

2.0 Purpose and Need

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2.1 Purpose

The purpose of the project is to implement transportation solutions that modernize the Interstate 270 (I-270) corridor to accommodate existing and forecasted transportation demands.

2.2 Needs for the Project

The identified transportation needs are as follows:

- Traveler safety on the corridor
- Travel time and reliability on the corridor
- Transit on the corridor
- Bicycle and pedestrian connectivity across I-270
- Freight operations on the corridor

In addition to addressing project needs, the Colorado Department of Transportation (CDOT), Federal Highway Administration (FHWA), Cooperating, and Participating Agencies have established a key project goal: to minimize environmental and community impacts resulting from the project.

2.2.1 Traveler Safety on the Corridor

I-270 experiences approximately 42 crashes per mile per year (2014 to 2022), nearly 40 percent higher than what other similar four-lane freeways in Colorado experience at an average rate closer to 30 crashes per mile per year. These crashes cause unpredictable and unavoidable traffic congestion, which adds to or worsens the already existing congestion from travel demand that exceeds the normal roadway capacity. The unpredictable nature of traffic congestion on I-270 increases safety concerns for freight carriers, employers, manufacturers, and business interests in the region, as well as commuters and residents. Detailed results of the safety analysis are documented in Appendix A, *Safety Assessment Technical Report*.

2.2.1.1 Prevalent Crash Types and Locations

Figure 2-1 shows the locations along I-270 where the number of crashes is higher than an average four-lane urban interstate in Colorado. Within the I-270 corridor, nearly 3,000

crashes were reported from 2014 to 2022; more than 700 crashes resulted in injury (nearly 1,000 persons injured) and 14 crashes resulted in a fatality (14 persons killed).

Figure 2-1. Safety on the I-270 Corridor



Figure 2-2 summarizes the locations and patterns of frequent crash types observed on the I-270 corridor between 2014 and 2022. Rear end crashes, sideswipe same direction crashes, and fixed-object (concrete barrier or guardrail) crashes are the most frequent crash types on I-270. Rear end and sideswipe same direction crashes frequently occur during congested stop-and-go traffic conditions for several reasons:

- Rear end and sideswipe crashes often result from stop-and-go congestion where short following distances and frequent lane changes reduce reaction time and increase crash risks, especially when drivers fail to properly signal their intentions.
- Fixed object crashes are linked to poor pavement conditions, debris in the road, and/or sudden lane changes/swerving in stop-and-go traffic to avoid other vehicles.

Figure 2-2. I-270 Prevalent Crash Types and Locations



2.2.2 Travel Time and Reliability on the Corridor

Travel time reliability refers to the consistency and predictability of travel times on a given freeway or roadway segment. Sudden slowdowns, stop-and-go traffic, and aggressive driving behaviors can create hazardous conditions and contribute to unreliable travel times.

Every day more than 100,000 vehicles travel on the I-270 corridor, which frequently operates at or over capacity (i.e., more vehicles are trying to use I-270 than I-270 can accommodate), resulting in substantial congestion and travel delays. At the posted speed limit of 55 miles per hour (mph), the corridor should take 6 to 8 minutes to traverse from end to end. Instead, peak-period travel times typically range from 12-18 minutes in the morning and 15-25 minutes in the afternoon, with speeds often falling below 20 mph. By 2050, without improvements to the corridor, end-to-end peak hour travel times are projected to more than double.

2.2.2.1 Congestion Duration on the Corridor

Figure 2-3 illustrates congestion along the I-270 corridor in 2023. In 2023, westbound traffic experienced congestion from 6 a.m. to 6 p.m., stretching from the Vasquez Boulevard Interchange past Quebec Street. The cloverleaf design at Vasquez contributes to bottlenecks due to short merging and diverging distances.

Congestion is less pronounced in the eastbound direction. Eastbound congestion starts near York Street and extends past the Interstate 76 (I-76) interchange in both the a.m. (6-10 a.m.) and p.m. (4-7 p.m.) peak periods.

In 2050, without improvements, congestion is projected to extend across the entire corridor.

