CapMetro

Executive Summary

September 2024

Red Line Trail Study

Photographs provided by the Red Line Parkway Initiative

CapMetro

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Introduction

The Red Line Trail Study, launched by CapMetro in February 2023, is a crucial step towards realizing a long-standing vision for the Red Line Trail in Central Texas. Originating in 2004 with CapMetro's voter-approved All Systems Go Plan, the Red Line Trail is envisioned as a 32-mile corridor that generally follows the Red Line commuter and freight rail corridor through Austin, Cedar Park, and Leander. For nearly two decades, regional partners have worked towards implementing this active transportation corridor that provides critical first and last mile connections to the regional transit system. The study aims to provide a consistent and clear path forward for delivering the trail with our partners in the region.

CapMetro approaches this study, and the Red Line Trail, with our commitment to multi-modal, environmentally responsible, transportation solutions for Central Texas. We recognize that the most beneficial role CapMetro can play in delivering the trail is by providing access to, and usage of, our existing right-of-way, where possible, to help facilitate the realization of this project for the region. While CapMetro owns the rail right-of-way; and would be glad to provide access for partners who focus on trail construction to build and maintain the trail segments, the agency cannot deliver this project for the community alone.

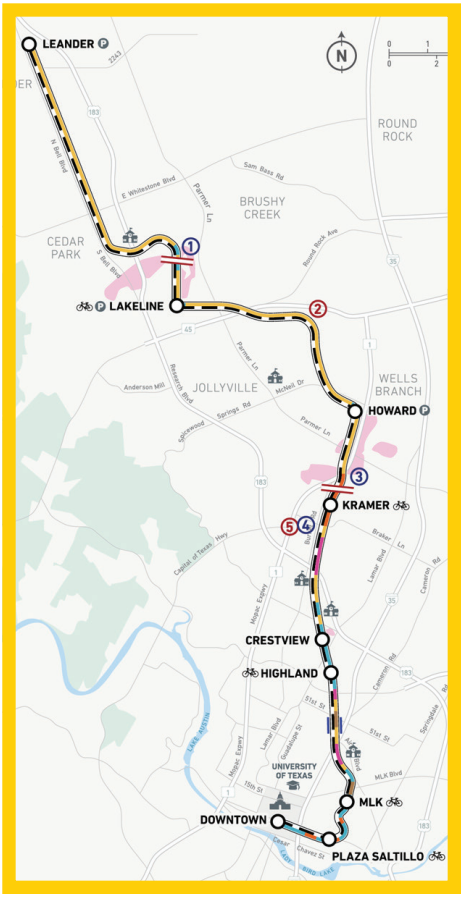
The study identifies feasible opportunities and recommendations for incorporating the Red Line Trail within CapMetro's rail right-of-way. It evaluates the corridor by analyzing each trail segment's opportunities and constraints. Additionally, the study outlines guidelines that support safe multimodal connectivity, and establishes processes that clarify how implementing partners can work closely with us to design, engineer and construct the trail.

The analysis identified that approximately 40% of the 32-mile corridor can safely accommodate the trail along with rail operations and future operational expansion of the rail without requiring variances. This includes segments totaling 13.07 miles, from south of MoPac/Walnut Creek Trail to Howard Station, West Palmer Lane to Lakeline Station, and Staked Plains Neighborhood to Leander Station.

The remaining 60% of the corridor requires close work with implementing partners to make location-specific adjustments that safely accommodate rail operations and bike and pedestrian access. Through similar partnerships, several segments on this portion of the Red Line Trail currently have existing bike infrastructure, totaling 5.7 miles. Those segments with existing bike infrastructure were analyzed for potential relocation to or expansion within the rail right-of-way.

The opportunities outlined in the study serve as a guide for possibilities within the rail right-of-way and provide a critical path forward. The study is not meant to predict the final design or placement of a potential future trail. Regional partners will implement the vision, in collaboration with CapMetro. Timing and implementation of the trail depends on available funding, constructability, and the complexity of each segment. CapMetro will continue championing the Red Line Trail, through provision of rail right-of-way access and usage, and will work collaboratively with our implementing partners to deliver an integrated trail for the community. The following report summarizes the key efforts and findings from the Red Line Trail Study.

