Baker Historic Neighborhood
Association
P.O. Box 9171
Denver, CO 80223

November 1, 2019

City and County of Denver
201 W Colfax Ave, Dept 201
Denver, CO 80202

Re: Rezoning of, and development plans for, 50 S. Kalamath St.

To: Members of Denver City Council, Denver Planning Board, Community Planning and Development, Westside Investment Partners, and others whom it may concern

Baker Historic Neighborhood Association (BHNA) supports the rezoning of the parcels knowns as 50 S. Kalamath St. (former Sports Authority warehouse and adjacent parcels) to I-MX from the current I-A and I-B zone districts. BHNA requests careful coordination of development plans for this property with the transportation infrastructure plans for the immediate area.

BHNA is a Denver Registered Neighborhood Organization representing the area from 6th Ave. to Mississippi Ave., and from the South Platte River to Lincoln St. Membership is open to all residents and real property owners within these boundaries. The neighborhood has approximately 6,136 residents.

At its regularly-scheduled general membership meeting on 10 September 2019, BHNA voted 27-0-5 to support the proposed rezoning and to request that the developers and the City of Denver address the infrastructure implications of existing plans (Valley Highway, Bicycle Master Plan etc.) including potential grade separation of the railroad, Bayaud bike bridge and connection to other bicycle/pedestrian facilities.

The process leading up to taking this position was as follows:

- in early July 2019, Westside Investment Partners informed BHNA that it had purchased the property in question and would like to work with BHNA for community input; Westside attended the regularly-scheduled 9 July 2019 BHNA general membership meeting and discussed with members what they hoped to see at 50 S. Kalamath
- at its regularly-scheduled 28 August 2019 meeting, the BHNA Zoning Committee met with Westside Investment Partners; after a detailed discussion of what would be permitted under I-MX-3 or I-MX-5 zoning, a committee motion to recommend the aforementioned position passed 3-0-1

- the Zoning Committee's recommendation was presented to the BHNA membership at its 10 September 2019 meeting; Westside Investment Partners was present and there was some discussion; as noted above, the BHNA membership approved the Zoning Committee's recommendation

Understanding that a development with a large residential component is a likely outcome of this rezoning, BHNA maintains a strong interest in how this parcel will connect to the rest of the neighborhood. We want residents at 50 S. Kalamath to benefit from the high walkability of the Baker neighborhood. We are encouraged that Westside has committed to a community process and want this process, as well as the the city's rezoning and site development planning processes, to carefully consider several existing and potential transportation plans.

In particular, BHNA has long advocated for some specific improvements in this area. City planners have concurred, as documented in various plans, with a vision for:

- pedestrian/bicycle access via Bayaud and a new bridge to the west side of the South Platte River
- a solution to the disruptive at-grade intersection of the Consolidated Main Line and Santa Fe and Kalamath Streets
- and general improvement in the pedestrian-friendliness of the area west of Santa Fe, which has been attracting increasing foot traffic.

You will find evidence of a consistent vision and planning effort for a Bayaud pedestrian/bicycle bridge in the following plans:

- Denver Bicycle Master Plan Update 2001 (page 22)
- Baker Neighborhood Plan 2003 (pages 71, 124, 132)
- Valley Highway Environmental Impact Statement 2005 (EIS; pages 7-5, 7-28 to 7-30, 7-32) and Record of Decision 2007 (ROD; map, page 4, pages 15, 21, 30)
- Alameda Station Area Plan 2009 (pages 21-23, 40)
- Denver Moves 2011 (map, page 40)

Plans for this bridge are not in isolation, as part of the planned bicycle network it would connect Baker, and the 50 S. Kalamath development, to the Platte River trail and neighborhoods west of the river as well as to light rail stations to the south and travel north via Galapago St.

Grade separation of Santa Fe & Kalamath from the Consolidated Mainline is included in phase 4 of the Valley Highway Plan EIS and ROD. The grade separation concept is integrated with and facilitates the Bayaud bicycle/pedestrian bridge and connections to the east. In particular see figure 7-9, page 7-29, of the EIS, which details a new routing for streets in the area: westbound Bayaud Ave. would cross above Santa Fe Dr., then would turn

north through a new street in the middle of the 50 S. Kalamath property to reach Ellsworth Ave. This would facilitate access to the bicycle/pedestrian bridge and also make access to the east safer and more attractive, since it would remove the unsignalized crossing of Santa Fe Dr. During the development of this plan, CDOT planners stated that the property at 50 S. Kalamath would be acquired to facilitate implementation of Phase 4.

We recognize that the I-25 Central Planning and Environmental Linkages (PEL) study is considering alternatives that may not require the grade separation at this location, however they would still have major impacts in the area. Under consideration are expansion of light rail from two tracks to four, moving the Consolidated Mainline heavy rail tracks to parallel the light rail alignment, and even moving I-25 to parallel the light-rail alignment. Any of these would imply significant property acquisition, and consideration of other transportation impacts. Further, the PEL is a “plan for a plan” and at this point nothing has formally superseded the Valley Highway EIS.

We may be waiting some time for implementation of bicycle network improvements, the grade separation, and/or additional infrastructure the PEL may recommend. Meanwhile, the potential for many new residents at 50 S. Kalamath calls for special attention to pedestrian safety at the intersection of Santa Fe & Bayaud Ave.

In short, while BHNA welcomes a creative redevelopment of 50 S. Kalamath, BHNA requests the decision makers — the Denver Planning Board, Denver Community Planning and Development, City Council and the potential developers — to carefully coordinate the plans to avoid disrupting the vision for major transportation improvements in the immediate area. We also feel that a residential project at this location will be most successful if there are safe, attractive bicycle/pedestrian links to the east.

Luchia A. Brown

LB:SH

From:	James Bertini
To:	Levingston, Courtney L. - CPD City Planner Senior
Cc:	Patrick Schmitz
Subject:	[EXTERNAL] Fw: 50 S Kalamath clarification
Date:	Wednesday, June 24, 2020 12:09:02 PM

Courtney,

Patrick Schmitz asked me to forward this email to you regarding his company's rezoning application as you are the project planner.

He explained the context of Zoning Committee Chair Steve Harley's comments which I questioned, i.e. that they were informative only, and not inconsistent with the BHNA support for the rezoning.

He said he appreciated the historical information and thought you would, too. I have been a member of the BHNA Zoning Committee ever since I moved to the neighborhood in 1997.

James Bertini
423 Kalamath Street
303 572-3122

----- Forwarded Message -----
From: James Bertini <jamesbertini@yahoo.com>
To: Zoning Committee <zoning@bakerneighborhood.org>; steve harley <bhna-zoning@paper-ape.com>
Cc: BHNA Board <board@bakerneighborhood.org>
Sent: Wednesday, June 24, 2020, 07:53:35 AM MDT
Subject: 50 S Kalamath clarification

Steve,

Regarding 50 S Kalamath, I would like some clarification about comments you made at a meeting. As reported on P20 of the rezoning application:
"Additionally, in a Community Meeting held on February 5th, 2020, Steve Harley, the chairman of the Baker Zoning Committee, noted that during the neighborhood planning process, industrial owners did not want mixed use development because they were concerned about residential uses causing graffiti." The neighborhood planning process referred to occurred in ~2002 and 2003. Since I attended two of the meetings, I am aware that only one industrial owner attending the meetings for this planning process, and so if you stated "owners" in plural it would be inaccurate. Moreover, since I am acquainted with that particular owner I also know that his concern was with graffiti from gang-bangers, and not from the kind of people who would occupy new housing, such as the townhomes being built now in the corridor or the units that will be built at 50 S. Kalamath.

This comment must be taken in context with other statements on this page:
"Neighboring residents supported residential uses in the west of the RTD line, but as a compromise, agreed to label this sector as strictly industrial."

In fact, there was no such compromise from 2003. At a BHNA general membership meeting to approve the neighborhood plan, my motion to approve the plan albeit with a single change to have the Santa Fe-Kalamath corridor labeled as mixed use was approved overwhelmingly. However, then-president Adrian Brown - who told me before the meeting that he opposed my position - completely subverted the desires of the neighborhood **and reported to the City the exact opposite of the vote**, i.e. that Baker residents want this corridor to be kept industrial. This duplicitous subversion of democracy is mostly unknown, and indeed I did not find out about this until many months later and after the City had adopted the neighborhood plan when it was too late for me to speak up for the true voice of BHNA residents. Had Adrian Brown reported the actual vote to the City, it is possible that this rezoning application would never have been necessary because the 2010 citywide rezoning would have taken into consideration *the true desires* of Baker residents and rezoned this corridor mixed use.

The rezoning application continues:
"At our neighborhood meeting, everyone in attendance, including neighboring commercial owners and residents, supported residential uses at the Property and west of the RTD line in general. As further support, we received the attached letter from the Baker RNO (Exhibit B-4) which "supports the rezoning of the parcels known as 50 S. Kalamath St. (former Sports Authority warehouse and adjacent parcels) to I-MX from the current I-A and I-B zone districts"(Baker RNO Letter 11/1/19). We understand the Baker RNO does not represent the entire community, and we look forward to hosting, in conjunction with the City, a community meeting that may reach more community stakeholders."

Referring back to your first quote above, I don't know the context of your remarks about the development of the neighborhood plan in the early 2000s, but it seems that by raising them you were arguing *against* the decision of the Zoning Committee and of BHNA which supported the rezoning.

James

On Tuesday, June 23, 2020, 06:00:25 PM MDT, steve harley <bhna-zoning@paper-ape.com> wrote:

6:30 p.m. 24 June 2020, via Zoom, will send the invitation tomorrow afternoon

agenda to include the following (please reply with anything you feel should be added):

* welcome new committee members
* 329 Santa Fe — shipping container accessory building encroaching setback
* 420 W Cedar — deficient loading space (initial notice)
* 160 W Maple — second story deck addition (initial notice, no hearing date, no details)
* Lincoln St transit project — position requested from BHNA
* ADU overlay — should we do outreach on the concept or draft language before doing outreach?
* 50 S Kalamath — understand purpose of "DO-7 overlay with waivers" on notice from Planning Board
* 5G tower notifications — multiple new locations indicated on city mapping tool, but no notice; requested more information

updates:
* I-25 PEL report issued
* the L liquor license granted
* Group Living Amendment

From:	Chris Saros
To:	Levingston, Courtney L. - CPD City Planner Senior
Cc:	PSchmitz@westsideinv.com
Subject:	[EXTERNAL] Westside Investment Partners Development Proposal
Date:	Tuesday, April 21, 2020 6:01:08 PM

April 21, 2020

Courtney L. Levingston, AICP/ Senior City Planner
Community Planning and Development
City and County of Denver
courtney.levingston@denvergov.org

RE: Development Proposal Westside Investment Partners, Inc.
4100 East Mississippi Ave. Suite 500
Denver, Colorado 80246

Dear Courtney:

I have been the property owner of 1030 W. Ellsworth Ave. for 49 years. During these past years, we have not had what could be called “great” developments in the Baker District. I have been following Westside’s Development plans from its inception and I believe that this development would be an excellent project for Kalamath & West Ellsworth. Housing in this location would benefit small businesses in the Baker District and Central Denver. This location adjoining I-25 and West Alameda, served by RTD, provides easy access and close proximity to downtown Denver. Westside’s vision for this project serves several interests. They are providing housing for personnel working in the Baker District and the Central Business District. By developing this area they are making improvements to an area in need of redevelopment. Currently, there is a very serious problem affecting the homeless, wherein we are experiencing damage to the real estate, personal property and the welfare of the people employed in the district. I have tenants, specifically women, who have expressed concerns for their safety when working past 5pm. It is my understanding that this Development Proposal has been delayed until August. As a developer, I know firsthand how zoning delays create loss of highly valued sub-contractors and loss of “holds” on special materials. But more importantly, by postponing this project, the delay affects the community. I am asking you to move up the August hearing to be heard and judged at your earliest to get this property developed as quickly as possible.

Sincerely,

Chris M. Saros

Chris M. Saros
Principal Broker
cell: 303.912.4839/ office: 303-781-2244
e-mail: cmsaros@gmail.com
Saros & Associates, LLC
9275 S. Cedar Hill Way I Lone Tree I CO. I 80124
Sales I Leasing I Investment Brokerage I Development

To whom it may concern:

I am writing on behalf of he rezoning of the old Sports Authority Warehouse property of Kalamath and Ellsworth. I am the owner of the office building located at 1030 W Ellsworth Ave, practically across the street from the warehouse. I have been the owner of this building for multiple decades and have seen many tenants go in and out of the warehouse and think it is time for a change in the neighborhood. Although my building and many others around me, are used for a light industrial or office use, the vast size of that warehouse and amount of semi-truck traffic it produced did not fit in with the area and a lighter use would be appreciated. The area could benefit from a more mixed use zoning and bringing in residential, office, and retail. For these reasons, I would support a rezoning from the current industrial to a mixed use zoning.

Sincerely,

Chris Saros

RIO GRANDE CO.
BUILDING MATERIALS SINCE 1893

201 Santa Fe Drive ~ Denver, Co. 80223 ~ Phone 303-825-2211

July 27, 2020

Denver Planning Board
City & County of Denver, Colorado
1437 Bannock Street
Denver, CO 80202

Dear Planning Board,

This letter responds to the notice of an application for rezoning of 50 S. Kalamath St., application number 2019I-00045.

Our companies own the Rio Grande Co. and Santa Fe Shooting Star properties, which sit east across So Santa Fe Dr. from the site.

As an industrial user and employer in the neighborhood for many decades, we have concerns about the negative impact of such rezoning on our properties and operations, including without limitation, the traffic impacts along Bayaud and South Santa Fe Dr.

At the time of this notice, we have not been contacted by the applicant nor any of its consultants and we have not had the opportunity to review the applicant's full development proposal. So we cannot support the application at this time and reserve the right to raise further concerns. Below is my contact information as well as contact information for our counsel.

Bruce W. Peterson Rio Grande Co. Santa Fe Shooting Star, LLC 201 Santa Fe Dr. Denver, Co. 80223 720-253-6672 Cell 303-825-2211 Office bpeterson@riograndeco.com	Christopher Payne Ballard Spahr LLP 1225 17th Street, Suite 2300 Denver, CO 80202-5596 Direct 303.299.7345 paynec@ballardspahr.com

Once we have reviewed the applicant's proposal in full, we will provide supplemental comments. Thank you for your consideration.

Bruce Peterson
CEO of Rio Grande Co.
Manager of Santa Fe Shooting Star, LLC

From: Jep Seman
To: Levingston, Courtney L. - CPD City Planner Senior
Cc: PSchmitz@westsideinv.com
Subject: [EXTERNAL] Proposed rezoning 50 S Kalamath St/Application No. 2019I-00045
Date: Monday, July 20, 2020 12:14:13 PM
Importance: High

Ms. Levingston:

I am the owner of property located at 23 S. Kalamath Street, Denver, CO. 80223.

I am writing to endorse and support the proposed rezoning application referenced in the subject line above. This area of South Kalamath Street has been long neglected resulting in a variety of urban problems and challenges for adjacent property owners, including myself. The Applicants exhibit a strong vision for the revival and reactivation of South Kalamath Street with needed housing and other amenities.

Please add my name to the list of supporters and endorsers of the proposed rezoning.

Happy to discuss.

Jep Seman
Attorney At Law
JPS Law Group
1700 N. Lincoln St., Suite 2430
Denver, CO. 80203
720-377-0703 (direct)
303-832-4818 (fax)
jseman@jps-law.net

The Sherman Agency, Inc.
910 W. 8th Avenue
Denver, Colorado 80204
303-572-8778
www.theshermanagencyinc.com

June 6, 2020

Patrick Schmitz
Westide Investment Partners
4100 East Mississippi Avenue, Suite 500
Denver, Colorado 80246

Dear Patrick,

Our company represents the ownerships of the adjacent property known as The Yard located at 900-924 W. 1st Avenue, Denver. We are very excited to see a change with respect to the zoning change for the outdated warehouse property previously occupied by Sports Authority to a new zoning of I-MX-5, to allow office, retail, multi-family, & some industrial uses. I think such uses will be a huge plus to the neighborhood as well as our property specifically since it will add new customers for our tenants. An updated property and such uses will be a great addition in a changing neighborhood. In addition, since the existing building goes up to the existing sidewalks I am excited to see the existing bulding be removed with a new structure which will have set-backs to allow improved visibility to our project and vehicles traveling along Santa Fe & Kalamath streets.

I was most interested in making sure there will be sufficient parking off-site for the residential units in particular so those residents will not be using our private parking which is meant for the our business tenants only. And I am also concerned about access to the parking garage which will be a part of the new development. I have been assured that the entrance for the parking garage will be on the south side of the project, off of W. Bayaud and I do believe the developer is listening to our concerns to improving the neighborhood. I definitely want their parking entrance to be on the south side of their project so the traffic in and out of the new development does not overwhelm the limited access on W. Ellsworth. I fully support the planned zoning change.

Sincerely,

THE SHERMAN AGENCY, INC.

Hal M. Naiman

_____
Hal M. Naiman, President
hal@theshermanagwncyinc.com

aw
architectural WORKSHOP

July 31, 2020

Denver Community Planning and Development
201 W. Colfax, Dept. 205
Denver, Colorado 80202

To whom it may concern:

I am writing in support and with suggestions for the property at 50 S. Kalamath Street.
I am the owner of 2 Kalamath Street which is occupied by one office space and two artist live work apartments. I operate my design and architecture firm out of the newly renovated 1950's masonry industrial building.

The development of 50 S. Kalamath Street as well as 39 S. Kalamath St., 101 S. Santa Fe Dr. and 10 S. Lipan with mixed use and residential is essential for the growth and transformation of the neighborhood. The Baker Neighborhood is an exciting location as the Santa Fe Arts District continues to grow to the south and re-development continues to occur like The Bolt Factory, The Yard, Moss and multiple authentic restaurants.

From my office window on Kalamath Street, I continue to see more and more pedestrian activity along with small business growth, home renovations and artistic live work units.

The proposed Zoning application of I-MX-5 with the DO-7 overlay including waivers is an appropriate zoning request for a mixed-use development that includes residential and retail. In conversation with the Developer, the proposed commercial use on Ellsworth with street and garage parking would build upon the growing pedestrian activity and safety. I am also in favor of the DO-7 overlay that has been successfully implemented in the RiNo Area.

As a building owner observing traffic and pedestrian use, a suggestion for the Ellsworth portion of the development would be to provide a building setback with landscape buffer and street parking to support the retail, provide much needed parking and allow for direct sun light to minimize snow and ice buildup in the winter months. The other suggestion would be to implement upper story setbacks to reduce building mass and help with the pedestrian feel for the neighborhood.

The one request for the City of Denver and Colorado Department of Transportation is to allow safe ingress from Santa Fe and egress to Kalamath Street for the residents to help reduce the congestion at Bayaud Avenue and minimize access to Ellsworth Avenue. From observations over the past two years, far too many semi-trucks and delivery vehicles use the very tight Ellsworth Avenue to safely incorporate any primary ingress and egress to the development. Several cars parked on the street have been scraped and have lost mirrors over the past few years.

In summary, I fully support the proposed rezoning and hope that the above comments for the developer, City of Denver and CDOT can be considered and incorporated.
If you have any questions, please don't hesitate to contact me at AW.

Sincerely,

Mark Bowers, AIA, NCARB, LEED AP
Owner of 2 Kalamath Street
Principal of Architectural Workshop

2 Kalamath Street . Denver . Colorado 80209 . **303.788.1717** *ph* . **303.788.1964** *fx*
www.archshop.com

DOOR & MILLWORK BOUTIQUE
983 W. ELLSWORTH AVE.
DENVER, CO 80223
A.WENK@DOORANDMILLWORKBOUTIQUE.COM
303.946.5208

August 4, 2020

City and County of Denver
201 W Colfax Ave, Dept 201
Denver, CO 80202

Re: Rezoning of, and development plans for, 50 S. Kalamath St.

Members of the Denver Planning Board and Others it may concern,

As the residents and business owners of 983 W. Ellsworth Ave. we are writing to give our support for the rezoning and redevelopment of the property located at 50 S. Kalamath Street.

Our support comes with the expectation that Westside Development Company will greatly improve their involvement in the betterment of the neighborhood. The current property is in disrepair and neglected. Basic landscaping and maintenance of the building has not been performed, and it has attracted crime to the neighborhood. Those experiencing homelessness have trespassed on the property on a continual basis and the company has not taken action when notified of the matter. This has lead to members of the public being assaulted on the surrounding sidewalks and trash continually building up on the property. Quite simply, this property, in its current state, is a danger and an embarrassment to the citizens of the City and County of Denver. Please move forward with rezoning this property before further issues arise surrounding, what is currently, an urban blight.

With this being said, we look forward to the redevelopment and rezoning of this property and the positive effects, for which it has the potential to bring to the neighborhood.

Thank you for your consideration in this matter,

Angela Wenk- Owner, Door & Millwork Boutique
&
Alex Dorgan- Lieutenant, Denver Fire Department

Denver Planning Department:

My name is Derek Boone and I live in Baker at 39 W Irvington Pl. I wanted to write a letter supporting the rezoning of the old warehouse property on Santa Fe and Ellsworth. I have been in the neighborhood for a few years now and would love to see the neighborhood continue to grow. The westside of Baker is currently underutilized in my opinion and it would be great to see more residents and retail users come into the area. Especially considering the other alternative of another industrial user going into the warehouse space and having more semi-truck and heavy equipment traffic through the neighborhood, I feel the rezone to more of a mixed use will greatly benefit the neighborhood and add to the character that Baker has become. Please let me know if you have any further questions.

Thank you for your time!

Derek Boone
Owner/Resident
39 W Irvington Pl

RIO GRANDE CO.
BUILDING MATERIALS SINCE 1893

August 13, 2020

Re: Re-Zoning Application with respect to 50 S. Kalamath Street, 39 S. Kalamath Street, 10 S. Lipan Street, and 101 S. Santa Fe Drive.
Official Zoning Map Amendment Application #2019I-00045

Ladies and Gentlemen of the Land Use, Transportation and Infrastructure Committee of the Denver City Council, City and County of Denver, Colorado:

Thank you for your attention to our concerns. We are writing regarding the proposed re-zoning of 50 S. Kalamath Street and surrounding properties from I-A UO-2 & I-B UO-2 to I-MX-5, UO-2, DO-7 to allow for residential, multi-use development (Proposed Development).

Since the early 1900's our company, Rio Grande Co., has owned and operated several properties in this industrial area. Rio Grande Co. and an affiliate Santa Fe Shooting Star LLC own the adjacent parcel to the southeast of the proposed development site and have operated there since the late seventies. On this 10 acre parcel we operate a garage facility, steel yard, and warehouses, and we lease facilities to both US Mix Co. and Railroad Solutions for purposes of packaging and warehouse usage. Like other industrial facilities in this area, access to the Santa Fe/Kalamath corridors, Bayaud, I-25, and railway lines are critical to our operations. While we understand the changing nature of Denver in general, and of the Baker Neighborhood in particular, we ask that the LUTIC and the City Council consider both future economic development and the needs of existing businesses and solving the real traffic complexity of this site.

We ask LUTIC to consider how the proposed rezoning, development plans and proposed traffic modifications, if approved, would interfere with established manufacturing and industrial businesses and pose a danger to existing employees and future residents alike. The Proposed Development site is in the midst of a complex traffic area, and if approved, would create additional logjams and potential hazards. The site is hemmed in by I-25 and Kalamath to the West, by Santa Fe Drive to the East, and the consolidated rail mainline to the South. Santa Fe, a State highway, and Kalamath are both three-lane, one-way streets. The area is complicated by both the natural barrier to the East formed by the light rail and related rail crossing at Bayaud, mixed in with industrial users and traffic.

The Proposed Development includes a planned traffic signal at Bayaud Avenue and Santa Fe Drive and plans to make Bayaud a two way street where possible. The design of the Proposed Development is such that it will effectively direct vehicles from the development onto Santa Fe, which is one-way north bound, so that traffic will be particularly heavy heading North on Santa Fe and East on Bayaud, plus increased traffic West to the Proposed Development. The congestion created at this intersection will affect traffic going into both our facilities and the property across the street, which property can only be accessed via Bayaud. In addition to the general congestion and interference with our business, this configuration presents the danger of cars being backed up on Bayaud at the traffic signal and getting stuck. This configuration poses a particular danger for

the trucks in the neighborhood, which are more difficult to maneuver. The proposed light also potentially backs up traffic on northbound Santa Fe Drive and that there are no outlet streets between the proposed light and the tracks. Generally, after the main line train passes through, traffic can back up as far as I-25, which problem was already the subject of a Valley Highway EIS study regarding a potential bridge over Santa Fe at Bayaud for local traffic was completed as a part of the Alameda I-25 bridge rebuilding.

We attach two CDOT studies which point out the high volume of train and other traffic in this area, and note that heavy train traffic has been a major issue in this area for many years.[1] The proposed traffic signal from the Proposed Development would worsen congestion and increase the danger of cars and truck being stuck at the crossing. There is not enough room for queuing at the Santa Fe Drive and Bayaud signal location causing a probable risk for traffic backing onto the consolidated mainline tracks. The proposed signal could also affect our main access because of the backups at the consolidated mainline rail, also affecting maneuverability.

The Proposed Development calls for pedestrian access to the light rail station to run south on Kalamath to Alameda to Cherokee and biking access at the Bayaud and Santa Fe intersection. Pedestrians and cyclists heading east would have to cross the light rail crossing with limited access to any sidewalks to Cherokee, while heading south pedestrians and cyclists would have limited sidewalks. Bayaud is an industrial street with narrow sidewalks and with minimal or no setbacks from the existing structures, which increases the danger to pedestrians and cyclists. However, the addition of sidewalks and crossing improvement would make it more difficult for trucks to safely turn out of our facility onto Bayaud, and would impede drivers' sightlines, also endangering pedestrians and cyclists. The industrial nature of the neighborhood presents an inherent danger to cyclists and pedestrians.

We posit that the Transportation Mobility Study performed by Kimley Horn as part of the Proposed Development is incomplete and potentially inaccurate. The study was performed in June 2020, in the midst of the economic downturn and stay-at-home orders caused by COVID-19, and thus relied on a 2018 study of a nearby intersection to determine traffic volume, and as such fails to account for the unique nature of the intersection in question and the growth of traffic in the area. The study otherwise was conducted largely in consideration of whether the site was fit for residential re-development, without regard to existing small businesses. Furthermore, the study does not analyze the area with respect to vehicle type. We have contacted independent traffic engineers to review this study and, if necessary, to conduct additional studies to more accurately asses the traffic patterns and consequences of the proposed development in this area and on our operations.

For now, we implore this committee to strongly consider the traffic issues surrounding this development in order to ensure the small businesses utilizing this area for its intended use are

[1] See, in particular, (A) the Valley Highway Environmental impact statement, Section 1.4.6 "Consolidate Main Line Railroad Crossing at Santa Fe Drive and Kalamath" and figure 1-9 showing the two at-grade crossings south of the property and (B) The I-25 Central Planning and Environmental Linkages (PEL) Study showing 38 trains a day traveled the corridor in 2017 (pg 67).

protected from the negative traffic impacts of this re-zoning and invest the time and resources to understand the impact of traffic in the area, and the significant issues posed to existing businesses.

Please reach out to us with any questions or follow-up.

Best regards,

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1.0 PURPOSE AND NEED

1.1 Project Location and Purpose

The Federal Highway Administration (FHWA), in cooperation with the Colorado Department of Transportation (CDOT), is considering improvements to portions of Interstate 25 (I-25; the Valley Highway) and US 6 (6th Avenue) in south-central Denver. Also being considered are improvements to adjacent portions of Santa Fe Drive and Kalamath Street, including the crossing between these streets and the Consolidated Main Line railroad corridor.

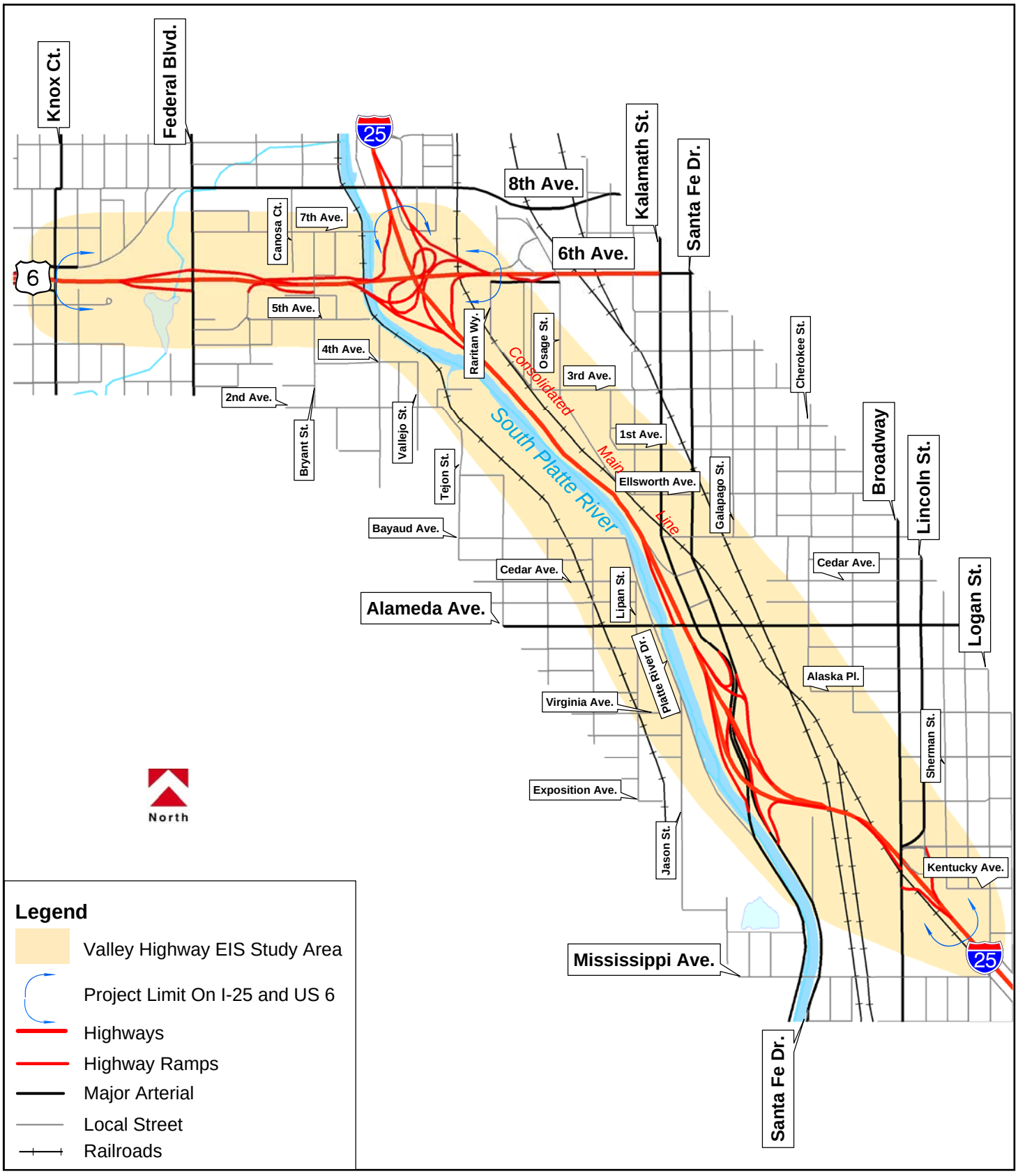
Planning for the freeway now known as I-25 began in 1944 with a preliminary engineering study for a freeway initially named the "Valley Highway." The highway originally extended from 58th Avenue on the north to Colorado Boulevard on the south. Much of the highway followed an alignment along the South Platte River. Construction began in 1948 with the first storm drains placed on the north end of the freeway. With the completion of the Broadway viaduct in 1958, the northern and southern sections were connected.

I-25 and US 6 are vital links in the freeway system serving Metro Denver and Colorado. At a national level, I-25 is designated as congressional "High Priority Corridor" No. 27 within the National Highway System. It is also designated as a Western Trade Transportation Network corridor for movement of national and international goods. At an international level, I-25 is part of a transportation trade corridor known as the Camino Real Corridor. This corridor traverses the nation from arterials in Mexico; along I-10 from El Paso, Texas, to Las Cruces, New Mexico; along I-25 from Las Cruces to Buffalo, Wyoming; and northward through Montana via various routes to the Canadian border.

Figure 1-1 shows the project area in which improvements are being considered. Improvements being considered for I-25, US 6, and the Santa Fe Drive/Kalamath Street crossing of the Consolidated Main Line are referred to collectively in this report as the "Valley Highway Project" or the "proposed action." The Valley Highway Project may also include ancillary improvements to adjacent streets. Specific alternatives are described in detail in **Chapter 2** *Alternatives*.

The ***purpose*** of the Valley Highway Project is to:

- Provide lane continuity and balance on I-25 from Logan Street to US 6, linking with sections of I-25 to the north and south
- Optimize highway system operations while recognizing the constraints on highway expansion identified through the regional transportation planning process
- Improve connectivity between transportation modes
- Improve pedestrian / bicycle mobility across the project corridor
- Increase safety along and across the corridor for motorists, pedestrians, and bicyclists
- Correct roadway deficiencies along I-25 and US 6 to meet current design standards to provide a safer, more efficient, and more reliable transportation system
- Increase safety and reduce congestion and delays related to the at-grade crossing of Santa Fe Drive / Kalamath Street and the Consolidated Main Line



Valley Highway, 02-069, 06/03/2004

0 0.25 0.5 1 Miles

Valley Highway EIS Study Area

Valley Highway - Logan to 6th Ave. Environmental Impact Statement (EIS)

Figure 1-1

This Final Environmental Impact Statement (Final EIS) for the Valley Highway Project describes the alternatives being considered for improvements within the project area, including the Preferred Alternative identified by FHWA and CDOT. The Final EIS has been prepared in accordance with National Environmental Policy Act (NEPA) provisions and corresponding regulations and guidelines of the Council on Environmental Quality and the FHWA, the lead federal agency for this proposed action. Other agencies cooperating in preparation of the Final EIS include the Federal Railroad Administration (FRA), the Federal Transit Administration (FTA), the Regional Transportation District (RTD), and the City and County of Denver.

1.2 Project History and Status

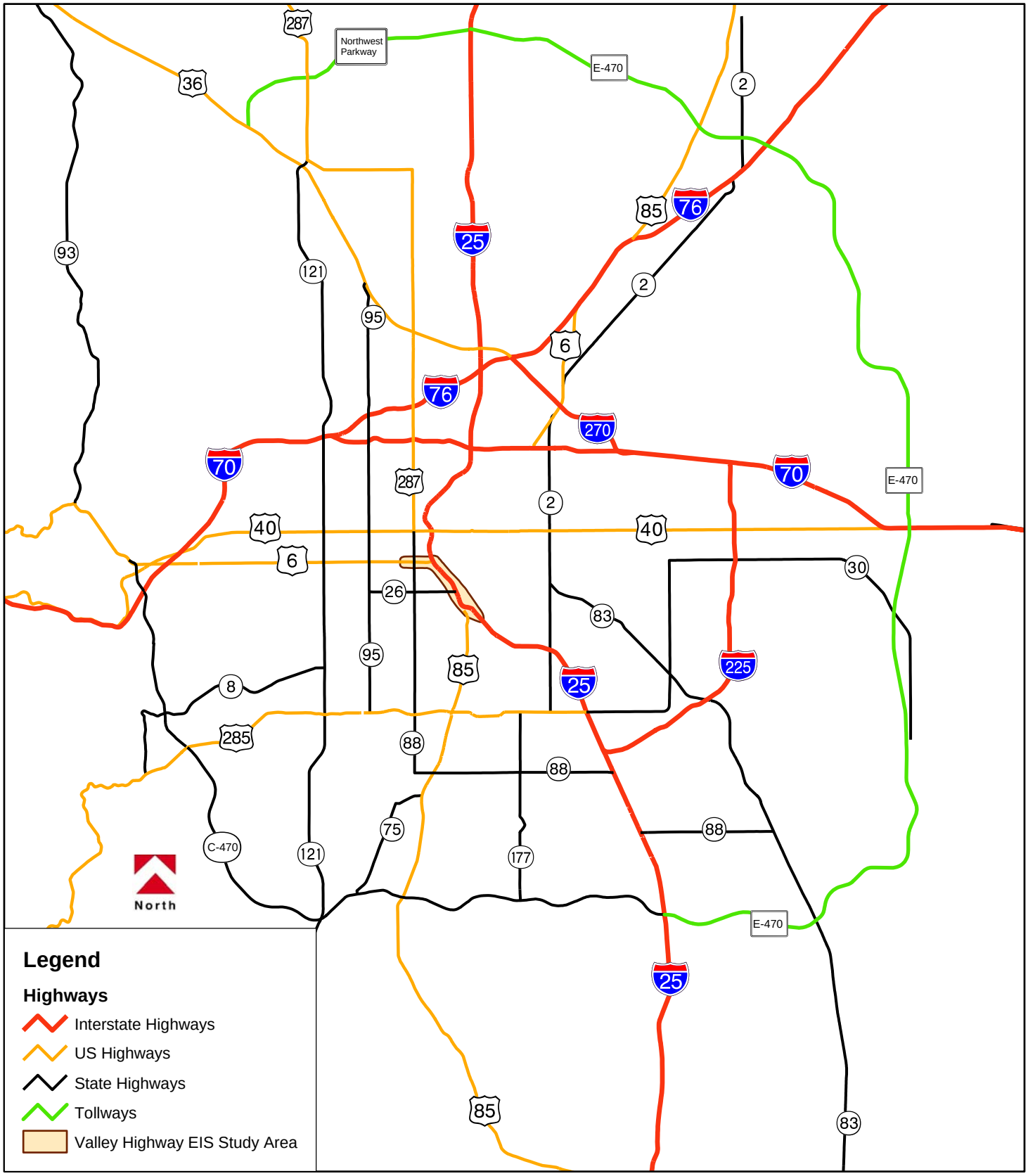
I-25 corridor studies from US 6 in Denver to Lincoln Avenue in Douglas County over the last two decades have examined the condition and operational context of this major interstate facility. **Figure 1-2** shows the Metro Denver regional highway system. The Valley Highway – Logan Street to US 6 segment was identified by CDOT as needing reconstruction of structures, and safety and capacity improvements. The Regional Transportation Plan for 2025 prioritized the Valley Highway Project by inclusion in the plan.

Previous corridor studies have recommended the following:

- *6th Avenue / I-25 Interchange Feasibility Study, January 1985* – recommended improvements to the interchange and 6th and I-25, many of which have been implemented
- *I-25 6th Avenue to Lincoln Avenue Corridor Evaluation Study, April, 1992* – recommended multimodal corridor enhancements including highway widening and high-occupancy vehicle (HOV) elements
- *Southeast Corridor Major Investment Study, July 1997* – recommended multimodal corridor enhancements for I-25 from US 6 south to Douglas County. Subsequent efforts from this study resulted in the Southeast Corridor Environmental Impact Statement, the Transportation Expansion Project (T-REX), and this EIS

The corridor/project development effort for the Valley Highway Project was initiated in 1998. Originally an Environmental Assessment (EA) was recommended to address transportation issues associated with the segment of the I-25 Valley Highway from Logan Street to and including US 6. However, CDOT and FHWA determined that planning and environmental concerns of the adjacent property and business owners and overall concerns and issues raised by the City and County of Denver warranted the requirements of a major action project to be addressed through an EIS. The federal Notice of Intent to prepare this EIS was published on July 23, 2002 in the *Federal Register*.

In 2002, reconstruction of the main structure of I-25 over Broadway began as an emergency measure. This segment was in extremely poor structural condition, which necessitated immediate action. The project was evaluated for environmental impacts, which resulted in issuance of a Categorical Exclusion in June 2000. Ramp connections to the new structure are being evaluated as part of this Final EIS.



Valley Highway, 02-069, 06/03/2004

0 2.5 5 10 Miles

Metro Denver Regional Highways

Valley Highway - Logan to 6th Ave. Environmental Impact Statement (EIS)

Figure 1-2

1.3 Project Needs and Objectives

This section summarizes the need for the project and identifies the objectives that have been established to address the needs. Further detail regarding the need for the project is provided in **Section 1.4**.

The ***need*** for the project arose primarily out of a number of identified roadway deficiencies that result in unsafe conditions. The age, condition, and geometric design of the roadway compromise the safety of the traveling public and require improvements to meet current design and safety standards.

Project objectives have been established based on identified needs and a series of discussions with cooperating agencies, resource agencies, and the public.

Specific project needs and objectives fall into several categories as follows.

System Linkages / Lane Continuity and Balance:

- **Need**: Completion of the T-REX Project and I-25 / Broadway viaduct Replacement Project to the south will result in a discontinuity of travel lanes on I-25 through the project area, with four lanes in each direction to the north and south and three lanes in each direction through a portion of the project area.
- **Objective**: Provide lane continuity and balance on I-25 between the existing and planned roadway sections to the north and south of the project

Transportation Demand and Operations:

- **Need**: The I-25 corridor is currently experiencing pervasive severe congestion, which is expected to continue to worsen.
- **Objective**: Optimize highway system operations as measured in reduced delay of vehicle hours/day, reduced hours of congestion, and/or levels of service

Inter-modal Relationships and Bicycle / Pedestrian Mobility:

- **Need**: The I-25 corridor restricts east-west mobility for pedestrians and bicyclists and limits access to transit facilities.
- **Objective**: Preserve existing or provide improved facilities for automobile, bus, and pedestrian connections. Upgrade bicycle/pedestrian facilities within and across the project corridor to provide improved access to the Platte River Trail, safer facilities at intersections, complete missing links of bicycle/pedestrian facilities, and provide better linkages between transportation modes

Safety:

- **Need**: Accident histories for I-25 and US 6 show greater accident frequency and severity than expected for similar facilities, due to congestion, close interchange spacing, and substandard geometric configuration.
- **Objective**: Increase safety and decrease the likelihood of accidents within the project corridor by improving the geometric design of the roadway system

Roadway Deficiencies:

- **Need**: I-25 and associated interchanges have substandard geometrics and design features and many roadway structures are nearing the end of their useable life.
- **Objective:** Address existing roadway deficiencies, and replace aging structures to provide for improved operation of and reduced maintenance costs for the roadway facilities

Consolidated Main Line Railroad Crossing at Santa Fe Drive and Kalamath Street:

- **Need**: Santa Fe Drive and Kalamath Streets cross the Consolidated Main Line railroad at-grade, causing congestion and safety concerns.
- **Objective**: Reduce system disruptions, and improve safety conditions related to the current at-grade crossing

1.4 Detailed Identification of the Project Needs

Specific project needs are detailed in **Sections 1.4.1** through **1.4.6** for each of the categories identified above.

1.4.1 System Linkages / Lane Continuity and Balance

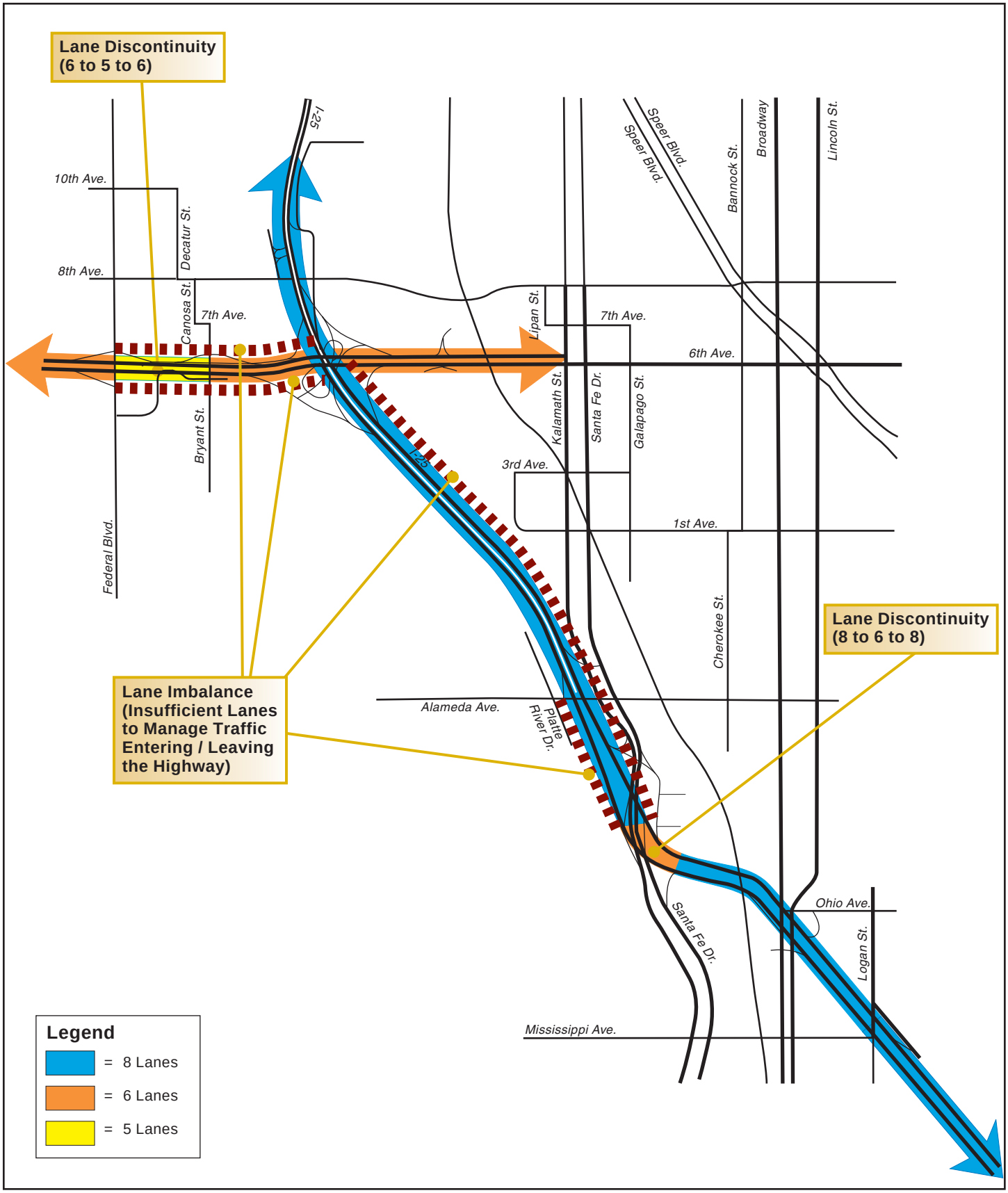
Existing lane configurations on the I-25 mainline in and adjacent to the project (see **Figure 1-3**) include four through-lanes in each direction north of Santa Fe Drive, three lanes in each direction between Santa Fe Drive and Logan Street, and four lanes in each direction currently being constructed south of Logan Street as a part of the T-REX project. Improvements to the Valley Highway are needed to provide a uniform connection between the eight-lane T-REX project to the south and the eight-lane section north of Santa Fe Drive.