Figure 2-3. Hours of Congestion on the I-270 Corridor

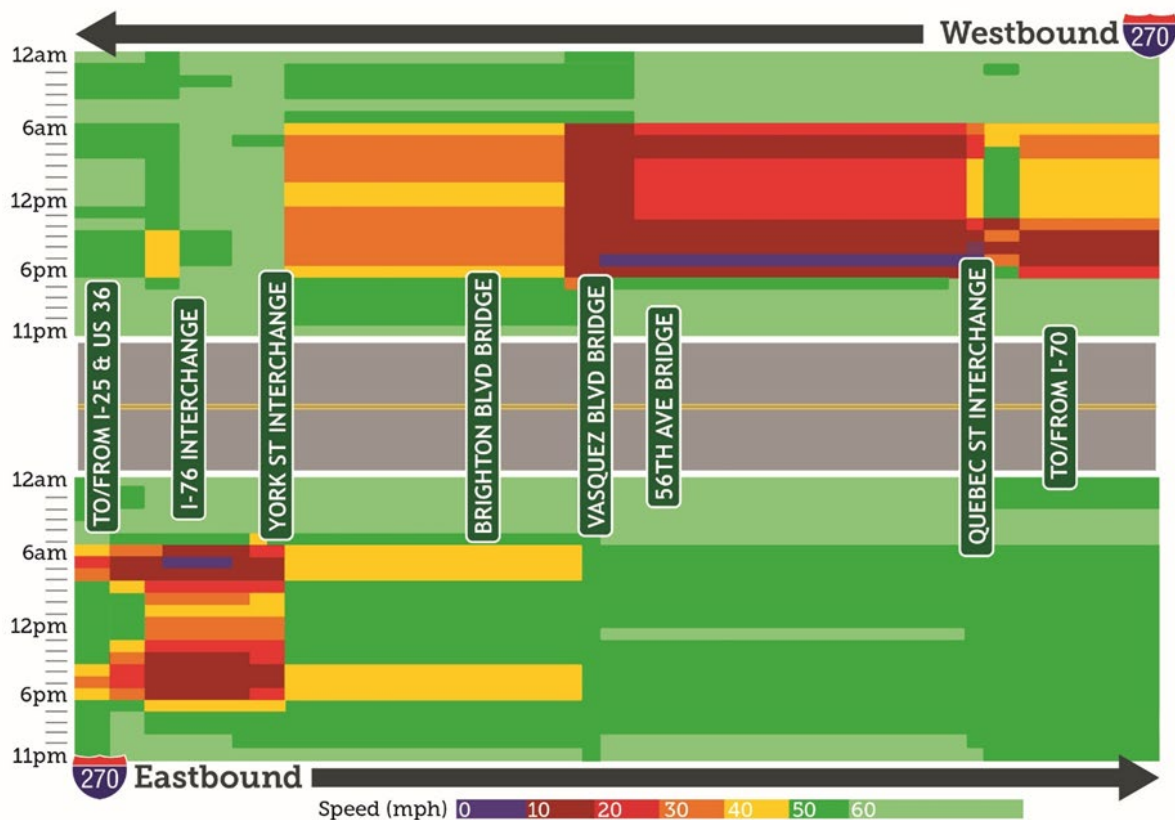
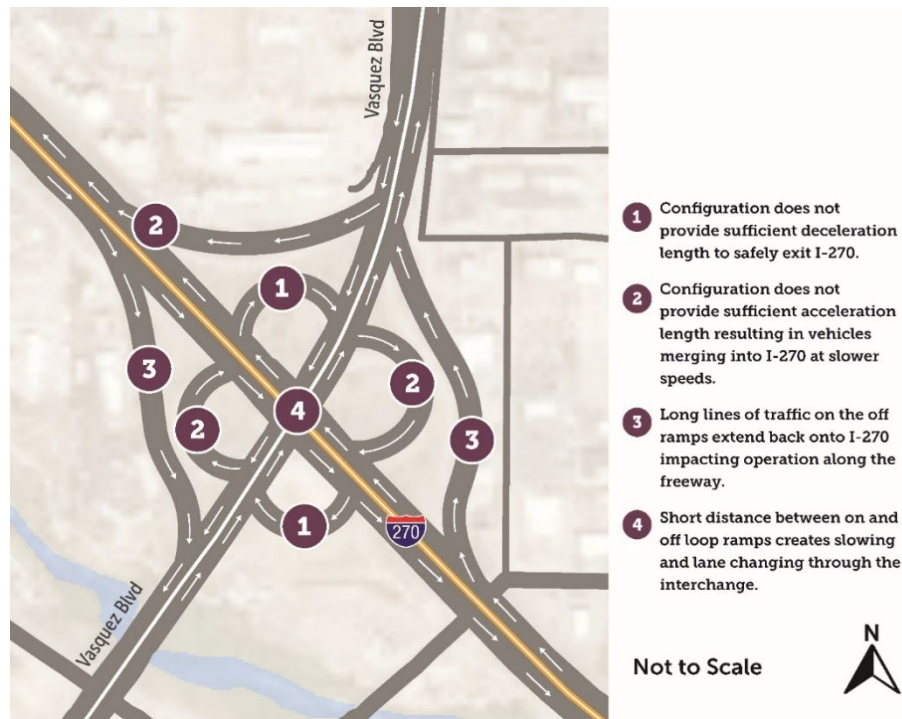


