

Part 1

Base Information

1. Project Title	16 th Street Mall Rehabilitation Project
2. Project <i>Start/End</i> points or Geographic Area <i>Provide a map with submittal, as appropriate</i>	16 th Street from Market Street to Civic Center Station
3. Project Sponsor (<i>entity that will construct/ complete and be financially responsible for the project</i>)	City and County of Denver
4. Project Contact Person, Title, Phone Number, and Email	Justin Begley, Project Manager, 7209131743, justin.begley@denvergov.org

5. Does this project touch CDOT Right-of-Way, involve a CDOT roadway, access RTD property, or request RTD involvement to operate service? x Yes No
If yes, provide applicable concurrence documentation with submittal

6. What planning document(s) identifies this project?	x DRCOG 2040 Fiscally Constrained Regional Transportation Plan (2040 FC RTP)	
	<input type="checkbox"/> Local plan:	
	<input type="checkbox"/> Other(s):	

Provide link to document/s and referenced page number if possible, or provide documentation with submittal

7. Identify the project's **key elements**.

- Rapid Transit Capacity (2040 FC RTP)
- x Transit Other: Fixed Guideway SOGR
- Bicycle Facility
- x Pedestrian Facility
- Safety Improvements
- Roadway Capacity or Managed Lanes (2040 FC RTP)
- Roadway Operational

Grade Separation

- Roadway
- Railway
- Bicycle
- Pedestrian
- x Roadway Pavement Reconstruction/Rehab
- Bridge Replace/Reconstruct/Rehab
- Study
- Design
- Transportation Technology Components
- Other:

8. **Problem Statement** What specific Metro Vision-related subregional problem/issue will the transportation project address?

The Mall's two greatest transportation challenges involve limited sidewalk capacity that jeopardizes pedestrian safety by increasing the opportunity for pedestrian/shuttle conflict; and frequent and costly maintenance of pavers that impede transit operations and negatively affect mobility and access to businesses and other destinations. Increased sidewalk congestion encourages pedestrians to travel in the transitway.

ATTACHMENT, asymmetrical and median blocks lend creative detail to the otherwise linear corridor but increase the risk of passenger/shuttle conflict and limit capacity on sidewalks and in gathering places. Consistent with

CCD's Vision Zero goal of eliminating traffic fatalities by 2030, this is a safety first project to coincide with a beyond end-of-life reconstruction of the shared transit and pedestrian surface.

The vibrant pedestrian corridor requires rehabilitation to alleviate congestion and enhance safety. The current capacity of the asymmetrical and median blocks is approximately 4,320 and 3,840 pedestrians per hour, respectively. On median blocks, peak-hour pedestrian volume of 4,100 pedestrians per hour already exceeds capacity, and CCD expects peak-hour volumes on both block types to average 4,800 pedestrians per hour by 2040 ATTACHMENT. Recent pedestrian counts in ATTACHMENT demonstrate sidewalk utilization is already approaching state capacities.

Increased sidewalk congestion encourages pedestrians to travel in the transitway, increasing risk for multimodal conflict. A review of crashes between 2007 and 2017 finds 784 reported crashes, of which 72 involved crashes between the shuttle and a pedestrian, with 46 resulting in non-fatal injury. Median blocks had five times more crashes than asymmetrical blocks ATTACHMENT. Forecasts for increased pedestrian volumes compel RTD to address the issue now before it grows worse.

Regular festivals on and near the Mall – 27 in 2018 – as well as shuttle stops at each block, where passengers gather; non-compliant, narrow sidewalk widths; and street furniture that obstructs disabled travel all exacerbate the potential for multimodal conflict and highlight the need to increase public space on the Mall where pedestrians may amble and linger so the Mall may better connect users to their destinations.

9. Define the *scope* and *specific elements* of the project.

Project will address deteriorating infrastructure to allow reasonable maintenance frequency and costs; improve safety for pedestrians and vehicles; improve mobility for desired transit operations and all users; and increase opportunities for public use.

- Maintain an alignment that retains the pattern of asymmetrical and median blocks and supports the need for safety, mobility, and public use:
 - o On asymmetrical blocks, relocate light fixtures; shift the pattern of the underlying pavement to align with pedestrian walkway on the narrow side of the block in order to accommodate removal; install amenity zone with additional new row of trees on narrow side of the block to buffer pedestrian walkway and transitway.
 - o On median blocks, locate transitway in the center of the block; and consolidate public space into two equal areas on either side, each consisting of amenity zone with trees, pedestrian walkway, and patio/gathering area. SEE ATTACHMENT: Comparison of Existing and Proposed Cross Sections
- Delineating pedestrian walkways from the transitway with an amenity zone, including trees, lights, and features (e.g., benches, chairs, planters, and kiosks) to improve safety and reduce pedestrian/transit conflicts. RTD and CCD may consider additional delineating features, including in-pavement lighting or different color materials, a strip of textured surface, detectable to the visually impaired, or other delineating features that would not impair movement across the Mall, either alone or in combination.
- Installing bulb-outs at cross streets to reduce the crossing distance for pedestrians on those streets, except for instances where space is reserved for existing bicycle or light rail infrastructure. RTD and CCD will consider additional intersection improvements to slow traffic and increase pedestrian safety (e.g., pavement patterns, pavement color, pavement texture, or raised pavement) during subsequent design phases.
- Installing a new granite pavement system, new trees, and new underground infrastructure to reduce safety concerns and the negative effects of frequent maintenance and repair activities to shuttle service, as follows:
 - o The pavement system would consist of granite pavers with improved surface friction over a new and improved concrete sub-base, complete with a system to drain moisture that penetrates the surface.
 - o The pattern of the granite pavers would honor and complement the original I.M. Pei–Hanna/Olin design but would not replicate the pattern in every detail in order to comply with contemporary standards, such as ADA and RTD's bus loading and unloading requirements.
 - o The existing light fixtures, which replicate the original design, would be reused.

o New trees, in a variety of species that meet CCD forestry requirements and similar criteria to those used in the original I.M. Pei–Hanna/Olin design, would be planted in a placement that honors the existing character of the Mall by retaining geometric and spatial relationships of the original design. Trees would be planted in new Silva Cell suspended tree infrastructure that provides 1,000 cubic feet of soil volume for each tree, ensuring healthy growth and longevity of the tree canopy.

· Addressing the light rail at-grade crossings concurrent with the larger Mall project will create efficiencies in construction and limit operational disruptions, which in turn will likely reduce maintenance costs.

10. Would a smaller DRCOG-allocated funding amount than requested be acceptable, while maintaining the original intent of the project?

Yes x No

If yes, define smaller meaningful limits, size, service level, phases, or scopes, along with the cost for each.

