stopped waiting to turn, unless use of your hand is needed to control your bicycle.



Left

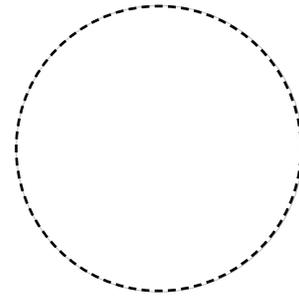
Slow/Stop

Right

For more information on statewide bicycle resources, visit TxDOT's website: [www.txdot.gov](http://www.txdot.gov) | keyword search: bicycle safety



# Bicycle Program



### Make Sure Your Helmet Fits



Correct Fit

Wrong

Wrong

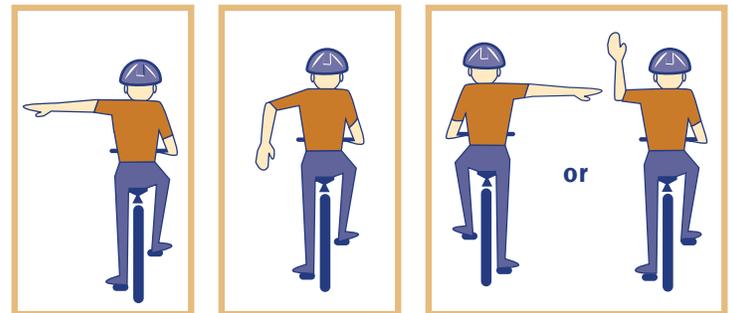
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Left

Slow/Stop

Right

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# Bicycle Program

# AGENDA ITEM 7

# Briefing Materials for TxDOT Bicycle Advisory Committee Strategic Direction Report Workshop

## May 1, 2015 Workshop

The information on the following pages is suggested reading prior to the May 1, 2015 Bicycle Advisory Committee (BAC) meeting. This will help facilitate an informed discussion at the meeting. The briefing pages are not comprehensive in nature; they begin to discuss what TxDOT is currently doing and what could be improved upon to address TxDOT's Strategic Plan goals through its bicycle and pedestrian program.

### Purpose of the Workshop

The workshop with the BAC will provide an overview of the Bicycle and Pedestrian Strategic Direction Report's purpose and give BAC members the opportunity to provide feedback on programs, policies, laws and events that could be implemented in support of bicycling and walking in Texas.

### Workshop Overview

The workshop will be facilitated by consultant staff. Sixty minutes have been allotted to the workshop. The workshop will begin with a ten minute PowerPoint presentation providing an overview of the Strategic Direction Report's purpose and introducing the facilitated exercise to follow.

The facilitated exercise will use flip charts with "Strategic Issue Areas" listed on the top. These issue areas are identical to TxDOT's 2015 – 2019 Strategic Plan goals:

- Maintain a safe system
- Address congestion
- Connect Texas communities
- Become a best in class state agency

BAC members will be asked for ideas on how TxDOT can support these goals with strategies specifically for bicyclists and pedestrians. Staff will write these ideas under the corresponding flip charts. Staff will continue to capture ideas until all ideas are listed or there is only twenty minutes left for the workshop. At that time, staff will distribute ten "dots" to each BAC member; members will be asked to place one dot next to the areas/ideas they identify as areas of most significance for TxDOT.

After the placement of dots, the BAC will be invited to take a five minute break, during that time staff will count up the ideas that received the most dots. That information will be presented on the projector and BAC members will be invited to provide any additional discussion.

### Next Steps

The information obtained from the May BAC Workshop will be used in the development of TxDOT's Bicycle and Pedestrian Strategic Direction Report. A draft of the Report will be sent via email to the BAC members for review prior to the August 2015 BAC meeting.

On the following pages you will find a discussion of what TxDOT is currently doing to support bicycling and walking in Texas or could improve upon. This information is organized under each of the 2015-2019 TxDOT Strategic Plan goals.

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# TxDOT Strategic Plan Goal: Maintain a Safe System

## What it means to TxDOT.

TxDOT lists the following objectives to meet their safety goals.

- Reduce crashes and fatalities on the system through innovations, technology and public awareness.
- Maintain and preserve the transportation assets of the state of Texas.

## What can TxDOT do to maintain a safe bicycle and pedestrian system?

TxDOT has a number of programs and policies in place that support a safe non-motorized transportation system. Some of those programs and policies are noted below along with potential areas of improvement.

### Engineering

On March 23, 2011, John Barton delivered a memorandum to TxDOT district engineers entitled *Guidelines Emphasizing Bicycle and Pedestrian Accommodations* for planners and engineers “...to proactively plan, design and construct facilities to safely accommodate bicyclists and pedestrians.” It is critical that bicycle and pedestrian accommodations be considered and discussed as the need and purpose of a project is defined during the National Environmental Policy Act (NEPA) process, taking into consideration existing and anticipated bicycle and pedestrian facility systems and needs.” Requirements for the provision of facilities were made for both urban and rural settings. These requirements make positive strides toward the provision of facilities for walking and bicycling. Amendments to the Texas MUTCD and TxDOT’s design standards may be needed to better support safe non-motorized infrastructure.