Figure 2-4 illustrates how merging and exiting traffic movements at the Vasquez Boulevard cloverleaf interchange slows traffic and causes congestion, thereby negatively impacting travel time and reliability.

Figure 2-4. Vasquez Boulevard Cloverleaf Interchange Areas of Congestion



2.2.2.2 Deficient Structures and Pavement

The I-270 corridor includes 19 existing bridge structures that were designed to last 50 years. Twelve of the 19 bridges are reaching the end of their useful life and require substantially more maintenance when compared to those in good operating condition and will be replaced as part of this project.

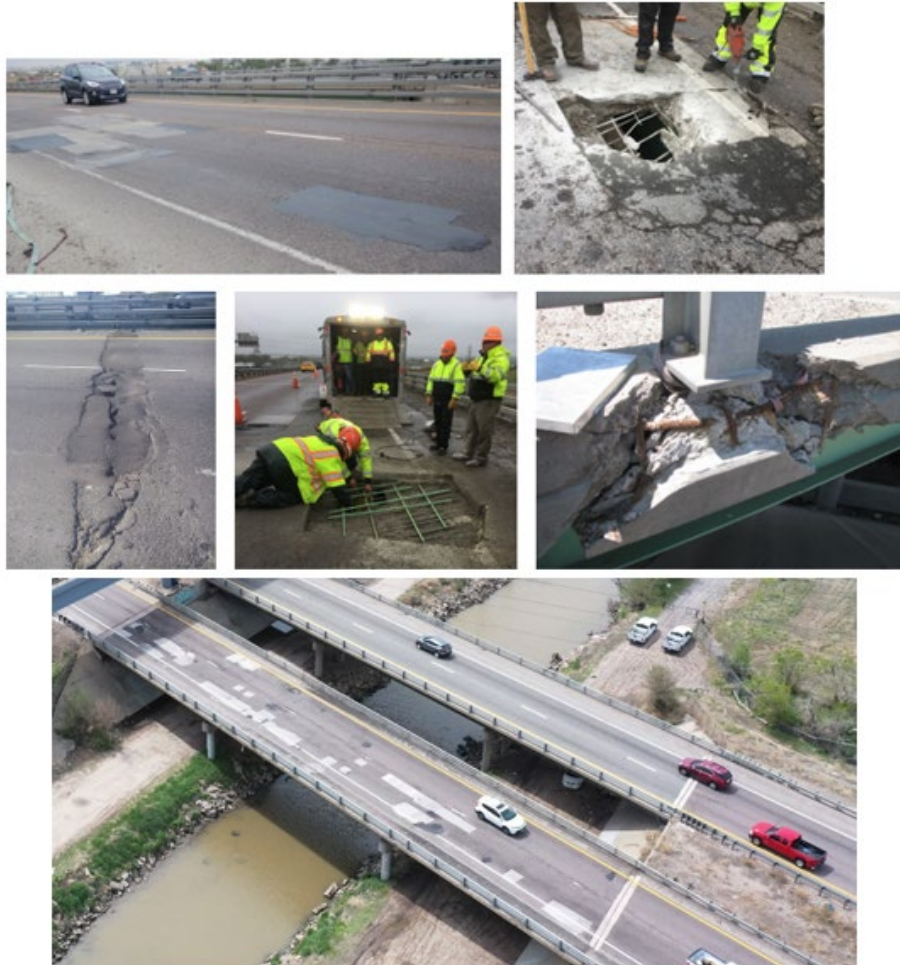
Over the past decade, CDOT performed 160 planned and 65 emergency repairs, many requiring peak-hour lane closures that increase congestion and crash risk. Emergency repairs also expose maintenance crews to live traffic with minimal protection and divert funds from long-term upkeep.