The amount requested represents the reduced amount of an original request that was highly ranked but not funded from the DRCOG Regional Share

A. Project Financial Information and Funding Request

1. Total Project Cost		\$118,000,000
2. Total amount of DRCOG Subregional Share Funding Request	\$10,928,084	9% of total project cost
3. Outside Funding Partners (other than DRCOG Subregional Share funds) List each funding partner and contribution amount.	\$\$ Contribution Amount	% of Contribution to Overall Total Project Cost
RTD match for Federal grants from tax revenue	\$1,000,000	1%
City and County of Denver TIF and Local Funds	\$79,000,000	67%
FTA Bus Livability Grant	\$8,000,000	7%
1st Denver Subregional Share Commitment	\$5,000,000	4%
2020 TIP Regional Share Award	\$9,071,916	8%
FTA STP-Metro Grant	\$5,000,000	4%
Total amount of funding provided by other funding partners <i>(private, local, state, Regional, or federal)</i>	\$107,071,916	91%

Funding Breakdown (year by year)*

**The proposed funding plan is not guaranteed if the project is selected for funding. While DRCOG will do everything it can to accommodate the applicants' request, final funding will be assigned at DRCOG's discretion within fiscal constraint. Funding amounts must be provided in year of expenditure dollars using an inflation factor of 3% per year from 2019.*

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Federal Funds	\$5,000,000	\$16,000,000	\$17,000,000	\$	\$38,000,000
State Funds	\$	\$	\$	\$	\$0
Local Funds	\$20,000,000	\$31,000,000	\$38,000,000	\$8,000,000	\$80,000,000
Total Funding	\$25,000,000	\$47,000,000	\$38,000,000	\$8,000,000	\$118,000,000
4. Phase to be Initiated <i>Choose from Design, ENV, ROW, CON, Study, Service, Equip. Purchase, Other</i>	Design	Con			

5. **By checking this box**, the applicant's Chief Elected Official (Mayor or County Commission Chair) or City/County Manager for local governments or Agency Director or equivalent for others, has certified it allows this project request to be submitted for DRCOG-allocated funding and will

x

follow all DRCOG policies and state and federal regulations when completing this project, if funded.

Part 2 Evaluation Criteria, Questions, and Scoring

A. Subregional significance of proposed project

WEIGHT **30%**

Provide **qualitative and quantitative** (derived from Part 3 of the application) responses to the following questions on the subregional significance of the proposed project.

1. Why is this project important to the Denver subregion?

While this project geographically occupies an urban street in the heart of Denver, it has long been appropriately known as 'Colorado's Main Street' for good reason. Constructed in 1982 to provide more efficient regional bus service, minimize the first and last mile associated traffic congestion with those regional trips and create a new multimodal environment; the mile-long 16th Street Mall today serves as a regional economic engine integrally linked by the Free MallRide shuttle to thousands of homes, businesses, and destinations and to more than 50 bus routes and 10 rail lines in one of the largest transit-sheds in the nation.

16th Street is a critical transportation nexus for an expansive 2,342 square mile transit-shed that serves the nearly 3 million people within the region and beyond. The 16th Street Mall serves as the Front Range region's employment center with 38 million square feet of office space, with a workforce of 130,000 as well as:

- 4 million square feet of retail space, generating over \$50 million in sales tax annually
- 80,000 residents
- 9,500 hotel rooms, serving 16.4 million overnight visitors that spend \$5 billion annually
- 58,000 students

Colorado's busiest transit hubs which bookend the MallRide accommodate more than 53,000 and nearly 19,000 passengers, respectively, each weekday. Additionally, high-frequency transit service also crosses the corridor at two intersections; four intersecting light-rail lines stop at two Mall stations, through which another 6,000 passengers travel each weekday. With 82,000 passengers per day expected by 2040, the region has a significant stake in the continued success of the Mall and its destinations. Regular festivals on and near the Mall – 27 in 2018 – as well as shuttle stops at each block, where passengers gather; attract Regional visitors and highlight the need to increase public space where pedestrians may amble and linger so the Mall may better connect users to their destinations.

However, the transit way is now beyond its useful life, presenting ever-mounting problems related to safety, efficient operations and an overall State of Good Repair. The last 36 years have provided ample opportunity to develop lessons learned about what components of the Mall have been successes and which should be redesigned to ensure the next 35+ years of Mall life build upon those positive outcomes experienced to date.

The project has many benefits, but the two primary improvements likely to be most impactful to the subregion as a whole relate to safety and improved operational efficiency of the MallRide service.

SAFETY: As noted in Section 3, a review of RTD crash data among all modes between 2010 and 2015 finds 155 reported crashes. RTD reports 9.2 percent involved crashes between the shuttle and a pedestrian and 5.9 percent resulted in injury. Median blocks experienced five times more multimodal crashes than asymmetrical blocks. In response, the Project will redesign all median blocks to remove the promenade and its two separate transitway crossing maneuvers and replace it with a two-way consolidated transitway similar to that of the safer asymmetrical blocks, consolidating pedestrian crossing conflicts to a well-defined single location with improved bus operator and pedestrian lines-of-sight and associated visibility.

OPERATIONAL EFFICIENCY: The deteriorating subsurface of the Mall pavement requires frequent, unplanned emergency maintenance which results in bus detours and delays in associated travel times for those on the

MallRide. The MallRide carries 35,000 passengers per day, often with crush passenger loads during peak and lunch hours periods.

2. Does the proposed project cross and/or benefit multiple **municipalities**? If yes, which ones and how?

The 2,342 square mile transit-shed the MallRide shuttle serves connects Colorado's busiest transit hubs which facilitate travel to and from the Metro Region's jurisdictions. Today, the shuttle is integral to regional mobility: 39 percent of downtown employees commute by transit; and 80 percent of shuttle passengers transfer to or from connecting transit service or have an RTD transit pass (Source: RTD). Given those splits, an analysis of US Census Longitudinal Employer-Household Dynamics (LEHD) data for home addresses in 2015 for those approximately 145,000 jobs within a 5 block radius of the Mall reveals a truly Regional employment base, many of which use transit to get to work (39%) and use the MallRide (80% are RTD users beyond the MallRide) (ATTACHMENT).

Based on those home addresses and work locations surrounding the Mall and understanding nearly 2 in 5 commuters to downtown use transit, an order of magnitude estimate of utilization from various Counties in the DRCOG Region reveals that Denver residents represent 35% of all work home addresses with 20,000 daily transit users. Aurora home work addresses represent 7% of the total with more than 4,000 estimated transit users, Lakewood with 5% and 2,800 transit users and Arvada and Thornton each with 3.2% and approximately 1,800 transit users. The 65% of home addresses for employment surrounding the Mall coming from cities outside of Denver coupled with the fact 4 in 5 MallRide users are transferring or hold a RTD pass demonstrate the safety and operational benefits of the project will be realized by a collective majority of non-Denver municipalities in the Region.

3. Does the proposed project cross and/or benefit another **subregion(s)**? If yes, which ones and how?

The 2,342 square mile transit-shed the MallRide shuttle serves connects Colorado's busiest transit hubs which facilitate travel to and from the Metro Region's jurisdictions. Today, the shuttle is integral to regional mobility: 39 percent of downtown employees commute by transit; and 80 percent of shuttle passengers transfer to or from connecting transit service or have an RTD transit pass (Source: RTD). Given those splits, an analysis of US Census Longitudinal Employer-Household Dynamics (LEHD) data for home addresses in 2015 for those approximately 145,000 jobs within a 5 block radius of the Mall reveals a truly Regional employment base, many of which use transit to get to work (39%) and use the MallRide (80% are RTD users beyond the MallRide) (ATTACHMENT).