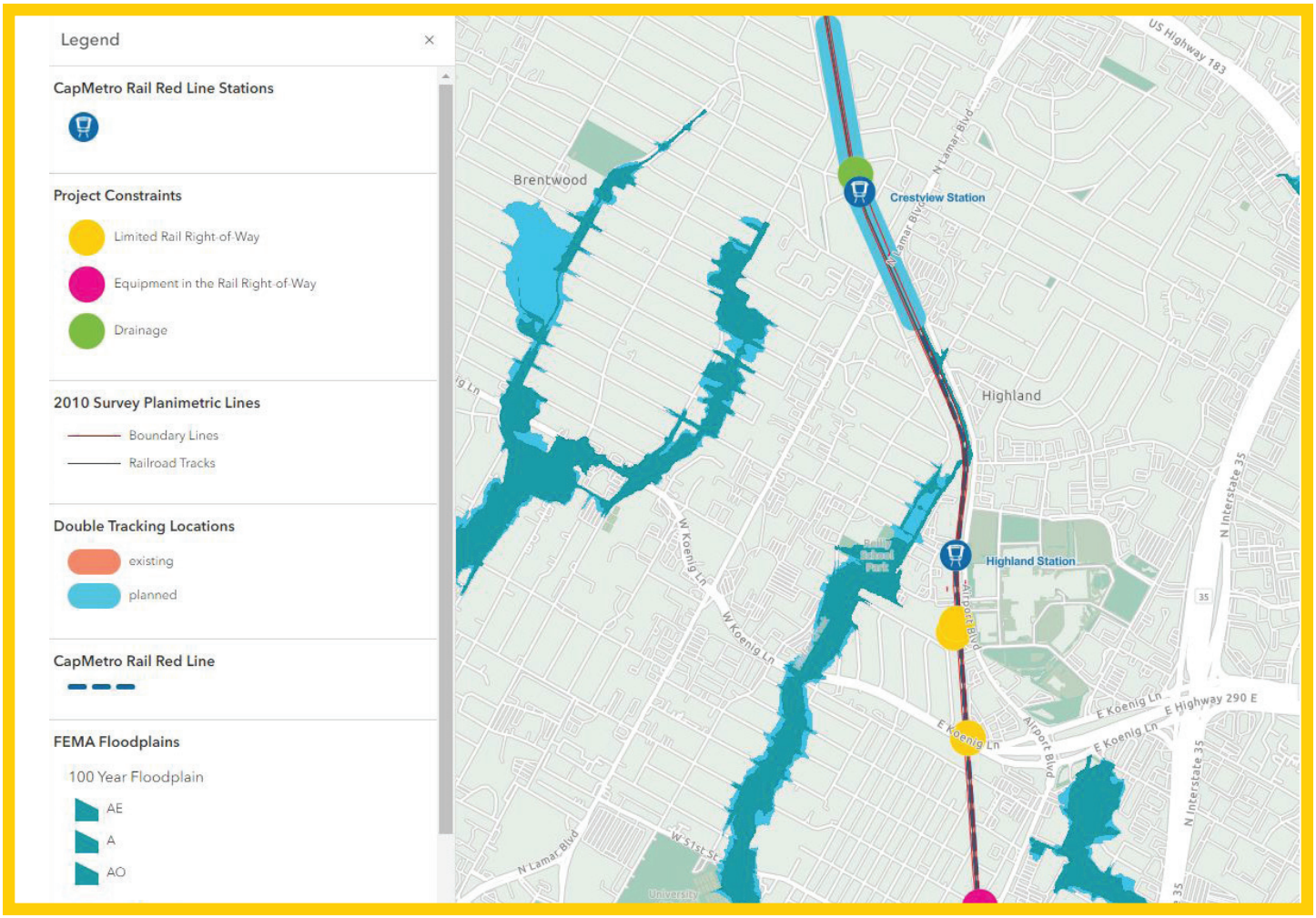
Figure 1: Route Map



Existing Conditions and Needs Assessment

Existing conditions along the Red Line corridor were documented and analyzed using data provided by governmental jurisdictions, including relevant policies, guidelines, and projects; development permitting websites for the cities of Austin, Cedar Park, and Leander; US Census data; existing GIS data; and a field review conducted in late May of 2023. The existing conditions analysis focused on rail assets, demographics, land use, environmental factors and transportation data. Detailed operating profiles, such as speed and curvature, as well as the most recent and available planimetric surveys, were compiled under this effort.

Figure 2: Zoomed-In View of CapMetro Rail Existing Conditions Map

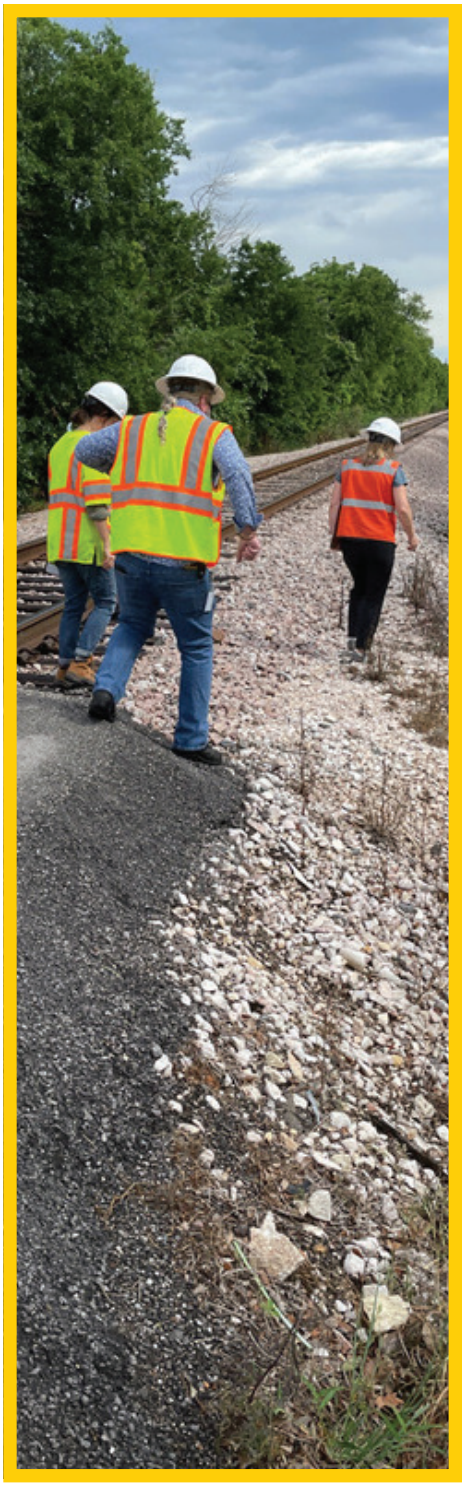


From the analysis, preliminary opportunities and challenges were identified for siting the Red Line Trail within the rail right-of-way:

Opportunities

- **Adjacent Redevelopment**: Redevelopment is occurring at multiple locations along the corridor. This offers opportunities to secure recreational easements to site the trail along or closely adjacent to the corridor during the site permit process. These redevelopment areas will not have the same constraints as locations with existing infrastructure and may offer viable alternatives for the trail corridor. Additionally, areas that are being developed are likely to be denser and generate more use.
- **Positive Activity along the Rail Corridor**: Trail development along the corridor could reduce/eliminate some nuisance behavior such as dumping or trespassing on the rail. The trail could also provide access for maintenance and emergency response along the rail.
- **Trail Implementation Efficiency**: Sections of the right-of-way that can host a trail offer significant time and cost savings compared to the process of identifying a feasible route outside of the right-of-way.

Challenges



- **Limited right-of-way**: Several sections along the Red Line have limited right-of-way widths, and the space along the rail must also accommodate operational, maintenance and equipment needs for the trains. Existing double tracking also restricts space for a trail within the right-of-way. CapMetro is currently planning four near-term double tracking projects and one siding track project. Additional double tracking projects are likely to occur in the future to improve service. Adding additional tracks to the railroad right-of-way limits the area available for trail construction.
  Double tracking refers to the construction of two railway tracks, allowing trains to travel in both directions simultaneously. Double tracking provides efficiency and reliability of service. Double tracking reduces delay and provides reliability by not forcing trains to wait while passing. For every mile of double track added, travel time is reduced. Travel time reduction encourages more riders and allows for higher person carrying capacity of the rail. Project Connect incorporates the double tracking of the Red Line as a component of the broader regional transit improvements. Given limited resources and complexities with topography and right-of-way, there are main segments where double tracking is selected in the near future. These segments would substantially enhance and improve rail service along the corridor. While these targeted segments of double tracking are near term in nature, this study considers trail impacts to double tracking along the length of the entire corridor.
- **Signal houses:** Also called signal bungalows or signal shelters, these metal structures contain rail signaling equipment and are located at least 25 feet from the centerline of the nearest track. Per the TxDOT Manual on Uniform Traffic Control Devices, equipment housings (controller cabinets) should have a lateral offset of at least 30 feet from the edge of the highway, and where railroad and conditions allow, at least 25 feet from the nearest rail. Per CapMetro MetroRail Design Criteria (2021), all communications equipment devices and enclosures (including bungalows, cases, radiating cable, antennas, platform communication devices, and repeater housings) shall clear the dynamic clearance envelope, which is 8'6" from the center of track. The signal houses are sited frequently along the corridor and may be located within an otherwise ideal alignment for the trail. Signal houses are necessary for rail operation, so relocation would require the installation of a new bungalow before the conflicting bungalow is removed. There are also limited areas in which to relocate the structures and relocation is costly.
- **Drainage**: Managing stormwater runoff, channels, and streams around the rail corridor presents a challenge for siting the trail as well as designing for trail drainage. Existing infrastructure including ditches, concrete drainage swales, and culverts may be difficult and/or costly to accommodate in a trail design. Working with existing drainage patterns or altering the drainage pattern so that both the railroad and trail corridors have positive drainage will also be a challenge in certain areas. However, CapMetro along with support from the City of Austin have had some success in building trails with drainage structures that include capped culvert systems and cantilevered boardwalks. See McKalla Station example on page 90.
- **Structures and Grade Separation**: The rail bed narrows where it crosses over significant creeks, canyons, and other features. Thus, the developable space within the corridor is limited, and accommodating the trail would require widening of structures such as bridges and drainage features.

- **Crossings**: Areas where the rail crosses a roadway are not always ideal for trail crossings and often occur midblock. While trains can rely on bells, lights, and gates, safe crossing for trail users may require additional infrastructure and treatments.

The Existing Conditions Memo and the Existing Conditions Virtual Open House offer more detail on the precise occurrences for factors. This thorough assessment resulted in a better understanding of the study area context and provides a foundation for future trail considerations.

Public Engagement

The study team conducted two phases of community engagement to share findings and learn more about desired trail uses and trail design preferences. These engagement phases were supported by the Red Line Parkway Initiative, a nonprofit organization that unites partners and communities to successfully plan, fund, build, and activate the Red Line Trail. During this study, they successfully helped spread awareness and gather feedback through trail activation and outreach events.

In Fall of 2023, the study team created a Virtual Open House on Existing Conditions to interactively share the study's vision, timeline, existing conditions, and preliminary opportunities and constraints to be considered in the study. The community provided input through a survey, sharing valuable feedback regarding how they hoped to use any future trail, as well as the top destinations they wanted to reach. "Recreation" topped the list of desired trail uses, followed by "Connecting to Transit." The locations with the most responses included existing CapMetro Red Line stations (showing a desire to integrate the trail with other transit options) as well as major shopping/entertainment destinations. For more information, please see the Virtual Open House #1 Engagement Results.