Traffic disruptions from unplanned maintenance events force drivers to make sudden lane changes, increasing crash risks. In addition, emergency response vehicles can be delayed due to congestion and blocked lanes, posing a significant risk to public safety. These recurring disruptions reduce corridor reliability and predictability, directly impacting commuters, transit services, and freight operators.

In 2023, CDOT completed preventative maintenance on multiple bridges on I-270 between Vasquez Boulevard and York Street. The driving surfaces on these bridges were deteriorating, requiring frequent repairs and causing drivers to slow or change lanes suddenly, leading to congestion and safety issues. While resurfacing provided short-term relief, the bridges remain functionally obsolete and do not meet modern design standards.

Figure 2-5 includes several photos demonstrating the condition of some of the bridges in the I-270 corridor.

Figure 2-5. I-270 Bridge Photos



Deteriorating pavement on I-270 continues to degrade traffic flow and safety. CDOT uses "drivability life" to assess surface conditions based on cracking, rutting, and roughness. When these problems get worse, it means the road is wearing out and needs repairs to stay safe and comfortable for drivers.

The 3-mile segment of I-270 from I-76 to east of Vasquez Boulevard has between two and four years of drivability life remaining (CDOT 2020b) before it will require emergency maintenance and lane closures.

The segment between the South Platte River and Brighton Boulevard is built over a historic landfill. On-going settlement beneath the roadway causes structural damage to pavement, guardrails, and bridge abutments, reducing the corridor's long-term drivability.

Ongoing maintenance of aging bridges and pavement disrupts traffic and creates safety risks in work zones. These disruptions reduce travel time reliability for all users along I-270. Deteriorating surfaces also challenge freight operations by making travel less safe and less

efficient. The wear and tear of freight vehicles on aging infrastructure may increase maintenance needs and costs and limit the efficient movement of goods.

2.2.2.3 Projected 2050 Traffic Conditions

By 2050, daily traffic on I-270 is expected to grow by about 15 percent. Growth on nearby roadways will likely exceed this rate because I-270 already operates over capacity. Without improvements, increased demand will lead to longer travel times, reduced reliability, and increased safety risks.

Freight vehicles currently make up 8 to 17 percent of total daily traffic on I-270, depending on location; this percentage of freight vehicles is projected to persist in 2050. As traffic volumes increase, freight travel time and reliability, and safety concerns worsen. In addition, emergency response times would be compromised, impacting public safety.

2.2.3 Transit on the Corridor

Reliable transit systems increase the person-carrying capacity of the transportation network by encouraging more people to use public transportation instead of relying on single occupant vehicles.