Based on those home addresses and work locations surrounding the Mall and understanding nearly 2 in 5 commuters to downtown use transit, an order of magnitude estimate of utilization from various municipalities in the DRCOG Region reveals that Denver residents represent 35% of all work home addresses with 20,000 daily transit users. Jefferson County home work addresses represent 17% of the total with nearly 10,000 estimated transit users, Arapahoe County with 15% and 8,800 transit users and Adams County with 10.6% and more than 6,000 transit users. The 65% of home addresses for employment surrounding the Mall coming from Counties outside of Denver coupled with the fact 4 in 5 MallRide users are transferring or hold a RTD pass demonstrate the safety and operational benefits of the project will be realized by a collective majority of non-Denver Counties in the Region.

4. How will the proposed project address the specific transportation problem described in the **Problem Statement** (as submitted in Part 1, #8)?

Transit use (35,000 daily) and pedestrian activity (25,000 daily) are forecast to increase at an average of 4% a year to 2040 resulting an unprecedented opportunity to reduce SOV travel.

This project ensures continuing two-way shuttle service between Union Station and Civic Center Station, with reduced opportunity for interruption due to the continued unplanned maintenance activity when pavers settle and become hazardous. Years of previous study and stakeholder outreach means the project shall develop and implement a flexible and sustainable plan to improve pedestrian and transit safety on the Mall, address deteriorating infrastructure, provide equitable and expanded public space to deter pedestrians in the transitway, and honor the Mall's use and iconic design with the following features:

- Improved maintenance of headway based transit bus schedules which will reduce bunching as well as extended stretches of traffic light cycles where no bus arrives, which lead to less predictability and desired pedestrian behavior
- ATTACHMENT, maintaining an alignment that retains the pattern of asymmetrical and median blocks and supports the need for safety, mobility, and public use:
 - On asymmetrical blocks, remove light fixtures; shift the pattern of the underlying pavement to align with pedestrian walkway on the narrow side of the block in order to accommodate removal; install amenity zone with new row of trees on narrow side of the block to buffer pedestrian walkway and transitway.
 - On median blocks, the relocation of the transitway to the center of the block will provide for consolidation of public space into two equal areas on either side. The importance of this cannot be overstated as the existing blocks where this is the current design, property values are higher and safety outcomes are five times more favorable than the current blocks with a split transitway and the center pedestrian area.

By clearly separating pedestrian walkways from the transitway with an enhanced amenity zone, that includes trees, lights, and other transit and pedestrian infrastructure (e.g., benches, chairs, planters, and kiosks) will improve safety and reduce pedestrian/transit conflicts. RTD and CCD continue to refine the anticipated infrastructure improvements, considering in-pavement lighting or different color materials, a strip of textured surface, detectable to the visually impaired, or other delineating features that would not impair movement across the Mall, either alone or in combination.

The installation of bulb-outs at cross streets will reduce the crossing distance for pedestrians on those streets, except for instances where space is reserved for existing bicycle or light rail infrastructure. RTD and CCD will consider additional intersection improvements to slow traffic and increase pedestrian safety (e.g., pavement patterns, pavement color, pavement texture, or raised pavement) during subsequent design phases.

Increases in pedestrian facility capacity will keep walking activity channeled into areas where it is safe for crossing buses and cars, where lines of sight are improved with the new intersection geometry.

The installation of a new granite pavement system, new trees, and new underground infrastructure shall reduce safety concerns and the negative effects of frequent maintenance and repair activities to shuttle service, as follows:

The pavement system would consist of granite pavers with improved surface friction over a new and improved concrete sub-base, complete with a system to drain moisture that penetrates the surface. The pattern of the granite pavers would honor and complement the original design but would not replicate the pattern in every detail in order to comply with contemporary standards, such as ADA and RTD's bus loading and unloading requirements.

Repair of the light rail at-grade crossings concurrent with the larger Mall project will reduce tripping hazards where the existing concrete is deteriorated, cracked and sunken in.

5. One foundation of a sustainable and resilient economy is physical infrastructure and transportation. How will the **completed** project allow people and businesses to thrive and prosper?

Transit proximity and access support the Mall's economic vibrancy. Colorado's Main Street is home to:

- 38 million square feet of office space, with an workforce of 130,000
- 4 million square feet of retail space, generating over \$50 million in sales tax annually
- 80,000 residents
- 9,500 hotel rooms, serving 16.4 million overnight visitors that spend \$5 billion annually
- 58,000 students

This economic vitality attracts hundreds of thousands of residents, employees, and visitors each day, contributes nearly three percent of citywide sales tax revenue annually and represents over a third of retail sales tax collected in the Downtown Denver area.

Since 2007, ten development projects have contributed \$925 million in new private investment, 310 new residential units, over 2 million square feet of new office space, and almost 190,000 square feet of new retail space.

A safe 16th Street for residents, employees and visitors as well as a reliable MallRide service support an economically vibrant downtown Denver. Approximately 40 percent of all Denver office space and seven percent of all Denver retail (including restaurants) are located in or around the Mall in downtown, which contributed 5.6 percent of all Denver sales tax revenue in 2016 – an increase of 11 percent since 2012. Because issues related to safety and state of good repair affect economic vitality, the Project’s improvements to pedestrian mobility, infrastructure, safety and security, and public space will directly benefit the Mall’s 372 businesses. Of the nearly 150,000 jobs that exist within 5 blocks of Mall nearly 2 in 5 of those jobs are accessed by transit, keeping auto congestion down when people have alternative modes to choose rather than their cars.

6. How will connectivity to different travel modes be improved by the proposed project?

In addition to bookending the Mall, high-frequency transit service also crosses the corridor at two intersections; four intersecting light-rail lines stop at two Mall stations, through which another 6,000 passengers travel each weekday. ATTACHMENT

From Union Station, passengers can board one of 21 RTD bus routes, including Flatiron Flyer bus rapid transit, one of three RTD light-rail lines, or one of two (expanding to four by 2020) RTD commuter-rail lines, including service to Denver International Airport. Union Station also accommodates private transportation services: Colorado Department of Transportation’s Bustang, Greyhound, Black Hills Stage Lines, and Amtrak.

Civic Center Station accommodates passengers boarding 27 RTD bus routes, including the system’s most popular routes operating on the Denver’s commercial crossroads, Broadway and Colfax Avenue.

Departing Union Station or Civic Center Station every 90 seconds during peak-hour and operating at least 20 hours a day every day, the battery-powered Free MallRide shuttle serves as an integral first- and last-mile resource for 35,000 passengers daily. With 82,000 passengers per day expected in 2040, a DRCOG TIP award to enhance transit reliability would greatly benefit a broad regional constituency for decades to come.

The improved connectivity to those modes from the project will be realized by the improved efficiency of the MallRide service, as frequent unplanned maintenance will be eliminated in favor of preventive maintenance which can be scheduled to take place overnight when the shuttle is out of service.

Project includes \$1 million to repair concrete at rail grade crossings where is deteriorating ensuring light rail will not be interrupted due to unplanned maintenance.

7. Describe funding and/or project partnerships (other subregions, regional agencies, municipalities, private, etc.) established in association with this project.

From the Mall’s beginning, its success has relied on partnership between the public sector,

special districts, business associations, and institutions that all benefit from the Mall as a directional beacon for locals and visitors alike. Shortly after construction, a coalition of stakeholders formed the Mall Management District to promote and maintain the Mall as a regional economic icon. The Mall Management District, which later became the Downtown Denver Business Improvement District (BID), was created to provide for the ongoing care, operation, and maintenance of the Mall. More recently, DURA designated much of the Mall as an urban renewal area eligible to receive tax-increment financing. As the region's metropolitan planning organization, DRCOG plays a critical role in funding transportation improvements on the Mall.

