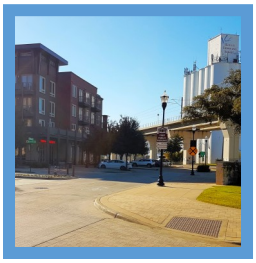
Dallas Area Rapid Transit
Silver Line Corridor
Transit-Oriented Development Plan








North Central Texas Council of Governments

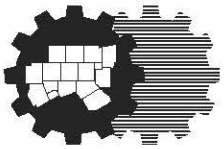
August 2025

What is NCTCOG?

The **North Central Texas Council of Governments** (NCTCOG) is a voluntary association of, by, and for **local governments** within the 16-county North Central Texas Region. The agency was established by state enabling legislation in 1966 to assist local governments in **planning** for common needs, **cooperating** for mutual benefit, and **coordinating** for sound regional development. Its purpose is to strengthen both the individual and collective power of local governments, and to help them recognize regional opportunities, resolve regional problems, eliminate unnecessary duplication, and make joint regional decisions – as well as to develop the means to implement those decisions.

North Central Texas is a 16-county **metropolitan region** centered around Dallas and Fort Worth. The region has a population of more than 8 million (which is larger than 38 states), and an area of approximately 12,800 square miles (which is larger than nine states). NCTCOG has 235 member governments, including all 16 counties, 170 cities, 20 independent school districts, and 29 special districts.

NCTCOG's **structure** is relatively simple. An elected or appointed public official from each member government makes up the **General Assembly** which annually elects NCTCOG's **Executive Board**. The Executive Board is composed of 17 locally elected officials and one ex-officio non-voting member of the legislature. The Executive Board is the policy-making body for all activities undertaken by NCTCOG, including program activities and decisions, regional plans, and fiscal and budgetary policies. The Board is supported by policy development, technical advisory and study **committees** – and a professional staff led by **Todd B. Little**, Executive Director.



NCTCOG's offices are located in Arlington in the Centerpoint Two Building at 616 Six Flags Drive (approximately one-half mile south of the main entrance to Six Flags Over Texas).

North Central Texas Council of Governments
P. O. Box 5888
Arlington, Texas 76005-5888
(817) 640-3300
FAX: (817) 640-7806
Internet: http://www.nctcog.org

NCTCOG's Department of Transportation

Since 1974 NCTCOG has served as the Metropolitan Planning Organization (MPO) for transportation for the Dallas-Fort Worth area. NCTCOG's Department of Transportation is responsible for the regional planning process for all modes of transportation. The department provides technical support and staff assistance to the Regional Transportation Council and its technical committees, which compose the MPO policy-making structure. In addition, the department provides technical assistance to the local governments of North Central Texas in planning, coordinating, and implementing transportation decisions.

Prepared in cooperation with the Texas Department of Transportation and the U.S. Department of Transportation, Federal Highway Administration, and Federal Transit Administration.

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Silver Line Corridor
Transit-Oriented Development Plan









North Central Texas Council of Governments

August 2025

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Silver Line Transit-Oriented Development Plan

Introduction

Transit-Oriented Development (TOD) is a key strategy supported by the North Central Texas Council of Governments (NCTCOG) to improve transportation and continue sustainable growth of the North Central Texas region. The Dallas Area Rapid Transit (DART) Silver Line is a new 26-mile regional rail service that will connect seven cities with three other rail lines and the Dallas-Fort Worth International Airport (DFW Airport), providing a significant opportunity for TOD and increased mobility options. Together NCTCOG and DART, DFW Airport, The University of Texas at Dallas (UT Dallas), the Cities of Carrollton, Dallas, Richardson, Plano, and the Town of Addison have partnered to continue advancing TOD around their stations with this plan.

Plan Background

In 2021, the Federal Transit Administration (FTA) awarded NCTCOG $1 million through the FTA TOD Planning Grant program to support land use planning with the new Silver Line rail corridor to increase future ridership and economic development. Coordinating with the Silver Line partners, the study addresses three TOD focus areas relevant to the Silver Line:

Pedestrian and Bike Infrastructure Routes to Rail Stations: Identifies needs and recommends improvements to enhance connections to rail stations to support increased ridership.

Parking and Management Study: Recommends parking management strategies for TOD using observed data of parking use at existing Silver Line developments to inform and suggest regulatory changes for appropriate parking ratios and management, for higher density TOD.

Land Use, Jobs and Housing Analysis: Evaluates opportunities to increase jobs and housing access around corridor stations through different land use scenarios and recommends future densities, uses, and related policies.

This study includes nine station half-mile radius areas across six cities seen in **Figure 1**. **Table 1** shows which planning focus areas applied to each station.

Figure 1: Study Area Map

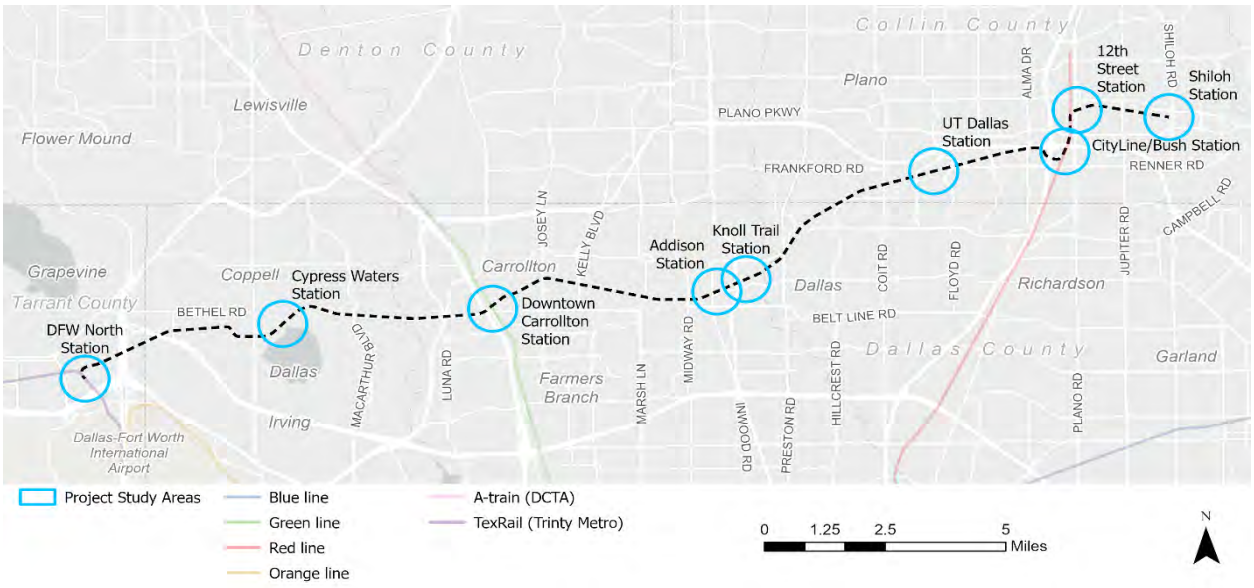


Table 1 Task by Station

Station	City	Sidewalk Study	Bicycle Study	Parking Study	Land Use Jobs/ Housing Balance
Shiloh Road	Plano	✓			✓
12th Street	Plano	✓	✓	✓	✓
CityLine/ Bush	Richardson			✓	✓
UT Dallas	Richardson	✓		✓	✓
Knoll Trail	Dallas	✓	✓	✓	✓
Addison	Addison	✓	✓	✓	✓
Downtown Carrollton	Carrollton	✓	✓	✓	✓
Cypress Waters	Dallas			✓	✓
DFW Airport North	Grapevine				✓

Report Structure

This final summary report presents the main findings and recommendations in each of the three focus areas. Separate report documents on the NCTCOG TOD website provide detailed information and findings from some of the focus areas. All other supporting study material for the three focus areas is briefly summarized in this report.

Overall recommendations applying to the whole corridor for TOD are provided at the end of this report. Additionally, recommendations unique to each station area that combines the three focus areas are provided. The recommendations are intended as a resource for

the cities, private developers, and other stakeholders to use in improving TOD implementation.

Bikeway and Pedestrian Routes to Rail Stations

Two separate studies, one for bikeways and another for pedestrian infrastructure, identify recommended improvements. The goal is to provide a continuously connected active transportation network to and from rail stations, thus increasing the number of potential transit riders using the DART Silver Line.

Bikeway Key Findings and Recommendations

The bikeway portion of the study reviewed options and provides recommendations for the most appropriate roadway retrofits to implement bikeway facilities (on-street bikeways and/or off-street sidepaths) along corridors in Addison, Carrollton, Dallas, and Plano at four of the nine stations in study. The purpose of the study was to improve bicycle accessibility to various DART Silver Line rail stations by identifying the preferred and feasible high comfort bicycle facility types suitable for people of all ages and abilities that various jurisdictions can implement.

The corridors evaluated in the study were selected in consultation with city staff. Each corridor implements either a segment of the Cotton Belt Trail which largely parallels the DART Silver Line commuter rail alignment, completing a gap between an existing shared-use path and the Cotton Belt Trail, or providing a direct on-street bikeway connection to both the future rail station and the Cotton Belt Trail. The project scope of work included the preparation of fifteen percent (15%) schematics and opinion of probable construction cost (OPCC) for each bikeway corridor.

> Regional Cotton Belt Rail Trail corridor is planned to run from Plano to Fort Worth and has been identified in the region's Metropolitan Transportation Plan since the early 1990's. The trail corridor generally follows the DART Silver Line rail corridor in Dallas County and Collin County as well as a portion of the Trinity Metro TEXRail commuter rail in Tarrant County. Learn more here: https://nctcog.org/trans/plan/bikeped/veloweb/cotton-belt-trail-corridor

A short-term pilot project was also conducted in October 2024 along Quorum Drive in the Town of Addison. During the pilot project, a survey was distributed to collect community feedback about the interim roadway reconfiguration.

An opinion of probable construction cost (2024 dollars) was developed for each of the alignments in conjunction with the 15 percent schematics and are summarized in **Table 2**. Three of the alignments subsequently received funding awards for construction from the

Regional Transportation Council, and modifications were submitted in June 2025 to the NCTCOG Transportation Improvement Program.

Key Recommendations

- Implement Bicycle Infrastructure Improvements: The Town of Addison and the Cities of Carrollton, Dallas and Plano, and DART should prioritize funding for bicycle improvements as needed in the Silver Line Station areas.
- Identify Funding Opportunities: NCTCOG will work with local governments to identify funding opportunities as applicable for bicycle facility improvements.

Table 2: Opinion of Probable Construction Cost for Bikeway Implementation

Corridor	DART Rail Station	2024 Cost Estimate	Summary of Improvements
Addison Quorum Drive	Addison Station	$2,045,458	• Two-way cycle track off-street between DART Silver Line and Addison Circle. Bicycle facility will transition from two-way cycle track to one-way, separated bicycle facility at the south side of the traffic circle. • One-way bicycle facilities with a buffer that includes rubber modular lane separators (separators proposed where possible due to on-street parking). • Shared bus-bike lane and/or floating bus stop. • Reconfiguration of the existing four-lane divided roadway to a two-lane divided roadway section. • Connection to the future Silver Line Rail Station and Cotton Belt Trail. • Connection to other facilities such as Quorum Drive, south of the Silver Line Rail and along Westgrove Drive.
Carrollton Kelly Boulevard	Downtown Carrollton Station	$2,545,000	• Replacement of the existing sidewalk along the east side of Kelly Blvd. with a 12-ft. wide shared-use path connection from the future Cotton Belt Trail to the City's Purple Trail. •The shared-use path alignment includes a prefabricated 16-ft. wide trail bridge at Hutton Creek Branch. •Traffic signal improvements at Kelly Blvd./ Honors Club Drive intersection for the shared-use path crossing.
Dallas Knoll Trail Drive	Knoll Trail Station	$1,234,000	• Reconfiguration of the existing 4-lane undivided roadway section to a 3-lane section with two-way left turn lane and installation of one-way bike lanes on both sides of the roadway with raised 2-ft. wide concrete curb adjacent to the vehicle travel lanes. • Safety end treatments to prevent vehicles from entering bike lane.
Dallas Marni Kaner Trail Extension	Knoll Trail Station	$688,000	• Two-way cycle track from Cotton Belt Trail to Southpoint Drive. • Connection to Cotton Belt Trail crossing with pedestrian gate arm and escape gates. • Buffer with rubber modular lane separators between cycle track and travel lane. • Off-street shared-use path from Southpoint Drive to existing Marni Kaner Trail. • Trail medians (in lieu of bollards) at driveways or street crossings.
Plano Municipal Avenue	Downtown Plano Station and 12th Street Silver Line Station	$12,188,400	• Road diet reducing one-way roadway from 3-lanes to 2-lanes with on-street parking. • 10-ft. wide shared-use path on east side of Municipal Ave. and 7-ft. wide sidewalk on west side from 10th Street to L Avenue. • Shared lane markings on L Avenue from Municipal Ave to 18th Street. • Connection to existing Downtown Plano DART Station via shared lane markings onto 15th Street. • Connection to Cotton Belt Trail / Silver Line Rail crossing with pedestrian gate arm and escape gates. • Pedestrian hybrid beacon on Avenue K/ 10th St. • Two-stage turn boxes and pavement markings. • Raised driveway/intersection for trail crossings. • Overhead flashers with pedestrian button activation. • Bicycle signal improvements (signal heads, signage, radar detection).
	Total	**$18,700,858**	

Pedestrian Infrastructure Key Findings and Recommendations

The pedestrian infrastructure portion of the study provides a high-level inventory and evaluation of improvements needed within a half-mile radius of seven of the nine Silver Line rail stations: Cypress Waters, Downtown Carrollton, Addison, Knoll Trail, The University of Texas at Dallas (UT Dallas), 12th Street, and Shiloh. The DFW Airport North Station was not included in this study due to a lack of existing development 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.

