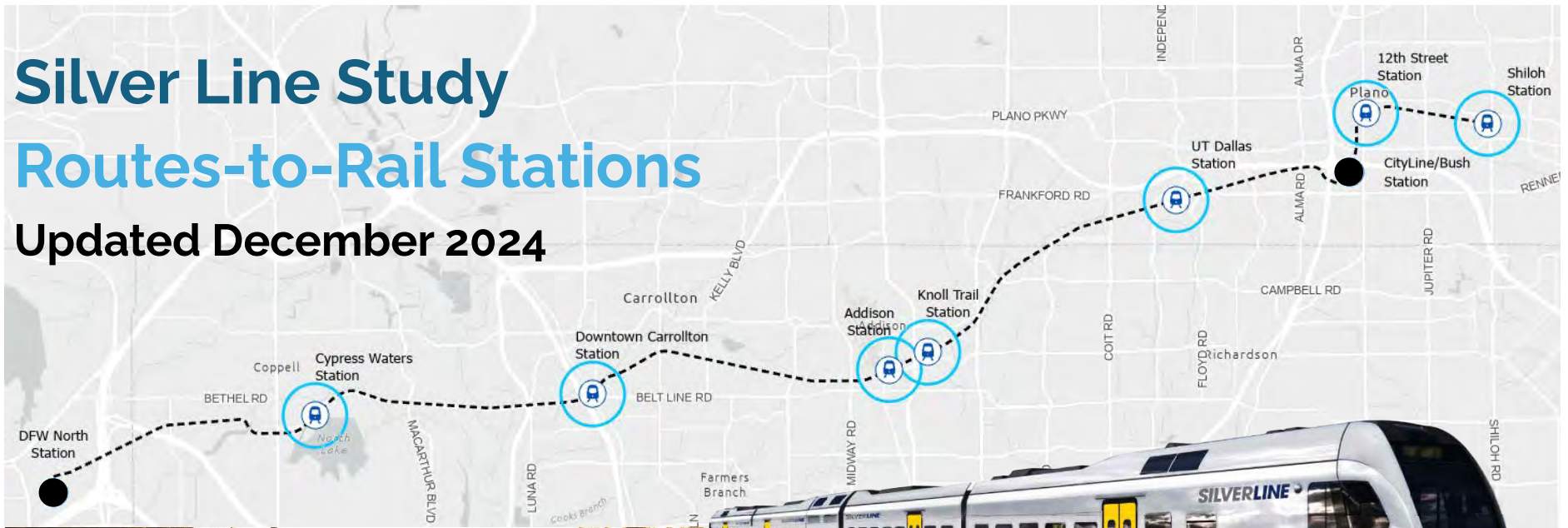


# Silver Line Study

## Routes-to-Rail Stations

Updated December 2024



North Central Texas  
Council of Governments

# Acknowledgements

## Project Staff

Kevin Kokes, AICP

*Program Manager*

Daniel Snyder, AICP

*Senior Transportation Planner*

Erik van Bloemen Waanders

*Transportation Planner II*

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## Objective

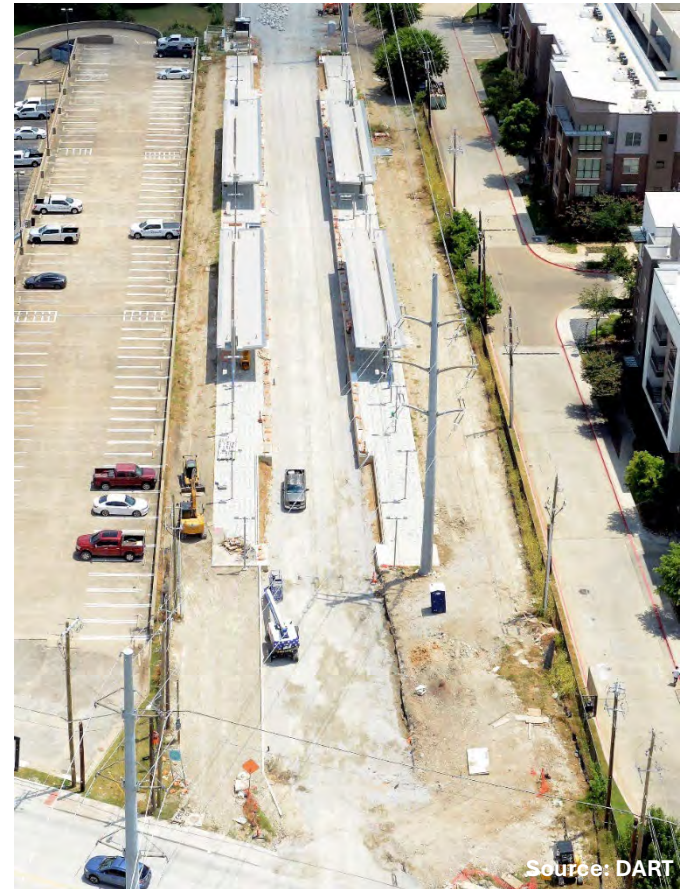
The purpose of the Silver Line Routes-to-Rail Stations Study is to identify recommended infrastructure improvements to enhance pedestrian accessibility for residents, workers, and transit riders with a continuously connected sidewalk network to and from rail stations, thus increasing the number of potential transit riders using the Dallas Area Rapid Transit (DART) Silver Line commuter rail service that traverses seven cities from Dallas-Fort Worth International Airport (DFW Airport) to Plano.

## Introduction

This study with corresponding analysis performed by the North Central Texas Council of Governments (NCTCOG) provides a high-level inventory and evaluation of pedestrian infrastructure needs within a half-mile radius of seven Silver Line rail stations: Cypress Waters, Downtown Carrollton, Addison, Knoll Trail, The University of Texas at Dallas (UT Dallas), 12<sup>th</sup> Street, and Shiloh. The DFW Airport North Station was not included in this study due to a lack of development currently surrounding the station. The City Line/Bush Station was also not included in this study since the surrounding area was included in a previous study completed in 2020 for rail stations along the DART Red Line corridor.

Recognizing full build-out of all improvements may not occur at one time due to funding availability or other local conditions; this study identifies a phased implementation approach, wherein recommended improvements are identified and ranked as high, medium, and low, based on the potential benefit to improve access for the greatest number of active users.

Opinion of Probable Construction Cost for new sidewalks with associated phasing priorities for implementation are provided for each station area. In addition, existing street trees within or adjacent to public street right-of-way (ROW) are identified for each station area to address opportunities for tree planting to improve shade and comfort for pedestrians.



*Silver Line Rail at Knoll Trail Station under construction*

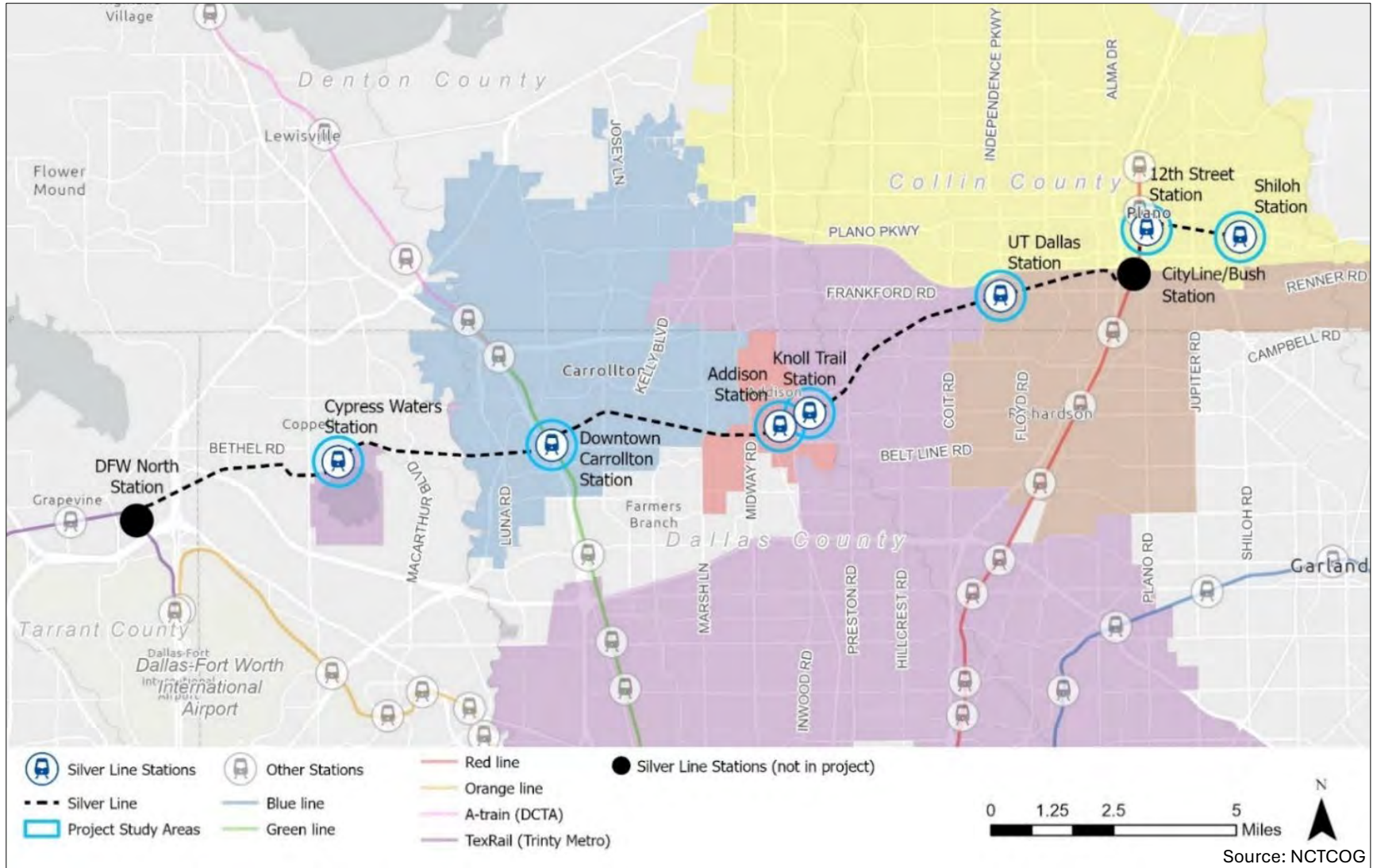
## Study Area

This study is focused on existing developed areas only. For some locations city staff provided information about approved development plans which will construct sidewalks at the time of development, and as such those locations are identified in this study as “existing/funded”. It is assumed future development on other undeveloped parcels such as around DFW Airport North Station and Cypress Waters Station will construct sidewalks when development occurs.

This study is intended to be a resource for DART, the Town of Addison, and the cities of Carrollton, Dallas, Plano, and Richardson to plan for needed active transportation infrastructure to increase pedestrian access to each rail station along the DART Silver Line rail corridor. This study focuses on the active walk distance using existing pedestrian facilities within public rights-of-way, which is impacted by gaps in the pedestrian network and other barriers of walking to and from a rail station. The corresponding analysis recommends priorities to construct sidewalk improvements by reviewing distance to rail stations, parcel land uses, access to major developments and destinations, and pedestrian safety. As a result of the sidewalk prioritization efforts, stakeholders and decisionmakers will have a better understanding of areas needing infrastructure investment and the associated opinion of probable construction cost to enhance the pedestrian network connectivity.

The study area includes seven Silver Line rail stations located in five cities (Addison, Carrollton, Dallas, Plano, and Richardson). The study area excluded the DFW Airport North Station in Grapevine and the City Line/Bush Station in Richardson.

# Study Area Map



Study Area



## Methodology

The Study methodology is based on NCTCOG's Federal Transit Administration Transit-Oriented Development 2020 study, ([NCTCOG's Federal Transit Administration Transit Orientated Development 2020 study.](#)) which provided the base framework to collect data and to establish prioritization efforts for infrastructure improvements.

## Sidewalk Inventory Base Data Collection

NCTCOG aerial imagery and Google Street View were used to review roadways within a half-mile radius of each Silver Line station to identify existing sidewalks, trail facilities, and gaps between those existing facilities. Existing sidewalks, sidewalk gaps, trails, and street trees were digitized in GIS to create an ultimate build-out scenario for active transportation needs (See Figure 1).

Sidewalks were digitized along public roadways owned by either the local municipal authority or the Texas Department of Transportation or along future developments provided at the instruction of the various cities included in this study. Additionally, all existing sidewalks determined to be in poor or unusable condition in the digitization phase were designated as a sidewalk gap since they comply with Americans with Disabilities (ADA) accessibility guidance.