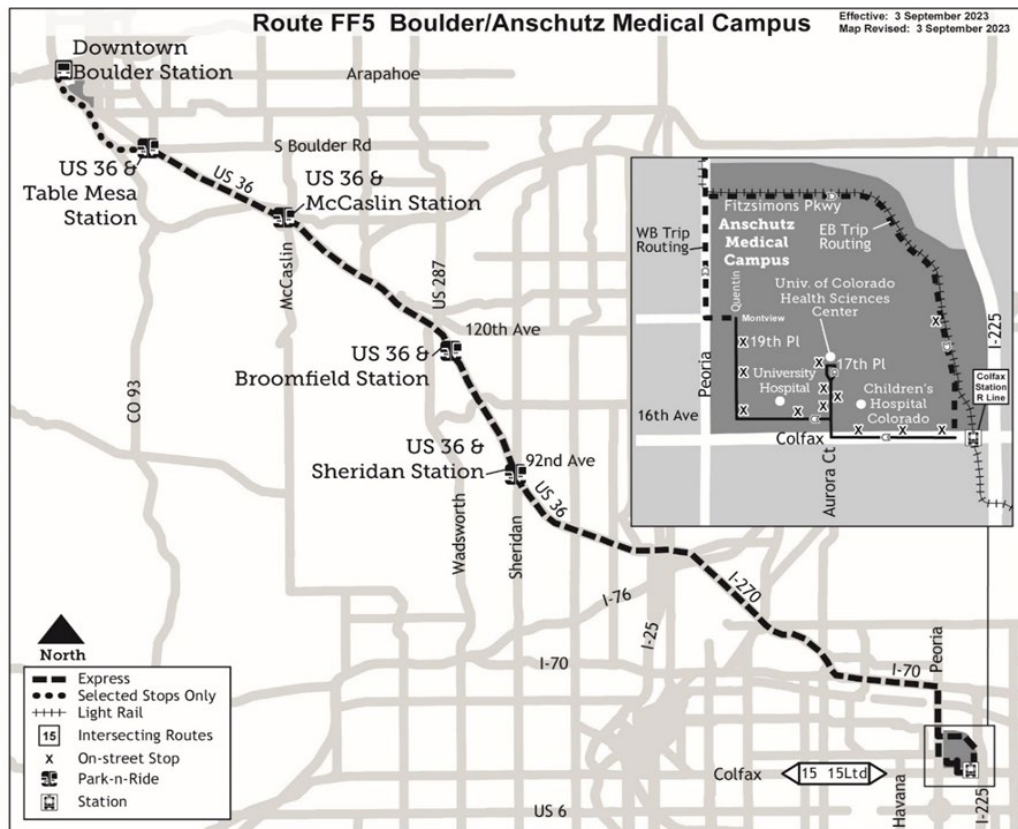
2.2.3.1 Travel Delays for Public Transit

Congestion slows both private vehicles and public transit. When transit buses get stuck in traffic, travel times increase, delays become unpredictable and reduce transit schedule reliability.

The Regional Transportation District (RTD) operates one bus route along the I-270 corridor, the Flatiron Flyer 5 (FF5). This route connects downtown Boulder to Anschutz Medical Campus in Aurora with a limited-stop service as shown on Figure 2-6.

RTD data shows that the FF5 operates at speeds below 35 mph despite being a freeway route with limited stops. Table 2-1 shows RTD's recent on-time performance data for the FF5. In 2022, westbound on-time performance was just 45 percent, compared to 81 percent for eastbound. The FF5 route segment along I-270 is the primary cause of inconsistent travel times and substantial delays. In contrast, the FF5 segment along US 36 benefits from Express Lanes and provides more dependable transit travel times.

As a commuter route, the FF5 depends on reliability in both directions. Persistent delays in one direction discourages ridership, and reduces rider confidence, and lowers overall transit demand.

Figure 2-6. RTD Bus Route FF5 map


Source: RTD-Denver.com

Table 2-1. Transit Performance Metrics for the Bus Route FF5

Year	Direction	Total Daily Boardings	Average On-Time Performance (Percent)
2022	Eastbound	73	81.37
2022	Westbound	94	45.28

Congestion on I-270 has forced FF5 bus operators to adopt a formal diversion route using I-70 and I-25 to maintain schedules. In 2023, RTD Dispatch reported that drivers used this route daily, often at their own discretion.

Congestion diminishes the overall efficiency of transit systems. Buses stuck in congestion are less productive, spending more time idling and less time in service, which increases operating costs and, in some instances, reduces service frequency. Faster and more reliable travel times allows agencies to increase service, making transit a more competitive and viable option (National Association of City Transportation Officials 2016).