The Silver Line Routes-to-Rail Stations Study estimates there are approximately 27 miles of sidewalk gaps in the half-mile radius around the stations. A base opinion of probable construction cost of approximately $47 million (2024 dollars) is needed to address these sidewalk gaps (See **Table 3**). In addition, existing street trees within or adjacent to public street right-of-way are identified for each station area to address opportunities for tree planting to improve shade and comfort for pedestrians. Addressing these sidewalk gaps and tree planting opportunities would help transit riders safely and comfortably walk to TOD around the Silver Line stations.

NCTCOG staff digitized the existing and missing sidewalks in coordination with local government staff, acknowledging future developments that would construct some portions of the missing sidewalk network. Needed improvements were prioritized using factors such as distance from the station, connectivity to employment and higher density housing, and frequency of pedestrian/motor vehicle crashes in the area. Opinion of probable construction costs based on consultation with local government staff were then applied to summarize needed funds for construction.

The opinion of probable construction costs represents high-level rough order of magnitude costs for planning purposes. Further detailed engineering is needed to identify more precise costs that may result from additional infrastructure or specialty construction items which may be necessary for each sidewalk project.[1] Constructing these sidewalks will require local agency coordination and funding to improve access to the greatest number of potential transit riders. It is anticipated that future development will construct sidewalks along adjacent streets in areas which are currently undeveloped.

[1] *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 3: Opinion of Probable Construction Cost per Station

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**
12th 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**
Total	**$10,526,800**	**$14,811,000**	**$22,560,000**	$47,130,000	$57,340,900

**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.*

****Town of Addison staff indicated all gaps may be constructed as part of future development along the roadway corridor. See online report for more detail: https://nctcog.org/trans/plan/bikeped/silver-line-routes-to-rail-stations*

Key Recommendations

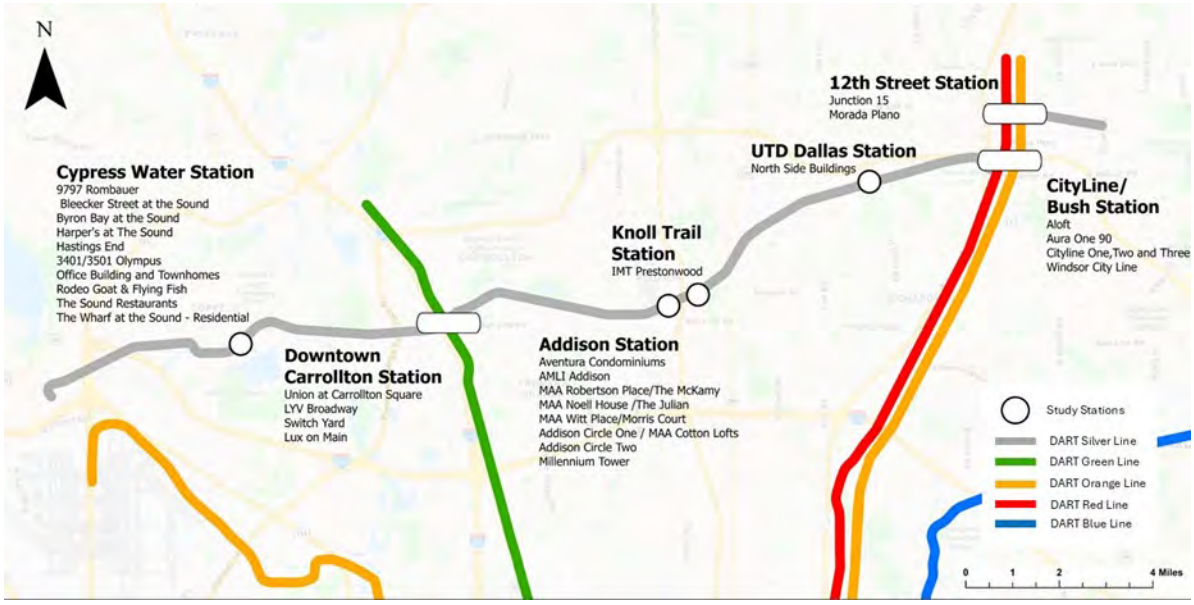
- Prioritize First/Last Mile Sidewalk Improvements: The Town of Addison and Cities of Carrollton, Dallas, Plano and Richardson, and DART should prioritize funding sidewalk improvements as needed in the Silver Line Station areas.
- Identify Funding Opportunities: NCTCOG will work with local governments to identify funding opportunities as applicable for priority sidewalk gap improvements. Local governments are also encouraged to privatize these areas for investment through their Capital Improvements Program (CIP) and through coordination with DART.

Transit-Oriented Development Parking Study

The objective of the Dallas Area Rapid Transit Silver Line TOD Parking Study was to analyze parking use and supply requirements at existing development with TOD characteristics near the future DART Silver Line. Using data collected from participating sites, the study informs future parking supply and management decisions related to land uses, with the goal of increasing TOD effectiveness through parking that is better aligned to multi-modal transportation.

The data and analysis presented in this section is intended to help cities and developers more accurately anticipate parking generation rates for developments in the corridor. Findings are based on parking occupancy data collected on-site from 34 private developments, five public parking districts, and selected on-street parking areas within seven of the nine DART station areas as seen in **Figure 2**. Parking observations were then compared to each site's documented parking supply, zoning requirements, leased building occupancy, and projected parking demand by land use.

Figure 2: DART Silver Line Parking Study Participating Sites and Study Stations



Findings

Most zoning requirements for parking consistently overestimated the actual demand for spaces as seen in **Table 4**. Approximately 51 percent of developments provided more parking than required by code, oversupplying by an average of 19 percent per site. This oversupply was particularly common in single-use office and mixed developments.

Table 4: Provided vs. Required Parking Ratio by Station Area*

Station Area	Average Provided Parking Ratio (per unit/1,000 sqft)			Required Parking Ratio (per unit/1,000 sqft)		
	Residential	Retail/Dining	Office	Residential	Retail/Dining	Office
Addison	1.96 spaces	5.75 spaces	2.91 spaces	1 to 2 spaces	4 spaces	3.33 spaces
CityLine/ Bush*	1.32 spaces	6.34 spaces	4.28 spaces	1.5 spaces	3.33 spaces	3.33 spaces
Cypress Waters	1.43 spaces	5.12 spaces	2.5 spaces	1.3 spaces	4 spaces	3 spaces
Downtown Carrollton	1.13 spaces	9.92 spaces	N/A	1.25 spaces	2.86 to 4 spaces	2 spaces
Knoll Trail	1.53 spaces	N/A	N/A	1.15 to 2 spaces	4 to 10 spaces	2 to 6 spaces
12th Street	1.14 spaces	6.22 spaces	N/A	1 to 2 spaces	3.33 spaces	3.33 spaces
UT Dallas	1.35 spaces	7.79 spaces	N/A	1 to 3 spaces	3.33 to 4.44 spaces	3.33 to 4.44 spaces

** Parking ratios highlighted in red were higher than the code requirement, those highlighted in green were within the required parking ratio range or below it, and those highlighted in gray were not applicable due to a lack of analyzed land use within each station area.*

Areas near high-capacity transit can provide fewer spaces to encourage transit use and support TOD goals. This study only looked at transit ridership near the developments studied (where available) and compared to the on-street parking use in the station area. A correlation between that parking demand and ridership was not found, however many other factors may influence the relationship such as walking distance, sidewalk quality, transit frequency, and more. Further study of the impact of transit on parking use is needed.

Residents use free adjacent street parking at a high rate even when on-site parking is available. This behavior is particularly common in mixed-use districts, where there is abundant free on-street parking. Residential sites in these locations also have most of their parking supply in a garage. This preference for on-street could be driven by the perceived convenience of on-street parking compared to garage parking.

Many residential developments had underutilized parking facilities during the study period. **Residential developments (including those with ground floor retail) across the corridor averaged 92 percent leased building occupancy, however their parking use on average was only 67 percent during the week and 64percent on the weekend.** This includes low rates across the whole corridor and different housing contexts making simple explanations difficult. A limitation of point-in-time data collection like this study is that it cannot explain ongoing trends on its own. More frequent data collection is needed.

Best Practices

Recognizing that changing parking supply requirements alone may not be enough, and that existing properties can help support transit, a menu of best practices is provided for parking management strategies:

- Reduce Parking Requirements
- Set Parking Maximums
- Incentivize Shared Parking Agreements
- Improve Mobility to Reduce Parking Demand
- Consider Parking Management Districts
- Incentivize Public Parking
- Use Curb Space Management
- Encourage Parking Availability Platforms and Guidance Systems
- Allow Fee-in-Lieu of Parking Options
- Credit Off-Site Parking

Key Recommendations

This study found that many TODs are oversupplied with underused parking. Excess parking discourages transit by making driving more convenient and displacing density exchange for parking spaces. While parking demand is difficult to predict, rightsizing parking supply through policy and management strategies can support higher-density development and DART Silver Line ridership. Recommendations are made for all the public and private actors who can influence parking:

- Promote Coordination and Regional Support: NCTCOG should continue to collect parking use data and provide technical expertise like guidelines and best practices.
- Reform Existing Parking Policy Framework: The Silver Line municipalities should adopt parking policies in transit-oriented areas such as eliminate/reduce parking minimums, paid on-street parking, and other recommended best practices.
- Implement TOD-Aligned Practices: TOD Stakeholders should support policy education and outreach to public and private decision makers while also advocating the need for updated parking policies.

Land Use and Corridor Jobs and Housing Analysis

Existing Land Use Conditions Findings

The Existing Land Use Conditions Report of the Silver Line Corridor analyzes current conditions and needs of the corridor for supporting improved TOD. The information presented in this section is a brief summary of key findings and recommendations from the full report which is available on the NCTCOG website here Silver Line Corridor TOD Planning Study.

Demographics

Selected demographics show how likely land uses are to support future transit service. The Silver Line Corridor is almost seven times denser than the region on average. Today, the corridor is home to an estimated 37,494 residents and has a population density of about 8.5 people per acre. **Table 5** shows population and density estimates by half-mile station area radius.

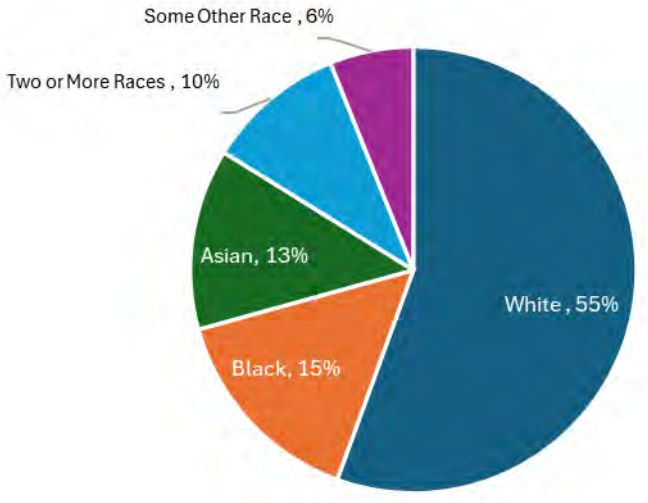
Table 5: 2024 Station Area Population Estimates

Station Area	Total Population	Density (per square mile)	Median Age
Knoll Trail	8,838	21.40	35.8
CityLine/Bush	6,946	13.81	31.8
Addison	5,764	12.03	35.8
12th Street	4,994	9.93	30.5
Downtown Carrollton	3,997	7.95	33.3
UT Dallas	3,563	7.08	30.5
Shiloh Road	2,645	5.26	31.8
Cypress Waters	706	1.40	36.4
DFW North	42*	0.08	6.1
Corridor	**37,494**	**8.50**	**33.3**
Region	**8,100,037**	-	**35.2**

*Includes part of Grapevine neighborhoods within half mile radius
** ACS 2023 1-Year Estimate

The population in the Silver Line Corridor is generally younger than the regional average, with 58 percent of residents under the age of 34. Additionally, the corridor has nearly 1.2x the proportion of minority residents when compared to the region. **Figure 3** shows the race and ethnicity composition of the corridor.