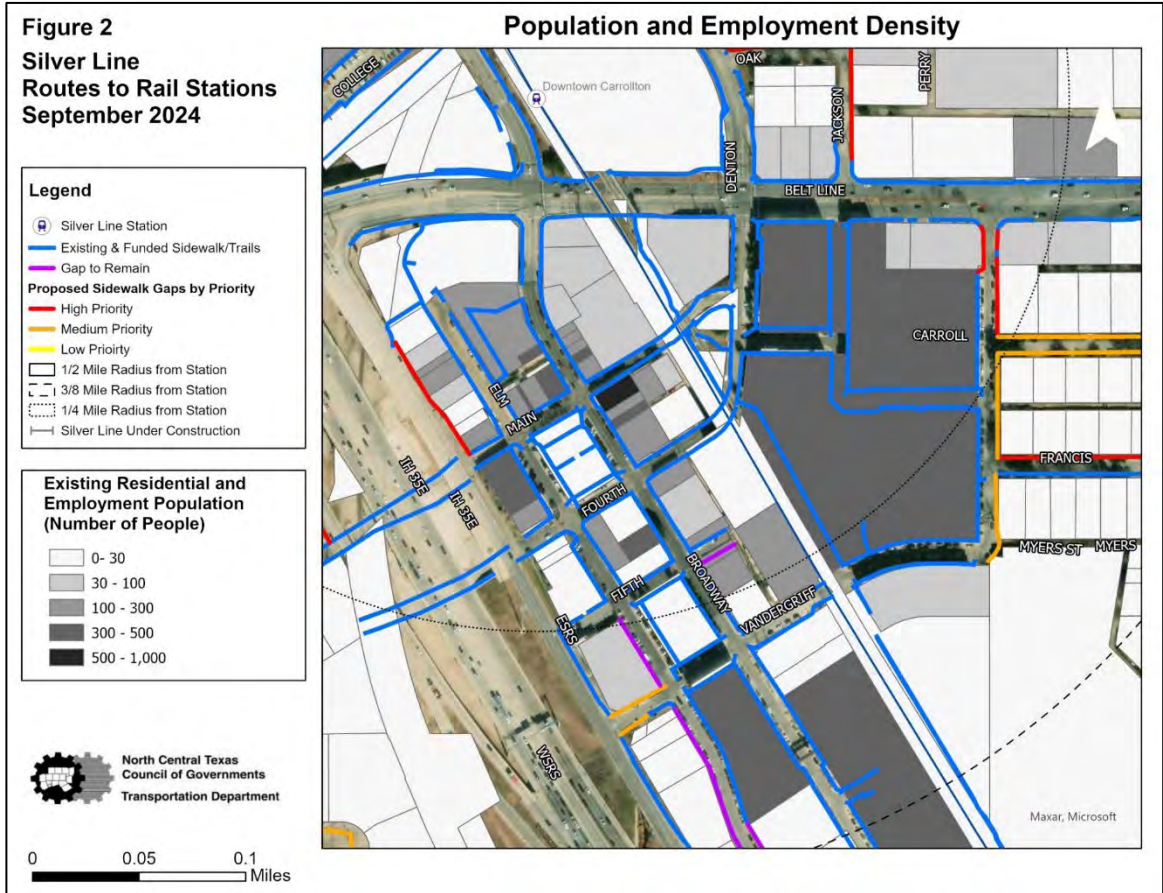


## Population and Employment Base Data Collection

For this study, NCTCOG staff developed a transit-oriented development (TOD) land use/parcel population density database, which served as a parcel level estimate of the average number of people who may be at a property (parcel) over the period of a typical day. This database considers the reported size and land use of each building and is supplemented with local knowledge from city staff about special institutional uses, such as hospitals and universities.

A database of population and employment density data was collected for parcels within the half-mile radius around Silver Line rail stations which provided approximate estimates for population, employment, and daily visitors (See Figure 2). These estimates were used to calculate the total number of potential transit riders within each block and to help prioritize the sidewalk gaps for implementation.

The TOD land use/parcel population estimates from 2023 were derived for each city from Central Appraisal Districts (CAD). Residential unit counts and/or commercial square footage were evaluated and edited if necessary. County CAD websites, satellite imagery, and other third-party websites were utilized in this process. NCTCOG 2020 Land Use data was created at the regional scale by NCTCOG’s Research and Information Services department. This data was spatially joined to the parcel data and edited for accuracy.



Source: NCTCOG

### **Prioritized Improvements for Implementation**

A network of recommended sidewalk improvements for implementation was developed and then prioritized by analyzing the following criteria: distance to rail station, tributary population and employment, access to major developments, and pedestrian safety (See Table 1).

Sidewalk gaps were first prioritized for implementation based on distance to/from the rail station dependent on a series of measurements; one-quarter mile radius, three-eighths mile radius, and one-half mile radius. As referenced in Table 1, the sidewalk gaps within a one-quarter mile radius distance were designated as high priority for sidewalk improvements. The sidewalk gaps located between the radius distances of one-quarter mile and three-eighths mile from the station received medium priority unless other criteria were met to elevate the priority to implement the sidewalk gap block. Sidewalk gaps located between the radius distances of three-eighths mile and one-half mile from the station received low priority unless other criteria were present within this block to elevate the priority for implementation.

**Table 1: Criteria for Sidewalk Implementation Prioritization**

Priority	Distance	Population and Employment	Bus Stops	Major Destinations	Major Streets	Crashes
Description						
Default prioritization which may be adjusted based on the 5 criteria (Population and Employment, Bus Stops, Major Destinations, Major Streets, and Crashes)	Radius distance from transit station	Everything connecting to the block Gap group with a high number of Potential riders (Population + Employment)	Streets with bus routes and stops are prioritized for improvements	Streets with key destinations (hospitals/clinics/ urgent care, schools, government buildings, grocery stores, malls, supercenters, entertainment, fine arts, parks, libraries, museums) are prioritized for improvements	Arterial and collector streets are prioritized for improvements	Streets with high frequency of crashes are prioritized for improvements
Criteria						
High Priority	0 - 1/4 mile (1,320 ft.)					
Medium Priority	1/4 mile - 3/8 mile (1,980 ft.)	Medium priority unless the amount of population and employment of all parcels within the entire block is $\geq 50$ and would be assigned high priority as well as the route to get to high priority.	Medium priority unless there is a bus route with stops along the block, and if so, improvements within this block are classified as high priority.	Medium priority unless there is a major destination along the block, and if so, improvements within the block are classified as high priority as well as the route to get to high priority.	Medium priority unless the block is along an arterial street or collector street, and if so, improvements within this block are classified as high priority.	Medium priority unless there are $\geq 3$ crashes along the block, and if so, improvements within this block are classified as high priority.
Low Priority	3/8 mile - 1/2 mile (2,640 ft.)	Low priority unless the population + employment is $\geq 50$ as well as the route to get to tier 1. Anything in low priority zone will become medium priority if the population + employment is between 25 and 50 as well as the route to get to medium priority.	Low priority unless there is a bus route with stops along the block, and if so, improvements within this block are classified as high priority.	Low priority unless there is a major destination along the block, and if so, improvements within this block are classified as high priority as well as the route to get to high priority.	Low priority unless the block is along an arterial street, and if so, improvements within this block are classified as high priority. If the block is along a collector street, improvements within this block are classified as medium priority.	Low priority unless there are $\geq 3$ crashes along the block, and if so improvements within this block are classified as high priority.

As identified in Table 1, the criteria of Distance, Population and Employment, Bus Stops, Major Destinations, Major Streets, and Crashes were reviewed and where appropriate a sidewalk gap designation was increased to a higher priority for improvement. For example, sidewalk gaps beyond the one-quarter mile distance from the station were reviewed and prioritized if they were adjacent to areas of higher density population and employment. Sidewalk gaps adjacent to key destinations located in proximity of the station (e.g. hospitals/clinics/urgent care, schools, government buildings, grocery stores, malls, supercenters, entertainment, fine arts, parks, libraries, museums) were reviewed and elevated for higher priority to implement. Sidewalk gaps adjacent to bus routes were given high priority for improvements regardless of the distance from the station within the one-half mile study area. Sidewalk gaps located along arterial and collector streets were prioritized for improvements. Safety considerations were also considered based on the number of reported crashes involving pedestrians and motor vehicles. However, in this study the review of crash data around the stations did not identify a significant number of crashes in proximity to blocks with existing sidewalk gaps.

### **Opinion of Probable Construction Cost**

A cost per linear foot was used to calculate opinion of probable construction cost (OPCC) for high, medium, and low priority improvements within each station area. After coordinating with local city staff, a base construction cost was estimated for sidewalk construction ranging from \$300 per linear foot (City of Plano) to \$350 per linear foot (Town of Addison, and Cities of Carrollton, Dallas, and Richardson).\*

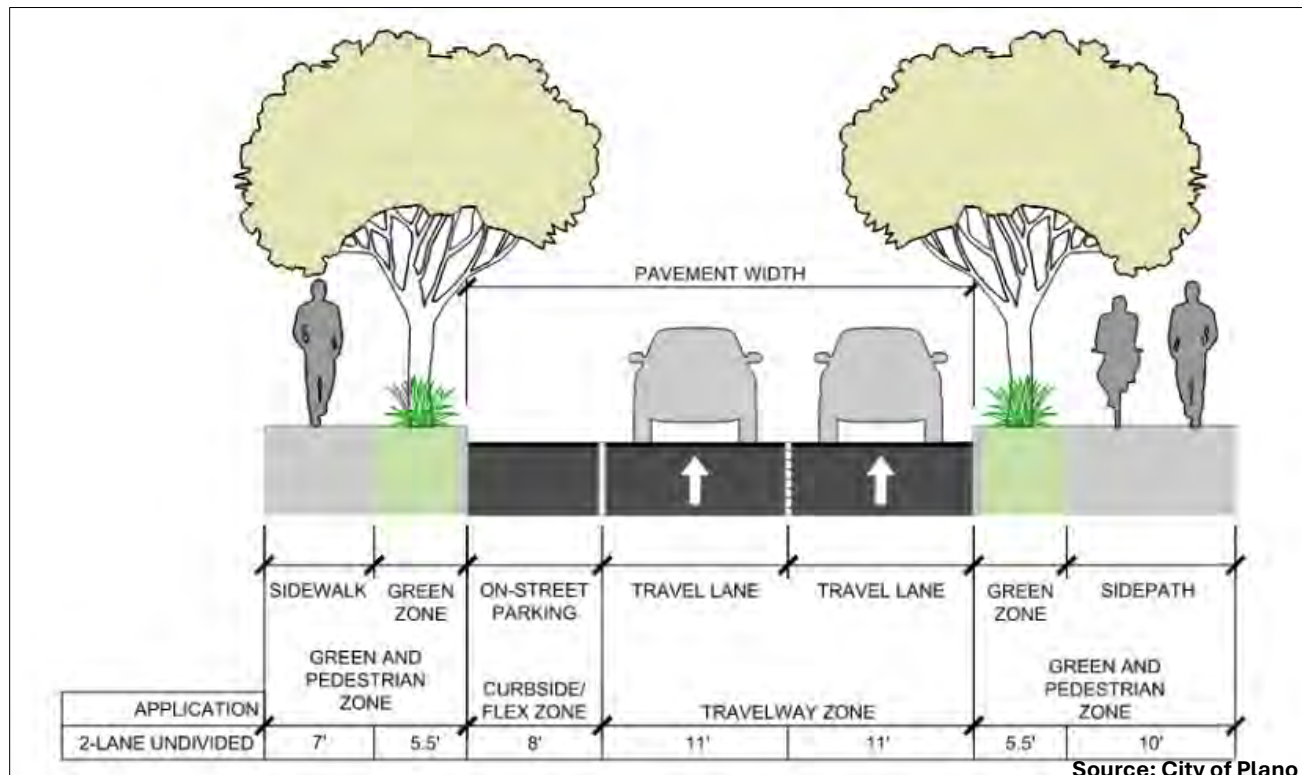
This base construction cost provides a high-level engineering estimate for identified blocks needing improvement. This base cost includes standard items included in constructing a sidewalk in addition to multipliers for other associated project costs.

The OPCC does not include specialty construction items for a project based on the context of the project area, such as: utility relocation (lines, poles, boxes), railroad crossings, traffic signals (Rectangular Rapid Flashing Beacon (RRFB), Pedestrian Hybrid Beacon, Accessible Pedestrian Signals (APS)/Countdown pedestrian signal, pedestrian signal), illumination, retaining walls, driveway reconstruction, drainage culverts, and reinforced concrete pipe (RCP). Thus, a more detailed engineering cost estimate should be developed for each improvement area before finalizing funding needed for project implementation.

\*The estimate of \$300-\$350/LF is based on 2024 values and does not account for inflation; it is recommended similar projects in the future reassess this value and update as needed.

## Existing Street Trees and Recommendations

The shading and cooling effects street trees provide increases the perceptions of safety and comfort and as such increases the likelihood pedestrians will choose to use the sidewalks to make a walking trip to/from their destinations. Other benefits include sound pollution reduction, vehicle speed management for pedestrian safety, and air quality improvements. Documenting existing street trees in the public ROW around a transit station identified sidewalks lacking shade for pedestrians. As such it would be desirable to plant more trees in these areas to improve the pedestrian environment.