### Education

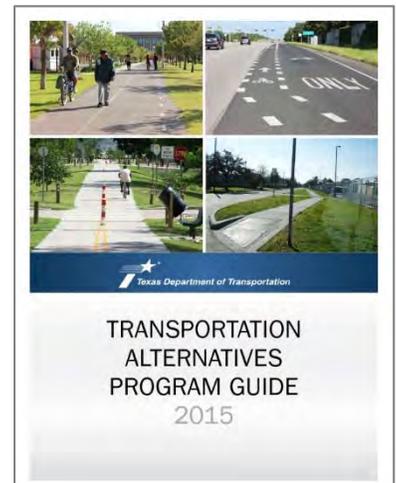
## Drive FRIENDLY. Drive SAFE. Throug h the

*Drive Friendly. Drive Safe. campaign.* TxDOT has customized its “share the road” campaign to educate roadway users to share the road responsibly with pedestrians and bicyclists, exercise caution in work zones and drive at speeds appropriate to road conditions.

TxDOT provides funding for bicycle safety education programs through BikeTexas and Please Be Kind to Cyclists. Additionally, TxDOT is in the process of producing the *Texas Guide to Safe Bicycling*. Additional safety education programs may be recommended to target law enforcement training, driver education and/or support for Safe Routes to School programs.

### Encouragement

TxDOT’s first call for projects under the Transportation Alternatives Program (TAP) closes on May 4, 2015. This program will fund non-motorized infrastructure projects in population areas of less than 200,000 throughout the state. Eligible TAP entities are encouraged to develop projects that support walking and bicycling. Non-motorized safety projects may be eligible for funding through TxDOT’s Highway Safety Improvement Program (HSIP). However, a specific HSIP funding category for bicycle or pedestrian projects does not currently exist. Additional funds could be allocated to bicycle and pedestrian projects and programs throughout the state. TxDOT may consider highlighting outstanding non-motorized projects throughout the state through its bicycle program, to encourage local entities to provide and improve non-motorized accommodations.



## Evaluation and Planning

TxDOT has management systems in place that track crashes throughout the state. Those management systems include bicycle and pedestrian crashes. While the data is continuously evaluated more can be done to identify where safety “hot spots” exist and design effective bicycle and pedestrian programs to reduce accidents. Unfortunately, many bicycle crashes are not reported.

Maintaining bicycle and pedestrian infrastructure is an important safety consideration. When maintenance is not done regularly, facilities can become unsafe for the traveling public. Through the development of a comprehensive database of bicycle and pedestrian accommodations on state owned right-of-way, TxDOT would be able to monitor asset conditions and prioritize investments to build and maintain a safer network for walking and bicycling.

In some cases, facilities that can physically accommodate bicyclists and pedestrians may be unsafe or uncomfortable for walking or biking. An example of this is a roadway shoulder along a high-speed highway. Texas agencies might consider collaborating to develop a bicycle or pedestrian “suitability index” to evaluate how appropriate a facility is for bicycles or pedestrians. In addition, TxDOT might consider developing and maintaining data on ADA facilities to identify gaps and guide future planning and programming decisions.

## Enforcement

Texas has a number of laws in place in support of non-motorized transportation; these laws support bicyclists by giving them the same rights as a motorist and provide them with access to most roadways. However, through additional legislation, Texas could be safer for bicyclists and pedestrians. New legislation could address vulnerable road users, distracted driving, a safe passing distance and helmet use. Laws that are aimed at making it safer to bike or walk must also be enforced. Additional training may be needed for law enforcement across the state.

## What are Others Doing to Improve Safety?

### Training for Engineers and Planners

The Washington DOT offers training to local agencies through the Local Technical Assistance Program. This program offers a variety of courses which have included courses specifically designed to educate engineers and planners on designing safer bicycle and pedestrian infrastructure.

### Bicycle Safety Education Programs

The North Carolina DOT has a safety education program for bicyclists. Materials are organized to target ages. Within each age level, you can find an assortment of pamphlets, handouts, tests, curriculum, information sheets, posters, videos and other miscellaneous items.

Many cities and a couple of states have adopted **Vision Zero** programs, these programs are aimed at reducing injuries and fatalities on all roads.

### Allocating State Funding to Non-motorized Projects

Many states allocate state funding toward bicycle and pedestrian projects. For example, Minnesota has decided to fund a Safe Routes to School Program even after the federal program expired under MAP-21. Maryland DOT has established a Bikeways grant program to fund bicycle infrastructure across the state.