The FF5 operates in mixed traffic and does not provide a competitive and reliable alternative to private vehicle use. By 2050, without improvements to the corridor, peak hour transit travel times are projected to more than double, making transit less competitive.

2.2.4 Bicycle and Pedestrian Connectivity across I-270

Bicyclists, pedestrians, micromobility devices, such as electric bicycles and scooters, and those using other non-vehicular modes, have limited opportunities to cross the I-270 corridor, limiting the ability to travel between neighborhoods and to the Sand Creek Regional Greenway (commonly referred to as the Sand Creek Trail). While the Denver metro area averages eight east-west sidewalk-connected roadways per mile, I-270 has fewer than two crossings per mile. Most existing crossings lack adequate sidewalks or bicycle and pedestrian trails. Figure 2-7 shows the existing bicycle and pedestrian crossings, with descriptions following the map.

Figure 2-7. Existing Crossings of I-270


Crossings of I-270 include the following:

- 1. Washington Street (Figure 2-8):** Washington Street is a north-south roadway with five-foot attached sidewalks on both sides. The sidewalks connect to the neighborhoods on either side of I-270. There are no separate bicycle facilities on Washington Street.

Figure 2-8. Washington Street at I-270 Looking Northbound



2. **Colorado 224 (CO 224) and Clear Creek Trail (Figure 2-9):** The Clear Creek Trail is an eight-foot-wide non-motorized bicycle and pedestrian trail that crosses under I-270 along Clear Creek. The trail connects Commerce City and Golden, Colorado. Clear Creek Trail runs parallel to CO 224, also known as East 70th Avenue, but there are no formal connections between CO 224 and the Clear Creek Trail; CO 224 does not provide sidewalks or bicycle facilities.

Figure 2-9. Colorado 224 (CO 224) and Clear Creek Trail (Plan View)



3. **York Street (Figure 2-10):** York Street lacks safe pedestrian and bicycle accommodations over I-270. The bridge has no sidewalks, shoulders, or bike facilities. Sidewalks exist north and south of the bridge, but the one north of I-270 is narrow and attached to a guardrail,

making it difficult to maintain. Bicyclists must share the road with vehicles, as there are no designated bike lanes.

Figure 2-10. York Street at I-270, Looking Southbound



4. **South Platte River Trail (Figure 2-11):** The South Platte River Trail is a high-quality, non-motorized bicycle and pedestrian trail that crosses under I-270 along the South Platte River and connects Commerce City to downtown Denver and the south Denver metro area.

Figure 2-11. South Platte River Trail Bridge Over Clear Creek (Source: Google Maps)



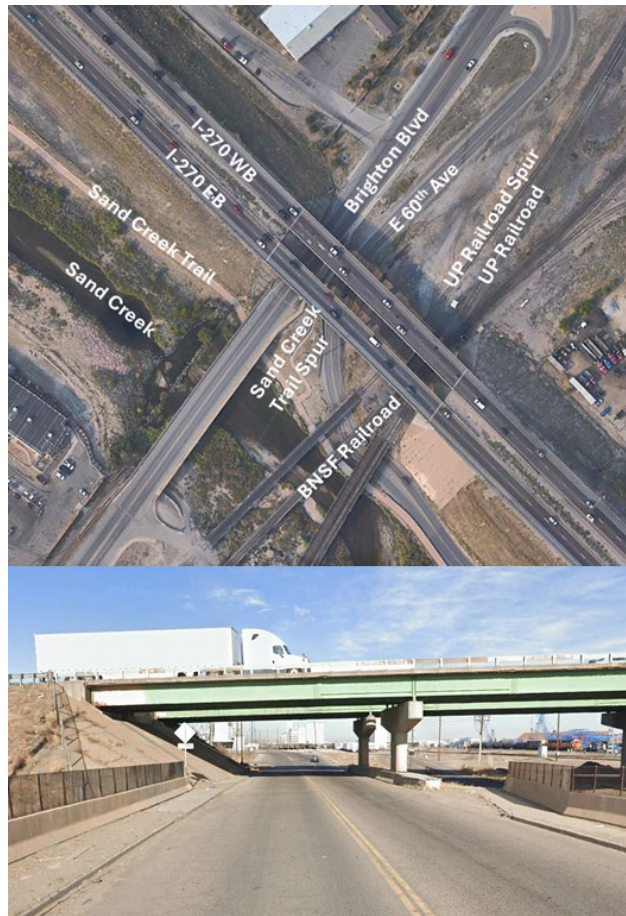
5. **Burlington Ditch (Figure 2-12):** East 64th Avenue is an east-west roadway that runs west from Vasquez Boulevard to the Farmers Reservoir and Irrigation Company's (FRICO) irrigation ditch known as the Burlington Ditch. At the Burlington Ditch, a dirt service roadway extends south of 64th Avenue along the east side of the ditch to provide access to the N-Line and provides informal access to the Sand Creek Regional Greenway. West of the ditch, it continues as a dirt road under I-270 before ending at the trail. There are no existing sidewalks, designated shoulders, or bicycle facilities on East 64th Avenue or across the Burlington irrigation ditch.