In Spring of 2024, a second Virtual Open House presented feasible opportunities and recommendations for a trail within the rail right-of-way. Built and presented with the ArcGIS StoryMaps online engagement platform, the open house provided an attractive way to learn more about the trail possibilities, along with new design guidelines and standard operating procedures that provide a clear path forward for implementation.

A multiple-choice survey was conducted to explore how much participants supported the specific cross sections and renderings throughout the corridor. Participants were also asked about their aesthetic preferences, the amenities they found most important to include throughout the trail, and the type of trail

they preferred. An average of 68% of participants strongly supported the proposed cross sections and design renderings, with the highest supported location being the portion of trail through Brushy Creek Recreation Park in the City of Cedar Park at 72%. This feedback aims to provide guidance as implementing partners continue designing and prioritizing segments of the future Red Line Trail. For more information, please see the Virtual Open House #2 Engagement Results.

Trail Possibilities including Feasibility Tiers

CapMetro created and formalized Design Guidelines to establish uniform standards and preferences for trail design parameters, such as the setback distance between the trail and the track, and other operational considerations. CapMetro's preferred setback minimum is 25 feet from centerline based on key safety, operational, and maintenance concerns associated with freight and commuter rail, such as the train dynamic envelope, the speed and frequency of trains, the topography and sight lines along the corridor, and space needed in case of derailments. CapMetro also developed official Standard Operating Procedures (SOP) to provide processes for how implementing partners can coordinate with CapMetro on potential design variances, such as closer setback in areas with limited space. The SOP also clarifies how implementing partners can work closely with us to continue with design, engineering and construction of the trail.

Utilizing the Design Guidelines, the study team created three tiers that reflect the feasibility and complexity of incorporating the Red Line Trail within CapMetro's rail right-of-way. A trail width range of 11 to 16 feet was used for determining spacing for the trail, based on local jurisdiction

standards and the potential for the trail's width to flex in response to site conditions or constraints[1]. In areas with existing bicycle and pedestrian infrastructure, segments were still analyzed for potential relocation or expansion within the CapMetro rail right-of-way and assigned a feasibility tier.

The feasibility tiers are described in the table below. The results are not meant to predict the final design or placement of any potential future trail, as there are additional engineering requirements such as design, drainage, utility, survey work, and permitting that are necessary to identify a final alignment prior to construction.

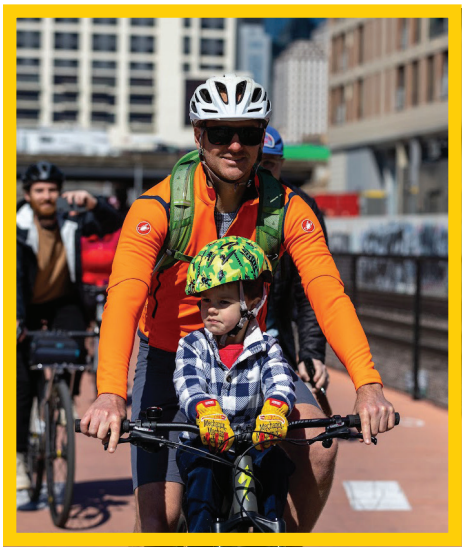
1 The preferred trail widths are based on local jurisdictional standards. The City of Austin trail width standards are context sensitive with a preference for dual track trails that separate pedestrians and cyclists where space permits. The standard minimum width for a shared use trail in the City of Austin is 12 feet, but trail width can be reduced to 10 feet in constrained areas and extended to 16 feet when space allows. In the City of Leander and City of Cedar Park, the standard trail width is 12 feet.

Table 1: Feasibility Tiers

FEASIBILITY TIER	CRITERIA
Tier 1: Compatible with Future or Existing Double Tracking	Identified segment can meet CapMetro preferred setback of 25 feet* AND Is compatible with current or future double tracking along the Red Line corridor. Future double tracking assumes 15 feet between centerlines of rails and double tracking centered within the right-of-way (may assume relocation of existing track)** AND Is not eliminated by any other geological/physical constraint present in available data
Tier 2: Meets CapMetro Preferred Setback	Identified segment can meet CapMetro preferred setback of 25 feet* AND Is compatible with **prioritized double tracking projects along the Red Line corridor but not future double tracking along the entire corridor**, assuming 15 feet between centerlines of rails and double tracking centered within the right-of-way (may assume relocation of existing track)**
Tier 3: Does not meet CapMetro Preferred Setback	Identified segment cannot meet CapMetro preferred setback of 25 feet but may be physically feasible* Due to constraints and safety considerations, requires further discussion and coordination with CapMetro to explore and determine context-sensitive options and variance possibilities through the SOP.

** Based on side with greater availability of unused right-of-way if tracks are not centered within the right-of-way*

***Setback will be measured from centerline of closest track to the closest edge of the trail (including trail installations, such as a fence)*



Approximately 40% of the 32-mile corridor can safely accommodate the trail along with rail operations and potential expansion of the rail system in the future without requiring variances. This includes segments totaling 13.07 miles, specifically from south of MoPac/Walnut Creek Trail to Howard Station, West Palmer Lane to Lakeline Station, and Staked Plains Neighborhood to Leander Station.

None of the corridor segments met Tier 2 criteria, which considered the flexibility of allowing a near-term trail as CapMetro gathers resources and funding for longer-term double tracking projects[2]. The lack of Tier 2 segments was due to the increments of right-of-way width and how they corresponded with the CapMetro Guidelines.

