Mapping Pedestrian Networks and Density to Improve Transit

Kevin Kokes, AICP

Mobility 2045

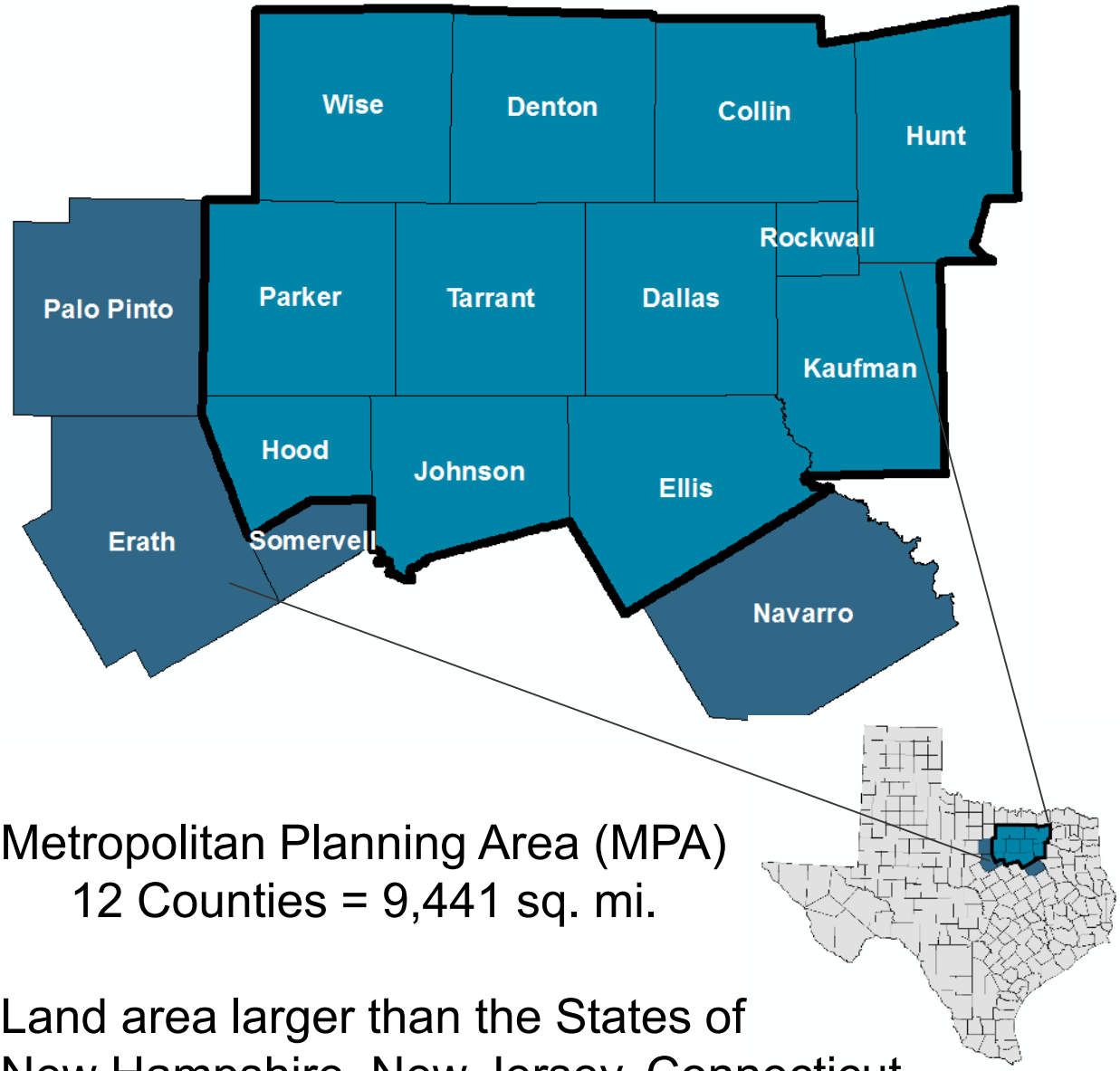
North Central Texas Council of Governments

Public Works Roundup

May 21, 2019

North Central Texas Council of Governments

MPO for the Dallas-Fort Worth Region



Metropolitan Planning Area (MPA)
12 Counties = 9,441 sq. mi.

Land area larger than the States of New Hampshire, New Jersey, Connecticut, Delaware, and Rhode Island

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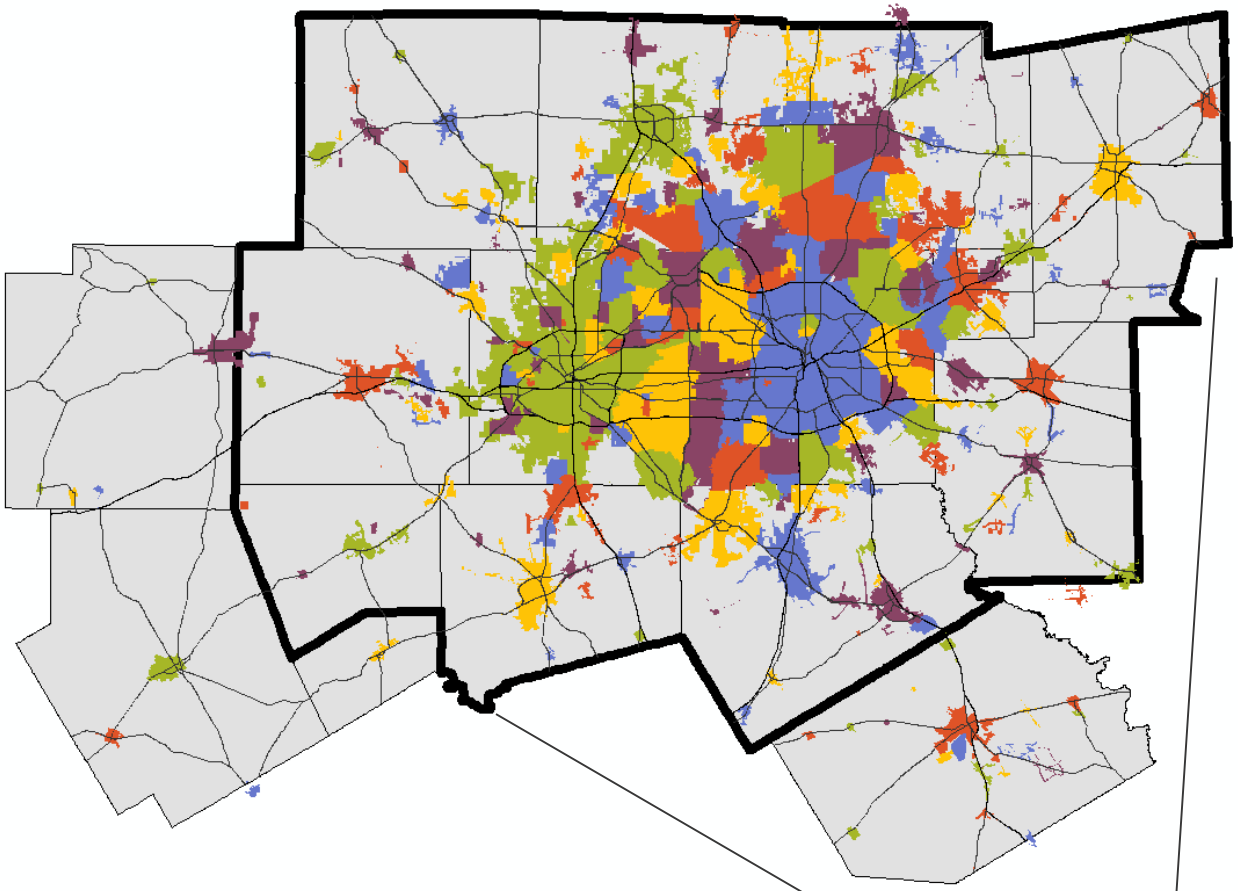
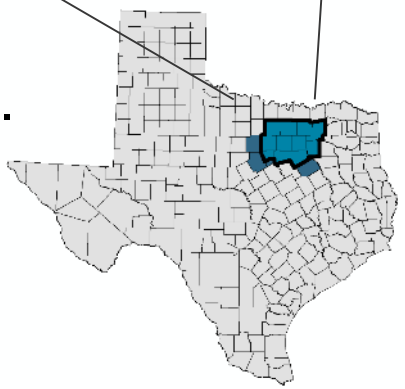
MPO for the Dallas-Fort Worth Region





Metropolitan Planning Area (MPA)

209 cities

13 cities larger than 100,000 pop.

MPA Population

2018 Estimate = 7.4 million

2045 Forecast = 11.2 million

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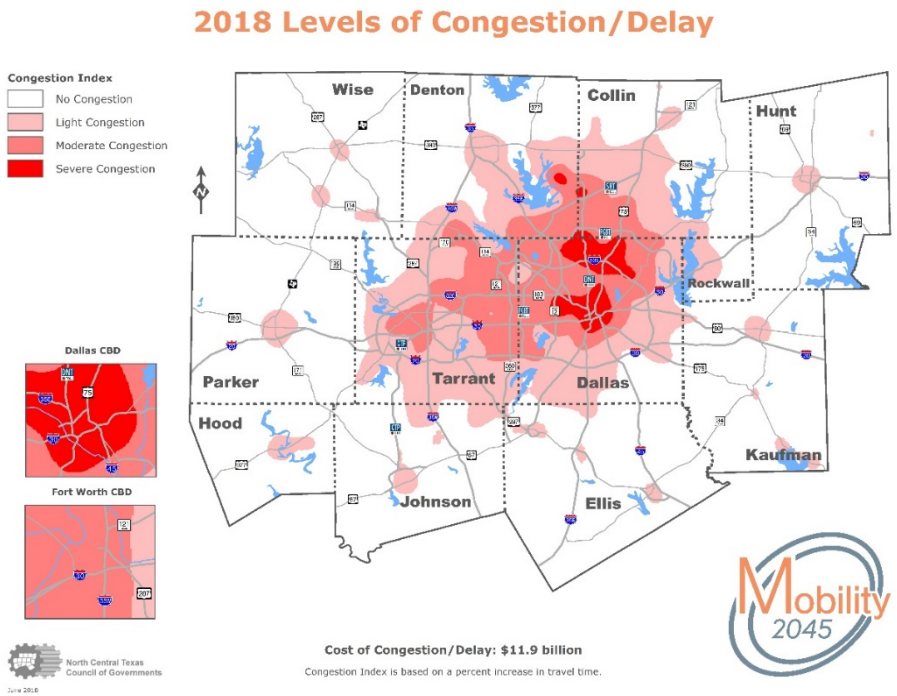
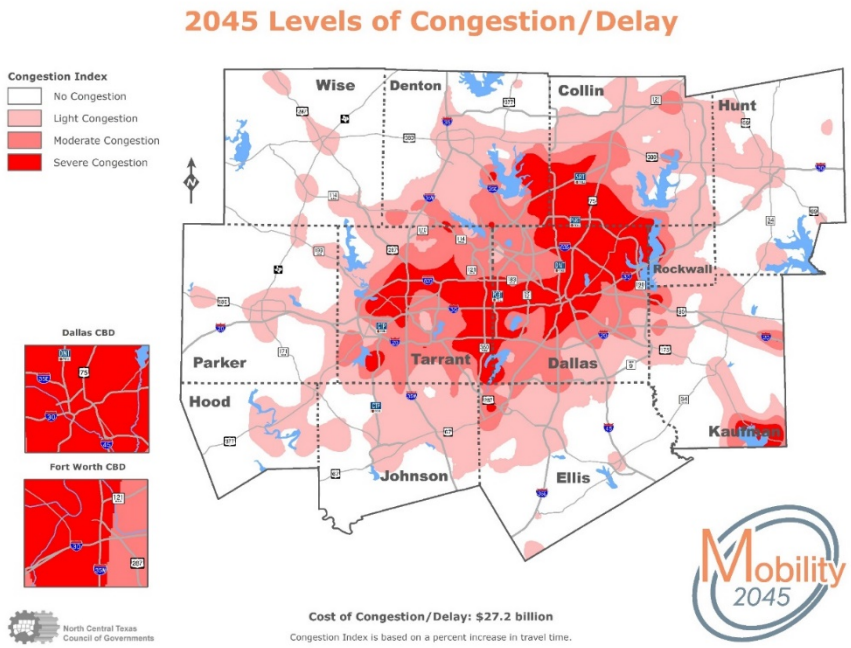
Levels of Congestion/Delay





Sustainable Development

Support alternative modes of transportation (walking, biking, transit)

- Walking-friendly development
- Bicycle/pedestrian infrastructure
- Transit-Oriented Development