The Mall's success has relied on broad collaboration from the beginning, and implementation of the Project will rely on close inter-agency partnerships for funding of construction and maintenance from the following stakeholders:

- RTD & CCD: \$13 million Elevate Bond; RTD: \$1,000,000 local dollars \$300,000 per year to maintenance (anticipated);
- CCD & DURA via TIF: \$66 million to capital; and
- DDP: \$1.38 million per year to maintenance (anticipated)

As discussed in a June 2018 report to the RTD Board of Directors, IGAs between RTD and CCD will govern the following:

- Grant funding available to RTD (with CCD as a subrecipient) for the Project, subject to obtaining approval from the FTA, DRCOG, and RTD Board of Directors.
- Ongoing maintenance of the transitway.
- Ongoing use of the pedestrian walkways to ensure the necessary clear width is maintained for unimpeded pedestrian traffic.
- Funding for maintenance of the amenity zone, pedestrian walkway, and patio/gathering area will continue to be provided through an IGA between CCD and BID.
- Additionally, the Programmatic Agreement that addresses mitigation for the adverse effects to the 16th Street Mall historic property will be executed prior to completion of the NEPA process. The Consulting Parties will be invited to continue to participate in future phases to coordinate on subsequent design elements.

B. DRCOG Board-approved Metro Vision TIP Focus Areas and Specific Denver Goals

WEIGHT

30%

Provide ***qualitative and quantitative*** (derived from Part 3 of the application) responses to the following questions on how the proposed project addresses the three DRCOG Board-approved Focus Areas (in bold).

VULNERABLE POPULATIONS AND EQUITY

1.A. Describe how the project will **improve mobility infrastructure and services for vulnerable populations (including improved transportation access to health services)** as defined in the [Adopted 2020-2023 TIP Policy](#):

Improvements to the Mall and associated bus service running way are inherently equitable for vulnerable populations as the MallRide is a free-fare service connecting people to many lower wage retail and service jobs along the length of the Mall.

Gentrification and affordable housing are significant ongoing issues in Denver. More than 7000 zero car households exist within one mile of the project limits. Based on 2013 and 2015 data on map attached, neighborhoods surrounding Union Station and the CBD at risk for gentrification include Auraria, North Capitol Hill and parts of the Five Points area. Therefore, improvements to fare-free transit and pedestrian infrastructure increase the capacity of transportation alternatives for vulnerable populations.

Use of the Mall from certain vulnerable populations is on the rise. The overall share of use by 0-14 year olds on the segment from Court to Arapahoe during weekend with activities increased by 20% over baseline weekends in pedestrian surveys conducted in 2015 and 2016.

An analysis revealed that nearly 4,000 individuals with disabilities make residence within 1 mile of 16th Street and that 17 health service centers are located within 1 mile of the street as well. Improvements to the already ADA accessible MallRide shuttles will be enhanced with compliant 5'x8' ADA landing pads added at the shuttle stops.

1.B. Describe how your project is consistent with **Denver's commitments to Equity principles** as defined below, and discussed in more detail in Chapter 4, Access to Opportunity, in the [Blueprint Denver \(Public Review Draft August 6, 2018\)](#).

Equity is providing everyone with access to opportunity regardless of income level, race, ethnicity, gender, ability, or age.

Blueprint Denver is integrating equity accounting for the forces of change through three major concepts. The 16th Street Mall primarily addresses 2 of those concepts

- **Improving Access to Opportunity & Expanding Housing and Jobs Diversity** – A more reliable and enhanced 16th Street Mall service and corridor will spur increased employment opportunities through continued economic development which should create wide spectrum of jobs from service and retail through higher skilled professional positions. An improved 16th Street as a main artery and destination both increases the number of and access to those jobs.

RELIABILITY OF THE MULTIMODAL TRANSPORTATION NETWORK

2.A. Describe how the project will **increase reliability of existing multimodal transportation network** as defined in the [Adopted 2020-2023 TIP Policy](#):

The vibrant pedestrian corridor requires rehabilitation to alleviate congestion and enhance safety. The current capacity of the asymmetrical and median blocks is approximately 4,320 and 3,840 pedestrians per hour, respectively. On median blocks, peak-hour pedestrian volume of 4,100 pedestrians per hour already exceeds capacity, and CCD expects peak-hour volumes on both block types to average 4,800 pedestrians per hour by 2040

(Att. 8). Recent pedestrian counts in ATTACHMENT demonstrate sidewalk utilization is already approaching stated capacities during peak times of day. This slowdown in foot traffic adds uncertainty to walking to connecting modes with fixed schedules such as buses and rail.

A primary objective of this project is to replace the existing pavers and paver system, which has 400,000 pavers, with a new system and pavers that require significantly less maintenance and replacement. The pavers near curbs and within the transitway are the most commonly damaged areas and need repair to the mortar holding the pavers or replacement of the pavers. However, this is not a permanent solution. ATTACHMENT illustrates in red the pavers that needed to be replaced along one block of the Mall.

Greater reliability due to the reconstructed running way for the transit buses will encourage more Mall users to depend on the shuttle as a trusted first- and last-mile connection to Mall destinations and its transit connections, allaying the impulse to hail congestion-inducing vehicle for a short, transit-accessible downtown trip. The MallRide is seeing greater competition for short trips from new mobility alternative modes such as scooters and ebikes.

2.B. Describe how the project will meet the goals of the [Denver Mobility Action Plan](#).

1. **Reduce single-occupant vehicle commuters to 50 percent, and increase the percentage of bike/pedestrian commuters to 15 percent and transit commuters to 15 percent.** The 16th Street Mall is the highest ridership bus line in the RTD system. By improving its operational performance it holds the greatest potential to increase pedestrian (72% of bus riders walk to stop) and bicycle (3.5% of riders bike to stop) of an line in the system.
2. **Reduce to zero the annual number of traffic fatalities, serious injuries and major crashes by fully implementing the city's Vision Zero program.** Given the significant number of crashes to be reduced through the investments in rehabilitating 16th Street, this project should be a stride towards achieving Vision Zero goals

2.C. If applicable, describe how the project will **increase multimodal person-trip capacity and access** as described in the [Denver Strategic Transportation Plan \(2008\)](#).

By RTD's estimates, there is an expected 230% project increase of use of the MallRide service by 2040. In order to accommodate the additional buses needed to carry those riders and the associated pedestrian activity getting to and from the buses, the end of life 16th Street transitway must be reconfigured. This will accommodate a greater number of buses and pedestrian by moving the runningway to the center of the corridor opening more sidewalk space for often overcrowded sidewalks.

TRANSPORTATION SAFETY AND SECURITY

3A. Describe how the project will **improve transportation safety and security** as defined in the *Adopted 2020-2023 TIP Policy*:

A review of RTD crash data among all modes between 2007 and 2017 finds 784 reported crashes, of which 9.2 percent involved crashes between the shuttle and a pedestrian and 5.9 percent resulted in injury. Median blocks experienced five times more multimodal crashes than asymmetrical blocks. From 2010-2015 specifically, there were more than 150 property damage and 25 injury crashes. The improvements proposed as follows will reduce those injury crashes by nearly half and non-injury crashes by 75% (see Part and attached BCA).