*Trees, Sidewalks and Street Cross section*

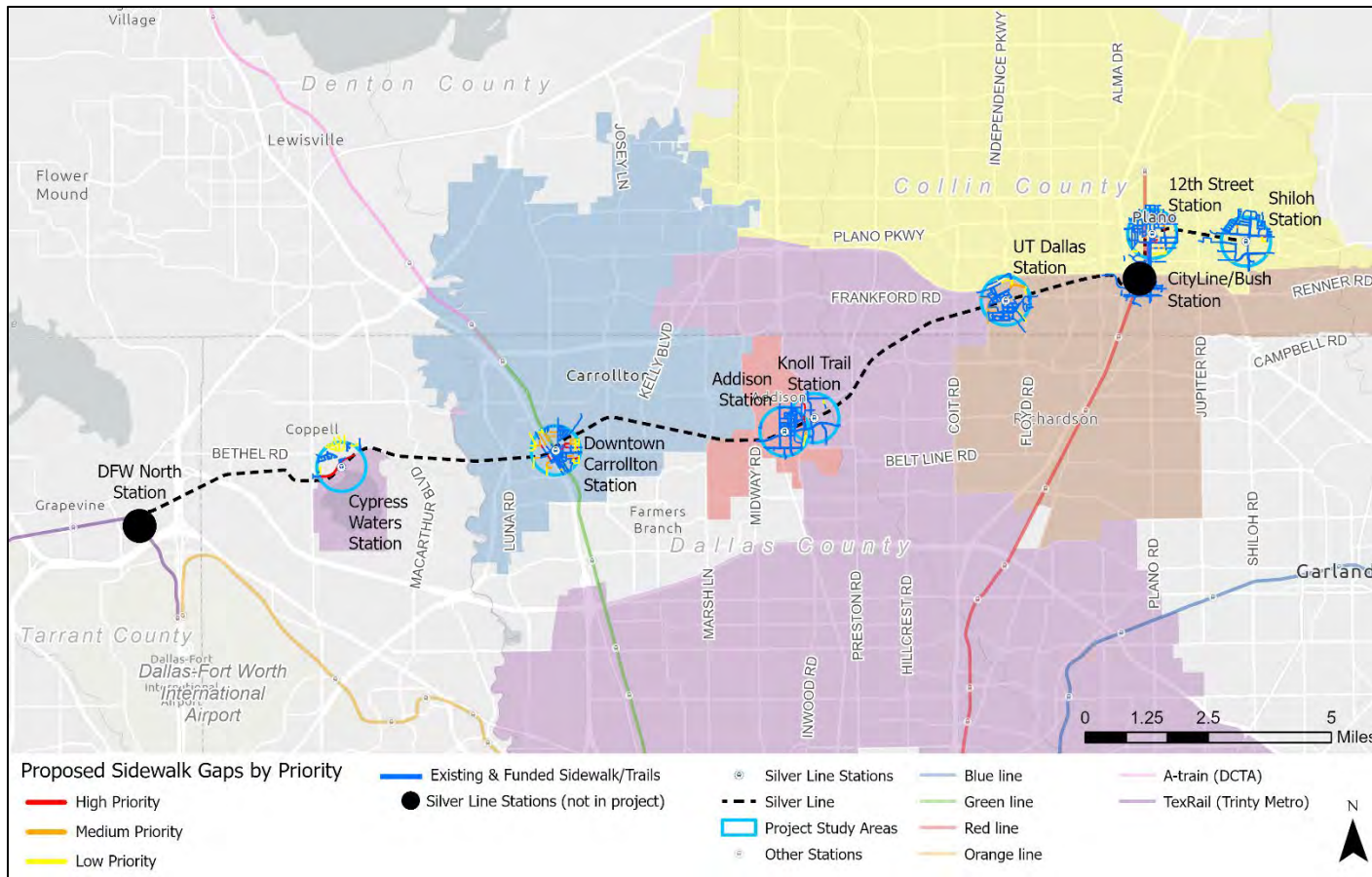
Existing trees were reviewed and inventoried within the half-mile radius area of each station and digitized if located within the street ROW or on private property within 10 ft. of the street ROW. Street trees must provide adequate shade for pedestrians traveling on sidewalks along roadways to be included in the station area existing street tree inventory. Streets with trees exceeding 50 ft. in distance from one another along sidewalks are considered lacking adequate pedestrian shading coverage. However, all such trees were identified regardless of the spacing between the trees referenced in Appendix C.

# Station Area Recommendations

## Station and Sidewalk Gap Block Organization

The following station area recommendations are provided from the westernmost station (Cypress Waters) to the easternmost station (Shiloh). Each station includes recommendations for high, medium, and low priority improvements, documents existing street trees, and provides base level opinions of probable construction costs in 2024 dollars.

See Appendix A for a summary of detailed opinion of probable construction cost associated with each block segment.



Silver Line Rail Stations aerial view of sidewalk improvement recommendations

## Cypress Waters Transit Station

### Station Area Recommendations

Within the half-mile radius of Cypress Waters Station, there are 14 blocks of sidewalk gaps totaling approximately five miles in length (See Figure 3). Table 2 identifies the estimated total construction costs for sidewalk gap improvements around Cypress Waters Station is approximately \$9.5 million (2024 dollars). Sidewalk gaps are mostly located in Coppell single family residential neighborhoods north of the station area and were identified as low priority due to long circuitous walking distances to access the station. One block along Belt Line Road is identified as a high priority sidewalk connection to the future Cypress Waters development to the south of the station area around North Lake.

The north side of Belt Line Road between Kyra Court and Moore Road was identified as a sidewalk gap to remain since a sidewalk in this location would not provide access to a destination. A high priority connection from the rail station to the North Lake Trail was not included in the OPCC since it is expected to be constructed with future development.

Approximately half of the neighborhood streets to the north of the station have consistent street tree plantings (See Figure 4). However, Belt Line Road lacks street tree coverage.



Cypress Waters Station

**Table 2: Cypress Waters Summary  
Opinion of Probable Construction Cost**

Priority Rank	Linear Feet	Opinion of Probable Construction Cost (2024 \$)*
High	7,160**	\$ 2,500,000**
Medium	0	\$ 0
Low	20,000**	\$ 7,000,000**
<b>Total:</b>	<b>27,200**</b>	<b>\$ 9,500,000 **</b>

\*The \$350 cost per linear foot does not include specialty construction items which could be included in a project based on the context of the project area, such as: utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, retaining walls, driveway reconstruction, drainage culverts, and reinforced concrete pipe.

\*\*Values may not sum correctly due to independent rounding.



**Figure 3**

**Silver Line  
Routes to Rail Stations  
September 2024**

**Cypress Waters Station  
Recommended Sidewalk Construction**

**Legend**

- Silver Line Station
- Existing & Funded Sidewalk/Trails
- Gap to Remain

**Proposed Sidewalk Gaps by Priority**

- High Priority
- Medium Priority
- Low Priority

- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction

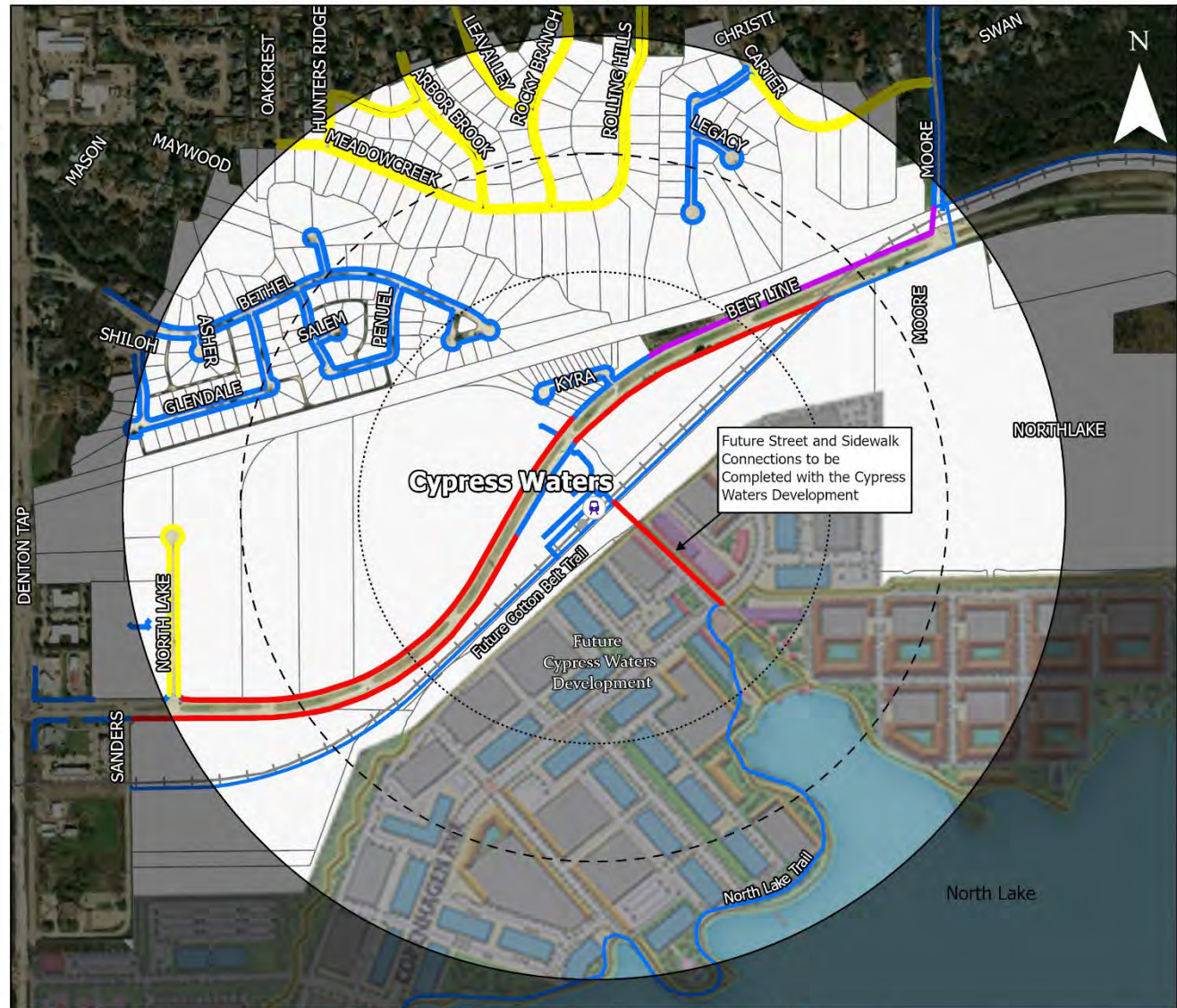
**Opinion of Probable Base Construction Cost (2024 \$)**

High.....	\$ 2,500,000
Medium.....	\$ 0
Low.....	\$ 7,000,000
<b>Total.....</b>	<b>\$ 9,500,000</b>

*\*See footnote below\**

**Existing Residential and Employment Population (Number of People)**

- 0 - 30
- 30 - 100
- 100 - 300
- 300 - 500
- 500 - 1,000



\*The \$350 cost per linear feet does not include major site-specific or project-specific construction items that could be included in a project based on the context of the project area, such as: major utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, major retaining walls, driveway reconstruction, major drainage culverts, and reinforced concrete pipe (RCP). Values may not sum correctly due to independent rounding.

0 0.13 0.25 Miles












Source: NCTCOG

Figure 4

**Silver Line  
Routes to Rail Stations  
September 2024**

**Cypress Waters Station Existing Street Trees**

**Legend**

-  Silver Line Station
-  Existing & Funded Sidewalk/Trails
-  Gap to Remain
- Proposed Sidewalk Gaps by Priority**
-  High Priority
-  Medium Priority
-  Low Priority
-  Street Trees
-  1/2 Mile Radius from Station
-  3/8 Mile Radius from Station
-  1/4 Mile Radius from Station
-  Silver Line Under Construction



Future Street and Sidewalk Connections to be Completed with the Cypress Waters Development

## Downtown Carrollton Station

### Station Area Recommendations

Downtown Carrollton consists of approximately 80 blocks with various sidewalk gaps with a combined total of ten miles in sidewalk gaps (See Figure 5). Table 3 identifies the estimated total construction costs for sidewalk gap improvements around Downtown Carrollton Station which is approximately \$18 million (2024 dollars). Based on feedback from city staff, Walnut Street and Francis Avenue were elevated to high priority to provide an important connection from the neighborhoods east of the station. In addition, city staff requested the sidewalk gap on College Avenue between North Interstate 35E and Luna Road be identified as a high priority for improvement consistent with City of Carrollton’s Thoroughfare Plan and future development anticipated in this area. It is anticipated this roadway and associated sidewalk improvement will be constructed with future development, and therefore was not included in the opinion of probable construction cost.

Some streets in the Downtown Carrollton study area have consistent street tree plantings (See Figure 6), primarily areas where new development has occurred in recent years. However, most of the street corridors within the station study area lack adequate tree coverage.



*Downtown Carrollton Station*

**Table 3: Downtown Carrollton Summary  
Opinion of Probable Construction Cost**

Priority Rank	Linear Feet	Opinion of Probable Construction Cost (2024 \$)*
High	10,700**	\$ 3,740,000**
Medium	22,100**	\$ 7,740,000**
Low	20,800**	\$ 7,280,000**
<b>Total:</b>	<b>53,600**</b>	<b>\$ 18,000,000**</b>

*\*The \$350 cost per linear foot does not include specialty construction items which could be included in a project based on the context of the project area, such as: utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, retaining walls, driveway reconstruction, drainage culverts, and reinforced concrete pipe.*

*\*\*Values may not sum correctly due to independent rounding.*

**Figure 5**

**Silver Line  
Routes to Rail Stations  
September 2024**

**Downtown Carrollton Station  
Recommended Sidewalk Construction**

**Legend**

- Silver Line Station
- Existing & Funded Sidewalk/Trails
- Gap to Remain
- Proposed Sidewalk Gaps by Priority**
- High Priority
- Medium Priority
- Low Priority
- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction

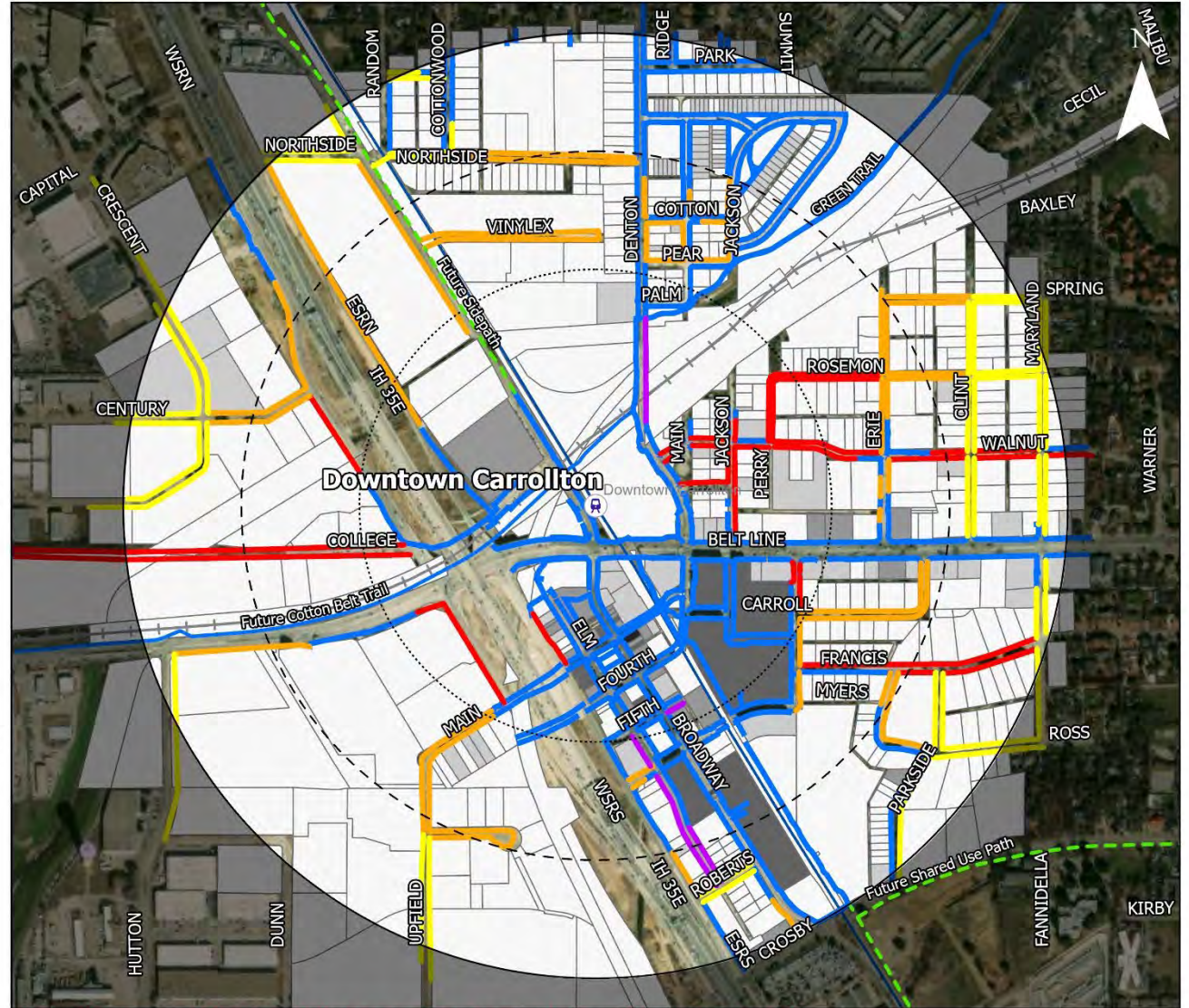
**Opinion of Probable Base Construction Cost (2024 \$)**

High.....	\$ 3,740,000
Medium.....	\$ 7,740,000
Low.....	\$ 7,280,000
<b>Total.....</b>	<b>\$ 18,800,000</b>

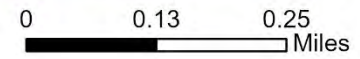
*\*See footnote below\**

**Existing Residential and Employment Population (Number of People)**

- 0 - 30
- 30 - 100
- 100 - 300
- 300 - 500
- 500 - 1,000



\*The \$350 cost per linear feet does not include major site-specific or project-specific construction items that could be included in a project based on the context of the project area, such as: major utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, major retaining walls, driveway reconstruction, major drainage culverts, and reinforced concrete pipe (RCP). Values may not sum correctly due to independent rounding.



Source: NCTCOG

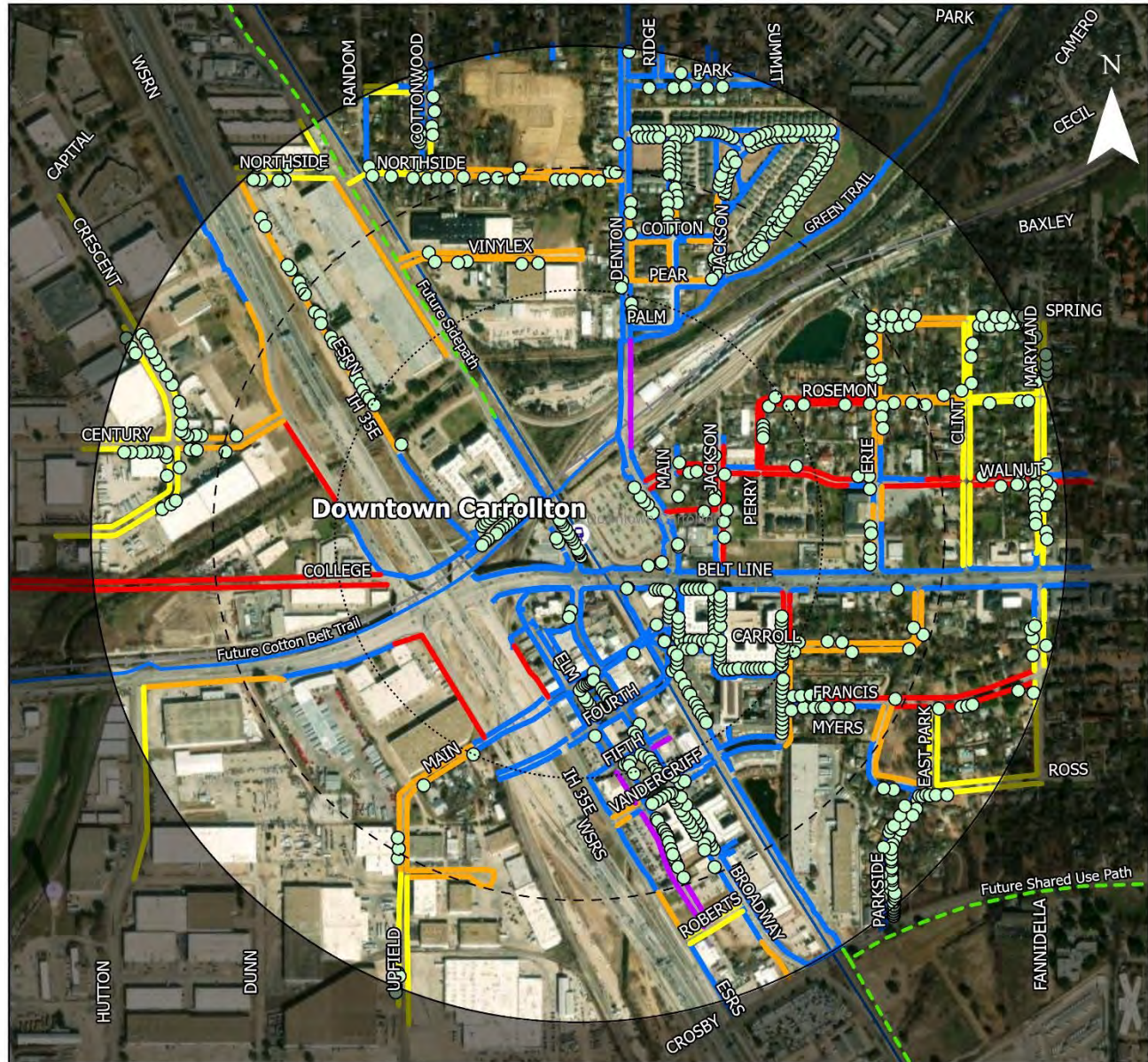
Figure 6

Silver Line  
Routes to Rail Stations  
September 2024

Downtown Carrollton Station Existing Street Trees

**Legend**

- Silver Line Station
- Existing & Funded Sidewalk/Trails
- Gap to Remain
- Proposed Sidewalk Gaps by Priority**
- High Priority
- Medium Priority
- Low Priority
- Street Trees
- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction



## Addison Station

### Station Area Recommendations

A total of 11 blocks with sidewalk gaps were identified within the Addison Station area (See Figure 7). The sidewalk gaps identified along Addison Road require further study for the feasibility of construction or may be constructed as part of future redevelopment along the roadway corridor. The sidewalk gap identified along Lindbergh Drive south of Addison Airport is a significant corridor providing access to the station area. However, additional study is also needed to determine the feasibility of construction. Other sidewalk gaps were identified as existing or funded expected to be constructed with future development.

The existing pedestrian crossings along Belt Line Road at the Dallas North Tollway main lanes between the Dallas Parkway frontage roads are narrow and feel unsafe for pedestrians. Thus, the Town of Addison staff indicate a desire to study improvements at this location to enhance the pedestrian crossing, aesthetics, and level of comfort. Town staff also indicated a desire to study a potential roadway retrofit along Spectrum Drive (reduction in the number of vehicular lanes) to implement sidewalk facilities. Addison Station has a substantial number of street trees for pedestrian shading coverage in the half-mile area (See Figure 8). Streets currently lacking street tree coverage are Lindbergh Drive and Arapaho Road.