### Locating “Areas of Concern”

Hawaii DOT's Statewide Pedestrian Plan was an outgrowth of its Strategic Highway Safety Plan, which had identified the relatively high rate of pedestrian fatalities on the Hawaii road network. Hawaii prioritized projects in the plan by first looking at locations with identified safety deficiencies (in addition to other criteria such as the location and intensity of pedestrian attractors, and vulnerable populations). By structuring its plan this way, Hawaii focused on its most important goal, which was to improve pedestrian safety statewide.

**Vulnerable Road User Laws:** In most cases, when a pedestrian or bicyclist is seriously injured or killed by a motorist it is considered “an accident” and motorists might expect a minor fine, at most, and receive no criminal penalties. Vulnerable road user laws are enacted to penalize reckless drivers that injure or kill vulnerable road users. At least nine states have adopted Vulnerable Road User Protection Laws, including Nevada, Tennessee, Washington, Oregon, Illinois, Maryland, Delaware, New York and Hawaii. Texas passed one through the legislature in 2009 but it was vetoed by the Governor.

## TxDOT Strategic Plan Goal: Address Congestion

### What it means to TxDOT.

TxDOT lists the following objectives with this goal.

- Partner with local officials to develop and implement congestion mitigation plans in Texas
- Ensure consideration of all modes of transportation in the development of more reliable solutions for moving people and goods

### What can TxDOT do to address congestion?

TxDOT has a number of programs and policies in place that support and promote consideration of non-motorized modes of transportation. Some of those programs and policies are noted below along with potential areas of improvement.

#### Engineering

Non-motorized improvements are often included in congestion mitigation plans. Additional emphasis could be placed on identifying non-motorized projects in these plans and in all highly congested corridors.

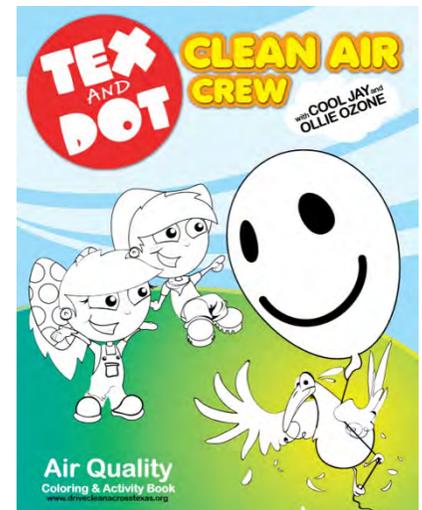
#### Education

TxDOT currently does not have bicycle or pedestrian education or outreach centered on reducing congestion and increasing non-motorized mode share. Many MPOs throughout the state have travel demand management (TDM) programs that educate individuals and employers on the benefits of transportation options. A statewide educational program to get more people to bike and walk to reduce congestion and improve air quality would also be in alignment with TxDOT's Strategic Plan goals.

#### Encouragement

Some states and MPOs promote bicycling and walking as a means to reduce congestion. Whether through statewide bike months, bike-to-work days or other initiatives, these programs aim to encourage individuals to bike or walk and reduce congestion. Some states use Congestion Mitigation and Air Quality (CMAQ) funds for these programs in addition to directly funding bicycle and pedestrian infrastructure.

TxDOT and the Texas Commission on Environmental Quality (TCEQ) launched the statewide [Drive Clean Texas](#) initiative in 2001, with the goal of raising awareness about the impact of vehicle emissions on air quality and motivating drivers to take steps to help keep the air clean. While there is mention of bicycling or walking to reduce congestion and emissions, it is only ancillary and more emphasis could be placed on the overall use of non-motorized transportation in reducing emissions and congestion.



## Evaluation and Planning

Through alternatives analysis in the environmental review phase of project development, planners and engineers must consider bicycle and pedestrian accommodations. Additional emphasis could be placed on the provision of non-motorized infrastructure in the environmental review process.

TxDOT and other transportation agencies have the ability to place additional emphasis on bicycle and pedestrian projects that reduce congestion as part of the scoring criteria used in project selection. Examples might include regionally significant projects, projects that provide facilities to divert peak-hour traffic or projects that provide the “first/last mile” in conjunction with transit, ride share or rail transportation.

## Enforcement

There are few laws or policies that are directly related to congestion reduction and non-motorized transportation. Several states have enacted laws that require additional planning for Greenhouse Gas Emissions (GHG) and air quality, although they are not directly linked to non-motorized programs or planning. Several states have enacted Trip Reduction Laws, these laws enact statewide targets for reductions to vehicle miles traveled (VMT) and often require businesses to offer programs and facilities to employees that incentivize alternative transportation.

## What are Others Doing to Reduce Congestion?

### Engineers and Planning

SB 375 in California links GHG emission reduction targets to regional plans. It requires MPOs to develop sustainable communities’ strategies to meet congestion and air quality targets.

### Education and Encouragement

In Georgia, the Clean Air Campaign, which is funded in part by Congestion Mitigation and Air Quality funds, serves as a statewide non-profit, educating the public on transportation demand management strategies. The Clean Air Campaign offers several programs aimed at reducing congestion through bicycling and walking.