The 16th Street Mall reconstruction is 12.5 blocks long. Half of the blocks have an asymmetrical design with the bus travel lanes next to each other offset in the middle of the right of way. The other half of the blocks have a center running median separating the transit lanes. The rehabilitation project will redesign all symmetrical blocks to remove the median promenade and its two separate transitway crossing maneuvers and replace it with a two-way consolidated transitway similar to that of the safer asymmetrical blocks, consolidating pedestrian crossing conflicts to a well-defined single location. The time needed for pedestrians to cross 16th Street is reduced as the length of the overall crossing maneuver is reduced. The concentrated maneuver area is also expected improve transit operators' ability to see pedestrians.

The Project also will introduce a buffer between the sidewalk and the transitway on all blocks. The buffer will consist of plantings, traffic control items, signs, utilities such as fire hydrants, and designated boarding areas for passengers using transit. In function, this buffer zone provides a physical separation between the transit and pedestrian modes while clearly visually defining the separation of modes. This visual space is important because it provides sight distance needed for pedestrians to view oncoming transit vehicles and for transit operators to see pedestrians and other users in the corridor. For transit requirements, the buffer area provides a boarding pad and addresses accessibility needs – at least 60 inches by 96 inches, as required by FTA, and should be connected to an accessible pedestrian path of travel. Additional space may be needed for wheelchair lifts or for access to bus shelters. All of these elements serve to enhance safety and the pedestrian experience.

The Project will reuse lighting where possible and add lighting where needed. National safety studies indicate the quantitative effect of lighting improvements. Where no lighting is present (in the case of possible dark spots within the project area), adding lighting can reduce injury accidents by 28 percent and non-injury accidents by 17 percent; and doubling the existing lighting level reduces injury accidents by eight percent and non-injury accidents by one percent.

The current pavers are slippery when wet. Although the original pavers were textured to provide traction for pedestrians and vehicles, weather has worn the finish and dirt has filled the rough texture of the granite pavers, creating a smooth surface and presenting a safety hazard for pedestrians and vehicles. When the pavers are wet or icy, pedestrians slip on the slick surface, and the transit shuttles have difficulty gaining traction to start and stop. The deteriorating surface causes buses to lose traction in inclement weather, especially at grade changes. As the Mall continues to deteriorate to the point where it cannot be reasonably maintained beyond its useful life, it will become unusable for shuttles that so many people depend on for access to goods, services, and jobs.

The new pavement system would consist of granite pavers with improved surface friction over a new and improved concrete sub-base, complete with a system to drain moisture that penetrates the surface.

The Project will also rebuild two light rail at-grade crossings of the Mall. The subgrade under the road is showing signs of degradation, leading to sagging of the rails and damage to the interface between the rail and the adjacent concrete.

3B. Describe how the project will meet the goals of [Denver's Vision Zero Action Plan](#).

The safety improvements within the 16th Street Mall rehabilitation project are projected to reduce by half both the number of Serious and Non-Serious Bodily Injury crashes that took place in recent years on the Mall. This is a tremendous first step towards reaching zero traffic fatalities. Two of the fundamental principles of a meaningful Vision Zero commitment will be achieved through this project design and implementation. These include that **traffic deaths and severe injuries are acknowledged to be preventable** and that **safety work should focus on systems-level changes above influencing individual behavior.**

C. Consistency & Contributions to Transportation-focused Metro Vision and Denver Plans, Goals, and Objectives

WEIGHT

30%

Provide **qualitative and quantitative** responses (derived from Part 3 of the application) to the following items on how the proposed project contributes to Transportation-focused Objectives (in bold) in the adopted Metro Vision plan. Refer to the expanded Metro Vision Objective by clicking on links. In addition, provide information related to the consistency with Denver goals, objectives, plans, and priorities.

[MV objective 2](#)

Contain urban development in locations designated for urban growth and services.

1. Will this project help focus and facilitate future growth in locations where urban-level infrastructure already exists or areas where plans for infrastructure and service expansion are in place?

Yes No

Describe, *including supporting quantitative analysis*

Many trips in Denver start or end downtown, given its large regional draw, which means these streets have the highest degree of pedestrian volume. Sidewalks are wide with minimal driveway access to prioritize pedestrians. Curb lane uses on downtown streets generate the greatest demand and are highly managed to maximize the highest and best use of the curb space. Operating speeds are the lowest on downtown streets to improve safety for all modes.

Denver's Blueprint Plan identifies the 16th Street Mall as an Urban Center within its downtown neighborhood area typology specifying the highest priority is given to pedestrians in the downtown residential areas with superior access to the multimodal transportation network. Vehicular access is consolidated. Parking is primarily structured with shortterm on-street.

The Mall reconstruction project brings up a vital urban asset to a State of Good Repair with improvements to safety and operational efficiency that allow the Region to keep moving between modes and continue to densify the downtown area in favor of suburban sprawl.

[MV objective 3](#)

Increase housing and employment in urban centers.

- 2.A. Will this project help establish a network of clear and direct multimodal connections within and between urban centers, or other key destinations?

Yes No

Describe, *including supporting quantitative analysis*

Given its urban core location with regional significance, the 16th Street Mall has a high mix of land uses throughout, including many large scale multi-unit residential uses. There are large scale buildings with heights up to 20 stories. There is high lot coverage and shallow setbacks. Locations are typically served by local transit that are part of the transit priority street network. There are 66,784 residents within a mile of the Mall by 2020 and more than 92,000 forecast by 2040. There are nearly 200,000 jobs forecast to be within a mile of the Mall by 2040. ATTACHMENT

From Union Station, passengers can board one of 21 RTD bus routes, including Flatiron Flyer bus rapid transit, one of three RTD light-rail lines, or one of two (expanding to four by 2020) RTD commuter-rail lines, including service to Denver International Airport. Union Station also accommodates private transportation services: Colorado Department of Transportation's Bustang, Greyhound, Black Hills Stage Lines, and Amtrak.

Civic Center Station accommodates passengers boarding 27 RTD bus routes, including the system's most popular routes operating on the Denver's commercial crossroads, Broadway and Colfax Avenue.

A recent example of the attractiveness of the Mall is the recent announced relocation of VF Corporation headquarters for many of its best known brands to the 16th Street Mall. A Fortune 250 Company, is the latest in a

long string of examples of businesses expanding in the downtown area surrounding the Mall. In addition there are numerous medium and large scale residential towers recently opened and in development surrounding Union Station and the Mall.

2.B. How does this project focus or serve desired growth in areas identified on the Places map (Chapter 5, p. 126) in the [Blueprint Denver \(Public Review Draft August 6, 2018\)](#)?

The places map largely covers future designations and the area immediately surrounding the 16th Street Mall is already highly developed. The most closely served Place on the map would be the Community Place of Commons Park area between the Highlands and Union Station and 16th Street will serve that destination. The urban center neighborhoods are the most intense areas of the city outside of downtown. Although many of these areas are located next to the downtown core, areas that are desired to be highly active and vibrant (such as rail transit stops and other regional centers) are also found in this context.

[MV objective 4](#)

Improve or expand the region's multimodal transportation system, services, and connections.

3.A. Will this project help increase mobility choices within and beyond your subregion for people, goods, or services?