Figure 3: Race Composition of Silver Line



Income and Housing Costs

Most households along the Silver Line Corridor have lower incomes than the region. **Table 6** shows the median household income, median home value, and median gross rent per station area. Fifty-three percent of station area households earn less than $75,000

annually. Housing costs in the corridor vary significantly between station areas. Affordability is a challenge for about 36 percent of households in the corridor who are housing cost burdened (spending more than 30 percent of their income on housing) regardless of their household income level.

Table 6: Income vs. Housing Cost per Station Area

Name	Median Household Income	Median Home Value	Median Gross Rent
12th Street	$57,368	$106,893	$582
Addison	$77,403	$203,470	$911
CityLine/Bush	$72,534	$50,188	$2,525
Cypress Waters	$94,607	$101,242	$799
DFW North	$12,533	$13,902	$74
Downtown Carrollton	$70,076	$149,683	$894
Knoll Trail	$78,916	$219,157	$1551
Shiloh Road	$69,644	$151,099	$912
UT Dallas	$44,607	$83,084	$1,920
Corridor	**$70,562**	**$206,883**	**$1,453**
Region	**$76,916**	**$255,600**	**$1,638**

Jobs and Housing

The Silver Line Corridor has more jobs than housing. There are approximately 60,000 jobs and 20,000 housing units within a half mile of the Silver Line stations. Along the corridor, Knoll Trail and Addison station areas account for approximately 54 percent of both jobs and housing in the corridor. **Table 7** shows the estimated total jobs, total housing units, and job density per station area.

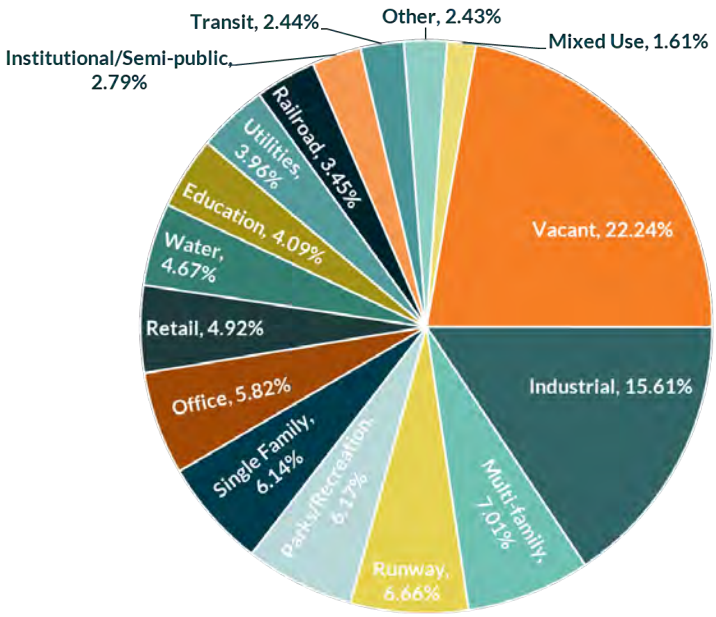
Table 7: Estimated Total Jobs, Total Housing Units, and Job Density per Station Area

Station Area	Total Jobs	Housing Units	Jobs per Acre	Jobs to Housing
12th Street	5,708	2,636	11.35	2.2
Addison	22,229	3,639	46.41	6.1
CityLine/Bush	10,674	3,859	21.22	2.8
Cypress Waters	820	252	1.63	3.3
DFW North	52	15	0.10	3.5
Downtown Carrollton	6,932	2,036	13.78	3.4
Knoll Trail	9,981	7,306	24.17	1.4
Shiloh Road	2,423	1,336	4.82	1.8
UT Dallas	1,076	1,964	2.14	0.5
Corridor	**59,895**	**20,307**	**13.58**	**2.9**

Land Use and Existing Transit-Oriented Development

The land use mix varies between stations along the Silver Line Corridor. However, the most prominent land uses are vacant land at 22.24 percent and industrial at 15.61 percent. **Figure 4** shows the complete distribution of land uses along the corridor.

Figure 4: Distribution of Land Uses Along the Silver Line Corridor



Cities along the Silver Line Corridor have increased station area planning efforts with the construction of the new rail line. **Table 8** shows the latest station area plans with TOD-related content. A description of each plan can be found in the Existing Land Use Conditions report.

Table 8: Latest Station Area Plans for the Silver Line Stations

Station	Plan Title	Year of Adoption
DFW North	DFW International Airport Land Use Plan	2022
Cypress Waters	Cypress Waters Master Plan	2020
Downtown Carrollton	Downtown Master Plan	In Progress
Addison	Addison Circle Special Area Study	2018
Knoll Trail	-	-
UT Dallas	UTD Campus Master Plan Update	2018
CityLine/Bush	-	-
12th Street	City of Plano Silver Line Station Areas Plan	2025
Shiloh		

Cities along the Silver Line Corridor have built TOD in anticipation of the DART Silver Line construction with 75 transit-oriented developments already existing. TOD in this study is defined by NCTCOG's TOD Inventory standards. The highest concentration of TODs are at the Addison and CityLine/Bush station areas. **Table 9** shows the number of TODs per Silver Line Station area.

Table 9: Number of TODs per Silver Line Station area, ½ mi.

Station*	Number of TOD Developments
Addison	25
CityLine / Bush	20
12th Street	15
UT Dallas	6
Downtown Carrollton	5
Knoll Trail	4
Total	**75**
*Shiloh Road, Cypress Waters, and DFW Airport North are not currently listed as they have no existing TODs in the half-mile radius.	

Zoning

Most current zoning along the Silver Line Corridor is not supportive of TOD. This is due to the corridor's freight-oriented history, auto-centric development, and restrictive zoning that limits the density and urban form needed for TOD. While some areas of the DART Silver Line Corridor have zoning for TOD, primarily through Planned Unit Developments (PUDs), overall zoning for TOD remains limited. **Table 10** shows the percentage of TOD supportiveness for each station.

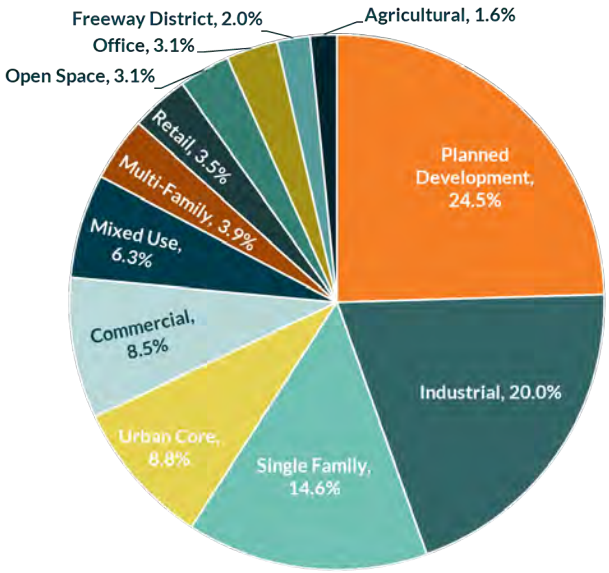
Table 10: The Percentage of TOD Supportiveness per Silver Line Station

Station Area	Percent TOD Supportive Base Zoning Acres	Percent Non-TOD-Supportive Base Zoning Acres
Knoll Trail	66%	33%
DFW Airport North	61%	39%
CityLine/Bush	57%	43%
UT Dallas	51%	49%
Cypress Waters	48%	52%
Downtown Carrollton	38%	62%
Addison*	33%	64%
12th Street	22%	78%
Shiloh Road	0%	100%
**The Addison Transit Center Station has a significant number of PDs that are not TOD-supportive as they are very site-specific/building-specific.*		

Planned Unit Developments can be used to support TOD. Cities like Richardson showcase successful district-wide PUDs around transit stations, such as the CityLine/Bush station,

which promotes mixed-use development with form-based codes. However, TOD-supportive base zoning districts as seen in **Figure 5**, like those in Carrollton's Downtown Transit Center and Plano's Downtown Business/Government zoning that allow density by-right remain rare on the corridor.

Figure 5: Distribution of Zoning along the Silver Line Corridor



Key Recommendations

Recommendations created using the Existing Conditions report are shared between the public and private sector who could influence development along the Silver Line Corridor. There will also be detailed recommendations for each station area in the Individual Station Recommendations section.

- Rezone to Support TOD: The dominance of non-TOD supportive zoning means station areas will likely require rezoning or variances to support TOD form and design.
- Prioritize Development Incentives for TOD Projects: Providing development incentives and encouraging public-private partnerships can catalyze TOD in locations with weaker market conditions or no existing TOD presence.
- Create and Update Station Area Plans: Implementing increased TOD at stations on the corridor will take a neighborhood-level planning approach and attention to detail for each station to address evolving needs and context.
- Expedite Zoning Applications and Permits: For projects submitted within a station's "two-mile radius", reduce or revise permitting fees and expedite the review and permit process to prioritize TOD.

Silver Line Scenario Planning

Methodology

To evaluate how TOD land use around the Silver Line can best support transit ridership, NCTCOG has used its travel model, the Transportation Analytical Forecasting Tool (TAFT), to test four land use scenarios:

1. Scenario 1: Planned density and redevelopment – land use changes based on current zoning, proposed developments, or city supported area plans.
2. Scenario 2: Workforce housing – the land uses from Scenario 1 but with an assumption that a larger share of housing will be more affordable to low- and moderate-income households.
3. Scenario 3: Continue a job-heavy corridor – a larger share of the land is assumed to be a land use that generates employment, continuing the corridor's already high employment numbers.
4. Scenario 4: Balance the jobs with more housing – as much land as possible is assumed to be higher density housing to balance job opportunities on the corridor.

Creating these land use scenarios required NCTCOG to identify development/redevelopment opportunities property by property in consultation with city staff and other stakeholders. The method used for this is detailed below.

Scenario 1 Methodology

A layer of property parcels from 2023 Dallas, Tarrant, and Collin County appraisal districts within a half-mile radius of each Silver Line station was used to create Scenario 1. Several factors were evaluated to identify parcels likely to redevelop in 20 years, including:

- Is the parcel vacant land?
- Does the parcel have a low valued land use? (i.e., the land value is greater than the improvement value)
- Are there any known planning efforts such as station area plans, proposed developments, redevelopment plans, etc.?

In addition to these priority factors, other subjective factors were evaluated such as:

- Age of buildings on parcels.
- Existence of non-conforming land uses.
- Ability to subdivide/combine parcels.
- City comprehensive and area plans.

Parcels located in FEMA flood plains, single family homes, and designated public spaces were excluded from redeveloping in the scenario.

Future land use designation of redeveloping parcels was then determined by city zoning or development plans, prioritizing higher density. After the future land use was determined, the possible building size that could fit on the redeveloping parcel was identified using similar properties near each station. Using the possible building size and future land use, the number of housing units, square feet of retail, square feet of office, and square feet of other land uses was then calculated – see **Table 11**.

Table 11: Housing Units and Square Feet (SQFT) by Land Use Added to Each Station Area with Scenario 1

Station Name	Total Housing Units	Total SQFT Retail	Total SQFT Office	Total SQFT Other
DFW North	1,230	401,200	1,084,200	986,000
Cypress Waters	4,244	203,000	6,750,000	15,000
Downtown Carrollton	3,402	90,750	308,977	256,670
Addison	4,854	1,070,839	1,371,599	-
Knoll Trail	859	122,400	770,000	-
UT Dallas	2,196	69,900	2,070,000	200,000
CityLine/Bush	4,523	75,000	2,023,600	106,940
12th Street	2,672	114,000	115,000	36,000
Shiloh	82	80,000	90,000	280,000
Total	**24,062**	**2,227,089**	**14,583,376**	**1,880,610**

Scenario 2 Methodology

Scenario 2 conceptually attempts to demonstrate the impact of increasing housing to balance the needs of workers on the corridor. The NCTCOG travel model does not have a variable for home price or rent. Instead, the household income variable in the travel model is modified showing more low/moderate income households over the next 20 years as a rough approximation of more subsidized housing units. The target household income ranges to represent housing price access were set based on the income profile of transit riders from the NCTCOG Regional On-Board Transit Survey. Since the land uses from Scenario 1 are not changed and repeated in Scenario 2, **Table 12** shows the modeled change in distribution of household income for Scenario 2 from the base 2025 model.