Planning and Designing for All Ages and Abilities

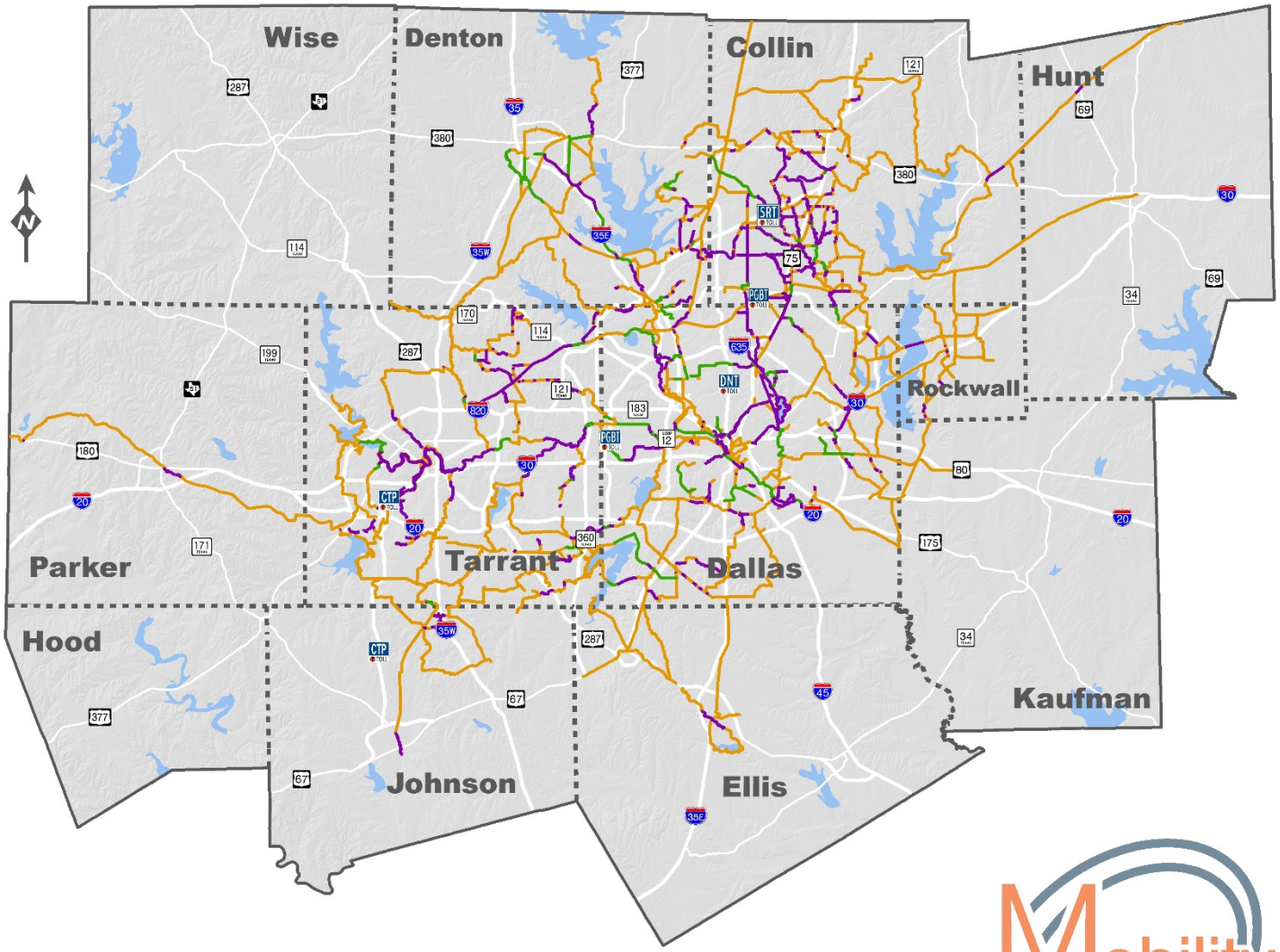
(Ages 8 to 80)

All Ages and Abilities

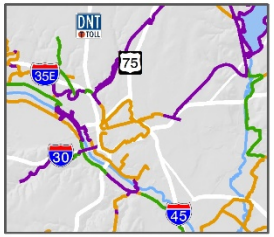
(Ages 8 to 80)

Regional Veloweb

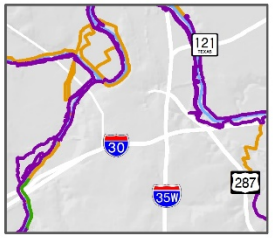
- Existing 455 Miles
- Funded 143 Miles
- Planned 1,285 Miles
- Total 1,883 Miles



Dallas CBD



Fort Worth CBD



Mobility 2045

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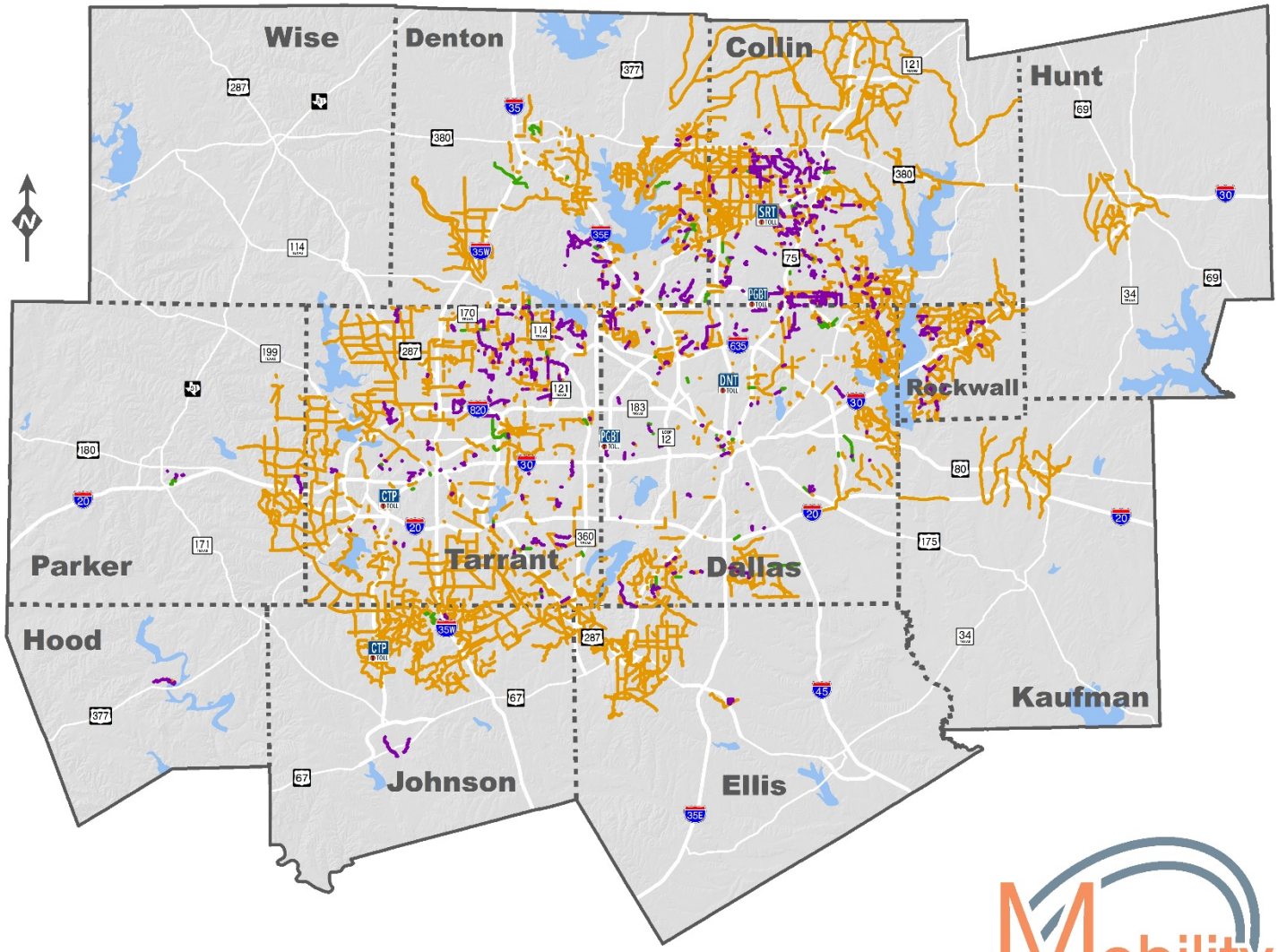
Facility recommendations indicate transportation need. Corridor-specific alignment, design, and operational characteristics for the Regional Veloweb system will be determined through ongoing project development.

June 2018

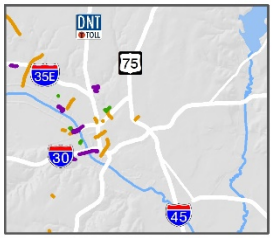
Community Shared-Use Paths

- Existing 318 Miles
- Funded 57 Miles
- Planned 2,584 Miles

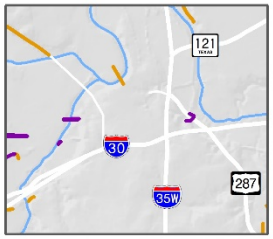
Total 2,959 Miles



Dallas CBD



Fort Worth CBD



Community Shared-Use Paths supplement the Regional Veloweb network. These paths do not include recreational paths/loops, private paths, equestrian or nature trails, or wide sidewalks less than 10 feet in width.

Facility recommendations indicate transportation need. Corridor-specific alignment, design, and operational characteristics will be determined through ongoing project development.

Mobility 2045

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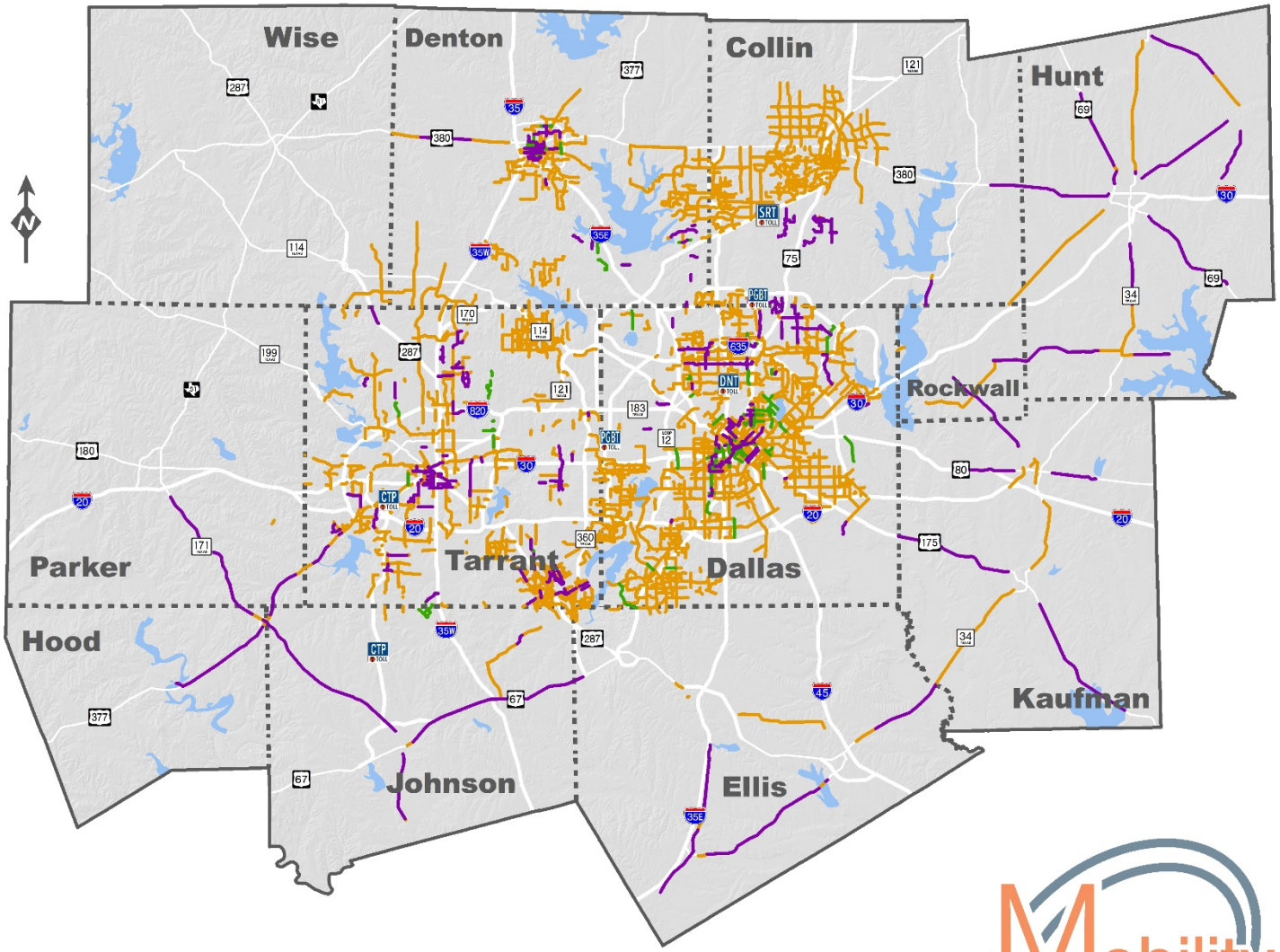
June 2018

On-Street Bikeway Network

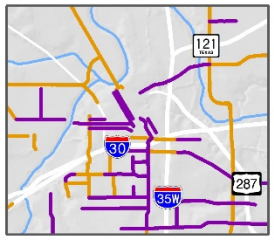
- Existing 459 Miles
- Funded 84 Miles
- Planned 1,918 Miles

Total 2,461 Miles



Dallas CBD

Fort Worth CBD



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Mobility 2045

On-street bikeways in the urbanized area include: separated or protected bike lanes/cycle tracks, bike lanes, marked shared lanes, and marked bicycle boulevards. On-street bikeways in the urbanized area do not include: signed bike "routes", signed "share the road", unmarked wide outside lanes, or signed wide shoulders. The use of wide shoulders is included on various roadways linking rural communities outside of the urbanized area.
Facility recommendations indicate transportation need. Corridor-specific alignment, design, and operational characteristics will be determined through ongoing project development.