X Yes No

Describe, *including supporting quantitative analysis*

Denver prioritizes biking, walking and public transit, and values innovative approaches to transportation and mobility. This reconstruction project results in a redesign which improves the pedestrian environment with wider, more connected sidewalks, an enhanced tree canopy cooling the street level air temperature during the Mall's busiest months in the summer and better defined transit boarding and alighting areas. These improvements will more clearly identify transit and pedestrian modal priority on the Mall, with a goal of encouraging bicycle and other shared mobility options to utilize parallel corridors with facilities on the 14th/15th street pair and 18th/19th streets.

The 16th Street Mall is more than a business and tourist corridor for Downtown Denver; RTD's 16th Street transit service ties directly into Denver Union Station (DUS) and – through DUS' Amtrak service and the A Line to the airport – connects us to the rest of the region and, indeed, the nation . Regional commuter and light rail connections as well as regional bus services make a more seamless transition to the remainder of downtown Denver through a reconstructed Mall that has improved safety and operational improvements.

3.B. If applicable, describe how this project is consistent with Denver's specific alternative mode and/or project priorities contained in one or more of **Denver's modal plans linked below or small area plans** (Neighborhood Planning Initiative, corridor plans, station area plans, Next Steps Studies, etc.). See Denvergov website: denvergov.org search bar and specific plan links below:

NOTE: The application does not need to address numerous plans. Provide documentation for the most applicable or relevant document(s) or plan(s).

Examples are listed below:

- Denver Moves: Transit
<https://www.denvergov.org/content/denvergov/en/denveright/transit.html>
- Denver Moves: Pedestrian and Trails
<https://www.denvergov.org/content/denvergov/en/denveright/pedestrians-trails.html>
- Denver Moves: Bicycles
https://www.denvergov.org/content/dam/denvergov/Portals/708/documents/FINAL_Denver_Moves.pdf
- Transit Oriented Development (TOD) Strategic Plan

https://www.denvergov.org/content/dam/denvergov/Portals/193/documents/TOD_Plan/TOD_Strategic_Plan_FINAL.pdf

- Small area plans (Neighborhood Planning Initiative, corridor plans, station area plans, Next Steps studies, etc.)

Denver Moves Transit sets forward a Vision of transit services comprised of Medium and High Capacity frequent transit lines as a network connecting people and places throughout the City. The 16th Street Mall is recognized a crucial, high utilization line that serves a variety of trip types from commuters to visitors and recreation.

[MV objective 6a](#)

Improve air quality and reduce greenhouse gas emissions.

4.A. Will this project help reduce ground-level ozone, greenhouse gas emissions, carbon monoxide, particulate matter, or other air pollutants?

X Yes No

Describe, *including supporting quantitative analysis*

The Mall's fountains and trees have served to remind urban denizens of Colorado's natural amenities, but these elements of green infrastructure also require rehabilitation.

Tree infrastructure on the Mall generally consists of trees, tree boxes, and irrigation. The 144 existing honey locust trees have reasonably good health for short-term survival, but only 18 percent are healthy enough for longer-term survival – none are in excellent health – and all generally suffer from poor soil conditions, poor nursery practices prior to the purchase and installation of the trees, inadequate soil volume in tree boxes, and leaky irrigation.

The Project will plant 246 new trees of different varieties, mitigating the risk of species-specific blight to the expanded tree grove. These new trees will be planted in a continuous trench and Silva Cell suspended pavement system providing over 1,000 square of soil per tree, nearly four times the soil available to the current trees. This additional soil volume will support a dramatically larger tree canopy providing greater environmental benefits. This larger tree canopy both directly improves air quality reducing carbon and indirectly improves air quality by making the Mall a more attractive walking environment. The GHG Reduction anticipated as a result of the 16th Street Mall reconstruction due to increased pedestrian utilization alone is 874 pounds in 2023 and 3956 pounds annually by 2040. Additionally, according to the U.S. Environmental Protection Agency, a mature tree canopy reduces surface temperature by 15 degrees Fahrenheit, allowing the Project to respond to and reduce the urban heat island effect.

Other benefits include reduced energy use in adjacent buildings, reduced air pollution and greenhouse gas emissions, reduced airborne particulates, reduced volatile organic compounds, greater carbon storage and sequestration, reduced noise, improved human health, and enhanced quality of life. RTD and CCD are considering how to integrate stormwater runoff as irrigation to the expanded tree grove.

Battery-powered shuttles inherently improve air quality on the Mall, replacing carbon- emissive car trips with shared clean mobility. RTD expects shuttle ridership to grow from 35,000 today to 82,000 by 2040; resulting in 39,706 pounds of GHG reduced by 2023 and 204,003 reduced annually by 2040.

4.B. If applicable, describe how this project is consistent with, or helps implement, Denver's [80x50 Climate Action Plan](#), which set the City's target to **reduce greenhouse gas emissions to 80% below 2005 levels by 2050**, and/or Denver's [2020 Sustainability Goals](#).

The 39,706 pounds of GHG reduced by 2023 and 204,003 reduced annually by 2040 offer significant localized progress towards the 2040 Goal of a 65% reduction of GHG Emissions from the 2005 baseline. Transportation related goals served by the 16th Street Mall project include the 2050 Goal that 100% of public transportation will be carbon free.

4.C. If applicable, describe if this project contains **water quality and green infrastructure** consistent with project types and focus areas identified in **Denver’s [Green Infrastructure Implementation Strategy](#)**:

There is a significant amount of green infrastructure being implemented within this project. Planting new trees in a continuous trench with Silva Cell suspended pavement system providing over 1,000 square of soil per tree, nearly four times the soil available to the current will support a dramatically larger tree canopy providing greater environmental benefits. This project will also connect with a Green Infrastructure Plan priority project proposing integrating stormwater management, multi-modal mobility and economic development opportunities into existing alleys in the downtown core. The study focused on the alleys leading one block north and south of the 16th Street Mall, between Broadway and Wewatta Street which encompasses a total of 32 blocks and 16 alleys. A number of alleys were recommended as a pilot including Cook’s Alley. Water quality benefits can be achieved through the implementation of permeable pavement in alleyways.

[MV objective 7b](#)

Connect people to natural resource or recreational areas.

5.A. Will this project help complete missing links in the regional trail and greenways network or improve other multimodal connections that increase accessibility to our region’s open space assets?

X Yes No

Describe, *including supporting quantitative analysis*

The MallRide improvements represent a vital non-SOV link between several highly utilized urban park landscapes as well as intercity travel destined for natural mountain areas via regional bus lines connected to Denver International Airport through Denver Union Station. The Mall connects Confluence Park to the north over a pedestrian bridge to Denver's cultural district to the Southwest adjoining the iconic Civic Center Park. The Mall also serves travelers to Skyline Park at 16th Street and Arapahoe. A key component of creating a green city and an Outdoor Downtown, Skyline Park serves Downtown Denver’s diverse community of residents, employees and visitors through unique programs and events.

The Mall also provides a mobility option for users of the Cherry Creek and South Platte Regional Trails to reach Larimer Square and points southwest. Cherry Creek Trail starts at the confluence of Cherry Creek and the South Platte River at Confluence Park where it intersects the South Platte River Trail. The trail then follows the channel for the creek that forms a protective corridor as it goes past the busy downtown streets.