*Addison Station*

**Figure 7**

**Silver Line  
Routes to Rail Stations  
December 2024**

**Addison Station  
Recommended Sidewalk Construction**

**Legend**

- Silver Line Station
- Existing and Funded Sidewalk/Trails
- Gap to Remain

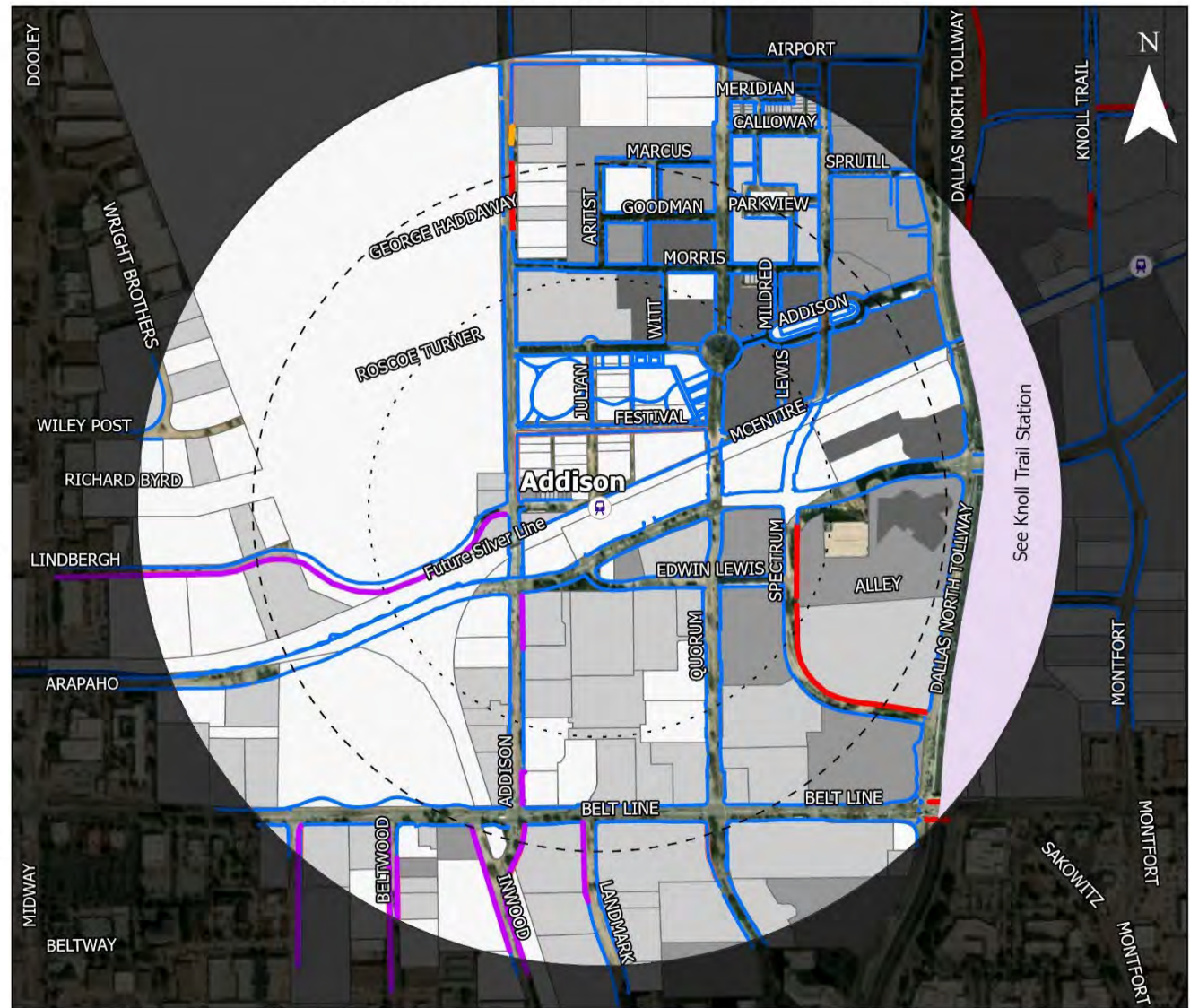
**Proposed Sidewalk Gaps by Priority**

- High Priority
- Medium Priority
- Low Priority

- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction

**Existing Residential and Employment Population (Number by People)**

- 0 - 30
- 30 - 100
- 100 - 300
- 300 - 500
- 500 - 1,000



See Knoll Trail Station

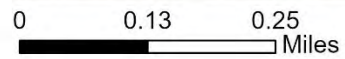
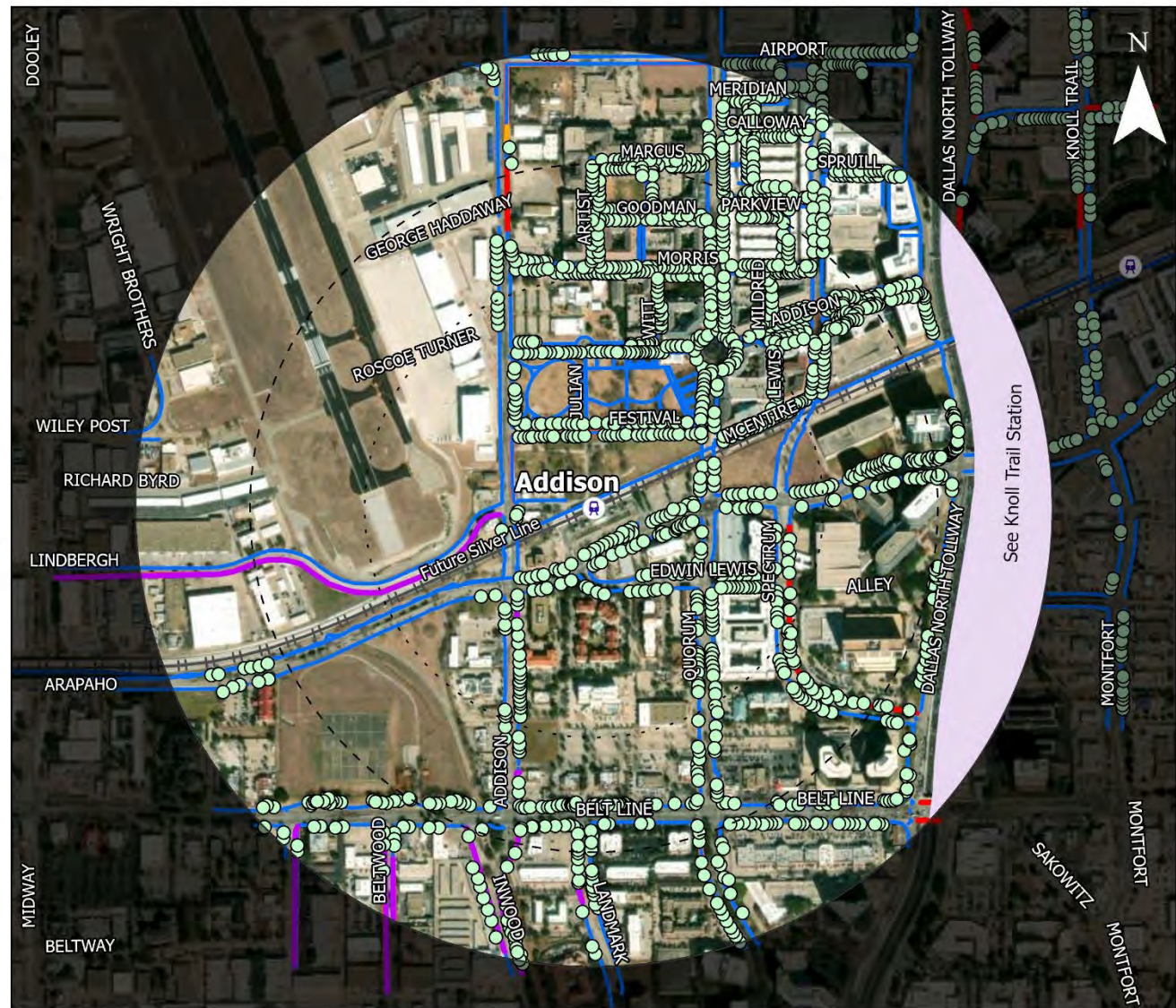
Figure 8

# Addison Station Existing Street Trees

Silver Line  
Routes to Rail Stations  
December 2024

**Legend**

- Silver Line Station
- Existing and Funded Sidewalk/Trails
- Gap to Remain
- Proposed Sidewalk Gaps by Priority**
- High Priority
- Medium Priority
- Low Priority
- Street Trees
- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction



North Central Texas  
Council of Governments  
Transportation Department

Source: NCTCOG



## Knoll Trail Station

### Station Area Recommendations

The area around Knoll Trail Station has 10 blocks with approximately 1.3 miles of sidewalk gaps (See Figure 9). Table 4 identifies the estimated total construction costs for sidewalk gap improvements around Knoll Trail Station is approximately \$2.5 million (2024 dollars). The sidewalk gaps along Knoll Trail Drive were identified as high priority making a direct connection to the station from businesses and neighborhoods to the north.

Some streets in the Knoll Trail study area have consistent street tree plantings (See Figure 10). However, most of the street corridors within the station study area lack adequate street tree coverage.



Knoll Trail Station

**Table 4: Knoll Trail Summary  
Opinion of Probable Construction Cost**

Priority Rank	Linear Feet	Opinion of Probable Construction Cost (2024 \$)*
High	3,030**	\$ 1,060,000**
Medium	679**	\$ 238,000**
Low	3,310**	\$ 1,160,000**
<b>Total:</b>	<b>7,010**</b>	<b>\$ 2,450,000**</b>

\*The \$350 cost per linear foot does not include specialty construction items which could be included in a project based on the context of the project area, such as: utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, retaining walls, driveway reconstruction, drainage culverts, and reinforced concrete pipe.

\*\*Values may not sum correctly due to independent rounding

**Figure 9**

**Silver Line  
Routes to Rail Stations  
September 2024**

**Knoll Trail Station  
Recommended Sidewalk Construction**

**Legend**

- Silver Line Station
- Existing & Funded Sidewalk/Trails
- Gap to Remain

**Proposed Sidewalk Gaps by Priority**

- High Priority
- Medium Priority
- Low Priority

**Radius Indicators**

- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction

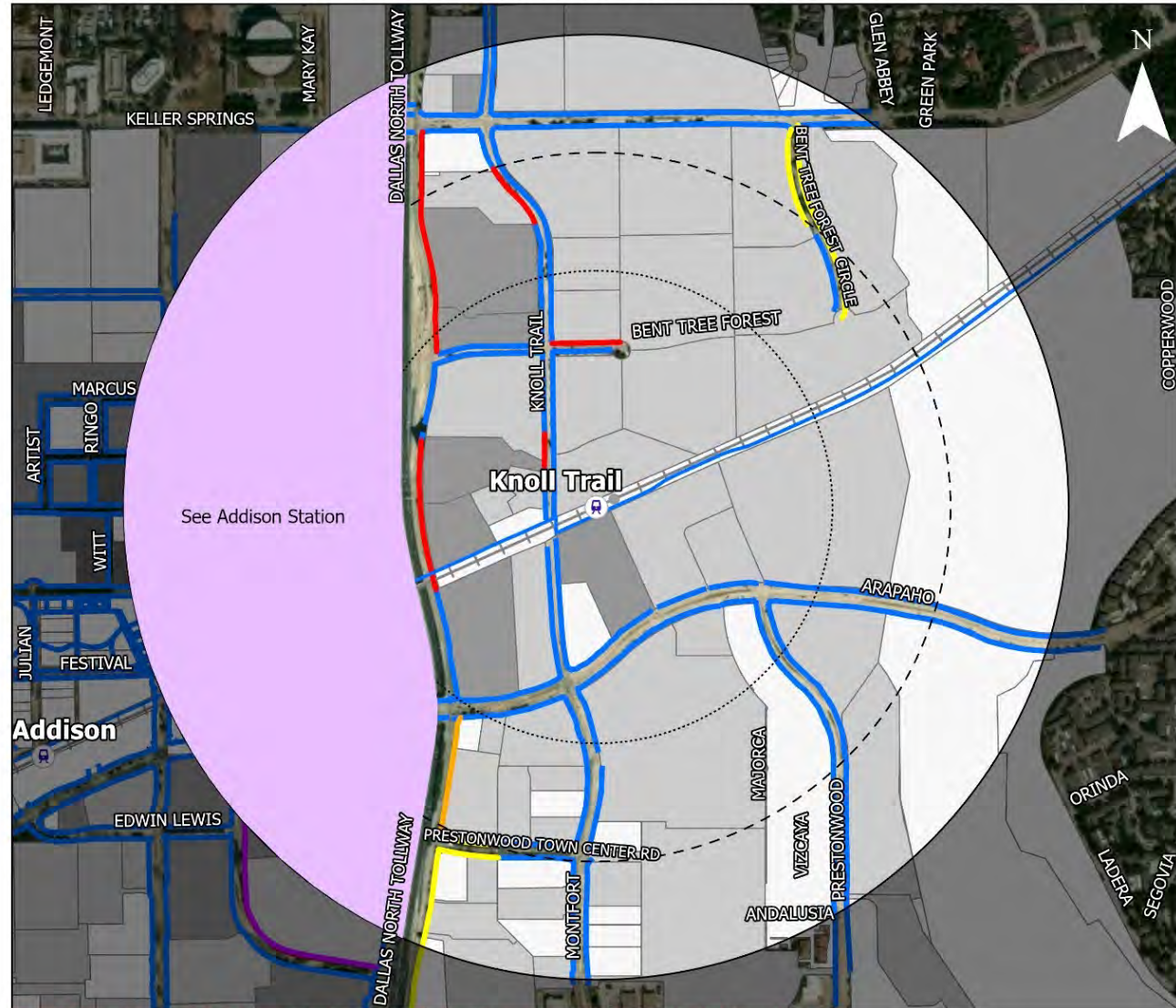
**Opinion of Probable Base Construction Cost (2024 \$)**

High.....	\$ 1,060,000
Medium.....	\$ 238,000
Low.....	\$ 1,160,000
<b>Total.....</b>	<b>\$ 2,450,000</b>

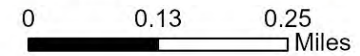
*\*See footnote below\**

**Existing Residential and Employment Population (Number of People)**

- 0 - 30
- 30 - 100
- 100 - 300
- 300 - 500
- 500 - 1,000



*\*The \$350 cost per linear feet does not include major site-specific or project-specific construction items that could be included in a project based on the context of the project area, such as: major utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, major retaining walls, driveway reconstruction, major drainage culverts, and reinforced concrete pipe (RCP). Values may not sum correctly due to independent rounding.*



Source: NCTCOG



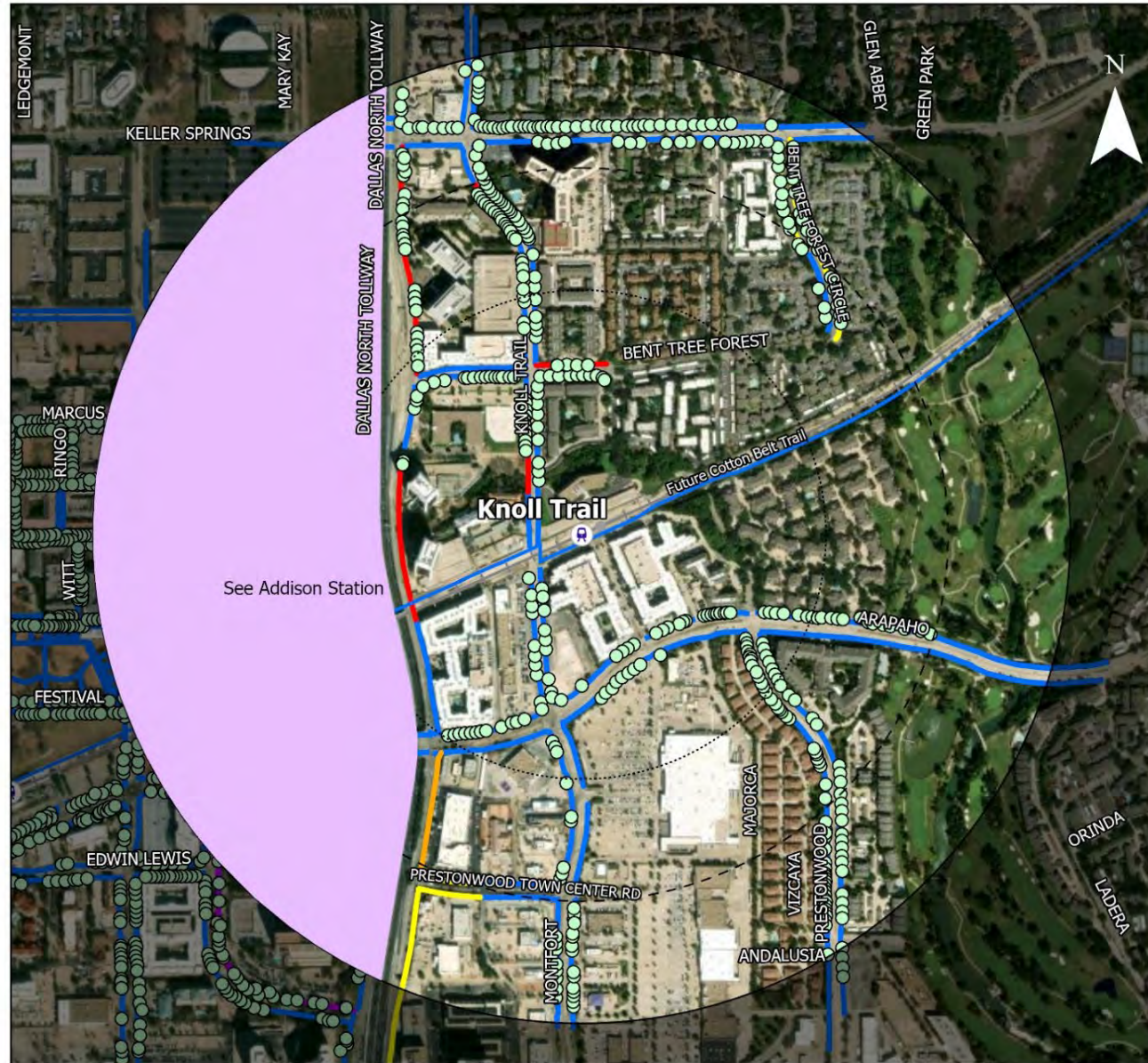
Figure 10

Silver Line  
Routes to Rail Stations  
September 2024

Knoll Trail Station Existing Street Trees

**Legend**

- Silver Line Station
- Existing & Funded Sidewalk/Trails
- Gap to Remain
- Proposed Sidewalk Gaps by Priority**
- High Priority
- Medium Priority
- Low Priority
- Street Trees
- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction



## University of Texas at Dallas Station

### Station Area Recommendations

The UT Dallas Station area has 13 blocks with various sidewalk gaps totaling approximately three miles (See Figure 11). Table 5 identifies the estimated total construction costs for sidewalk gap improvements around UT Dallas Station is approximately \$5.5 million (2024 dollars). Sidewalk gaps were identified as primarily medium and low priority since most are adjacent to future development areas and are not currently critical for providing pedestrian access to the station.