### Allocating State Funding to Non-motorized Projects

Many states allocate state funding toward bicycle and pedestrian projects. Wisconsin DOT funds bicycle and pedestrian projects through its statewide Congestion Mitigation and Air Quality Improvement Program. Projects must reduce vehicle trips or miles traveled, reduce emissions or reduce the per mile rate of vehicle emissions.

### Trip Reduction Law

Washington State’s Commute Trip Reduction Law (CTR) is designed to reduce traffic congestion, pollution and fuel consumption. Employers in major urban areas with more than 100 employees at a worksite are required to develop CTR programs that encourage employees who drive alone to work to consider using an alternative commute mode such as buses, vanpools, carpools, biking, walking, teleworking and flexible work schedules.

### Funding for Congestion Relief Projects

A large portion of Montana’s statewide Congestion Mitigation and Air Quality and Transportation Enhancement programs have gone to bicycle and pedestrian projects. Montana recognizes that “bicycling and walking can provide alternative means of transportation and have the potential to help to reduce roadway congestion and air pollution in some areas.”

# TxDOT Strategic Plan Goal: Connect Texas Communities

## What it means to TxDOT.

TxDOT lists the following objectives with this goal.

- Support efficient multimodal options that serve the transportation needs of metropolitan, urban, and rural communities and their economies
- Improve freight movement, enhance international trade, and expand access to markets to support the economic competitiveness of Texas

## What can TxDOT do to connect Texas communities?

TxDOT has a number of programs and policies in place that promote consideration of non-motorized modes of transportation. Some of those programs and policies are noted below along with potential areas of improvement.

### Engineering

As mentioned previously, John Barton's March 23, 2011 [memorandum](#) directs district engineers to consider bicycle and pedestrian improvements in the NEPA process, during project scoping and in the development of project plans, specifications and estimates (PS&Es). Additional engineering guidelines may be recommended to develop support for non-motorized modes. Amendments might be considered to the Texas MUTCD and TxDOT's design standards may be needed to better support development of non-motorized infrastructure. Additional emphasis could be placed on providing non-motorized accommodations to connect communities, some facilities having regional significance.

Context Sensitive Solutions (CSS) or Complete Streets (CS) guidance or policies could establish requirements for the inclusion of non-motorized infrastructure on or near TxDOT roadways. Although TxDOT does not currently have a stand-alone CSS or CS policy, many states and local governments do. Studies have found strategies such as reducing speed limits and making engineering changes including roundabouts and pedestrian medians can significantly reduce pedestrian and bicyclist crashes with severe injuries and deaths. Additionally, engineering studies have found that American cities with more bicycle- and pedestrian-friendly infrastructure see more bicycling and walking. These activities contribute to a healthier and more social community (i.e. an improved quality of life).

### Education

TxDOT currently does not have bicycle or pedestrian education or outreach centered on connecting Texas communities. If TxDOT were to improve upon current programs, they might consider implementing a statewide education program to get more people to use bicycles or walk, this might be most applicable to "first and last-mile" considerations such as providing bicycle and pedestrian facilities near rail and transit stations and near park-and-rides lots.

Statewide bicycle and pedestrian funding opportunities might be prioritized toward projects that promote regional connectivity and coordination between neighboring jurisdictions.

### Encouragement

Bicycle and pedestrian infrastructure promote walkable and livable communities. Some states encourage smart growth policies that promote connectivity between communities. Development of intergovernmental coordination requirements for transportation and land use planning may be appropriate to encourage communities to work together and provide connected transportation systems. This can be very beneficial for regional growth.

## Evaluation and Planning

TxDOT has an inventory of roadway infrastructure throughout the state; the creation of an inventory of bicycle infrastructure is being planned by TxDOT. This will help TxDOT identify where planned bikeways exist and where there are gaps that should be addressed to better connect communities.

The state of Texas currently does not have a local assistance grant program for planning. Such a program would provide incentives for localities to produce their own plans, which should include non-motorized transportation elements.

Each TxDOT district office has a bicycle coordinator; this person serves as a resource at the district on bicycle projects and programs. Although the District Bicycle Coordinator should be knowledgeable of local projects and help serve as a regional resource, for most, this job is only one of many hats they wear. Through the development of a database of regionally planned projects, District Bicycle Coordinators could serve as the “go-to” person in each district to ensure proper coordination is occurring between localities, MPOs and the state.

Many Texas cities have designated bicycle routes. Some cater more to recreational users while other routes are more suited for the commuter bicyclist. TxDOT does not have many designated bicycle routes on the state highway system. However, TxDOT, in coordination with localities, could designate bicycle routes throughout the state. These routes may cross jurisdictional boundaries and could bring consistency to future development, maintenance and help users navigate. In addition, design requirements (width, surface type, accessibility and safety considerations) should be developed based upon roadway traffic volumes, posted/actual speed, and vertical/horizontal alignment to accommodate the average cyclist.