The project corridor integrates a combination of overlapping route systems. For example, it serves as a primary connection between Santa Fe Drive, US 6, I-70, and US 36, in addition to carrying its own interstate level volume. Auxiliary lanes are lacking north of Santa Fe Drive to accept and disperse the traffic on these overlapping systems, thereby resulting in a lane imbalance.

I-25 from Broadway to US 6 provides access to a dynamically redeveloping area of the City and County of Denver. It is the interstate system's linkage to regional arterials, providing access to Downtown Denver as well as connections with other state and regional freeway systems. Improvements are needed to address the deficient operational configurations of the remaining interchanges that have not undergone substantial improvements over recent years.

1.4.2 Transportation Demand and Operations

The corridor connects the two largest employment centers in the region, Downtown Denver with approximately 117,000 employees and the Southeast Business District with approximately 130,000 employees in the year 2000. With employment centers at both ends of the corridor, traffic congestion occurs in both directions during the morning and evening rush hours and frequently during the noon hour along many segments of the corridor.



North

Existing Lane Continuity and Balance Deficiencies

Figure 1-3

The existing traffic volume on the Broadway viaduct is approximately 180,000 vehicles per day. When combined with the traffic to and from Santa Fe Drive, I-25 carries 265,000 vehicles per day just north of Santa Fe Drive. Currently, the peak-hour traffic is 7 percent of the daily traffic volume. This peak-hour traffic volume is maintained throughout much of the day. The heavy truck traffic is 5 percent of the daily traffic volume, and this segment of I-25 provides major access for through freight as well as local and regional distribution.

The Final EIS for the T-REX project forecasted a future demand of 210,000 to 240,000 vehicles per day south of Broadway by 2020. More recent studies indicate that I-25 from Alameda Avenue to US 6 is expected to carry 320,000 vehicles per day by 2025. Detailed analysis of existing and future traffic conditions is presented in **Chapter 3** *Transportation Analysis*.

The 2025 regional transportation planning process identifies the I-25 and Santa Fe Drive corridors as currently experiencing pervasive severe congestion. It further predicts that operating conditions along the project corridor will continue to deteriorate towards 2025.

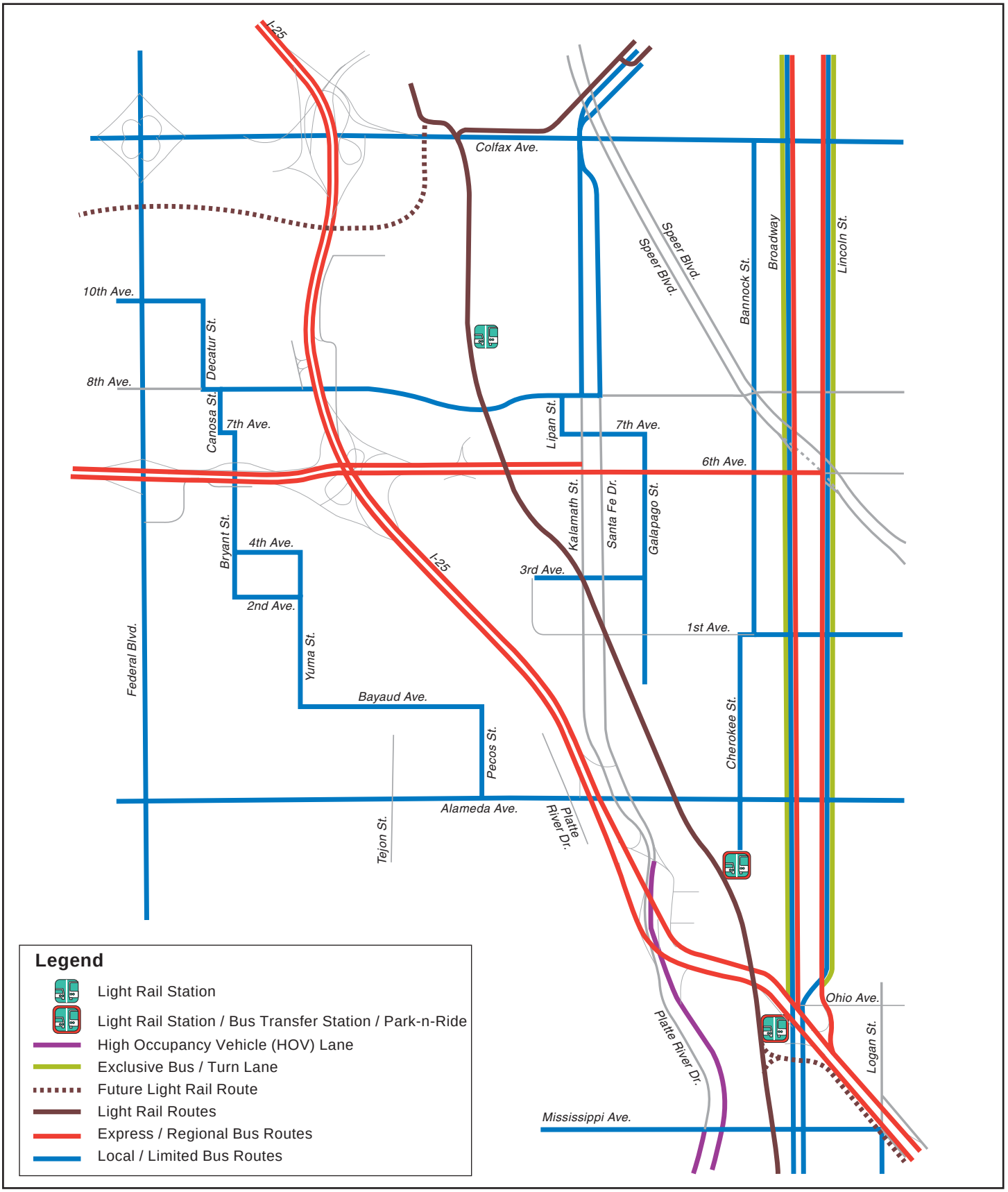
1.4.3 Inter-Modal Relationships and Bicycle/Pedestrian Mobility

A significant number of multimodal transportation facilities converge within the limits of the project corridor, as shown on **Figure 1-4**. These transportation facilities include Light Rail Transit (LRT), bus service, HOV lanes on Santa Fe Drive, and dedicated bus lanes on Broadway (PM peak) and Lincoln Street (AM peak). Local and regional pedestrian and bicycle facilities exist within the corridor as well. The southern terminus of the study area, located near the convergence of Santa Fe Drive, I-25, and Broadway, is one of the region's major junctions of current and future modal activities. Preservation and/or enhancement of these multimodal facilities must be considered with corridor enhancements.

1.4.3.1 LIGHT RAIL TRANSIT

RTD is currently constructing and implementing the southern portion of the LRT component of the MetroVision transit network. LRT is now in operation along Santa Fe Drive from Mineral to downtown Denver via the southerly access along California and Stout Streets or the Central Platte Valley spur connection to Denver Union Station. The 16th Street shuttle provides a distribution of downtown transit ridership from both buses and LRT. The T-REX project is currently constructing the LRT segment along I-25 from the I-25 and Broadway station south to Lincoln Avenue in Douglas County.

The planning process is continuing for development of the regional transit network. RTD's current FasTracks plan includes improvements to the Central Corridor and Central Platte Valley LRT lines to improve access into Downtown Denver. Within the Valley Highway project area, FasTracks includes modification of existing LRT stations to accommodate four-car trains and the construction of two additional tracks between Broadway and Alameda Avenue. The Valley Highway Project will need to consider these planned LRT improvements, such that they are complemented and not precluded.



North

Study Area Transit System

Valley Highway - Logan to 6th Ave. Environmental Impact Statement (EIS)

Figure 1-4

A transit oriented development is in the planning stages for the area in and around the I-25 and Broadway station. Future development footprints and associated local street modifications may require redefining the access at I-25 and Broadway. Coordination between planning efforts in this area is described in **Section 2.5.**

1.4.3.2 RTD PARK -N- RIDE ACCESSIBILITY

Two park-n-Rides exist within the study corridor – the I-25 and Broadway park-n-Ride and the Alameda park-n-Ride. The I-25 and Broadway park-n-Ride is accessed through a bus only entrance at Ohio, north of the interchange, and a full movement bus and auto access at Kentucky and Broadway, south of the interchange. Internal to the park-n-Ride, a ”kiss-n-Ride” area is provided and surface parking is available under, as well as south and north of the I-25 viaduct. Pedestrian accessibility is provided via sidewalks along Broadway, Ohio, and Kentucky. Access and internal circulation is inefficient with numerous modal conflict points. Bus access is limited to inbound only and shared outbound leading to operational difficulties.

Upon completion of the Southeast Corridor LRT as part of T-REX, RTD will modify their regional and local bus service including the I-25 and Broadway transit station. This will require redefinition of the bus access route from/to Broadway and a reconfiguration of available parking layouts for the park-n-Ride portion of the station to adjust for construction of the new Broadway viaduct.

The Alameda park-n-Ride is located south of Alameda along Cherokee Street. It provides a “kiss-n-Ride” location with limited parking availability. The station is accessed via automobile and bus principally through the signalized intersection at Alameda and Cherokee Streets although there is connectivity to Broadway through the shopping complex directly to the east. Pedestrians access the park-n-Ride via sidewalks along Cherokee Street. The limited on-site parking leads to overflow parking on Cherokee Street and illegal parking within the shopping center to the east. Connectivity with the I-25 and Broadway park-n-Ride, just to the south, is restricted by gates and fencing thereby limiting shared parking and station access between the two. This loads the intersection at Alameda and Cherokee or requires cut-through access to Broadway to the east.

1.4.3.3 BUS / HOV LANES

The bus/HOV lane component of the *2025 Regional Transportation Plan* includes the existing bus lanes on Broadway and Lincoln Street between I-25 and Downtown Denver and the bus/HOV lanes on Santa Fe Drive south of I-25.

The existing bus/HOV lanes in the left lanes of Santa Fe Drive are restricted only during peak-hour periods and integrate with general purpose lanes south of the I-25/Broadway area near Santa Fe Drive and Mississippi Avenue. The peak period bus-only lanes along Broadway/Lincoln Street are offered as parking lanes in the evenings along residential stretches.

For the project corridor, the function of the Santa Fe Drive HOV lanes needs appropriate definition at the confluence with the Valley Highway project. The transition to achieve connectivity with the general purpose lanes feeding into I-25 needs to be considered in the

interchange configuration evaluation of Santa Fe Drive with I-25. Buses and high occupancy vehicles also need access to the intermodal facility at Broadway.

1.4.3.4 BICYCLE AND PEDESTRIAN MOBILITY

Pedestrian and bicycle facilities occur sporadically in the project corridor. The highway, South Platte River, and rail corridor act as barriers to east-west mobility through the corridor while reasonable north-south mobility is offered via the Platte River trail and local street systems. Key components of the existing system include:

- The South Platte River Trail: The South Platte River Trail is a vibrant regional trail that offers both commuter and recreational bicycle and pedestrian mobility north and south through the metropolitan area. The trail starts at Chatfield Reservoir in Jefferson and Douglas Counties in the southern metropolitan Denver area and parallels the South Platte River through the City of Denver. Through the project corridor, it is generally adjacent to the South Platte River channel with connections to local streets at Mississippi Avenue and Alameda Avenue. The trail is a major destination for residents from adjacent neighborhoods east and west of the highway.

  Connections to the trail are problematic at Alameda Avenue due to steep grades and tight radius switchback turns. The low clearance under the US 6 bridge at the South Platte River is a challenge to maneuver under and is dark and uninviting.

- East-West Connectivity: East-west connectivity is limited through the project area. Two principal crossings of I-25 exist – Alameda Avenue and US 6. US 6 is a high-speed urban freeway and is not conducive for bicycle and pedestrian use. Alameda Avenue is the only east-west crossing of I-25 that offers bicycle/pedestrian accommodations within the project corridor. Sidewalks are narrow under the existing railroad crossing east of Santa Fe Drive. Crossing the one-way pair arterial streets of Santa Fe Drive and Kalamath Street at grade is difficult and intimidating for bicyclists, and pedestrians. Numerous accidents have occurred at these crossings. Alameda Avenue also serves as access to the Alameda RTD park-n-Ride station east of I-25 and the LRT system.
- At Broadway and I-25, east-west connectivity to the RTD park-n-Ride is a challenge. Ohio Avenue is designated as a neighborhood bike and pedestrian route providing access to the Broadway retail district and the transit station at the Broadway park-n-Ride. Crossing the high speed, unsignalized I-25 off ramp at Ohio Avenue is problematic for pedestrians and bicyclists, while sight distance restrictions at Broadway make the signalized crossing equally as difficult.
- Santa Fe Drive / Kalamath Street Pedestrian Facilities: Sidewalks occur sporadically along Santa Fe Drive and Kalamath Street through the project limits. North of Alameda Avenue 5-foot sidewalks are generally available on one or both sides of Santa Fe Drive and Kalamath Street. South of Alameda Avenue, there are no pedestrian provisions.

1.4.4 Safety

The freeway corridor accident history was evaluated for the three-year period from January 1, 1999 to December 31, 2001, and a *Traffic Safety Report* was prepared (CDOT, 2005). A total of 3415 accidents were reported in the three-year period and eight of them were fatal. A review of accident data reveals that rear-end and sideswipe accidents are predominant both on I-25, US 6, and at the interchanges. Further analysis reveals that this segment of I-25 is experiencing a greater frequency and severity of accidents than would be expected for facilities of this type with this volume of traffic. These accidents can be related to congestion, recurrent and frequent queuing, close interchange spacing, and the substandard geometric characteristics of I-25.

1.4.5 Roadway Deficiencies

The Valley Highway portion of I-25 was planned prior to enactment of the Federal-Aid Interstate Highway Program. Design features were developed using traffic volume projections, geographic constraints, cost considerations, and design criteria of the early 1950s. Consequently, the mainline and ramp configurations by today's standards have substandard geometrics and design features and non-standard interchange configurations that do not meet today's driver expectancy. In addition, several existing roadway structures within the project area are nearing the end of their useable life. The deteriorating condition of the structures, with increasing maintenance and repair requirements, point to the need to replace the structures in the near term.

Additional deficiencies within the project corridor include substandard lane widths, inadequate sight distances, and inadequate shoulder widths, all of which reduce relative levels of safety and restrict the smooth operation of vehicles. Geometric deficiencies at the Broadway interchange include inadequate shoulder widths, sight distance deficiencies, substandard taper lengths, and minimum curve radii. Similar deficiencies exist at the Alameda Avenue and Santa Fe Drive interchanges. Roadway deficiencies are also present at arterial street intersections directly adjacent to the interchanges at Broadway, Alameda Avenue, and Federal Boulevard.

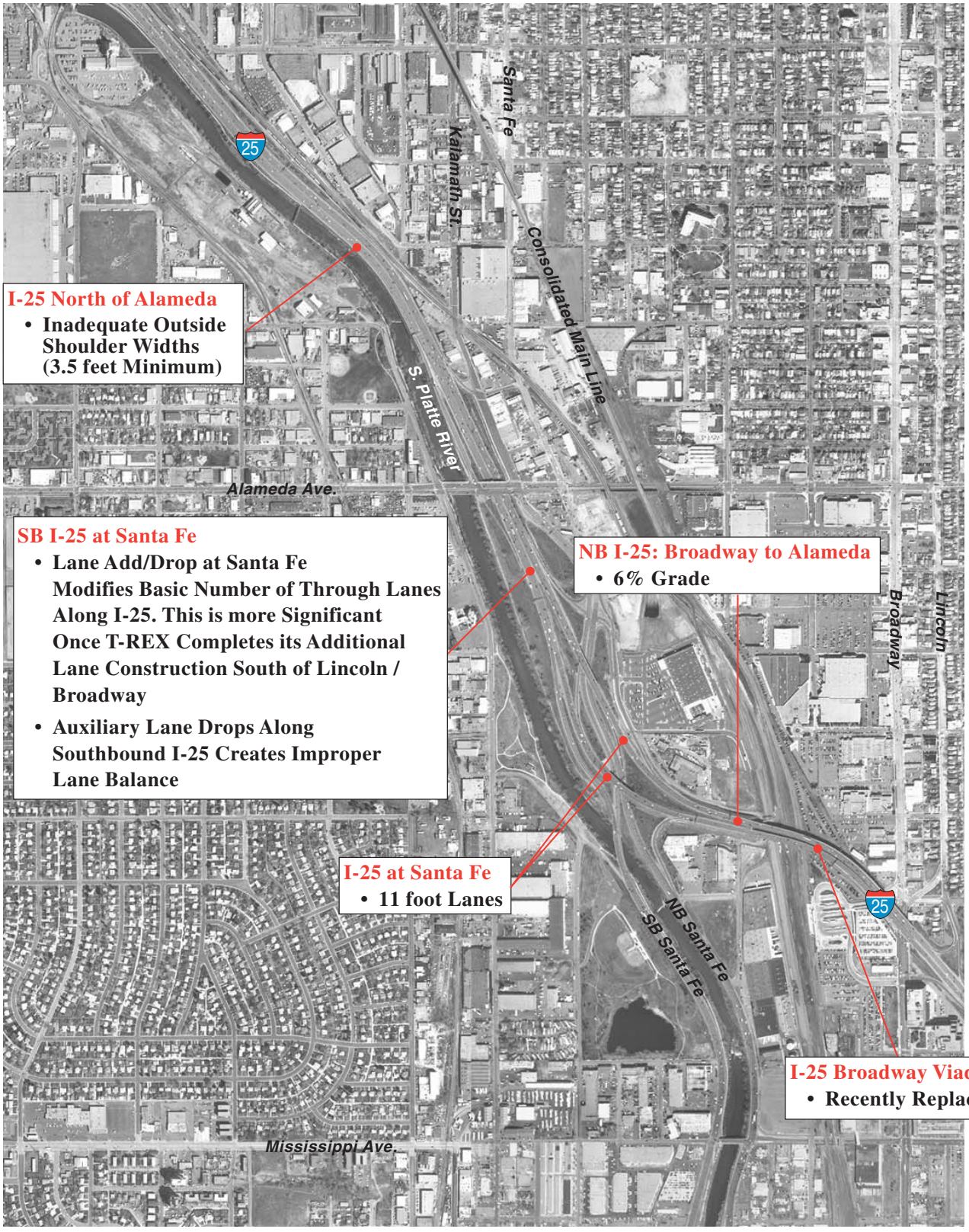
In addition to geometric deficiencies, several other factors contribute to the need to reconfigure the Broadway interchange. These include: integration of LRT from the T-REX project, bus access consideration by RTD, the existing need for enhanced pedestrian connectivity to the RTD park-n-Ride, and land use changes.

Left-hand on- and off-ramps tying to the expressway facility at Santa Fe Drive create merge and weave conditions that exacerbate current capacity and flow problems of the I-25 mainline. The I-25/Santa Fe Drive structures were built in the late 1950s and are showing signs of distress, as evidenced by exposed reinforcing steel and spalling concrete. The structures are currently sufficiency-rated at 38.4 (out of a possible 100) for southbound and 34.9 for northbound. For reference, the existing Broadway viaduct was replaced for similar reasons. Prior to replacement, the Broadway viaduct northbound structure had a sufficiency rating of 23.6 and the southbound structure had a sufficiency rating of 6.

The I-25/Alameda Avenue bridge structure has limitations in that sidewalks across the bridge are narrow and the length limits the ability for adequate acceleration of northbound on-ramps or the ability to provide continuous auxiliary lanes southbound. The sump created on I-25 under the bridge is frequently flooded during major storm events.

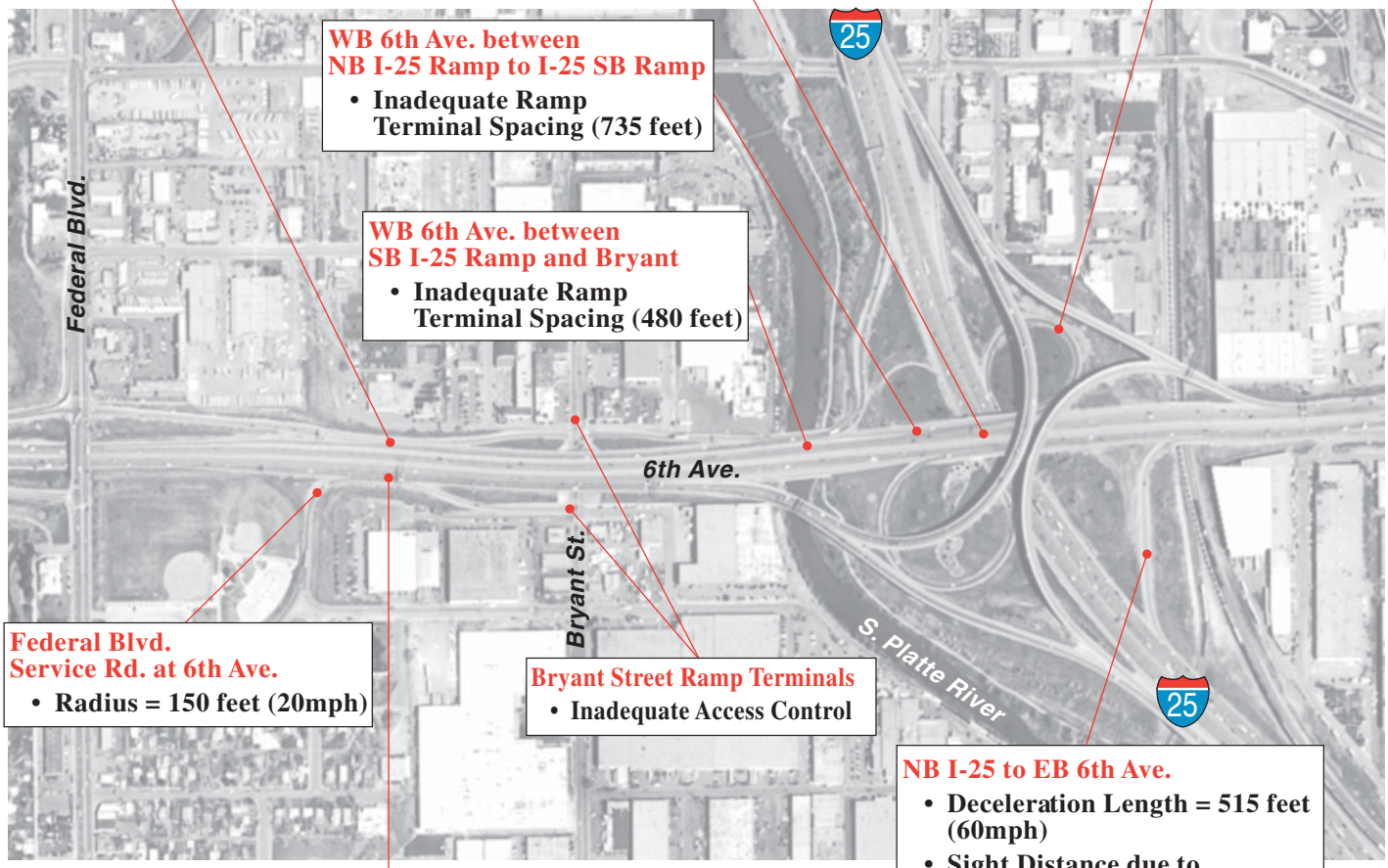
Along eastbound and westbound US 6, weave lengths between Federal Boulevard, Bryant Street, and I-25 are severely deficient. These weave lengths would need to be increased to provide safer vehicle movements among these access points. The US 6 bridge over the South Platte River is subject to flood water flows overtopping the bridge during a major (100-year) storm event.

Roadway deficiencies are highlighted on **Figures 1-5** through **1-9. Table 1-1** outlines deficiencies compared to current design standards. These design standards are the minimum standard currently applied as adopted by CDOT in agreement with FHWA.



North

Mainline I-25 Geometric Deficiencies



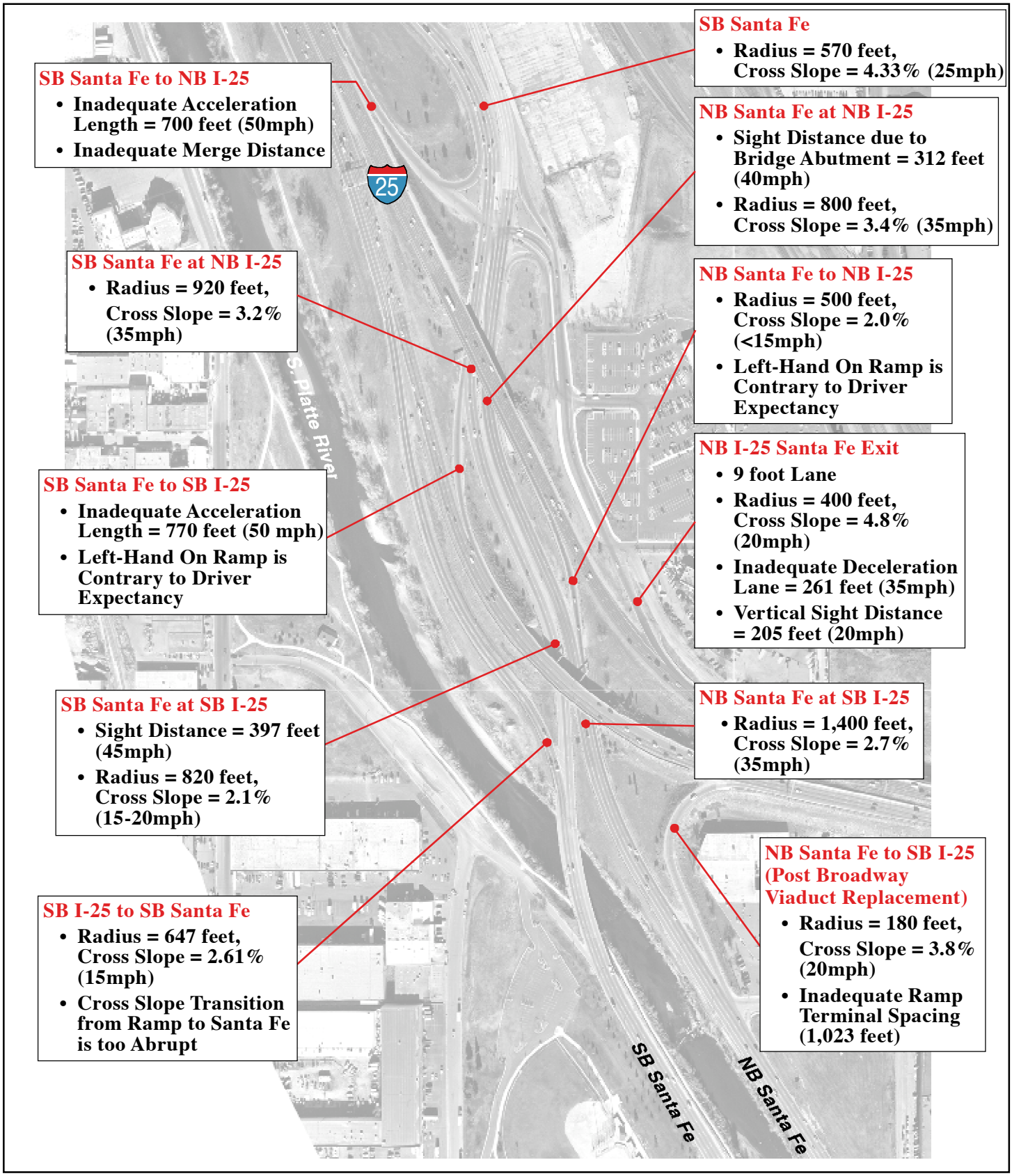
North

I-25 / 6th Avenue Geometric Deficiencies

Figure 1-6

North

I-25 / Broadway Interchange Geometric Deficiencies



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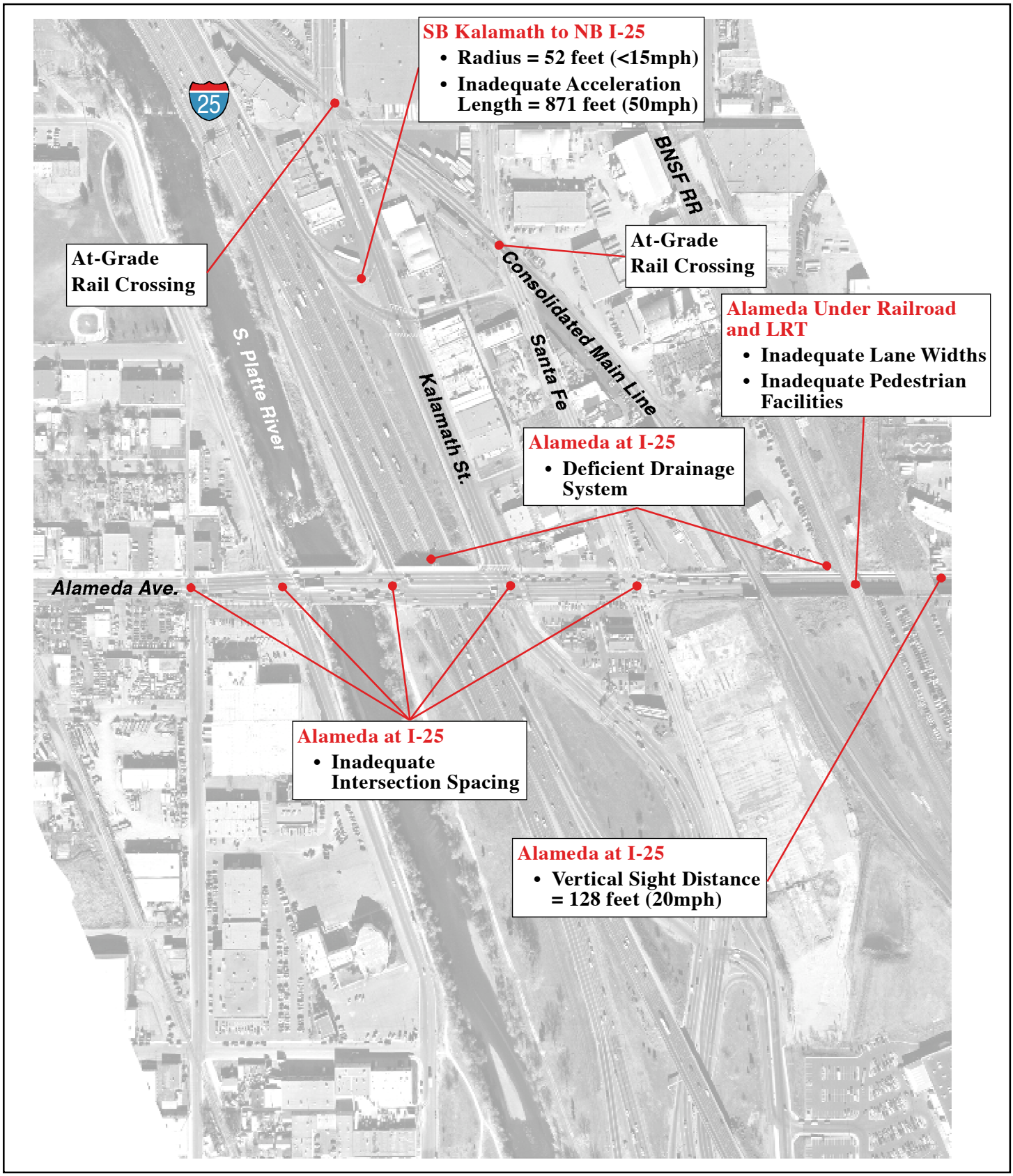
I-25 / Santa Fe Drive Geometric Deficiencies



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I-25 / Alameda Avenue Geometric Deficiencies

Table 1-1 Comparison of Roadway Deficiencies and Current Design Standards

Design Criteria	Existing Facility	Current Criteria	Comment
I-25 Mainline (refer to Figure 1-5):			
Lane Widths	11-foot lanes	12-foot lanes	12 feet lanes provide desirable clearances between larger vehicles. Narrow lanes force drivers to operate their vehicles closer to each other than normally desired, which affects the level of service of highway. The resultant erratic operation has an undesirable effect.
Shoulder Widths	Inside varies from 0–12 feet, Outside varies from 0–10 feet	Inside 10 feet–12 feet Outside 12 feet	Heavily traveled high-speed highways and highways carrying large numbers of trucks, such as I-25, should have useable shoulders at least 10–12 feet so a stopped vehicle on the shoulder clears the edge of traveled way by at least 1–2 feet. Narrow shoulders affect the level of service of highway.
Ramp Terminal Spacing	Washington Street to Lincoln Street – 1455 feet	1600 feet	Lane length between entrance at Washington Street and exit to Lincoln Street is too short for vehicles to accelerate and weave with vehicles on I 25 exiting subsequent off-ramp. Distance is not adequate for these maneuvers.
Basic Number of Lanes	Post T-REX and Broadway Viaduct Project, 4 lanes in each direction south of Santa Fe Drive exit; 3 lanes in each direction through the Santa Fe interchange; 4 lanes in each direction north of Santa Fe Drive to US 36.	4 lanes	A basic number of lanes should be maintained over a significant length along any route of arterial character. This becomes significant with completion of an 8-lane section south of Santa Fe creating a 6-lane bottleneck at Santa Fe.
Lane Balance	Lane Drop / Add at Santa Fe Drive		To achieve efficient traffic operation through and beyond an interchange, there should be a balance of the number of traffic lanes on the highway and on the ramp. This balance is determined through guidance published in the AASHTO guide.
Grade	6 percent on NB from Broadway to Alameda Avenue	4 percent Max	In urban areas where interchanges are closely spaced and frequent speed changes are needed, the use of flat grades is desirable.

Table 1-1 Comparison of Roadway Deficiencies and Current Design Standards *(Continued)*

Design Criteria	Existing Facility	Current Criteria	Comment
I-25 / US 6 Interchange and US 6 Mainline (refer to Figure 1-6):			
Stopping Sight Distance	NB I-25 to EB US 6 – 110 feet (15 mph)	200 feet (30 mph)	The stopping sight distance is the sum of the distance traversed during the brake reaction time and the distance to brake the vehicle to a stop. If obstructions occur within the distance of lower design speeds, the odds of vehicle accidents increase.
Curve Radius (Horizontal Curves) and Cross Slope	NB I-25 to EB US 6 – 380 feet, 2.2 percent (<15 mph) 150 feet, 5.5 percent (<15 mph) NB I-25 to WB – 135 feet, 6.8 percent (15 mph) Federal Boulevard Service Road 150 feet (20 mph)	30 mph design speed: Min. radius of 250 feet with 8 percent cross slope, or 380 feet with 7.1 percent cross slope, etc.	Design speed through curves is a function of the curve radius and cross slope. AASHTO provides various design elements in tables based on cross slope and design speeds.
Acceleration Lanes	NB I-25 to EB US 6 – 394 feet (45 mph)	546 feet	Inadequate acceleration lanes require vehicles to merge into traffic at a speed less than what vehicles will likely be traveling (design speed).
Ramp Terminal Spacing on US 6	NB I-25 Ramp / US 6 Collector – 700 feet NB I-25 Ramp / SB I-25 Ramp – 735 feet SB I-25 Ramp / Bryant Street – 480 feet Bryant Street / Federal Boulevard – 700 feet Bryant Street / Federal Boulevard – 300 feet	1600 feet 800 feet 1600 feet 1600 feet 1600 feet	The length of the ramp terminal spacing is determined by the type of ramps in the pair and the weaving potential. The 1600 feet distance is required when an entrance ramp is followed by an exit ramp, while 800 feet is required between two entrance ramps. The distances are required to allow for weaving of vehicles.
I-25 / Broadway Interchange (see Figure 1-7):			
Curve Radius (Horizontal Curves) and Cross Slope	Lincoln Street at Ohio Avenue – 150 feet (20 mph) Lincoln Street N. of Ohio Avenue – 280 feet (25 mph) NB I-25 On Ramp – 114 feet, 1.76 percent (15 mph) SB I-25 On-Ramp – 150 feet, 8 percent (20 mph)	Lincoln Street, 40 mph design speed: Min. radius of 565 feet with 4 percent cross slope. Ramps, 30 mph design speed: Min. radius of 250 feet with 8 percent cross slope.	Drivers doing posted speed through curves which do not follow established guidelines, are too tight, or do not have the correct cross-slope and the vehicle may skid toward outside of curve or be unable to maneuver the curve and lose control of the vehicle.
Shoulder Widths	NB I-25 On-Ramp – 0 feet	6 feet outside, 4 feet inside	Ramps are turning roadways and if the shoulders are not at least 10 feet (combined right and left), the roadway width would need to be increased to account for the turning movements.
Stopping Sight Distance	Lincoln Street at I-25 due to East Building – 116 feet (20 mph) NB I-25 On-Ramp – 103 feet (20 mph)	Lincoln Street – 305 feet (40 mph) Ramp – 200 feet (30 mph)	The stopping sight distance is the sum of the distance traversed during the brake reaction time and the distance to brake the vehicle to a stop. If obstructions occur within the distance of lower design speeds, the odds of vehicle accidents increase.

Table 1-1 Comparison of Roadway Deficiencies and Current Design Standards *(continued)*

Design Criteria	Existing Facility	Current Criteria	Comment
I-25 / Santa Fe Drive Interchange (see Figure 1-8):			
Curve Radius (Horizontal Curves) and Cross Slope	NB Santa Fe Drive Ramp to SB I-25 – 185 feet (25 mph) NB Santa Fe Drive at SB I-25 – 1400 feet, 2.7 percent (35 mph) NB Santa Fe Drive at NB I-25 – 800 feet, 3.4 percent (35 mph) NB I-25 Santa Fe Drive Off-Ramp – 400 feet, 4.8 percent (20 mph) NB Santa Fe Drive to NB I-25 – 500 feet, 2.0 percent (<15 mph) SB Santa Fe Drive – 570 feet, 4.3 percent (25 mph) SB Santa Fe Drive at NB I-25 – 920, 3.2 percent (35 mph) SB Santa Fe Drive at SB I-25 – 820 feet, 2.1 percent (20 mph) SB I-25 to SB Santa Fe Drive – 647 feet, 2.6 percent (15 mph)	Santa Fe Drive, 50 mph design speed – Min. radius of 930 feet with 4 percent cross slope. Ramps, 30 mph design speed – Min. radius of 250 feet with 8 percent cross slope.	Drivers doing posted speed through curves which do not follow established guidelines, are too tight, or do not have the correct cross slope may skid toward outside of curve or be unable to maneuver the curve and lose control of the vehicle.
Acceleration Lanes	SB Santa Fe Drive to NB I-25 – 700 feet (50 mph) SB Santa Fe Drive to SB I-25 – 770 feet (50 mph)	1020 feet (60 mph) 910 feet (60 mph)	Inadequate acceleration lanes require vehicles to merge into traffic at a speed less than what vehicles will likely be traveling (design speed).
Deceleration Lanes	NB I-25 Santa Fe Drive Off-Ramp – 261 feet (35 mph)	516 feet (60 mph)	Causes excessive braking or backup onto I-25 because braking will take place earlier than the exit.
Ramp Terminal Spacing	NB Santa Fe Drive Ramp to SB I-25 / Broadway Off-Ramp – 1023 feet	1600 feet	The length of the ramp terminal spacing is determined by the type of ramps in the pair and the weaving potential. The 1600 feet distance is required when an entrance ramp is followed by an exit ramp. Lane length between entrance at Santa Fe and exit to Broadway is too short for vehicles to accelerate and weave with vehicles on I-25 exiting subsequent off-ramp. Distance is not adequate for these maneuvers.
Stopping Sight Distance	NB Santa Fe Drive at NB I-25 Bridge Abutment – 312 feet (40 mph)	570 feet (60 mph)	The stopping sight distance is the sum of the distance traversed during the brake reaction time and the distance to brake the vehicle to a stop. If obstructions occur within the distance of lower design speeds, the odds of vehicle accidents increase.

Table 1-1 Comparison of Roadway Deficiencies and Current Design Standards *(continued)*

Design Criteria	Existing Facility	Current Criteria	Comment
I-25 / Santa Fe Drive Interchange (see Figure 1-8):continued			
Vertical Sight Distance	NB I-25 Santa Fe Drive Off-Ramp – 205 feet (20 mph)	200 feet (30 mph)	Minimum vertical curves are established to make sure that the driver can see an object in enough time to stop. If this object is out of sight due to a curve that is too small, an accident is more likely to occur.
Left-Hand On-Ramp	NB Santa Fe Drive to NB I-25 SB Santa Fe Drive to SB I-25	Right-hand on-ramps	Slower speed traffic from ramps traditionally merges with the slower moving mainline highway lanes on the right. It is therefore contrary to current driver's expectation that they merge with the higher speed left-hand lanes as currently occurs.
Cross Slope	SB I-25 to SB Santa Fe Drive Ramp – not sufficient runout lengths between reverse curves, too abrupt	4 percent with proper runout lengths	Having insufficient runout lengths within reverse curves can cause a roller coaster effect. This, along with merging with Santa Fe traffic at 50 mph, has caused tractor trailers to overturn.
I-25 / Alameda Avenue Interchange (see Figure 1-9):			
Curve Radius (Horizontal Curves)	SB Kalamath Street to NB I-25 – 52 feet (<15 mph)	Ramps, 30 mph design speed – Min. radius of 250 feet with 8 percent cross slope.	Drivers doing posted speed through curves which do not follow established guidelines, are too tight, or do not have the correct cross-slope may skid toward outside of curve or be unable to maneuver the curve and lose control of the vehicle.
Intersection Spacing	310 feet – 360 feet	450 feet-600 feet	Adequate intersection spacing is necessary for the efficient operation of the traffic and provides necessary space for queuing, turning, and lane changes.
Stopping Sight Distance (Vertical Curves)	Alameda Avenue – 128 feet (20 mph)	305 feet (40 mph)	Minimum vertical curves are established to make sure that the driver can see an object in enough time to stop. If this object is out of sight due to a curve that is too small, an accident is more likely to occur.
Lane Widths	Alameda Avenue Under Railroads / LRT – 10 feet	11 feet	11-foot lanes provide desirable clearances between larger vehicles. Narrow lanes force drivers to operate their vehicles closer to each other than normally desired, which affects the level of service of highway. The resultant erratic operation has an undesirable effect on driver comfort and crash rates.
Acceleration Lane	SB Kalamath Street to NB I-25 – 871 feet (50 mph)	1140 feet (60 mph)	Inadequate acceleration lanes require vehicles to merge into traffic at a speed less than what vehicles will likely be traveling (design speed).

AASHTO – American Association of State Highway and Transportation Officials
EB – eastbound
LRT – light rail transit
SB – southbound
mph – miles per hour
NB – northbound
WB – westbound

1.4.6 Consolidated Main Line Railroad Crossing at Santa Fe Drive and Kalamath Street

The one-way arterial street pair of Santa Fe Drive and Kalamath Street crosses the Consolidated Main Line railroad at-grade north of Alameda Avenue. This causes periods of substantial congestion as traffic queues and/or diverts to neighborhood streets while waiting for the train to cross the intersections. In addition, access to the existing northbound I-25 on ramp at Cedar Avenue and Kalamath Street is restricted when trains are present.