What are Complete Streets?

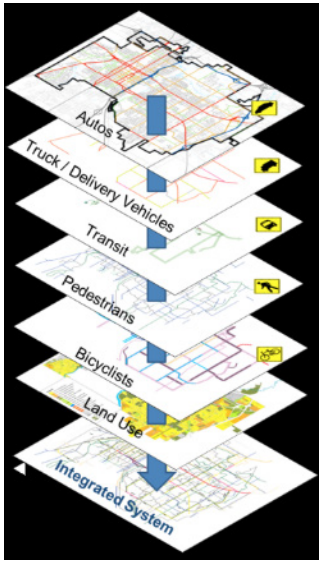
Multimodal Complete Streets

There is no singular design prescription for Complete Streets;

each one is unique and responds to its community context.

They are designed and operated to enable safe access for all users, including *pedestrians, bicyclists, motorists and transit riders of all ages and abilities*.

Source: Smart Growth America



Proven Safety Countermeasures

https://safety.fhwa.dot.gov/provencountermeasures/

Leading Pedestrian Interval

Medians and Pedestrian Crossing Islands in Urban and Suburban Areas

Pedestrian Hybrid Beacon

Road Diet

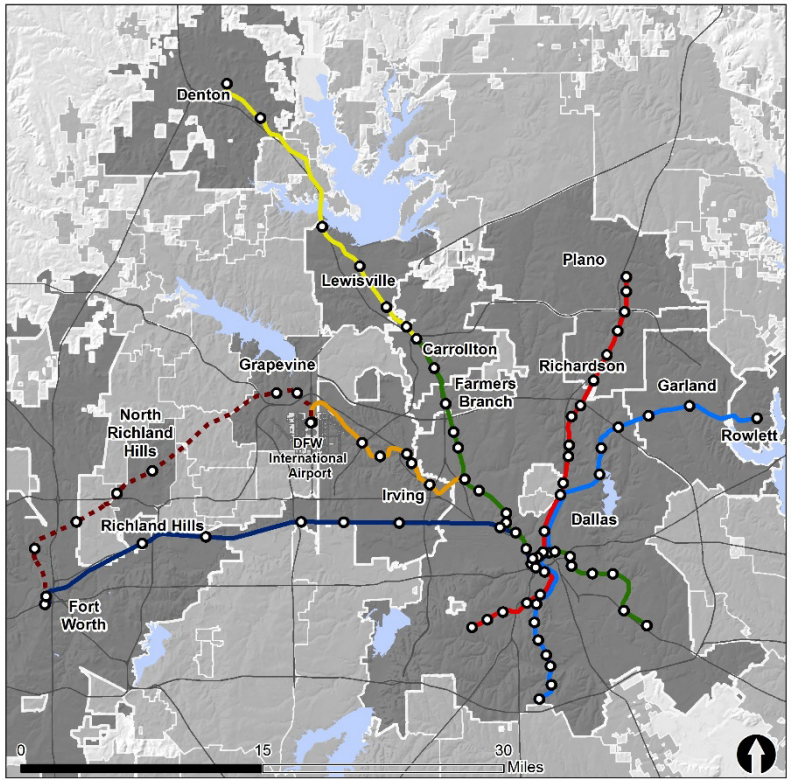
Walkways

Road Safety Audit

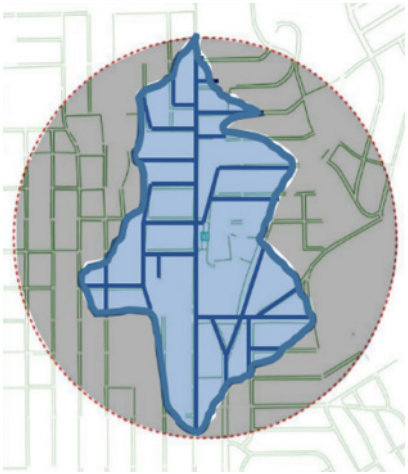
Pedestrian and Bicycle Routes to Rail Stations

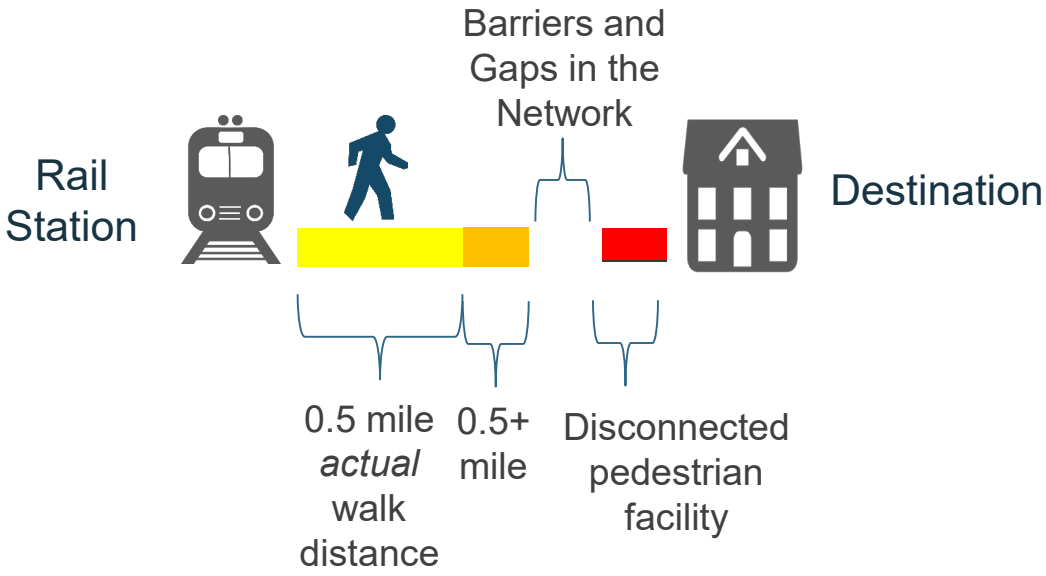
Distance and gaps in the actual "Routes" to stations (walksheds)

nctcog.org/RoutesToRail



"A true walkable radius does not typically exist."





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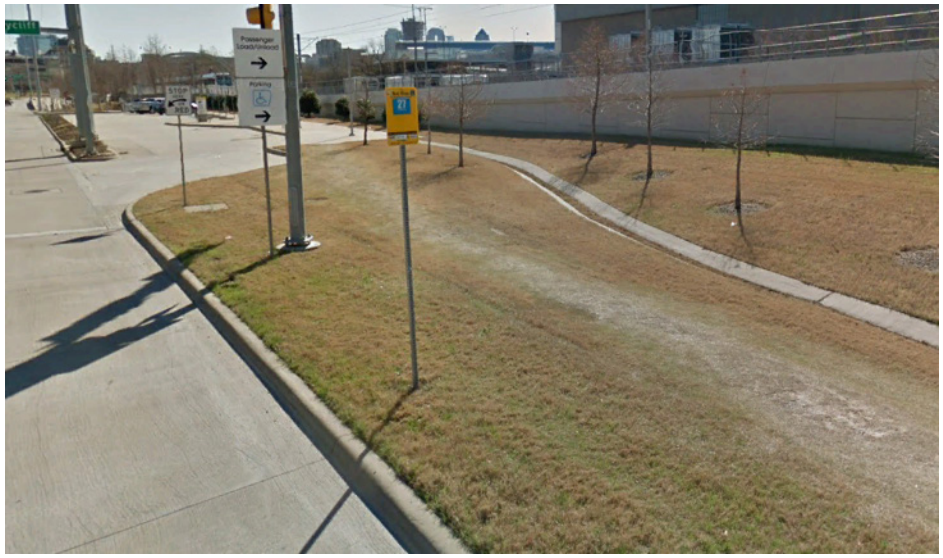
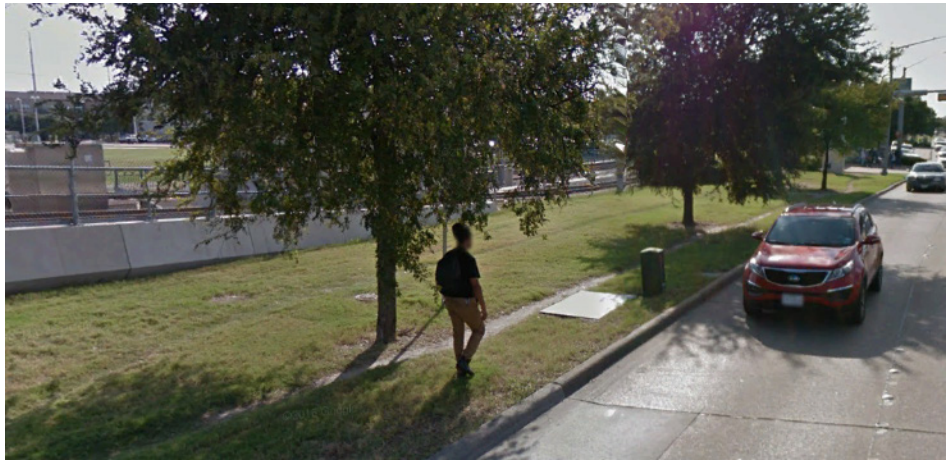
Facility Disconnected From Network
S. Denley Dr.
E. Illinois Ave.
4 ft
© 2015 Google
© 2015 Google
© 2015 Europa Technologies
Google earth