2 Given the limited resources and complexities of topography and right-of-way, double tracking is currently prioritized in the near-term at Howard Station (Adelphi Lane to McNeil Drive), Broadmoor Station (North of Kramer Lane to South of Gracy Farms), between Highland and Crestview Stations (Denson Drive to Morrow Street with current prioritization from Guadalupe to Morrow Street) and Plaza Saltillo Station (Onion Street to East 7th Street).

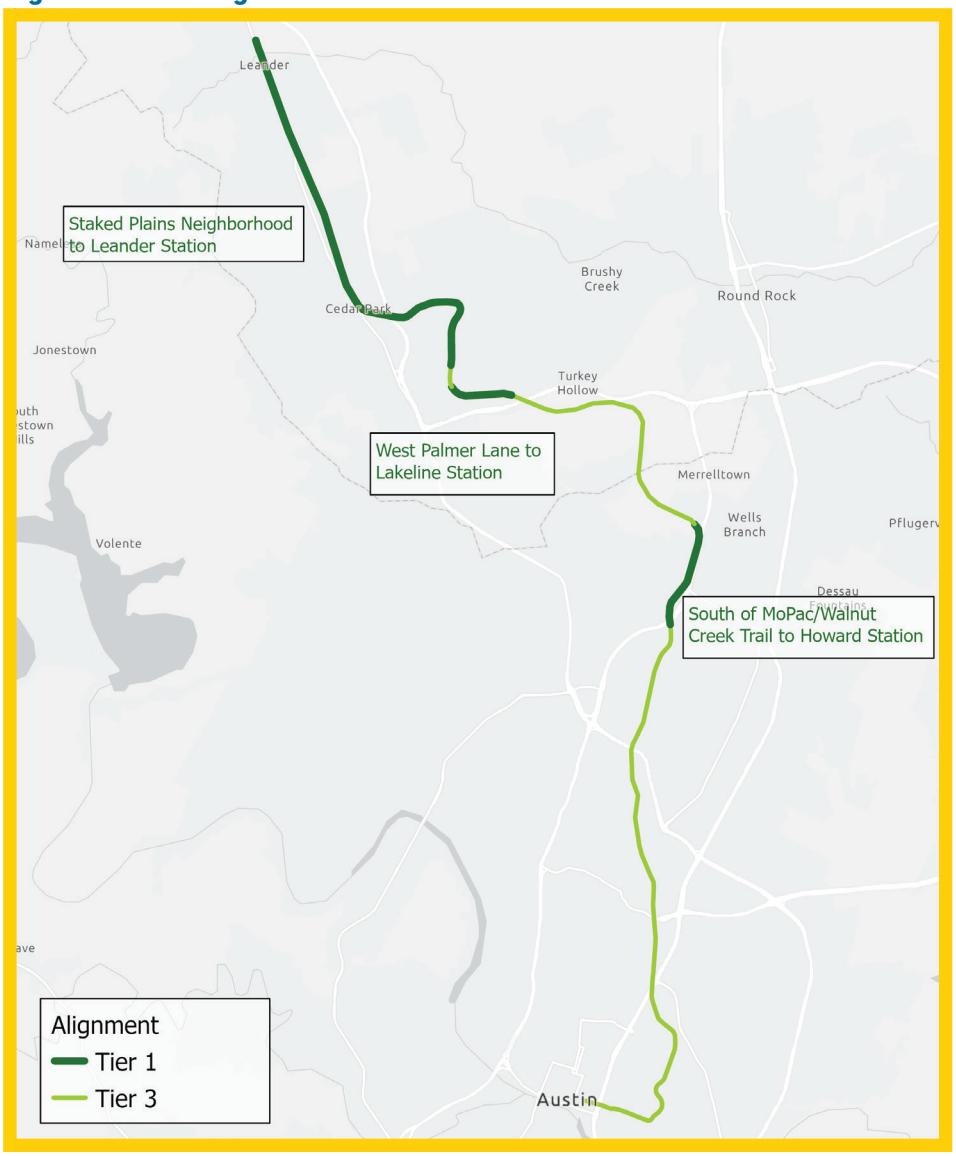
The remaining 60% of the corridor requires us to work closely with implementing partners to make necessary, location-specific adjustments in order to safely accommodate rail operations and bike and pedestrian access. It's important to note that through successful partnerships and collaboration, several segments of the Red Line Trail are open to the public today, totaling 5.7 miles. In areas with existing bicycle infrastructure, segments were still analyzed for potential relocation to, or expansion within, the rail right-of-way.

The following table provides a summary of the mileage and percentage of the study corridor according to the feasibility tier. For more details, please see Trail Alignment Possibilities Memo.

Table 2: Tier Feasibility

FEASIBILITY TIER/ STATUS	TOTAL LENGTH (MILES)	PERCENT OF STUDY CORRIDOR
Tier 1	13.07	40%
Tier 2	0	0%
Tier 3	19.44	60%
TOTAL	**32.51**	**100%**

Figure 3: Trail Alignment Possibilities



Trail Design Graphics

The study team created concept-level graphics and designs for the Red Line Trail based on various trail alignment scenarios. The concept graphics and designs are intended to illustrate what the trail may look and feel like based on CapMetro and jurisdictional guidelines. The goal of the graphics and concepts is to illustrate applied design guidelines, future and existing double tracking, and jurisdictional preferences for trail width and other trail design elements. Moving forward, the graphics and designs will aid discussions between CapMetro and the implementing partners, serve as an educational tool, and provide support for potential funding pursuits.