Future developments with funded sidewalks are identified north and south of Waterview Parkway where the project will be combining the redevelopment of the privately owned parcel northwest of the UT Dallas station and property owned by UT Dallas north of the station. Existing sidewalks located within UT Dallas property have been identified to represent the significant sidewalk network located around the station.

Some streets in the UT Dallas study area have consistent street tree plantings within recently constructed UT Dallas developments (See Figure 12). However, most of the street corridors within the station study area lack adequate street tree coverage.



UT Dallas Station

**Table 5: UT Dallas Summary  
Opinion of Probable Construction Cost**

Priority Rank	Linear Feet	Opinion of Probable Construction Cost (2024 \$)*
High	62**	\$ 21,800**
Medium	10,700**	\$ 3,730,000**
Low	4,980**	\$ 1,740,000**
<b>Total:</b>	<b>15,700**</b>	<b>\$ 5,490,000**</b>

\*The \$350 cost per linear foot does not include specialty construction items which could be included in a project based on the context of the project area, such as: utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, retaining walls, driveway reconstruction, drainage culverts, and reinforced concrete pipe.

\*\*Values may not sum correctly due to independent rounding.

**Figure 11**

**Silver Line  
Routes to Rail Stations  
September 2024**

**UT Dallas Station  
Recommended Sidewalk Construction**

**Legend**

- Silver Line Station
- Existing & Funded Sidewalk/Trails
- Gap to Remain

**Proposed Sidewalk Gaps by Priority**

- High Priority
- Medium Priority
- Low Priority

- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction

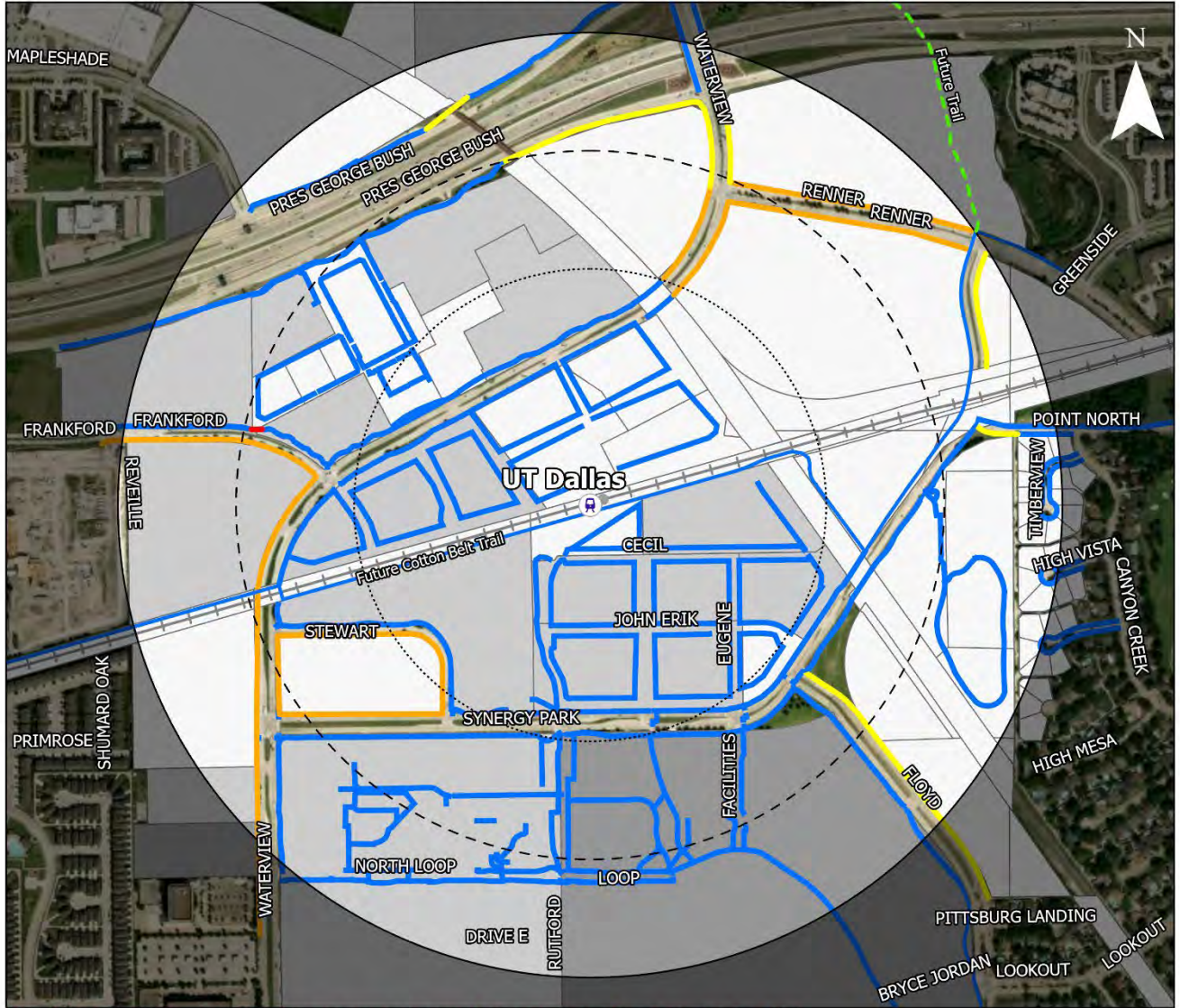
**Opinion of Probable Base Construction Cost (2024 \$)**

High.....	\$ 21,800
Medium.....	\$ 3,730,000
Low.....	\$ 1,740,000
<b>Total.....</b>	<b>\$ 5,490,000</b>

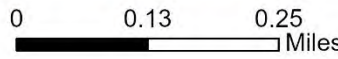
*\*See footnote below\**

**Existing Residential and Employment Population (Number of People)**

- 0 - 30
- 30 - 100
- 100 - 300
- 300 - 500
- 500 - 1,000



*\*The \$350 cost per linear feet does not include major site-specific or project-specific construction items that could be included in a project based on the context of the project area, such as: major utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, major retaining walls, driveway reconstruction, major drainage culverts, and reinforced concrete pipe (RCP). Values may not sum correctly due to independent rounding.*



Source: NCTCOG



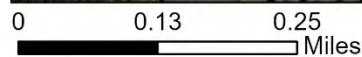
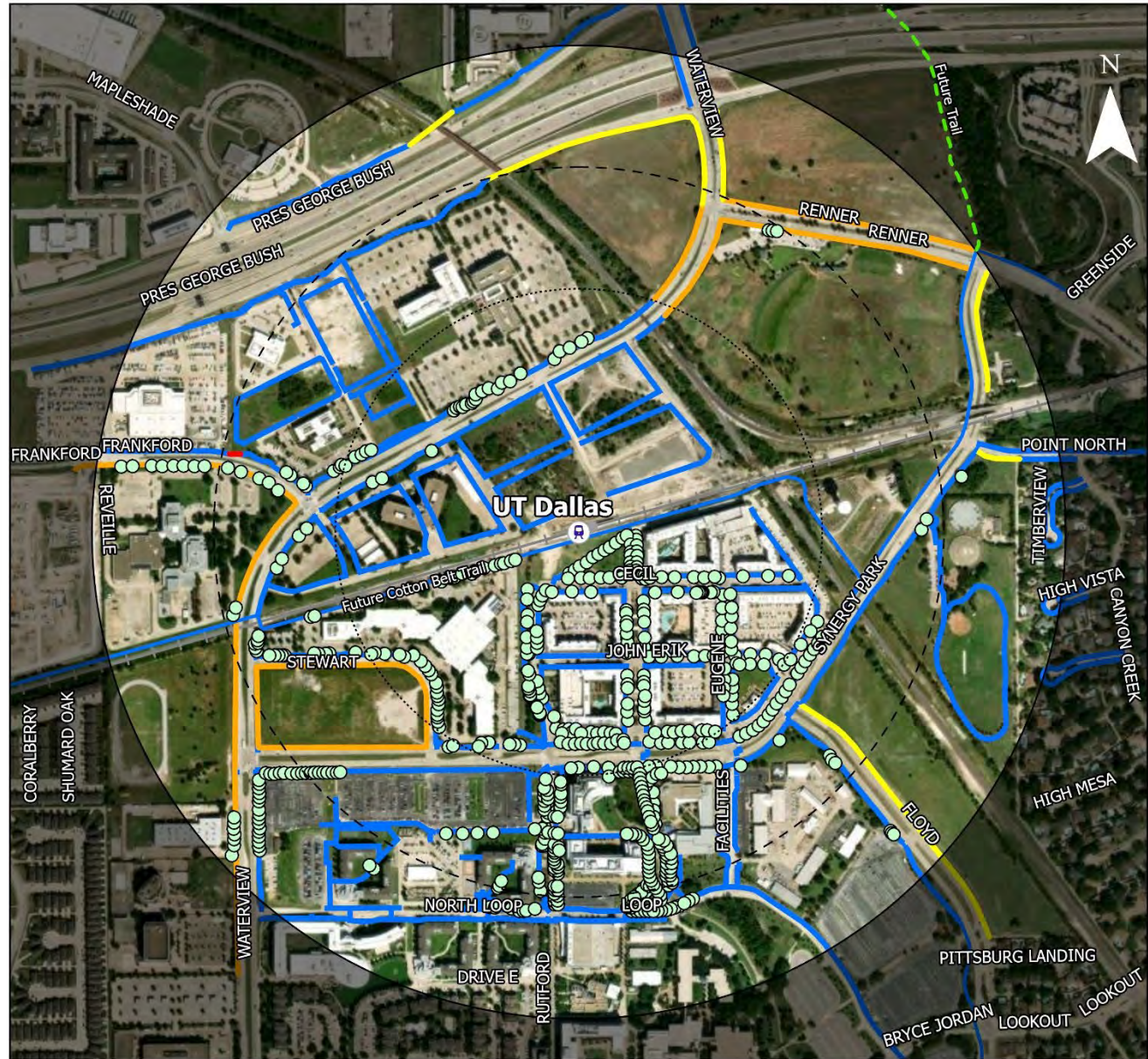
Figure 12

Silver Line  
Routes to Rail Stations  
September 2024

UT Dallas Station Existing Street Trees

**Legend**

- Silver Line Station
- Existing & Funded Sidewalk/Trails
- Gap to Remain
- Proposed Sidewalk Gaps by Priority**
- High Priority
- Medium Priority
- Low Priority
- Street Trees
- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction



Source: NCTCOG

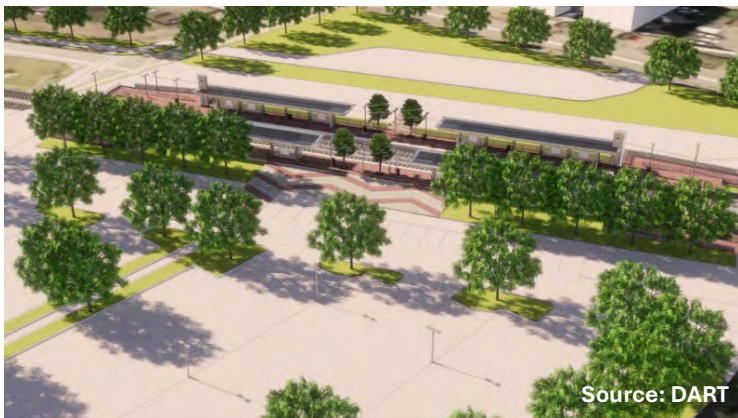
## 12<sup>th</sup> Street Station

### Station Area Recommendations

The 12<sup>th</sup> Street Station area has 56 blocks with various sidewalk gaps totaling approximately six miles in length (See Figure 13). Table 6 identifies the estimated total construction costs for sidewalk gap improvements around 12<sup>th</sup> Street Station is approximately \$9.7 million (2024 dollars). Most sidewalk gaps identified for improvement are in the southern part of the station area which currently consists of warehouse and light industrial land uses.

In addition, the Douglass neighborhood area generally bounded by 13<sup>th</sup> Street and Southwestern Avenue and F Avenue to I Avenue currently has a significant amount of sidewalk gaps. However, the City of Plano has funded sidewalks for construction along several streets in this area as part of the Community Investment Program. As such, those alignments are shown as existing/funded on Figure 13. The City of Plano has also approved development plans for other properties in the station area, such as the southeast corner of K Avenue and 10<sup>th</sup> Street which will include the construction of sidewalks adjacent to the property and are therefore shown as existing.

Some streets in the 12<sup>th</sup> Street Station study area have consistent street tree plantings (See Figure 14). However, most of the street corridors within the station study area lack adequate street tree coverage to shade walking routes to the station.



12th Street Station

**Table 6: 12th Street Summary  
Opinion of Probable Construction Cost**

Priority Rank	Linear Feet	Opinion of Probable Construction Cost (2024 \$)*
High	9,720**	\$ 2,920,000 **
Medium	8,780**	\$ 2,630,000**
Low	13,800**	\$ 4,130,000**
<b>Total:</b>	<b>32,300**</b>	<b>\$ 9,680,000**</b>

The \$300 cost per linear foot does not include specialty construction items which could be included in a project based on the context of the project area, such as: utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, retaining walls, driveway reconstruction, drainage culverts, and reinforced concrete pipe.

\*\*Values may not sum correctly due to independent rounding.