Poor Design for Access to Transit





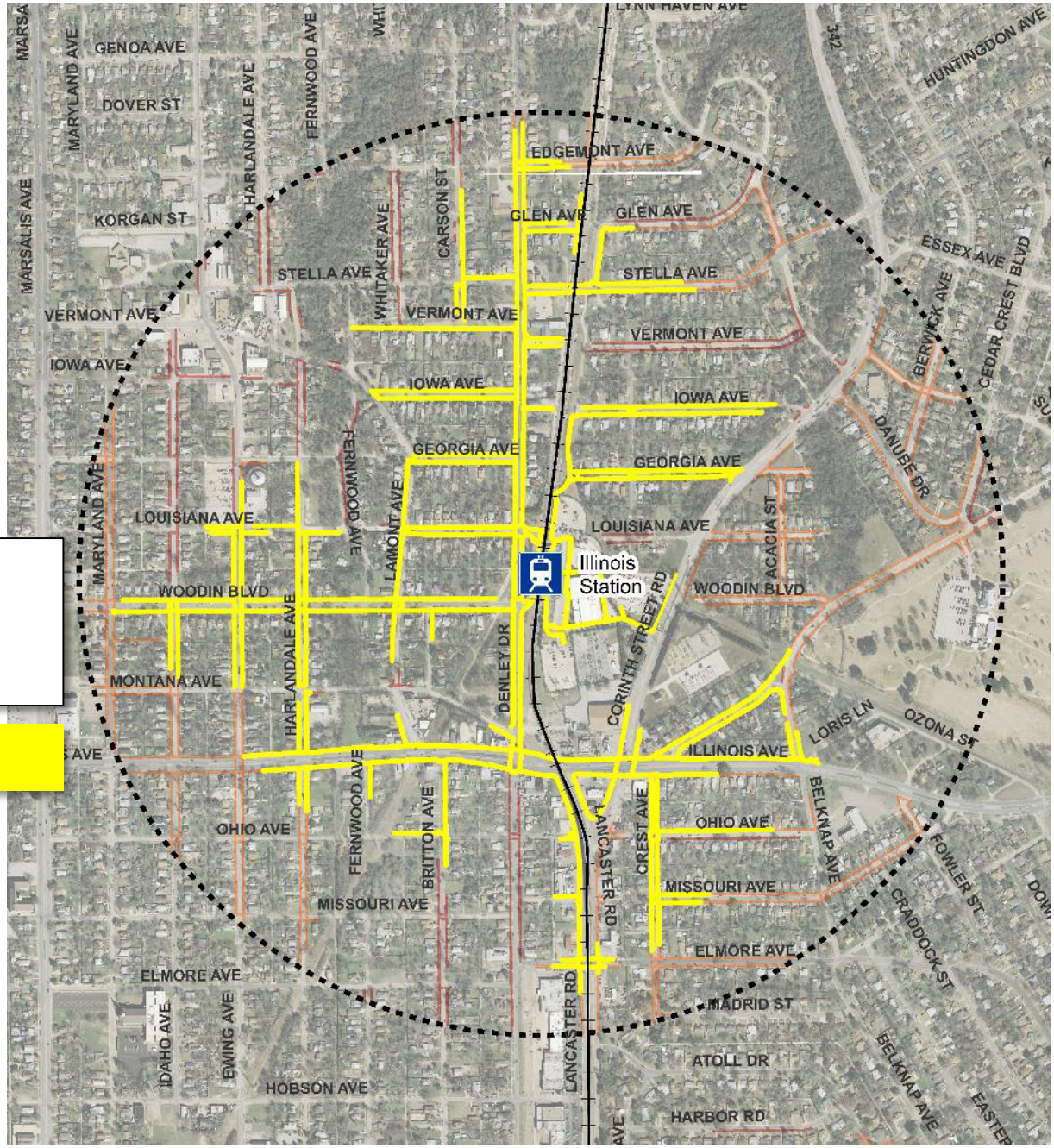
Routes to Rail Stations

Goal: Identify public rights-of-way needing sidewalks and sidewalk improvements

1. Digitizing Sidewalks
2. Network Analysis
3. Prioritizing Projects

2. ArcGIS Network Analysis

0.5 mile walkshed on a connected sidewalk route



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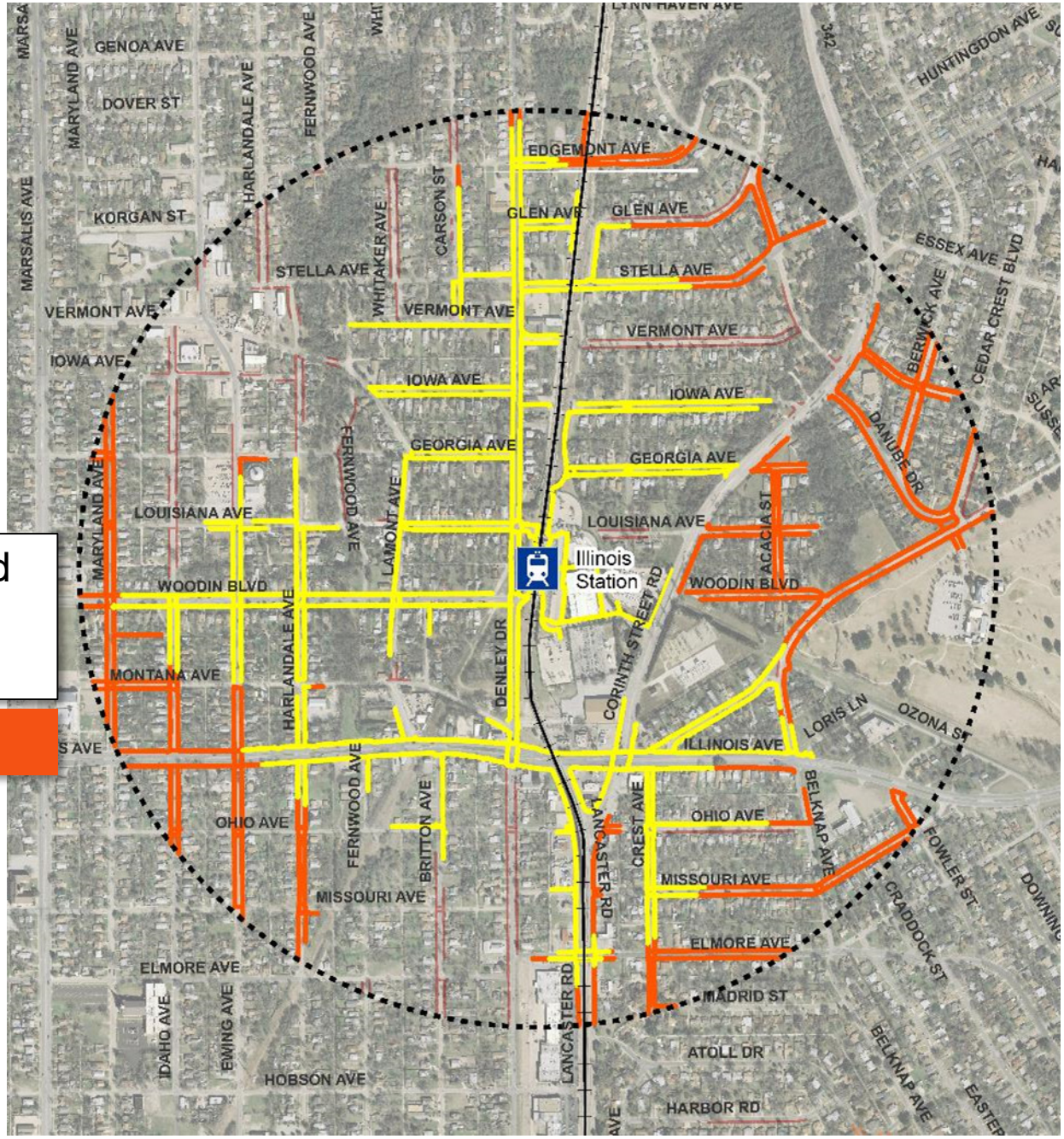
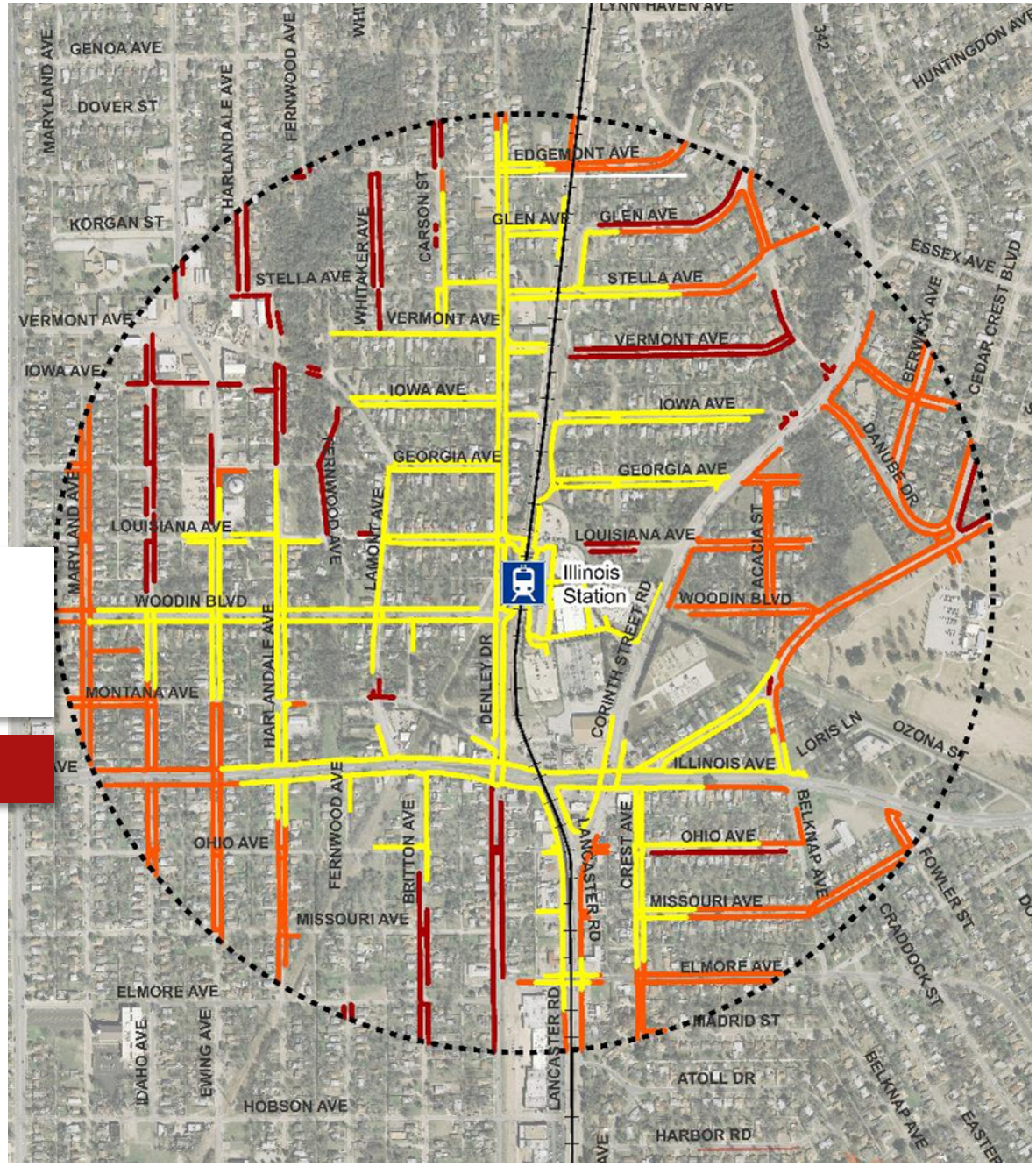
2. ArcGIS Network Analysis

0.5+ mile walkshed on a connected sidewalk route



2. ArcGIS Network Analysis

Other sidewalks disconnected from the network



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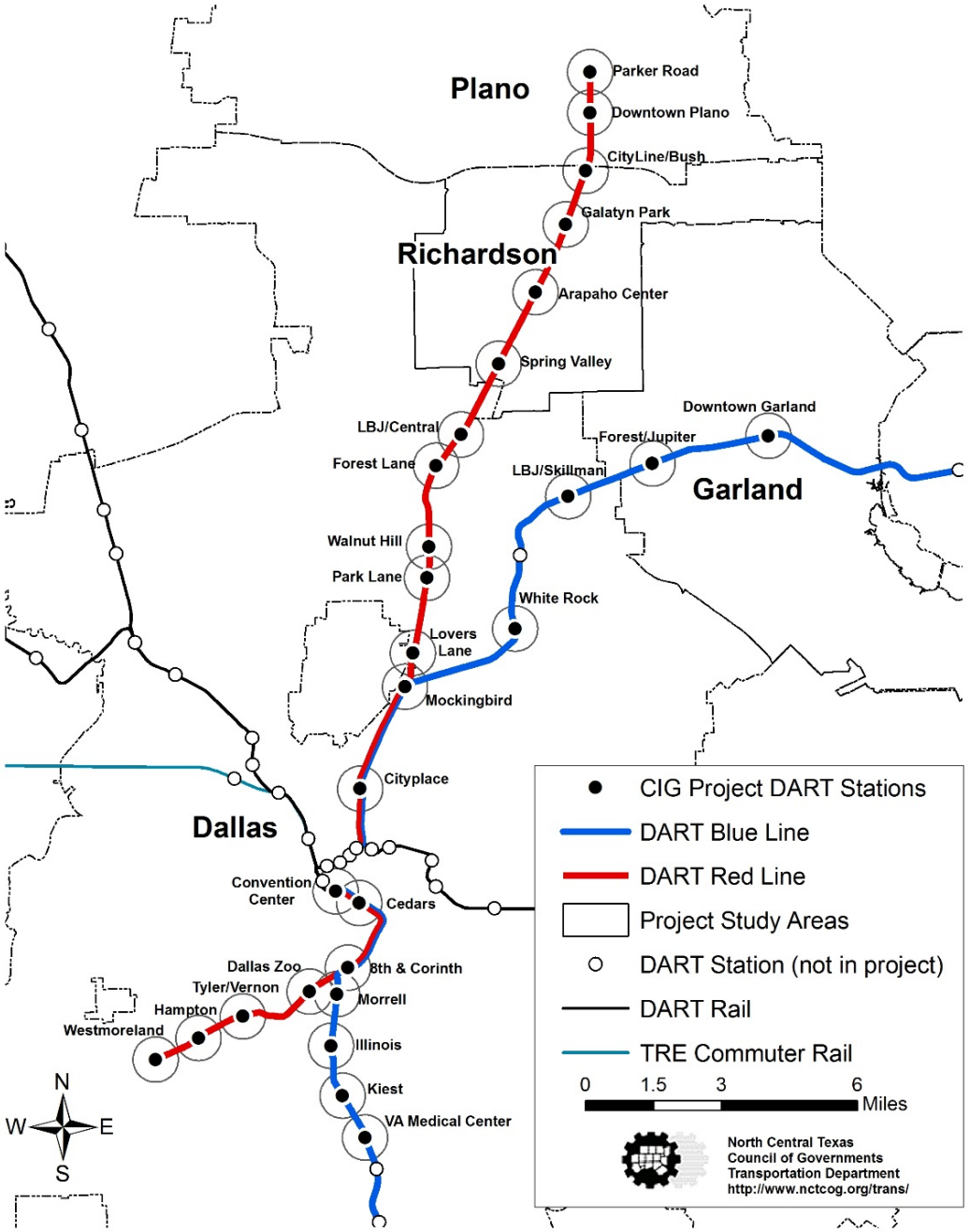
FTA Grant


Plano
Parker Road
Downtown Plano
CityLine/Bush
Galatyn Park
Richardson
Arapaho Center
Spring Valley
Downtown Garland
LBJ/Central
Forest/Jupiter
Forest Lane
LBJ/Skillman
Garland
Walnut Hill
Park Lane
White Rock
Lovers Lane
Mockingbird
Cityplace
Dallas
Convention Center
Cedars
Dallas Zoo
8th & Corinth
Tyler/Vernon
Morrell
Hampton
Westmoreland
Illinois
Kiest
VA Medical Center
N
W
E
S
CIG Project DART Stations
DART Blue Line
DART Red Line
Project Study Areas
DART Station (not in project)
DART Rail
TRE Commuter Rail
0 1.5 3 6
Miles
North Central Texas Council of Governments
Transportation Department
http://www.nctcog.org/trans/

Data Collection
Sidewalk Gaps And Verification

3. Prioritizing Projects

300+ Miles missing sidewalk in the 0.5 mile radius around rail stations

Where to start?

