# **Pedestrian Trees:**

A Case Study in How to Pick Low-Hanging Fruit for

Improving Safety & Multi-Modal Last Mile Connections to Transit

Josh Smith, Project Manager, Lee Engineering

## Pedestrian and Bicycle Routes to Rail Stations





### ACTUAL WALKSHED

## 0.5 mile walkshed on a connected sidewalk route

The actual 0.5 mile walkshed is often much less coverage than the 0.5 mile radius



### ACTUAL WALKSHED

0.5+ mile walkshed on a connected sidewalk route

The 0.5 mile radius may require a much further actual walking distance on existing sidewalks.



### ACTUAL WALKSHED

Other sidewalks disconnected from the network



### FTA Planning Pilot Program for Transit-Oriented Development

Partnership

NCTCOG, DART, Cities of: Dallas, Garland, Plano, and Richardson

#### Transit Project

DART Red and Blue Lines Platform Extensions (28 stations built before 2004)



## FTA Planning Pilot Program Scope of Work



Task 1. Routes to Rail Stations Connectivity



### Task 2. TOD Parking Utilization Study



Task 3. TOD Resident / Employee Survey

## FTA Planning Pilot Program Scope of Work



### Task 1. Routes to Rail Stations Connectivity

Goal:

Identify sidewalks and sidewalk improvements to maximize access for potential transit riders



Menu of Improvements for the Access and Safety of Potential Riders

> Recommended Improvements and preliminary cost estimates

> > Preliminary Engineering





#### 

## Criteria And Weighting Proposed Improvements

Criteria	Weight
Employment and Population Density (Number of potential riders connected by the improvement's catchment area)	50
Distance / Proximity of Improvements to the Station	25
Walkshed Trip Length Reduction (Catchment area benefitting from a reduced walk distance to the station)	5
Land Use Types and Key Destinations (e.g. schools, government buildings, social services, hospitals, large shopping centers, parks)	5
Crash History (Number of crashes in the general area of the project improvement)	5
Safety Benefit (Speed limit as a surrogate for systemic safety of the project improvement)	5
Equity / Transit Dependent Populations (Minority households, % below poverty line)	5





## **Station Recommendations Matrix**

Station Impro	vements Mat	rix tion		Improvement Code Legend           ID: 1A-PR-ST-01           1A ← Station Number         ST ← Station Improvement           PR ← Station Abbreviation         ∧	North Central Texas Council of Governments DART Red & Blue Line Corridors Last Mile Connections	51							
Location ID	Ownership	Project Type	Description	01									
1A-PR-ST-01	DART	Lighting	Add pedestrian lighting fo	for area where tree cover makes for dark nighttime conditions.		\$	68,100						
1A-PR-ST-02	DART	Fencing	Close gap in hedges that a an inappropriate location	appears to imply this as a valid location for crossing the bus loop. Co n for a crossing. A fire hydrant here is likely the reason for the gap in	insider fencing to redirect pedestrians. The lack of ramps or a crosswalk across the bus loop here makes this the hedges, so fire hydrant access from the bus loop should be preserved.	\$	700						
1A-PR-ST-03	DART	Multi-Use Trail	Add Regional Veloweb sh Concrete drainage swales	hared use path to connect platform more directly to Parker Road to the solution of the solutio	e north. Will require grading, new fence between parking lot and tracks, and drainage modifications. s proposed path alignment, so additional study will be required.	Sepa	rate Project						
1A-PR-ST-04		Bicycle Parking	Add educational signing a	at all covered bike parking locations regarding rules of use. Existing (	overed bike parking lids were locked. Several of the locked lids were empty without bikes inside or were	\$	700						
1A-PR-ST-05	Image: control of the lock dot in the problem of the state of the instance of the instance of the instance of the problem of the state of the sta												
1A-PR-ST-06	DART	Bicycle Parking	Add additional covered b	oike parking, preferably closer to train platform (at Location 4).		s	17,400						
1A-PR-ST-07	DART	ADA Ramp or Relocate ADA Parking	Relocate ADA parking fro Ramps are absent for Much of the ADA park southwest of the platf The lack of ramps nea more direct route via	om Location 7 closer to the north crosswalk to the train platform (near crossing the southbound tracks east of the bus loop (near Location 6 king for the station is in the small parking lot immediately west of the form near Location 14. ar Location 6 requires passengers in wheelchairs to travel to the comp the central crosswalk.	r Location 3). Reasons for this change are: ). bus loop (Location 7 and southwest of Location 10). Some ADA parking is already located liant crosswalks at the north or south ends of the platform (Locations 7a or 7b) rather than the	\$	32,600						
1A-PR-ST-08 1A-PR-ST-09	DART	Crosswalk Markings	Add 12" white markings on each side of brick paver crosswalks. Bus loop crosswalks are stop-controlled, but need white markings outside the brick area to be legal crosswalks.										
1A-PR-ST-10	DART	Crosswalk Signs and Markings	Add pedestrian warning s	signs and 12" white markings outside brick pavers for Kiss & Ride cros	swalk. (Crosswalk is raised to slow drivers but not signed or marked.)	\$	1,900						
1A-PR-ST-11	DART	Sidewalk Repair	Correct trip hazard on sid	dewalk.		\$	700						
1A-PR-ST-12	DART	Landscaping	Trim hedges or replace w	with easier maintenance plants so they don't encroach on sidewalk.		\$	6,900						
1A-PR-ST-13	DART	Landscaping	Close hedge gap that prov Provide bike parking close	ovides access to existing covered bike parking (at Location 5). Gap in h ser to platform as indicated at Location 4 above.	edges is convenient for bicycle access to existing covered parking, but lacks ramps and conflicts with bus loop.	\$	400						
1A-PR-ST-14	DART	Multi-Use Trail	Add new shared use path	h connecting platform more directly to Park Blvd to the south on plan	ned Regional Veloweb alignment. May require relocation of utilities or removal of trees and/or parking spaces	. Sepa	rate Project						
Opinion of Pr	obable Cost -	DART Subtotal				\$	131,200						