**Figure 13**

**Silver Line  
Routes to Rail Stations  
September 2024**

**12th Street Station  
Recommended Sidewalk Construction**

**Legend**

- Silver Line Station
- Existing & Funded Sidewalk/Trails
- Gap to Remain
- Proposed Sidewalk Gaps by Priority**
- High Priority
- Medium Priority
- Low Priority
- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction

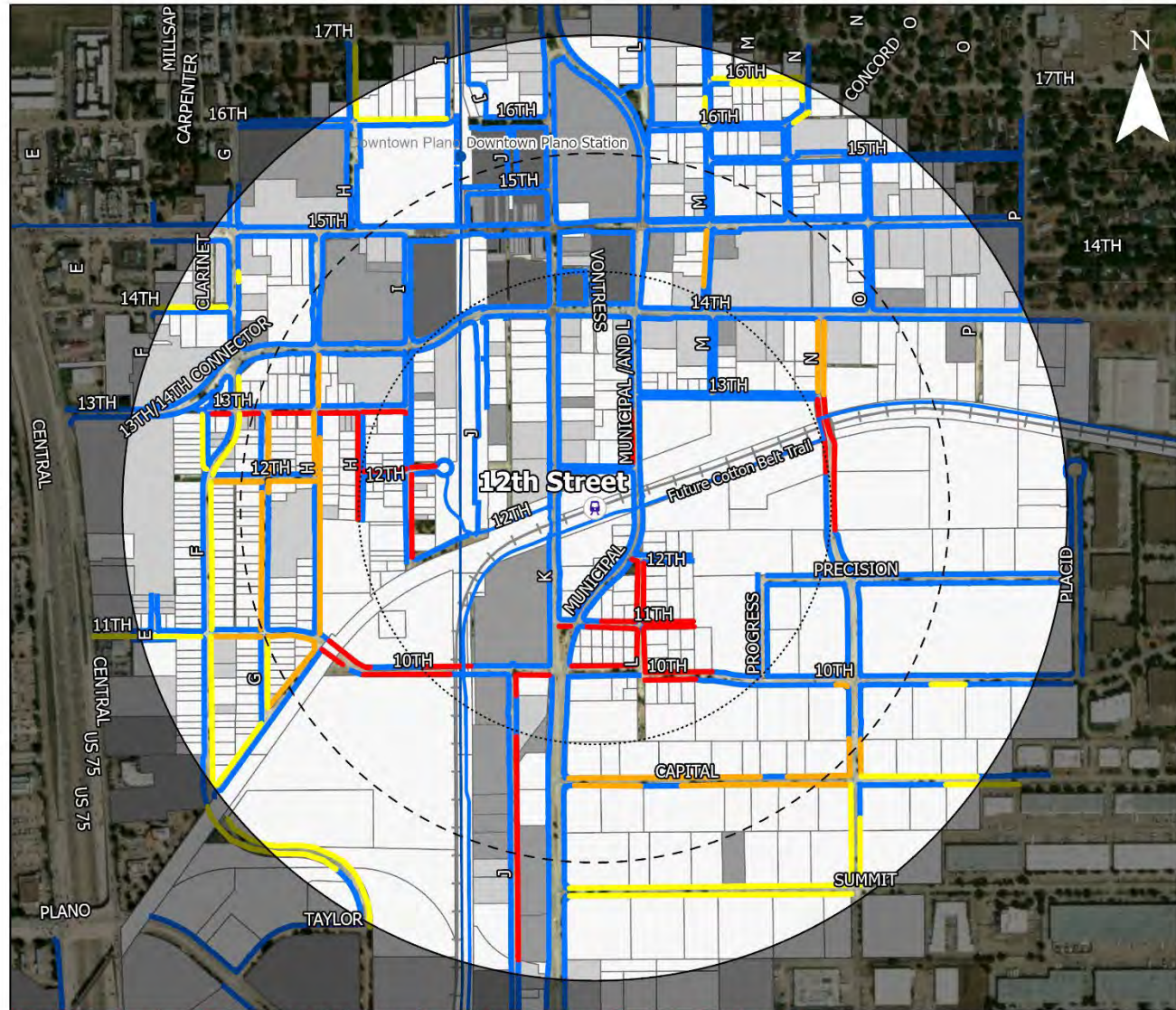
**Opinion of Probable Base Construction Cost (2024 \$)**

High.....	\$ 2,920,000
Medium.....	\$ 2,630,000
Low.....	\$ 4,130,000
<b>Total.....</b>	<b>\$ 9,680,000</b>

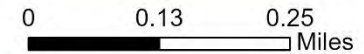
\*See footnote below\*

**Existing Residential and Employment Population (Number of People)**

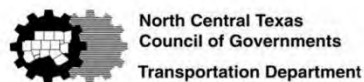
- 0 - 30
- 30 - 100
- 100 - 300
- 300 - 500
- 500 - 1,000



\*The \$300 cost per linear feet does not include major site-specific or project-specific construction items that could be included in a project based on the context of the project area, such as: major utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, major retaining walls, driveway reconstruction, major drainage culverts, and reinforced concrete pipe (RCP). Values may not sum correctly due to independent rounding.



Source: NCTCOG
















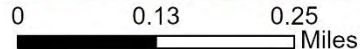
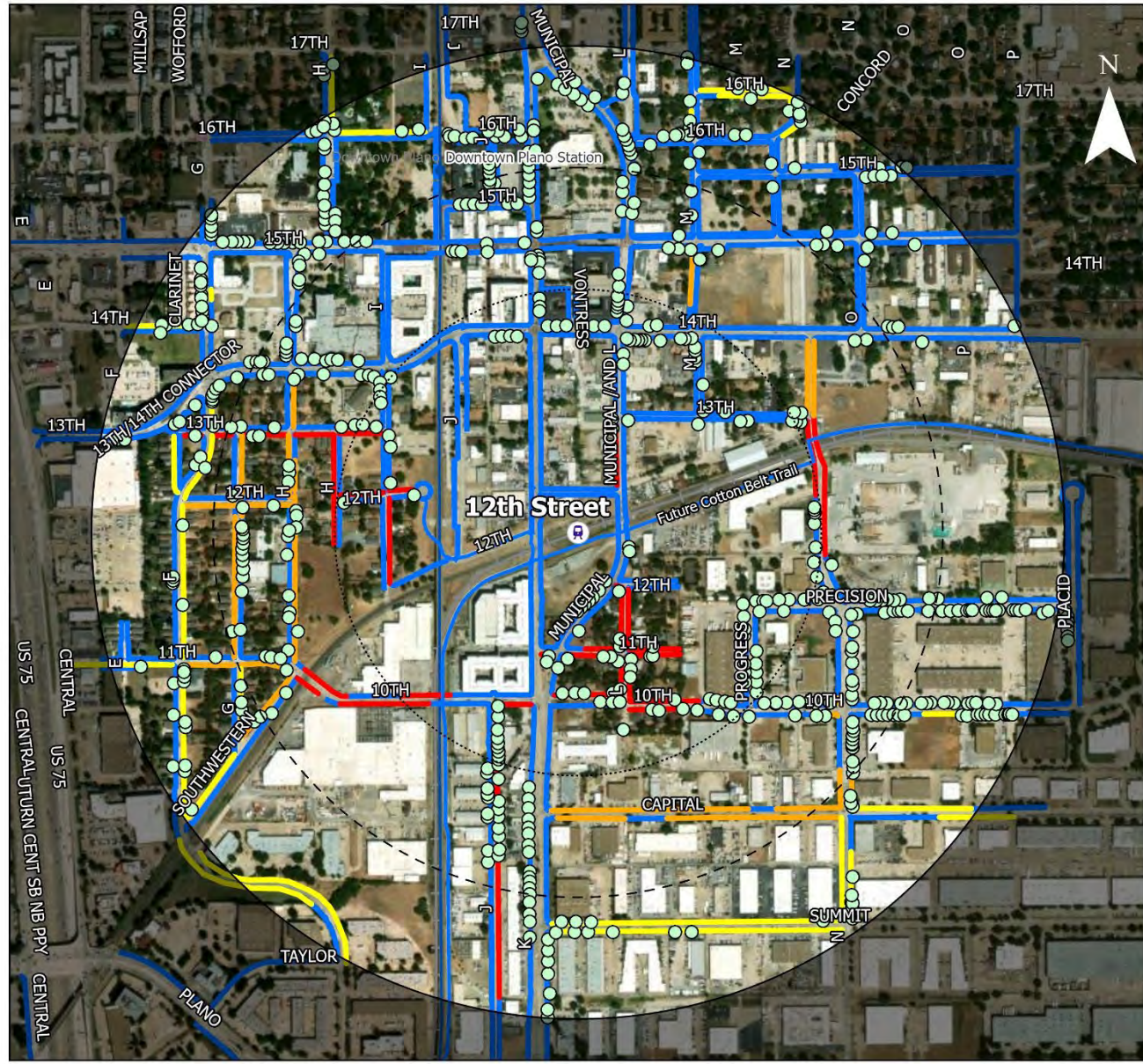
**Figure 14**

**Silver Line  
Routes to Rail Stations  
September 2024**

**12th Street Station Existing Street Trees**

**Legend**

-  Silver Line Station
-  Existing & Funded Sidewalk/Trails
-  Gap to Remain
- Proposed Sidewalk Gaps by Priority**
-  High Priority
-  Medium Priority
-  Low Priority
-  Street Trees
-  1/2 Mile Radius from Station
-  3/8 Mile Radius from Station
-  1/4 Mile Radius from Station
-  Silver Line Under Construction



## Shiloh Station

### Station Area Recommendations

The Shiloh Station area has approximately eight blocks with various sidewalk gaps totaling approximately 1.3 miles in length (See Figure 15). Table 7 identifies the estimated total construction costs for sidewalk gap improvements around Shiloh Station is approximately \$2 million (2024 dollars). High priority sidewalk gaps for improvement are identified along 14<sup>th</sup> Street to create important connections to businesses and neighborhoods east of the station.

Some streets in the Shiloh Station study area have consistent street tree plantings (See Figure 16). However, most of the street corridors within the station study area lack adequate street tree coverage to shade walking routes to the station.



Shiloh Station

**Table 7: Shiloh Summary**  
**Opinion of Probable Construction Cost**

Priority Rank	Linear Feet	Opinion of Probable Construction Cost (2024 \$)*
High	952**	\$ 285,000**
Medium	1,580**	\$ 473,000**
Low	4,170**	\$ 1,250,000**
<b>Total:</b>	<b>6,700**</b>	<b>\$ 2,010,000**</b>










\*The \$300 cost per linear foot does not include specialty construction items which could be included in a project based on the context of the project area, such as: utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, retaining walls, driveway reconstruction, drainage culverts, and reinforced concrete pipe.

\*\*Values may not sum correctly due to independent rounding.

**Figure 15**

**Silver Line  
Routes to Rail Stations  
September 2024**

**Legend**

-  Silver Line Station
-  Existing & Funded Sidewalk/Trails
-  Gap to Remain
- Proposed Sidewalk Gaps by Priority**
-  High Priority
-  Medium Priority
-  Low Priority
-  1/2 Mile Radius from Station
-  3/8 Mile Radius from Station
-  1/4 Mile Radius from Station
-  Silver Line Under Construction






**Opinion of Probable Base  
Construction Cost (2024 \$)**

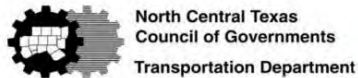
High.....	\$ 285,000
Medium.....	\$ 473,000
Low.....	\$ 1,250,000

**Total..... \$ 2,010,000**

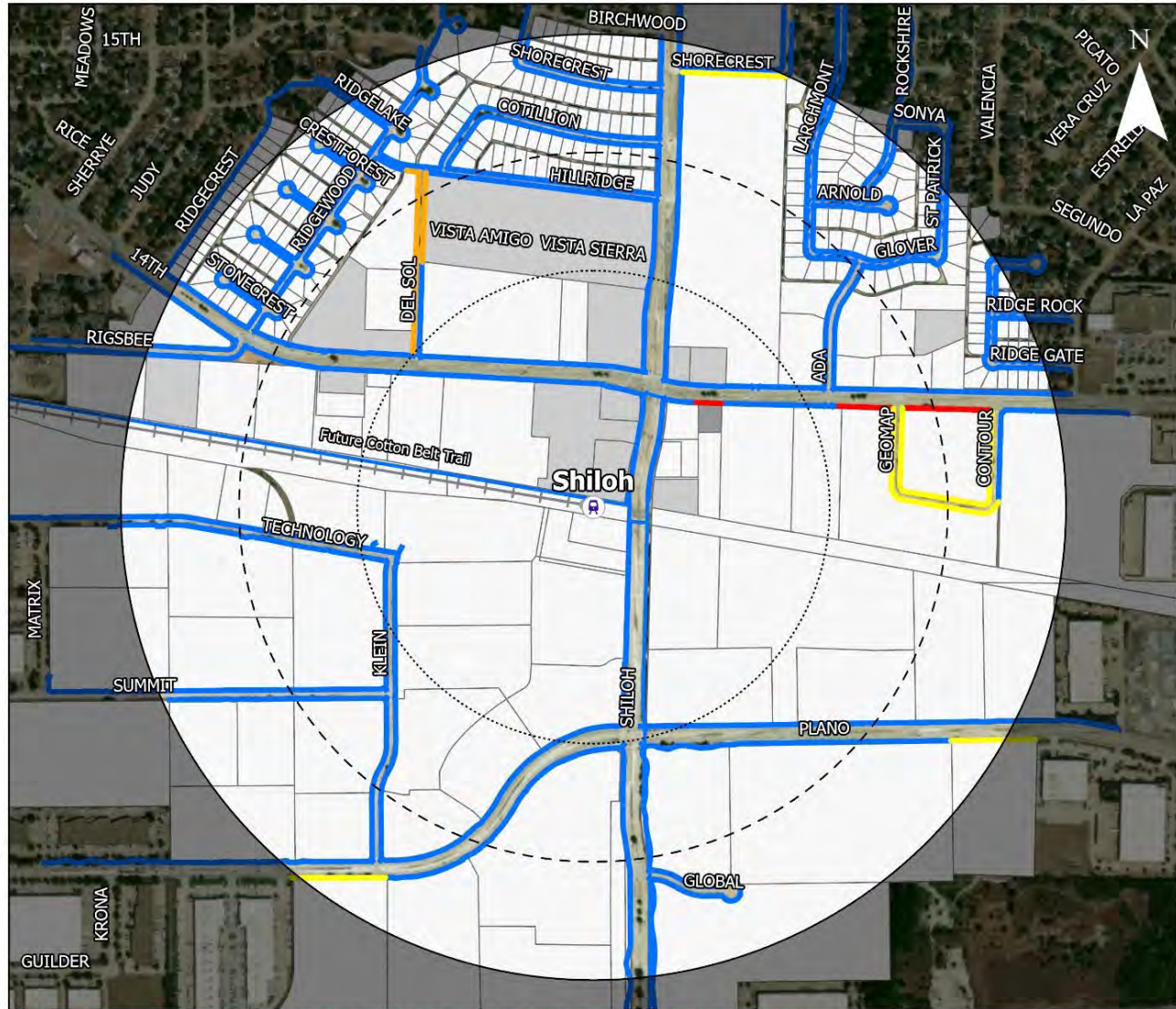
*\*See footnote below\**

**Existing Residential and  
Employment Population  
(Number of People)**

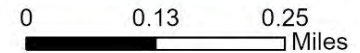
-  0- 30
-  30 - 100
-  100 - 300
-  300 - 500
-  500 - 1,000