## Enforcement

TxDOT’s ability to enforce laws and policies directed at connecting Texas communities through bicycle and pedestrian infrastructure is limited. However, through incentive programs and policies, TxDOT can help encourage localities and its districts to provide facilities that help connect communities and provide access.

## What are Others Doing to Connect Communities?

### Complete Streets

30 states have Complete Streets policies in place. These laws, resolutions, agency policies, and planning and design documents establish a process for selecting, funding, planning, designing, and building transportation projects that allow safe access to destinations for everyone, regardless of age, ability, income or ethnicity, and no matter how they travel. West Virginia adopted their Complete Streets Act in 2013. The Act states “All transportation projects receiving federal or state funds should strive to improve safety, access and mobility for users of all ages and abilities, defined to include pedestrians, bicyclists, public transportation vehicles and their passengers, motorists, movers of commercial goods, persons with disabilities, older adults and children.” West Virginia created a Complete Streets Advisory Board to make recommendations to the Division of Highways on implementing the policy as well as tracking and reporting on progress in the state.

### Livability Index

AARP developed a [livability index](#) which measures the quality of life in American communities across multiple dimensions: housing, transportation, neighborhood characteristics, environment, health, opportunity and civic and social engagement. The livability index allows users to compare communities. [Walk Score](#) is another tool that ranks the walkability of areas across the country.

### Supporting Livable Communities

LiveWell Colorado’s community investments strategy funds community coalitions working on healthy eating and active living strategies at the local level. LiveWell Colorado provides technical assistance and opportunities for shared learnings and collaborations. Since 2005, the community investments program has directly benefited more than a million Coloradans by implementing policy and environmental interventions critical to making health eating and active living the accessible and easy choice. Many implemented projects focus on active transportation. For example, in Wheatridge, CO, LiveWell funded an evaluation of where gaps existed for bicycle commuters.

# TxDOT Strategic Plan Goal **Become a Best in Class State Agency**

## What it means to TxDOT.

TxDOT lists the following objectives with this goal.

- Ensure the agency deploys its resources responsibly and has a customer service mindset
- Focus on work environment, safety, succession planning, and training to develop a great workforce

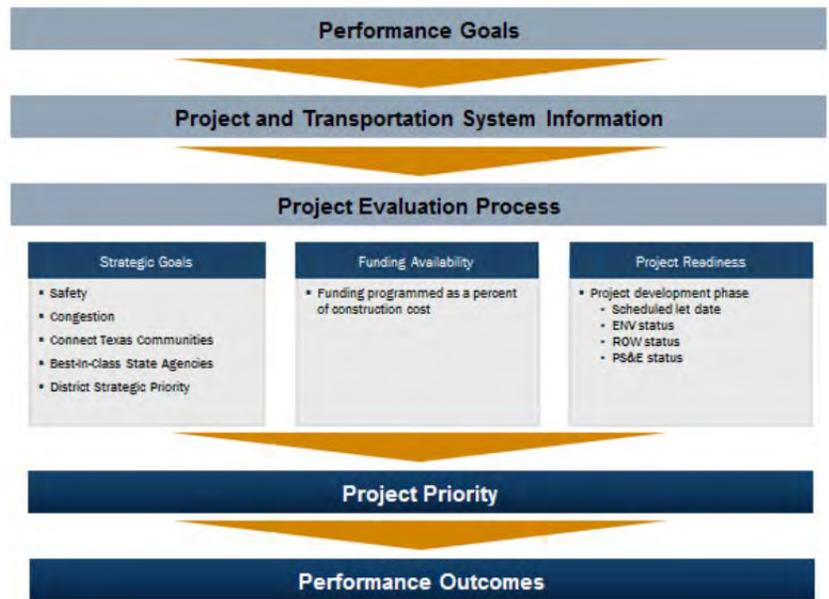
## What can TxDOT do to connect Texas communities?

TxDOT has a number of programs and policies in place that support and promote the consideration of non-motorized modes of transportation. Some of those programs and policies are noted below along with potential areas of improvement.

### Engineering

TxDOT is responsible for a vast multi-modal transportation system. There are not enough funds to maintain the current system in good or better condition into the future while also providing for new infrastructure. In order to best meet the needs of a growing state, TxDOT will have to make tough choices about where to spend money. Through performance-based planning, TxDOT can evaluate multi-modal projects against each other and promote the best investment package. This will include bicycle and pedestrian infrastructure. Performance-based planning will help TxDOT deploy its resources responsibly. Currently, TxDOT is in the process of developing a pilot performance-based project evaluation tool that evaluates multi-modal projects across the state.