5.B. If applicable, describe how your project meets the goals, objectives and priorities of the Denver Department of Parks and Recreation’s **[Game Plan for a Healthy City \(Public review draft 2018\)](#)**.

The Game Plan Vision calls for celebration of Denver's culture and heritage, infusing history, art, community engagement, and nature throughout the system and practices. To this end, the 16th Street Mall rehabilitation shall honor the original 1982 I.M. Pei/Olin design by replicating the rattlesnake pattern and incorporating the originally forestry while updating the ADA and others components to a more modern design.

[MV objective 10](#)

Increase access to amenities that support healthy, active choices.

6. Will this project expand opportunities for residents to lead healthy and active lifestyles?

X Yes No

Describe, including supporting quantitative analysis

Greater sidewalk capacity shall encourage more pedestrian activity connecting to the Mall's natural and cultural resources which include water-based recreational activities on the South Platte River, outdoor festivals such as the sidewalk chalk murals in Larimer Square and socialization encouraged through the greater opportunity to linger, enjoy street entertainers and patronize dining establishments.

[MV objective 13](#)

Improve access to opportunity.

7.A. Will this project help reduce critical health, education, income, and opportunity disparities by promoting reliable transportation connections to key destinations and other amenities?

X Yes No

Describe, including supporting quantitative analysis

The Mall is home to nearly 400 business, with many being service and retail establishments that are accessible to prospective and current employees throughout the Region due to the availability of the free fare MallRide service.

7.B. Describe how your project addresses the neighborhood inequities related to transportation as depicted and mapped in the **Denver Neighborhood Equity Index** which was produced by the Denver Department of Public Health and Environment, which helps to inform decision makers about where city investment and resources are needed most for those living in Denver's underserved neighborhoods?

General information on the Neighborhood Equity Index is on the Denvergov website:

<https://www.denvergov.org/content/denvergov/en/environmental-health/community-health/health-in-all-policies.html>

See the interactive map, by opening this [link](#) in a new window. The source of each indicator is described in the map. Click on each individual link and see specific map layers; for example, in Built Environment, there is information on "Access to Parks" separately.

The 16th Street Mall Service area ranks highly as an area with less inequity with a score (3.67) above both the median (3) and mean (3.15). Higher scores means less inequity. It also ranke highly on access to Parks (4 out of 5) and access to full service grocery stores (4 out of 5).

[MV objective 14](#)

Improve the Denver Subregion's competitive position.

8. Will this project help support and contribute to the growth of the subregion's economic health and vitality?

x Yes No

Describe, including supporting quantitative analysis

The Mall supports an economically vibrant downtown Denver. Approximately 40 percent of all Denver office space and seven percent of all Denver retail (including restaurants) are located in or around the Mall in downtown, which contributed 5.6 percent of all Denver sales tax revenue in 2016 – an increase of 11 percent since 2012. Because issues related to safety and state of good repair affect economic vitality, the Project's improvements to pedestrian mobility, infrastructure, safety and security, and public space will directly benefit the Mall's 372 businesses. A Fortune 250 Company HQ, VF Corporation has recently annouced its relocation to 16th Street alongside major health care company DaVita which has a Transit oriented Development sire at the Mall's northend.

D. Project Leveraging

WEIGHT **10%**

<p>9. What percent of outside funding sources (non-DRCOG-allocated Subregional Share funding) does this project have?</p>	<p>91%</p>	<p>60%+ outside funding sources High 30-59%Medium 29% and belowLow</p>
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Part 3

Project Data Worksheet – Calculations and Estimates

(Complete all subsections applicable to the project)

A. Transit Use

1. Current ridership weekday boardings	35,000
2. Population and Employment	

Year	Population within 1 mile	Employment within 1 mile	Total Pop and Employ within 1 mile
2020	66,784	164,370	231,154
2040	92,989	199,268	292,257

Transit Use Calculations	Year of Opening	2040 Weekday Estimate
3. Enter estimated additional daily transit boardings after project is completed. (Using 50% growth above year of opening for 2040 value, unless justified) <i>Provide supporting documentation as part of application submittal</i>	9,286	47,000
4. Enter number of the additional transit boardings (from #3 above) that were previously using a different transit route. (Example: {#3 X 25%} or other percent, if justified)	2,321	11,570
5. Enter number of the new transit boardings (from #3 above) that were previously using other non-SOV modes (walk, bicycle, HOV, etc.) (Example: {#3 X 25%} or other percent, if justified)	2,321	11,570
6. = Number of SOV one-way trips reduced per day (#3 – #4 – #5)	4,644	23,860
7. Enter the value of {#6 x 9 miles} . (= the VMT reduced per day) (Values other than the default 9 miles must be justified by sponsor; e.g., 15 miles for regional service or 6 miles for local service)	41,796	214,740
8. = Number of pounds GHG emissions reduced (#7 x 0.95 lbs.)	39,706	204,003
9. If values would be distinctly greater for weekends, describe the magnitude of difference: Unlike many commuter bus routes, the Mall Ride uniquely serves two major rider markets. The weekday-based commuter market is supplemented by a recreational/visitor market on weekdays and demonstrating relatively heavy usage on the weekends. 2016 total ridership for the Mall Ride was 11,783,047 with 35,000 average weekday (per RTD) and more than 25,000 daily ridership averaged per weekend day.		
10. If different values other than the suggested are used, please explain here: Please reference ATTACHMENT documenting the 2040 Mallride ridership projections from RTD's modeling team. The opening year estimate in 2023 is based on that 2040 estimate, assuming a linear 4% year-over-year increase to reach that amount in 2040.		

B. Bicycle Use

1. Current weekday bicyclists	0
2. Population and Employment	

Year	Population within 1 mile	Employment within 1 mile	Total Pop and Employ within 1 mile
2020	0	0	0
2040	0	0	0

Bicycle Use Calculations	Year of Opening	2040 Weekday Estimate
3. Enter estimated additional weekday one-way bicycle trips on the facility after project is completed.	0	0
4. Enter number of the bicycle trips (in #3 above) that will be diverting from a different bicycling route. (Example: {#3 X 50%} or other percent, if justified)	0	0
5. = Initial number of new bicycle trips from project (#3 – #4)	0	0
6. Enter number of the new trips produced (from #5 above) that are replacing an SOV trip. (Example: {#5 X 30%} or other percent, if justified)	0	0
7. = Number of SOV trips reduced per day (#5 - #6)	0	0
8. Enter the value of {#7 x 2 miles} . (= the VMT reduced per day) (Values other than 2 miles must be justified by sponsor)	0	0
9. = Number of pounds GHG emissions reduced (#8 x 0.95 lbs.)	0	0
10. If values would be distinctly greater for weekends, describe the magnitude of difference:		
11. If different values other than the suggested are used, please explain here:		

C. Pedestrian Use	
1. Current weekday pedestrians (include users of all non-pedaled devices)	25,000
2. Population and Employment	

Year	Population within 1 mile	Employment within 1 mile	Total Pop and Employ within 1 mile
2020	66,784	164,370	231,154
2040	92,989	199,368	292,357

Pedestrian Use Calculations	Year of Opening	2040 Weekday Estimate
3. Enter estimated additional weekday pedestrian one-way trips on the facility after project is completed	9,214	41,645
4. Enter number of the new pedestrian trips (in #3 above) that will be diverting from a different walking route (Example: {#3 X 50%} or other percent, if justified)	4,607	20,822
5. = Number of new trips from project (#3 – #4)	4,607	20,823