Figure 2-12. Burlington Ditch near East 64th Avenue/N Line at I-270



6. **Brighton Boulevard and Union Pacific Railroad (UPRR)/BNSF Railway (BNSF) Crossings Under I-270 (Figure 2-13):** There are five unique crossings at this location: Brighton Boulevard, the Sand Creek Trail spur trail, East 60th Avenue, UPRR, and BNSF. The Sand Creek Trail spur, a 6-foot-wide path, provides bicycle and pedestrian connectivity to Brighton Boulevard, a two-lane arterial road that lacks bicycle lanes and has inconsistent sidewalks, especially under and north of I-270. East 60th Avenue runs under I-270 and three railroad bridges with very low vertical clearance (9 feet) and narrow lanes (8 to 10 feet). The road has no pedestrian or bicycle facilities, forcing bicyclists to share space with vehicles. Sight lines are poor, and closely spaced bridge piers further reduce safety.

Figure 2-13. Brighton Boulevard and UPRR/BNSF Crossings Under I-270 (Plan View) and Brighton Boulevard at I-270 Looking North



- 7. East 60th Avenue and BNSF (Figure 2-14):** East 60th Avenue, the United Asphalts access road and the BNSF pass under I-270 to the west of the Vasquez Boulevard Interchange. There are no existing sidewalks or bicycle facilities on either East 60th Avenue or the United Asphalts access road.

Figure 2-14. East 60th Avenue and BNSF Under I-270 Looking South



8. **Vasquez Boulevard (Figure 2-15):** Vasquez Boulevard does not have bicycle facilities or continuous, accessible sidewalks in the study area, resulting in limited bicycle and pedestrian access across I-270. Worn dirt paths along the roadway indicate pedestrian demand, but the absence of formal infrastructure limits safe access to transit, nearby neighborhoods, and the Sand Creek Regional Greenway.

Figure 2-15. Vasquez Boulevard at I-270 Looking Northbound



9. **East 56th Avenue (Figure 2-16):** East 56th Avenue has 5-foot attached sidewalks on both sides of the bridge under I-270. These sidewalks are difficult to maintain due to narrow clearance under the bridge. On the west side, poor connectivity limits use and upkeep, making the sidewalk hard to navigate. On the east side, the sidewalk connects to Sandcreek Drive and the Dahlia Trailhead. This crossing does not support bicycle travel. This crossing of I-270 does not accommodate bicycles.

Figure 2-16. East 56th Avenue at I-270 Looking Northbound



10. Quebec Street (Figure 2-17): Quebec Street is a north-south road crossing over the top of I-270 with a 12-foot, bi-directional, multi-use, attached path on the east side. Quebec Street is not a designated bicycle route but has shoulders that could accommodate bicyclists. The path connects to the Northfield Trail and the Stapleton Link Trail.