### Linking Performance Based Planning to Project Selection



Source: Texas Transportation Plan 2040

While training opportunities exist for planners and engineers on the provision of non-motorized infrastructure, additional training could help the agency stay current on emerging engineering practices and develop the best non-motorized facilities for users.

### Education

TxDOT has educated the public through the most recent Transportation Alternatives Program (TAP) call for projects, many additional funding sources exist for localities looking to fund bicycle and pedestrian infrastructure. If improving conditions for walking and bicycling become a priority for the agency, TxDOT will need to develop materials and tools (website, newsletter, etc.) to educate and inform localities, advocates, and the general public about funding opportunities, programs, emerging trends or exciting projects.

## Encouragement

TxDOT has an opportunity to serve as a leader when it comes to encouraging their employees and contractors to bike and walk whenever possible. Developing an employer-based transportation demand management program has numerous benefits for the agency including:

- Improved employee wellness
- Reduced facility costs (less parking required)
- Happier employees
- Smaller environmental footprint
- Cost savings for employees

The agency could assign transportation coordinators at each office and develop a toolkit for those coordinators to help implement an agency-wide program.

## Evaluation and Planning

TxDOT has impressive management systems in place that catalog facilities, crashes, forecasted travel demand and programmed projects. Ensuring that these management systems talk to one another will lead to better planning decisions.

TxDOT has the opportunity to become the “go-to” agency for bicycle and pedestrian information in Texas. The agency is in the process of developing a statewide bicycle map and a number of other initiatives to lead the way in promoting safer bicycle and pedestrian transportation.

Best practices need to be established for the provision and maintenance of bicycle and pedestrian infrastructure owned or funded by TxDOT. Additionally, bicycle and pedestrian count data is collected inconsistently and not at regular intervals or locations across the state. A best practice manual could be developed with guidelines for collecting count data; TxDOT or another agency could serve as the repository for that data for the state. Just like motor vehicle counts, counting bicyclists and pedestrians at specific locations helps to more accurately estimate demand, measure the benefits of investments, and design projects. This information will also help TxDOT improve traffic models.

## Enforcement

The state of Texas could benefit from enacting a number of laws to support being a safer place to bike and walk. Other states have a number of laws in place that support non-motorized transportation. A number of cities across the state have enacted laws that are leading the way to promote non-motorized transportation.

## What are Others Doing to Connect Communities?

### Training for Engineers and Planners

The [Michigan DOT](#) offers “Training Wheels” courses around the state designed to educate communities interested in providing on-road bicycle facilities.

### Serving as a Statewide Resource

The [Ohio DOT](#) has developed a statewide listserv to communicate updates and provide technical information with the bicycle and pedestrian community.

### Statewide Bicycle Map

Many states maintain statewide bicycle maps. The Missouri DOT maintains statewide and regional bicycle maps that include information on Amtrak stations, bus stations, camping locations and hospitals. These maps can be downloaded from the [Missouri DOT website](#).

### Counting on Bicyclists

The [Washington State Documentation Project](#) occurs annually in the early fall. Bicycle and pedestrian usage of specific intersections in cities throughout the State are counted and documented, similar to the [National Documentation Project](#).

### An Idaho Stop

In [Idaho](#), if a cyclist approaches a stop sign, he or she needs to slow down and look for traffic. If there's already a car or another bike there, then the other vehicle has the right of way. If there's no traffic, however, the cyclist can slowly proceed. Basically, for bikers, a stop sign is a yield sign. If a cyclist approaches a red light, meanwhile, he or she needs to stop fully. Again, if there's any oncoming traffic, it has the right of way. If there's not, the cyclist can proceed cautiously through the intersection. Put simply, red light is a stop sign.



# WORKSHOP

## Bicycle & Pedestrian Strategic Direction Report

May 1, 2015



## Workshop Purpose

- Provide an overview of the Strategic Direction Report
- Get your feedback on bike/ped strategies to be considered by TxDOT



# What is the Strategic Direction Report?

- The Strategic Direction Report will provide TxDOT with:
  - Short-term guidance in developing the bicycle and pedestrian program
  - A reference document for staff, policy makers and stakeholders
- It will not identify specific bike/ped projects or corridors, it is a policy-level document



# Texas Strategic Direction Report Framework

- Focus areas for TxDOT
  - Goals, focus areas, strategies
- Existing conditions and trends
- Recommendations and next steps for TxDOT



# Framework for Strategic Direction Plan

## Goals

TxDOT 2015 - 2018 Strategic Plan

Maintain a Safe System

Address Congestion

Connect Texas Communities

Become a “Best in Class” State Agency

Emphasis areas/organization to be developed

## Strategies

Policies, programs and initiatives that support bicycle and pedestrian activities