Table 12: Distribution of Households Across Income Groups for Scenarios 1 and 2

Income Group	Percent of Households in each Income Groups	
	Scenario 1	Scenario 2
1 – Under $35,000	31%	**40%**
2 - $35,000 to $49,999	16%	**35%**
3 - $50,000 to $74,999	18%	**15%**
4 – Over $75,000	35%	**10%**

Scenario 3 Methodology

Scenario 3, *Job Heavy*, started with Scenario 1 at the base but converted applicable residential land to retail, office, and industrial uses. This involved decreasing or removing the number of housing units while increasing the square footage of retail, office, and other uses. Areas where development was already in progress or were prohibitively zoning against commercial uses were not changed. See **Table 13** for a summary of square feet by use and station area in Scenario 3.

Table 13: Housing Units and Square Feet (SQFT) by Land Use Added to Each Station Area with Scenario 3

Station Name	Total Housing Units	Total SQFT Retail	Total SQFT Office	Total SQFT Other
DFW North	1,230	401,200	1,084,200	986,000
Cypress Waters	-	359,000	10,150,000	1,145,000
Downtown Carrollton	33	432,406	1,017,027	830,000
Addison	1,121	512,661	3,256,599	-
Knoll Trail	-	122,400	1,635,000	-
CityLine/Bush	2,287	155,000	3,023,600	-
UT Dallas	1,354	103,900	2,720,000	200,000
12th Street	951	206,000	955,000	186,000
Shiloh	-	80,000	200,000	280,000
Total	**6,976**	**2,372,567**	**24,041,426**	**3,627,000**

Scenario 4 Methodology

For Scenario 4, *Housing Balance*, Scenario 1 counts were again used to start but residential uses were prioritized by increasing the number of housing units while decreasing or removing the square footage of retail, office, and other uses. Areas where development was already in progress or that are zoning against residential (such as airport overlays) were not changed. See **Table 14** for a summary of square feet by use and station area in Scenario 4:

Table 14: Housing Units and Square Feet (SQFT) by Land Use Added to Each Station Area with Scenario 4

Station Name	Total Housing Units	Total SQFT Retail	Total SQFT Office	Total SQFT Other
DFW North	1,230	401,200	1,084,200	986,000
Cypress Waters	10,131	157,000	-	-
Downtown Carrollton	5,024	100,388	-	76,670
Addison	6,719	759,026	559,599	-
Knoll Trail	1,759	122,400	-	-
UT Dallas	5,995	78,900	-	200,000
CityLine/Bush	5,589	60,000	923,600	-
12th Street	3,783	114,000	30,000	36,000
Shiloh	825	60,000	-	100,000
Total	**41,055**	**1,852,914**	**2,597,399**	**1,398,670**

The scenarios were sent to city stakeholders for review before being finalized.

Conversion from Parcels to Traffic Analysis Zones

To project future rail transit ridership, the scenarios were run through NCTCOG's travel model. The number of housing units, square feet of retail, square feet of office, and square feet of other land uses calculated for redeveloping parcels were converted into 2045 population and employment values (see **Table 15** below for conversion factors).

Table 15: Conversion Factors

NCTCOG LU	Description	Units	SQFT	Employees per 1,000 SQFT	Population per Unit
111	Single Family	1	0	0	2.8
112	Multi-Family	1	0	0	1.8
121	Office	0	1,000	3.0	0
122	Retail	0	1,000	1.0	0
124	Hotel/Motel	1	0	0.5	0.6
125	Institutional/Semi Public	0	1,000	0.7	0
131	Industrial	0	1,000	1.0	0
147	Venue	0	1,000	3.0	0
160	Mixed Use	1	1,000	SQFT Office: 3.0 SQFT Retail: 1.0	1.8

Future employment was divided into three subcategories as required for the NCTCOG travel model:

- "Basic" which are industrial uses
- "Retail" which are retail uses
- "Service" which are office, venue, and institutional uses

The four scenario parcels were then spatially summarized to the NCTCOG traffic analysis zones (TAZs) in which they are located. The 2045 population and employment projections for all redeveloping parcels within a TAZ was totaled. Each scenario's new population and employment projection was then added to the existing 2045 population and employment projections used in NCTCOG's Mobility 2045 Update.

Travel Model Results

Travel Model Assumptions in the Silver Line TOD Study

The only input variables Scenarios 1, 3, and 4 changed in the NCTCOG travel model are the total population and employment for selected TAZs. For Scenario 2, the distribution of household income groups was also changed for selected TAZs. All other model assumptions will come from those used in the Mobility 2045 Update such as:

- 2045 demographic forecast assumptions for all TAZs except the study area remain unchanged.
- 2045 transit alignment and service do not change (connection to TEXRail, Wylie Extension, headways, etc.).
- Transit station park-and-rides lots at the Silver Line stations will remain.
- Regional road networks and congestion impacts to ridership as used in Mobility 2045 Update will not be changed.

2045 Silver Line Station Ridership

Results from the NCTCOG travel model provide an estimation for the change in ridership for the different land use scenarios. **Table 16** shows the results of the travel model for each of the land use scenarios. These are compared to the "Base Year" which comes from NCTCOG's Mobility 2045 Update.

Table 16: Travel Model Ridership Results for the Silver Line Corridor

Station Name	Rail Transit Ridership				
	Base Year	Scenario 1	Scenario 2	Scenario 3	Scenario 4
DFW Airport Terminal B*	3,221	3,374	3,355	3,568	3,158
DFW North	953	1,094	1,134	1,129	1,072
Cypress Waters	193	214	215	261	187
Downtown Carrollton	4,842	5,264	5,436	5,662	4,815
Addison	3,778	4,154	4,232	4,594	3,740
Knoll Trail	897	1,002	1,067	1,107	951
UT Dallas	591	749	792	777	718
CityLine/Bush	3,000	3,272	3,393	3,519	3,056
12th Street	656	725	779	747	694
Shiloh	299	318	410	321	331
Total Corridor	**18,430**	**20,167**	**20,814**	**21,685**	**18,722**
Percent Difference	-	**9%**	**13%**	**18%**	**2%**

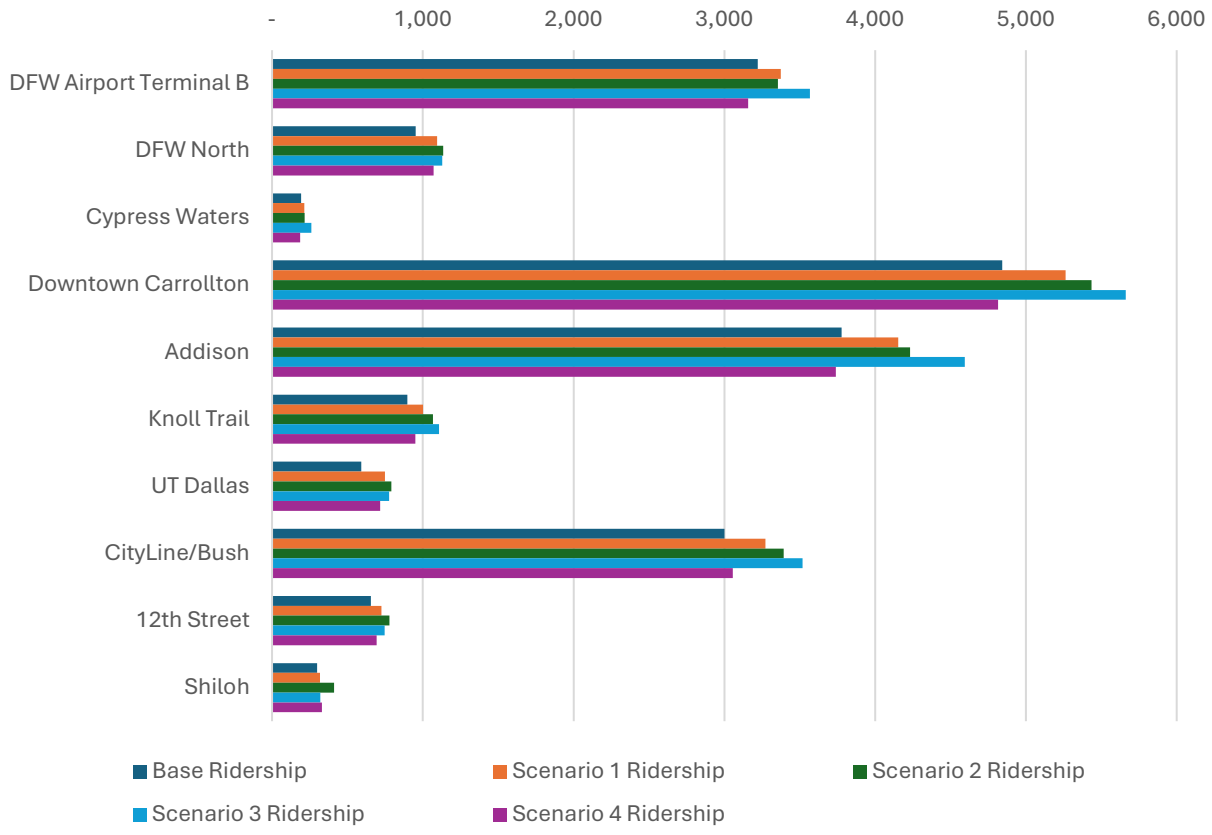
** No land use changes at DFW Airport Terminal B*

According to the NCTCOG travel model, continuing a job-heavy corridor will have the greatest increase in rail transit ridership. Building significantly more housing opportunities, replacing some future jobs, will have the lowest increase in ridership along the Silver Line Corridor.

Scenario 2, increasing affordable housing to low- and moderate-income households, showed the next highest impact. This is consistent with past regional patterns of transit use and shows the importance of balancing moderate wage jobs with housing affordable to those workers.

Land use and demographic changes may not yield the most influence on ridership in the NCTCOG travel model. **Figure 6** compares the change in 2045 Silver Line station ridership for the different land use scenarios. The stations with the greatest jobs, housing, and demographic changes did not get the greatest ridership increase. **Appendix B** provides information on other considerations in the travel model influencing ridership such as distance between stations and transit connections.

Figure 6: Comparison of Travel Model Ridership Results per Station



Key Recommendations

The NCTCOG travel model provides travel forecasts about the future of transportation in the region to advise ongoing investment with stakeholder input. Likewise in this plan it will be considered in the context of other information.

Future work is needed to evaluate the input of each scenario on each jurisdiction. Ridership increase was the primary measure evaluated in this study. Another measure such as comparing projected property tax revenue against the cost and expense of infrastructure improvements and ongoing public policy implementation could be used to evaluate scenarios. This is a potential direction for future research, but beyond the scope and resource of this study.

Based on the ridership forecast and the previously collected land use existing conditions the following are recommended:

- Increase Density: Density can have a positive impact on increasing ridership. It needs to be paired with supportive design, mobility options, and land use mixes to have the most impact.
- Implement Mixed Use: A mix of land uses with employment will likely support more ridership than residential development alone. Local governments should be flexible to market demands while continuing to offer incentives and partnering to get transit-oriented commercial uses.
- Encourage Mixed Income Housing Developments: More mixed income housing can provide a better balance of housing options for corridor jobs supporting increased ridership. The challenges of implementing workforce housing likely require innovative partnerships and funding approaches.

Overall Summary Recommendations

Combining the findings from the pedestrian and bicycle routes to rail study, the parking study, and the land use analysis with ridership scenarios, the following cumulative recommendations are made for the Silver Line.

Improve Active Transportation Connections to Silver Line Stations

AT-1: *Implement DART Silver Line Corridor Routes-to-Rail Stations Study recommended pedestrian and bicycle infrastructure improvements*

- **Municipalities:** Coordinate with stakeholders as needed on priority projects to advance to construction. Identify funding needs and sources for infrastructure improvements. Coordinate with developers to implement improvements, as applicable.
- **DART**: Collaborate with cities on first/last mile connectivity within DART property and right-of-way. Identify funding needs and sources for infrastructure improvements.
- **NCTCOG:** Coordinate with municipalities and DART to assist with funding, as applicable.
- **Private Developers:** Prioritize pedestrian and bicycle paths that link to surrounding neighborhoods and destinations. Reduce or eliminate design barriers that would discourage active transportation.
- **Other Land Authorities**[2]: Coordinate with stakeholders as needed to prioritize projects to construct. Coordinate with developers to implement improvements, as applicable.