The Santa Fe Drive and Kalamath Street one-way couplet crosses the Consolidated Main Line tracks approximately ¼ mile north of Alameda Avenue. Bayaud Avenue connects Santa Fe Drive and Kalamath Street and crosses the main line tracks just east of Kalamath Street. These crossings are protected by signals, bells, and gating. Santa Fe Drive and Kalamath Street are principal north-south oriented arterial streets that carry automobile traffic to/from Downtown Denver to/from points southwest of the metropolitan area. The Consolidated Main Line railroad is the principal north-south freight rail route in and out of Denver. The Burlington Northern and Santa Fe Railroad and the Union Pacific Railroad operate in this corridor, principally transporting coal from the Powder River Basin of Wyoming to customers in Oklahoma and Texas.

There is a history of train and automobile accidents at the crossing. From 1975 to the present there have been seven train/automobile accidents at the Santa Fe Drive crossing – all involving property damage without injury or death. There have been 15 accidents at the Kalamath Street crossing – all involving property damage and three involving injuries with no fatalities.

Current and future traffic on each of these systems are shown in **Table 1-2.**

Table 1-2 Current and Future Traffic at the Consolidated Main Line

System	Current Average Daily Traffic	Projected (2025) Average Daily Traffic
Kalamath Street (vehicles per day)	14,800	22,700
Santa Fe Drive (vehicles per day)	15,000	19,300
Consolidated Main Line (trains)	60	60 [a]

[a] Future train volumes are uncertain. Current traffic has been noted.

The City and County of Denver has long considered this crossing a priority for grade separation. The traffic volumes on Kalamath Street and Santa Fe Drive are among the largest volumes of traffic crossing the Consolidated Main Line railroad in Denver. As a result, these are listed as the highest priority railroad grade-separation projects in the *Denver Citywide Railroad Study and Plan* (City and County of Denver and CRSS Civil Engineers, 1992a).

Exposure factor is a measure used to assess the conflict and resulting safety risk associated with a road crossing a railroad at grade. The exposure factor is computed using the following equation:

Exposure Factor = Average Daily Traffic Volume x Average Daily Number of Trains

The Colorado Public Utilities Commission uses a minimum criteria exposure factor of 75,000, actual or projected, at urban locations to warrant grade separation cost allocation (Colorado Public Utilities Commission, 2003). **Table 1-3** identifies current and future exposure factors at the Consolidated Main Line. This calculation shows that both Kalamath Street and Santa Fe Drive currently have exposure factors that are more than ten times those that warrant consideration of grade separation.

Table 1-3 Current and Future Exposure Factors at the Consolidated Main Line

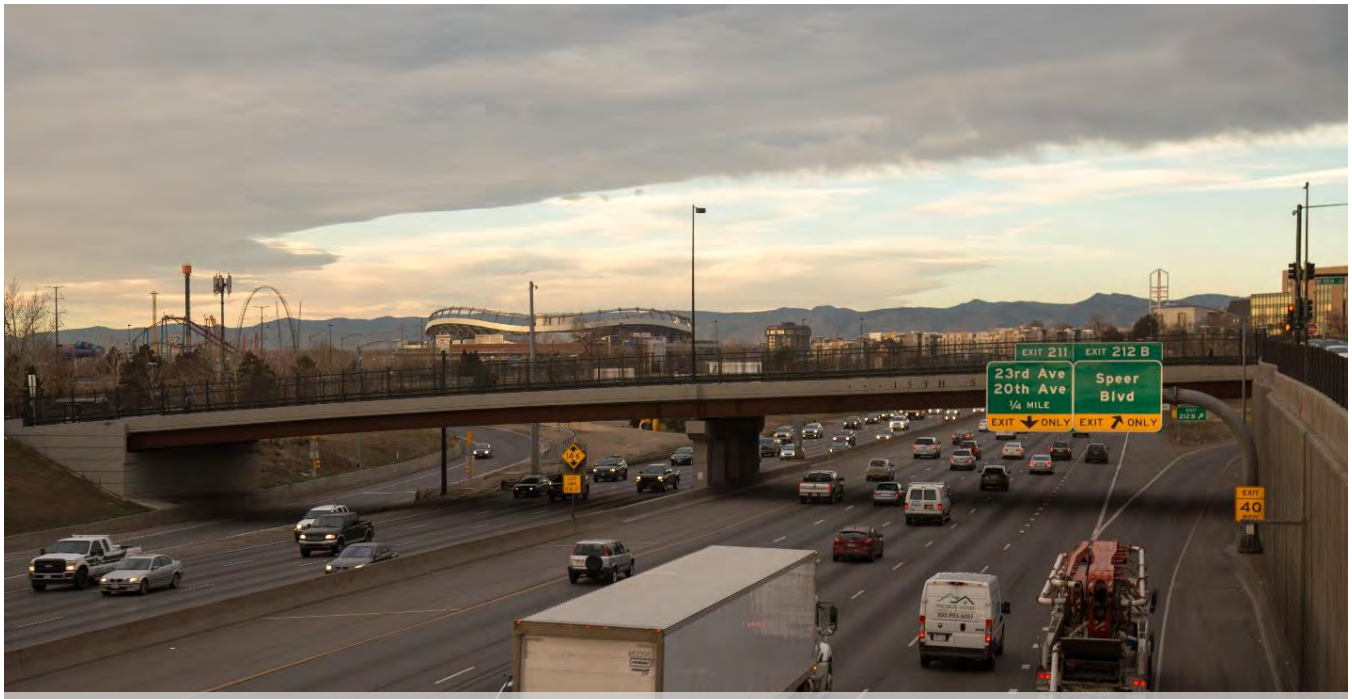
Crossing	Current Exposure Factor	Future Exposure Factor [1]
Kalamath Street Crossing	888,000	1,362,000
Santa Fe Drive Crossing	900,000	1,158,000

[1] Future exposure factors have assumed current daily train traffic.

The crossing also meets FRA conditions for consideration of a grade separation, with an estimated 310 vehicle-hours of delay based on current conditions, compared with the FRA's threshold of 40 vehicle hours of delay (FRA, 2002).

Effects on traffic operations associated with the Kalamath Street and Santa Fe Drive Consolidated Main Line railroad crossings are summarized below. Additional detail is provided in **Chapter 3** *Transportation Analysis*.

- Vehicle Delay: Based on the current number of train movements and the traffic volumes on Kalamath Street and Santa Fe Drive, there is an estimated 310 vehicle hours of delay per day caused by trains blocking the two roads.
- Queuing Effects: Queues (vehicles waiting) that would form on northbound Santa Fe Drive when the street is blocked by a 95-car coal train crossing during the AM peak period are estimated to extend approximately 1325 feet under current conditions and approximately 1600 feet under forecasted year 2025 conditions. The available storage distance on Santa Fe Drive between the Consolidated Main Line railroad and Alameda Avenue is approximately 880 feet. Therefore, peak period vehicle queues currently exceed the available storage length by more than 400 feet and are projected to exceed available storage by more than 700 feet in the future. Thus, train movements that occur during peak traffic periods have the effect of not only delaying Santa Fe Drive and Kalamath Street traffic, but also of severely impacting operations on Alameda Avenue.
- Other Transportation Modes: In addition to general vehicular effects, other modes of travel are also affected by delays associated with the at-grade railroad crossings. Bicycles and pedestrians experience the same delays and accident exposure as motor vehicles, and bicyclists particularly are affected by the railroad crossing surface. Emergency services vehicles, RTD buses and school buses either experience delays or avoid Kalamath Street and Santa Fe Drive due to the unpredictability of travel times



I-25 Central PEL

Existing Conditions Assessment

I-25 Central

Planning and Environmental Linkages (PEL) Study

COLORADO
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Region 1

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Contents

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Acronyms

AAI	All Appropriate Inquiry
AASHTO	American Association of State Highway and Transportation Officials
ACS	American Community Survey
ADT	average daily traffic
APCD	Air Pollution Control Division
AQCC	Air Quality Control Commission
BFE	Base Flood Elevation
BID	Business Improvement District
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe
CAFE	Corporate Average Fuel Economy
CDLE	Colorado Division of Labor and Employment
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	Colorado Geological Survey
CNHP	Colorado Natural Heritage Program
CNI	Choice Neighborhoods Initiative
COBRA	Corridor Operations and Bottleneck Reduction Assistance
CPW	Colorado Parks and Wildlife
CRECs	Controlled Recognized Environmental Conditions
CRHP	Colorado Register of Historic Places
CRS	Colorado Revised Statutes
dB	decibel
Denver	City and County of Denver
DHA	Denver Housing Authority
DOI	U.S. Department of the Interior
DRCOG	Denver Regional Council of Governments
E. Coli	*Escherichia Coli*
EDP	extended detention pond
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FAC	Freight Advisory Council
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FRA	Federal Railroad Association
GIS	geographical information systems
HCM	Highway Capacity Manual
HRECs	Historical Recognized Environmental Conditions
HSM	Highway Safety Manual
HUD	U.S. Department of Housing and Urban Development

I-10	Interstate 10
I-25	Interstate 25
I-76	Interstate 76
I-90	Interstate 90
I-225	Interstate 225
I-270	Interstate 270
IPA	Interagency Programmatic Agreement
IRI	International Roughness Index
ITS	Intelligent Transportation Systems
LWCF	Land and Water Conservation Fund
µg/m^3	micrograms per cubic meter
MP	Mile Post
mph	miles per hour
MS4	Municipal Separate Storm Sewer System
MSE	mechanically stabilized earth
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NPI	Neighborhood Planning Initiative
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OAHP	Office of Archaeology and Historic Preservation
OD	origin-destination
OPS	Oil and Public Safety
OTIS	Online Transportation Information System
pc/mi/ln	passenger cars per mile per lane
PDO	property damage only
PEL	Planning and Environmental Linkages
PFYC	Potential Fossil Yield Classification
ppb	parts per billion
ppm	parts per million
RCRA	Resource Conservation Recovery Act
REC	Recognized Environmental Condition
RISO	River South
ROD	Record of Decision
ROW	right-of-way
RTD	Regional Transportation District
SAM	Species Activity Mapping
SHPO	State Historic Preservation Office
SOV	single-occupancy vehicle
STP	Strategic Transportation Plan
SVED	Sun Valley EcoDistrict
T-REX	Transportation Expansion
TAZ	traffic analysis zone
TDM	Travel Demand Model

TOD	transit-oriented development
TSMO	Transportation Systems Management and Operations
UDFCD	Urban Drainage and Flood Control District
UPRR	Union Pacific Railroad
US 6	U.S. Highway 6
US 36	U.S. Highway 36
US 85	U.S. Highway 85
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VMS	Variable Message Sign
vpd	vehicles per day
WQCC	Water Quality Control Commission

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Introduction

This Existing Conditions Assessment Report *is the first part of the Planning and Environmental Linkages (PEL) process, presenting the existing conditions along the I-25 Central corridor. This summary will guide the development of subsequent parts of the PEL process and provide the basis for the development of the purpose and need.*

The Colorado Department of Transportation (CDOT) is conducting a PEL study for Interstate 25 (I-25) between Santa Fe Drive/U.S. Highway 85 (US 85) and 20th Street in Denver, Colorado. The purpose of a PEL study is to identify transportation issues, along with environmental concerns, on a specific corridor. These studies are used to make planning decisions regarding the development and prioritization of transportation improvements.

The PEL process generally is composed of five primary parts:

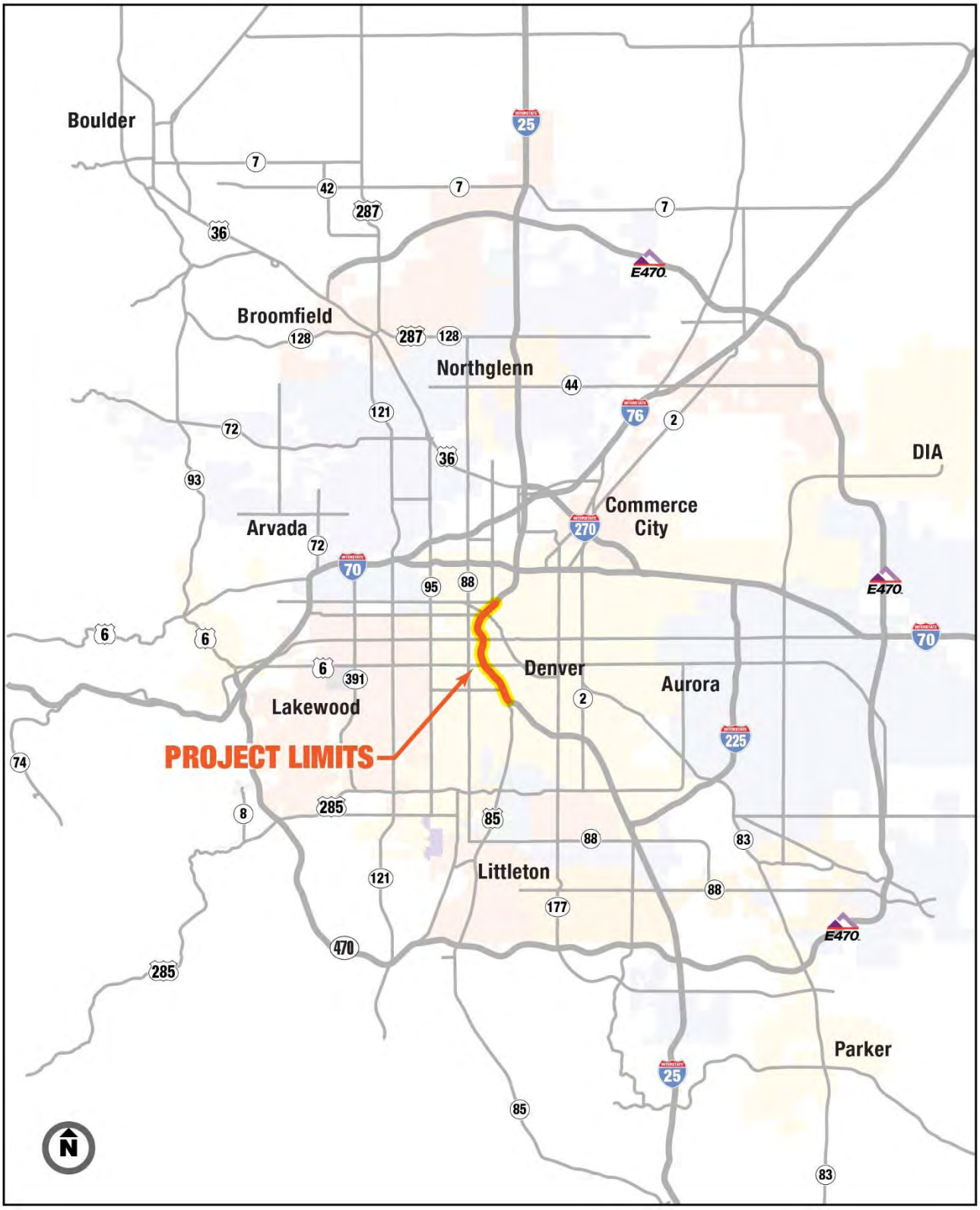
- **Existing conditions** is the first step in the PEL process. This effort analyzes and identifies the key issues along the corridor and the causes of these issues.
- **Purpose and need** is a statement used to guide decisions and it provides the first criterion in the alternatives evaluation process. Goals and objectives also can be defined in addition to the purpose and need. This statement defines the core reasons why the project was initiated.
- **Alternatives development** is the process by which different solutions to the identified issues are generated and packaged together to solve the purpose and need of the project.
- **Alternatives evaluation** is the process used to analyze and refine the different options identified in the alternatives development process. During this process, alternatives can be eliminated, refined, or carried forward into future phases of the PEL process.
- **Project phasing** is the final step in the PEL process, in which different alternatives are selected and project implementation strategies are identified.

This report represents the initial phase of the PEL process and summarizes the existing conditions of the I-25 corridor between Santa Fe Drive/US 85 and 20th Street, hereafter referred to as the I-25 Central corridor. This summary of existing conditions will be used to guide the development of the project's purpose and need, goals and objectives, and alternatives.

Study Location and Description

Serving as a vital connection through metropolitan Denver, I-25 is one of the most valuable links in Colorado's transportation system. As the primary north-south regional route, I-25 provides regional and local connections to Denver's businesses, entertainment venues, and residences (Figure 1).

Figure 1. I-25 Regional Location



Beyond Denver, I-25 is a major north-south interstate highway in the western United States and extends from Interstate 10 (I-10) at Las Cruces, New Mexico, to Interstate 90 (I-90) in Buffalo, Wyoming. At a national level, I-25 is designated as Congressional High Priority Corridor No. 27 within the National Highway System. It also is designated as a Western Trade Transportation Network corridor for movement of national and international goods. At an international level, I-25 is part of a transportation trade corridor known as the Camino Real Corridor. This corridor traverses North America from Mexico to Canada.

The I-25 Central PEL study is examining an approximately 4.5-mile-long section of I-25 through Denver from Santa Fe Drive/US 85 to 20th Street (Figure 2).

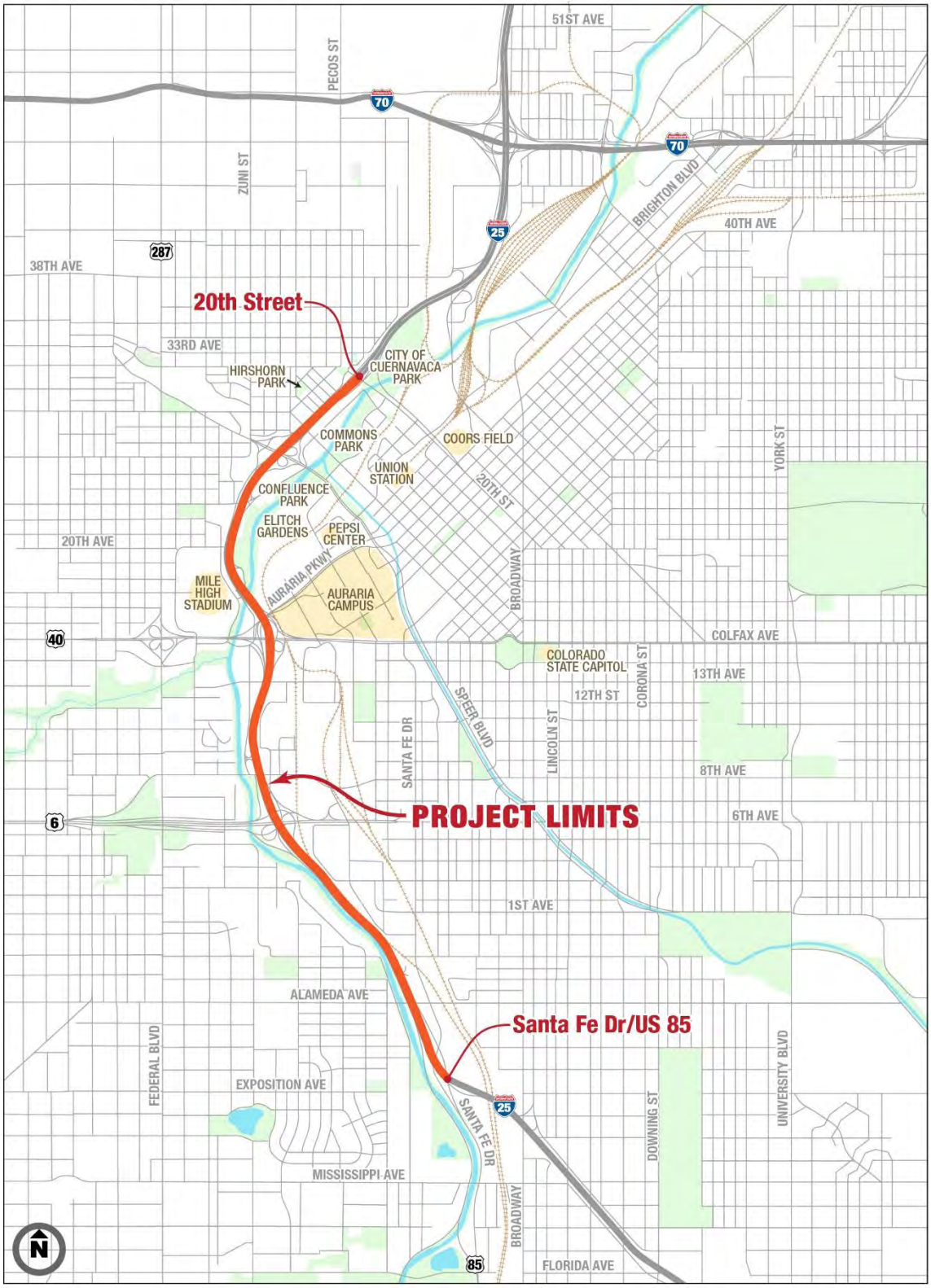
Public and Stakeholder Engagement

The analysis presented within this report includes both quantitative data collected from multiple sources, identified individually in the following sections, as well as qualitative data collected through the stakeholder engagement and public outreach process. The public outreach process conducted during the generation of this report, which will continue throughout this PEL process, engaged numerous stakeholders from a wide range of organizations, including:

- Auraria Campus of Higher Education
- Baker Historic Neighborhood Association
- City and County of Denver (Denver) — Community Planning & Development
- Denver council members Brooks, Clark, Espinoza, Ortega, and Lopez
- Denver Mayor's Office
- Denver—Office of Economic Development
- Denver—Public Works
- CDOT—Colorado Transportation Management Center
- Children's Museum of Denver
- Colfax Business Improvement District (BID)
- Colorado Motor Carriers Association
- Denver Aquarium
- Denver Broncos
- Denver Children's Museum
- Denver Housing Authority
- Denver Metro Chamber of Commerce
- Denver Police Department
- Denver Regional Council of Governments (DRCOG)
- Downtown Denver Partnership
- Elitch Gardens
- Freight Advisory Council (FAC)
- Greenway Foundation
- Highland United Neighbors
- Jefferson Park United Neighbors
- Joshua Station
- La Alma/Lincoln Park Neighborhood Association
- Metropolitan Football Stadium District
- Mile High Ministries
- Pepsi Center
- Regional Transportation District (RTD)
- Sun Valley Community Coalition

These stakeholders are a multi-disciplinary group of individuals representing a wide range of interested organizations and entities, including local, regional, and statewide public agencies; businesses; neighborhoods; community resources; environmental groups; and more.

Figure 2. I-25 Central Corridor PEL Study Limits



Feedback Received To-Date

During the development of this report, these stakeholders, and the general public, were engaged in three primary ways including through one-on-one stakeholder interviews, the project's stakeholder focus group, and the project website. Feedback received from the stakeholders and the general public is summarized thematically below.

Mobility:

- Reduce congestion, especially in and around event venues such as Mile High Stadium.
- Consider options to reduce or remove turbulence on the highway from vehicles merging and weaving.
- Consider the impacts of access changes on neighborhoods, businesses, and event venues.
- Improve multimodal transportation opportunities and connections along and across the interstate.

Safety:

- Provide designs that reduce driver distractions, especially around crashes and incidents along the corridor, and ensure that facilities can accommodate the needs of emergency responders.
- Improve safety for pedestrians and bicyclists.
- Increase the clearances on low bridges.

Neighborhoods:

- Consider the needs and character of surrounding neighborhoods and the people who live there.

Environment:

- Consider noise, air quality, and water quality impacts from the interstate.

Land Use:

- Explore opportunities to reduce the land required for the interstate.
- Consider the potential of contaminated ground around the corridor, especially near the South Platte River and industrial sites.
- Coordinate with ongoing planning efforts around Denver.
- Consider the interstate impacts on economic development opportunities.

Communications and Public Engagement:

- Make sure to include public involvement opportunities when alternatives are ready to be considered.

Timeline:

- Improvements are needed now. There should not be a large passage of time between the study and implementation of improvements.

Stakeholders and the public will continue to be engaged as this study progresses. This includes a continuation of stakeholder interviews, stakeholder meetings, public meetings, and other public feedback opportunities, including opportunities to comment through the project website.

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Transportation Planning Context

Understanding the existing context of the I-25 Central corridor ensures that future decisions made because of this study are congruent with existing visions along the corridor. This section summarizes the historical context of I-25, the existing land use context of I-25, as well as the previously completed and ongoing planning studies and construction activities along the corridor.

The History of I-25 Central

Planning for I-25, also known as the Valley Highway, began in 1944 and early visions of the corridor created a continuous transportation facility capable of carrying traffic efficiently from Greeley, Colorado, to Colorado Springs, Colorado. The portion of I-25 being studied in this PEL, I-25 Central, was the first segment of the new highway and was completed in 1958. This first segment of roadway extended from 48th Avenue (now Interstate 70 [I-70]) in the north to Evans Avenue in the south. Over the next 11 years, I-25 would be extended multiple times until it finally reached from the New Mexico border to the Wyoming border in 1969 (CDOT, 2017b).

Since its completion, the I-25 Central corridor has experienced numerous changes. Initial expansion of the I-25 Central corridor began in the mid-1960s and included widening the highway from its original four lanes of traffic to six lanes. Today, the I-25 Central corridor has eight through lanes—four in each direction—twice as many as when it was first built. Major reconstruction beginning in the late 1980s addressed deficiencies to the north of the I-25 Central corridor, including the I-25/I-70 interchange. In the early 2000s, the Transportation Expansion (T-REX) Project reconstructed and expanded I-25 south of the I-25 Central corridor. Despite the comprehensive improvements to adjacent sections of I-25 Central, little has been done to update the I-25 Central corridor outside of repairing or replacing bridges as they reach the end of their useful lives. Parts of the I-25 Central corridor have retained elements of the original 1940s design, implemented prior to the standardization brought by the 1956 Federal-Aid Highway Act.

Existing Land Use Context

The I-25 corridor between Santa Fe Drive/US 85 and 20th Street is located entirely within Denver, and, consequently, land use planning within the study area is the primary responsibility of Denver. Although located within one jurisdiction, the study area covers a sizable space with numerous neighborhoods and planning districts, many of which have their own neighborhood-scale plans that outline current and future land use within each respective boundary.

To accurately reflect and evaluate the current land use within the study area, I-25 has been divided into three generalized sections. For the purposes of land use analysis, the boundaries of these sections were defined using several factors, including natural and man-made divisions, neighborhood character, land use designations, and logical geographic borders. These are discussed further below.

Section 1: 20th Street to Colfax Avenue

The section of I-25 between 20th Street and Colfax Avenue is a highly developed area and the area of greatest land use diversity, including mixed use, entertainment, cultural, campus, parks, and open space. The most urban segment within the study area, I-25 traverses numerous core urban neighborhoods, including Lower Highlands, Jefferson Park, Auraria, and Mile High Stadium. Given the location within the larger urban core, this section is highly connected to Downtown Denver, community amenities, city attractions, and new development while also providing access to regional pedestrian and bicycle networks. The physical context of I-25 generally is uniform within this section, with a fairly consistent street grid on both sides of the interstate, minimal buffered edges, and a strong link to the South Platte River, which runs roughly parallel to I-25 along the east edge. Development and/or park space divides the two uses. Figure 3 shows an overview of the land uses of this section of I-25.

Progressing north to south along I-25, the adjacent land use begins as largely mixed use on both sides of the interstate, more specifically between 20th Street and Speer Boulevard, where numerous mixed-use developments currently exist and are planned in the future. The mixed-use designation continues along the northwest edge of Speer Boulevard to Colfax Avenue, with an isolated cluster of single-family residential dwellings at the West 23rd Avenue overpass. Mixed use continues along the west edge of I-25 through to 17th Avenue, where the land use designation shifts to entertainment, cultural, and exhibition in line with the location of Mile High Stadium. Along the southeast edge of Speer Boulevard to Colfax Avenue, the land use is primarily campus, entertainment, cultural, and exhibition, with Elitch Gardens, the Downtown Aquarium, the Children's Museum of Denver, the Pepsi Center, and the Auraria Campus dominating the landscape.

Section 2: Colfax Avenue to US 6/6th Avenue

The section of I-25 between Colfax Avenue and US 6/6th Avenue is located within a transitional urban neighborhood and exhibits characteristics of both the urban core and more traditionally suburban neighborhoods. Rapidly changing, with development planned throughout adjacent communities, I-25 passes through Sun Valley and La Alma/Lincoln Park; two traditionally low-density, low-income neighborhoods. Existing land use is largely industrial, with a corresponding street grid that is sizeable but lacks connectivity. Existing light rail and heavy rail to the east creates a physical barrier between industrial land uses and the primary residential areas/main street corridors of La Alma/Lincoln Park. Within this section, the South Platte River continues to run roughly parallel to I-25 along the west edge with a small buffer of development. Figure 4 shows the land uses within this segment.

The land use designations within this section vary along the west and east edges of I-25. Along the west, adjacent land is designated largely transit-oriented development (TOD) within Sun Valley with additional designations, including employment and industrial on adjacent lands. The east edge of I-25 is designated employment and industrial/light industrial and includes a mixture of commercial and warehouse structures with a minimally connected street grid. Note that this area currently is undergoing large-scale changes in land use and is expected to continue to transition from the existing predominantly industrial land uses into more TOD/mixed-used land uses.

Figure 3. Section 1 Land Use—20th Street to Colfax Avenue

Source: Generalized land use categorization as identified in Blueprint Denver, An Integrated Land Use and Transportation Plan (Denver, 2002)

Figure 4. Section 2 Land Use—Colfax Avenue to US 6/6th Avenue

Source: Generalized land use categorization as identified in Blueprint Denver, An Integrated Land Use and Transportation Plan (Denver, 2002)

Section 3: US 6/6th Avenue to Santa Fe Drive/US 85

The section of I-25 between US 6/6th Avenue and Santa Fe Drive/US 85 is farther out from the Downtown core and transitions to more suburban development, running through the neighborhoods of Valverde, Baker, Athmar Park, and Washington Park West. Punctuated to the north with the major interchange at US 6/6th Avenue, the adjacent communities have relatively limited interstate access and connectivity is hindered by the existing light rail that runs to the east. A significant adjacency within this section is the proximity to the South Platte River, which directly borders I-25 along the west edge, the closest of any section within the study area, with minimal to no buffer between the two uses. Additionally, heavy rail runs east along I-25 south of US 6/6th Avenue to West Bayaud Avenue with limited, if any, existing buffer.

Adjacent land use within this section is predominantly designated industrial, with a small portion of mixed-use north of West Bayaud Avenue along South Navajo Street, and the Commercial Corridor along West Alameda Avenue. Large industrial properties dominate the irregular street grid south of US 6/6th Avenue to Bayaud Avenue along the west edge with an anchor of TOD south of West Alameda Avenue at the Broadway Station along the east. Figure 5 shows the land uses within this segment.

Figure 5: Section 3 Land Use—US 6/6th Avenue to Santa Fe Drive/US 85

Source: Generalized land use categorization as identified in Blueprint Denver, An Integrated Land Use and Transportation Plan (Denver, 2002)

Previous Planning Efforts and Studies

Due to the prominence of the I-25 Central corridor to the local, regional, and national transportation network, there have been numerous studies conducted during the past years. Each of these studies has examined a specific element of I-25 or the surrounding corridor. To provide a starting point for this I-25 Central PEL study, these previous studies were reviewed. The list of these studies is included below and organized by the publishing agency.

CDOT Studies

- *I-25 Valley Highway Environmental Impact Statement* (EIS) and *Record of Decision* (ROD) (2006)
- *I-25/US 85 (Santa Fe Drive) Bridge Replacement and Interchange Improvements* (2010)
- *Colorado State Freight and Passenger Rail Plan* (2012)
- *Draft Structure Selection Report, 23rd Avenue Over I-25 and Speer Boulevard Over I-25* (2013)
- CDOT Region 1 Structure Pre-Scoping Reports
  - *23rd Avenue over I-25 Structure Pre-Scoping Report* (2014)
  - *Speer Boulevard over I-25 Structure Pre-Scoping Report* (2014)
- *Intercity and Regional Bus Network Plan* (2014)
- *Interregional Connectivity Study* (2014)
- Corridor Operations and Bottleneck Reduction Assistance (COBRA) Technical Reports
  - *I-25 Northbound On-Ramp at Cedar Avenue* (2016)
  - *US 6 and Southbound I-25 Merge Area* (2016)
  - *I-25 and Mulberry* (2017)

Denver Studies

- *Blueprint Denver* (2002)
- *Baker Neighborhood Plan* (2003)
- *Jefferson Park Neighborhood Plan* (2005)
- *Denver Downtown Area Plan* (2007)
- *Denver Strategic Transportation Plan—Moving People* (2008)
- Denver Station Area Master Plans
  - *Alameda Station Area Plan* (2009)
  - *(10th Avenue and Osage Street) La Alma/Lincoln Park Neighborhood Plan* (2010)
  - *Decatur-Federal Station Area Plan* (2013)
  - *I-25 and Broadway Station Area Plan* (2016)
- *The River South (RISO) Greenway Master Plan* (2010)
- *Denver Moves* (2011)
- *West Side Transit Enhancement Study* (2012)

- *Denver South Platte Corridor Study* (2013)
- *Transit Oriented Denver—Transit Oriented Development Strategic Plan* (2014)
- *Denver Moves: Enhanced Bikeways* (2016)
- *Neighborhood Planning Initiative Strategic Plan* (2016)
- *Denver's Mobility Action Plan 2017*
- *Federal Boulevard Corridor Plan—Opportunities and Implementation Report* (2017)
- *West 13th Avenue Realignment Study* (2017)
- *Denver Downtown Area Plan Amendment, Central Platte Valley—Auraria District* (2018)

Other Studies

- *Cherokee Redevelopment of the Former Gates Rubber Factory—General Development Plan* (2006)
- *Rocky Mountain Rail Authority High-Speed Rail Feasibility Study* (2010)
- *Denver Area Regional Bus Facility Study* (2015)
- *2016 Downtown Denver Commuter Survey* (2016)
- *Auraria Higher Education Master Plan (2017)*

Summary of I-25 Relevant Previous CDOT Studies

Previous CDOT studies with relevant recommendations, plans, or identified improvements specific to the I-25 Central corridor have been summarized below.

CDOT Region 1 Structure Pre-Scoping Report

A pre-scoping study was undertaken to identify potential issues associated with the rehabilitation or replacement of bridge structures at 13 locations throughout CDOT Region 1, which generally includes the counties of Clear Creek, Gilpin, Jefferson, Douglas, Arapahoe, Denver, Adams, and Broomfield. As part of this study, three bridges along the I-25 Central corridor were identified as needing replacement.

The first bridge is the 23rd Avenue bridge over I-25. The replacement of this bridge is recommended due to structural deficiencies and substandard vertical clearance for I-25 traffic. The other two bridges are the Speer Boulevard bridges over I-25. These bridges—one carrying eastbound Speer Boulevard traffic and the other carrying westbound Speer Boulevard traffic—were identified for replacement due to the substandard clearance under the bridges for I-25 traffic, and the substandard bridge width for Speer Boulevard traffic. These three bridges are the only bridges between New Mexico and Wyoming with clearance below 14 feet.

The COBRA Program

The COBRA Program is a CDOT initiative aimed at improving operational deficiencies through simple, relatively low-cost, readily implementable solutions. To this end, three locations on the I-25 Central corridor have had COBRA studies performed.

Cedar Avenue On-Ramp to Northbound I-25

The first COBRA study, performed in 2016, was for the Cedar Avenue (Kalamath Street/Alameda Avenue) on-ramp to northbound I-25. The identified issue at this location was the short ramp spacing between the Santa Fe Drive/US 85 on-ramp and the Cedar Avenue on-ramp. Concepts that were evaluated as part of this COBRA study included:

- Closing the Cedar Avenue on-ramp
- Adding ramp meters to the Santa Fe Drive/US 85 on-ramp
- Adding ramp meters to the Cedar Avenue on-ramp
- Closing the right lane of northbound I-25 south of the Santa Fe Drive/US 85 on-ramp and converting that lane into a longer acceleration lane for both the Santa Fe Drive/US 85 and Cedar Avenue on-ramps
- Relocating the Cedar Avenue on-ramp south of Alameda Avenue and combining the ramp with the Santa Fe Drive/US 85 on-ramp prior to traffic merging with I-25

As part of the reconstruction of the Santa Fe Drive/US 85 on-ramps that was initiated through the *Valley Highway EIS*, ramp meters were added to the Santa Fe Drive/US 85 on-ramp. This COBRA report did not recommend any other concepts for implementation.

US 6 to Southbound I-25 Merge Area

The second COBRA study, performed in 2016, examined the merge location between US 6 and southbound I-25. The issue identified at this location was the driver behavior in which US 6 drivers slow down and attempt to merge into I-25 within the first 100 feet of the painted gore. This results in chronic congestion at this location. Proposed solutions included:

- Extending the solid white striping of the painted gore to encourage drivers to merge onto I-25 farther to the south
- Isolating the merge lane through physical means, such as flexible delineators or barriers, to force drivers to merge farther to the south
- Adding ramp meters to the US 6 ramp
- Braiding the US 6 on-ramp with the southbound I-25 Alameda off-ramp

As a result of this study, the painted gore striping of the merge location was extended an additional 500 feet.

Mulberry Place (8th Avenue) to Northbound I-25

The Mulberry Place on-ramp to I-25 COBRA study, performed in 2017, examined options to improve the ramp conditions and traffic operations at the Mulberry Place (8th Avenue) on-ramp to northbound I-25. The identified issues with this ramp include the short acceleration distance for traffic entering the mainline and the weaving distance between this ramp and the Colfax Avenue and Auraria Parkway off-ramps.

Options identified in the COBRA report to improve this ramp location included:

- Removing the Mulberry Place (8th Avenue) on-ramp to northbound I-25
- Reconstructing the ramp to begin from 8th Avenue instead of Mulberry Place to increase the acceleration distance
- Removing the Mulberry Place (8th Avenue) on-ramp to northbound I-25 and connecting eastbound 8th Avenue to Osage Street, allowing traffic to access northbound I-25 via westbound US 6
- Removing the Mulberry Place (8th Avenue) on-ramp to northbound I-25 and creating a new ramp from Umatilla Street that would connect to the Colfax Avenue ramp before joining the northbound I-25 mainline

The conclusion of this COBRA report recommended completing additional microsimulation traffic analysis for the options before any recommendations for implementation were made.

Although not included as a formal finding of this COBRA study, site visits to this location resulting from this COBRA study have identified an additional issue related to this ramp's configuration. Where the northbound on-ramp connects with the I-25 mainline, there is a break in the guardrail and barrier between the freeway and the local roadway network. Due to this break, northbound vehicles on I-25 are capable of illegally exiting the freeway at this location.

Draft Structure Selection Report, 23rd Avenue Over I-25 and Speer Boulevard Over I-25 (2013)

Because the bridges over I-25 at 23rd Avenue and Speer Boulevard were identified as needing improvement, a structure selection report was created to examine potential options for completing the work. This report identified three broad alternatives to improve the structures, which included:

- Alternative A: Basic preservation measures with some spot repairs to increase the structures' remaining lifespans by approximately 12 years
- Alternative B: More extensive preservation measures and repairs to increase the structures' remaining lifespans by approximately 25 years
- Alternative C: Replacement of the superstructures within the current roadway profile, increasing the structures' lifespans by approximately 60 years

At the conclusion of the study, Alternative A was selected for implementation. This was done with the understanding that it was likely all three bridges would be fully replaced within 12 years of the report's publication. CDOT completed this project in 2015 following the Alternative A rehabilitation recommendations; however, the project was not completely successful because many sections of the bridge deck were not salvageable during construction.

I-25 Valley Highway Environmental Impact Statement and Records of Decision

The Federal Highway Administration (FHWA), in cooperation with CDOT, published the *Valley Highway EIS* in 2006 to assess improvements to portions of I-25 and U.S. Highway 6 (US 6) in south-central Denver. The study also examined improvements to adjacent portions of Santa Fe Drive and Kalamath Street, including the crossing between these streets and the consolidated mainline railroad corridor.

Major elements of the Preferred Alternative identified in the *Valley Highway EIS* include:

- Widening I-25 to provide four through lanes plus auxiliary lanes in each direction from US 6 to Broadway
- Reconfiguring the I-25 and Broadway interchange to be a tight-diamond configuration
- Reconfiguring the I-25 and Santa Fe Drive/US 85 interchange to be a single-point urban interchange with a flyover ramp for northbound US 85 to northbound I-25 traffic
- Reconfiguring the I-25 and Alameda Avenue interchange to be an offset partial urban interchange; Kalamath Street and Santa Fe Drive would become grade separated under the existing consolidated mainline railroad
- Improving the I-25 and US 6 interchange through the reconfiguration of the US 6 and Federal Boulevard and US 6 and Bryant Street ramps

Funding limitations have required CDOT to adopt a phased implementation plan of the *Valley Highway EIS*. To date, this has resulted in two separate RODs being implemented. ROD 1, signed in 2007, initiated improvements around Santa Fe Drive/US 85 and Alameda Avenue. As identified in the DRCOG 2040 Fiscally Constrained Regional Transportation Plan, CDOT is committed to completing improvements identified in ROD 1.

Major elements included:

- Reconstructing the I-25 and Santa Fe Drive/US 85 interchange to be a single-point urban interchange with a flyover ramp for northbound Santa Fe Drive/US 85 to northbound I-25 traffic
- Replacing the southbound Santa Fe Drive/US 85 bridge over the South Platte River
- Reconfiguring Santa Fe Drive and Kalamath Street between I-25 and Alameda Avenue
- Replacing the Alameda Avenue bridge over I-25
- Reconfiguring the interchange at I-25 and Alameda Avenue to be an offset partial urban interchange

Based on the availability of additional funding, CDOT and FHWA published ROD 2 in 2013. This ROD initiated improvements around the I-25 and US 6 interchange. Major improvements initiated as part of this ROD included:

- Reconstructing the US 6 and Federal Boulevard bridge and interchange
- Reconstructing US 6 with collector-distributor roads/auxiliary lanes from Federal Boulevard to just east of I-25
- Replacing the US 6 bridge over the South Platte River
- Replacing the US 6 bridge over I-25
- Replacing the US 6 bridge over the Burlington Northern Santa Fe (BNSF) Railway tracks

At this time, all major improvements initiated as part of ROD 1 and ROD 2 are complete except for the reconfiguration of the I-25 and Alameda Avenue interchange. Funding for this element of ROD 1 and for the remaining elements of the *Valley Highway EIS*, which were not included in these two RODs, has not yet been identified.

Remaining elements to be completed include:

- I-25 widening from Alameda Avenue to US 6
  - Shift of the consolidated mainline railroad to allow for the widening of I-25
  - Reconstruction of I-25 north of Alameda to include full shoulders
- Santa Fe Drive/Kalamath Street consolidated mainline railroad grade separation
  - Construction of road underpasses to take Santa Fe Drive and Kalamath Street underneath the consolidated mainline railroad tracks
  - Construction of a pedestrian/bicycle bridge over Santa Fe Drive, Kalamath Street, the consolidated mainline railroad tracks, I-25, and the South Platte River
- I-25 and Broadway interchange
  - Reconfiguration of the existing interchange

Summary of I-25 Relevant Previous Denver Studies

Previous Denver studies with relevant recommendations, plans, or identified improvements specific to the I-25 Central corridor have been summarized below.

13th Avenue Realignment Study

Identified as a transformative project within the *Decatur-Federal Station Area Plan* (2013), the *13th Avenue Realignment Study* assessed the feasibility of roadway realignment, pedestrian amenities, and multimodal opportunities along 13th Avenue. Completed in early 2017, the study's project area is approximately North Federal Boulevard to I-25 and included a Preferred Alternative that connects Sun Valley to Downtown Denver, by providing a direct connection from 13th Avenue to Federal Boulevard. The realignment also would provide a protected bicycle facility, reinforce a gridded street network, and provide green infrastructure. The realignment of 13th Avenue, which crosses I-25, is primed to be a key connectivity component in the area and increase access to neighborhoods that currently experience limited connectivity to Downtown Denver and adjacent communities.

Baker Neighborhood Plan

Adopted in 2003 as a supplement to the *Denver Comprehensive Plan*, the *Baker Neighborhood Plan* addresses issues and provides guidance more specific to the vibrant neighborhood bounded by the South Platte River to the west, Broadway to the east, West 6th Avenue to the north, and Mississippi Avenue to the south. Key recommendations in relation to I-25, which runs parallel to the neighborhood, include the repair and improvement of the I-25 Broadway viaduct and safety improvements at the intersection of Alameda Avenue/Santa Fe Drive/I-25.

Blueprint Denver

Adopted in 2002, *Blueprint Denver: An Integrated Land Use and Transportation Plan* is a citywide planning document that links land use and transportation, providing three basic themes within the plan to accommodate future growth: (1) areas of change and areas of stability, (2) multimodal streets, and (3) mixed-use development. Applied to approximately 18 percent of Denver, Areas of Change are zones that "… represent those parts of the city where change is either underway or desirable." In contrast to Areas of Stability, Areas of Change represent the greatest opportunities for I-25 to respond

to proposed development and the foreseen influx in population and increased services. As shown in Figure 6, the majority of the study area is located adjacent to Areas of Change.