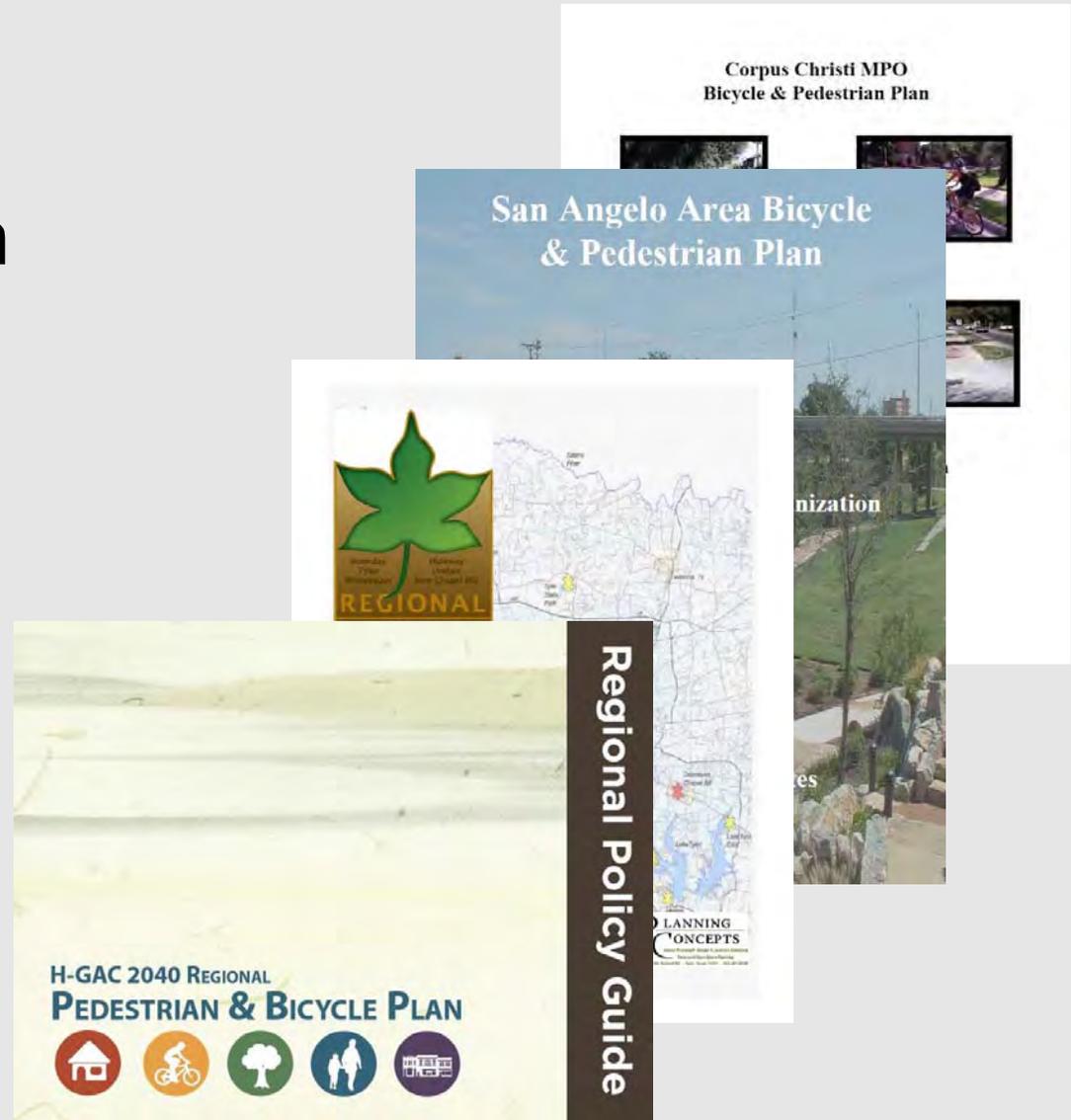
# Bicycle & Pedestrian Plan Research - Other States

- 30 states have adopted plans
- 2 states have plans underway
- Most plans are policy-level plans
- Most states include emphasis on safety and increasing mode share



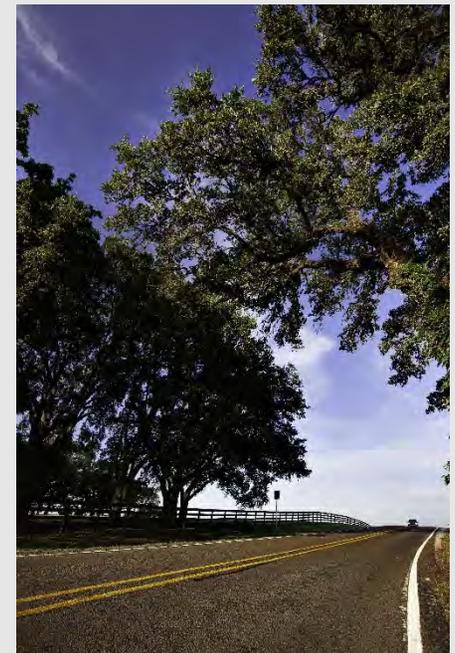
# Bicycle & Pedestrian Plan Research – Texas MPOs

- 10 MPOs have bicycle/pedestrian plans (40%)
- 6 include goals and/or objectives
- Plans vary greatly



# Brainstorming Exercise

- List strategies that support bicycle and pedestrian transportation
- Include long- and short-term ideas



## Brainstorming Exercise

What can TxDOT do to improve bicycling and walking in the state?