Locations were carefully selected to be representative of conditions that would occur throughout the corridor and depict points within Tier 1 segments of the corridor, apart from the McKalla Station cross section, which depicts a successfully completed section

of a trail along a Tier 3 segment. The side of the track where the trail is shown was selected to minimize new crossings and provide connectivity to stations; however, the side of the rail, along with other major and minor details, are preliminary in nature and subject to change with future planning, design and coordination with stakeholders such as the Lower Colorado River Authority and the Texas Department of Transportation.

Figure 4: Typical Tier 1 Segment Cross Section

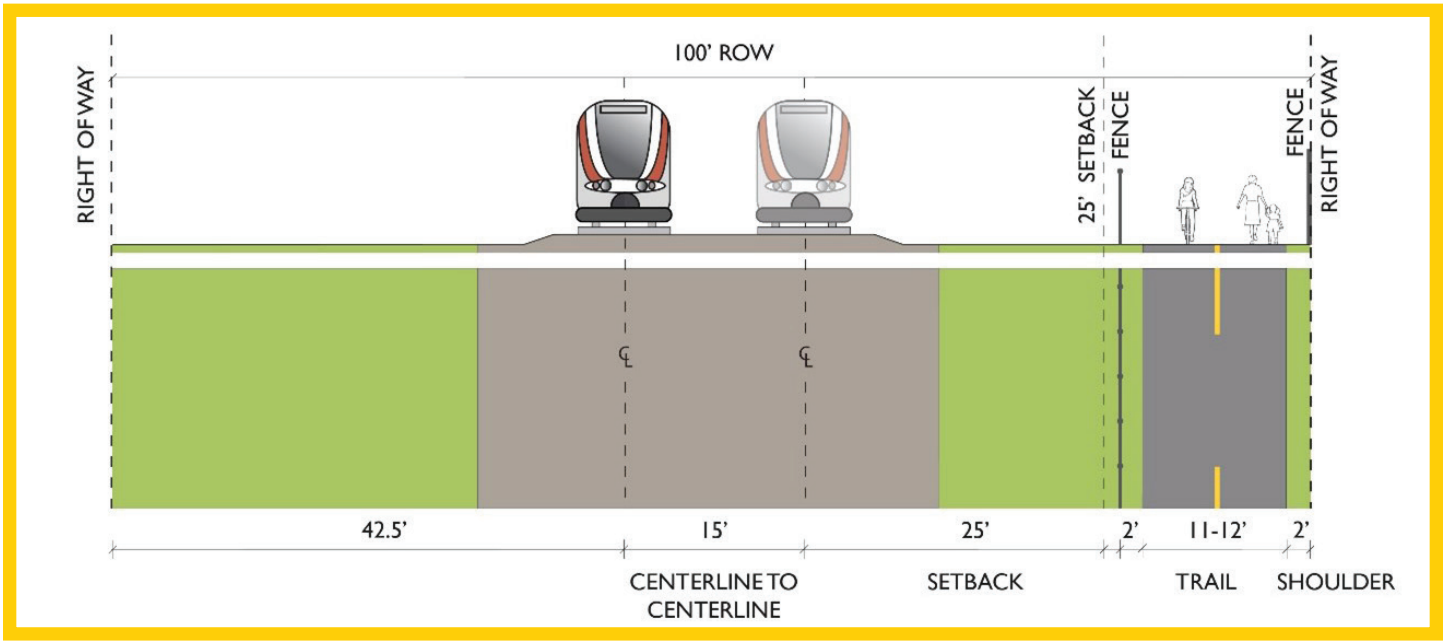


Figure 5: Visualization of a completed section

The Red Line route crosses many roadways with a range of widths and posted speed limits. Locations where the rail crosses a roadway, such as mid-block locations that lack traffic control, do not always have ideal conditions for creating safe pedestrian crossings. While trains can rely on bells, lights, and gates, additional crossing treatments and infrastructure may be necessary to create safe crossing conditions for trail users. A tailored effort in the design of the required trail-road crossings will be required to ensure the safety of trail and roadway users. This effort provides recommendations for potential treatments and safety feature options at potential crossings. The evaluation found that designers should consider multiple types of crossing treatments based on context, including jurisdictional standards and roadway volumes and speeds. An example workflow was created to guide planners and designers through the process of selecting the appropriate crossing type and related treatments.