**Shiloh Station  
Recommended Sidewalk Construction**



*\*The \$300 cost per linear foot does not include major site-specific or project-specific construction items that could be included in a project based on the context of the project area, such as: major utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, major retaining walls, driveway reconstruction, major drainage culverts, and reinforced concrete pipe (RCP). Values may not sum correctly due to independent rounding.*



Source: NCTCOG

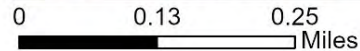
Figure 16

Silver Line  
Routes to Rail Stations  
September 2024

Shiloh Station Existing Street Trees

**Legend**

- Silver Line Station
- Existing & Funded Sidewalk/Trails
- Gap to Remain
- Proposed Sidewalk Gaps by Priority**
- High Priority
- Medium Priority
- Low Priority
- Street Trees
- 1/2 Mile Radius from Station
- 3/8 Mile Radius from Station
- 1/4 Mile Radius from Station
- Silver Line Under Construction



## Next Steps for Implementation

The Silver Line Routes-to-Rail Stations Study estimates approximately 27 miles of sidewalk gaps and a base construction cost of approximately \$47 million (2024 dollars) in sidewalk gap improvements primarily in existing developed areas surrounding the seven Silver Line rail stations (See Table 8). Opinion of probable construction costs generated for the improvements represent high-level cost estimates. Further detailed engineering estimates will be required to identify if additional infrastructure improvements are necessary, such as specialty construction items which may be necessary in the project area.\* Constructing these pedestrian improvements will require local agency coordination and local funding in order to improve access to the greatest number of potential transit riders. It is anticipated future development will construct sidewalks in areas which are currently undeveloped.

Sidewalk improvements are eligible for funding under various sources, including local funding by the Town of Addison and Cities of Carrollton, Dallas, Plano and Richardson, and DART. In addition, sidewalk improvements providing improved access for significant numbers of potential transit riders may also be eligible for federal transportation funding allocated to the region.

*\*The OPCC does not include specialty construction items which could be included in a project based on the context of the project area, such as: utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, retaining walls, driveway reconstruction, drainage culverts, and reinforced concrete pipe.*

**Table 8: Opinion of Probable Construction Cost Summary (All Stations)**

Station	Opinion of Probable Construction Cost Summary				
	High Priority	Medium Priority	Low Priority	Total (2024 \$)*	Total (2029 \$)**
Cypress Waters	\$ 2,500,000	\$ 0	\$ 7,000,000	\$ 9,500,000	\$11,558,200
Downtown Carrollton	\$ 3,740,000	\$ 7,740,000	\$ 7,280,000	18,000,000	\$21,899,800
Addison	N/A	N/A	N/A	N/A	N/A
Knoll Trail	\$ 1,060,000	\$ 238,000	\$ 1,160,000	\$ 2,450,000	\$2,980,800
UT Dallas	\$ 21,800	\$ 3,730,000	\$ 1,740,000	\$ 5,490,000	\$6,679,400
12 <sup>th</sup> Street	\$ 2,920,000	\$ 2,630,000	\$ 4,130,000	\$ 9,680,000	\$11,777,200
Shiloh	\$ 285,000	\$ 473,000	\$ 1,250,000	\$ 2,010,000	\$2,445,500
<b>Total</b>	<b>\$ 10,526,800</b>	<b>\$ 14,811,000</b>	<b>\$ 22,560,000</b>	<b>\$ 47,130,000</b>	<b>\$57,340,900</b>

*\*The \$300-\$350 cost per linear foot does not include specialty construction items which could be included in a project based on the context of the project area, such as: utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, retaining walls, driveway reconstruction, drainage culverts, and reinforced concrete pipe.*

*\*\*Assumes an annual inflation rate of four percent.*

## Appendix A:

### Half-Mile Area Improvement Opinion of Probable Construction Cost

#### Opinion of Probable Construction Costs

A cost per linear foot of sidewalk was developed to assess the cost of each sidewalk block to provide an opinion of probable construction cost for each Silver Line Station. After coordinating with local cities, a base construction cost ranged from \$300 per linear foot (City of Plano) to \$350 per linear foot (Town of Addison, and Cities of Carrollton, Dallas, and Richardson).<sup>\*</sup> This base cost provides a high-level engineering cost estimate for all identified sidewalk gaps within the study area. However, creating detailed engineering cost estimates for each block is recommended. This base cost includes standard items which would be included in constructing a sidewalk gap in addition to multipliers for other associated project costs (See Table 9).

Specialty items such as utility relocations, retaining walls, crossing signals, drainage culverts, and driveway reconstruction were not considered in the standard construction cost estimate.

*\*The \$300-\$350 cost per linear foot does not include specialty construction items which could be included in a project based on the context of the project area, such as: utility relocation (lines, poles, boxes), railroad crossings, traffic signals (RRFB, Pedestrian Hybrid Beacon, APS/Countdown pedestrian signal, pedestrian signal), illumination, retaining walls, driveway reconstruction, drainage culverts, and reinforced concrete pipe.*

**Table 9: Construction Items Included in Base Cost**

Construction Items Included in Base Cost*	
Sidewalk (5ft width)	
Ped Ramps	
Curb and Gutter Repair	
Drainage inlets (modify)	
Pavement Markings (crosswalks)	
Utility Adjustments (fire hydrant, manholes)	
Signage Adjustments	
Engineering Design	
General Landscaping	
SWPPP	
Traffic Control	
Mobilization	
Federal Contingency	
<b>BASE COST PER LINEAR FEET**</b>	<b>\$300-\$350</b>

*\*\*The estimate is based on 2024 values and does not account for inflation. For similar projects in the future, a reassessment of the value is recommended and updated as needed.*

## **Appendix B:**

### **Half-Mile Area Improvement Prioritization Methodology**

#### **Purpose**

The purpose of this appendix is to summarize the methodology used to prioritize sidewalk gaps for implementation through the review of distance from the station and other criteria related to population and employment, bus stops, major destinations, major streets, and crashes.

#### **Sidewalk Gaps Prioritized Based on Distance**

Distance from the rail station is the first criteria considered in the process in prioritizing sidewalk gaps for future implementation. A survey was conducted in 2016 by NCTCOG staff through the Federal Transit Administration Transit-Oriented Development Pilot Grant to measure the perceptions and behavior of residents and businesses around 28 DART stations. The survey found people are more likely to make a walking trip to the rail station when located within one-quarter mile distance from the station. For purposes of this study, the one-quarter mile area around the station was automatically designated as high priority for implementation as shown in Table 8. Sidewalk gaps located between one-quarter mile to three-eighths mile from the station were initially designated as medium priority and adjusted, if necessary, based on the five criteria. Sidewalk gaps located from three-eighths mile to one-half mile from the station are initially designated as medium priority and adjusted, if necessary, based on the five criteria (See Figure 17).



# Figure 17: Prioritization Distance Methodology

## Tier 1 (1/4 Mile):

Sidewalk gaps are **high** priority.



## Tier 2 (1/4-3/8 Mile):

Sidewalk gaps are initially **medium** priority and adjusted based on 5 criteria.



Additional considerations for sidewalk gaps in Tiers 2 and 3:

- Population and Employment Density
- Major Destinations
- Bus Stops
- Major Streets
- Reported Crashes

## Tier 3 (3/8-1/2 Mile):

Sidewalk gaps are initially **Low** priority and adjusted based on 5 criteria.



Source: NCTCOG

## **Data Collection and Prioritization Criteria**

Existing sidewalk data was provided by the Town of Addison, and the Cities of Carrollton, Dallas, Plano, and Richardson and was used to identify gaps in the network for each station's half-mile area. Other data collected and used for prioritizing sidewalk gaps includes population and employment, major developments, proximity to bus routes, number of pedestrian crashes involved with a vehicle, major arterial and collector streets.

### **Steps involved for the Sidewalk Gap Prioritization**

#### **1. Block Gap Groups**

Block gap groups (BGG) are sidewalk gaps clustered based on street blocks based on the assumption future construction of sidewalk improvements would include all gaps within the block.

#### **2. Distance Prioritization**

Distance from the rail station was the first criteria considered in the process in prioritizing sidewalk gaps. The one quarter mile area around the station was automatically designated as high priority. See table 1 for additional detail related to prioritizing sidewalk gaps located more than one quarter mile from the station.

#### **3. Symbolizing prioritization**

Once the initial priority for implementation was assigned based on distance from the station, then line symbology was assigned to the attributes in the priority field. The colors assigned for each priority were high as red, medium as orange, and low as yellow.

#### **4. Criteria Prioritization**

- **Population and Employment**
  - Station areas were reviewed for sidewalk gaps adjacent to areas with high population and employment density as referenced in Table 1.
- **Major Developments**
  - Destinations were manually counted located along the sidewalk BGG. If one or more destinations were located along the block, then the priority was increased to a higher priority referenced in Table 1 (applies to anywhere within the half-mile radius).
- **Proximity to Bus Routes**
  - If BGG's were confirmed to be along any bus routes, the BGG was changed to high priority (applies to anywhere within the half-mile radius).
- **Number of Pedestrian Crashes**
  - The number of crashes located within the block were evaluated.
  - For this study, there were no areas where there were greater than three fatal or non-fatal pedestrian crashes within a BGG, therefore no adjustments were made to the priorities based on crash data.
- **Major Streets**
  - Sidewalk BGG were reviewed to determine if they were along major streets and if so, the priority was increased to a higher priority referenced in Table 1 (applies to anywhere within the half-mile radius).

## Appendix C:

### Existing Street Tree Methodology

#### Purpose

Street Trees were identified within or immediately adjacent to street right-of-way to sidewalks along roadways within the station areas. The shading and cooling effects street trees provide can increase the likelihood pedestrians will use the sidewalks and reach their destination safely and comfortably. Therefore, documenting existing street trees in the public ROW around a transit station can identify areas lacking shade and desirable locations to plant more trees to improve the pedestrian environment.

#### Location of Existing Street Trees Identified Through ArcGIS (All Locations):

- Trees located within public street right-of-way, or within 10 ft. (or less) of the sidewalk (near or adjacent to street ROW), if they provide or will provide canopy upon maturity. These trees may be located on private property.
- Trees providing shade located within wild or free growing dense vegetation (not intentionally planted for street trees). See section on Street Trees Identified in Dense Vegetation.
- Trees exceeding 50 ft. spacing are considered lacking street tree shading coverage. However, these isolated trees were digitized regardless of the gap distance between the trees.
- Trees located within planters/tree wells within the sidewalk.



*Digitized Street Trees in ArcGIS*



Source: Google

*Examples of Existing Street Trees*

**Examples of Street Trees Identified:**



**Mexican Sycamore.**  
Max height: 80ft.  
Growth per year: 5ft.  
Eventual canopy size: 30ft.



**Green Ash.** Max height: 55ft.  
Growth per year: 2ft.  
Eventual canopy size: 25ft.



**Montezuma Cypress.**  
Max height: 80ft.  
Growth per year: 2ft.  
Eventual canopy size: 35ft.



**Live Oak.**  
Max height: 80ft.  
Growth per year: 2ft.  
Eventual canopy size: 100ft.

**Street Trees Identified in Dense Vegetation:**



Source: Google

*Examples of wild growing trees located within dense vegetation were identified as existing street trees. However, these wild growing trees were not planted with intent and likely do not provide the shade benefit of a canopy tree for sidewalk.*

**Examples of Trees Not Identified:**



Source: Google

*Ornamental trees, or any wild growing vegetation.*



Source: Google

*Wild growing vegetation or weeds*



Source: Google

*Trees located in the street center median.*



Source: Google

*Distance from sidewalk is within correct proximity of 10 ft. or less, but tree canopy and height are too small to serve as a street tree.*



Source: Google

*Ornamental Shrubs*



Source: Google

*Dead Trees*

**Definition List:**

- **Public Street Right-of-Way** is city-owned property where sidewalks are located.
- **Ornamental Trees/Shrubs** “are plants cultivated for the purpose of increasing the beauty of the garden, lawn, house, etc. such as Dahlia, Zinnia, Sunflower, Rose, etc.” ([Agriculturistmusa.com](http://Agriculturistmusa.com))
- **Deciduous Trees** “shed their leaves seasonally, usually in the fall. The leaves of deciduous trees are typically broad and flat, with a large surface area which allows for maximum absorption of sunlight. They are also thin and lightweight, which allows them to move easily in the wind.” ([plantnative.org](http://plantnative.org))



Source: Dallas Morning News

*Example of a Deciduous Tree*

- **Evergreen Trees** “retain their leaves throughout the year.” These types of trees do not provide sufficient shading for pedestrians. ([plantnative.org](http://plantnative.org))



Source: Google

*Examples of Evergreen Trees*

# **Silver Line Study**

## **Routes-to-Rail Stations**

### **Final Study**

September 2024

Updated December 2024



North Central Texas  
Council of Governments