Maintain a Safe System

Connect Texas  
Communities

Address Congestion

Become a “Best in  
Class” State Agency

Engineering, Enforcement, Education,  
Encouragement, Evaluation & Planning

# Prioritizing Ideas

- Each of you have 10 dots
- Places one dot next to the areas/ideas of most significance for TxDOT



**Thank You**



# Sample ideas

## Maintain a Safe System

- Increase the number of bicycle facilities
- Develop safety education curriculum
- Fund more bike/ped projects
  - Establish a category for dedicated funding
- Develop and maintain bike/ped management systems
- Support laws that make bicycling and walking safer

## Address Congestion

- Fund more bike/ped projects
- Include bicycle and pedestrian modeling in planning
- Develop statewide Transportation Demand Management program
- Inventory bikeways on state maintained roadways

## Connect Texas Communities

- Include bicycle and pedestrian modeling in planning
- Adopt statewide Context Sensitive policy
- Perform statewide needs analysis
- Incentivize smart growth
- Statewide bicycle routes

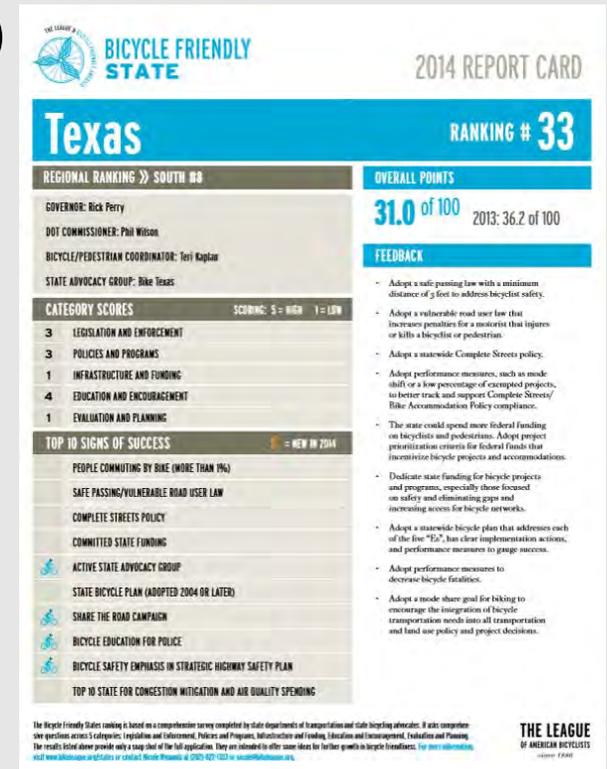
## Become a “Best in Class” State Agency

- Develop TxDOT employer Transportation Demand Management program
- Training for engineers and planners
- Serve as point-of-contact for bike/ped

# League of American Bicyclists Top 10 Signs of Success

- People community by bike (more than 1%)
- Safe passing and vulnerable road user laws
- Complete Streets policy
- Committed state funding \*
- Active state advocacy group \*
- State bicycle Plan (adopted 2004 or later)
- Share the road campaign \*
- Bicycle education for policy
- Bicycle safety emphasis in Strategic Highway Safety Plan

\* Indicates Texas has this in place



# Strategic Direction Report Outline - Implementing the Report

## Example of what the implementation chapter may look like

Goal	Strategy	Responsible Party	Time frame	Action
Maintain a Safe System	Identify and provide information for on-system facilities	TxDOT	1-2 years	Develop statewide bike map
	Provide more safe bicycle facilities	TxDOT	5 years	Stripe bicycle lanes on high-priority corridors throughout state
	Provide bicyclists and pedestrians with legal protections	Legislature, BikeTexas	5 years	Pass vulnerable road user legislation
	Promote safe bicycling	TxDOT	5 years	Sponsor and promote statewide Bike-to-Work Day events
	Monitor bicycle usage	TxDOT	2 years	Develop bicycle count guidelines and clearinghouse for state

The Report will give TxDOT a list of short-term strategies, policies and programs that can be implemented to support bicycle and pedestrian travel.

# Report Outline

- Introduction, background and purpose
- Report “focus areas”
  - Review of existing goals and objectives, strategies, policies, programs and performance measures
  - Development of strategies (policies, programs, events, laws)
- Existing conditions/trends
  - Review of current bicycle/pedestrian Plans
  - Review of current bicycle and pedestrian policies at TxDOT along with best practices
  - Bicycle and pedestrian data
- Implementation and next steps
  - Strategies, policies and programs
  - Project selection