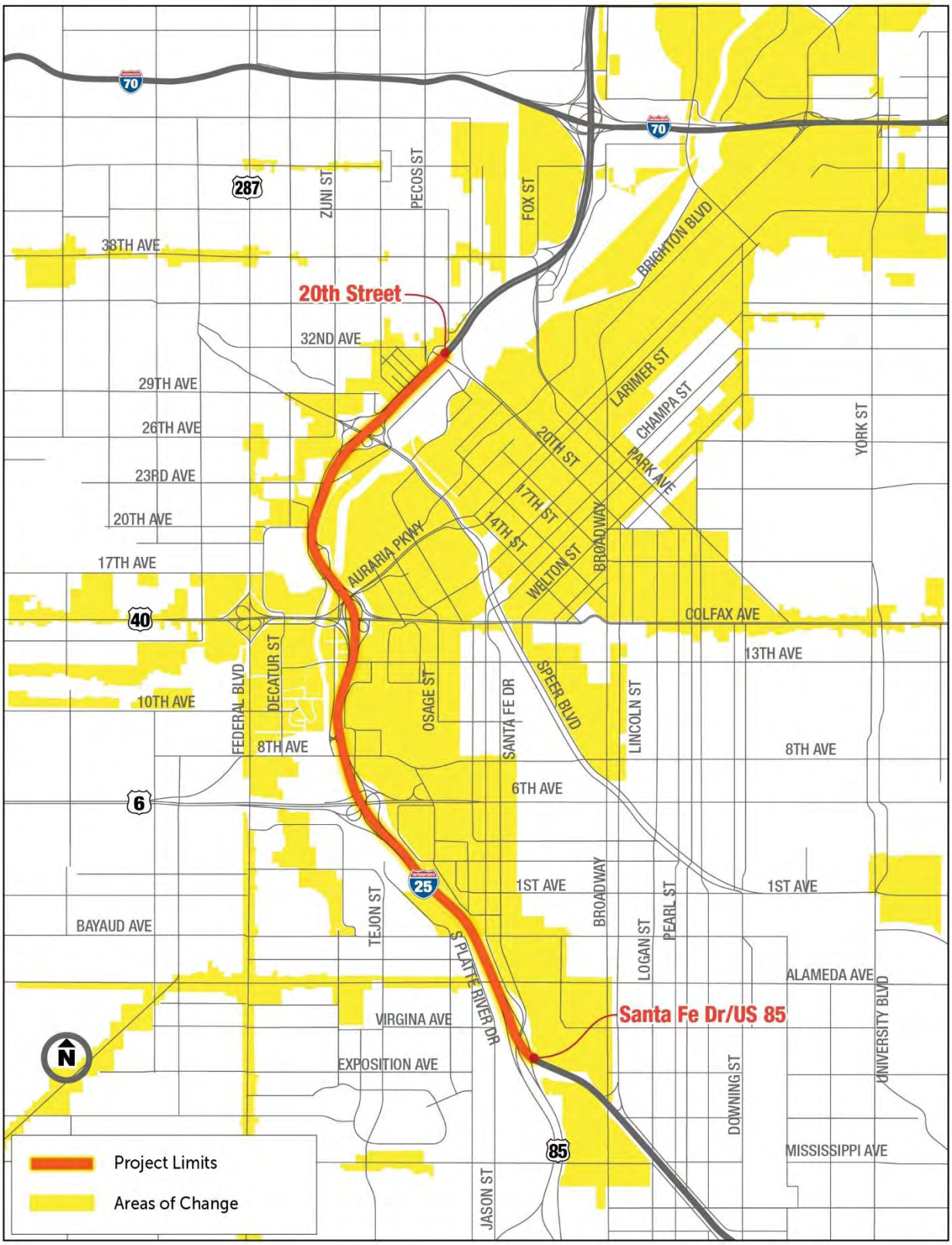
Denver Strategic Transportation Plan—Moving People

The *Denver Strategic Transportation Plan* (STP) is a multimodal transportation plan initiated by the Denver Department of Public Works, with support from other city agencies and interested stakeholders, to understand and address the current and future transportation needs of Denver. As part of this plan, Denver was subdivided into "travel sheds," each representing geographic areas having similar characteristics and facilities serving similar travel patterns.

Through the evaluation of travel sheds, I-25 was identified as a barrier to travel and connectivity, especially in the area around the I-25 Central corridor. A review of concerns by travel shed and any relevant recommendations to address these concerns are summarized below. Travel shed identifiers are included for each concern/recommendation and refer to the travel sheds identified in the Denver STP. An overview of these travel sheds, with their identifiers, is provided in Figure 7.

- Downtown (travel shed "b"): I-25—along with the South Platte River, Cherry Creek, and Speer Boulevard—is a barrier in this travel shed that limits people's ability to access Downtown Denver, especially from the north.
- Northwest (travel shed "h"): Within this travel shed, I-25 is identified as a barrier to connectivity. The plan recommends a focus on bicycle and pedestrian improvements within this travel shed, including specifically identifying improvements to Speer Boulevard to improve access from the west to I-25 and Downtown Denver.
- Southwest (travel shed "j"): Within this travel shed, a new bicycle and pedestrian bridge near Bayaud Avenue was identified as a recommended improvement. This bridge would span the South Platte River, I-25, Santa Fe Drive, Kalamath Street, and the consolidated mainline railroad. This improvement also was included in the Valley Highway EIS but has not yet been funded.
- West Side (travel shed "l"): I-25 and US 6 are both identified as barriers within this travel shed. The primary concerns identified were the limited opportunities to cross I-25, which results in traffic being funneled onto a limited number of congested streets.

Figure 6. Blueprint Denver Areas of Change



Source: Areas of Change as identified in Blueprint Denver, An Integrated Land Use and Transportation Plan (Denver, 2002)

Figure 7. Denver Strategic Transportation Plan Travel Sheds

Source: Denver Strategic Transportation Plan, Moving People (Denver, 2008)

Denver's Mobility Action Plan 2017

Denver's Mobility Action Plan 2017 creates numerous strategic goals for Denver. One of these goals is to deliver a multimodal transportation network to encourage travel mode shift away from single-occupancy vehicles (SOV). This includes reducing SOV commuters within Denver to 50 percent, increasing bicycle and pedestrian commuters to 15 percent, and increasing transit commuters to 15 percent. Achieving these goals may reduce the current and/or future demand/growth of demand for I-25.

Downtown Area Plan Amendment

As an amendment to the original *Downtown Area Plan* adopted in 2007, the in-progress effort revisits the Central Platte Valley Auraria District—located between I-25, Speer Boulevard, and Auraria Parkway—and provides additional details regarding the redevelopment potential of the area. Key recommendations include the transformation of Speer Boulevard into a grand boulevard, priority pedestrian improvements along Speer Boulevard and Auraria Parkway, and an *Elitch Gardens Master Plan* that will include the redevelopment of 1,800 currently underutilized parking spaces. A significant component of the plan is the orientation of development toward the South Platte River, particularly the development of Elitch Gardens.

Jefferson Park Neighborhood Plan

The *Jefferson Park Neighborhood Plan*, completed in 2005, represents a renewed interest in one of Denver's oldest and smallest neighborhoods. The plan establishes long-range goals and objectives for the development and stabilization of the neighborhood. As the primary boundary to the south, I-25 plays a vital role in the plan with recommendations including aesthetic improvements, the need for a buffer along the interstate, the establishment of a gateway feature at West 23rd Avenue and I-25, and a pedestrian bridge over I-25 between Frontview Crescent Drive and the South Platte River.

La Alma/Lincoln Park Neighborhood Plan

Adopted in September 2010, the *La Alma/Lincoln Park Neighborhood Plan* establishes long-range goals and objectives for development, identifies areas of change, and provides recommendations to achieve the outlined vision and goals for the neighborhoods of La Alma and Lincoln Park, bounded by Colfax Avenue to the north, 6th Avenue to the south, Cherry Creek to the east, and the South Platte River to the west. Within the plan, both sides of I-25 are designated as a mixed-use character area from Colfax Avenue to 12th Avenue, a deviation from the existing industrial land use, but in line with planned development within the area.

South Platte Corridor Study

The *South Platte Corridor Study*, adopted in 2013, is a 0.5-mile-wide corridor study along the river that analyzes the potential for the cleanup and reuse of river-oriented development and neighborhood revitalization. The *South Platte Corridor Study* identifies the 8 acres of surface parking located along Water Street as a Catalytic Site, with a preferred plan option that includes significant mixed-use development. In addition, Zuni Street and Colfax Avenue are identified as Catalytic Sites planned for mixed-use development.

River South Greenway Master Plan

The *RISO Greenway Master Plan*, published in 2010, creates a vision for the southern portion of the South Platte River corridor through Denver, which extends from approximately 20th Street in Downtown Denver to about Yale Avenue in southwest Denver. Within this plan, I-25, along with the adjacent railroads, is identified as a major barrier between local communities and the RISO greenway. Furthermore, the channelization of the river because of I-25's location, especially the segment between Santa Fe Drive/US 85 and US 6/6th Avenue, is identified as a major detriment to both the recreational aspects of the greenway and the water quality of the river.

Planned Developments (Private)

In addition to public investment, numerous private developments (see Figure 8) are planned within the study area. Major development efforts and concentrations of developments are outlined below.

Burnham Yards

Denver's historic Burnham Yards, located directly east of I-25 from 4th Avenue to 12th Avenue, has operated as a locomotive repair facility since 1874. Closed in early 2016, the 70-acre site is slated for redevelopment with opportunities for an influx of residential, retail, mixed use, and open space. While there are currently no solid plans outlining the full extent of redevelopment, the potential suggests a significant increase in active uses and population within the area.

Denver Water Campus

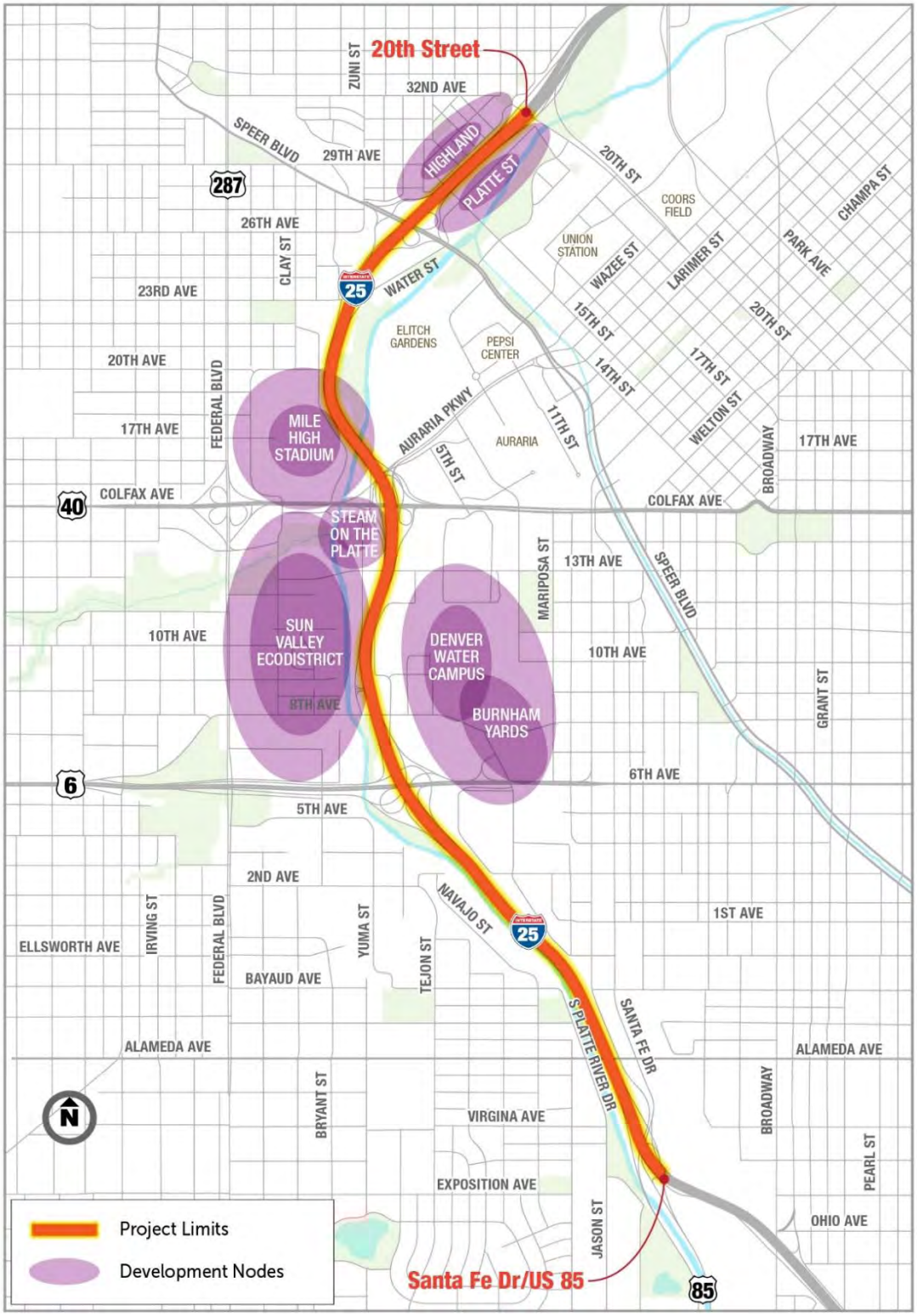
Denver Water's Operation Complex is currently undergoing an extensive redevelopment process to provide a more "… efficient, publicly accessible, and sustainable headquarters." The 34.6-acre campus southeast of Downtown Denver, between US 6/6th Avenue and West 12th Avenue just east of the freight railroad tracks, has a planned completion date of 2019. Redevelopment plans include 11 new structures to house additional warehouse space, a trade shop and central plant, an administration building, wellness center, meter shop, fleet building, and wash station.

Highlands

The Denver Highlands is a constantly evolving city-center neighborhood with several private multi-unit residential and mixed-use developments planned on both sides of I-25. The concentration of development is primarily centered along the interstate corridor with new buildings popping up along Platte Street and within the Highlands core. Proposed and in-progress developments include:

- Platte Fifteen—A mixed-use development with ground-floor retail located at the corner of 15th Street and Platte Street
- Circa Building—A mixed-use development located at 1615 Platte Street
- Grandview Lohi—A residential building with ground-floor retail located at 17th Street and Central Court

Figure 8. Development Nodes



Source: Development nodes based on information gathered by Livable Cities Studio from Denver staff and planning documents (Denver, 2018j; Denver Water, 2018; STEAM, 2018; SVED, 2018)

Stadium Redevelopment

The Mile High Stadium Neighborhood is in early feasibility planning to potentially transform Mile High Stadium and the adjacent community into an entertainment district with a high concentration of retail, commercial, and residential development.

STEAM on the Platte

Located at 1401 Zuni Street on the banks of the South Platte River, STEAM on the Platte is an adaptive reuse project that is currently in the process of rehabbing an old industrial warehouse complex into a mixed-use community with a focus on innovation, energy, and collaboration. Major redevelopment plans include the adaptive reuse of the existing historic warehouse and bow string building into creative office and restaurant space and new construction of commercial and residential space.

Sun Valley EcoDistrict

Sun Valley is a formally recognized neighborhood in Denver with a compact census tract of 0.64 square mile. The neighborhood is bound by Colfax Avenue and Mile High Stadium on the north, Federal Boulevard on the west, US 6/6th Avenue and the light industrial district on the south, and the South Platte River on the east.

Sun Valley is Denver's lowest-income neighborhood and home to less than 1,500 people. The majority are residents of the Denver Housing Authority's (DHA) 333-unit, distressed public housing site located in the heart of the neighborhood. Other residents live in Mercy Housing's transitional housing, called Decatur Place. There are a small number of single-family homes throughout Sun Valley.

The Sun Valley EcoDistrict (SVED) Trust is the master development entity structured to lead the districtwide implementation and sustainable redevelopment of Sun Valley. SVED is a nonprofit entity, separate from Denver and the DHA. SVED evolved from DHA's ongoing process to redevelop its existing public housing. That project, known as the Sun Valley Choice Neighborhood, recently received a $30-million grant from the U.S. Department of Housing and Urban Development (HUD) to help launch redevelopment efforts. More information on this development can be found at SVED's website: http://www.sved.org/.

When completed, this project will transform the Sun Valley Neighborhood into a dynamic district, home to more than 3,000 residents, 300 jobs, and new or enhanced neighborhood services. The district is poised to be one of Denver's most vibrant, mixed-use, transit-serving communities and will provide residents opportunities for local business, increased access to quality jobs and education, improved housing, integrated public spaces, and sustainable energy components.

Ongoing and Future Studies

As Colorado and Denver continue to grow at a rapid pace, the land use and visions for the I-25 Central corridor also will change. To prepare for these changes, several new planning efforts are ongoing with the intent to update previous planning studies or create entirely new plans. To effectively analyze future land use along the corridor and determine potential opportunities and constraints within the study area, relevant ongoing plans have been reviewed and are listed below. Preliminary goals, objectives, and recommendations of these plans that are relevant to I-25 are outlined in the following sections of this report.

Central Platte Valley-Auraria District of the Downtown Area Plan

This study is proposed to be an amendment to the 2007 *Downtown Area Plan* and provide planning direction for the Central Platte Valley-Auraria District. This district, which was included but not detailed in the original Downtown Area Plan, is located between I-25, Speer Boulevard, and Auraria Parkway. Currently, much of the land is surface parking serving cultural and entertainment venues, including the Pepsi Center, Elitch Gardens, the Downtown Aquarium, and the Children's Museum. Current draft visions for the area include some form of urban landscape similar to what is found in Downtown Denver. Although this plan will continue to develop and be refined throughout the planning process, the I-25 Central PEL study will assume this area will change into a more mixed-use urban environment with more housing and employment, as compared to what is there today.

Additional information about this ongoing planning effort can be found on the project's website: https://www.denvergov.org/content/denvergov/en/community-planning-and-development/planning-and-design/plans-in-progress/Downtown_Area_Plan_Amendments.html

Colfax Corridor Connections

Colfax Corridor Connections is a study of potential long-term mobility improvements along the East Colfax Corridor. The study will identify and provide a package of multimodal transportation improvements over the next 20 years in the study area. The project corridor is roughly bounded by I-25 and Interstate 225 (I-225) on the west and east, respectively, and 20th Avenue and 12th Avenue on the north and south. Final design and implementation plans are scheduled for 2018-2019, with construction proposed to start after 2020. More information on the study can be found on the project website: https://www.denvergov.org/content/denvergov/en/denver-department-of-public-works/projects/current/colfax-corridor-connections.html/

Denver Moves: Downtown

Denver Moves: Downtown is the re-envisioning of Downtown Denver's transportation system and will provide the framework required to develop a cohesive multimodal network within the central business district and create increased mobility, placemaking, and economic development opportunities within the Downtown core. There is currently no project website available for the study.

Denver Moves: Pedestrians & Trails

Denver Moves: Pedestrians & Trails is a long-term plan for achieving a vision for walking and trails in Denver. A public draft of the plan was released in November 2017. Within this draft plan, four projects were identified within the I-25 Central PEL study area. These projects include:

- 23rd Avenue/Water Street at I-25: This project calls for improving the existing sidewalk on this bridge and adding an additional sidewalk on the south side of the bridge, where there is currently no pedestrian infrastructure.
- 8th Avenue at I-25: This project proposes improvements to the existing 8th Avenue underpass at I-25 and the adjacent bridge over the South Platte River to enhance pedestrian infrastructure and connectivity.

- Bayaud Avenue at the South Platte River/I-25: This plan reinforces the need for a pedestrian bridge at Bayaud Avenue to connect over the South Platte River, I-25, and the railroads. This project was first identified in the *Valley Highway EIS*.
- West Virginia Avenue at I-25/the Railroad/the South Platte River: This project proposes a series of bridges to connect west and east Virginia Avenue over the South Platte River, I-25, and the railroad tracks.

Denver Moves: Transit Plan

The *Denver Moves: Transit Plan* will create a 20-year local transit vision and implementation plan for Denver. The plan seeks to move more people more efficiently on Denver's existing street network even as the city continues to grow and develop. Leveraging RTD's investments in rail and bus, the *Denver Moves: Transit Plan* will identify a transit vision that enhances the current transit system to increase ridership and build a culture of transit in Denver.

The State of the System document produced as part of the plan notes that the South Platte River trail provides convenient bicycle and pedestrian access through Downtown Denver; however, this area is bisected by I-25, which can be a barrier for people riding bicycles and walking. More information on the ongoing study can be found on the study website: https://www.denvergov.org/content/denvergov/en/denveright/transit.html

Denver Urban Waterways Restoration Study

As part of the ongoing efforts to improve the South Platte River, the *Denver Urban Waterways Restoration Study* is working to identify needed improvements to multiple waterways running through Denver, including the South Platte River between approximately US 6 and 58th Avenue. The goals of this project are to restore ecosystems and habitat, manage flood risks, and improve access to recreation and environmental education opportunities. Results and recommendations from this study are expected to be published in 2018. More information is available at Denver's website: https://www.denvergov.org/content/denvergov/en/denver-waterways.html/project

Denver 2017 General Obligation Bond—Elevate Denver

Periodically, Denver authorizes General Obligation Bonds to restore, replace, and expand infrastructure and capital assets across the city. Denver presented the bond authorization to voters in November 2017 after more than a year of agency, City Council, and public input. More than 460 capital infrastructure projects will be constructed across Denver over the next 10 years. Some of the projects include improvements to the street network surrounding I-25. More information on the program can be found on the project website: https://www.denvergov.org/content/denvergov/en/denver-department-of-finance/2017-go-bond.html

Opportunities

Based on the review of existing planning documents, planned private developments, and ongoing planning efforts, primary and secondary opportunity areas along the I-25 corridor within the study area have been developed. These opportunity areas represent locations where improvements to I-25 could enhance ongoing and future projects within the I-25 Central corridor. Primary opportunity areas are those where development and other changes are planned for the near future (within approximately the next 10 years), whereas secondary opportunity areas are those where changes are expected to happen over a longer-term period. Figure 9 shows these opportunity areas and the following sections describe plans and ideas. Please note, the number provided before each description below matches the callout in Figure 9.

(1) Speer Boulevard to Colfax Avenue—East side of I-25

With Denver's increase in population persisting year after year, the boundaries of Downtown Denver continue to become more flexible as growth pushes outward. The west side of I-25 from Speer Boulevard to Colfax Avenue likely will experience a great deal of change in terms of development—changes in land use are expected to follow. The proximity to the Downtown core in addition to the South Platte River are additional benefits. Because redevelopment is already occurring within this area, this is considered a primary opportunity area.

(2) Colfax Avenue to US 6/6th Avenue—West side of I-25 (Sun Valley)

The greatest opportunity for land use change within the study area is along the west side of I-25 between Colfax Avenue and US 6/6th Avenue. Given the planned redevelopment of Sun Valley and the proximity to the adjacent Stadium District and Downtown Denver, this area will continue to evolve, and land use will change accordingly, to reflect the rapid growth and future uses. Additional benefits include the strong existing access to I-25 as well as the area's relationship to the South Platte River as an important recreational amenity. Because much of this development is already planned and being implemented, this area is considered a primary opportunity area.

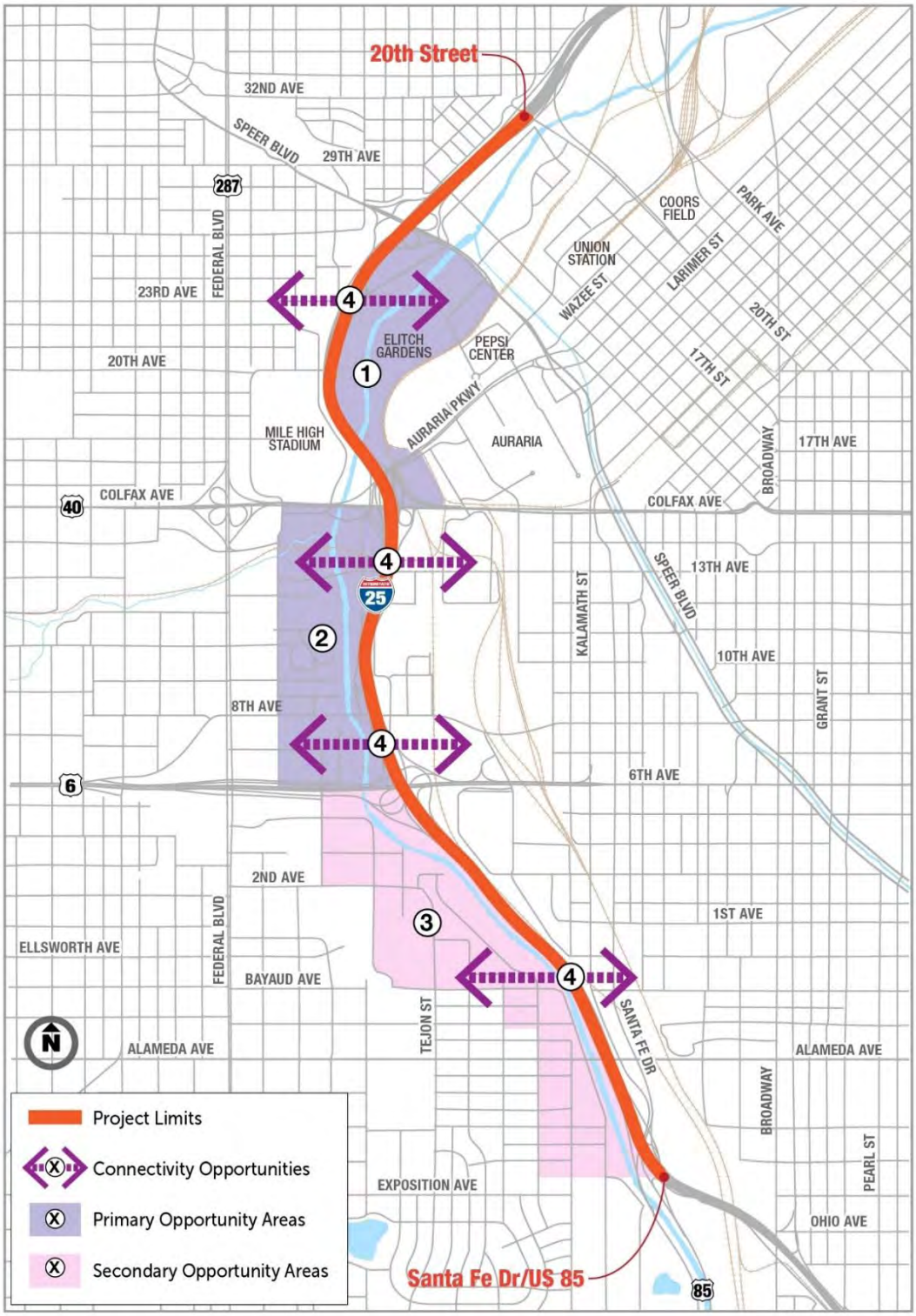
(3) Colfax Avenue to Santa Fe Drive/US 85—West side of I-25

As affordable housing increasingly becomes an issue in the urban core, more and more people are buying residential properties outside of Downtown Denver, including the neighborhoods of Valverde and Athmar Park, located along the west side of I-25 between US 6/6th Avenue and West Mississippi Avenue. As a majority of the land use along this edge is designated industrial, there is some opportunity for potential land use changes to accommodate the growing residential neighborhoods. Although this area is beginning to undergo change, it will likely take more time before this area fully transitions. Therefore, this is considered a secondary opportunity area.

(4) Additional Opportunities for Connectivity

Given the extent of development along I-25 and within the adjacent areas, there is an overall opportunity to further connect neighborhoods and activity centers via new bicycle and pedestrian routes. Specific opportunities that would provide the greatest benefit include the construction of infrastructure across or under I-25 to connect the neighborhoods of Lincoln Park to Sun Valley, and Baker to Athmar Park.

Figure 9. Opportunity Areas



Source: Opportunity areas were identified by Livable Cities Studio based on general land use observations, a review of existing planning documents (discussed in previous sections of this document), and input from Denver staff.

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Existing Roadway Overview

A primary objective of this report is to inventory the existing conditions throughout the I-25 Central study area to gain insight into the types and extent of needed system improvements. This chapter provides an overview of I-25 Central throughout the study area, including its basic geometric components and those of the cross streets and interchanges. Detailed analysis of specific elements—such as engineering analysis, traffic analysis, environmental analysis, etc.—is provided in subsequent chapters.

I-25 Mainline, Cross Streets, and Interchanges

Through the study area, I-25 has a prevailing cross-section of four through lanes in each direction with both an inside and outside shoulder. Some sections also contain one or more auxiliary lanes. Throughout the I-25 Central corridor, the posted speed limit is 55 miles per hour (mph). Furthermore, there are numerous crossings of I-25 as well as multiple interchanges. These individual elements are discussed throughout this section. For clarity, elements are discussed in the order in which they occur in the field moving from north to south. The resulting discussion includes:

Auxiliary Lanes

Auxiliary lanes are extra lanes added at the merge between a ramp and the mainline freeway and provide additional space for vehicles to merge into or out of traffic.

- I-25 and 20th Street interchange
- I-25 mainline between 20th Street and Speer Boulevard
- Highlands Pedestrian Bridge (16th Street) over I-25
- 15th Street over I-25
- I-25 and Speer Boulevard interchange
- I-25 mainline between Speer Boulevard and 23rd Avenue
- I-25 and 23rd Avenue interchange
- I-25 mainline between 23rd Avenue and 17th Avenue
- I-25 and 17th Avenue interchange
- I-25 mainline between 17th Avenue and Colfax Avenue, Auraria Parkway, and Walnut Street
- I-25 and Colfax Avenue, Auraria Parkway, and Walnut Street interchange
- I-25 mainline between Colfax Avenue, Auraria Parkway, and Walnut Street and 8th Avenue
- 13th Avenue and RTD W Line under I-25
- I-25 and 8th Avenue interchange
- I-25 mainline between 8th Avenue and US 6/6th Avenue
- I-25 and US 6/6th Avenue interchange
- I-25 mainline between US 6/6th Avenue and Alameda Avenue
- BNSF Railway crossing under I-25
- I-25 and Alameda Avenue interchange
- I-25 mainline between Alameda Avenue and Santa Fe Drive/US 85
- I-25 and Santa Fe Drive/US 85 interchange

I-25 and 20th Street Interchange

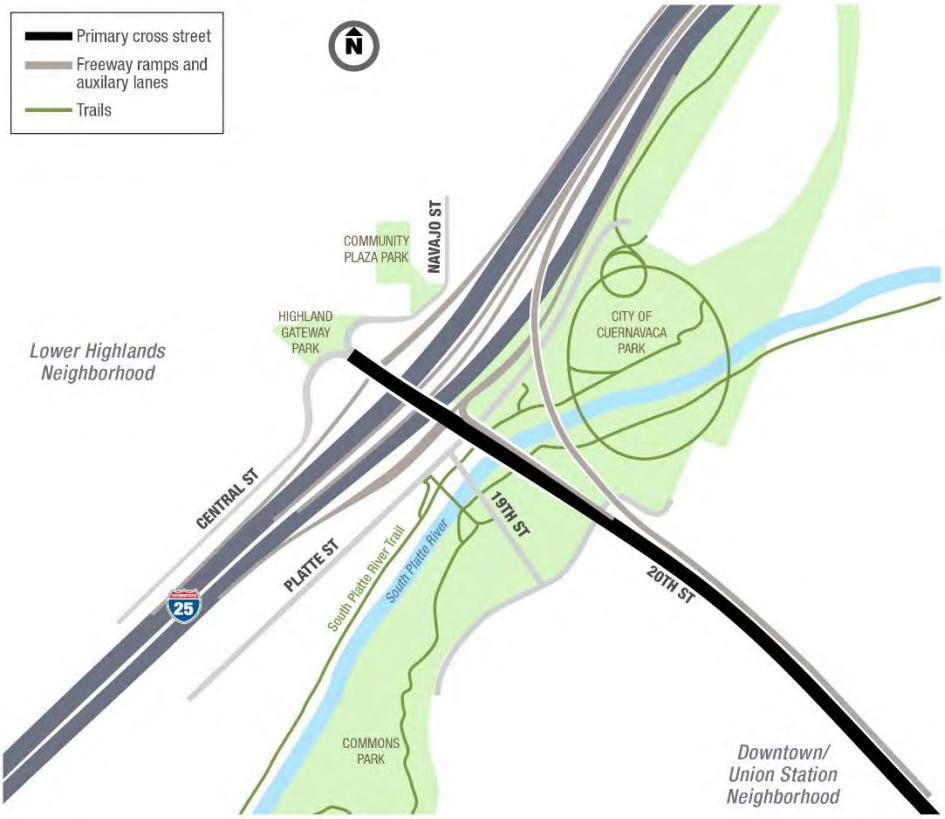
20th Street is an arterial extending from Broadway in the east to Central Street/Osage Street in the west, following Downtown Denver's diagonal street grid. This street provides access to and from I-25 into the Downtown Denver area and the Lower Highlands Neighborhood.

Over I-25, 20th Street forms a traditional diamond interchange with a posted speed limit of 35 mph and provides full access—to both the northbound and southbound directions—to and from I-25 (Figure 10).

In addition to this traditional diamond interchange, the 20th Street interchange also represents the southern terminal of the existing I-25 Express Lanes. These lanes extend from 20th Street to U.S. Highway 36 (US 36) and operate in a reversible manor with both lanes of traffic heading southbound during the morning—between 5:00 a.m. and 11:00 a.m.—and reversing to go northbound in the afternoon and evening—between 12:00 p.m. and 3:00 a.m.

Just north of the 20th Street interchange, there is a direct on-/off-ramp that takes vehicles into and out of Downtown Denver via a viaduct which runs parallel to 20th Street. Vehicles not using this direct-connect ramp can enter/exit the Express Lanes via a slip ramp from the I-25 mainline. It is important to note that these lanes are separated from general-purpose lanes by concrete barriers for the entire distance between the access point at 20th Street and US 36. Therefore, vehicles must remain in the Express Lanes for the entire duration.

Figure 10. 20th Street Interchange Diagram



I-25 Mainline Between 20th Street and Speer Boulevard

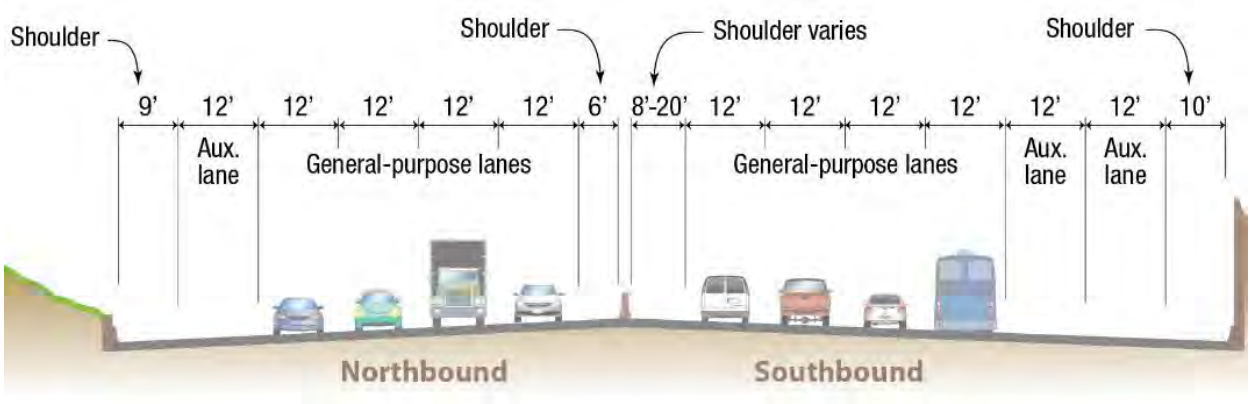
The segment of I-25 between 20th Street and Speer Boulevard is slightly more than a half-mile in length. The existing typical mainline cross-section through this segment includes four general-purpose lanes in each direction, inside and outside shoulders, a single auxiliary lane in the northbound direction, and two auxiliary lanes in the southbound direction. Figure 11 provides a diagrammatic typical cross-section of this segment.

I-25 looking south from the 20th Street bridge

Within this segment of I-25, there is also an entrance/exit to the I-25 Express Lanes. The entrance (going northbound) and the exit (going southbound) are provided by additional lanes on the inside (center) of the highway.

To the west side of I-25, Central Street runs alongside the interstate. A retaining wall and a grass median that ranges in width from approximately 8 feet to 20 feet runs alongside Central Street to separate it from the highway. On the east side of I-25, properties along Platte Street back up to the I-25 right-of-way (ROW) boundary. At its most constrained point, approximately 20 feet of space exists between the concrete barrier alongside the northbound I-25 traffic lanes and the edge of developments on Platte Street.

Figure 11. Typical Cross-Section—20th Street to Speer Boulevard



Highlands Pedestrian Bridge (16th Street) Over I-25

The Highlands Pedestrian Bridge is a 10-foot-wide bridge across I-25 located between the 15th Street and 20th Street bridges. This bridge carries non-motorized traffic across I-25 and represents the northern most portion of a continuous pedestrian mall extending from the Highlands Neighborhood in the north to the Colorado State Capitol in the south.

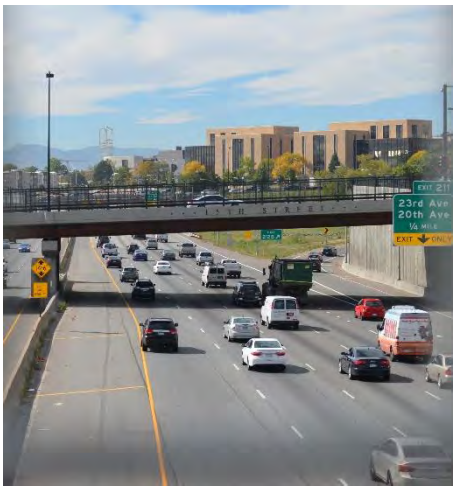
15th Street Over I-25

15th Street is a collector roadway that extends from Umatilla Street/29th Avenue in the north to Colfax Avenue in the south. Although 15th Street does not have an interchange with I-25, it does provide a local connection between the Highlands Neighborhood and Downtown Denver, crossing both I-25 and the South Platte River.

Where 15th Street crosses I-25, the highway has four lanes of vehicle traffic with a posted speed limit of 30 mph. The bridge also has a single bike lane in the northbound direction and sidewalks on both sides.

Left: Looking north across the Highlands Pedestrian Bridge.

Right: Looking west from the Highlands Pedestrian bridge at the 15th Street bridge over I-25.



I-25 and Speer Boulevard Interchange

Speer Boulevard is a major arterial that runs in a southeast to northwest direction from 1st Avenue to Irving Street. From 1st Avenue to Lawrence Street, Speer Boulevard is a divided roadway, running on either side of Cherry Creek. From Lawrence Street to Zuni Street, Speer Boulevard is a six-lane roadway that has a raised median to separate eastbound and westbound traffic; it has a posted speed limit of 35 mph. Speer Boulevard remains divided over I-25, with separate bridges accommodating three through lanes of traffic in each direction. There are no pedestrian facilities on this section of Speer Boulevard; however, there is a detached sidewalk and pedestrian bridge running parallel to the eastbound bridge.

The Speer Boulevard interchange is a partial cloverleaf that provides full access between Speer Boulevard and I-25. Where Speer Boulevard crosses I-25, the interstate highway cross-section includes four northbound lanes and four southbound lanes. Figure 12 shows the general layout of the Speer Boulevard and I-25 interchange.

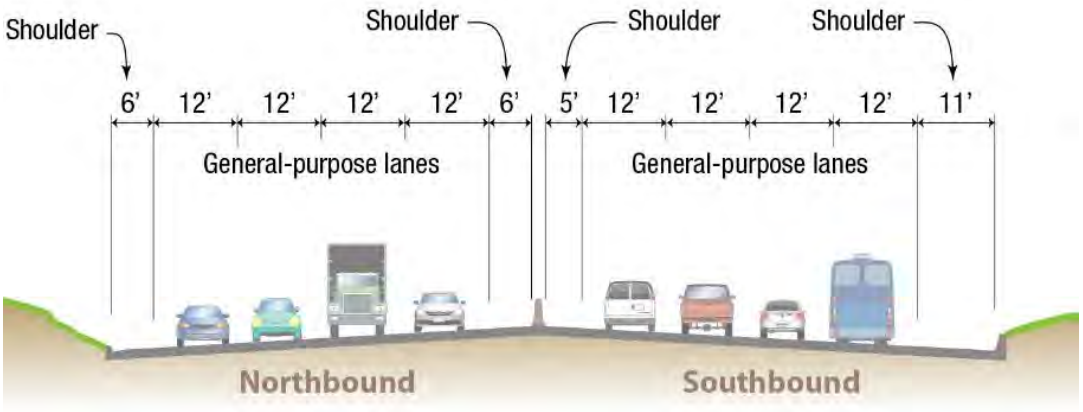
Figure 12. Speer Boulevard Interchange Diagram

I-25 Mainline Between Speer Boulevard and 23rd Avenue

The segment of I-25 between the Speer Boulevard bridges and the 23rd Avenue bridge is approximately 0.33 mile in length. The existing typical mainline cross-section through this segment includes four general-purpose lanes in each direction, inside and outside shoulders, and a single auxiliary lane in the northbound direction. Figure 13 shows a diagrammatic typical cross-section for this segment.

I-25 looking north from the 23rd Avenue bridge

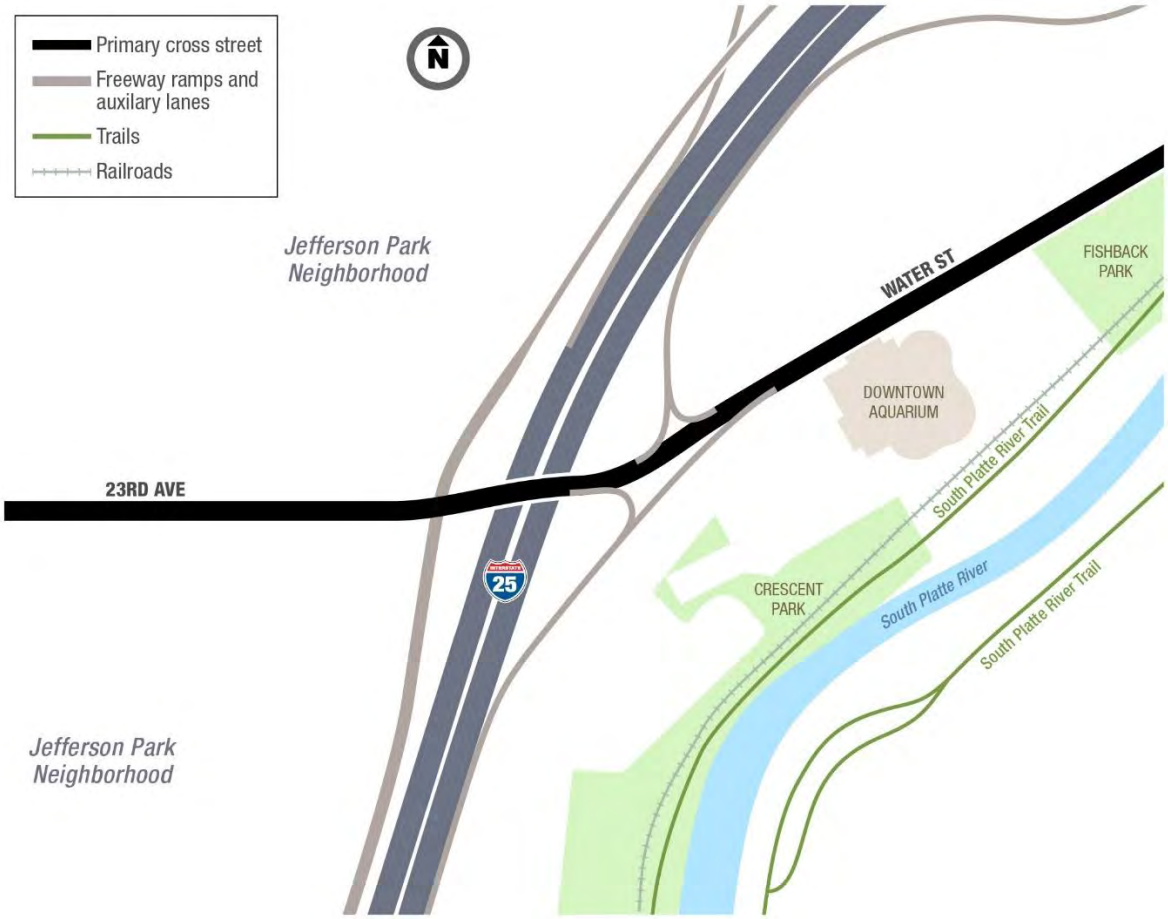
Figure 13. Typical Cross-Section—Speer Boulevard to 23rd Avenue



I-25 and 23rd Avenue Interchange

23rd Avenue is an east-west collector that runs from Water Street to Stuart Street (Sloan's Lake) and has a posted speed limit of 30 mph within the study area. Over I-25, 23rd Avenue is a two-lane collector with bicycle lanes in each direction and a sidewalk on the north side of the bridge. East of I-25, 23rd Avenue transitions to Water Street, which in turn transitions to Platte Street. The 23rd Avenue interchange with I-25 is a traditional diamond interchange and provides full access to and from I-25 and 23rd Avenue. It should be noted that access from 23rd Avenue to southbound I-25 is provided via a collector-distributor road. This collector-distributor road extends from 23rd Avenue to 17th Avenue before connecting into the southbound I-25 mainline. Figure 14 shows the general layout of the 23rd Avenue and I-25 interchange.