AT-2: *Promote pedestrian and bicycle safety and comfort enhancements in transit-oriented areas*

- **Municipalities:** Pursue zoning code revisions for streetscapes (including street trees), amenities, and connections improving pedestrian and bikeway facilities conditions. Implement traffic calming measures in station areas. Proactively implement street trees for shade along sidewalks in the study area. Provide pedestrian scale lighting to improve visibility and safety of all users at night.
- **DART:** Provide secure bike parking and support integration of micro-mobility options.
- **Private Developers**: Proactively implement enhancements and amenities, including street trees, with new and existing development.
- **Other Land Authorities:** Proactively implement enhancements and amenities, including street trees, with new and existing development.

[2] Other Land Authorities = University of Texas at Dallas, DFW International Airport

Apply Parking Management Strategies at TODs

PM-1: *Reduce or eliminate parking requirements in transit-oriented areas*

- **Municipalities:** Adopt updated zoning codes and parking regulations to reflect reduced parking minimums.
- **DART**: Coordinate with cities to ensure transit services support reduced car dependency.
- **Private Developers**: Design projects with fewer parking spaces and emphasize walkability and transit access.
- **Other Land Authorities**: Design projects on land authority-owned property with fewer parking spaces and emphasize walkability and transit access.

PM-2: *Continue conducting parking utilization studies at TODs along the Silver Line Corridor*

- **Municipalities:** Support NCTCOG in collecting regional parking data to inform policy.
- **DART**: Support NCTCOG in collecting regional parking data to inform policy.
- **NCTCOG:** Conduct more parking utilization studies to collect regional parking data from sensors and surveys. Develop TOD parking guidelines and best practices.
- **Private Developers**: Communicate with NCTCOG and municipalities to provide feedback on parking impacts and needs.
- **Other Land Authorities:** Support NCTCOG in collecting regional parking data. Communicate with NCTCOG and municipalities to provide feedback on parking impacts and needs.

PM-3: *Apply parking management best practices to manage demand and encourage alternative transportation*

- **Municipalities**: Evaluate and use recommended strategies from the DART Silver Line TOD Parking Study like parking management districts, incentives for public parking, shared parking facilities, fee-in-lieu of parking, and crediting off-site parking.
- **DART**: Coordinate with developers and land authorities to offer transit passes with new and existing development. Work with all stakeholders to promote transit use.
- **NCTCOG**: Continue studying best practices and providing information to stakeholders.
- **Private Developers**: Evaluate and use recommended strategies from the DART Silver Line TOD Parking Study like shared parking and improving mobility options to reduce parking demand.
- **Other Land Authorities**: Coordinate with cities, DART, NCTCOG to pursue parking management strategies. Identify more opportunities to encourage non-single occupancy vehicle commutes.

Continue Increasing Density and Mixed Land Use Types in Transit-Oriented Areas

LU-1: *Update zoning codes and land use policies to expand allowable land area supporting higher density TOD*

- **Municipalities**: Revise zoning codes and planning documents to allow transit-oriented design, higher Floor Area Ratios, higher density, reduced parking minimums, and mixed-use by-right in more properties near station areas. Encourage vertical integration of different land uses. Fast track permitting process and reduce or remove permitting fees for TOD within a half-mile radius of a station.

LU-2: *Incentivize higher density and transit-oriented development through requirements, bonuses, or other incentives*

- **Municipalities**: Increase tools like tax incentives, funding programs, and Tax Increment Financing to fund TOD improvements. Use density bonuses or expedited permitting for high density and TOD projects.
- **NCTCOG:** Offer grants and prioritize funding programs for higher density and TODs.
- **Private Developers**: Partner with cities to use city incentives with new and existing developments.
- **Other Land Authorities**: Partner with cities to use city incentives with new and existing developments.

LU-3: *Continue encouraging Public-Private Partnerships (P3s)*

- **Municipalities:** Identify more underutilized public land for TOD projects. Conduct additional feasibility studies and risk assessments to make projects attractive to investors.
- **DART**: Further efforts to develop higher density and mixed-use projects on agency-owned land near stations.
- **NCTCOG:** Organize regular forums, roundtables, and working groups to align interests and expectations. Encourage continuous engagement between cities, DART, and private developers.
- **Other Land Authorities**: Identify more opportunities to convert underutilized land authority-owned properties into TOD projects.

LU-4: *Continue planning, outreach and public engagement efforts on higher density, mixed land uses, and transit-oriented development*

- **Municipalities**: Create or update station area plans to align development with local needs.
- **DART**: Coordinate with cities on station area planning.
- **NCTCOG**: Coordinate with cities on station area planning. Promote pedestrian and bicyclist safety and outreach programs.
- **Private Developers**: Participate in station area planning processes.
- **Other Land Authorities**: Create or update plans on land authority-owned properties near station areas to align development with local needs. Coordinate with cities on station area planning.

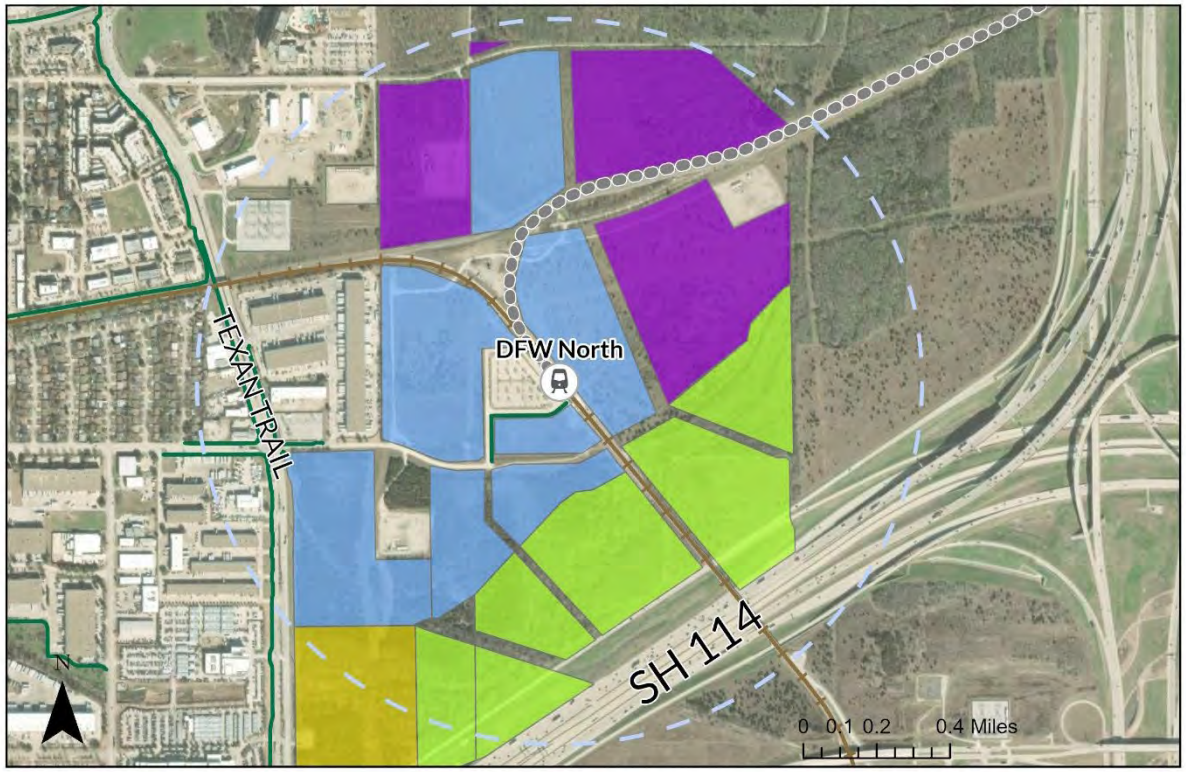
LU-5: *Promote Jobs/Housing Balance*

- **Municipalities**: Continue providing and look to expand public funding mechanisms for housing options balanced to worker incomes on the Silver Line corridor. Establish and expand by-right development processes for that housing.
- **DART**: Coordinate with cities and private developers to build balanced housing on underutilized transit-agency-owned property.
- **NCTCOG**: Partner with cities to help fund transit-oriented projects supporting balanced housing.
- **Private Developers**: Partner with cities, non-profits, and other related partners to use incentives to fund balanced housing projects.
- **Other Land Authorities**: Coordinate with cities and DART to build appropriate housing on underutilized land authority-owned properties.

Appendix A - Individual Station Recommendations and Maps

To coincide with the overall study recommendations, each station area has its own recommendations and associated map. These maps provide cities with priority sidewalk and bikeway improvement recommendations. They also identify which parcels might redevelop by 2045 based on existing planning documentation.

DFW North Station



Existing Sidewalk & Off-Street Shared-Use Path

Silver Line Station

Silver Line Rail

Station Half-Mile

City Boundaries

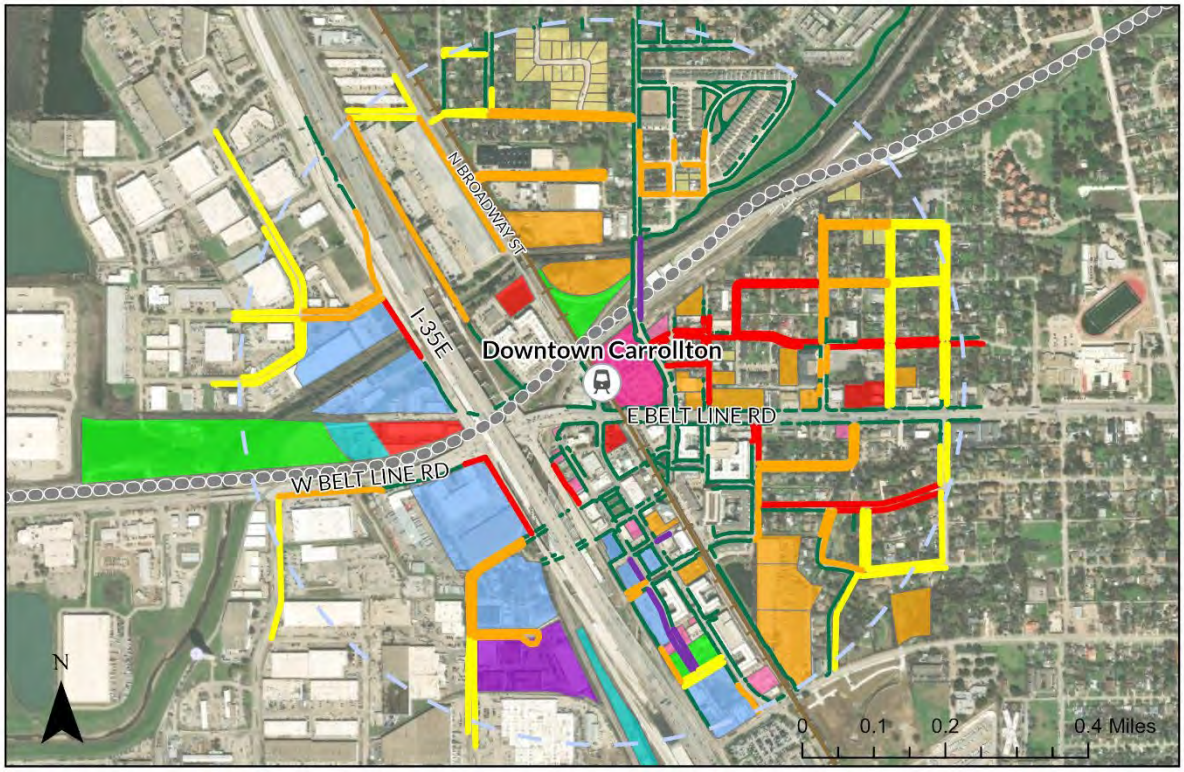
Recommendations

Land Use Redevelopment by 2045
Based on NCTCOG 2020 Land Use Classification

- Flood Control
- Hotel/motel
- Industrial
- Institutional/semi-public
- Mixed-Use
- Multi-family
- Office
- Parking
- Parks/recreation
- Retail
- Single family
- Vacant
- Venue
- Not Redeveloping

DFW North Station was only evaluated for future land uses as the area is mostly vacant land. No sidewalk, bikeway or parking study was conducted at this station. More info on NCTCOG land use categories: https://data-nctcoggis.hub.arcgis.com/datasets/NCTCOGGIS::2020-land-use/about