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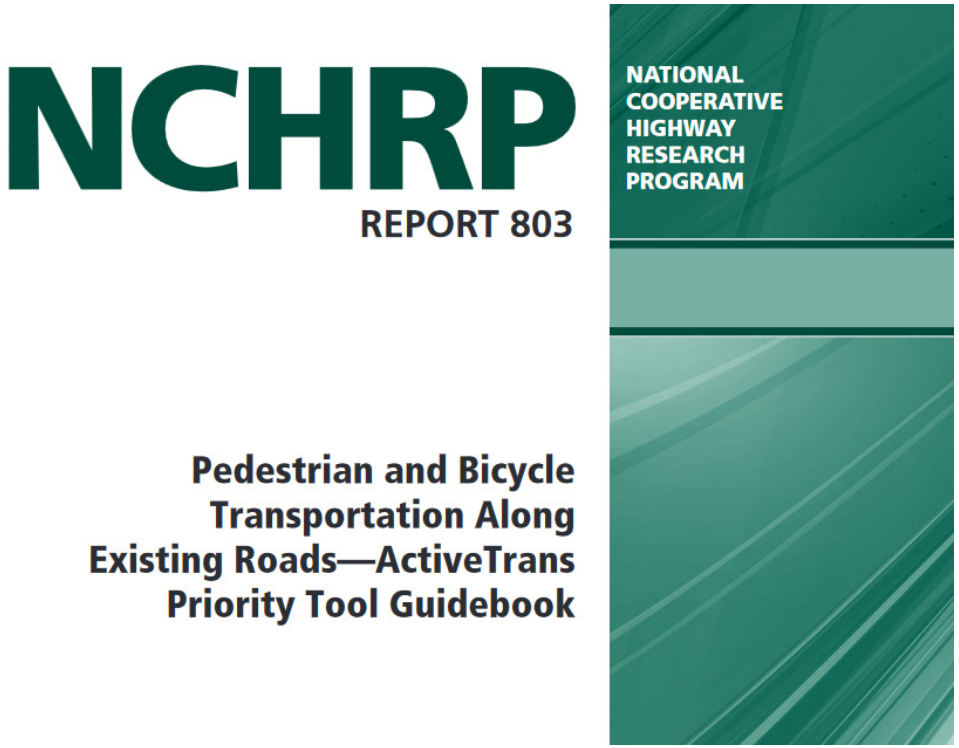
3. Prioritizing Projects



http://www.pedbikeinfo.org/planning/tools_apt.cfm

3. Prioritizing Projects

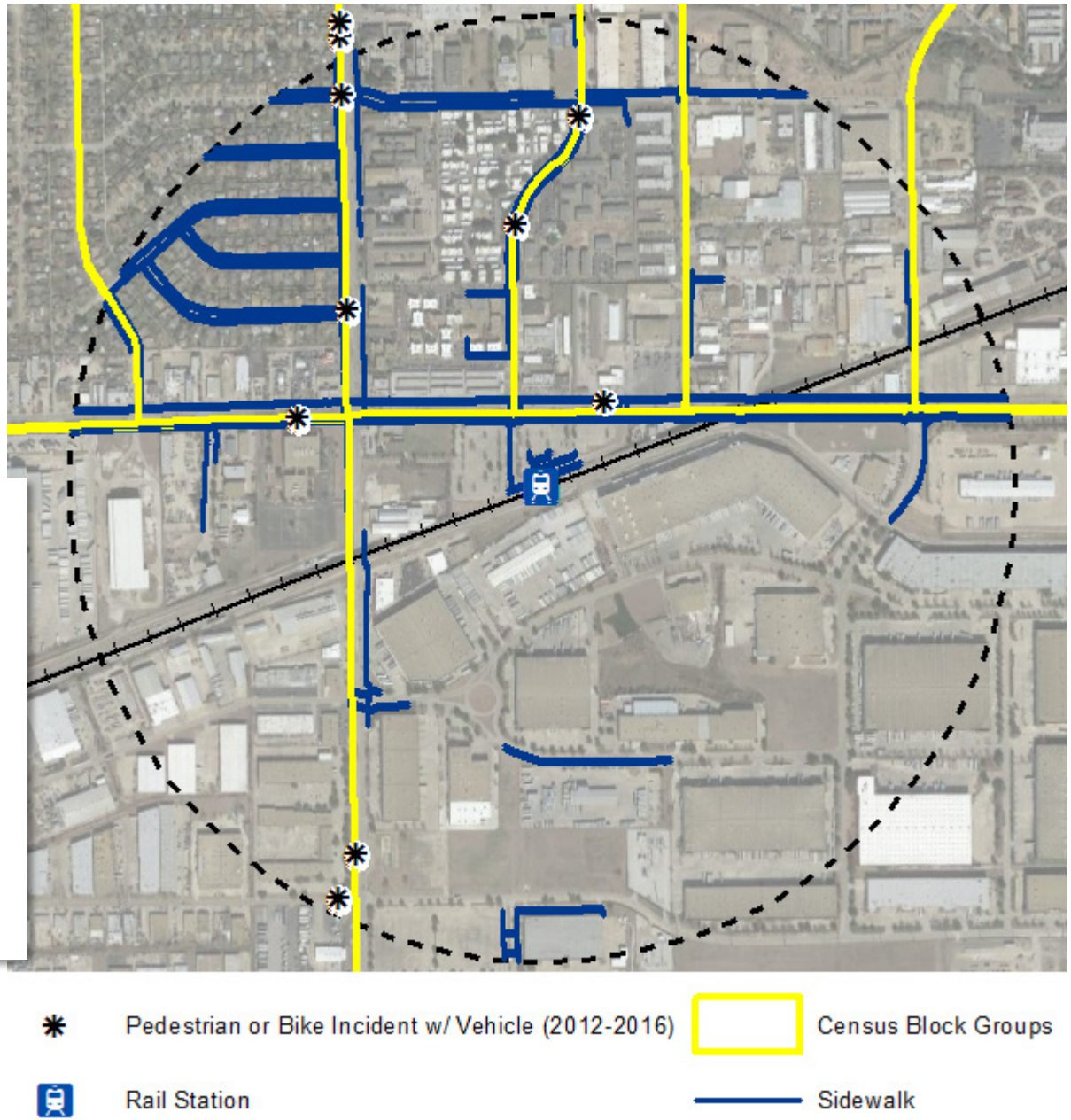
Variables:

Demographics

Crashes

Distance to station

Density



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3. Prioritizing Projects

Calculated Employment and Population Density

Appraisal district parcel data (Dallas, Collin, Denton, Tarrant Counties)

Edits/Quality control in 0.5 mile rail station buffer:

SQFT, land use, and parcel geometry

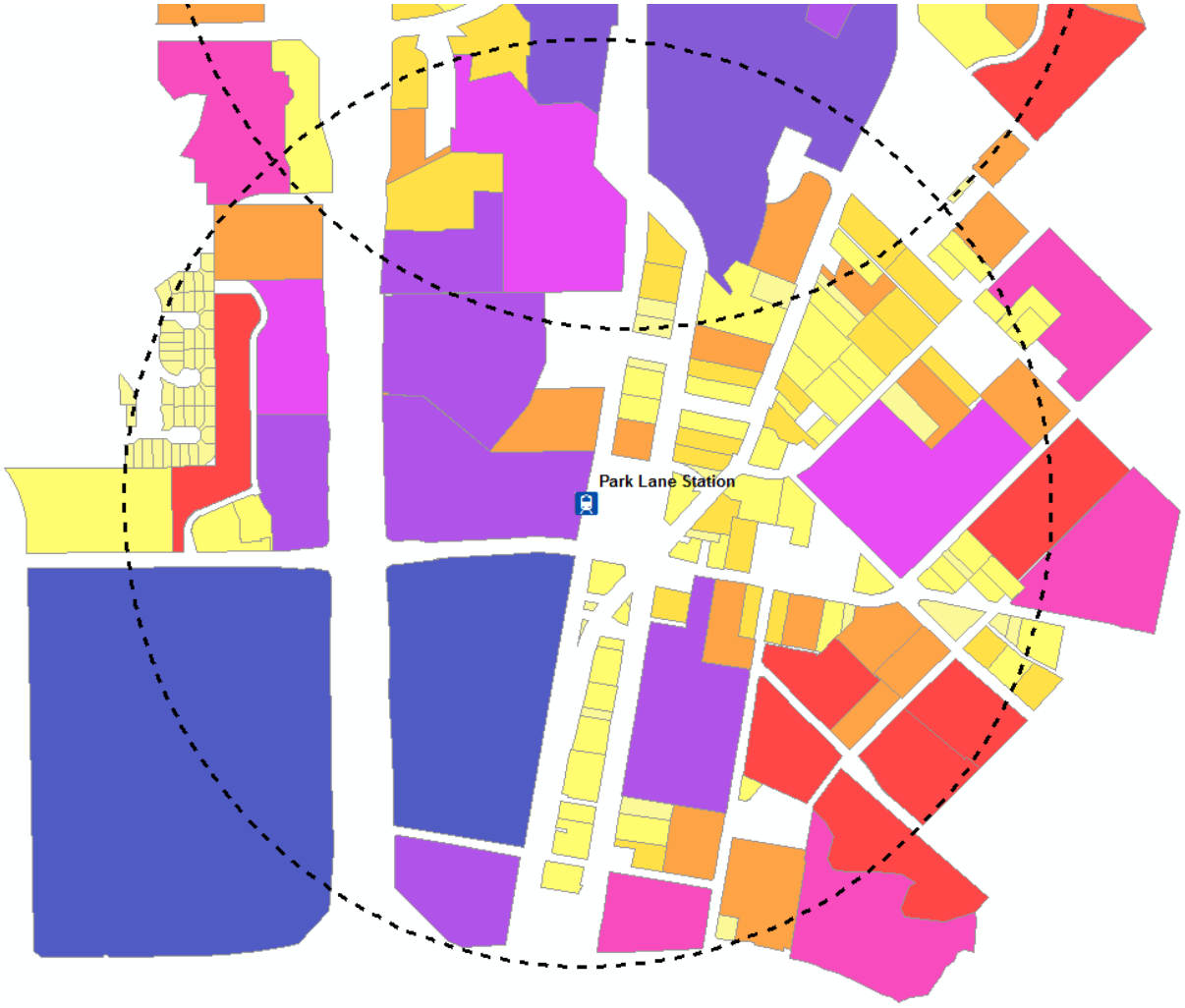
Calculate parcel population

e.g. 300 SQFT office = 1 person

3. Prioritizing Projects

COG LU	Description	Housing Units	SQFT	People	SQFT/ person
111	Single family	1	--	2.5	--
112	Multi-family	1	--	1.8	--
120	Commercial	--	1,000	3.5	286
121	Office	--	1,000	3	333
122	Retail	--	1,000	8	125
125	Institutional/semi public	--	1,000	6	167
126	Education	--	1,000	12	83
131	Industrial	--	1,000	1	1,000
143	Utilities	--	--	0	--
148	Rail road	--	--	0	--
160	Mixed use	--	1,000	4	250
170	Parks/recreation	--	--	1	--
301	Vacant	--	--	0	--
401	Parking	--	--	0	--