Figure 6: Example Workflow

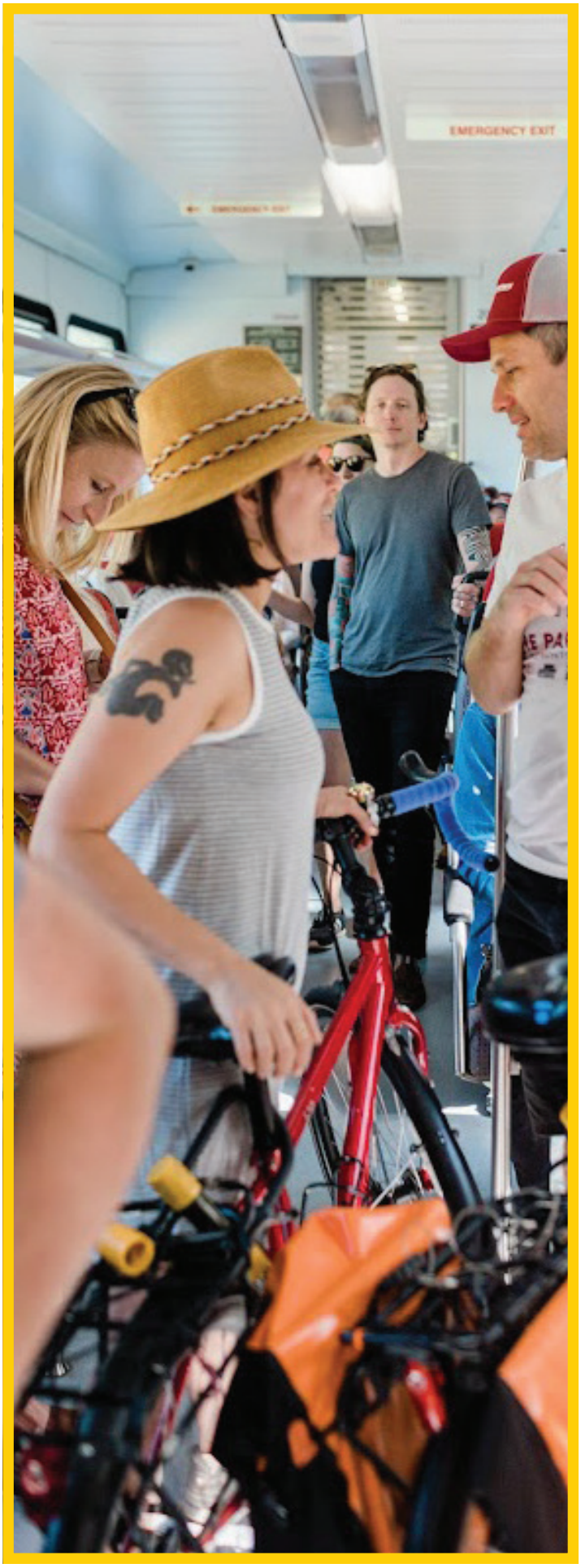
For more details, please see Trail Design Memo.

Segment Readiness Evaluation

A high-level evaluation of Tier 1 segments was conducted to provide context for which trail segments will be easier to design and construct along the Red Line corridor. This readiness evaluation is based on a high-level screening and uses a feasibility lens to aid in understanding predicted ease of trail design and construction. The evaluation is not a prioritization tool, but rather is intended to help jurisdictions understand the complexity around constructing various Tier 1 sections of the Red Line Trail.

Tier 1 segments were identified in the alignment analysis and together make up approximately 13.07 miles, which constitutes 40% of the Red Line corridor. Segments of rail right-of-way that are categorized as Tier 1 have sufficient width to meet CapMetro's preferred setback of 25 feet and are compatible with future or existing double tracking. Due to these advantages, Tier 1 segments are most ready for implementation and were examined in this evaluation to determine level of ease for design and construction. Segments in the Tier 3 category will require further collaboration with CapMetro as they have added complexity and do not meet CapMetro's preferred setback of 25 feet.

The seven Tier 1 segments were evaluated based on four criteria explored in the existing conditions and other phases of this study: intersections/ crossings; connectivity to existing/planned facilities; constructability; and development opportunities. These criteria were developed based on established project goals, industry best practices, and available data. A score of 1 (low) to 4 (high) was given to each of the criteria for the Tier 1 segments. Scores were determined by analyzing aerial imagery, data collected from the existing conditions phase of the project and provided by governmental jurisdictions, and GIS layers on the study's interactive webmap. Criteria definitions and scoring metrics can be found in the Segment Readiness Evaluation section of the Recommendations report. A high-level cost opinion is included for each of the segments as a reference. These opinions utilized the order-of-magnitude cost estimates to apply symbolic cost ranges ($-$$$$) to each segment. All costs are preliminary and subject to change with additional design, engineering, and drainage evaluations. Additional factors that may come to light in the future, such as opportunities for recreation easements, were not incorporated into this evaluation but should be considered and weighted into segment readiness as project planning progressed.



Planning Level Cost Estimates

Order-of-magnitude cost estimates were developed to help identify potential costs for segments of the Red Line Trail based on the conceptual design information provided in the study. These were tabulated based on the tier determined to be most appropriate along each corridor segment, and then projected out based on the lengths of the segments. The following table provides a summary of the planning-level cost estimates by category. More details are provided in the Planning Level Cost Estimates section of the Recommendations report.