Downtown Carrollton Station



Existing Sidewalk & Off-Street Shared-Use Path

Silver Line Station

Silver Line Rail

Station Half-Mile

City Boundaries

Recommendations

Silver Line Routes to Rails

Sidewalk Improvements

- High Priority Sidewalk Improvements
- Medium Priority Sidewalk Improvements
- Low Priority Sidewalk Improvements
- Sidewalk Gaps to Remain*

*Sidewalk gaps remain that are anticipated with

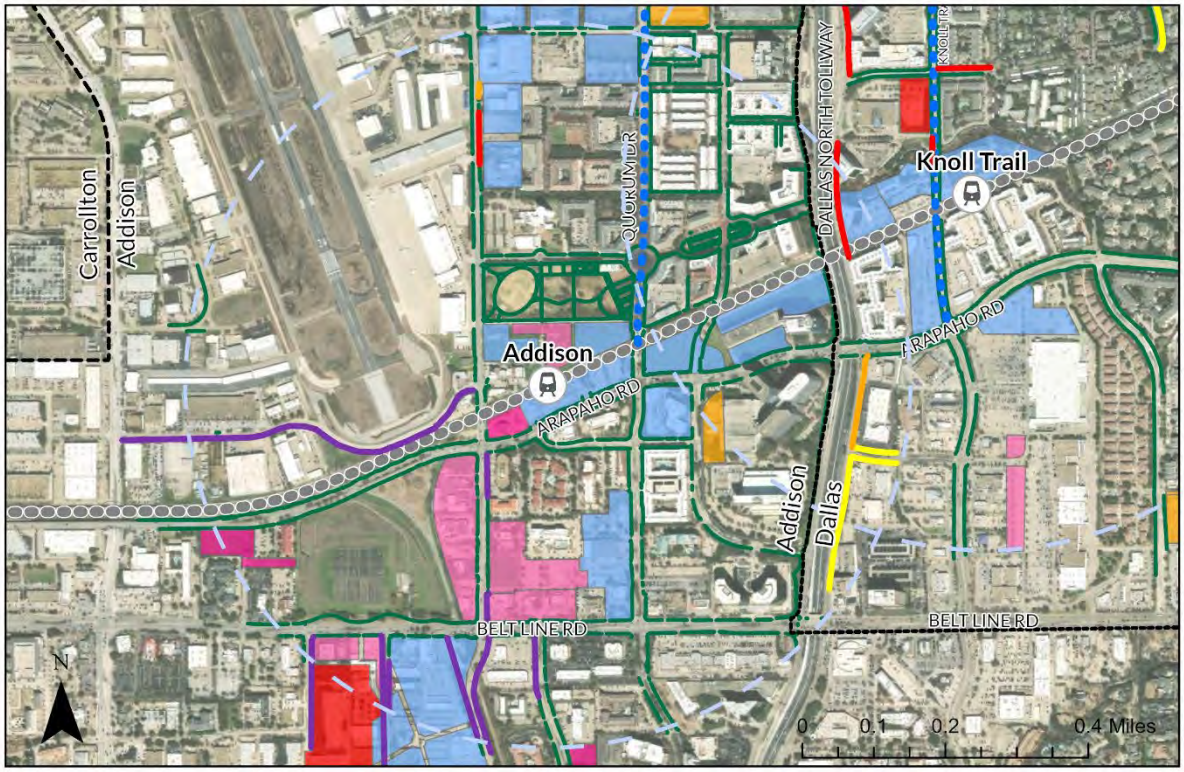
*Sidewalk gap on Belt Line to remain due to lack of connection to a destination

Land Use Redevelopment by 2045
Based on NCTCOG 2020 Land Use Classification

- Flood Control
- Hotel/motel
- Industrial
- Institutional/semi-public
- Mixed-Use
- Multi-family
- Office
- Parking
- Parks/recreation
- Retail
- Single family
- Vacant
- Venue
- Not Redeveloping

Bicycle improvement recommendations for Downtown Carrollton Station are not shown but include converting existing sidewalk into a shared-use path rather than a dedicated bikeway. Land use changes are only projected where deemed feasible by 2045. More info on NCTCOG land use categories: https://data-nctcoggis.hub.arcgis.com/datasets/NCTCOGGIS::2020-land-use/about

Addison Station



Existing Sidewalk & Off-Street Shared-Use Path

Silver Line Station

Silver Line Rail

Station Half-Mile

City Boundaries

Recommendations

Silver Line Routes to Rails

Sidewalk Improvements

- High Priority Sidewalk Improvements
- Medium Priority Sidewalk Improvements
- Low Priority Sidewalk Improvements
- Sidewalk Gaps to Remain*

Bicycle Improvements

- Bicycle Improvements

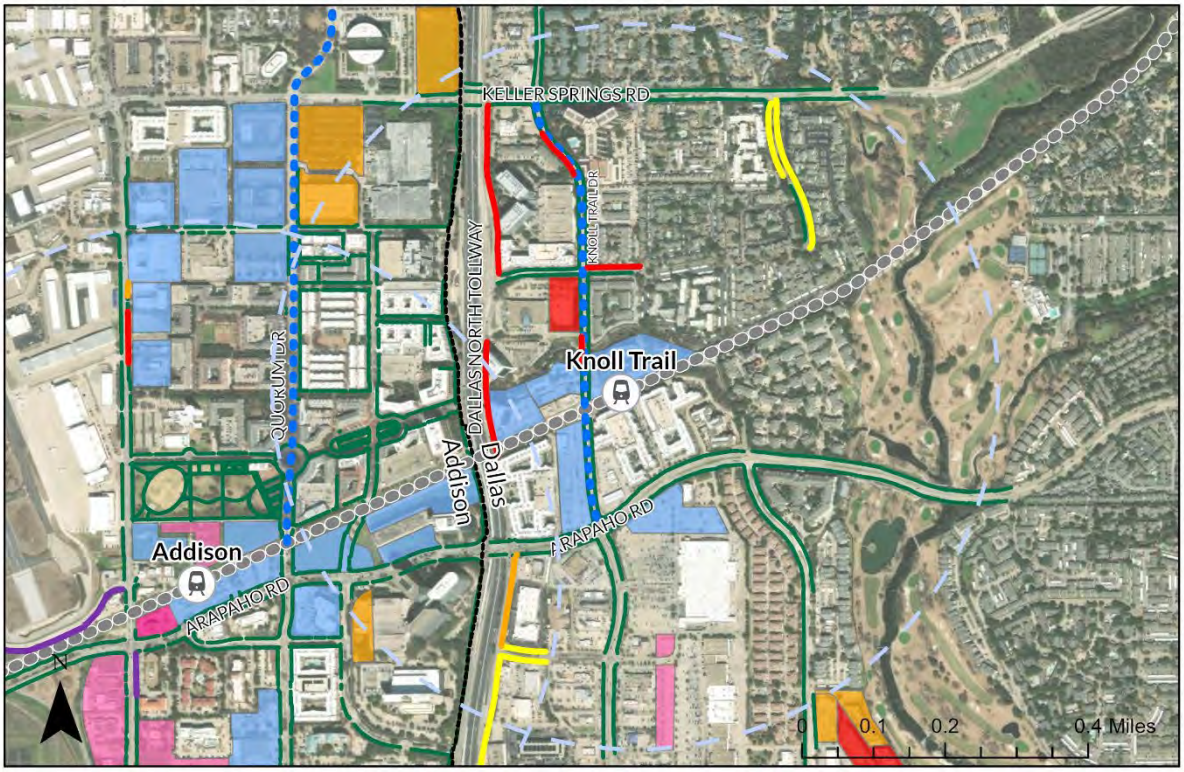
*Sidewalk gaps remain in Addison due to feasibility near airport or anticipated construction with future development.

Land Use Redevelopment by 2045
Based on NCTCOG 2020 Land Use Classification

- Flood Control
- Hotel/motel
- Industrial
- Institutional/semi-public
- Mixed-Use
- Multi-family
- Office
- Parking
- Parks/recreation
- Retail
- Single family
- Vacant
- Venue
- Not Redeveloping

Recommendations for Addison Station only apply to area west of the Dallas North Tollway. Land use changes are only projected where deemed feasible by 2045. More info on NCTCOG land use categories: https://data-nctcoggis.hub.arcgis.com/datasets/NCTCOGGIS::2020-land-use/about

Knoll Trail Station



Existing Sidewalk & Off-Street Shared-Use Path

Silver Line Station

Silver Line Rail

Station Half-Mile

City Boundaries

Recommendations

Silver Line Routes to Rails

Sidewalk Improvements

- High Priority Sidewalk Improvements
- Medium Priority Sidewalk Improvements
- Low Priority Sidewalk Improvements
- Sidewalk Gaps to Remain*

Bicycle Improvements

- Bicycle Improvements

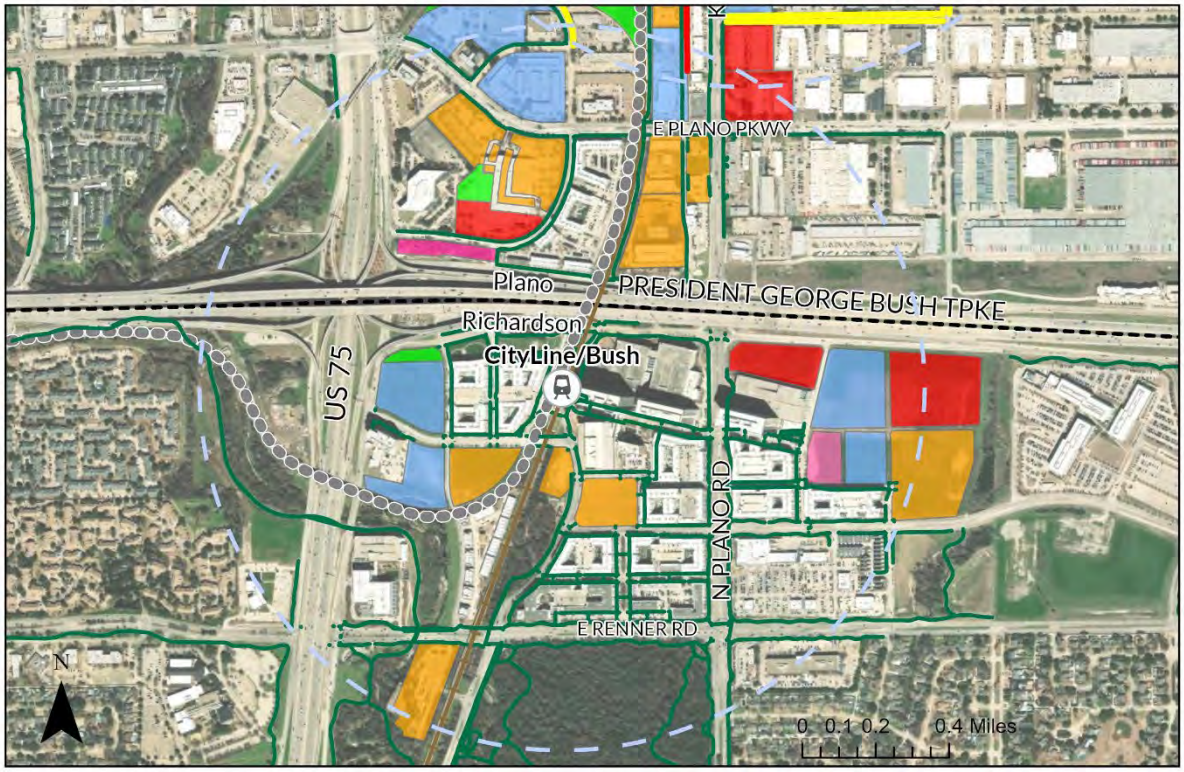
*Sidewalk gaps remain in Addison due to feasibility near airport or anticipated construction with future development.