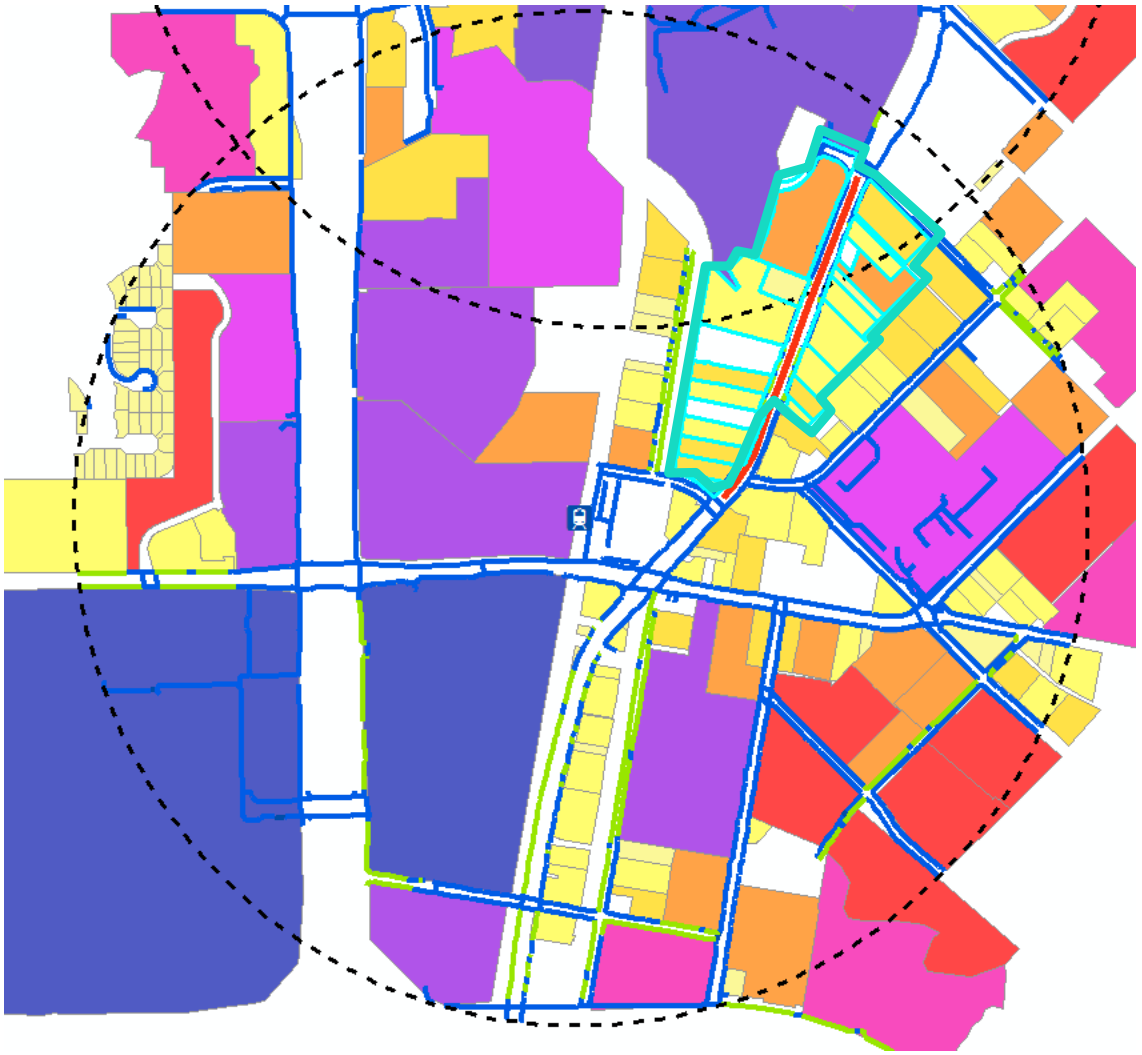
3. Prioritizing Projects



Population

- 0 - 1
- 2 - 15
- 16 - 50
- 51 - 100
- 101 - 324
- 325 - 476
- 477 - 700
- 701 - 1,030
- 1,031 - 1,771
- 1,772 - 4,104
- 4,105 - 14,000

3. Prioritizing Projects



Criteria And Weighting
Proposed Improvements

Criteria	Weight
Distance / Proximity of Improvements to the Station	**50**
Employment and Population Density (Number of potential riders connected by the improvement's catchment area)	**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 (systemic safety of the project improvement)	**5**
Equity / Transit Dependent Populations (zero car households, % below poverty line)	**5**
Total	**100**

FTA DART Stations
Last Mile Connections
Parker Rd Station

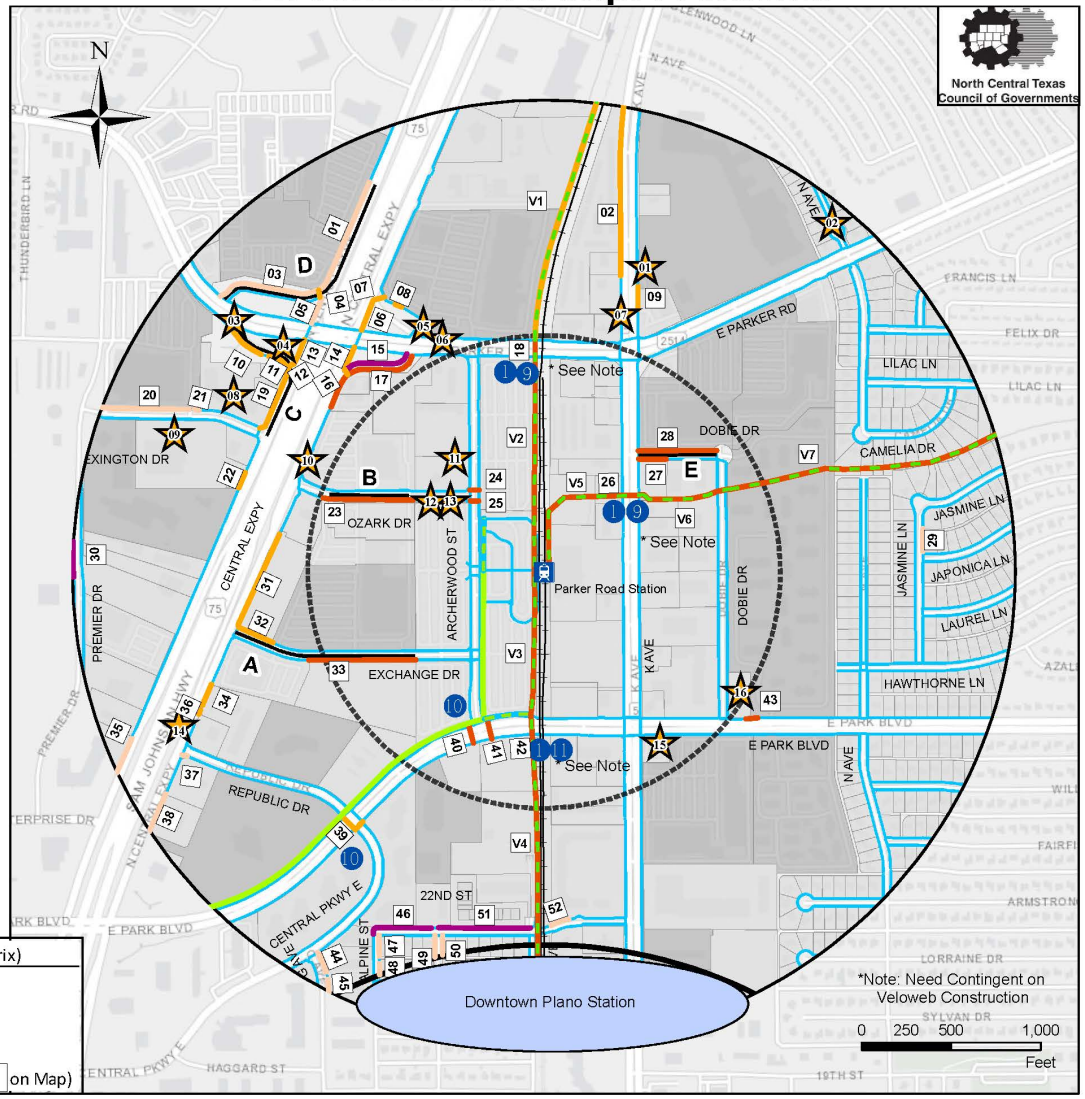
February, 2019

DRAFT

North Central Texas Council of Governments

DART Red & Blue Line Corridors Last Mile Connections

Recommended Improvements



Legend

- DART Rail Station

Sidewalk

- Existing Sidewalk/Crosswalk
- **Proposed Sidewalk/ Crosswalk by Priority** 1
  - High
  - Medium
  - Low
  - Gap to Remain
- **Regional Veloweb (Mobility 2045)**
  - Existing
  - Planned, High Priority
  - Planned, Medium Priority
  - Planned, Existing Sidewalk
- Spot Improvements
- Railroad Track
- Buffers
  - 0.5 Mile Buffer
  - 0.25 Mile Buffer
  - Primary Routes

Existing Residential and Employment Population (Number of People)

Ppl

0 - 234
235 - 1049
1050 - 2586
2587 - 5364
5365 - 10339

Improvement Code Legend (See Matrix)

1A-PR-SW-01

- 1A ← Station Number
- PR ← Station Abbreviation
- SW ← Sidewalk (or CW for Crosswalk)
- 01 ← Improvement Number (Matches 1 on Map)

Possible Pedestrian Safety Countermeasures

Unsignalized Crosswalk Improvements

1. Crosswalk Signs, Markings & Lighting
2. Raised Crosswalk
3. Advance "Yield Here" Sign
4. In-Street Pedestrian Crossing
5. Curb Extension
6. Pedestrian Refuge Island
7. Rectangular Rapid Flashing Beacon
8. Road Diet
9. Pedestrian Hybrid Beacon

Signalized Crosswalk Improvements

10. Add Marked Crosswalks & Provide Countdown, Accessible Pedestrian Signals
11. Traffic Signal

Primary Routes

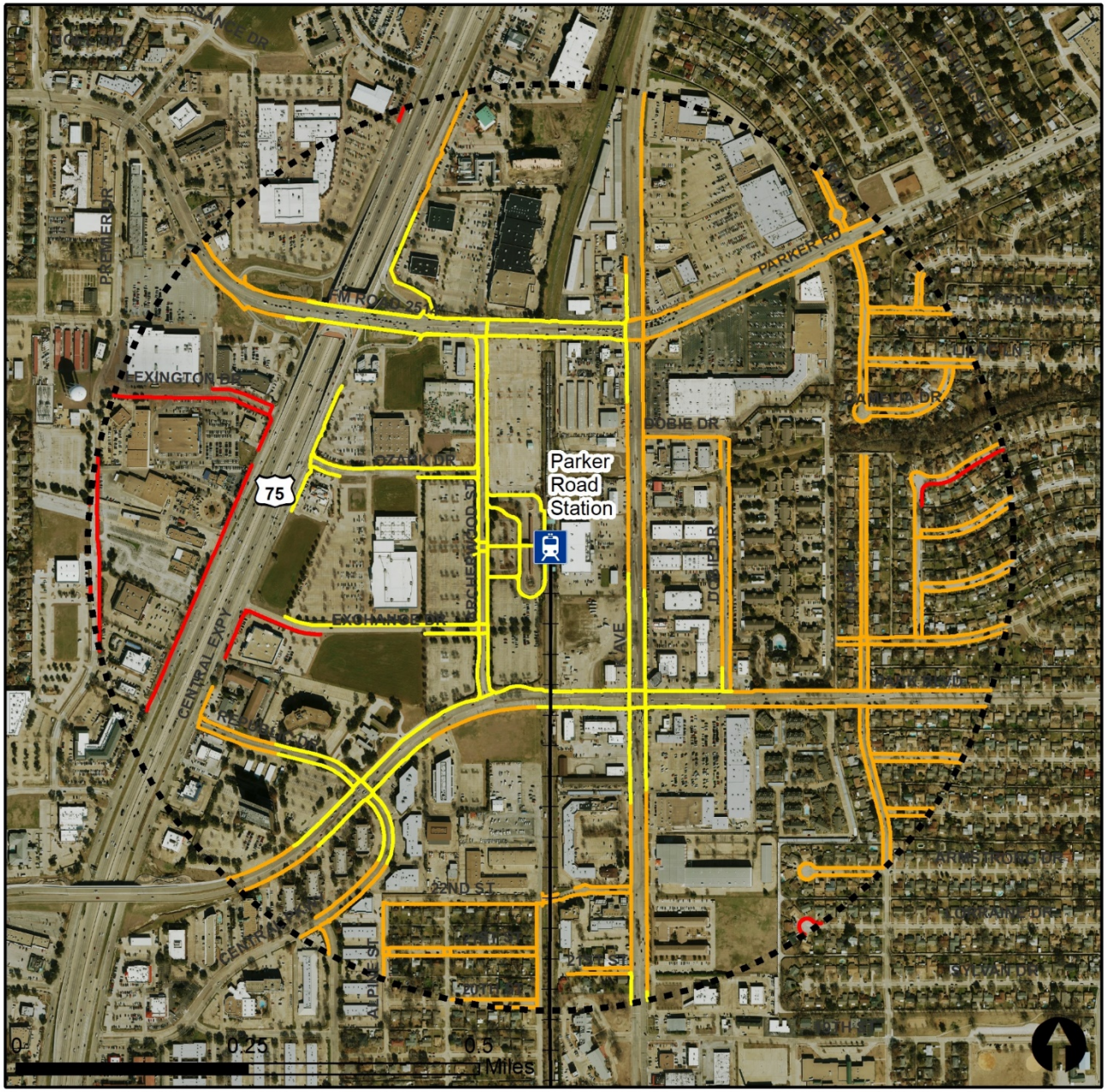
Route	Street Name
A	Exchange Dr
B	Ozark Dr
C	Central Expy
D	Central Expy
E	Dobie Drive