Table 3: Estimated Costs

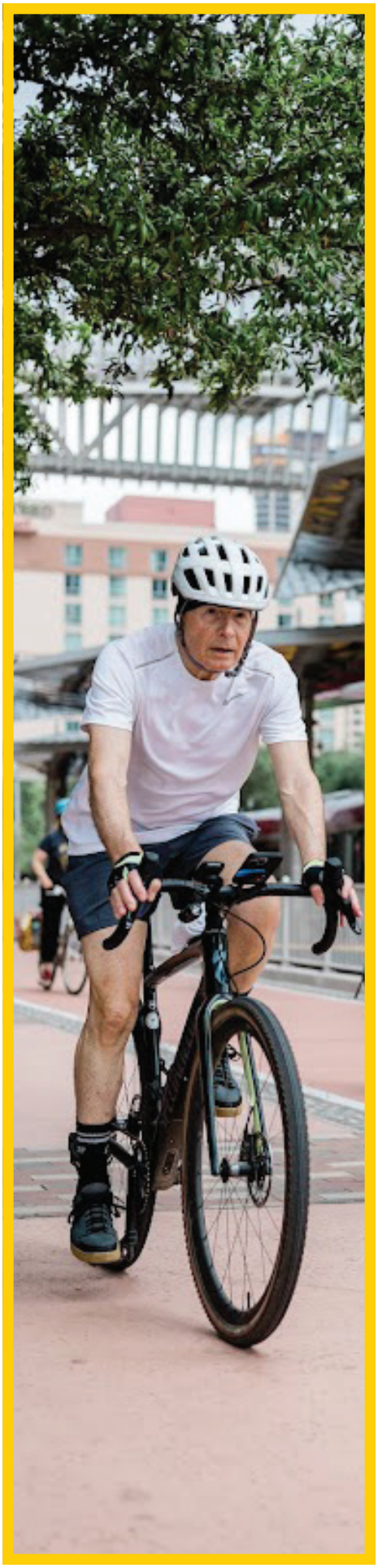
Tier	Cost per mile (2024 $)
Tier 1 (less constrained)	**$6,000,000**
Tier 1 (less constrained) with Signal House Relocation	**$9,000,000**
Tier 3 (more constrained, many unknowns)	**$12,000,000**
Tier 3 (more constrained, many unknowns) with Signal House Relocations and Pedestrian Bridge	**$34,000,000**

Funding Opportunities

The study team identified potential funding sources available to governmental entities and project partners to implement the proposed Red Line Trail. Funding is available for planning and construction of bicycle and pedestrian infrastructure projects. For instance, the Austin Mobility Bond Programs are a local method of funding numerous transportation projects, including the urban trails network. Grant funding for trail projects is typically administered by Federal agencies; however, it is recommended that project sponsors continue to monitor future funding offered locally such as through the Capital Area Metropolitan Planning Organization (CAMPO) or through other state sources offered through the Texas Department of Transportation (TxDOT). This can also include federal funds administered by state and local entities.

Overall, funding program availability on average ranges from $700,000 to $25 million with additional funding available through the Reconnecting Communities Pilot Grant Program. Red Line Trail project sponsors should continue to monitor funding availability and programs offered locally, regionally, and federally for long-term implementation.

Additionally, Red Line project partners may consider other funding opportunities that may become available in coordination with larger redevelopment opportunities. Fund sources such as Community Development Block Grants (CDBG), Tax Increment Financing (TIF), Tax Increment Reinvestment Zone (TIRZ), and Public Improvement Districts (PIDs) may be worth exploring as local funding opportunities to fund public infrastructure.



A summary of identified funding opportunities for the Red Line Trail are outlined below in Table 4. Funding sources identified include a description of the administering agency, project scope eligibilities, funding amount, and timeline for typical grant application and funding award.

Table 4: Summary of Red Line State and Federal Funding Opportunities

Funding Program	Grant Administrator	Funding Range for Projects Based Upon Historical Awards*	Key Considerations for Project Sponsors
Transportation Alternatives Set-Aside Program	Texas Department of Transportation (TxDOT)/ Capital Area Metropolitan Planning Organization (CAMPO)	$1.0M - $12.0M	Engage TxDOT and CAMPO for funding opportunities
National Recreational Trails Fund Grant Program	Texas Parks and Wildlife (TPWD)	$300,000 - $4.0M	Undersubscribed program.
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	Texas Department of Transportation (TxDOT)	N/A at this time	Monitor air quality attainment changes
Reconnecting Communities Pilot Grant Program (RCP)	U.S. Department of Transportation (USDOT)	No minimum to $100M	Recommend early engagement with local stakeholders to identify as key RCP project
Active Transportation Infrastructure Investment Program (ATIIP)	Federal Highway Administration (FHWA)	$100,000 - $15M (depending on project type)	May be best used for construction funds.
Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	U.S. Department of Transportation (USDOT)	$5M - $25M	Similar to RCP, consider prioritizing as regional application for max competitiveness.
Safe Streets and Roads for All (SS4A) Program	U.S. Department of Transportation (USDOT)	$100,000- $25M (depending on project type)	Confirm alignment with city with jurisdiction Action Plan Priorities.
Community Project Funding (CPF)/Congressionally Directed Spending (CDS)	At the discretion of Congress (Annual Federal Appropriations Bill)	$700,000 - $5M	Engage Member of Congress prior to spring 2025/2026

**Funding ranges are presented for reference only based on historical awards. Consult the applicable funding guidance (i.e. NOFO) at time of application for detailed information on funding minimums and maximums.*

Conclusion

The Red Line Trail Study serves as a key guide for feasible opportunities and recommendations for incorporating the Red Line Trail within CapMetro's rail right-of-way. This study provides a consistent and clear path forward for Red Line Trail segments with guidelines and processes that support safe multimodal connectivity.

Regional partners will implement the vision, in collaboration with CapMetro, through preliminary engineering and design. The timing and implementation of the trail would depend on the funding available to construct the trail, and range by segment depending on the complexity that it presents. CapMetro will continue championing the Red Line Trail, through provision of rail right-of-way access and usage, and work collaboratively with our implementing partners to deliver an integrated trail for the community.