## **Crash History**

- Only 8 crashes in 5-year history in Parker Rd Station area
- Doesn't mean there isn't real safety risk
- Considered but dismissed idea of differentiating by severity



## Systemic Safety

- > Use posted speed limit (adjacent or crossing) as surrogate measure
- > Could have used:
  - Number of lanes crossed
  - Traffic volumes
  - Crossing vs.
     walking along street?



## Which tree is more comfortable to climb?





## Which tree is more comfortable to climb?





## Pedestrian Level of Traffic Stress (Comfort)

- > Similar to Bicycle Level of Traffic Stress
- > Adapted for pedestrians by Oregon DOT
- > PLTS 1 islow stress
- > PLTS 4 is high stress
- Results for sidewalks
   & crosswalks
- > Tested at one station



## Pedestrian Level of Traffic Stress (Comfort)

- > Good results, but level of effort high for 28 stations (22 sq. mile area)
- > Lots of back-and-forth between GIS (Network Analyst) and Excel
- GIS coding needs to be precise
- Relationships between PLTS and walk-to-transit mode choice were speculative
- Research would be beneficial



## Unsignalized Crosswalk Improvements

- Nine options considered per FHWA's 2018 "Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations"
- Options to consider vary based on:
  - Number of lanes to cross
  - AADT
  - Speed

Table 1. Application of pedestrian crash countermeasures by roadway feature.