LEE ENGINEERING

Pedestrian Routes to Rail - Parker Road Station

Last Updated: February 2015

North Central Texas Council of Governments

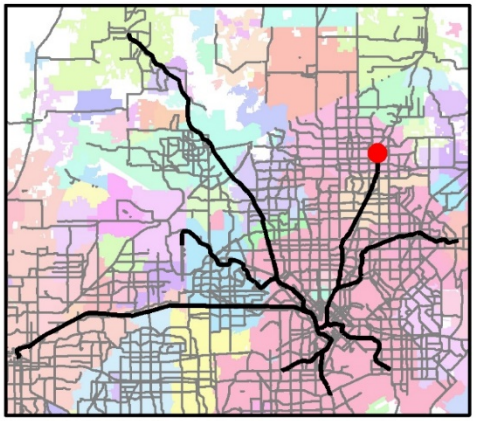


Legend

- Rail Stations
- 0.5 Mile Station Buffer
- Railroads
- Existing sidewalk facilities within a 0.5 mile walk distance
- Existing sidewalk facilities greater than a 0.5 mile walk distance
- Existing sidewalk facilites that are disconnected due to a gap in the network

Project Overview

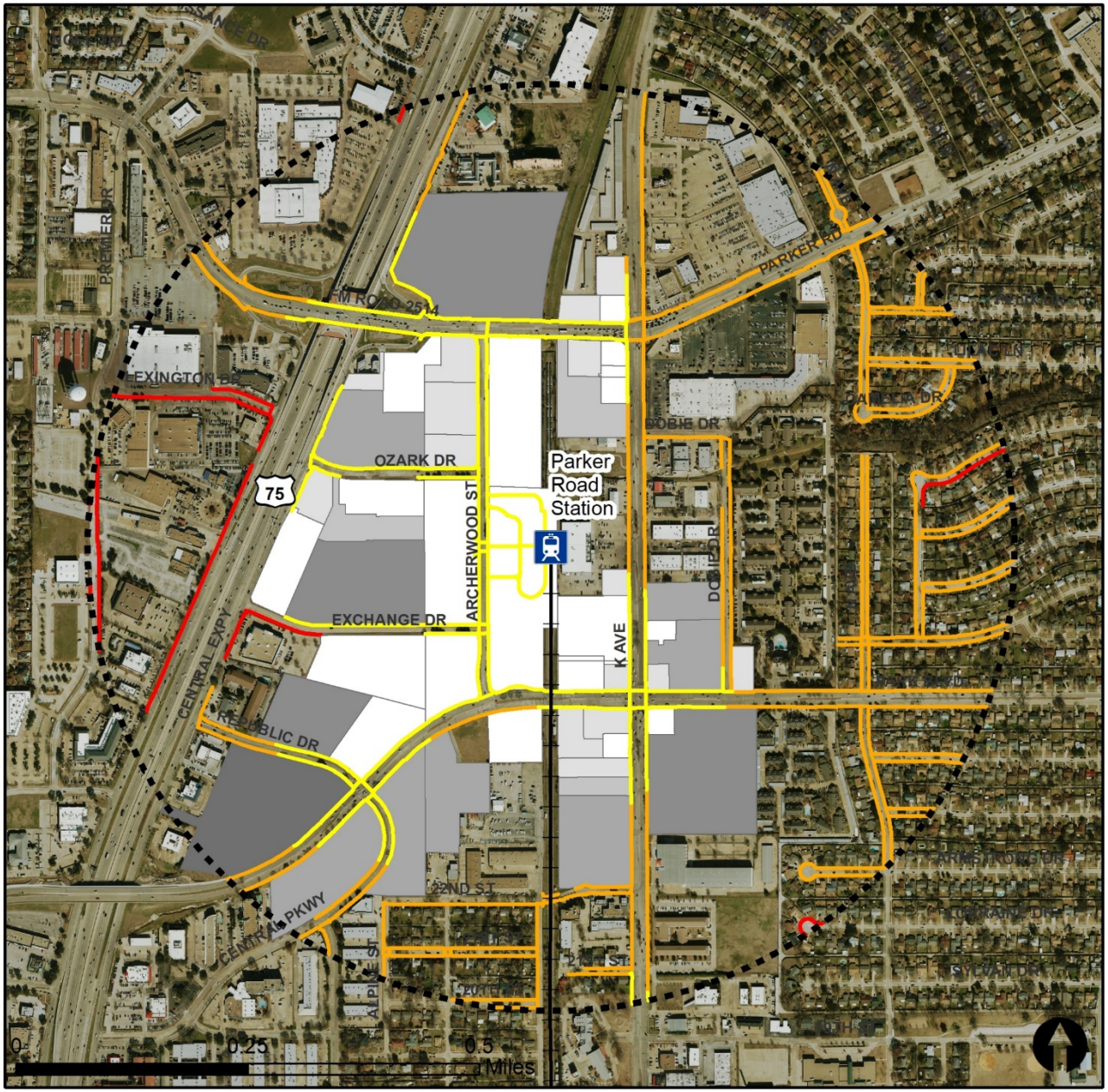
The Pedestrian Routes to Rail study identifies all existing pedestrian facilities within a half-mile radius of existing light rail and commuter rail stations in the Dallas-Fort Worth region based on 2014 data. ArcGIS Network Analyst tool was used to identify continuous facilities that are less than or 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

Last Updated: February 2015

North Central Texas Council of Governments



Legend

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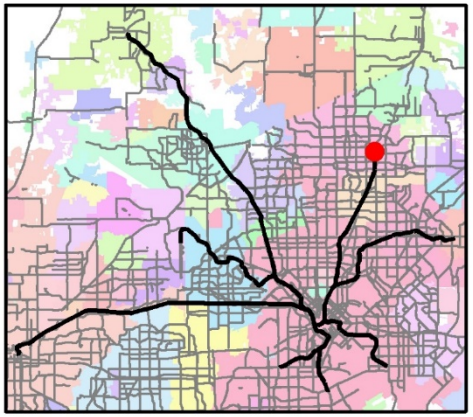
Legend

Half Mile Population and Employment Connected (4,240)

Ppl

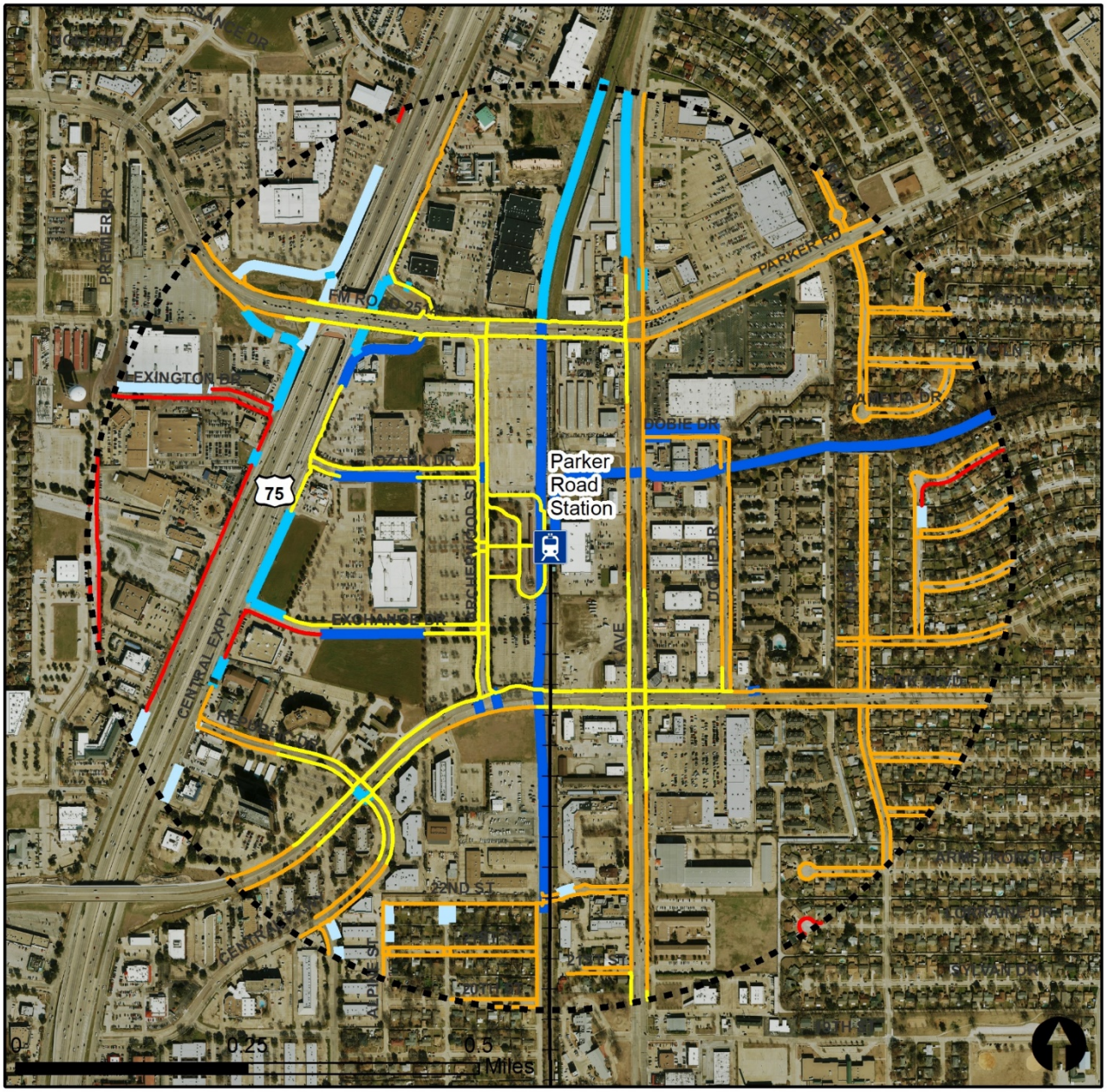
- 0 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 578
- 579 - 1000
- 1001 - 1500
- 1501 - 2500
- 2501 - 5000
- 5001 - 24170

*Per NCTCOG Calculation



Pedestrian Routes to Rail - Parker Road Station
Proposed Improvements

North Central Texas Council of Governments



Legend

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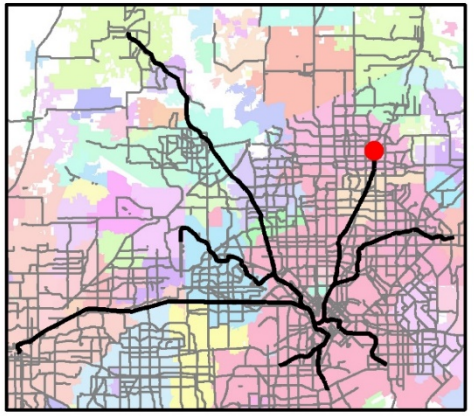
Legend

Parker Rd. Improvements

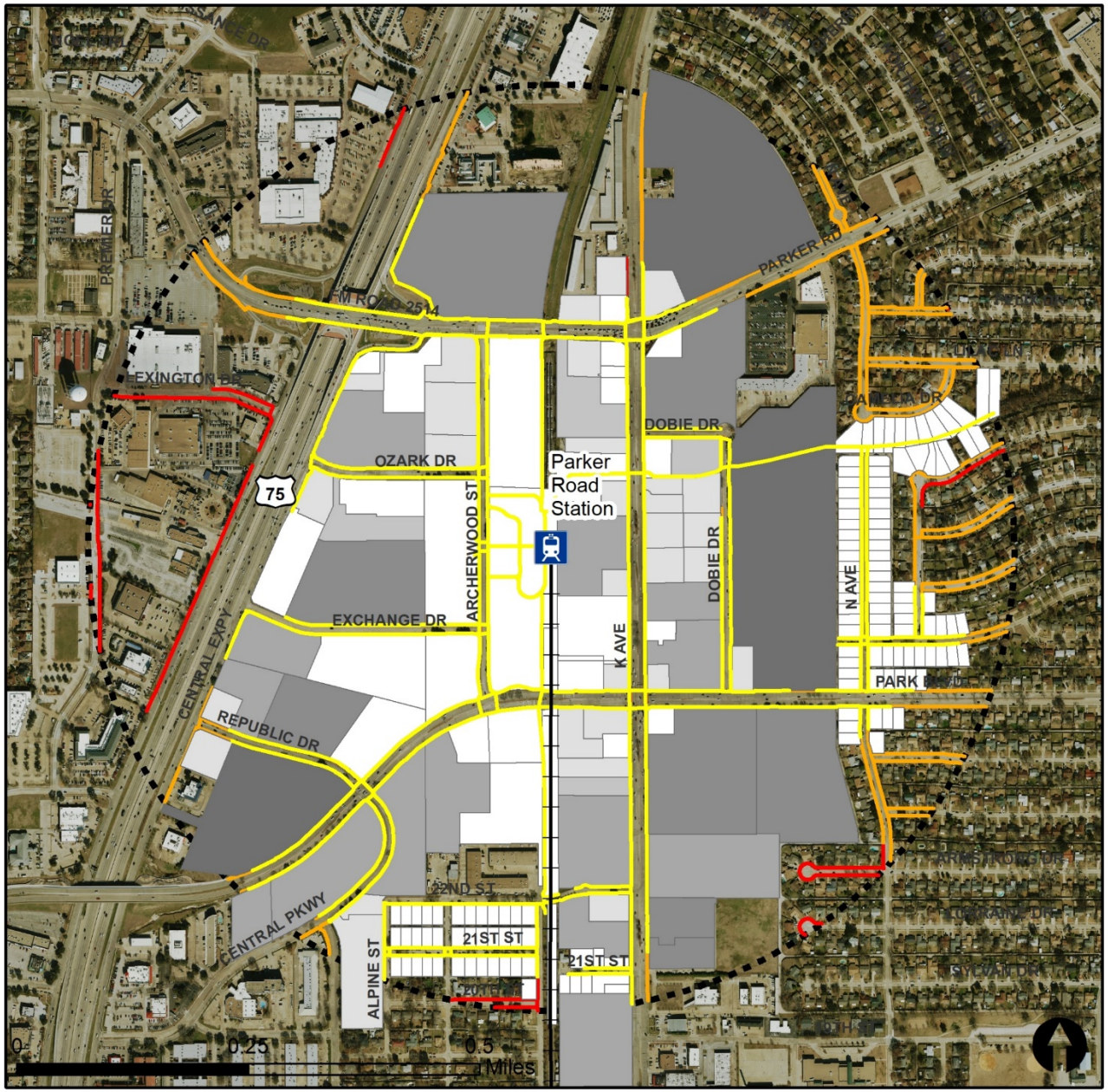
Priority

- High
- Medium
- Low



High Priority
Parker Rd. Routes to Rail Analysis

North Central Texas Council of Governments



Legend

- Rail Stations
- 0.5 Mile Station Buffer
- Railroads
- Existing sidewalk facilities within a 0.5 mile walk distance
- Existing sidewalk facilities greater than a 0.5 mile walk distance
- Existing sidewalk facilites that are disconnected due to a gap in the network