Figure 2-17. Quebec Street Over I-270 Looking Northbound



2.2.5 Freight Operations on the Corridor

Freight operations on interstates is critical to economic vitality and supply chain efficiency. It underpins economic growth, job creation, and competitiveness and highlights the importance of maintaining a safe, sustainable, and robust transportation network. These vehicles, which are larger and heavier than passenger cars, support key industries including logistics, manufacturing, and construction. Freight accounts for 8 to 17 percent of daily traffic on I-270, a higher share than on many other Colorado interstates. Commerce City, located along the corridor, is home to more than half of the state’s trucking companies.

2.2.5.1 Freight Movement Efficiency

Freight efficiency along I-270 is limited by several factors, including congestion, poor pavement, tight interchange ramps, narrow shoulders, short merge lanes, and frequent crashes involving trucks. The 2019 Colorado Freight Plan highlights the section of I-270, from I-76 to East 56th Avenue, as a “congested bottleneck area” with “economic connectivity needs” (CDOT 2019a).

Corridor deficiencies impact freight mobility on the corridor:

- **Poor Road Surface Conditions:** Deteriorating road surfaces make travel uncomfortable and dangerous for freight vehicles, potentially leading to damage to the freight.
- **Tight Curves at Interchange Loop Ramps:** The loop ramps at the Vasquez Interchange lack sufficient pavement width, causing trucks to slip off the edge while turning. According to the Colorado Motor Carriers Association, drivers must slow significantly to navigate these ramps, adding to corridor congestion.
- **Narrow Shoulder Widths:** Insufficient shoulder width on I-270 creates safety and operational risks for freight vehicles. Trucks carrying large loads are prone to mechanical failures and tire blowouts, requiring safe places to pull over. Without adequate shoulders, breakdowns can disrupt traffic and increase crash risk. The American Association of State

Highway and Transportation Officials (AASHTO) recommends shoulders be at least 10 feet wide on high-volume freight corridors, with 12 feet preferred (AASHTO 2018).

- **Short Acceleration and Deceleration Ramps at Interchanges:** Trucks need more space to accelerate and decelerate than passenger vehicles. Without adequate merge and exit ramps, they use travel lanes to speed up or slow down, creating speed differences that contribute to congestion and increase the risk of rear-end and sideswipe crashes.

Operational and safety needs of the corridor also impact freight:

- **Congestion:** Heavy traffic congestion on I-270 leads to delays, longer travel times, and increased operational costs for freight carriers.
- **Crashes Involving Freight Vehicles:** Between 2014 and 2022, trucks were involved in 14 percent of total mainline crashes and 11 percent of injury and fatal mainline crashes on I-270. The 2019 Colorado Freight Plan noted I-270 had higher than statewide average truck crash rates for five consecutive years (CDOT 2019a).

These factors not only result in operational inefficiencies for freight carriers but also pose safety risks and contribute to traffic disruptions for all travelers on the I-270 corridor.

2.2.5.2 Freight Impacts on In-state Economic Activity

I-270 is a critical freight corridor with no viable alternate routes for many high-priority shipments. It is part of the Primary Highway Freight System and the Strategic Highway Network, supporting both regional commerce and national defense. The corridor is designated for nuclear, hazardous, and oversize loads that are prohibited from using I-70 or I-25 through the Denver metro area. In 2023, more than 30 percent of oversize and overweight trips in Colorado (about 15,000 annually) included travel on I-270. These trucks often have no viable alternate route due to I-70 restrictions, making I-270 a bottleneck for oversized loads when the corridor is congested, under construction, or impacted by maintenance closures.

I-270 is also critical to the state's petroleum fuel supply chain. Of the seven primary fuel rack facilities in the region, over 80 percent of Colorado's fuel is distributed from these locations, and over 60 percent of fuel freight trips originate from six fuel racks located near I-270 in Adams County. Four of these racks, located near the Suncor Energy facility, have no feasible alternate route and are estimated to account for 40 to 45 percent of statewide fuel distribution. Any delay or disruption on I-270 directly impacts fuel delivery across the state.

Given the strategic importance, lack of alternate routes, and economic consequences tied to freight operations on I-270, addressing infrastructure deficiencies is critical. Enhancing freight efficiency and reliability along this corridor will reduce delivery delays, strengthen supply chain resilience, and maintain critical services statewide.