6. Enter number of the new trips produced (from #5 above) that are replacing an SOV trip. (Example: {#5 X 30%} or other percent, if justified)	2,304	10,411
7. = Number of SOV trips reduced per day (#5 - #6)	2,303	10,412
12. Enter the value of {#7 x .4 miles} . (= the VMT reduced per day) (Values other than .4 miles must be justified by sponsor)	921	4,165
8. = Number of pounds GHG emissions reduced (#8 x 0.95 lbs.)	874	3,956
9. If values would be distinctly greater for weekends, describe the magnitude of difference: The 25000 average weekday pedestrian count is based on 2016 counts conducted and referred to in attachment. The 2040 pedestrian counts are based on the corresponding 4% annual year over year increase that transit ridership is anticipated to receive per RTD modeling team.		
10. If different values other than the suggested are used, please explain here:		

D. Vulnerable Populations

Use Current Census Data	Vulnerable Populations	Population within 1 mile
	1. Persons over age 65	
2. Minority persons		13,293
3. Low-Income households		5,969
4. Linguistically-challenged persons		1,195
5. Individuals with disabilities		3,989
6. Households without a motor vehicle		7,002
7. Children ages 6-17		1,600
8. Health service facilities served by project		17

E. Travel Delay (Operational and Congestion Reduction)

Sponsor must use industry standard Highway Capacity Manual (HCM) based software programs and procedures as a basis to calculate estimated weekday travel delay benefits. *DRCOG staff may be able to use the Regional Travel Model to develop estimates for certain types of large-scale projects.*

1. Current ADT (average daily traffic volume) on applicable segments	0
2. 2040 ADT estimate	0
3. Current weekday vehicle hours of delay (VHD) (before project)	0

Travel Delay Calculations	Year of Opening
4. Enter calculated future weekday VHD (after project)	0
5. Enter value of {#3 - #4} = Reduced VHD	0
6. Enter value of {#5 X 1.4} = Reduced person hours of delay (Value higher than 1.4 due to high transit ridership must be justified by sponsor)	0

<p>7. After project peak hour congested average travel time reduction per vehicle (includes persons, transit passengers, freight, and service equipment carried by vehicles). <i>If applicable, denote unique travel time reduction for certain types of vehicles</i></p>	0
<p>8. If values would be distinctly different for weekend days or special events, describe the magnitude of difference.</p>	
<p>9. If different values other than the suggested are used, please explain here:</p>	

F. Traffic Crash Reduction

<p>1. Provide the current number of crashes involving motor vehicles, bicyclists, and pedestrians (<i>most recent 5-year period of data</i>)</p>		<p>Sponsor must use industry accepted crash reduction factors (CRF) or accident modification factor (AMF) practices (<i>e.g., NCHRP Project 17-25, NCHRP Report 617, or DiExSys methodology</i>).</p>
<p>Fatal crashes</p>	0	
<p>Serious Injury crashes</p>	4	
<p>Other Injury crashes</p>	21	
<p>Property Damage Only crashes</p>	155	
<p>2. Estimated reduction in crashes <u>applicable to the project scope</u> (<i>per the five-year period used above</i>)</p>		
<p>Fatal crashes reduced</p>	0	
<p>Serious Injury crashes reduced</p>	2	
<p>Other Injury crashes reduced</p>	10	
<p>Property Damage Only crashes reduced</p>	116	

G. Facility Condition

Sponsor must use a current industry-accepted pavement condition method or system and calculate the average condition across all sections of pavement being replaced or modified.
Applicants will rate as: Excellent, Good, Fair, or Poor

Roadway Pavement

<p>1. Current roadway pavement condition</p>	Fair
<p>2. Describe current pavement issues and how the project will address them.</p> <p>The Mall reached its 30-year design life in 2012, and initial design and construction defects have prompted RTD and CCD to routinely repair the corridor at a cost of more than \$1 million per year REFERENCE</p> <p>The Mall’s transitway and sidewalk were constructed with four- and two-inch-thick granite pavers, respectively, installed in a mortar bed over a series of concrete slabs. Illustrated in Figure 2, the Mall’s pavement system does not drain water that seeps into the mortar bed below; when moisture infiltrates below the surface of the pavers, settles, and freezes, it expands and erodes the saturated material, causing severe deterioration over time, limiting the effectiveness of repair, and often requiring costly but only temporary replacement. In addition, the wheel load from</p>	

heavy vehicles such as shuttles and delivery vehicles can damage the pavers. The 16th Street Mall Pilot Repair Project evaluated, cataloged, and defined the following

conditions:

- Cracked and loose pavers were typically found at block ends and alley crossings;
- Mortar erosion was most common near the curbs of the transitway;
- Pavers near transitway curbs and expansion joints were often cracked, loose, or displaced;
- Loose or displaced pavers lay under and near planters and electrical enclosures; and
- Cracked pavers were observed adjacent to utility openings. (Att. 4)

The pavers are also slippery when wet. Although the original pavers were textured to provide traction for pedestrians and vehicles, weather has worn the finish and dirt has filled the rough texture of the granite pavers, creating a smooth surface and presenting a safety hazard for pedestrians and vehicles. When the pavers are wet or icy, pedestrians slip on the slick surface,

and the transit shuttles have difficulty gaining traction to start and stop.

- The deteriorating surface causes buses to lose traction in inclement weather, especially at grade changes. As the Mall continues to deteriorate to the point where it cannot be reasonably maintained beyond its useful life, it will become unusable for shuttles that so many people depend on for access to goods, services, and jobs;
- If less than optimal maintenance funds are available, the rate of deteriorating paver condition will worsen, possibly forcing CCD to close the Mall to pedestrians due to the risk of injury from chipped, cracked, and airborne pavers and pushing RTD to discontinue shuttle service due to the potential for vehicular underside damage; and
- As the roadway material ages and costs escalate over time, RTD may be placed in a position to divert program funds, which could be used to enhance regional bus service.

ATTACHMENT illustrates the location of paver replacements between 2004 and 2014 on one representative block of the transitway. Replacing pavers is not a permanent solution, and in many cases, especially at the ends of blocks and adjacent to curbs, pavers are continually replaced in

the same location within the transitway. Installing a new granite pavement system, to reduce safety concerns and the negative effects of frequent maintenance and repair activities to shuttle service, as follows:

The pavement system would consist of granite pavers with improved surface friction over a new and improved concrete sub-base, complete with a system to drain moisture that penetrates the surface.

3. Average Daily User Volume	0
<i>Bicycle/Pedestrian/Other Facility</i>	
4. Current bicycle/pedestrian/other facility condition	Good
5. Describe current condition issues and how the project will address them.	
6. Average Daily User Volume	25,000

H. Bridge Improvements

1. Current bridge structural condition from CDOT	
2. Describe current condition issues and how the project will address them.	
3. Other functional obsolescence issues to be addressed by project	
4. Average Daily User Volume over bridge	0

I. Other Beneficial Variables *(identified and calculated by the sponsor)*

1.	
2.	
3.	

J. Disbenefits or Negative Impacts *(identified and calculated by the sponsor)*

1. Increase in VMT? <i>If yes, describe scale of expected increase</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Negative impact on vulnerable populations	
3. Other:	