Figure 14. 23rd Avenue Interchange Diagram



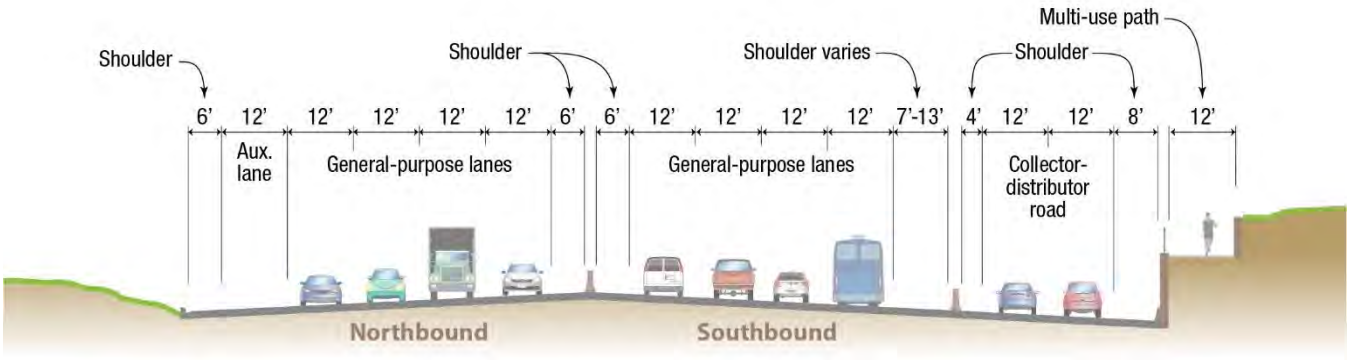
I-25 Mainline Between 23rd Avenue and 17th Avenue

The segment of I-25 between 23rd Avenue and 17th Avenue, pictured here, is approximately one mile in length. The existing typical mainline cross-section through this segment includes four general-purpose lanes in each direction, inside and outside shoulders, and a northbound auxiliary lane. Figure 15 shows a diagrammatic typical cross-section through this segment.

I-25 looking south from the 23rd Avenue bridge

Adjacent to the freeway on the east side is the Children's Museum of Denver and Crescent Park. A distance varying between 25 feet and 40 feet separates the properties from I-25. On the west side of I-25, the mainline is bounded by a collector-distributor road and multi-family residential properties.

Figure 15. Typical Cross-Section—23rd Avenue to 17th Avenue



I-25 and 17th Avenue Interchange

The 17th Avenue interchange is an offset diamond interchange that connects to 17th Avenue via Mile High Stadium Circle. Mile High Stadium Circle is a circulatory/orbital street that connects 17th Avenue on the west side of Mile High Stadium with I-25 on the east side of the stadium. The circulator roadway has a posted speed limit of 30 mph and has sidewalks on at least one side of the street through its entire length. The I-25 southbound on-ramp from 23rd Avenue operates as a collector-distributor road, which intersects 17th Avenue; this continues south and becomes an I-25 southbound on-ramp. 17th Avenue extends under I-25, providing access to parking lots west of I-25, then it connects to the I-25 northbound off-ramp and I-25 northbound on-ramp. Figure 16 shows the general layout of the 17th Avenue and I-25 interchange.

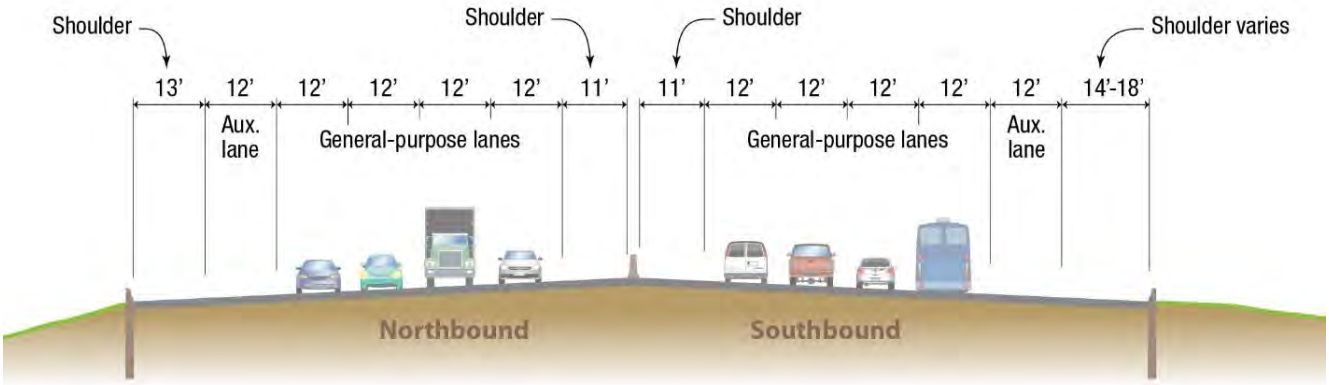
Figure 16. 17th Avenue Interchange Diagram

I-25 Mainline Between 17th Avenue and Colfax Avenue, Auraria Parkway, and Walnut Street

The segment of I-25 between 17th Avenue and Colfax Avenue/Auraria Parkway is just less than one-half mile in length. The existing typical mainline cross-section through this segment includes four general-purpose lanes in each direction, inside and outside shoulders, and an auxiliary lane in each direction. Figure 17 shows a diagrammatic typical cross-section through this segment. Within this segment, I-25 becomes elevated and spans over 17th Avenue, the South Platte River, and the South Platte River Trail.

The major development adjacent to this portion of I-25 includes Mile High Stadium and its associated parking lots, as well as Crescent Park and the South Platte River.

Figure 17. Typical Cross-Section—17th Avenue to Colfax Avenue/Auraria Parkway



I-25 and Colfax Avenue, Auraria Parkway, and Walnut Street Interchange

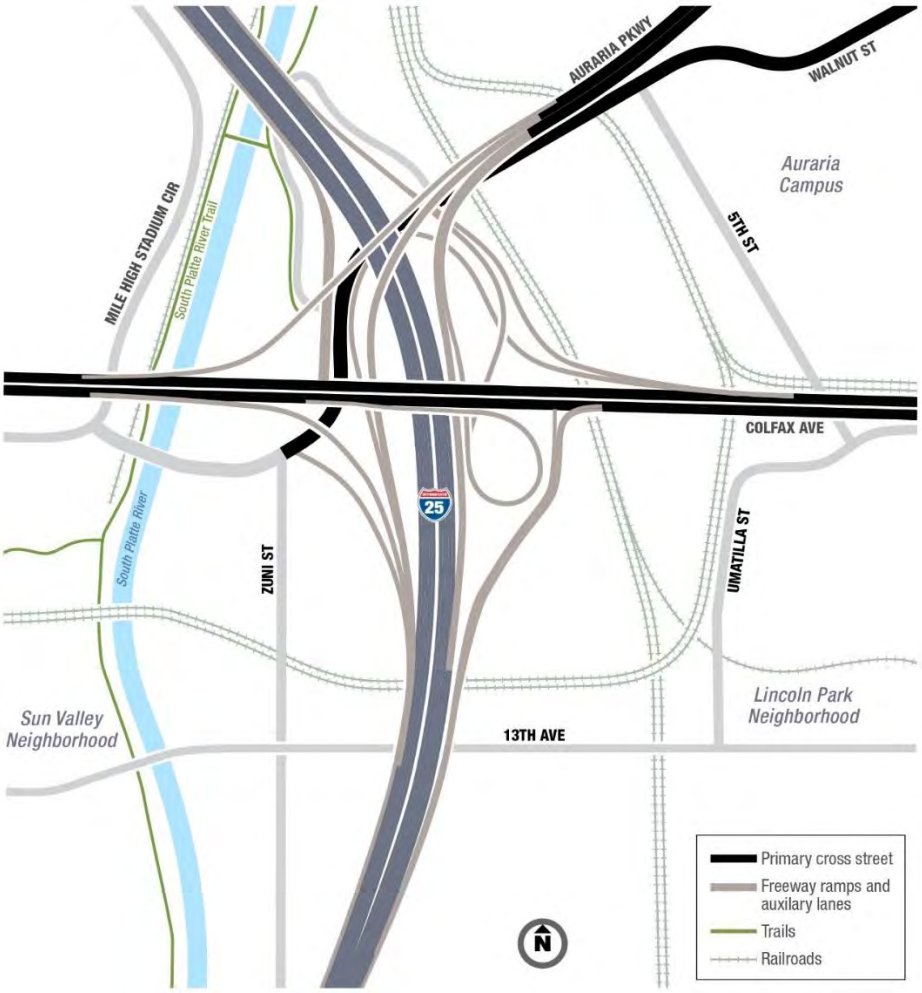
I-25, Colfax Avenue, and Auraria Parkway all form an interchange south of where the interstate crosses the South Platte River. Colfax Avenue is a major east-west arterial that runs from I-70 east of Aurora, reconnecting with I-70 west of Lakewood and continues west. Over I-25, Colfax Avenue contains three through lanes in each direction divided by a concrete barrier and has a posted speed limit of 40 mph. There is a sidewalk alongside the westbound lanes on the roadway, which is protected by a concrete barrier. Where Colfax Avenue crosses I-25, the interstate highway typical cross-section includes four northbound lanes and four southbound lanes.

Auraria Parkway is a six-lane arterial between I-25/Colfax Avenue and Speer Boulevard. The arterial has a posted speed limit of 35 mph and is divided by planted medians and concrete barriers. The southbound three lanes split just east of I-25 and transition to two flyover ramps over I-25—a one-lane ramp to westbound Colfax Avenue and a two-lane ramp to southbound I-25. Three other ramps merge into this southbound ramp to I-25 before it joins the interstate. A westbound ramp from Colfax Avenue merges with this southbound ramp, and two separate ramps from eastbound Colfax Avenue and eastbound Old Colfax Avenue merge together and join the southbound on-ramp to I-25. The southbound Auraria Parkway ramp to westbound Colfax Avenue has a sidewalk protected by a concrete barrier that connects to the sidewalk alongside westbound Colfax Avenue.

A cloverleaf ramp connects eastbound Colfax Avenue with northbound I-25 and northbound Auraria Parkway. The northbound ramp to I-25 merges with a ramp from westbound Colfax Avenue to join I-25 northbound. The I-25 northbound off-ramp to Colfax Avenue is approximately one-half mile in length and forms a signalized intersection with Colfax Avenue. Similarly, the I-25 southbound off-ramp forms a signalized intersection with Colfax Avenue and accommodates eastbound and westbound movements. Figure 18 shows the general layout of the Colfax Avenue/Auraria Parkway and I-25 interchange.

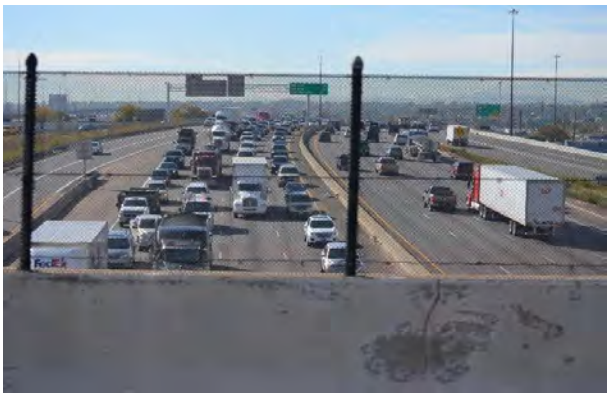
Underneath the interchange between I-25 and Colfax Avenue/Auraria Parkway, Walnut Street runs east-west at-grade level. This two-lane local street extends from Zuni Street in the west to 7th Street in the east and connects the Auraria Campus to the area around Mile High Stadium. Underneath I-25, the street has a speed limit of 25 mph with a single sidewalk on the north side of the roadway. There is no access from I-25 to Walnut Street; however, drivers on Walnut Street can access southbound I-25 via a slip ramp near Zuni Street.

Figure 18. Colfax Avenue, Auraria Parkway, and Walnut Street Interchange Diagram



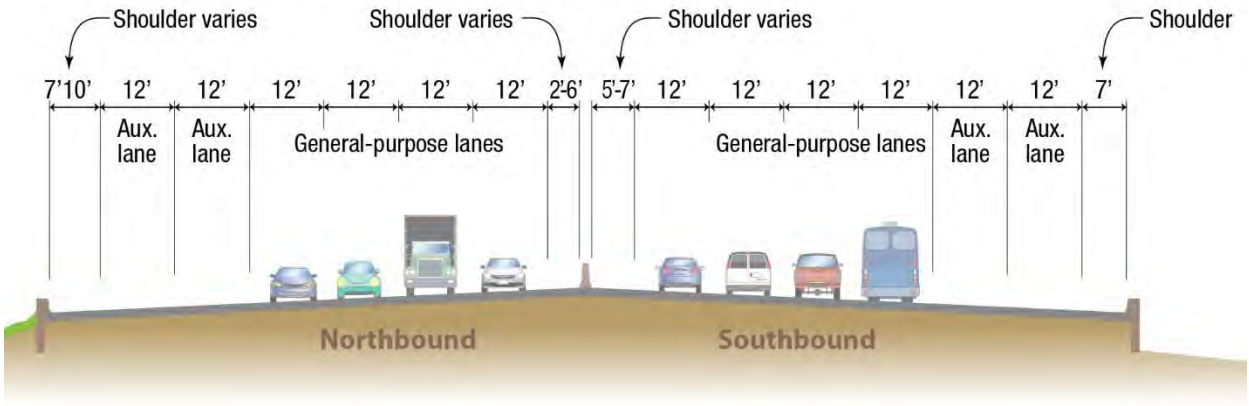
I-25 Mainline Between Colfax Avenue, Auraria Parkway, and Walnut Street and 8th Avenue

The segment of I-25 between Colfax Avenue/Auraria Parkway and 8th Avenue is approximately 0.75 mile in length. In this section, I-25 runs under Colfax Avenue/Auraria Parkway and spans over 8th Avenue. The existing typical mainline cross-section through this segment includes four general-purpose lanes in each direction, two auxiliary lanes in each direction, and inside and outside shoulders. Figure 19 shows a diagrammatic typical cross-section through this segment.



I-25 looking south from the Colfax Avenue bridge

Figure 19. Typical Cross-Section—Colfax Avenue/Auraria Parkway to 8th Avenue



13th Avenue and RTD W Line Under I-25

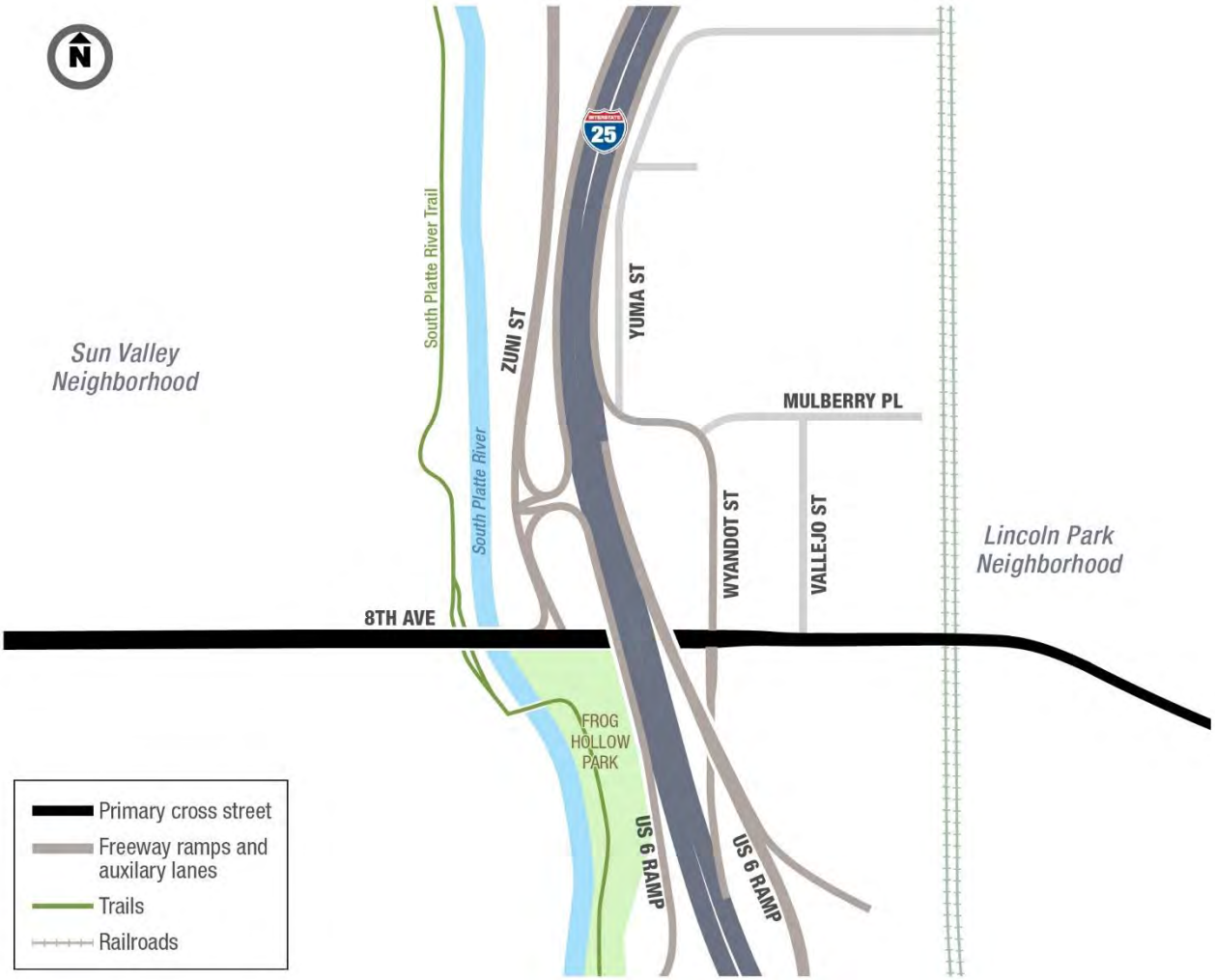
13th Avenue underneath I-25 is a two-lane local street with a speed limit of 25 mph. Regionally, 13th Avenue extends from Decatur Street in the west to I-225 in the east. Within the study area, 13th Avenue connects the Sun Valley Neighborhood to the Lincoln Park Neighborhood and provides a connection across both the South Platte River and I-25. Underneath I-25, the roadway has conventional bicycle lanes, but no sidewalks.

To the north of 13th Avenue, the RTD W light rail line also crosses underneath I-25. This two-track light rail line passes underneath I-25 along its own right of way.

I-25 and 8th Avenue Interchange

8th Avenue is a two-lane collector roadway that passes under I-25 and has a posted speed limit of 30 mph. Access to and from I-25 and 8th Avenue is provided via an offset diamond interchange configuration. From northbound I-25, vehicles exit directly to 8th Avenue; however, vehicles attempting to access northbound I-25 from 8th Avenue must first turn north onto Wyandot Street to access the northbound on-ramp at Mulberry Place. Southbound I-25 access to and from 8th Avenue is provided via slip ramps that connect to Zuni Street just north of 8th Avenue. Figure 20 shows the general layout of the 8th Avenue and I-25 interchange.

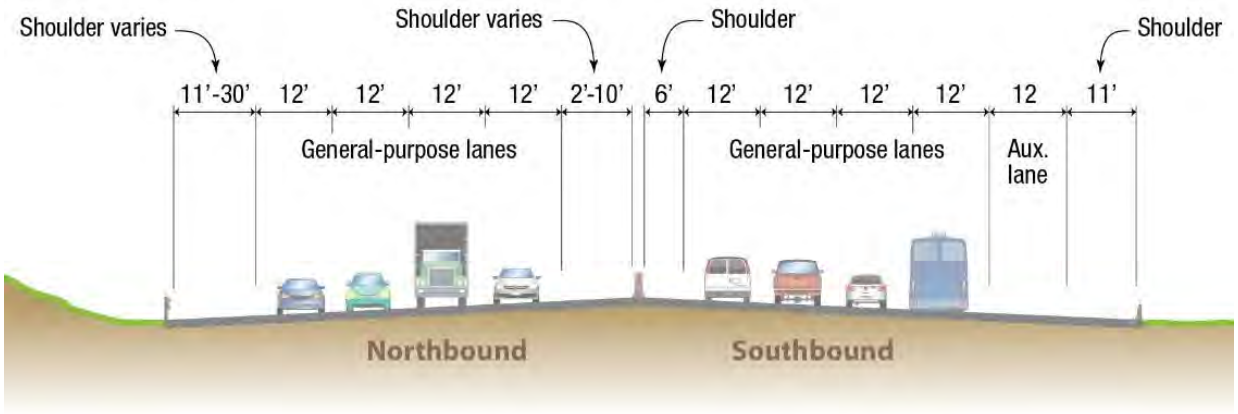
Figure 20. 8th Avenue Interchange Diagram



I-25 Mainline Between 8th Avenue and US 6/6th Avenue

The segment of I-25 between 8th Avenue and US 6/6th Avenue is approximately 0.25 mile in length and contains four general-purpose lanes in each direction, inside and outside shoulders, and an additional auxiliary lane in the southbound direction. Figure 21 shows a diagrammatic typical cross-section through this segment.

Figure 21. Typical Cross-Section—8th Avenue to US 6/6th Avenue

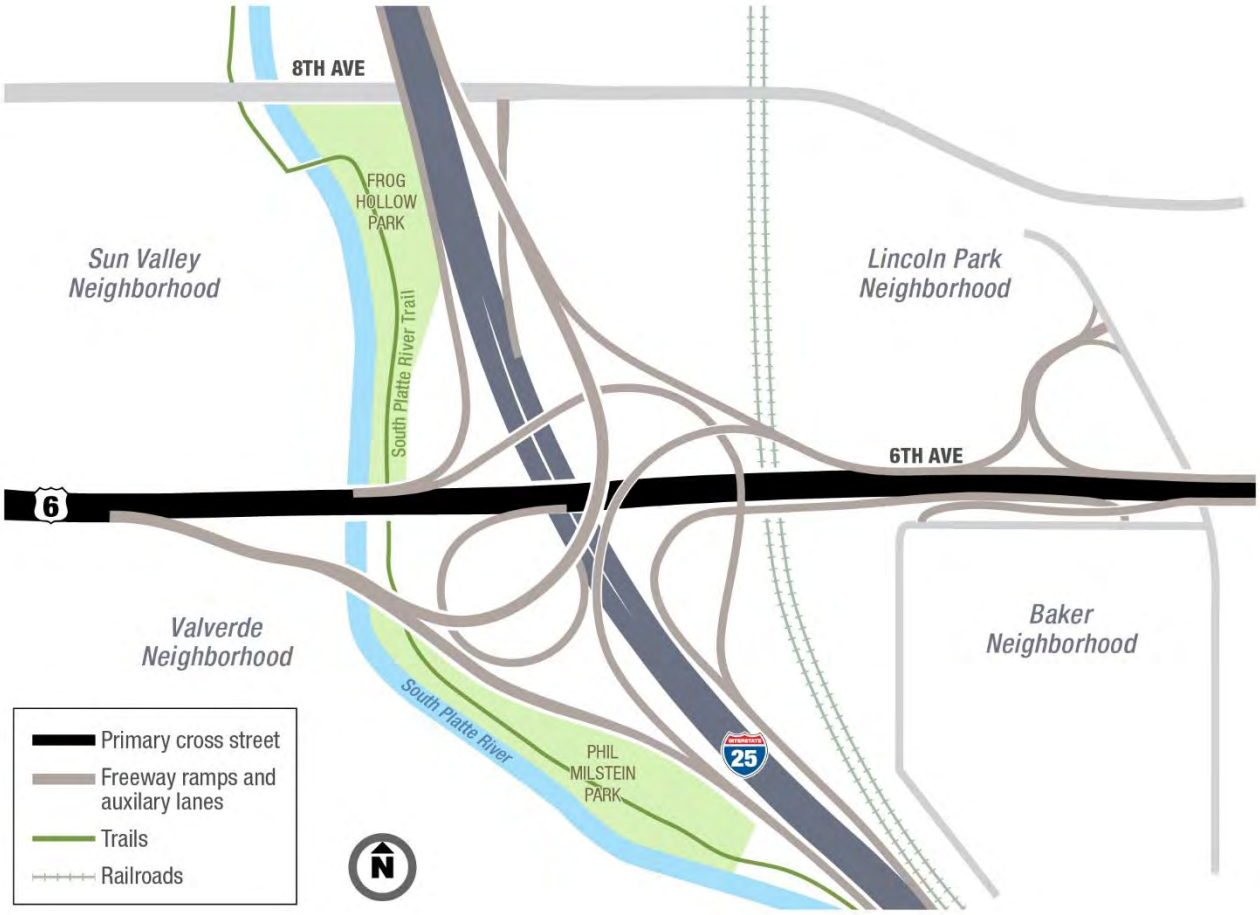


I-25 and US 6/6th Avenue Interchange

US 6/6th Avenue runs east-west from Aurora, Colorado, to Golden, Colorado, and continues west. From Colorado Boulevard to Kalamath Street, 6th Avenue is a one-way street accommodating eastbound traffic only. Kalamath Street, a southbound-only street, has a spur that becomes westbound 6th Avenue. West of Kalamath Street, 6th Avenue transitions into US 6 and continues west over I-25 as an urban highway. West of the I-25 interchange, US 6 is a six-lane freeway with a posted speed limit of 55 mph. Sidewalk facilities exist on 6th Avenue east of Kalamath Street but do not extend farther west along US 6. Figure 22 shows the general layout of the US 6/6th Avenue and I-25 interchange. Full access is provided between I-25 and US 6/6th Avenue via directional ramps.

The interchange and highway form a three-level interchange with I-25 running underneath US 6 and flyover ramps from eastbound US 6 to northbound I-25 and westbound US 6 to southbound I-25 running above US 6. Over I-25, 6th Avenue is made up of three eastbound lanes and two westbound lanes with a posted speed limit of 55 mph, reducing to 45 mph just east of I-25, where the eastbound direction reduces again to 35 mph west of Kalamath Street. Where US 6 crosses I-25, the interstate highway typical cross-section includes four northbound lanes and four southbound lanes.

Figure 22. US 6/6th Avenue Interchange Diagram



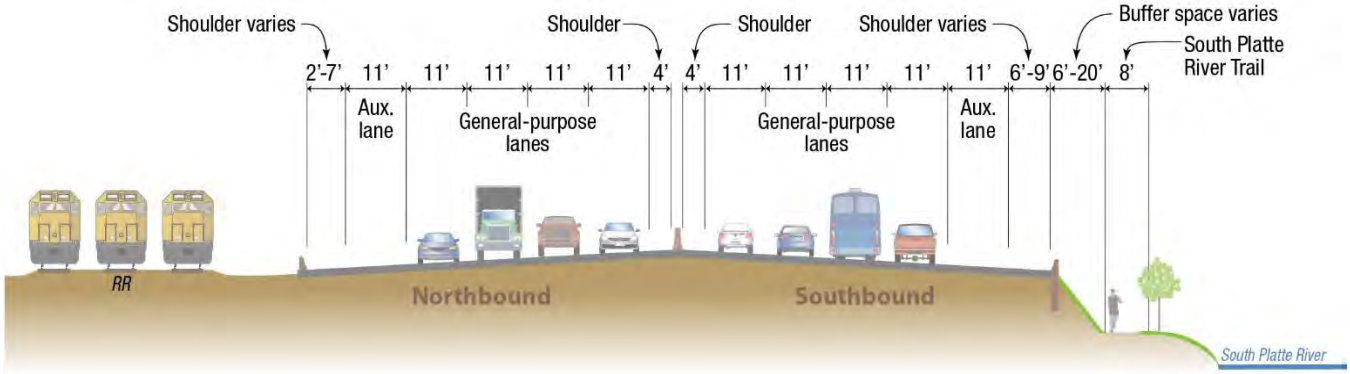
I-25 Mainline Between US 6/6th Avenue and Alameda Avenue

The segment of I-25 between US 6/6th Avenue and Alameda Avenue is approximately 1.25 miles in length. The existing typical mainline cross-section for this segment includes four general-purpose lanes in each direction, inside and outside shoulders, and one auxiliary lane in each direction. Figure 23 shows a typical cross-section through this segment.

Through this segment, I-25 runs through a narrow corridor bounded by the South Platte River to the west and the consolidated mainline railroad to the east. Beyond these barriers, the surrounding land uses are primarily light industrial on both sides of the highway.

I-25 looking north from the South Platte River trail between Alameda Avenue and US 6/6th Avenue

Figure 23. Typical Cross-Section—US 6/6th Avenue to Alameda Avenue



BNSF Railway Under I-25

Just south of the US 6/6th Avenue interchange, a BNSF Railway spur track passes underneath I-25. This spur line connects industrial properties on the west side of the South Platte River to the consolidated mainline railroad on the east side of I-25. Underneath I-25, there are two tracks; however, immediately to the west of the underpass, the railroad narrows to a single track before passing over the South Platte River.

Left: Looking east at the BNSF Railway crossing underneath I-25.

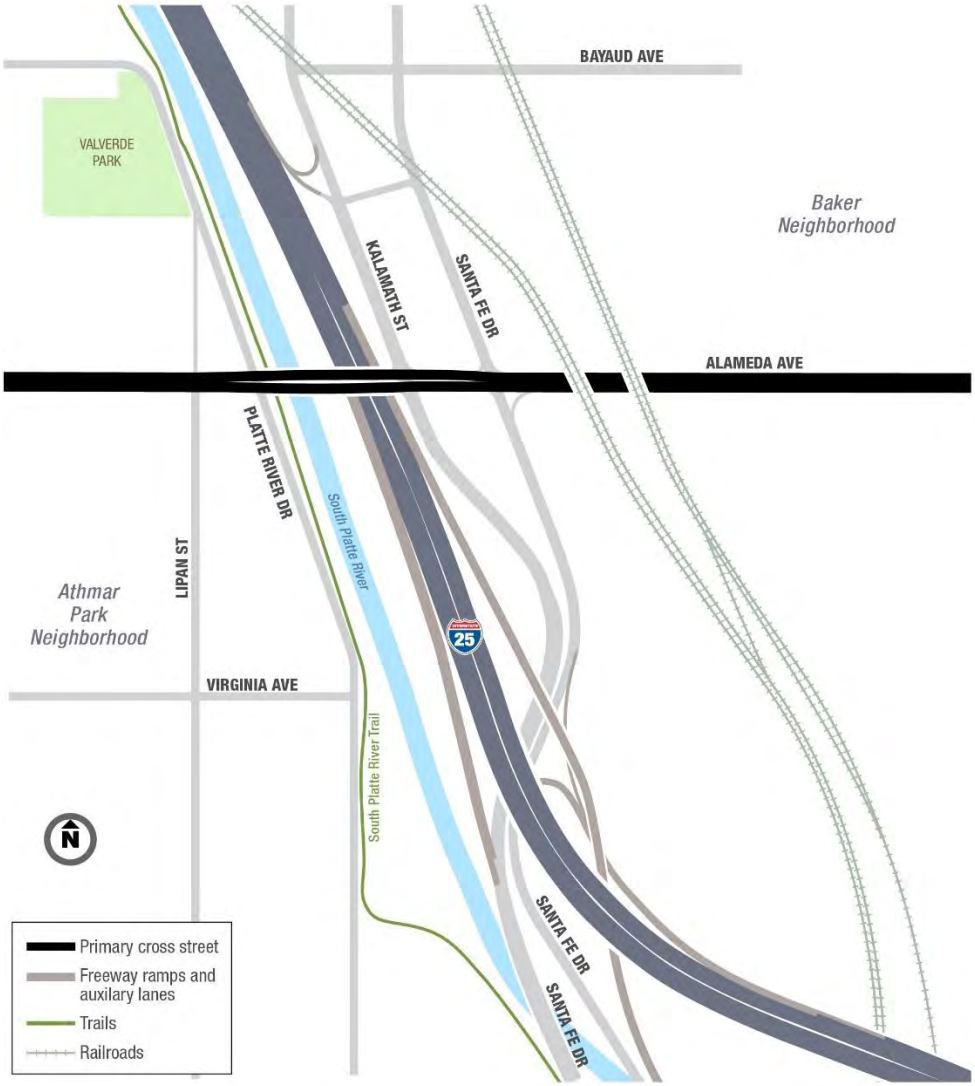
Right: Looking west at the BNSF Railway crossing over the South Platte River (directly west of the BNSF Railway crossing of I-25).

I-25 and Alameda Avenue Interchange

Alameda Avenue is an east-west arterial that runs from I-225 in Aurora to Union Street in Lakewood. East of I-25, Alameda Avenue runs under the consolidated mainline railroad and the RTD tracks. Over I-25, Alameda Avenue contains two through lanes and a left-turn lane in the westbound direction and two through lanes, two left-turn lanes, and a right-turn lane in the eastbound direction. Alameda Avenue has a posted speed limit of 35 mph through the study area. Alameda Avenue has sidewalks on both sides of the street over I-25; however, extending east under the railroad tracks, there are sidewalks only on the north side of the street.

The I-25 southbound off-ramp creates a signalized T-intersection with Alameda Avenue. Northbound access from Alameda Avenue to I-25 is achieved via Santa Fe Drive and the Cedar Avenue on-ramp. This ramp also provides access to northbound I-25 for southbound Kalamath Street traffic. There is no access from Alameda Avenue to southbound I-25 nor any access from northbound I-25 to Alameda Avenue. Figure 24 shows the general layout of the Alameda Avenue and I-25 interchange.

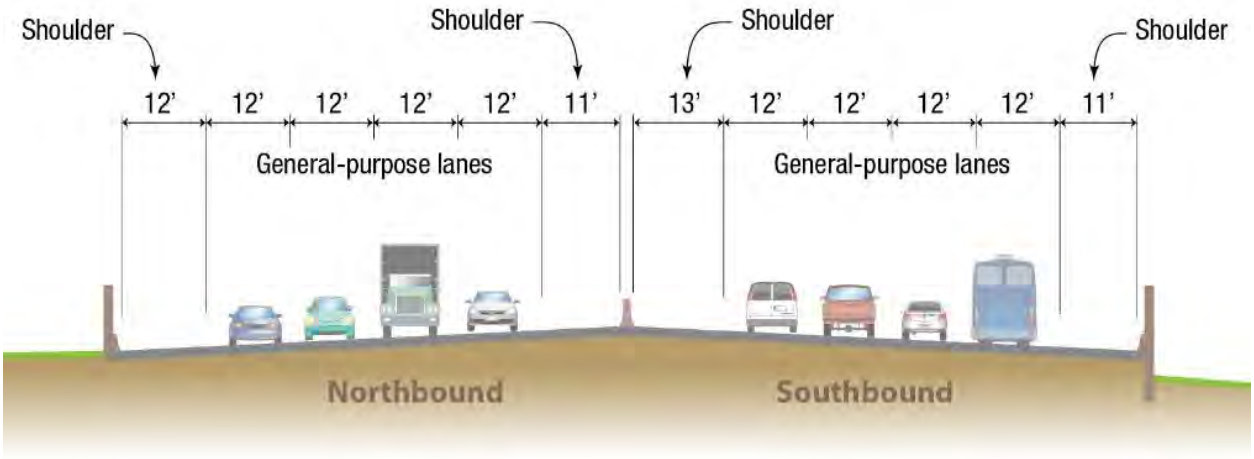
Figure 24. Alameda Avenue Interchange Diagram



I-25 Mainline Between Alameda Avenue and Santa Fe Drive/US 85

The segment of I-25 between Alameda Avenue and Santa Fe Drive/US 85 is approximately one-half mile in length. The existing typical mainline cross-section for this segment includes four general-purpose lanes in each direction and outside and inside shoulders. Figure 25 shows a diagrammatic typical cross-section through this segment.

Figure 25. Typical Cross-Section—Alameda Avenue to Santa Fe Drive/US 85



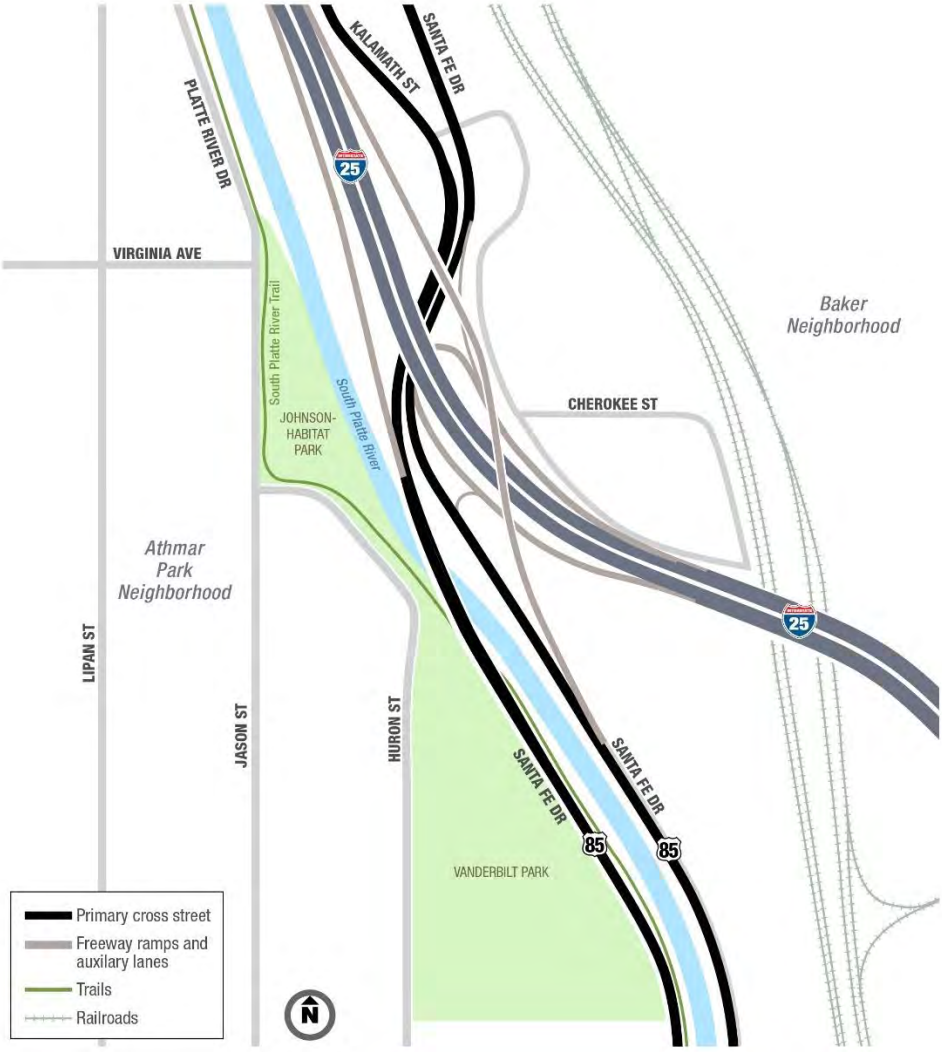
I-25 and Santa Fe Drive/US 85 Interchange

US 85 is Santa Fe Drive through Metro Denver. South of Florida Avenue, the highway has three through lanes and a high-occupancy vehicle lane in each direction, with a posted speed limit of 55 mph. North of Florida Avenue, Santa Fe Drive is a divided highway with northbound and southbound lanes running on either side of the South Platte River.

The northbound Santa Fe Drive to northbound I-25 ramp is a two-lane directional flyover ramp merging with I-25 under the Alameda Avenue bridge. The southbound I-25 to southbound Santa Fe Drive ramp also is a two-lane directional ramp.

North of the I-25 interchange, Santa Fe Drive becomes a one-way couplet with Kalamath Street accommodating northbound and southbound traffic, respectively. Figure 26 shows the general layout of the Santa Fe Drive/US 85 and I-25 interchange.

Figure 26. Santa Fe Drive/US 85 Interchange Diagram



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Engineering

General engineering elements of this project were analyzed to provide details about features and to identify those features that do not meet current engineering design standards.

As part of the review of existing conditions for this project, general engineering elements were examined. The primary goal of this analysis is to provide planning-level details about general engineering features and to identify areas of initial concern, such as those components of the I-25 Central corridor that do not meet current design standards. Engineering elements reviewed as part of this existing conditions report include:

- Roadway geometrics
- Structures
- Utilities
- Railroad facilities
- Recurring maintenance issues

Analysis of each of these engineering features is documented in the following sections. It should be noted that drainage infrastructure is discussed in the environmental portion of this document.

Roadway Geometrics

Roadway geometrics consist of roadway alignments and design features. A roadway is designed to promote safety and facilitate efficient travel through the corridor. Either through existing constraints, impracticality of implementation, or evolving standards, roadway systems may not always meet all current design criteria. The physical features of the I-25 Central corridor have been documented through recent survey (March 2018) and compared to current design standards. A summary of the general design characteristics and the identified deficiencies is provided in the following subsections; Figure 27 through Figure 31 provide graphical representations. Detailed information for the various roadway features and their deficiencies can be found in the *I-25 Central Roadway Geometrics Technical Memorandum* (July 2018).

Lane Widths

The width of a travel lane can influence many factors on a roadway, including travel speeds, driver comfort, and safety. In general, 12-foot travel lanes are the standard for most roadways, including interstate facilities such as I-25 (AASHTO, 2005). Typical I-25 lane widths are 12 feet, although some sections along the project corridor have lane widths of 11 feet. Lane widths of less than 12 feet can cause drivers to travel at reduced speeds because they feel less comfortable and can increase the frequency of crashes. Figure 27 shows lane width deficiencies identified within the corridor.

Shoulder Widths

Shoulders are a critical component to a roadway. They provide space on the sides of the road to accommodate necessary activities, such as emergency response or plowing snow. Throughout the

entirety of the corridor, existing shoulder widths vary. Many existing shoulder widths, both along I-25 and the associated ramps, do not meet current standards. At the time of publication of this document, FHWA recently updated the standard inside and outside shoulder width for metro area interstate facilities. The previous standard was 12 feet (AASHTO, 2005); however, through FHWA's review this standard was changed to 10 feet. The analysis presented in this report is based on the previous 12-foot standard; however, during future phases of this study the 10-foot standard will be used. This modification will not affect a majority of the study area because in extreme cases, the shoulder width is reduced to one foot at locations where the median barrier is flared out for overhead sign structures, creating safety and driver comfort issues. Figure 27 shows shoulder width deficiencies identified within the corridor.

Horizontal Alignment

The horizontal alignment design criterion is linked to the design speed of the facility, the radius of horizontal alignment, and the superelevation (roadway banking) of the roadway. Within a given design speed, the greater the superelevation is on the curve, the tighter the curve radius that is permitted. Existing superelevations were evaluated using recent survey surface and topographic information. Existing ramp horizontal curve radius deficiencies are shown in Figure 28. No mainline horizontal curve radius deficiencies were identified within this corridor. Superelevation deficiencies identified within the corridor for the mainline are shown in Figure 29.

Horizontal Stopping Sight Distance

Horizontal stopping sight distance is a calculation that determines the necessary distance to safely stop a vehicle in a sudden stop condition. The equation to determine the distance includes driver reaction time and the distance to stop a vehicle from a given design speed. Obstructions often infringe upon the sight distance lines, reducing driver safety. Based on the design speed of the mainline and respective ramps, Figure 28 and Figure 30 show horizontal stopping sight distance deficiencies that have been identified within the corridor.

Cross Slope

Cross slope within the roadway typical cross-section allows for drainage to sheet flow sufficiently across the roadway, reducing icy roads and ponding. According to the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Design Standards, Interstate System*, a typical cross slope for a highway is 2 percent. Cross slope deficiencies found on the mainline within the corridor can be seen in Figure 30.

Acceleration/Deceleration Distance

Acceleration distance provides space for vehicles to get up to speed and safely enter the highway. This distance can be provided on the ramp proper or on the highway, through use of an auxiliary lane. The acceleration length required is determined by the design speed of both the ramp and the mainline and is adjusted according to the vertical grades associated with each. Similarly, deceleration provides sufficient space for vehicles leaving the highway to safely reduce speed away from the mainline traffic. Figure 28 shows the acceleration/deceleration deficiencies identified within the corridor.

Ramp Spacing

Adequate spacing between ramps permits safe weaving operation between interchanges. Proper ramp spacing gives suitable distance for vehicles to accelerate along entrance ramps and weave into the through lanes, while permitting sufficient distance for vehicles leaving the highway to decelerate and weave onto exit ramps. As ramp spacing is reduced, strain is placed on operations through insufficient acceleration/deceleration distances and associated weaving. Ramp spacing deficiencies for the corridor can be seen in Figure 30 for the mainline and Figure 28 for the ramps.

Lane Balance and Route Continuity

Weaves in advance of an interchange cause friction within the facility, slowing traffic operations and causing safety issues. To reduce the number of weaves required at an interchange, designers implement the principle of lane balance. Lane balance properly aligns the number of lanes entering an interchange, allowing for the efficient exiting of vehicles leaving the highway. No improper lane balance has been identified in this corridor.