	Posted Speed Limit and AADT																									
		Vehicle AADT <9,000								Ve	Vehicle AADT 9,000-15,000									Ve	hicl	e A/	DT	>1	5,00	)0
Roadway Configuration		0 n	nph	35	m	ph	≥40 mph			≤30 mph			35 mph			≥40 mph			≤30	) m	nph	35 mph			≥40 r	
<b>2 lanes</b> (1 lane in each direction)	<b>0</b> 4	2 5	6	0	5	6	0	5	6	<b>0</b> 4	5	6	0	5	6	0	5	6	<b>0</b> 4	5	6	0	5	6	0	5
<b>3 lanes with raised median</b> (1 lane in each direction)	<b>0</b> 4	2 5	3	7 0 7	5	9	0	5	0000	0 4 7	5	3	0	5	9 6 0	0	5	0	7 0 4 7	5	9 9	0	5	9 8 0	0	5
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	<b>0</b> 4 7	2 5	3 6 9	<b>0</b> 7	5	6 9	0	5	6 6	0 4 7	5	3 6 9	0	5	6 6	0	5	6 0	0 4 7	5	6 9	0	5	6 0	<b>0</b> 5	6
4+ lanes with raised median (2 or more lanes in each direction)	<b>0</b> 7	5 8	<b>0</b> 9	<b>0</b> 7	5 8	<b>8</b> 9	0	5 8	8	07	5 8	<b>0</b> 9	0	5 8	0	0	5 8	0	0	5 8	0	0	5 8	0	0	58
4+ lanes w/o raised median (2 or more lanes in each direction)	<b>0</b> 7	5 8	6 9	<b>0</b> 7	5 8	8 0 9	0	58	800	0 7	5 8	<b>0</b> 9	0	5 8	800	0	5 8	8 0 0	0	5 8	000	0	5 8	0000	0	5 8
<ul> <li>Given the set of conditions in a c</li> <li># Signifies that the countermed treatment at a marked uncor</li> <li>Signifies that the countermed considered, but not mandate engineering judgment at a m crossing location.</li> <li>O Signifies that crosswalk visibilities always occur in conjunction w countermeasures.*</li> <li>The absence of a number signifies is generally not an appropriate the considered following angineering.</li> </ul>	ell, asur asur asur d or nark y er vith es th eatr	re is led re sl rec ed i har othe	s a c cro hou quir unce ncer ic the	cand ssing Id al ed, b ontro ment lenti cour out e.	ida g la wa bas blle s sl fiec nte	nte bocat ys t ed u ed houl d rme	tion. De upor Id easu	n re ma	у	1 2 3 4 5 6 7 8 9	Hig cro an Ra Ad an In- Cu Pe Ro Pe	gh-v ossv d cr isec van d vi Stre des ctar ad l des	risib valk oss d cross ce Y eld triar ngul Diet triar	ility ap ina ossv ielo (sto Pede nsio n re ar F	verce proce war walk walk d He pp) 1 estri pn fuge apie	re Ti an ( an ( d-Flo d Be	alk ade a sid o (S Cros and ashi	mai equc stop ssine ing E	rkinç ite n Hen g siç 3eaa	gs, nigh e Fo gn con	park httin or)   (RF	king he li Pede	res ghti estr	tricting	tions leve	s c Is,

This table was developed using information from: Zegeer, C.V., J.R. Stewart, H.H. Huang, P.A. Lagerwey, J. Feaganes, and B.J. Campbell. (2005). Safety effects of marked versus unmarked crosswalks of uncontrolled locations: Final report and recommended guidelines. FMVA, No. FHVA-HRT-04-100, Washington, D.C.; FHVA. Maruai on Unitom Traffic Control Devices, 2009 Edition. (revised 2012). Chapter 4F, Pedestrian Hytrid Beacons. FHVA, Washington, D.C.; FHVA-RCrash Modification Factors (CMF) Cleaninghouse. http://www.articleaninghouse.org/; FHVA. Pedestrian Sofely Guide and Countermeasure Selection System (FEDSAFE). http://www.padbitesate.org/PEDSAFE/. Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Strift, C. Sundstrom, N.J. Thirsk, J. Zegeer, C. Lyon, E. Ferguson, and R. Van Houten. (2017). NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.; Thomas, Thirsk, and Zegeer. (2015). NCHRP Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways. Transportation Research Board, Washington, D.C.; on personal Interviews with selected pedestrian sofely practitiones:

#### Pedestrian Routes to Rail - Parker Road Station

Last Updated: February 2015





#### **Project Overview**

The Pedestrian Routes to Rail study identifies all existing pedestrian facilities within a half-mile radius of existing light rail and commuter rail stations in the Dallas-Fort Worth region based on 2014 data. ArcGIS Network Analyst tool was used to identify continuous facilities that are less than or greater than a half-mile actual walking distance to a station. The maps also reflect existing facilities that are disconnected due to gaps or other barriers not allowing a continuous pedestrian route to a station. The maps do not reflect the condition or ADA compliance of the existing infrastructure. More information on the Routes to Rail study and methodology is available at:



#### **Pedestrian Routes to Rail - Parker Road Station**



















# Questions

**Kevin Kokes Program Manager** Sustainable Development Lee Engineering **NCTCOG** 817-695-9275 kkokes@nctcog.org



### **Josh Smith**

**Project Manager** 972-456-9044 jsmith@lee-eng.com

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**Improving Multimodal** Last Mile Connections to Transit