Land Use Redevelopment by 2045
Based on NCTCOG 2020 Land Use Classification

- Flood Control
- Hotel/motel
- Industrial
- Institutional/semi-public
- Mixed-Use
- Multi-family
- Office
- Parking
- Parks/recreation
- Retail
- Single family
- Vacant
- Venue
- Not Redeveloping

Recommendations for Knoll Trail Station only apply to area east of the Dallas North Tollway. Land use changes are only projected where deemed feasible by 2045. More info on NCTCOG land use categories: https://data-nctcoggis.hub.arcgis.com/datasets/NCTCOGGIS::2020-land-use/about

CityLine/Bush Station



Existing Sidewalk & Off-Street Shared-Use Path

Silver Line Station

Silver Line Rail

Station Half-Mile

City Boundaries

Recommendations

Silver Line Routes to Rails

Sidewalk Improvements

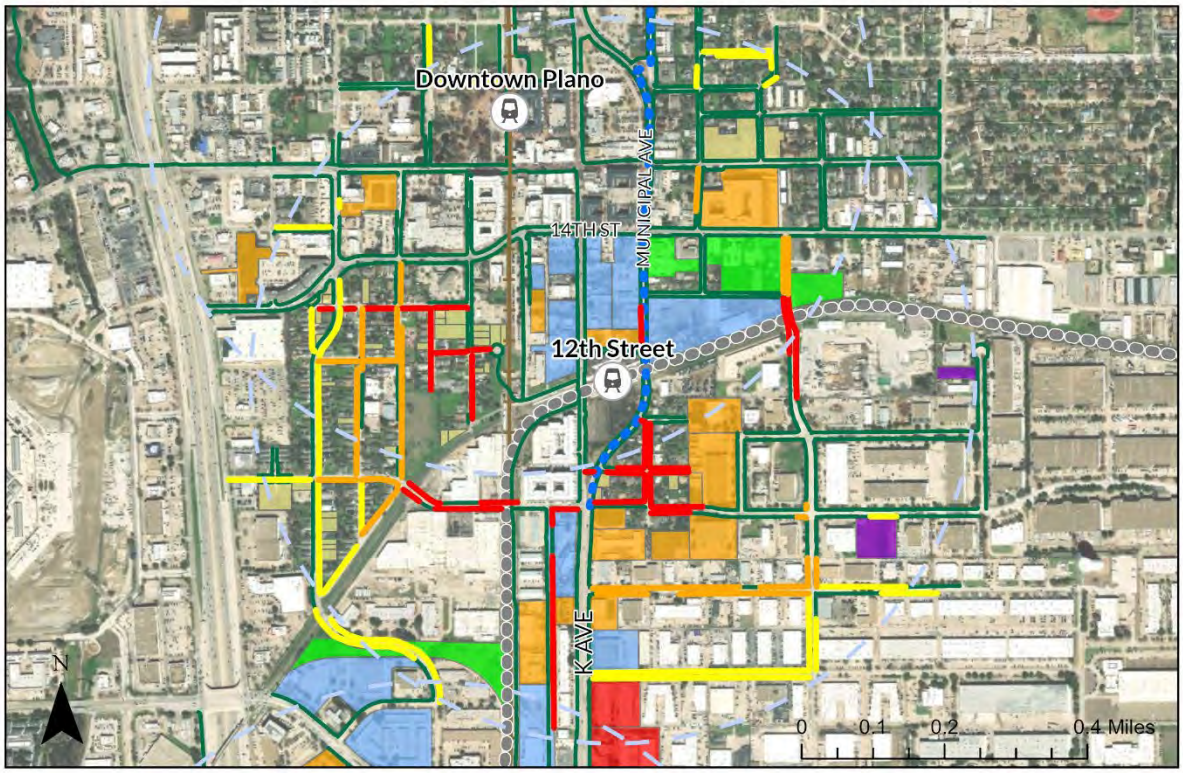
- High Priority Sidewalk Improvements
- Medium Priority Sidewalk Improvements
- Low Priority Sidewalk Improvements

Land Use Redevelopment by 2045
Based on NCTCOG 2020 Land Use Classification

- Flood Control
- Hotel/motel
- Industrial
- Institutional/semi-public
- Mixed-Use
- Multi-family
- Office
- Parking
- Parks/recreation
- Retail
- Single family
- Vacant
- Venue
- Not Redeveloping

CityLine/Bush Station did not include a bicycle or a pedestrian study because this station was included in a previous 2020 study along the DART Red Line. Land use changes are only projected where deemed feasible by 2045. More info on NCTCOG land use categories: https://data-nctcoggis.hub.arcgis.com/datasets/NCTCOGGIS::2020-land-use/about

12th Street Station



Existing Sidewalk & Off-Street Shared-Use Path

Silver Line Station

Silver Line Rail

Station Half-Mile

City Boundaries

Recommendations

Silver Line Routes to Rails

Sidewalk Improvements

- High Priority Sidewalk Improvements
- Medium Priority Sidewalk Improvements
- Low Priority Sidewalk Improvements

Bicycle Improvements

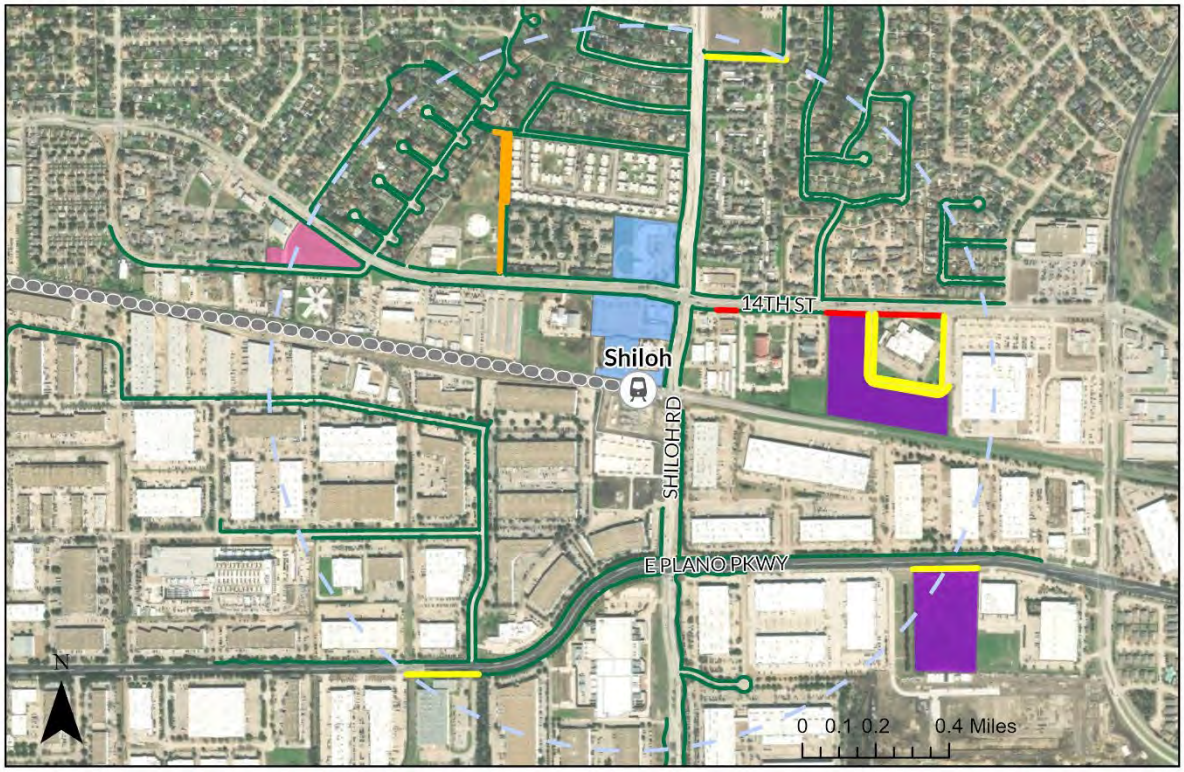
- Bicycle Improvements

Land Use Redevelopment by 2045
Based on NCTCOG 2020 Land Use Classification

- Flood Control
- Hotel/motel
- Industrial
- Institutional/semi-public
- Mixed-Use
- Multi-family
- Office
- Parking
- Parks/recreation
- Retail
- Single family
- Vacant
- Venue
- Not Redeveloping

Recommendations focused on 12th Street Station area south of downtown. Downtown Plano Station was part of a previous 2020 study. Land use changes are only projected where deemed feasible by 2045. More info on NCTCOG land use categories: https://data-nctcoggis.hub.arcgis.com/datasets/NCTCOGGIS::2020-land-use/about

Shiloh Station



Existing Sidewalk & Off-Street Shared-Use Path

Silver Line Station

Silver Line Rail

Station Half-Mile

City Boundaries

Recommendations

Silver Line Routes to Rails

Sidewalk Improvements

- High Priority Sidewalk Improvements
- Medium Priority Sidewalk Improvements
- Low Priority Sidewalk Improvements

Land Use Redevelopment by 2045
Based on NCTCOG 2020 Land Use Classification

- Flood Control
- Hotel/motel
- Industrial
- Institutional/semi-public
- Mixed-Use
- Multi-family
- Office
- Parking
- Parks/recreation
- Retail
- Single family
- Vacant
- Venue
- Not Redeveloping

Limited redevelopment is predicted to occur at Shiloh Station due to the existing land uses and station area characteristics. Land use changes are only projected where deemed feasible by 2045. More info on NCTCOG land use categories: https://data-nctcoggis.hub.arcgis.com/datasets/NCTCOGGIS::2020-land-use/about

Appendix B – NCTCOG Travel Model

Travel Model Description

The North Central Texas Council of Governments Transportation Analytical Forecasting Tool (TAFT) is a multi-step trip-based analysis tool and examines trip generations, trip distributions, mode choice, and traffic assignments to calculate future travel demand by multiple modes. The model components and the processes are streamlined into the analytical tool and are based on various data collection efforts and travel surveys. The TAFT covers 13 counties in the North Central Texas region and an area over 10,000 square miles. The sixteen-county area is broken into over 5,000 traffic analysis zones (TAZs) which are the geographic units that define the spatial resolution of the model. For the Silver Line Scenarios, only 41 TAZs along the corridor were included in the model run.

Travel Model Data Sources

TAFT requires demographic, airports, external trips, hospitals, colleges and universities, and school data sources for travel analysis. Key data sources updated yearly or as much as every five years include elements such as:

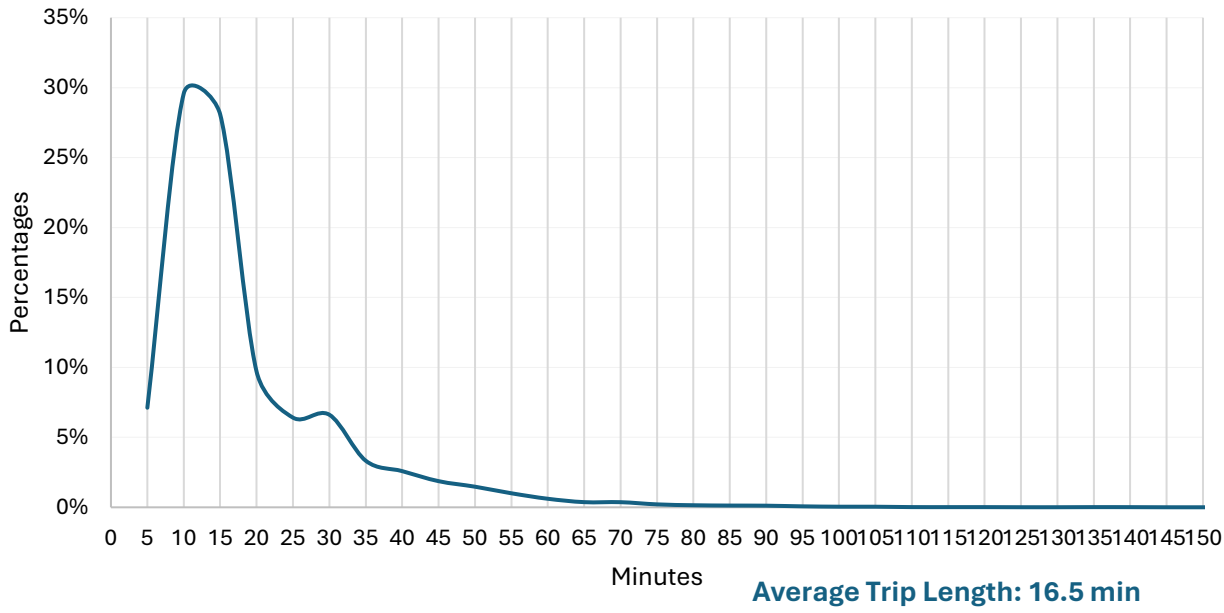
- Land use
- Demographics
- Transportation networks
- Travel surveys
- Travel pattern data
- Speed and signalized intersection data
- Transit traffic count data

Travel Model Considerations

Modeling transit ridership is complicated and impacted by several factors. The Silver Line Study only modified the demographics of a small area, but ridership results are influenced by many other assumptions. Other considerations influencing the model's transit ridership are factors such as:

- Past transit mode share: In the North Texas region, historically around one percent of all trips is by transit.
- Distance factors: Zones far from each other, even on a transit corridor, usually have few trips to each other. The Silver Line Corridor is over 20 miles long and may not have headways more frequent than every half hour. Transit trips with waiting time are likely to take over 30 minutes on the Silver Line while most daily regional trips are only 16.5 minutes, meaning the model assumes few will want to use the longer travel time on the Silver Line. **Figure B-1** demonstrates the surveyed distribution of trip times in the region.