Route continuity is a traffic operations concept referring to a continuous directional path along a designated route where lane changes on the route are not necessary. Maintaining route continuity provides a straightforward route for drivers traveling through a corridor by way of reduced decision points, fewer lane changes, and simplified signing. The corridor covered in this study maintains four through lanes and all exit lanes terminate on the right.

Ramp Departure Angle

Ramp departure angle refers to the change in direction drivers are required to maneuver to merge onto the interstate exit ramp. The departure angle should be between 2 degrees and 5 degrees, which allows drivers to exit the interstate while maintaining a higher speed onto the ramp (CDOT, 2005). Figure 28 shows deficient locations identified within the corridor.

Vertical Alignment

The vertical alignment design criterion is linked to the design speed of the facility, the grade along the profile, and the vertical curve length. A critical design element for vertical alignment is stopping sight distance along the vertical curve. Vertical curves are designed to allow sufficient sight lines along the roadway, permitting the user to identify an object in the road and come to a complete stop in a sudden stop situation. Vertical curves that do not meet stopping sight criteria pose a safety risk to drivers.

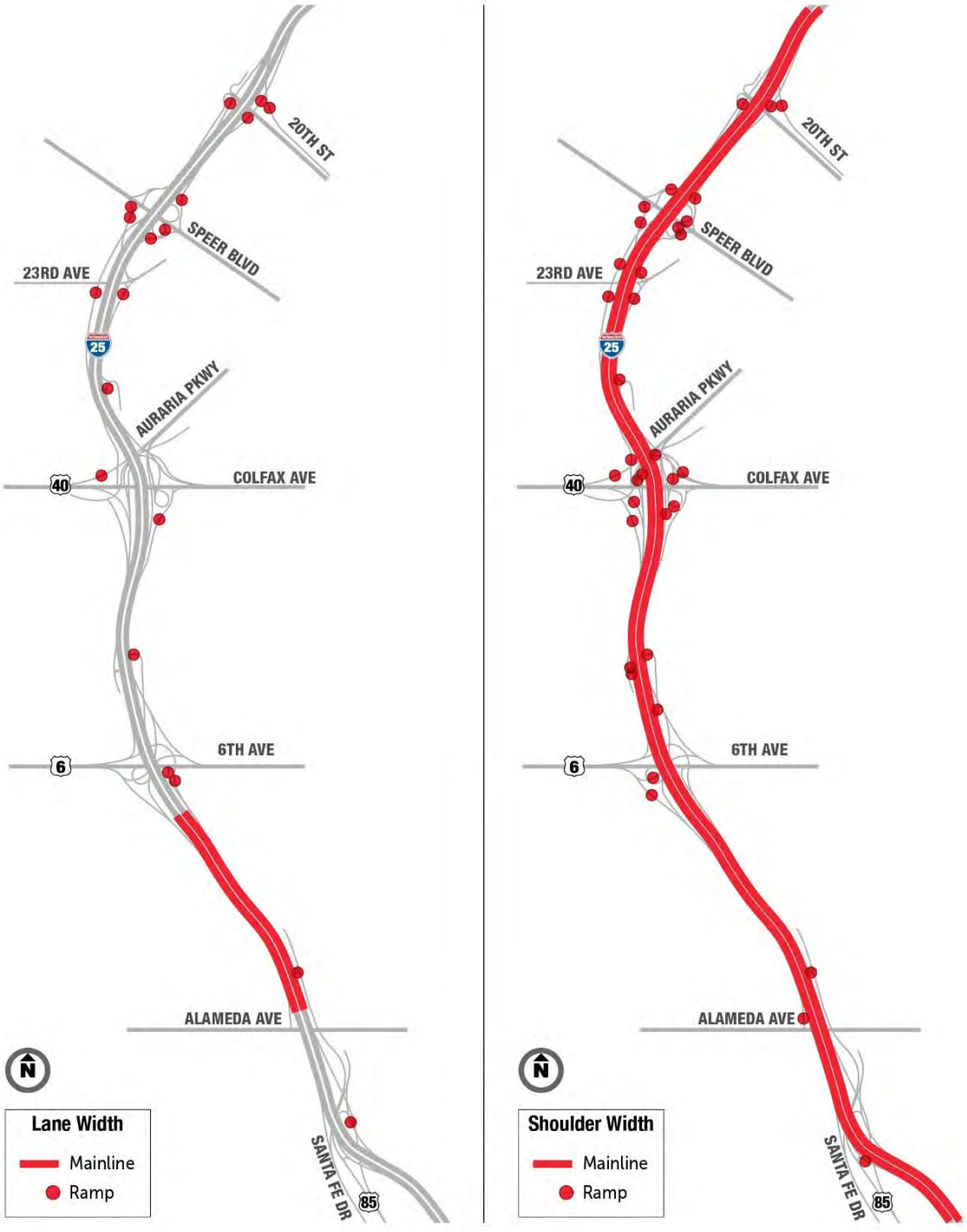
In roadway engineering, the vertical stopping sight distance criterion is measured and reported through K-values. K-values are determined by dividing the length of the vertical curve by the algebraic difference in grades. If a vertical curve does not have the necessary K-value, it is considered to be deficient. Vertical alignment deficiencies within the corridor for both the mainline and the ramps are shown in Figure 30 and Figure 28, respectively.

Clear Zone

Clear zone is the design concept of providing adequate “buffer” between the travel lane and the nearest obstruction. Obstructions include manmade objects (i.e., bridge piers, sign structures, culverts, etc.), as well as natural features (i.e., trees, rocks, etc.). Where insufficient space is available to provide a clear zone, barriers can be provided around the obstruction to redirect vehicles away from the obstruction if

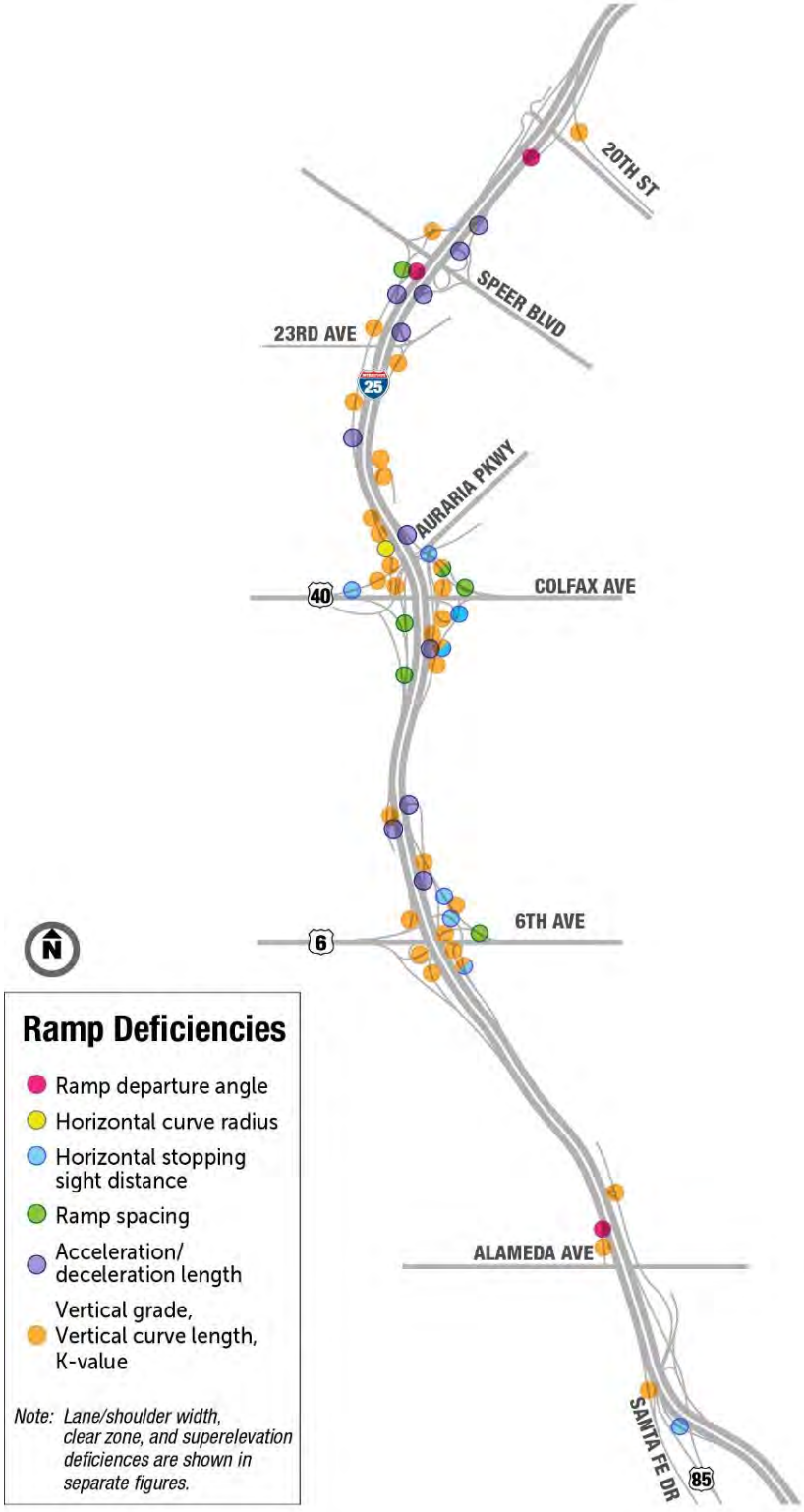
they veer off the roadway. Both the mainline and the ramps mostly provide barrier separation for objects within the clear zone. Figure 31 identifies locations where clear zone requirements are not met.

Figure 27. Existing Lane and Shoulder Width Deficiencies (20th Street to Santa Fe Drive)



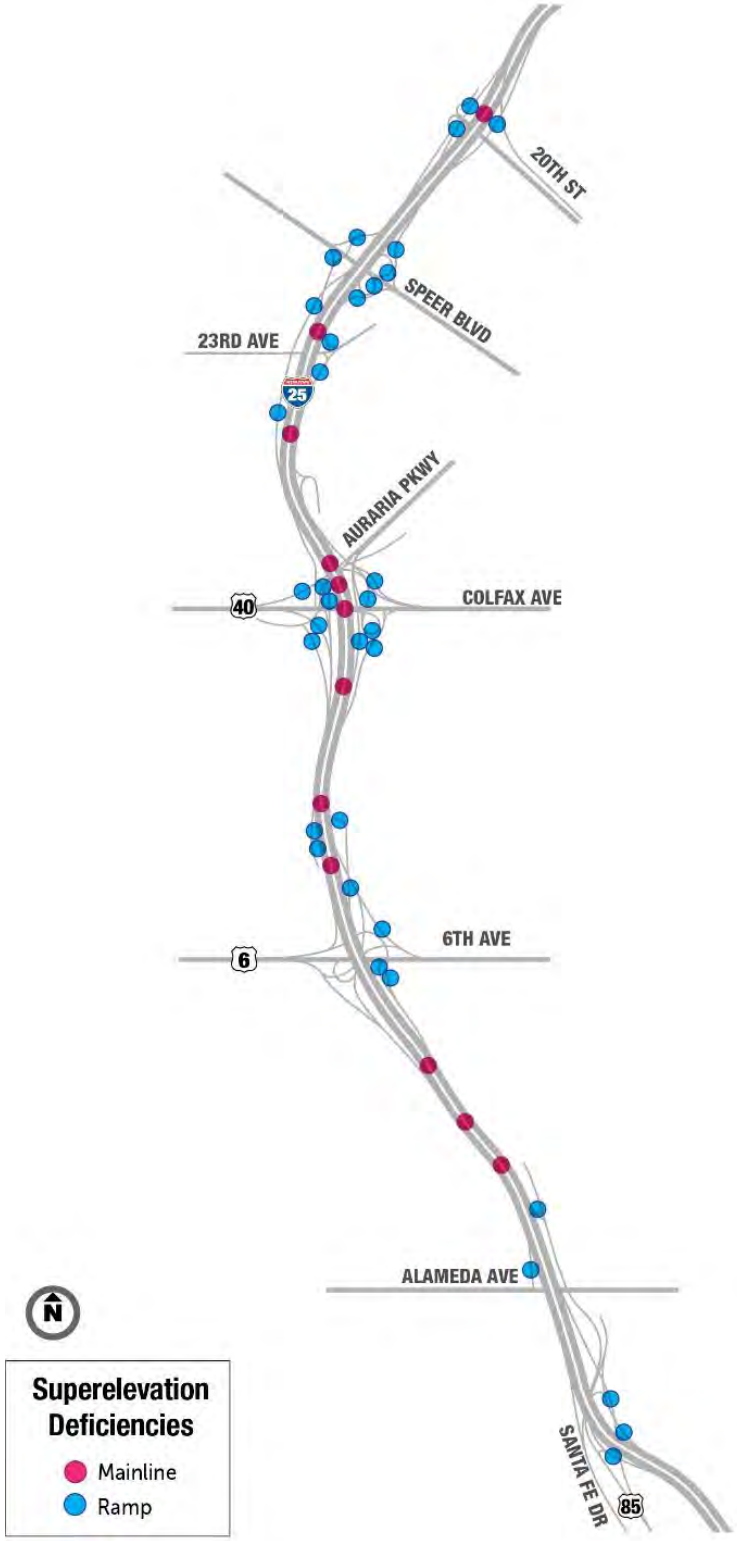
Source: Existing geometric survey data were collected by the project team in 2017 (Project Team, 2017a). Geometric standards are based on AASHTO guidelines (AASHTO, 2005)

Figure 28. Existing Ramp Geometric Deficiencies (20th Street to Santa Fe Drive)



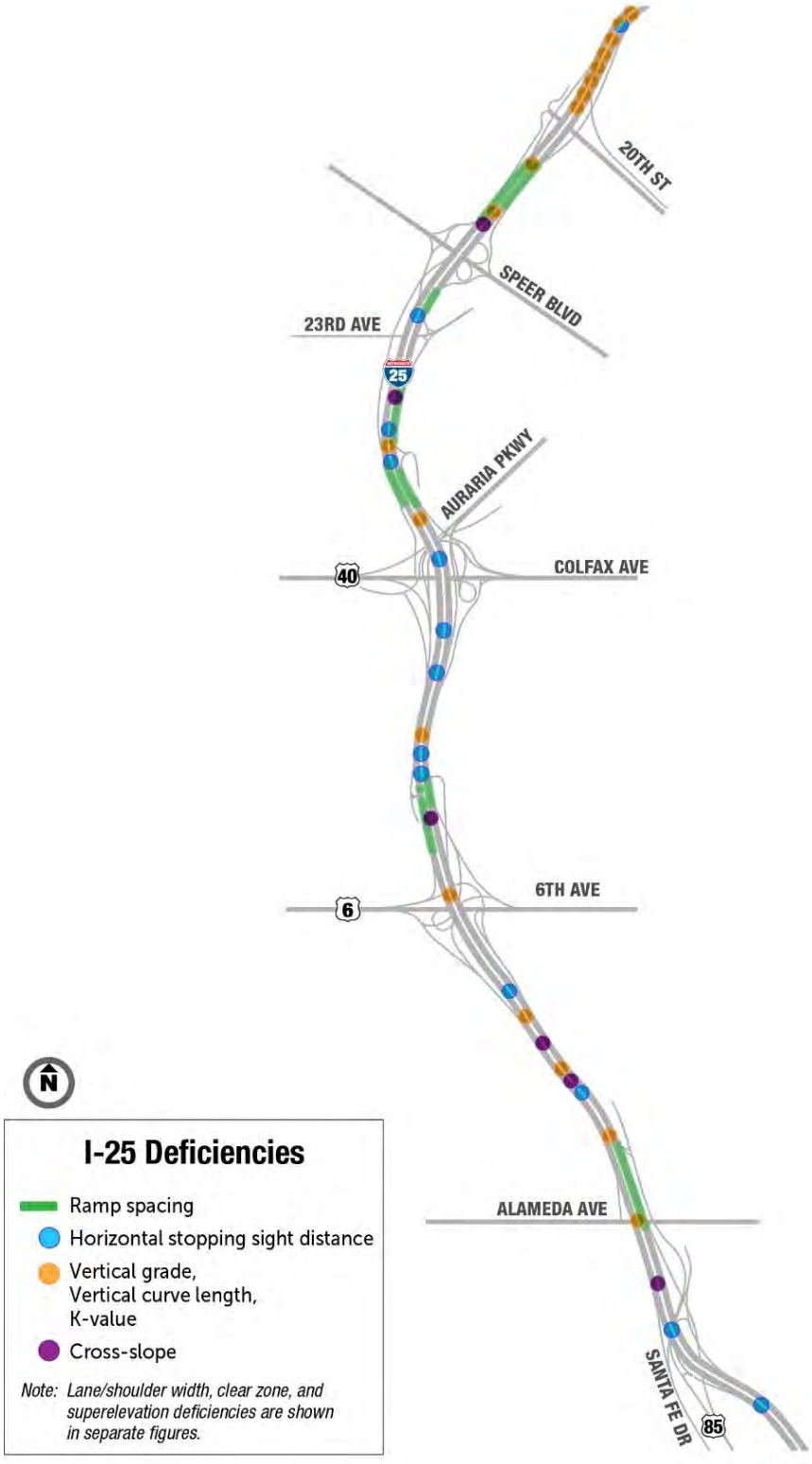
Source: Existing geometric survey data were collected by the project team in 2017 (Project Team, 2017a). Geometric standards are based on AASHTO guidelines (AASHTO, 2005)

Figure 29. Existing Superelevation Deficiencies (20th Street to Santa Fe Drive)



Source: Existing geometric survey data were collected by the project team in 2017 (Project Team, 2017a). Geometric standards are based on AASHTO guidelines (AASHTO, 2005)

Figure 30. Existing I-25 Geometric Deficiencies (20th Street to Santa Fe Drive)



Source: Existing geometric survey data were collected by the project team in 2017 (Project Team, 2017a). Geometric standards are based on AASHTO guidelines (AASHTO, 2005)

Figure 31. Existing Clear Zone Deficiencies (20th Street to Santa Fe Drive)

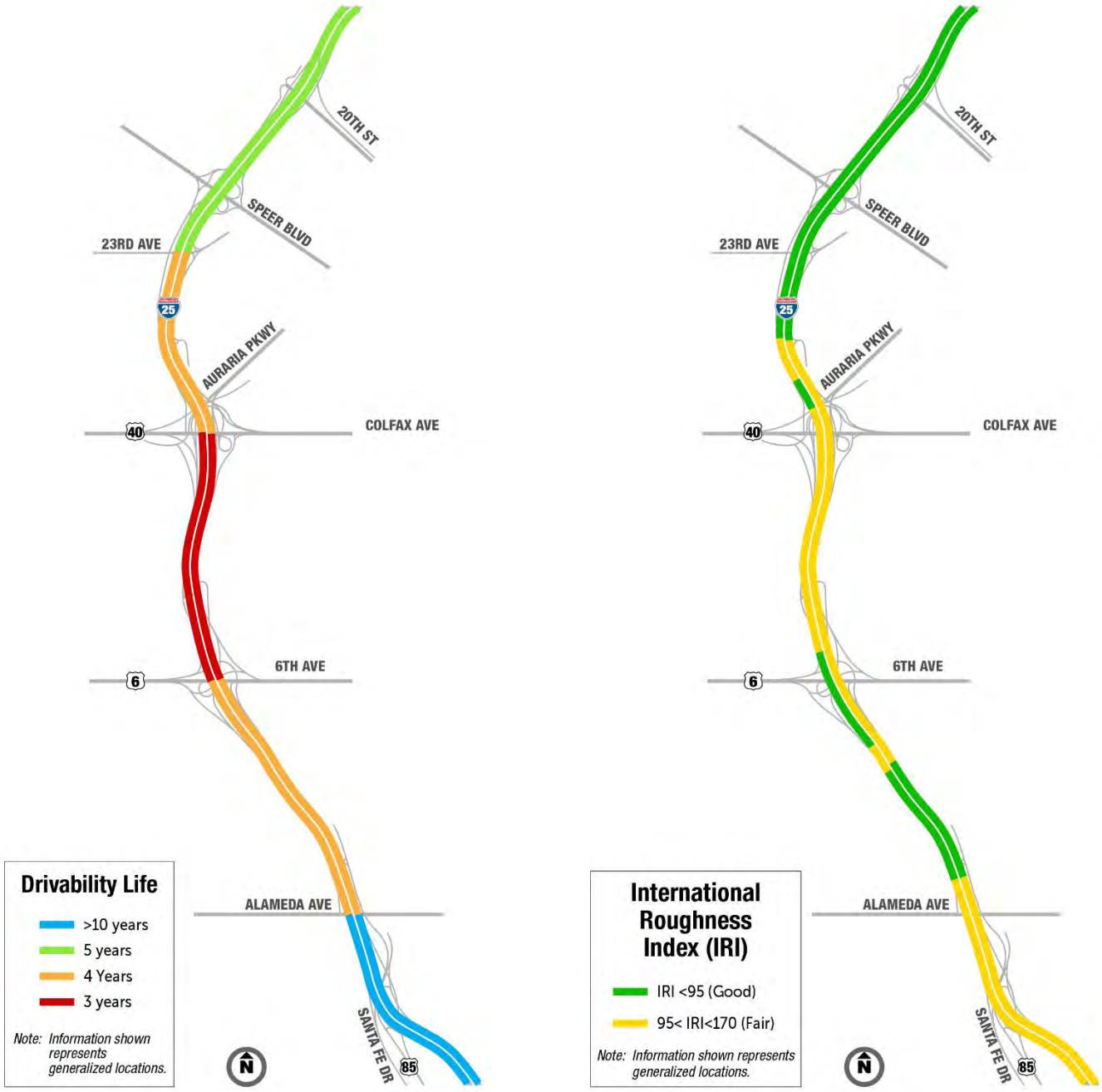
Source: Existing geometric survey data were collected by the project team in 2017 (Project Team, 2017a). Geometric standards are based on AASHTO guidelines (AASHTO, 2005)

Pavement Condition

This corridor is primarily asphalt pavement, except for a concrete pavement section approximately 0.5 mile north of Santa Fe Drive/US 85 extending to 0.25 mile south of Santa Fe Drive/US 85. The existing pavement condition has been evaluated through analysis of the remaining drivability life and through review of the International Roughness Index (IRI). The results from CDOT's Online Transportation Information System (OTIS) showed the remaining life of the asphalt pavement varied from 15 years to 2 years.

The IRI often is used to measure the roughness of the existing pavement and is divided into the following three categories: good (IRI < 95), fair (95 < IRI < 170), and poor (IRI > 170). The IRI results provided by the OTIS website showed that the average rating for this corridor is "fair" for the northbound lanes and "good" for the southbound lanes. Figure 32 shows the remaining drivability life and IRI rating for each portion of the I-25 Central corridor.

Figure 32. Remaining Pavement Drivability Life and IRI Rating



Source: CDOT, 2017e

Structures

Structures within the I-25 Central corridor include bridges, retaining walls, and overhead sign structures.

Bridges

Along the I-25 Central corridor, bridges support I-25, pass over I-25, or travel immediately adjacent to I-25 interchanges. Existing bridges within the corridor are identified in Figure 33, using the unique bridge identifier assigned by CDOT.

CDOT regularly inspects bridges to review their current conditions. Upon inspection, different elements of the bridge are assigned a condition rating ranging from "excellent condition" to "failed condition." Elements assigned a rating include the riding surface, the superstructure, the substructure, and culverts. More information can be found in the *I-25 Central Bridges Technical Memorandum* (July 2018).

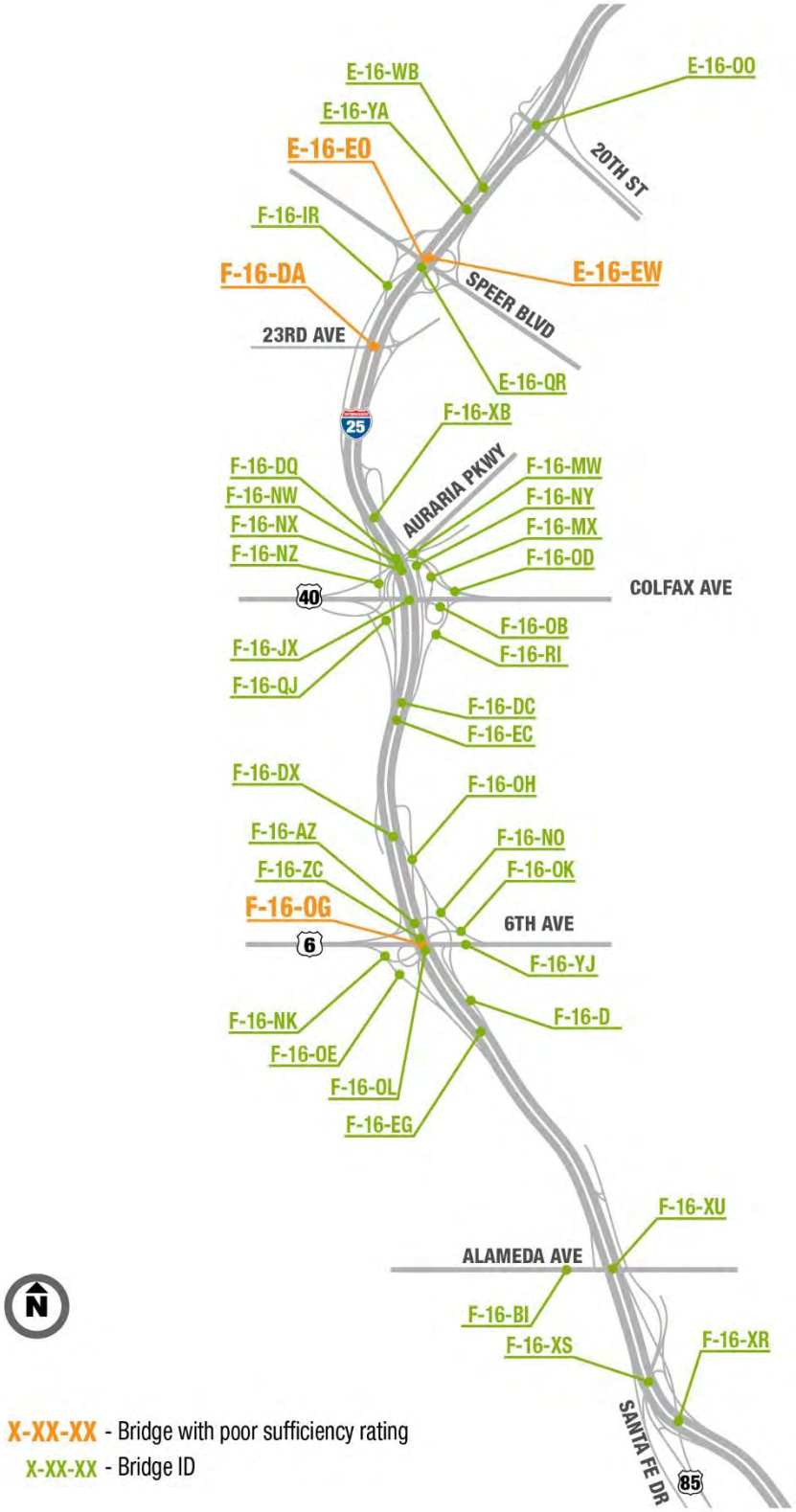
Condition ratings were obtained from the most recent inspection report as of July 9, 2018, provided by CDOT and reported per FHWA guidelines. Based on the reviewed inspection report, four bridges were identified as being in poor or serious condition. These bridges are noted in Table 1. More detailed information on these bridges as well as other bridges along the corridor can be found in the *I-25 Central Bridges Technical Memorandum* (July 2018).

Table 1. Bridges in Poor or Serious Condition

Bridge	Major Inspection Findings	Sufficiency Rating	Condition[1]
23rd Ave over I-25 (F-16-DA)	The structure has experienced multiple vehicular impacts resulting in damaged girders and exposed primary reinforcing. Cracking, heavy efflorescence, and spalled concrete with exposed rebar present throughout the concrete deck. Vertical clearance is 2 feet 9 inches below standard clearance requirements.	76%	Poor
Eastbound Speer Blvd over I-25 (E-16-EO)	The structure has experienced multiple vehicular impacts resulting in damaged girders and exposed primary reinforcing. Cracking, heavy efflorescence, and spalled concrete with exposed rebar present throughout the concrete deck. Vertical clearance is 3 feet, 1 inch below standard clearance requirements.	57%	Poor
Westbound Speer Blvd over I-25 (E-16-EW)	This structure has experienced multiple vehicular impacts resulting in damaged girders and exposed primary reinforcing. Cracking, heavy efflorescence, and spalled concrete with exposed rebar present throughout the concrete deck. Vertical clearance is 3 feet, 5 inches below standard clearance requirements.	58%	Poor
Eastbound US 6 flyover ramp to northbound I-25 (F-16-OG)	More than 20 cracks were discovered in a 4-year period. Many cracks have been arrested but some still exist. Damaged railing due to vehicular impacts. Expansion joints are leaking at Pier 1 and Pier 13.	33%	Serious

1 Poor Condition—advanced section loss, deterioration, spalling, or scour; Serious Condition—loss of section, deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present.
Source: CDOT, 2017e

Figure 33. Existing Bridges



Source: CDOT, 2017e

Non-Bridge Structures

Non-bridge structures within the corridor include approximately 30 retaining walls and 39 overhead sign structures. Most of the retaining walls are mechanically stabilized earth (MSE)-type walls, but walls also are constructed as soil nail, secant pile, and cantilever wall types. CDOT is implementing an inspection program currently to gain more information on these walls. In most situations, the walls facilitate the grade separations necessary for the various interchanges throughout the corridor. A series of walls also support southbound I-25 and the trail immediately adjacent to the South Platte River between US 6/6th Avenue and Alameda Avenue.

The overhead sign structures include both truss-type sign bridges and monotube sign structures.

Utilities

Multiple utilities exist along the I-25 corridor, most of which are located adjacent to the highway. Xcel Energy has a major electric line crossing north of 13th Avenue. Comcast has major fiber crossing at 8th Street and 15th Street. Fiber owned by Level 3, CDOT, and Zayo runs along both sides of I-25 for the entire length of the study area. Similarly, sanitary facilities owned by Metro Wastewater Reclamation District and Denver Water are located within the ROW adjacent the highway. There is no AT&T fiber within the area of the I-25 corridor except on the 15th Street overpass. Table 2 includes more information on location and size (if available) of the existing major utilities.

Table 2. Existing Major Utility Facilities

Utility Owner	Utility	Size	Notes
CDOT	Fiber	N/A	Runs adjacent to I-25 on the east side.
Comcast	Fiber	N/A	Crossings are at 8th Ave and 15th St.
Level 3	Fiber	N/A	Main cable runs parallel to I-25 on the east side between 6th Ave and Colfax Ave before crossing to the west side of I-25 north of Colfax Ave. Additional branch-offs of this main cable cross at Alameda Ave, 15th St, and UPRR south of Park Ave.
Metro Wastewater Reclamation District	Wastewater	42 inches	Crosses I-25 approximately 380 feet south of Alameda Ave.
Metro Wastewater Reclamation District	Interceptor	N/A	East of I-25 between the Alameda Avenue and Santa Fe Dr/US 85 interchanges.
Metro Wastewater Reclamation District	Wastewater	48 inches	Crosses US 6 approximately 650 feet west of I-25.
Metro Wastewater Reclamation District	Wastewater	56 inches	Crosses I-25 approximately 800 feet north of Colfax Ave.
Metro Wastewater Reclamation District	Wastewater	72 inches	Crosses I-25 approximately 1,200 feet north of Colfax Ave.
Metro Wastewater Reclamation District	Wastewater	72 inches	Runs adjacent to I-25 NB off-ramp at 20th St approximately 100 feet east of the ramp.

Utility Owner	Utility	Size	Notes
Metro Wastewater Reclamation District	Wastewater	60 inches and 78 inches	To pipes running on either side of the I-25 NB on-ramp and off-ramp at 20th St for approximately 950 feet.
Metro Wastewater Reclamation District	Wastewater	70 inches	Crosses I-25 approximately 800 feet south of 38th Ave.
Xcel Energy	Electric (Underground)	N/A	Major crossing is north of 13th Ave; in addition, a couple of minor crossings exist north of Colfax Ave and south of Speer Blvd.
Xcel Energy	Gas	N/A	Crosses I-25 approximately 0.5 mile south of US 6/6th Ave and approximately 1,000 feet north of US 6/6th Ave.
Xcel Energy	Gas (Tunnel)	N/A	Located at US 6/6th Ave and I-25 interchange.
Zayo	Fiber	N/A	Runs along the east side of I-25 from US 6/6th Ave to 20th St, with crossings at US 6/6th Ave, 13th Ave, 17th Ave, and Speer Blvd.

Source: Information provided in this table was provided by the respective utility owners in 2017.

Rail Facilities

BNSF Railway, Union Pacific Railroad (UPRR), and RTD operate and maintain rail lines in the I-25 Central study area. The location of these facilities is shown in Figure 34.

BNSF Railway Tracks

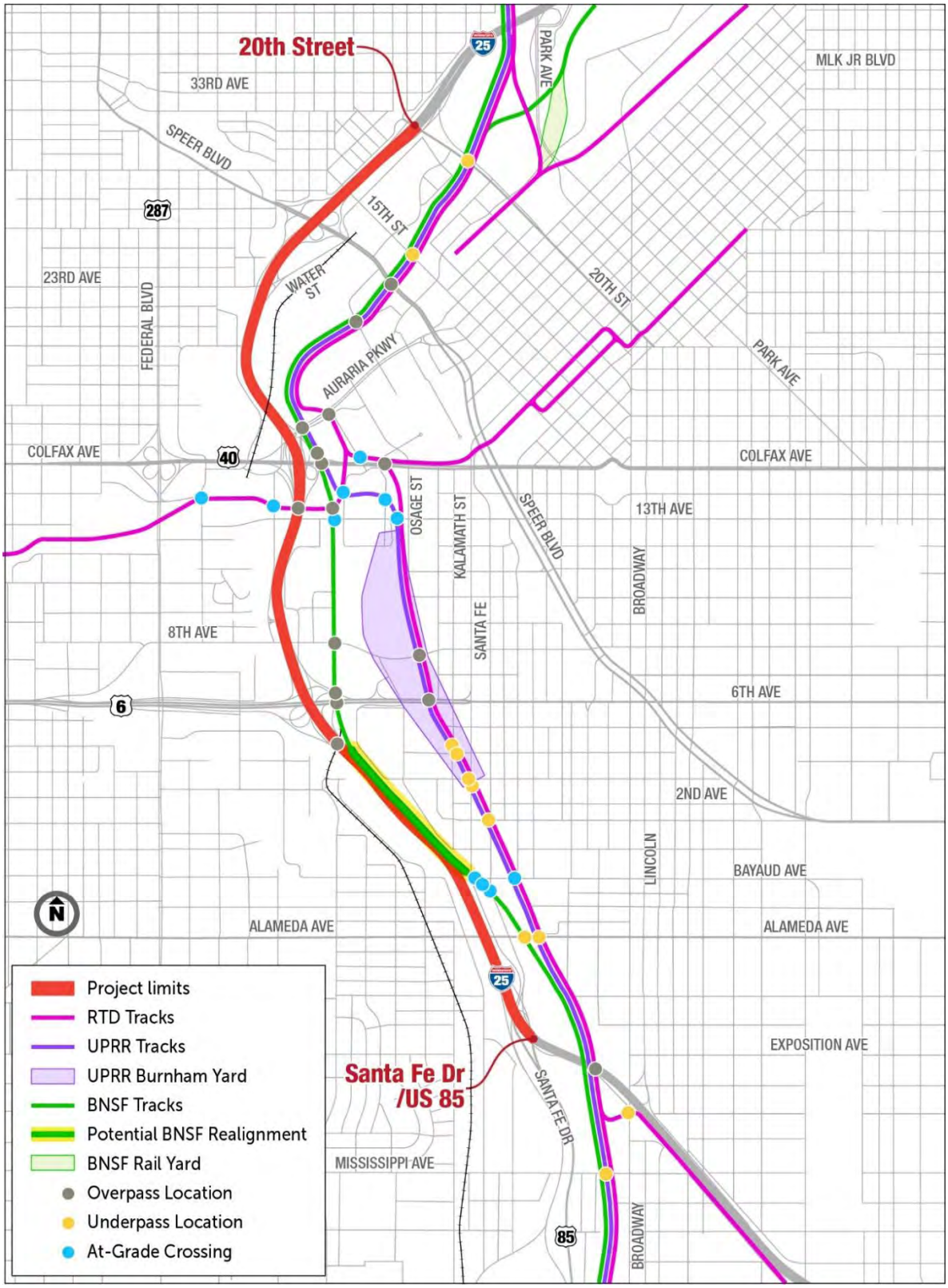
East of I-25, two mainline tracks parallel I-25 the entire length of the study area. These tracks are under a Joint Facility Agreement with UPRR and BNSF Railway. BNSF owns the property and all assets within the corridor and is responsible for all maintenance and construction; UPRR has operating rights on these tracks. The tracks are considered consolidated mainlines due to this agreement. BNSF Railway tracks within the project location are part of the BNSF Powder River Division under the Pikes Peak Subdivision.

Currently, there are 38 trains per day, on average, on these tracks (FRA, 2017) with 24 being operated by BNSF Railway (BNSF, 2017) and the remining being operated by UPRR. Mainline 1, the western line, handles all southbound trains while Mainline 2, the eastern line, handles all northbound trains. BNSF Railway transports a wide variety of commodities at an operating speed between 20 mph and 30 mph. The BNSF tracks are adjacent to multiple industrial sites and provide rail access/deliveries to many of them. BNSF Railway has not provided specific details on the industrial clients in this area, but it is assumed these sites are still active. Detailed information about UPRR usage of these tracks is not known at this time.

Previously Identified Changes to the BNSF Tracks

As discussed in previous sections, the Valley Highway EIS has identified changes to the existing BNSF Railway alignment between approximately US 6 and Alameda Avenue. These changes would move the railroad to the east, further away from the highway. Although these changes were identified in the Valley Highway EIS, they have not yet been funded.

Figure 34. Rail Facilities



Source: Denver, 2018k

UPRR Tracks

The Burnham Yards (railroad yard) is located east of the BNSF Railway tracks from just north of the West 3rd Avenue overpass to just south of the West 13th Avenue crossing. UPRR owns the yard, which ceased operations in 2015. UPRR's access to the yard is at both the north and south ends of the yard via a single mainline track. UPRR plans to discontinue the connection at the north end of the yard after an RTD contract for rail cars ends. This will leave the mainline south access as the only access to the yard track. This single track will remain in operation since UPRR still delivers to the industrial customers south of the yard. The mainline continues south and eventually converges with the BNSF Railway tracks to the west, just south of Alameda Avenue.

RTD Tracks

RTD operates five passenger light rail lines on the mainline tracks that parallel the Burnham Yards under a separate non-joint facility agreement with UPRR. RTD's Mariposa Division operations facility is located between 6th Avenue and 8th Avenue adjacent to the light rail line, also within the Burnham Yards. No plans to alter this operation or change any agreements between UPRR and RTD are known at this time.

In addition to the RTD tracks parallel to Burnham Yards, RTD also operates an additional rail line, the West Line, which passes underneath I-25 near 13th Avenue.

Existing Maintenance Issues

CDOT routinely performs maintenance inspections along the corridor to identify potential areas of concern or a decrease in performance for materials and highway elements. Maintenance inspectors review various corridor assets, including pavement condition, wall condition and settling, drainage ponding, damage to guardrails, reflectivity of striping, etc. As part of this study, the CDOT Maintenance Department identified major existing maintenance issues within the corridor which are summarized in Table 3.

Table 3. Identified Maintenance Issues

Maintenance Issue	Approximate Location
Roadway settled approximately 6 inches to 14 inches, causing separation between the roadway and bridge.	US 6 Ramp C—eastbound 6th Ave to southbound I-25, Station 313+00
Barriers (left and right) along shoulders are in poor condition due to age and vehicular impacts. Due to immediately adjacent bicycle trail, snow plowing is dangerous as drivers cannot see trail users below barrier.	US 6 Ramp C—eastbound 6th Ave to southbound I-25, Station 307+00
Flooding at inlet during heavy rain events. Adjacent barrier has separated.	Southbound I-25 Mainline, Station 1112+00
Type 4 barrier along right shoulder is in poor condition and is a safety issue.	Southbound I-25 Mainline, Station 1080+00 to Station 1120+00
Chain link fence between the railroad and I-25 is in poor condition but proximity of the fence to the railroad makes maintenance difficult.	Northbound I-25 Mainline, Station 1086+00 to Station 1115+00

Source: CDOT maintenance staff comments from fall of 2017

Corridor wide, CDOT Maintenance noted roadway typical cross-section inconsistencies, particularly the varying widths of shoulders, cause difficulties for sweeping and trash pickup operations. Additionally, existing median openings are not necessary for maintenance operations, but have a higher likelihood of being impacted, which causes damage to the impact attenuators. Current interchange design does not permit for efficient snow plowing operations. For example, CDOT maintenance staff prefer that plows are able to exit the highway and then enter back in on the immediate next entrance ramp. Often, this is unachievable because of necessary out-of-direction travel, which causes backups on the local roadway system.

Traffic and Transportation Conditions

The traffic and transportation discussion that follows is divided into four sections, which include vehicular traffic, bicycle facilities, pedestrian facilities, and transit. Results of the data collection and analysis for each of these categories are presented.

Traffic Study Area

Although the I-25 Central PEL project study area includes I-25 from Santa Fe Drive/US 85 to 20th Street, the traffic analysis area extends beyond this area. For this project, the traffic analysis area includes the transportation network between Federal Boulevard to the west, Interstate 76 (I-76)/US 36/Interstate 270 (I-270) to the north, Washington Street/Brighton Boulevard/Speer Boulevard to the east, and Mississippi Avenue to the south. Figure 35 depicts the traffic analysis area.

The traffic analysis area is larger than the project study area because traffic within the project study area is influenced by, and influences, the surrounding transportation network, which extends beyond the project study area. The traffic analysis area was created to capture other major transportation facilities that either provide an alternate route to I-25 or have a major impact on how I-25 operates through the study area.

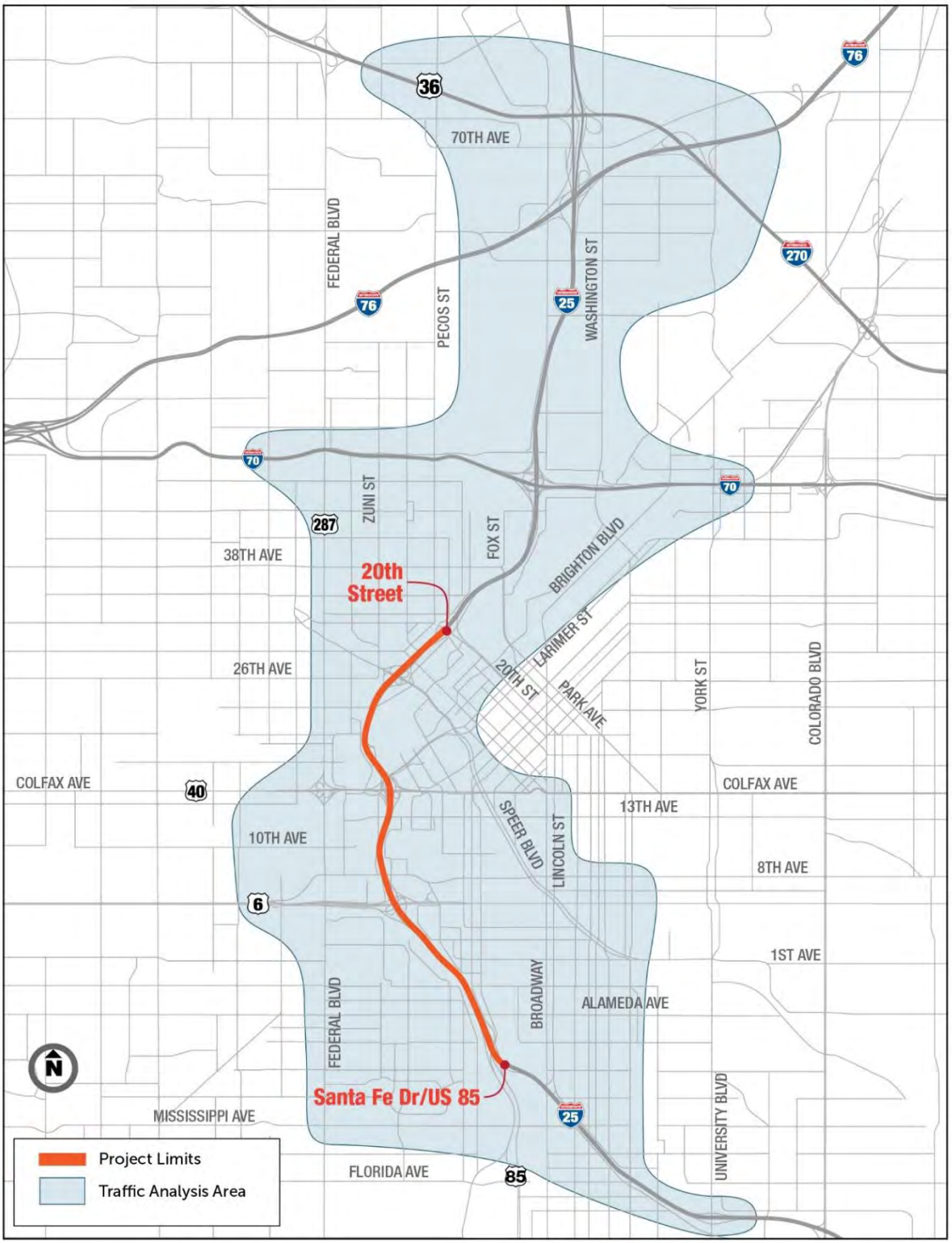
Facilities that provide an alternate route to I-25, also known as parallel facilities, may be impacted more heavily by changes to the interstate as a result of this project. Identified parallel facilities include Federal Boulevard, Downing Street, the Broadway and Lincoln Street one-way couplet, the Santa Fe Drive and Kalamath Street one-way couplet, and Speer Boulevard.