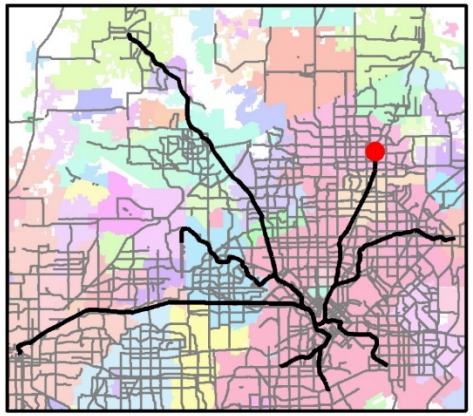
Legend

Half Mile Population and Employment Connected (8,562)

- 0 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 578
- 579 - 1000
- 1001 - 1500
- 1501 - 2500
- 2501 - 5000
- 5001 - 24170

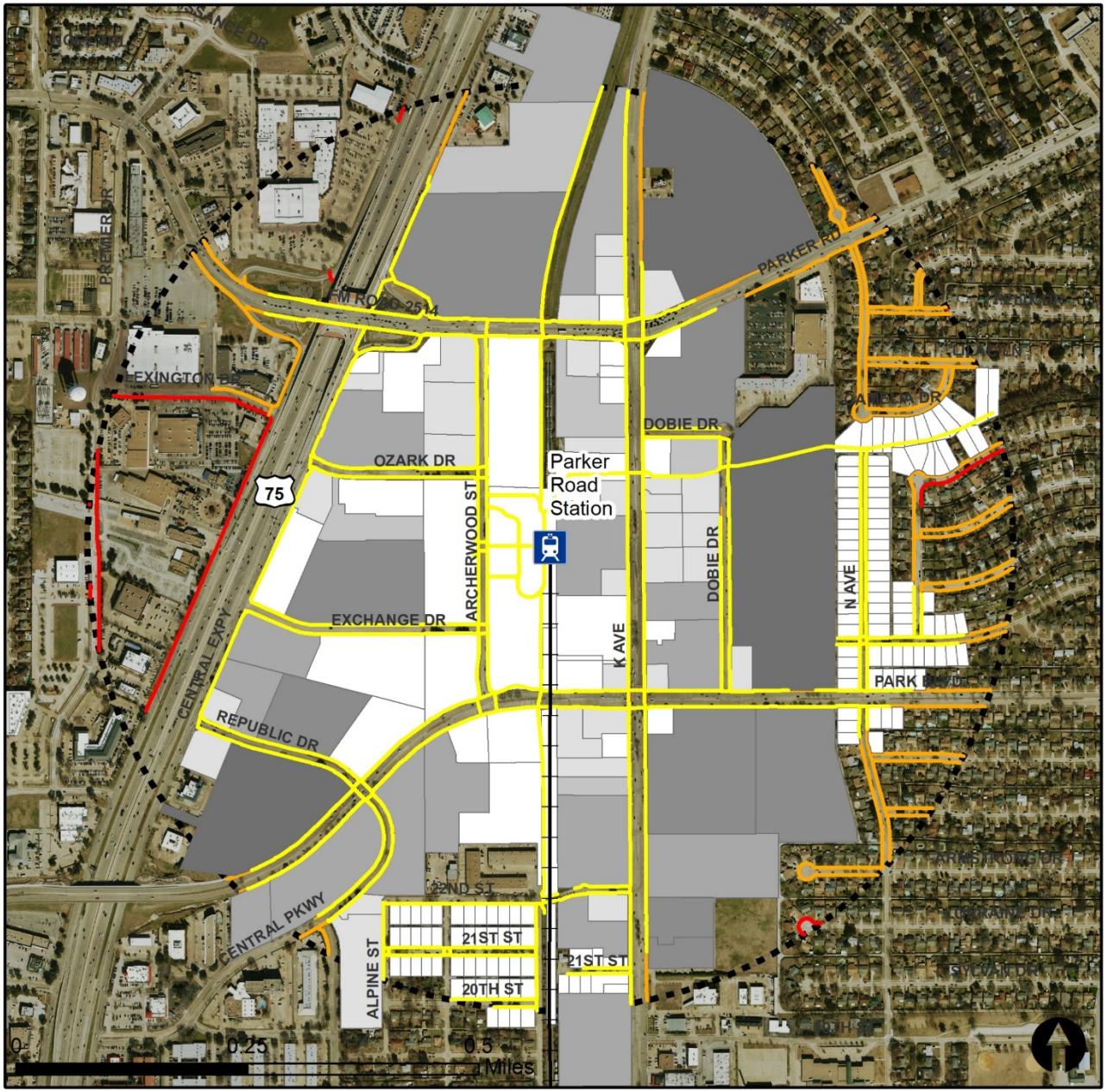
+ 4,322

*Per NCTCOG Calculation



High and Medium Priority
Parker Rd. Routes to Rail Analysis

North Central Texas Council of Governments



Legend

- Rail Stations
- 0.5 Mile Station Buffer
- Railroads
- Existing sidewalk facilities within a 0.5 mile walk distance
- Existing sidewalk facilities greater than a 0.5 mile walk distance
- Existing sidewalk facilites that are disconnected due to a gap in the network

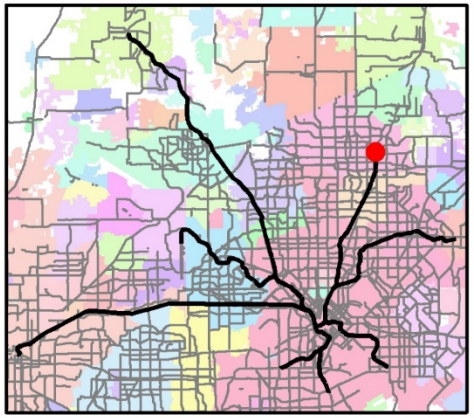
Legend

Half Mile Population and Employment Connected (9,026)

+ 492

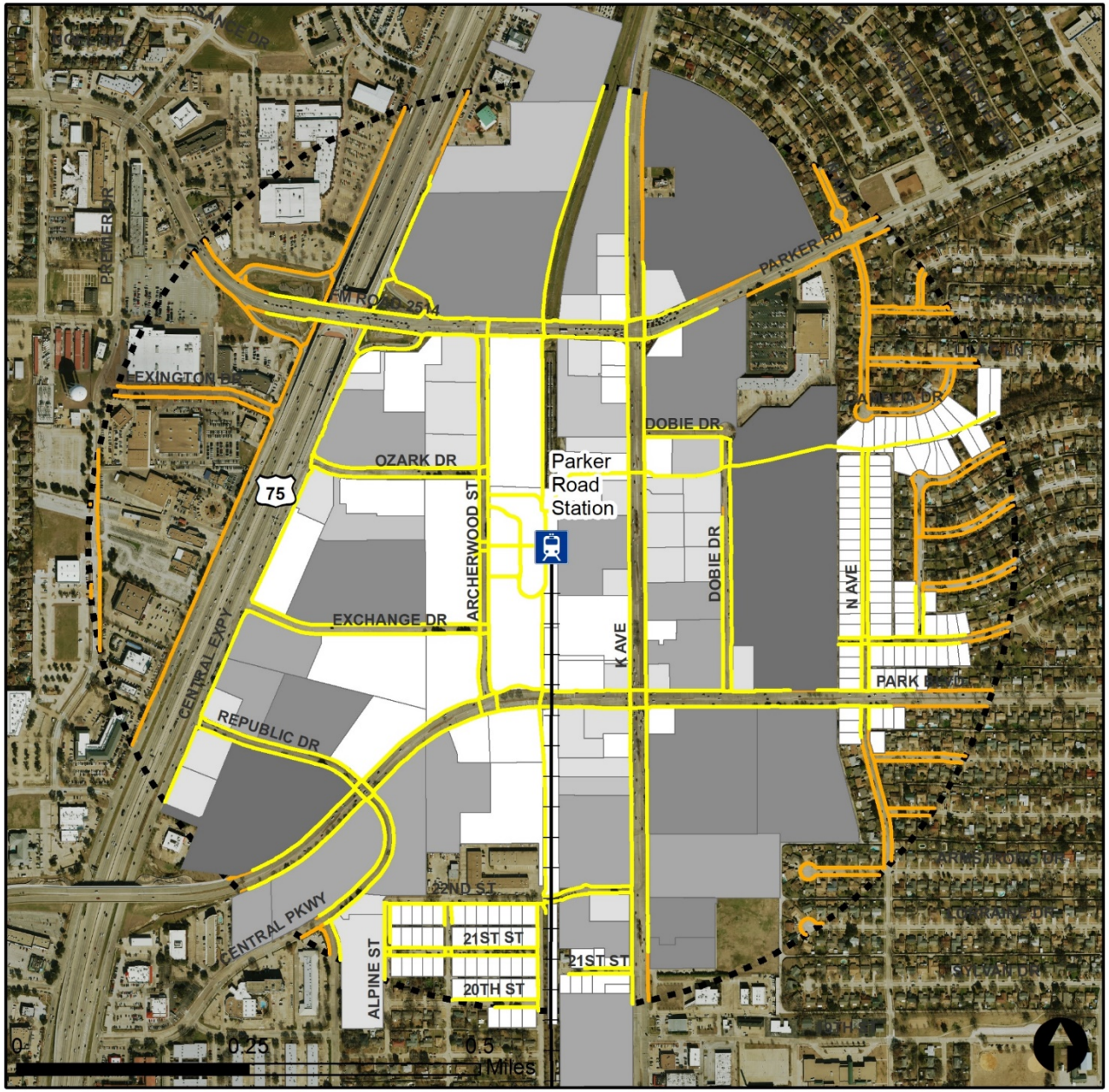
- 0 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 578
- 579 - 1000
- 1001 - 1500
- 1501 - 2500
- 2501 - 5000
- 5001 - 24170

*Per NCTCOG Calculation



High, Medium and Low Priority
Parker Rd. Routes to Rail Analysis

North Central Texas Council of Governments



Legend

- Rail Stations
- 0.5 Mile Station Buffer
- Railroads
- Existing sidewalk facilities within a 0.5 mile walk distance
- Existing sidewalk facilities greater than a 0.5 mile walk distance
- Existing sidewalk facilites that are disconnected due to a gap in the network

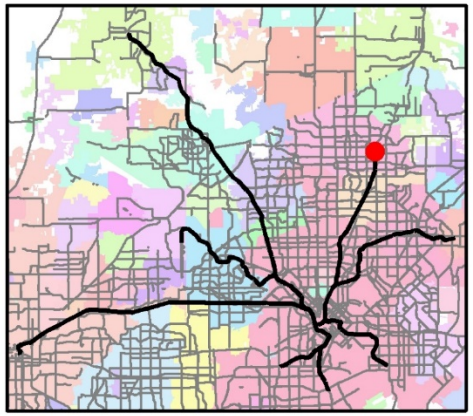
Legend

Half Mile Population and Employment Connected (9,054)

- 0 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 578
- 579 - 1000
- 1001 - 1500
- 1501 - 2500
- 2501 - 5000
- 5001 - 24170

+ 28

*Per NCTCOG Calculation



nctcog.org/RoutesToRail

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