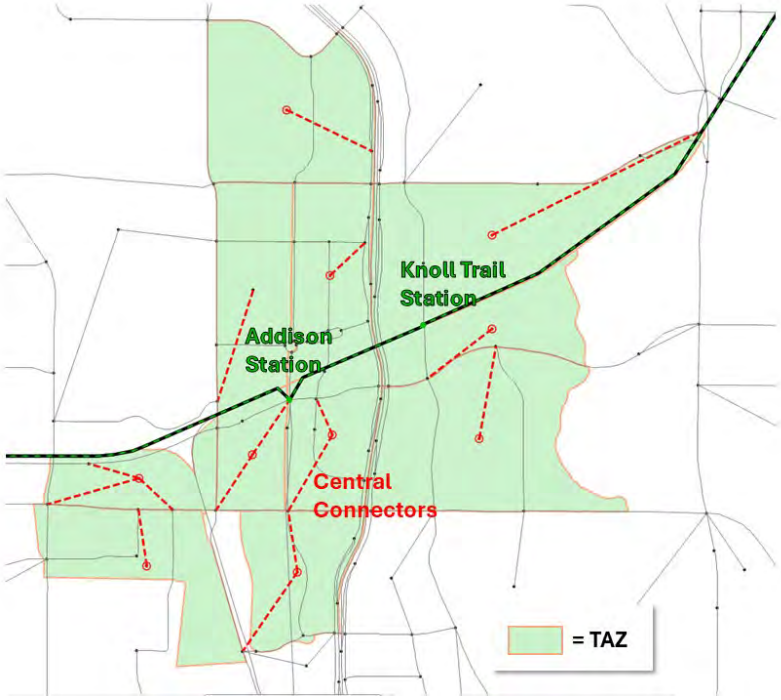
Figure B-1:-Trip Length (Minutes) Distribution 2023 TAFT - All Purpose



- Roadway Dominance: The auto-oriented nature of North Texas has long influenced trips and is heavily reflected in data such that the road access of stations influences trips more than density.

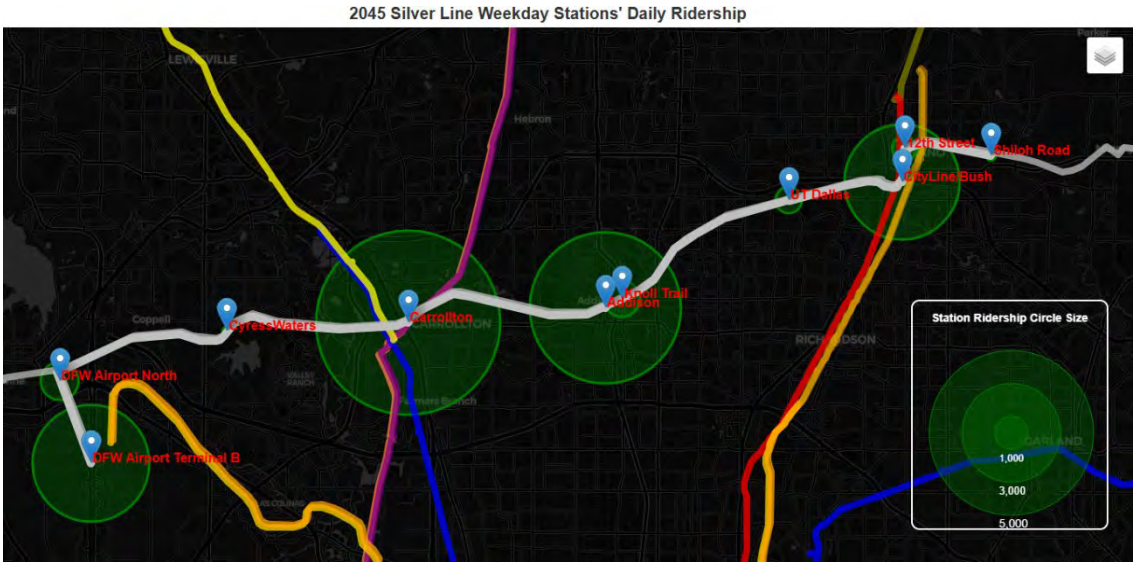
- Employment Anywhere Attracts more Trips: Compared to residential land uses, employment focused locations always bring more trips to their zone.
- Limited Market Segmentation and Trip Purposes: The differences in transit use across employment industries are lost since employment is simplified into three categories: Basic, Retail, and Service.
- Model only considers factors and alternatives included in equations: Socio-cultural-economic factors that influence origin-destination pairing as well as non-transport impacts are not able to model without extensive resources. Cultural preferences, political views, brand loyalty, unique operating hours, and other such things influence travel but the complexity of modeling these makes them extremely difficult to include.
- Model does not account for Pedestrian Network: Ease of walking, comfort, and safety factors have no effect on mode choice within the model. This is related to the model's TAZs being scaled to automobile travel.
- Disconnect between central connectors: Travelers will choose the path of least resistance; however, the central connectors used in the model's TAZs do not always represent the shortest walking path to the station as seen in **Figure B-2**. Additionally, large zones limit the representation of transit accessibility.

Figure B-2: Traffic Analysis Zones and Central Connectors Diagram



- <u>Ridership is impacted by rail network connections:</u> The expected build out of the commuter/light rail network by 2045 is modeled to increase ridership where many rail lines have shared stops such as Downtown Carrollton Station as seen in **Figure B-3** below.

Figure B-3: Forecast Ridership per Silver Line Station Compared to 2045



Appendix C - High-Rise Residential Evaluation for Silver Line Corridor

The Silver Line corridor already has more density on average than most neighborhoods in North Texas with new four- and five-story apartments with ground floor retail frequently being built. To offer more density supporting transit, can resident development become denser, specifically through taller buildings? This writing will take a cursory look at possible public and private sector influences on density of residential buildings.

On the public policy side, it appears most zoning districts, except for those in the City of Richardson, set height limits corresponding to 4 and 5 story buildings. However, most of the TOD-supportive zoning in the corridor is also using planned unit development zoning, also known as planned development zoning (PD), that is often negotiated with each developer. With PD zoning, the limits set may simply reflect the market for what can be built, resulting in clustered single-family housing rather than a mix of uses.[3] See **Appendix E "Zoning Evaluation" of the Silver Line Existing Land Use Conditions Report** for full details on existing Silver Line Zoning.

The private development market is another big influence on the capacity for high-rise residential development (development over 10 stories). Reviewing existing high-rise developments across the region with four or five-story apartments on the Silver Line, the high-rise residential can provide more units per acre, but typically have higher rents as shown in **Table C-1**.

[3] https://planning-org-uploaded-media.s3.amazonaws.com/document/PASQuickNotes22.pdf

Table C-1: Comparison of High-Rise Residential v. Silver Line Multi-Family

	High-Rise Residential*	Silver Line Multi-Family*
Units	308	364
Units per Floor	14	83
Estimate: SQFT per Floor (857 SQFT Apt.) **	14,571	83,699
Estimate: Acres per Floor	0.33	1.92
Units per Acre	919	189
Average One Bedroom Rent	$2,546	$1,447

**These are averages from 10 high-rise residential developments throughout the region and 14 multi-family apartments along the Silver Line Corridor.*
***To calculate, the number of units per floor was multiplied by the average apartment size of 857 SQFT. Then divided by 85% with the assumption that 15% of the building will be non-residential floor area.*[4]

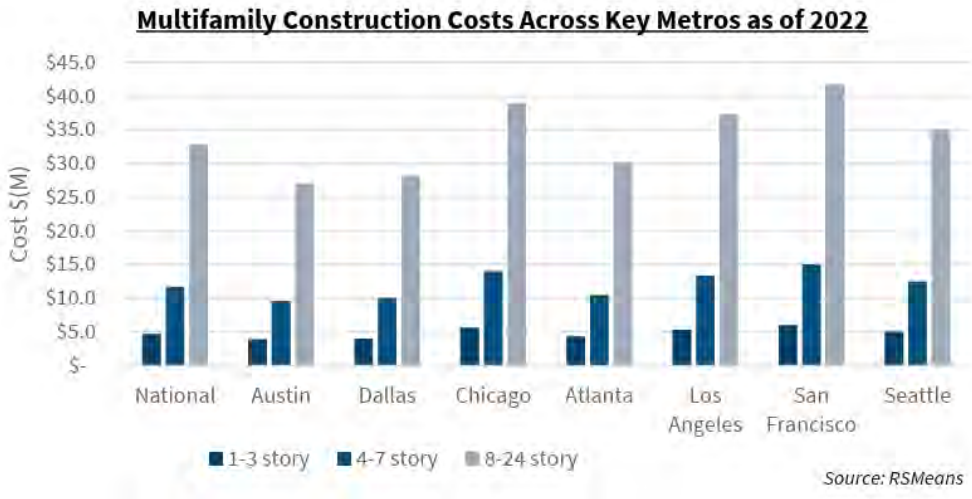
The private sector likely isn't pushing for high-rise residential on the Sliver Line because construction is expensive relative to return on investment. Several factors affecting construction costs outside the size of the building include[5,6,7]: land price, location, design/layout, permits, financing, cost of materials and labor. Assuming all these factors are equal, larger buildings have added complexities, require more materials, and take longer to build than smaller buildings as seen in **Table C-2** and **Figure C-1**. All of this can reduce a developer's return on investment if there's not a market for higher rent apartments.

Table C-2: Construction Costs for different Building Types[8]

Building Type	Square Foot Range	Cost Per Square Foot	Total Cost
1-3 Story Apartment	6,800 – 41,400	$220-575	$1.5-23.8M
4-7 Story Apartment	34,000 – 115,000	$210-475	$7.1-54.6M
8-24 Story Apartment	80,750 - 690,000	$250-$700	$20.1-483M

[4] https://www.multifamily.loans/apartment-finance-blog/multifamily-construction-costs-an-investor-guide/#apartment-complex-construction-calculator
[5] https://www.fanniemae.com/media/43576/display
[6] https://www.rsmeans.com/resources/how-much-does-it-cost-to-build-an-apartment-complex
[7] https://www.multifamily.loans/apartment-finance-blog/multifamily-construction-costs-an-investor-guide/#apartment-complex-construction-calculator
[8] https://www.rsmeans.com/resources/how-much-does-it-cost-to-build-an-apartment-complex

Figure C-1: Multi-family Construction Costs Across Key Metros in 2022[9]



Finally, there's the influence of fire code. The current four- or five-story residential apartments on the Silver Line are known as "5 over 1" or "one-plus-five", which are typically wood-framed residential apartments known as Type V in the International Building Code (IBC), built over a concrete base, which usually contains retail or commercial space, or parking structures, known as Type I in the IBC. As shown in **Table C-3**, high rise residential construction above a fifth floor is only feasible under Type I and Type IV construction. These types of construction require developers to use specialized, top-rated, non-combustible materials throughout the entire building rather than certain sections. For developers, these "5 over 1" buildings are cheaper and faster to build compared to high-rise apartment buildings. For residents, these buildings are more affordable due to the lower construction cost.

Table C-3: Allowable Number of Stories Above Grade based on 2024 Building Code[10]

Occupancy Classification	Type of Construction											
	Type I		Type II		Type III		Type IV				Type V	
	A	B	A	B	A	B	A	B	C	HT	A	B
R-2* (S)	UL	12	5	5	5	5	18	12	8	5	4	3
**Residential Group R-2 is defined as occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature* *UL = Unlimited* *(S) = Buildings equipped throughout with an automatic sprinkler system (Required in New Group R Occupancies)*												

[9] https://www.fanniemae.com/media/43576/display
[10] https://codes.iccsafe.org/content/IBC2024P1/chapter-5-general-building-heights-and-areas

High-Residential Findings

It's very likely the Silver Line does not see high rise residential due to restrictive city zoning. However, it may also be true that when developers have significant input on zoning, they are not pushing for increase height because it is more costly and difficult to profit on in the current market. The current trend of 4 and 5 story multi-family may represent a financial sweet spot of private development and walkable density goals for the cities.

Not explored in this cursory review was the role of utilities like water and sewer in the Silver Line cities as supporting high-rise residential. This may be a hidden limitation on development density. It's also likely that developers will continue to maintain high ratios of parking for high density high rise residential. This further adds to their cost as parking is likely to be provided in taller garages, possibly supporting many floors of residential units above.