One-Way Couplet

A one-way couplet is a pair of one-way roads that, together, serve bi-directional traffic. These roads often are one or two blocks apart from each other.

The traffic analysis area extends farther to the north than the I-25 Central PEL project study area to capture the influences of the existing highway and interstate network to the north. This includes both the general traffic volumes coming from US 36, I-76, and I-70, as well as the influence of the existing reversible managed lanes.

Figure 35. Traffic Analysis Area



Vehicular Traffic

Vehicular Traffic Data Collection and Analysis

For the purposes of the traffic analysis, three primary datasets were obtained. These include origin-destination (OD) data, speed and travel time data, and traffic count data. A brief description of each data type, including its source and use is presented in the following sections. For more detailed information about sources of data and the locations where data were collected, refer to the *I-25 Central Traffic Data Collection Technical Memorandum* (February 2018).

Origin-Destination Data

OD data provide information about where each trip starts—its origin—and where it ends—its destination. This is important to know because it provides insight into why people choose to use I-25. For this study, OD data were obtained from two sources. The first was the DRCOG regional travel demand model (TDM)—also known as the Focus model. This model uses a diverse range of data, including socioeconomic information, land use data, travel surveys, etc., to statistically model existing travel patterns.

To supplement this model, additional OD information was obtained from StreetLight. StreetLight is a third-party vendor that collects and compiles travel information from a variety of data sources—including mobile device information, GPS tracking information, and more—to determine where trips start and end.

Additional information about these data sources can be found in the *I-25 Central Traffic Forecasting Technical Memorandum* (November 2018) and the *I-25 Central Origin-Destination Analysis Technical Memorandum* (November 2018).

Speed and Travel Time Data

Speed and travel time data were collected along roadway segments to provide a baseline for how well those segments are operating. By comparing the speed and travel times of a roadway during the peak travel periods to the posted speed limit and free-flow travel times, conclusions about the roadway operations can be made. For this study, speed and travel time data were collected from INRIX, a third-party vendor, and by using in-the-field data collection efforts. Additional information about the data collection efforts for speed and travel times can be found in the *I-25 Central Traffic Data Collection Technical Memorandum* (February 2018).

Traffic Count Data

Traffic count data are collected along roadways and at intersections to provide information about how many vehicles travel along the roadway or how many vehicles, bicyclists, and pedestrians pass through an intersection. This information helps to identify travel patterns and traffic volumes throughout the day. Additional information about the in-the-field data collection efforts for vehicle volumes be found in the *I-25 Central Traffic Data Collection Technical Memorandum* (February 2018).

Vehicle Volumes

Traffic count data show that the average daily traffic (ADT) on I-25 ranges between 178,000 vehicles per day (vpd) and 260,000 vpd, depending on the location along the corridor. Generally, daily traffic is greater in the northern portion of the corridor, north of Colfax Avenue, than it is in the southern portion. A similar pattern can be seen in the truck data, which shows a higher percentage of trucks north of Colfax Avenue as compared to I-25 south of Colfax Avenue. Table 4 shows the I-25 ADT and truck percentages by location.

Table 4. Average Daily Traffic and Truck Percentages on I-25

Location	Average Daily Traffic	Average Daily Truck Volumes (Percentage of ADT)
I-25 North of 20th St	256,300	15,100 (5.9%)
I-25 North of Colfax Ave	236,700	14,500 (6.1%)
I-25 South of Colfax Ave	261,000	13,500 (5.2%)
I-25 South of Santa Fe Dr/US 85	178,100	6,800 (3.8%)
I-25 South of Broadway	188,500	7,500 (4.0%)

Source: Project Team, 2017b

For reporting purposes, traffic count data are summarized in the following sections by four categories:

- Northbound I-25
- Southbound I-25
- Parallel routes
- Cross-connectors

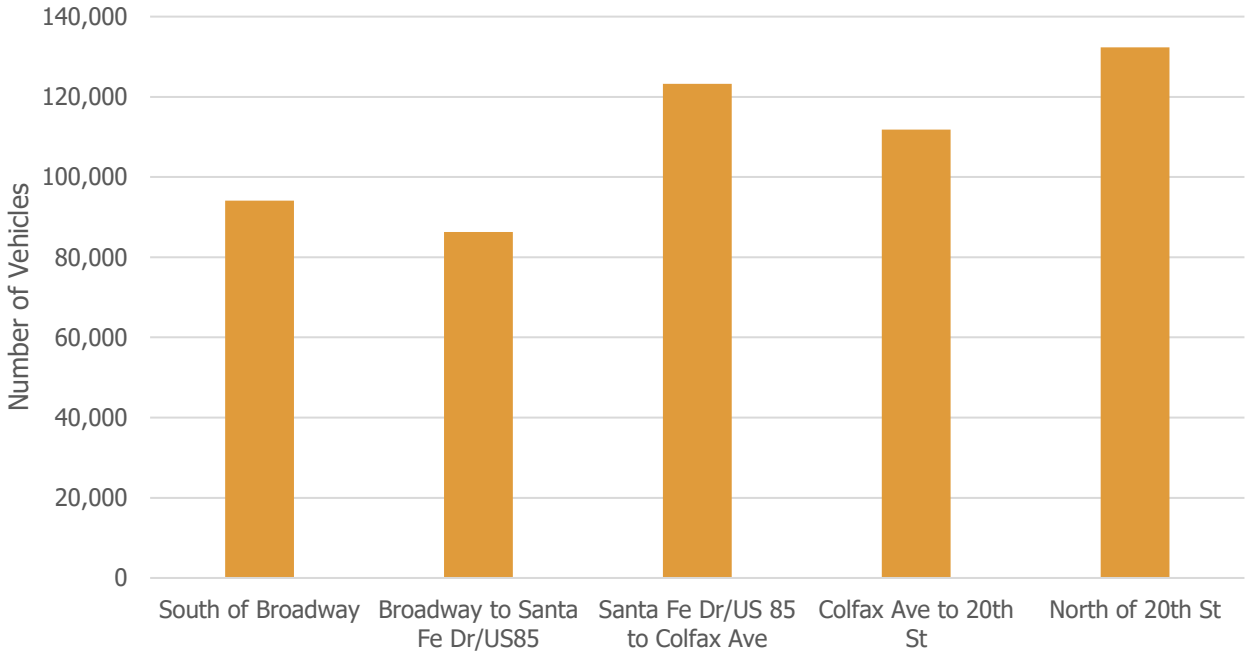
Northbound I-25 Vehicle Volumes

In the northbound direction, ADT is lowest in the southern portion of the corridor, between the Broadway and Santa Fe Drive/US 85 interchanges, and increases moving north. The highest northbound ADT occurs at the far northern portion of the study area, north of 20th Street. Figure 36 shows the northbound ADT by location.

The variation in ADT by location is a result of vehicles entering or exiting the freeway via the on-ramps and off-ramps.

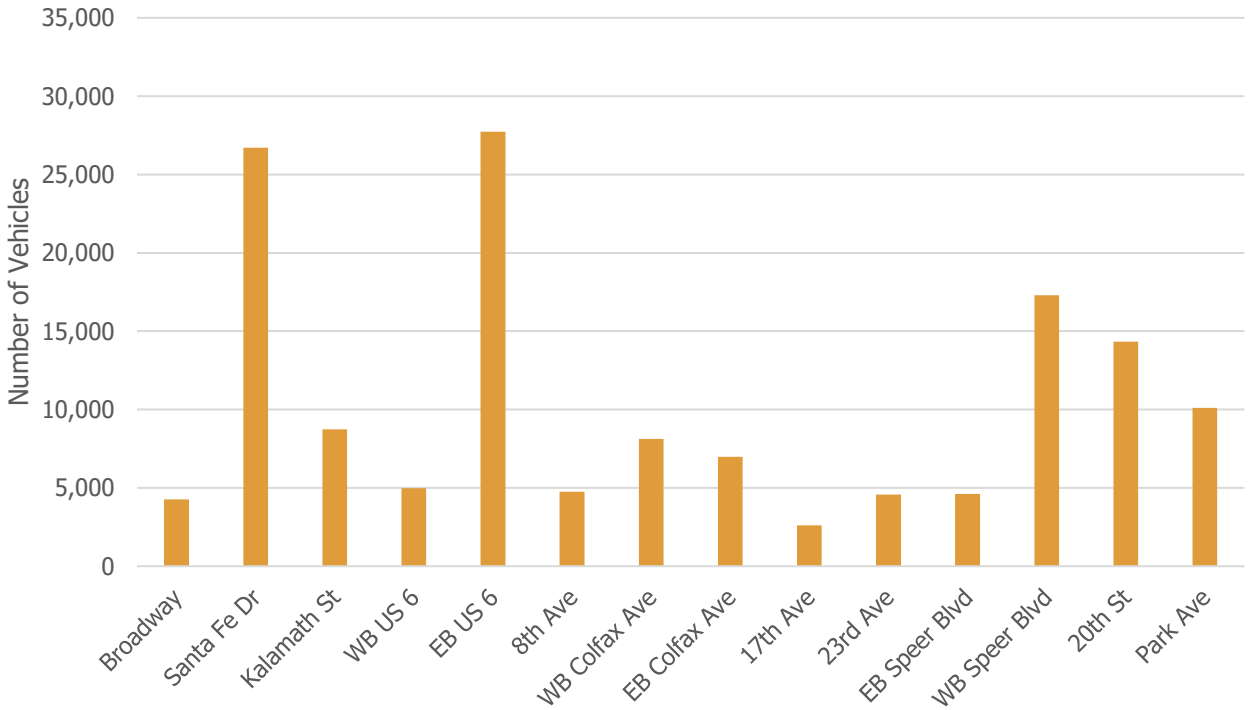
Figure 37 and Figure 38 show the average daily traffic for each northbound on-ramp and off-ramp, respectively. In the northbound direction, the most heavily used on-ramps include eastbound US 6/6th Avenue, Santa Fe Drive/US 85, westbound Speer Boulevard, 20th Street, and Park Avenue. The most heavily used northbound off-ramps include westbound US 6/6th Avenue, Broadway, Santa Fe Drive/US 85, Auraria Parkway, and Colfax Avenue.

Figure 36. Northbound I-25 ADT by Location



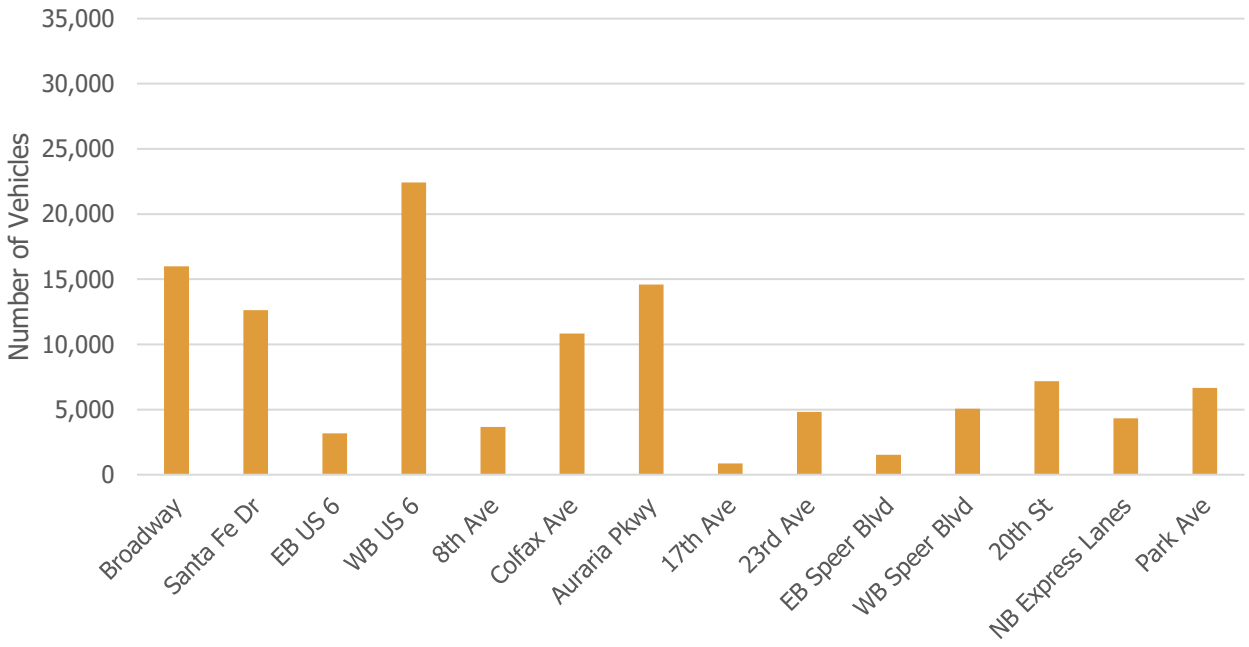
Source: Project Team, 2017b

Figure 37. Northbound I-25 On-Ramp ADT



Source: Project Team, 2017b

Figure 38. Northbound I-25 Off-Ramp ADT



Source: Project Team, 2017b

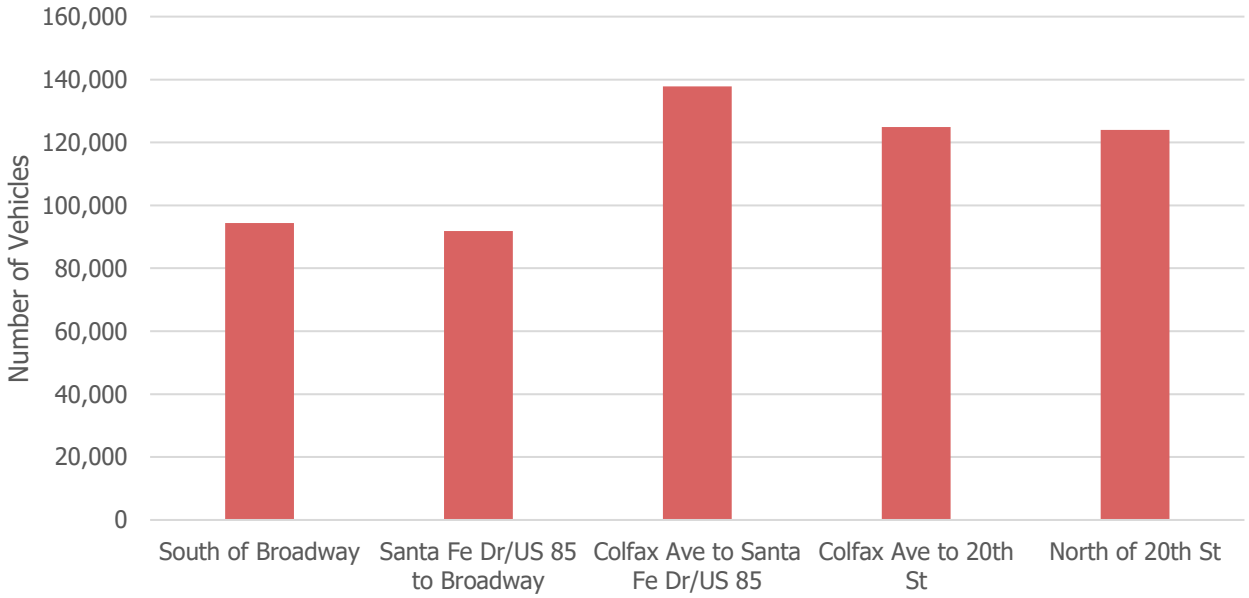
Southbound I-25 Vehicle Volumes

In the southbound direction, I-25 mainline vehicle volumes are approximately 120,000 vpd between 20th Street and Colfax Avenue/Auraria Parkway. South of the Colfax Avenue/Auraria Parkway interchange, southbound I-25 volumes peak, reaching approximately 140,000 vpd. South of the Santa Fe Drive/US 85 interchange, southbound volumes are at their lowest. Figure 39 shows the ADT along southbound I-25 by location.

The most heavily used southbound I-25 on-ramps within the study area include eastbound US 6/6th Avenue, Broadway, and Auraria Parkway. All three of these ramps carry more than 12,000 vpd. Conversely, the most heavily used southbound off-ramps are Santa Fe Drive/US 85, westbound US 6/6th Avenue, Park Avenue, and Speer Boulevard.

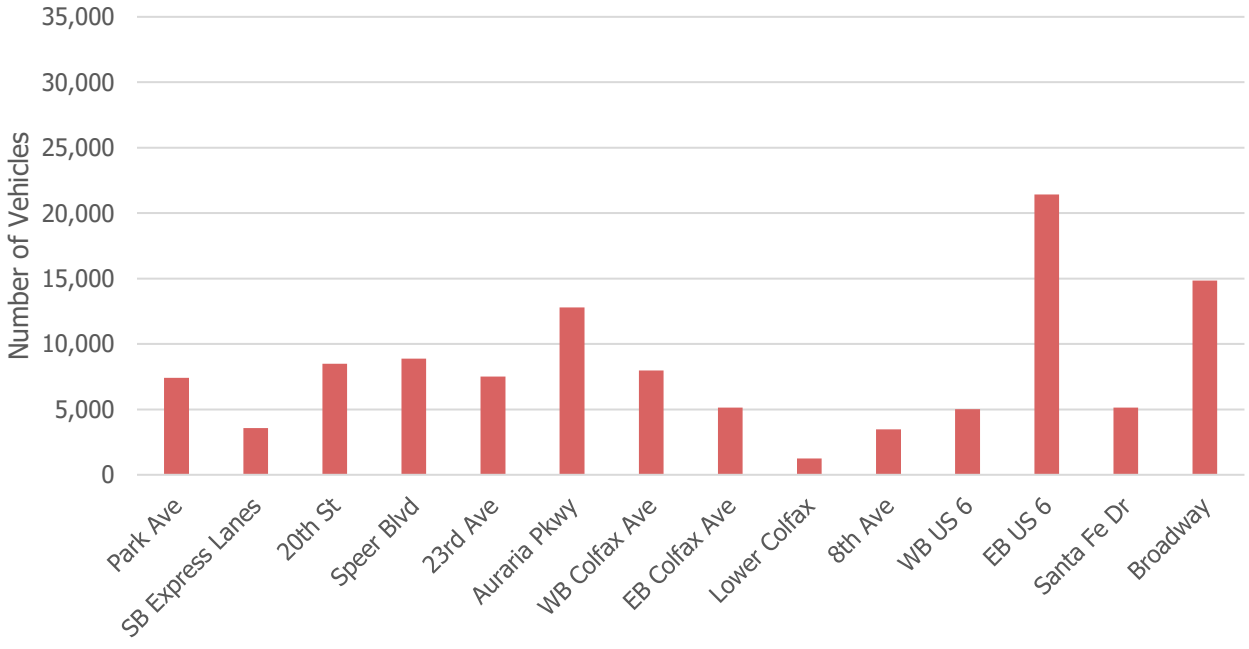
Figure 40 and Figure 41 show the ADT on each of the southbound on-ramps and off-ramps, respectively.

Figure 39. Southbound ADT by Location



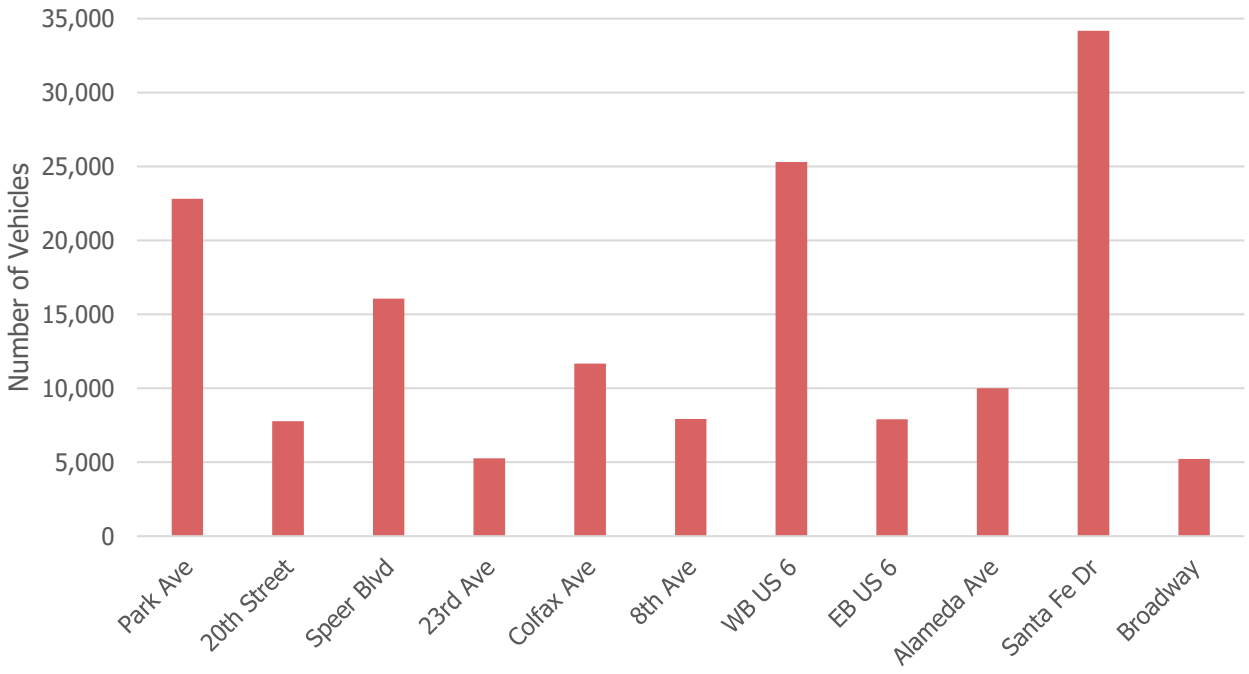
Source: Project Team, 2017b

Figure 40. Southbound I-25 On-Ramp ADT



Source: Project Team, 2017b

Figure 41. Southbound I-25 Off-Ramp ADT



Source: Project Team, 2017b

Parallel Route Vehicle Volumes

Parallel facilities are roadways that generally run north-south and provide an alternate route for drivers instead of using I-25. For this study, parallel roadways for I-25 were considered to be:

- Downing Street
- Broadway/Lincoln Street
- Santa Fe Drive/Kalamath Street
- Federal Boulevard

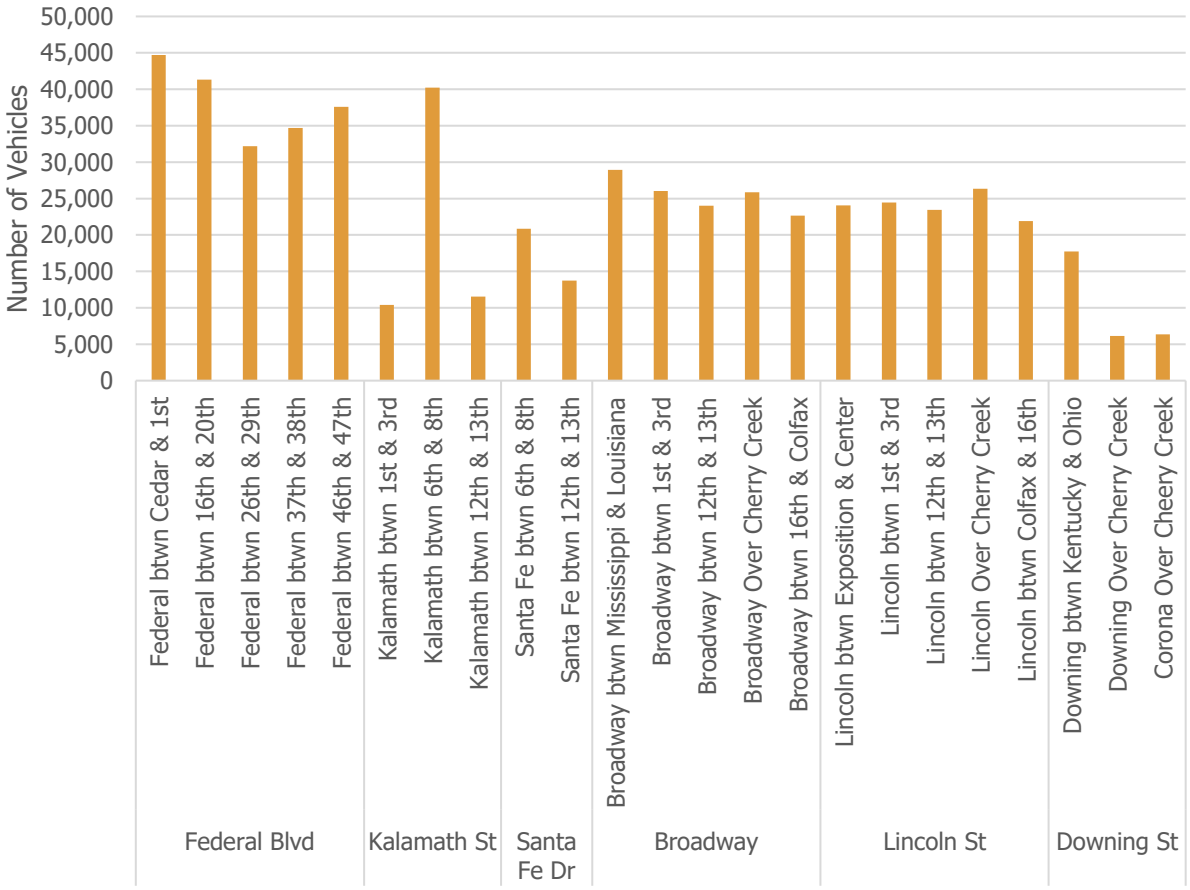
Parallel Facility

A parallel facility generally runs close to and in the same direction as a highway system. These facilities provide an alternate route for travelers.

It is important to note that traffic volumes reported in this section have not been normalized. Because facilities have different numbers of lanes and because some facilities are one way and others are bi-directional, the traffic volumes reported should not be used to compare congestion levels or traffic operations between facilities.

Among the parallel facilities, Federal Boulevard carries the most daily traffic—between 44,700 vpd and 32,200 vpd depending on the location. Note that Kalamath Street between 8th Avenue and 6th Avenue carries an almost equal amount of traffic as Federal Boulevard, approximately 40,200 vpd. However, this location represents a special case because, for this short segment, Kalamath Street carries both the through traffic on Kalamath Street as well as the 8th Avenue traffic attempting to reach westbound US 6/6th Avenue. Excluding this location, Kalamath Street has some of the lowest traffic counts compared to other parallel facilities, carrying between 10,400 vpd and 11,600 vpd. Figure 42 summarizes the daily traffic counts for these facilities.

Figure 42. ADT on Parallel Facilities



Source: Project Team, 2017b

Cross-Connector Vehicle Volumes

Cross-connectors are roadways that generally run perpendicular to I-25 and provide access to, from, and/or across the interstate. For this study, cross-connector routes include:

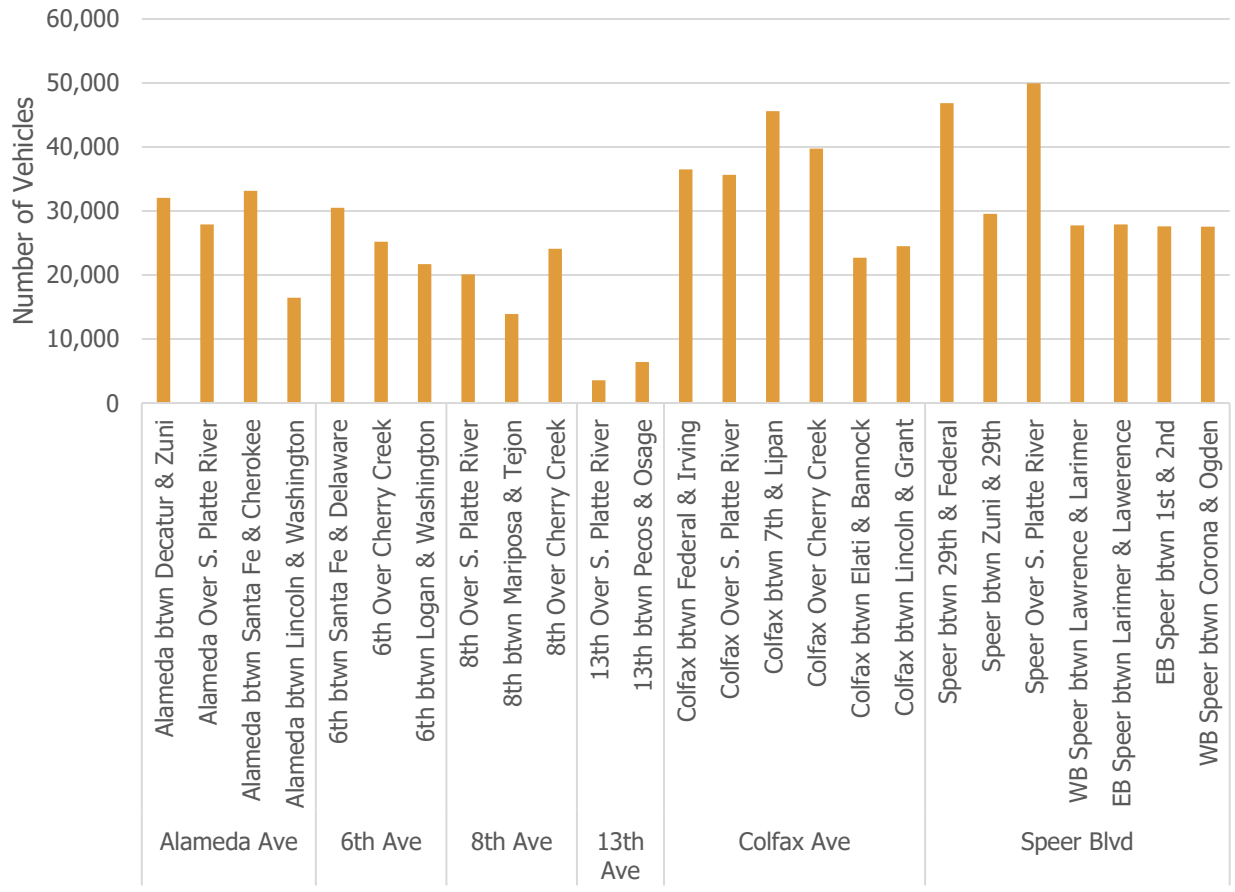
- Alameda Avenue
- US 6/6th Avenue
- 8th Avenue
- 13th Avenue
- Colfax Avenue
- Speer Boulevard

Cross-Connector

A cross-connector generally runs perpendicular to a highway system and provides access onto, from, and/or across an interstate.

Data collected along these facilities show the highest daily traffic volumes occur on Speer Boulevard west of Downtown Denver and on Colfax Avenue between I-25 and Cherry Creek. Both of these facilities carry more than 45,000 vpd. Conversely, the lowest traffic volumes are observed on 13th Avenue, which carries between 3,500 vpd and 6,400 vpd, depending on the location. Figure 43 shows the daily traffic volumes for the cross-connector facilities.

Figure 43. ADT on Cross-Connector Facilities



Source: Project Team, 2017b

Traffic Patterns

Traffic within the study area is influenced most heavily by I-25's proximity to Downtown Denver. Analysis of the StreetLight OD data shows that the most common destinations for northbound travelers—defined as drivers going northbound on I-25 and originating south of Downing Street—include I-25 north of I-70, US 6/6th Avenue, Broadway, and Downing Street. In the reverse direction, this same analysis shows that the most common destinations for southbound travelers—defined as drivers going southbound on I-25 and originating north of I-70—include I-25 south of Downing Street, I-70, Park Avenue, Santa Fe Drive/US 85, and US 6/6th Avenue. Figure 44 and Figure 45 show the overall OD patterns for the northbound and southbound directions, respectively. Additional information, including more OD patterns from specific ramps and interchanges within the study area, can be found in the *I-25 Central Origin-Destination Analysis Technical Memorandum* (November 2018).

I-25 Travel Times

Although congestion can be measured in a variety of ways, for the purposes of this report congestion is measured and explained through travel time and travel time reliability. Travel time is simply the time it takes to travel from one point to another. For the I-25 Central PEL Study, this can be summarized as the time it takes to travel from one end of the project study area to the other end using I-25. To help capture the congestion leading into and out of the study area, the extents of the travel time analysis were extended one additional interchange to the north and south of the study area. Thus, the travel times in this report are reported along I-25 from Broadway to Park Avenue.

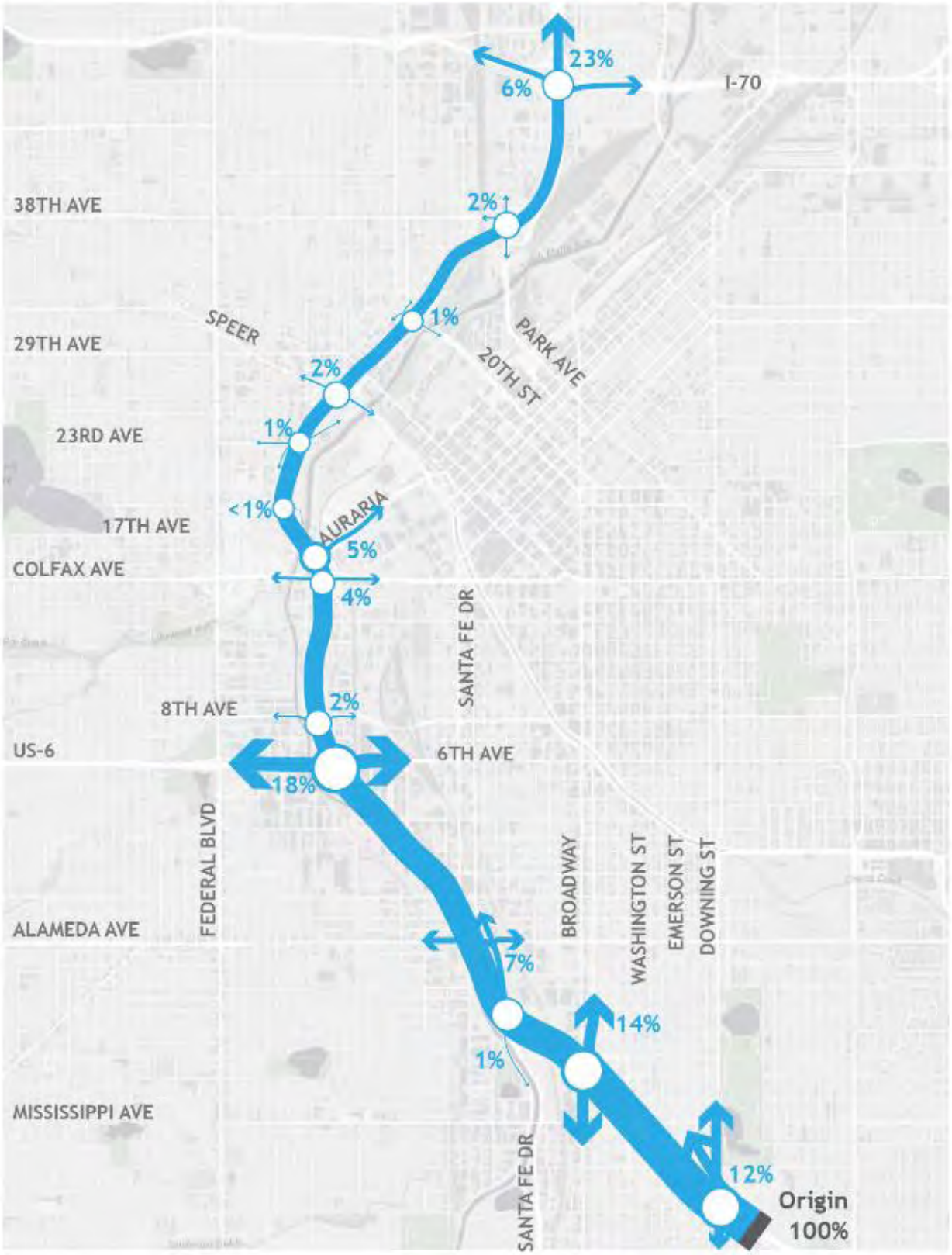
Travel time reliability is the concept of how much travel times can vary from one day to the next. This is important because a more reliable travel time can help people better plan their trips to ensure they arrive at their destination on time. A very unreliable travel time may cause people to allot themselves too much time to travel, resulting in them potentially arriving too early to their destination and wasting time, or not allotting enough time, resulting in people arriving late to their destination. Both conditions can cause irritation to travelers and can have significant economic impacts, especially for freight users.

Using the collected traffic information, existing travel times and travel time reliability were identified. The results show that, with no congestion, a trip between Broadway and Park Avenue or Park Avenue and Broadway takes approximately seven minutes. However, during the most congested travel periods, this same trip can take on average up to 25 minutes in the northbound direction and 14 minutes in the southbound direction.

Because travel time results are reported for a full 24-hour period, travel time information presented in this report is described using travel periods. These periods are determined primarily by the daily commuting patterns because these reflect when there is the most demand on I-25. Time periods used in this report include:

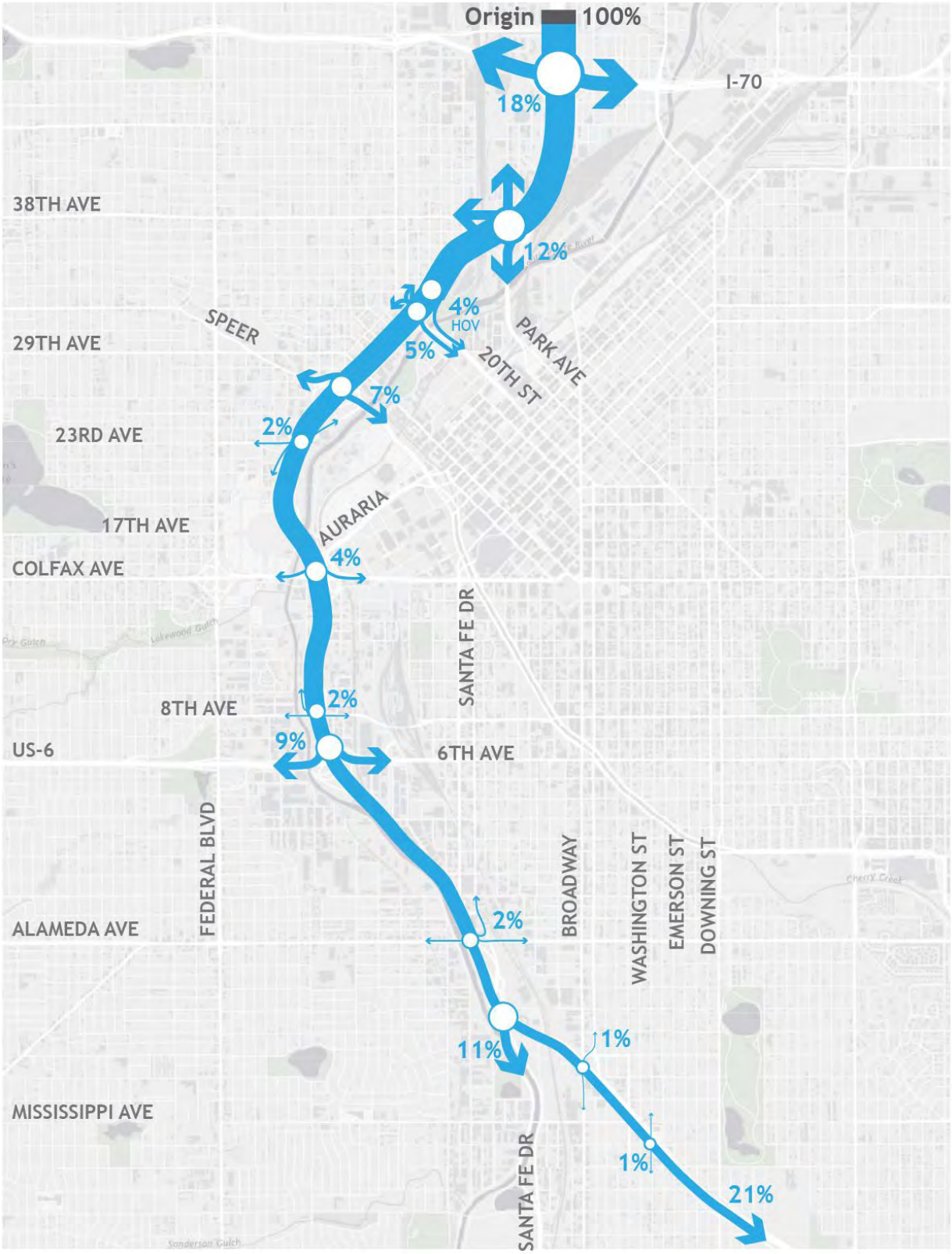
- Overnight—8:00 p.m. to 6:30 a.m.
- Morning Peak—6:30 a.m. to 9:00 a.m.
- Midday—9:00 a.m. to 2:30 p.m.
- Evening Peak—2:30 p.m. to 8:00 p.m.

Figure 44. Northbound I-25 Origin-Destination Patterns



Source: StreetLight Data, Inc., 2017

Figure 45. Southbound I-25 Origin-Destination Patterns



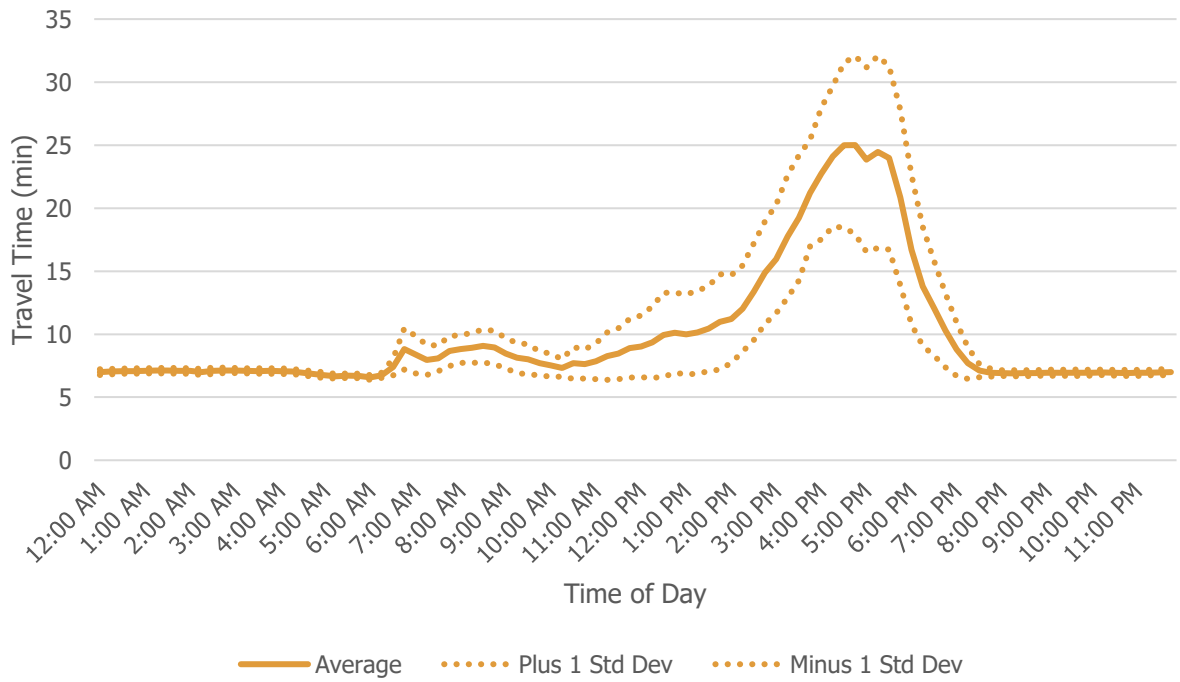
Source: StreetLight Data, Inc., 2017

Northbound Travel Times

Northbound travelers generally experience free-flow conditions during the overnight period. During the morning peak, there is a small increase in travel times with trips from Broadway to Park Avenue taking approximately two minutes longer (29 percent) than free-flow travel times. Although travel times recover slightly at the end of the morning peak period, they then begin to increase again starting around 12:00 p.m. From then on, northbound travel times continue to increase until peaking during the evening peak period. During this peak, a trip between Broadway and Park Avenue takes an average of 25 minutes, or 18 minutes (257 percent) longer than a free-flow trip. After about 6:00 p.m., travel times begin to recover until reaching free-flow conditions at approximately 8:00 p.m.

In addition to the peak travel times, northbound travel also is impacted by travel time reliability. Collected travel time data show that day-to-day northbound travel times can vary by as much as 7 minutes (±28 percent) from the average peak travel time. Figure 46 shows the average northbound travel times on I-25 for trips between Broadway and Park Avenue, as well as the variability in travel time. Travel time variability was taken to be plus or minus one standard deviation from the average travel time. Between 80 percent and 85 percent of all weekday travel times collected were within one standard deviation of the average.

Figure 46. Northbound, Weekday I-25 Travel Times (from Broadway to Park Avenue)



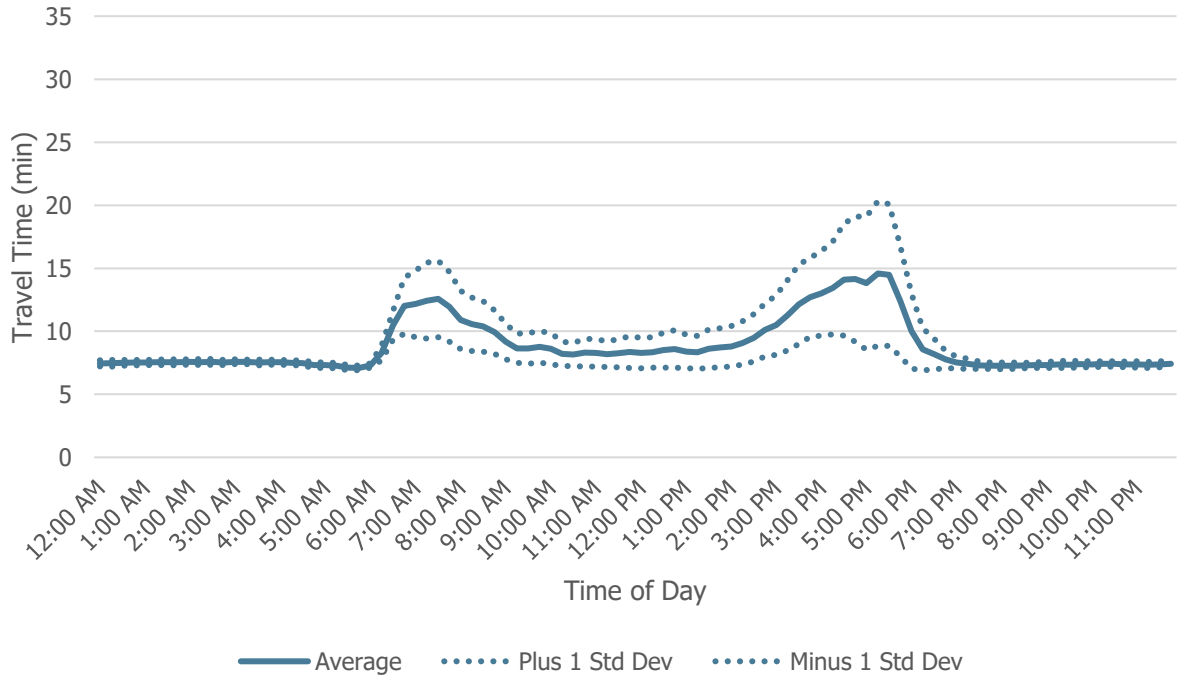
Source: INRIX, 2017

Southbound Travel Times

Similar to northbound trends, southbound travel on I-25 Central generally is free flowing until approximately 6:30 a.m. At this time, southbound travel is impacted by the morning peak period, which increases the average travel time to approximately 12 minutes, or 5 minutes (71 percent) longer than free-flow conditions. Following the morning peak, travel times recover slightly during the midday period, taking approximately 9 minutes to travel from Park Avenue to Broadway. Between 2:00 p.m. and 3:00 p.m., travel times begin to increase leading into the evening peak period. Southbound travel times hit their maximum around 5:00 p.m. when southbound trips take an average of 15 minutes, or 8 minutes (114 percent) more than free-flow travel times. Following the evening peak, travel times return to free-flow conditions at approximately 7:00 p.m.

Southbound travel times also experience reliability issues. Reliability is impacted by travel time variability, which is most prominent during the peak periods. Travel times can vary by plus or minus three minutes (25 percent) during the morning peak period and plus or minus six minutes (43 percent) during the evening peak period. Figure 47 shows the average southbound I-25 travel times for trips between Park Avenue and Broadway over the course of a typical weekday. This figure also shows one standard deviation above and below the average. Between 80 percent and 85 percent of weekday travel times are within one standard deviation of the average.

Figure 47. Southbound, Weekday I-25 Travel Times (from Broadway to Park Avenue)



Source: INRIX, 2017

Transportation Systems Management and Operations

Transportation Systems Management and Operations (TSMO) is a critical component of I-25 and facilitates day-to-day operations of the freeway. Operations include incident management and response, plowing snow, general maintenance, and other tasks that allow the interstate to remain in operation. These operations help maximize the use of the existing interstate infrastructure.

Incident Response

Incident response is a vital element of day-to-day operations on I-25. Incidents ranging from crashes to pedestrian intrusions in the roadway can result in lane closures and distractions to drivers. These outcomes have a negative impact on freeway operations and safety.

The Denver Police Department patrols and enforces laws and regulations pertaining to I-25 through the study area. However, maintenance—including snow plowing—is performed by CDOT. This is important to note because incident response procedures are dictated by the enforcing agency; therefore, Denver Police's policies regarding response and investigation govern how incidents are managed.

This is especially true for I-25 Central because the corridor has no incident management or event management plan. These plans provide a predetermined, coordinated, and often multi-agency response to incidents or events along the corridor. In the absence of these management plans, decisions regarding incident response are left to the discretion of the Denver Police Department and other first responders.

Safety Patrol Information

CDOT's State Farm Safety Patrol is an integral part of the state's incident management program. It provides limited roadside assistance at no charge to drivers in need, including:

- Providing fuel
- Changing flat tires
- Jump-starting vehicles
- Providing lockout assistance
- Moving disabled vehicles to the shoulder
- Assisting stranded motorists
- Providing back-up to the Colorado State Patrol at incident scenes
- Clearing debris from the highway to improve traffic flow and prevent future incidents

The Safety Patrol operates on sections of I-25 Central in three schedules and with multiple routes covering the I-25 Central corridor. Table 5 summarizes the existing safety patrol routes and schedules that cover the I-25 Central corridor.

Table 5. CDOT Safety Patrol

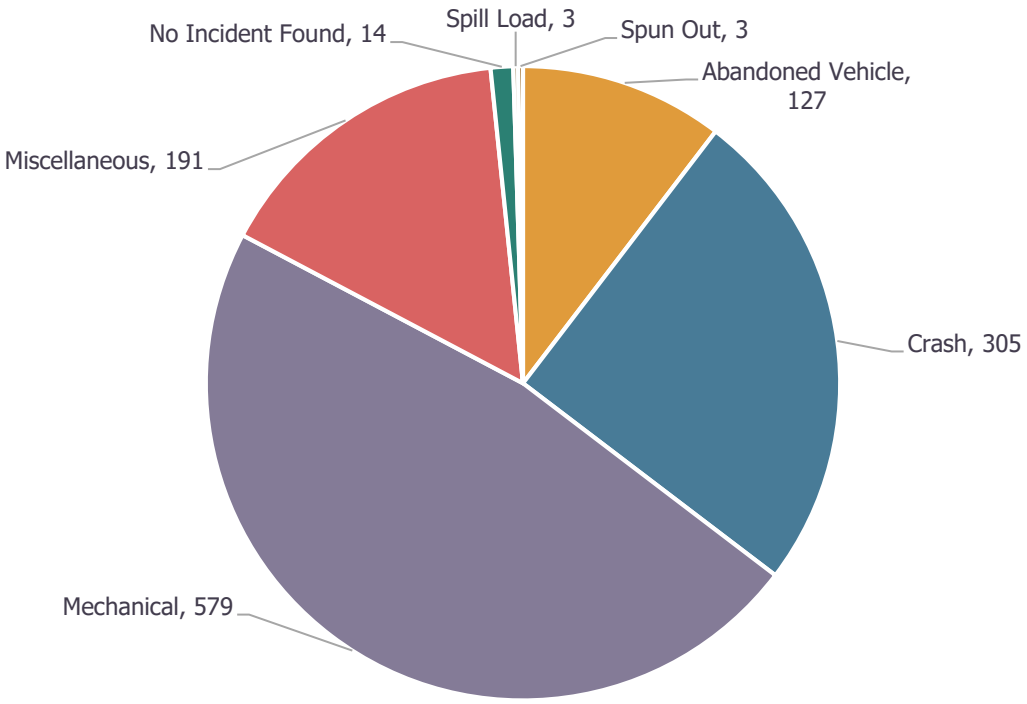
Shift	Route ID	Route Extents	Time of Operations
Peak	T. 14	I-25—58th Ave to Colorado Blvd	6:00 a.m. to 9:30 a.m. 2:30 p.m. to 7:00 p.m.
Peak	P. 15	I-25—58th Ave to Colorado Blvd	6:00 a.m. to 9:30 a.m. 2:30 p.m. to 7:00 p.m.
Peak	P. 21	I-25—Colfax Ave to Colorado Blvd	6:00 a.m. to 9:30 a.m. 2:30 p.m. to 7:00 p.m.
Midday	P. 301	I-25—120th Ave to Colfax Ave	9:30 a.m. to 2:30 p.m.
Weekend	T. 304	I-25—58th Ave to Colfax Ave	10:00 a.m. to 7:00 p.m.

Source: CDOT, 2018b

Safety patrol records were obtained for four months from December 2017 through March 2018. During this time, the five safety patrol routes that include the I-25 Central corridor responded to 1,222 incidents. The most common types of incidents the safety patrol responds to are vehicles experiencing mechanical issues and crashes. Figure 48 summarizes the types of incidents to which the safety patrol responded.

Of the 1,222 incidents responded to, approximately two-thirds were detected visually—meaning safety patrol staff members deployed along the corridor spotted and responded to the incident on their own—and about one-third were detected via dispatch—meaning someone other than a member of the safety patrol spotted the incident and requested assistance.

Figure 48. I-25 Safety Patrol Incidents



Source: CDOT, 2018b

Intelligent Transportation System Devices

Intelligent transportation systems (ITS) devices are different kinds of digital equipment installed along the roadway that collect data, display information, and/or control traffic. ITS devices located on this portion of I-25 include infrastructure related to the existing I-25 Express Lanes, variable message signs (VMSs), ramp meters, and other devices.

Variable Message Signs

VMSs are digital sign boards capable of relaying dynamic information to drivers. On the I-25 Central corridor, there are a total of six VMSs. Three of these VMSs are general, meaning they display any information deemed appropriate by CDOT. The remaining three signs are associated with the I-25 Express Lanes and generally only display pricing and availability of the Express Lanes. Table 6 shows the location of each VMS.

Table 6. Existing Variable Message Signs

Location	Direction	Description
North of Alameda Avenue	Southbound	General VMS
South of US 6	Northbound	General VMS
South of 23rd Avenue	Northbound	Express Lane VMS
	Southbound	General VMS
15th Street	Northbound	Express Lane VMS
South of 20th Street	Northbound	Express Lane VMS

Source: Google Maps

Ramp Meters

Ramp meters control the flow of traffic onto the freeway and help improve operations, especially during the most congested conditions. Along I-25 Central, most on-ramps are metered. These ramps include:

Northbound on-ramps with ramp meters

- Northbound Santa Fe Drive/US 85
- Colfax Avenue
- 17th Avenue
- 23rd Avenue
- Eastbound Speer Boulevard
- Westbound Speer Boulevard
- 20th Street

Southbound on-ramps with ramp meters

- 20th Street
- Speer Boulevard
- 23rd Avenue/17th Avenue
- Santa Fe Drive/US 85

Bicycle and Pedestrian Facilities

Although walking and bicycling is not permitted on I-25 through the study area, the corridor itself does interact with and affect bicyclists and pedestrians. The primary bicycle and pedestrian facilities along the corridor include the South Platte River Trail, which parallels I-25 through the entire corridor, and the multiple bridges and underpasses across I-25, which do accommodate bicyclists and pedestrians.

Pedestrian Facilities

In the approximately 6 miles of study area between 20th Street and Santa Fe Drive/US 85, there are 10 locations where pedestrians can cross the I-25 corridor (Table 7). The crossings at 16th Street and Speer Boulevard are both pedestrian bridges over I-25, while the crossing at 17th Avenue runs under I-25 and connects to the South Platte River Trail. All other pedestrian crossings are attached sidewalks along intersecting streets.

Table 7. Existing Pedestrian Facilities Across I-25

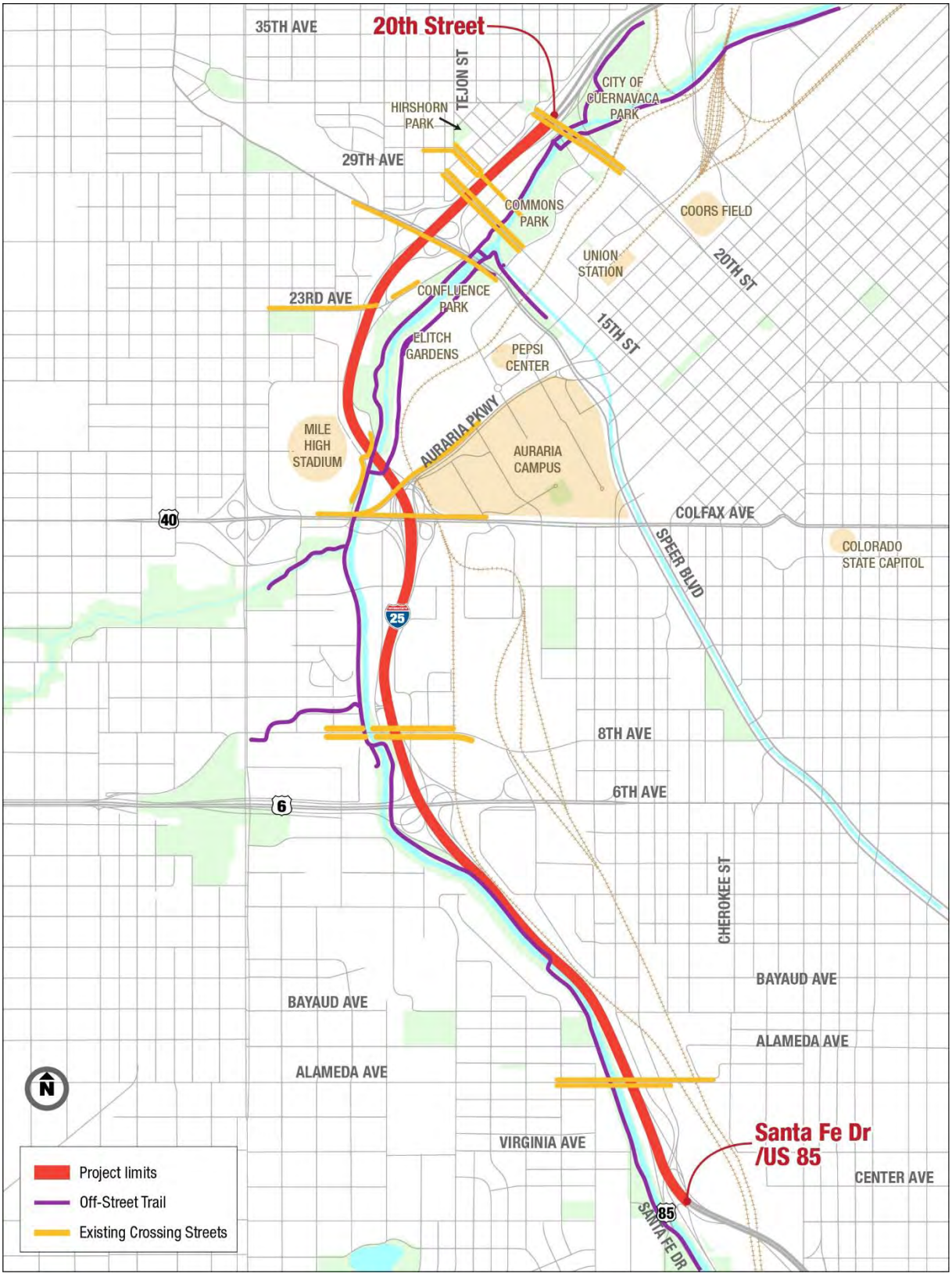
Crossing Street	Crossing Type	Direction	Sidewalk Width (ft)	Facility Type
20th St	Overpass	EB	11.5	Attached Sidewalk
		WB	7	Attached Sidewalk
16th St	Overpass	N/A	13.5	Pedestrian Bridge
15th St	Overpass	EB	7.5	Attached Sidewalk
		WB	10.5	Attached Sidewalk
Speer Blvd	Overpass	N/A	10.5	Pedestrian Bridge
23rd Ave	Overpass	WB	5.5	Attached Sidewalk
17th Ave/South Platte River Trail	Underpass	N/A	10	Attached Sidewalk
Auraria Pkwy	Overpass	WB	7	Attached Sidewalk
Colfax Ave	Overpass	WB	8.5	Attached Sidewalk
8th Ave	Underpass	EB	8	Attached Sidewalk
		WB	8	Attached Sidewalk
Alameda Ave	Overpass	EB	6	Attached Sidewalk
		WB	7	Attached Sidewalk

Source: Google Maps

There is an average density of approximately one crossing per half-mile in the study area, but the density varies, with most crossings located in the northern portion of the corridor near to Downtown Denver and major activity and sporting attractions. Between 20th Street and 23rd Avenue/Water Street, there are five crossing locations and four between 17th Avenue and 13th Avenue.

The pedestrian network along the southern portion of the corridor is less dense, with many of the streets missing sidewalks. The longest section of corridor without pedestrian crossing facilities is the 1.5-mile stretch of I-25 between Alameda Avenue and 8th Avenue. Figure 49 shows an overview of pedestrian facilities across and along I-25.

Figure 49. Pedestrian Facilities



Source: Denver, 2017g

Bicycle Facilities

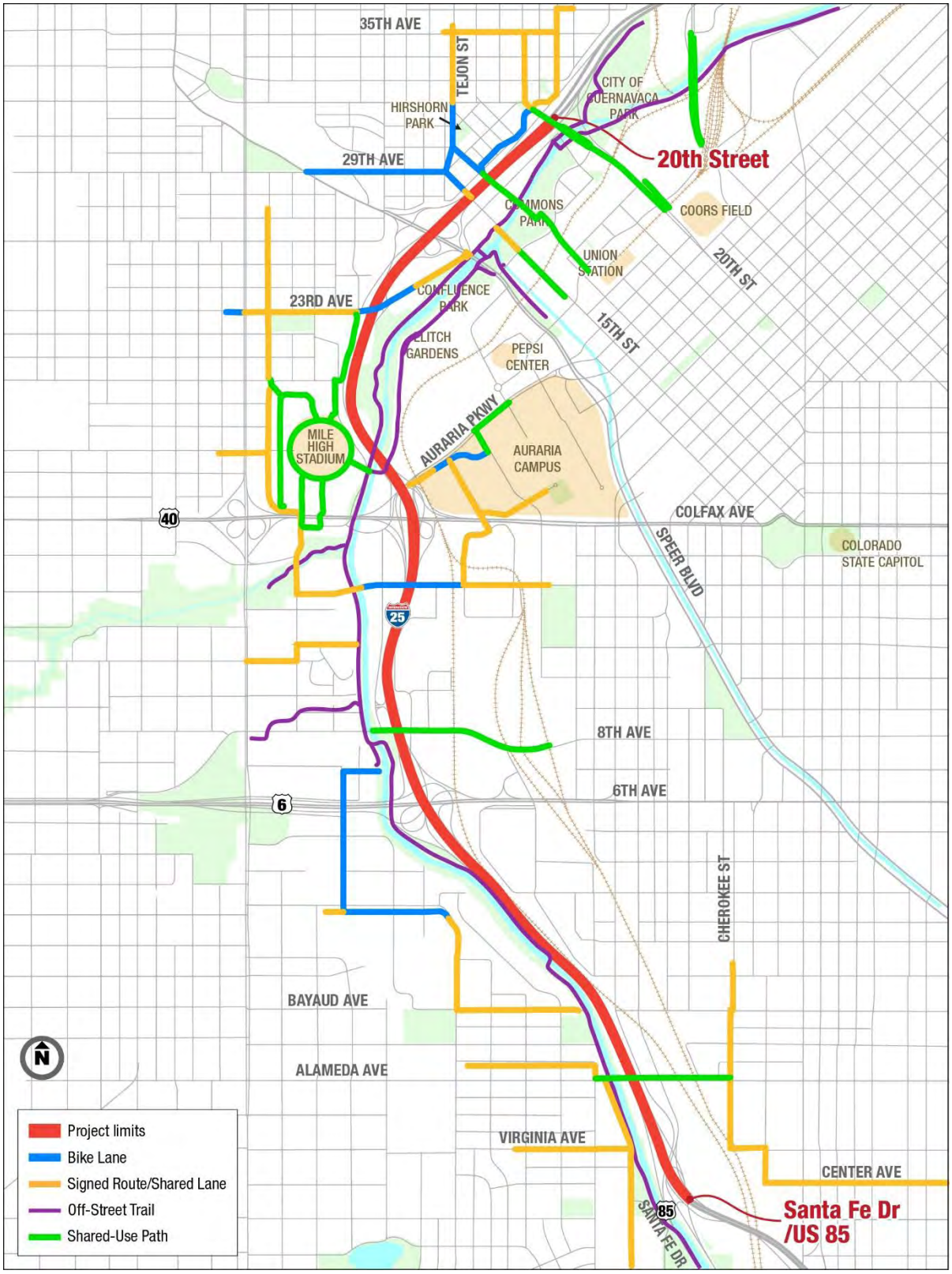
Bicycle accommodations within the study area exist as a mix of bicycle lanes, signed routes/shared lanes, multi-use paths, and off-street trails. Bicycle facilities on cross streets through the study area are described in Table 8 and shown in Figure 50. While the table describes the bicycle facilities as they exist close to I-25, note that facilities may extend beyond the study area limits.

Table 8. Bicycle Facilities Existing Conditions Summary

Cross Street	Adjacent Roadway Direction	Bicycle Facility Type	Prevailing Width
20th St	Eastbound	Multi-use path	11.5 feet
16th St	Two-way	Multi-use path	13.5 feet
15th St	Eastbound	Signed routes/Shared lanes	N/A
	Westbound	Conventional bicycle lane	5 feet
23rd Ave/Water St	Eastbound	Conventional bicycle lane	5 feet
	Westbound	Conventional bicycle lane	5 feet
17th Ave	Westbound	Multi-use path	12 feet
13th Ave	Eastbound	Conventional bicycle lane	5 feet to 6 feet
	Westbound	Conventional bicycle lane	5 feet to 6 feet
8th Ave	Eastbound	Multi-use path	8 feet
Alameda Ave	Westbound	Multi-use path	7 feet

Source: Google Maps

Figure 50. Bicycle Facilities



Source: Denver, 2017g

South Platte River Trail

The South Platte River Trail is an 18-mile-long paved multi-use facility that runs alongside the South Platte River. The trail forms an important part of Denver's overall pedestrian and bicycle network, supporting both utilitarian and recreational non-motorized trips. The trail also forms part of Denver's larger trail network, providing access to other regional trails, such as the Cherry Creek Trail and the Sand Creek Trail.

Through Metro Denver, the trail broadly follows the I-25 corridor, running through Confluence Park, and providing access to attractions such as the Pepsi Center, Auraria Campus, Mile High Stadium, and Elitch Gardens. Daily counts undertaken by CDOT in 2012 and 2017 recorded between 700 and 1,000 daily trail users at various locations throughout the corridor.

From 20th Street to Walnut Street, the South Platte River Trail runs on both sides of the river, continuing south on the west side of the river until 8th Avenue, where it crosses to the east side. This section of the trail is grade separated, running below all the cross streets through the study area, with ramps providing access to the cross streets with pedestrian and bicycle facilities.

From 4th Avenue to Irvington Place, the trail runs adjacent to the I-25 Central corridor, separated by a concrete crash barrier and wire fence. For most of this section, the trail is several feet below the roadway with an embankment of varying widths laying between the trail and the concrete crash barrier. This segment has one of the most constrained cross-sections of the trail, with a paved width of approximately six to eight feet.

South of Irvington Place, the trail runs on the west side of the river, continuing south alongside South Platte River Drive and out of the study area.

Transit

Transit offers an alternative to vehicle travel and represents a key alternate mode choice for users traveling through the I-25 Central corridor. Although there are currently limited transit services traveling on I-25 itself between Santa Fe Drive/US 85 and 20th Street, existing transit services run through the study area, crossing and running alongside I-25. Transit service within the study area is provided primarily by RTD, including rail and bus services. Other transit services and providers include Bustang, operated by CDOT, interstate bus and train service provided by Greyhound and Amtrak, and other private transit providers serving the Denver Metro Area.

Bus Services

Fixed-route bus operations within the I-25 Central study area consist of local and regional services. RTD's local bus routes belong to one of two categories: Downtown Local (direct service to Downtown Denver) or Crosstown Local (do not serve Downtown Denver) (Denver, 2018d). Local buses operate primarily along Denver's arterial and collector streets. They provide feeder service to transfer locations where passengers can transfer to other local service, regional service, or rail. RTD's regional and express routes provide service between regional transit centers and from outlying communities into Denver.

The Route 10 RTD bus, from Colfax-Federal Transit Center to Centretech Parkway in Aurora, travels on I-25 through the study area between 23rd Avenue and Colfax Avenue. All other bus services

through the study area run on corridors that cross or run adjacent to I-25. Figure 51 shows the existing bus services within the study area.

Light Rail

Several light rail routes that serve the Denver Metro Area are adjacent to and cross I-25 through the study area. Rail service is provided by RTD on seven lines (B Line, C Line, D Line, E Line, F Line, H Line, and W Line) with nine rail stations in close proximity to the study area. With the exception of the B Line, these light rail lines operate every 15 minutes or less throughout most of the day, including weekends. The B Line commuter rail travels between Denver and Westminster on a 30-minute headway during peak weekday hours and a 60-minute headway during off-peak hours and weekends. Within the I-25 study area, there are three light rail stations (Alameda Station, Sports Authority Field at Mile High Station, and Auraria West Station). Figure 51 outlines the existing light rail services within the study area.

Park-n-Ride Facilities

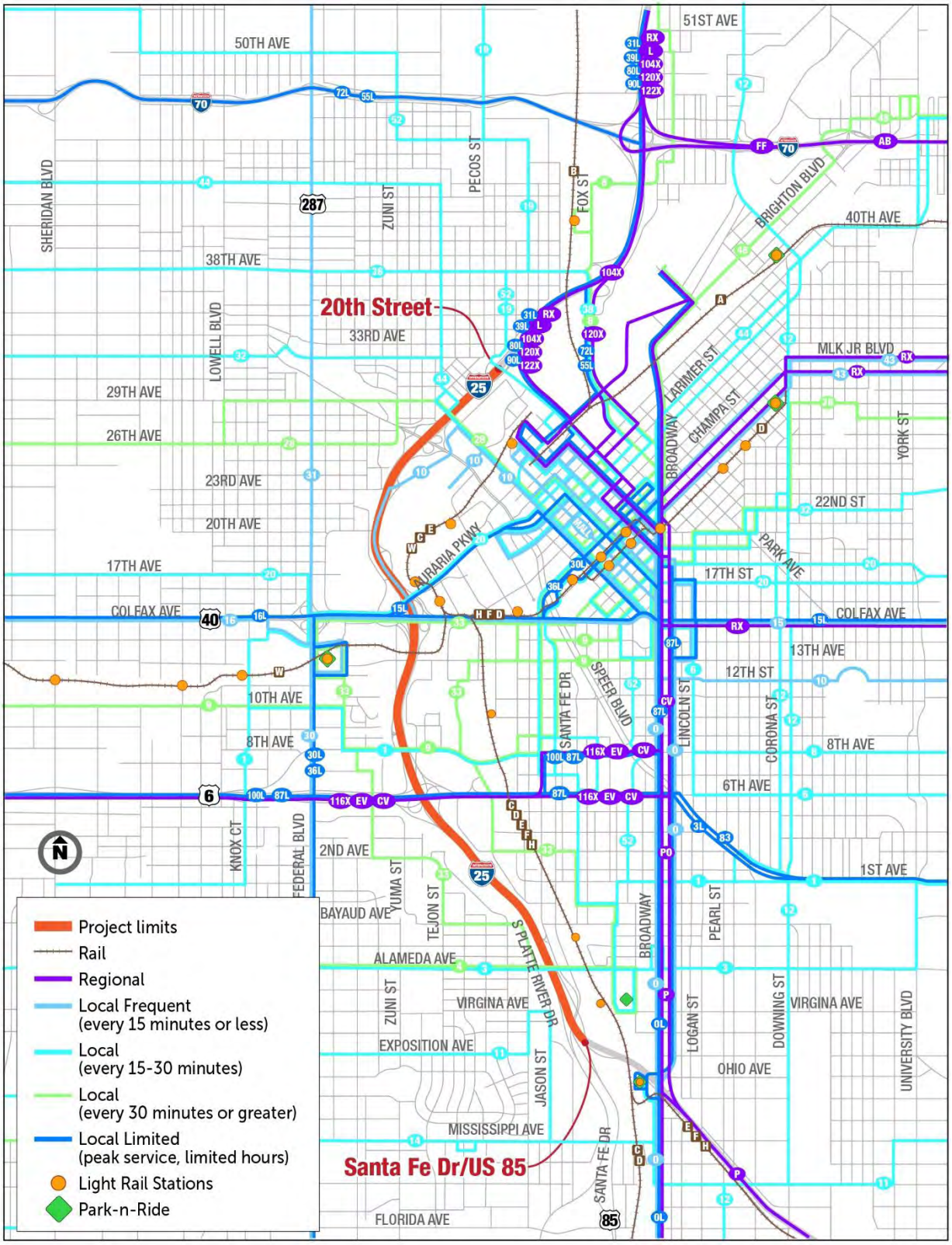
There are three Park-n-Ride facilities near the study area: Decatur-Federal Station, Broadway Marketplace, and I-25/Broadway Station. Information on each of these facilities is provided in Table 9.

Table 9. Park-n-Ride Facilities

Name	Rail Lines	Bus Routes	Parking Spaces	Bicycle Racks
Decatur-Federal Station	W	15L, 16, 30, 30L, 31, 33, 36L	1,900	10
Broadway Marketplace (Broadway & Alameda Shopping Center)	C, D, E, F, H	0, 0L, 3, 33, 52	221	0
I-25/Broadway Station	C, D, E, F, H	0, 0L, 11, 14	1,048	18

Source: Regional Transportation District, 2018

Figure 51. Existing RTD Transit Services Within the Study Area



Source: RTD, 2017a; RTD, 2017b; RTD, 2017c; RTD, 2017d; RTD, 2017e

Safety

To understand how safe the existing I-25 Central corridor is, crash data were collected for a three-year period between 2013 and 2015. Using these crash data, safety analysis was performed. An overview of the analysis results is provided in this chapter.

The safety assessment was conducted to establish a baseline of existing crash patterns along the corridor and to determine the presence of causal relationships, if any, among each facility type and road users. Ultimately, the findings from the safety assessment will assist the project team with identifying and selecting the appropriate design alternatives under consideration as part of the I-25 Central PEL Study.

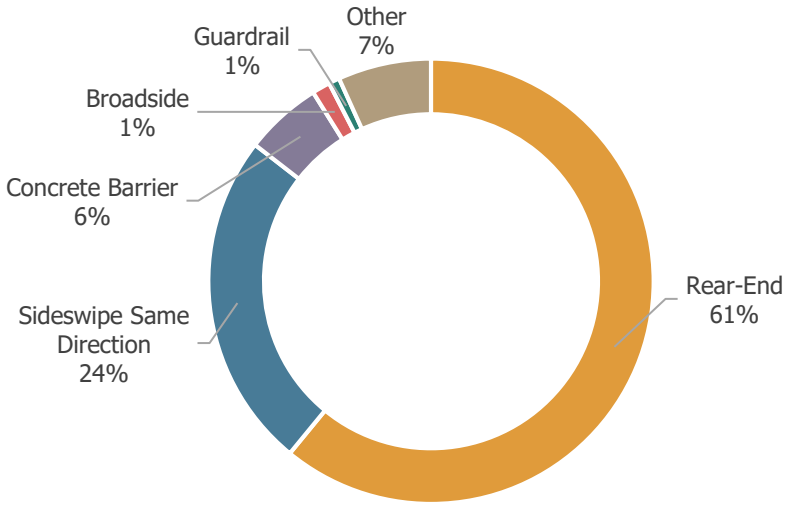
For the purposes of this report, the crash data and analysis are discussed in three sections. This includes a summary of all crash data, a discussion of crash data by facility type, and finally a brief discussion on the conclusions drawn from the data. For more information about the analysis methodology used and detailed results, see the *I-25 Central Traffic Safety Technical Memorandum* (July 2018).

Overview of Crashes

During the three-year analysis period, there were a total of 3,034 documented crashes along the I-25 Central corridor, including those on the mainline, on the ramps, and at the ramp terminals—the intersection at the end of a ramp where the ramp meets the local roadway. This total includes 7 fatal crashes (0.2 percent), 604 injury crashes (20 percent), and 2,423 property damage only (PDO) crashes (80 percent).

The most common crash types observed included rear-end collisions (61 percent), sideswipes by vehicles moving in the same direction (24 percent), concrete barrier collisions (6 percent), broadside crashes (1 percent), and colliding with the guardrail (1 percent). The remaining crashes (7 percent) were a combination of other crash types, including colliding with dislodged vehicle cargo or debris, overturning, hitting the crash cushion, becoming involved in an approach turn, or other non-collision events. Figure 52 summarizes the most common crash types observed.

Figure 52. Most Common Crash Types



Source: CDOT, 2017g

Crashes by Facility Type

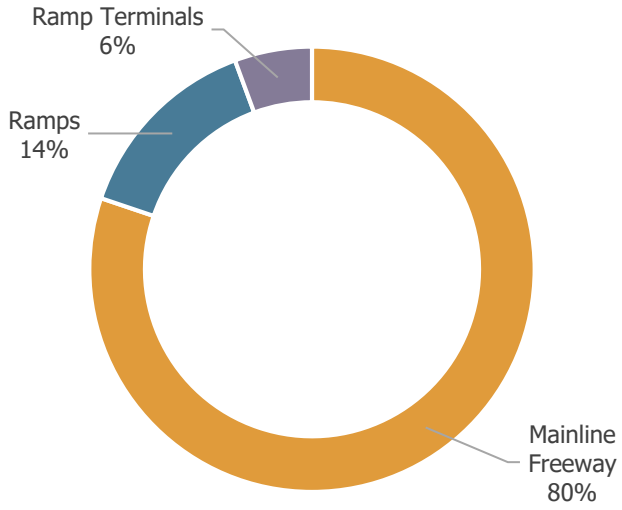
Crash types and severity often are influenced by the type of facility on which they occur. To better understand the crash patterns observed along the I-25 Central corridor, crash data were separated by facility type, which included mainline freeway segments, ramps, and ramp terminals. Of the total 3,034 observed crashes, 2,438 (80 percent) occurred on the mainline freeway, 425 (14 percent) occurred on ramps, and 171 (6 percent) occurred at ramp terminals. Table 10 summarizes crashes by facility type and severity; Figure 53 shows the crashes by facility type.

Table 10. Overall Crash Frequency by Facility

Facility	Fatal	Injury	PDO	Total
Mainline Freeway	4	473	1,961	2,438
Ramps	2	87	336	425
Ramp Terminals	1	44	126	171
Total	**7**	**604**	**2,423**	**3,034**

Source: CDOT, 2017g

Figure 53. Crashes by Facility Type



Source: CDOT, 2017g

Mainline Freeway

During the three years for which data were analyzed, there were a total of 2,438 crashes on the mainline freeway. Of these crashes, 4 (0.16 percent) resulted in a fatality, 473 (19 percent) resulted in an injury, and 1,961 (80 percent) had only property damage.

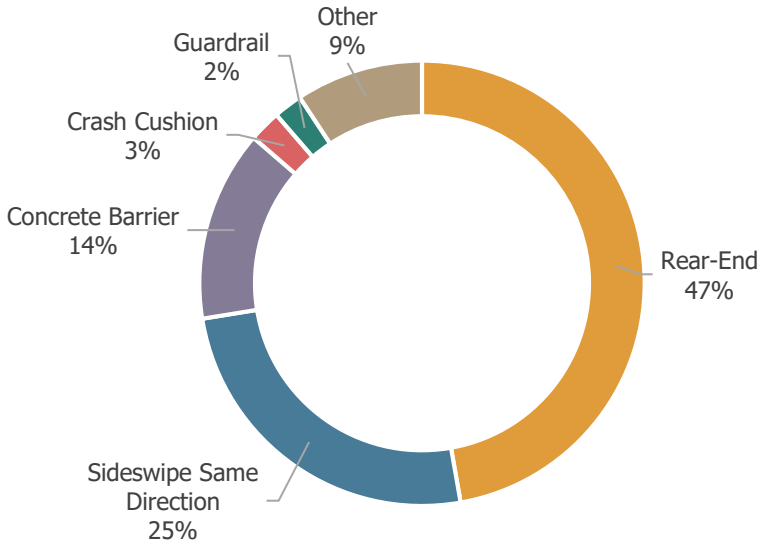
The most common crash types observed on the mainline freeway include rear-end collisions (65 percent), sideswipes by cars going in the same direction (25 percent), collisions with the concrete barrier (4 percent), colliding with vehicle cargo/debris (1 percent), and other non-collision incidents (1 percent). The remaining crashes (4 percent) are a combination of other crash types.

Ramp Crashes

A total of 425 crashes occurred on ramps within the I-25 Central study area. Of these crashes, 2 (1 percent) resulted in a fatality, 87 (20 percent) resulted in an injury, and 336 (79 percent) had only property damage.

The most common crash types observed on ramps include rear-end collisions (47 percent), sideswipes by vehicles moving in the same direction (25 percent), concrete barrier crashes (14 percent), crash cushion collisions (3 percent), and guardrail crashes (2 percent). The remaining crashes (9 percent) are a combination of other crash types. Figure 54 summarizes the ramp crash types.

Figure 54. Ramp Crashes by Type



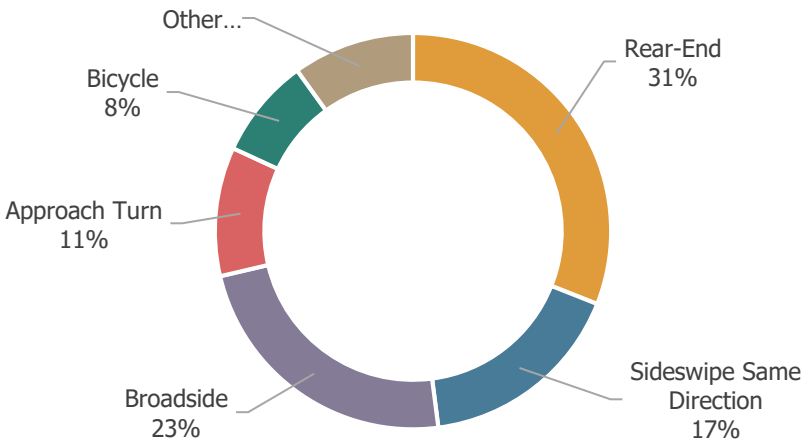
Source: CDOT, 2017g

Ramp Terminal Crashes

A total of 171 crashes occurred at ramp terminals within the I-25 Central study area. Of these crashes, one (1 percent) resulted in a fatality, 44 (26 percent) resulted in injury, and 126 (73 percent) had only property damage.

The most common crash types observed at ramp terminals include rear-end collisions (31 percent), broadside crashes (23 percent), sideswipes by vehicles moving in the same direction (17 percent), approach turn crashes (11 percent), and bicycle (8 percent) crashes. The remaining 10 percent of crashes are a combination of other crash types. Figure 55 summarizes the ramp terminal crash types.

Figure 55. Ramp Terminal Crashes by Type



Source: CDOT, 2017g

Summary of Safety Results

To provide context to the crash data collected, the *Highway Safety Manual* (HSM) (AASHTO, 2010) methodology was applied to each mainline freeway segment, ramp, and ramp terminal to determine if it experienced more or less crashes than would be expected. This expected number of crashes—determined individually for each mainline freeway segment, ramp, and ramp terminal—is based on an examination of other, similar facilities from within Colorado or, in cases where Colorado-specific data are not available, from around the United States. This is useful because if there are elements/portions of the I-25 Central corridor that are experiencing more crashes than other similar facilities, then this indicates there are likely improvements that could be made to this element/portion of I-25 Central that would result in improved safety.

Due to the extent of this analysis, only the aggregated information by facility type is documented in this report. For additional information on individual freeway segments, ramp, or ramp terminals, please see the *I-25 Central Traffic Safety Technical Memorandum* (July 2018).

In general, the mainline freeway and ramps along the I-25 Central corridor experience more crashes than would be predicted based on HSM analysis, while the ramp terminals experience fewer crashes than predicted. This indicates that there are likely opportunities to improve safety, specifically on the mainline freeway and the ramps. Table 11 shows the overall HSM results. These results indicate there are likely opportunities to improve safety throughout the corridor.

Table 11. Overall I-25 Central HSM Results

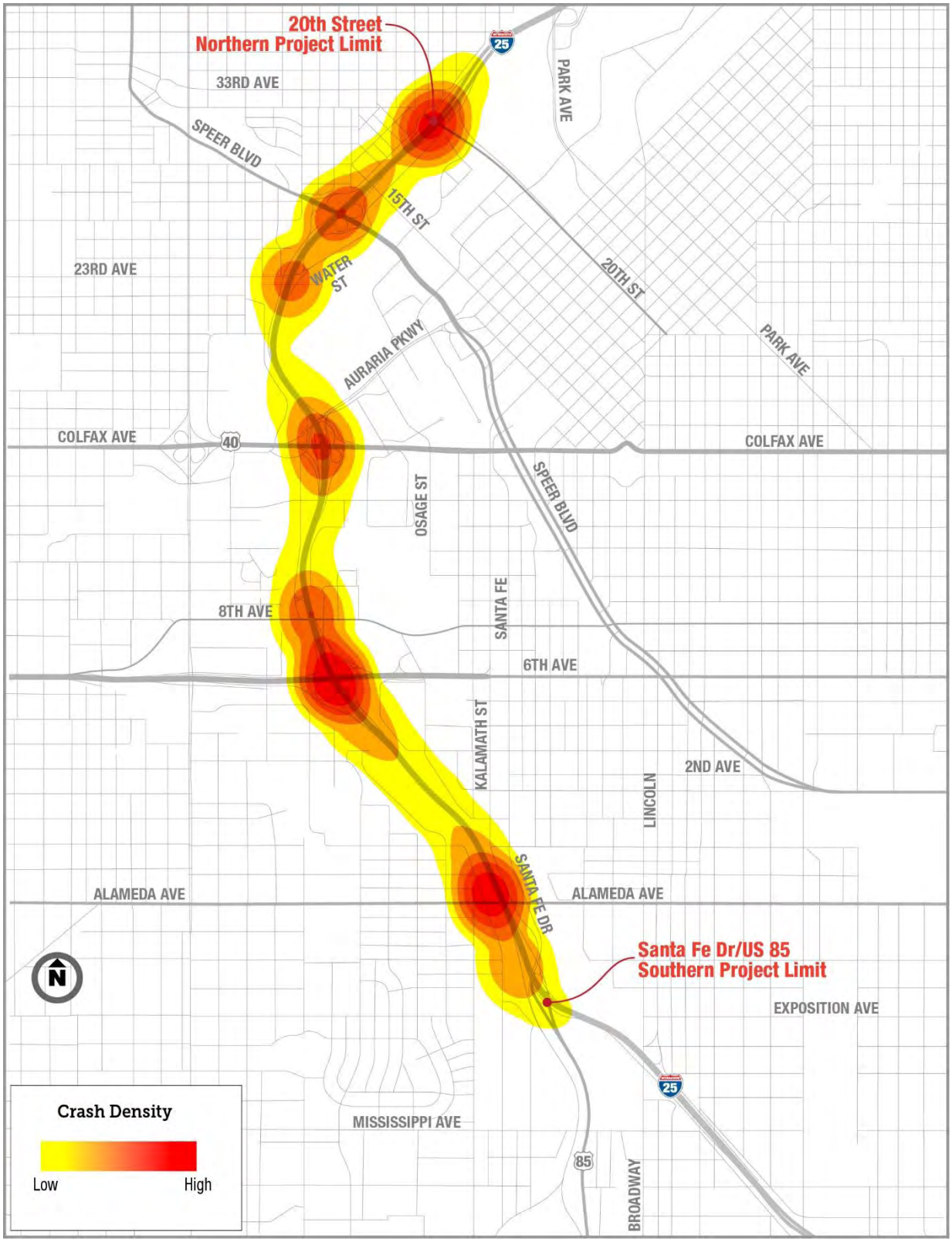
Facility	Crash Severity[1]	Number of Crashes (per year)[2]	Predicted Crashes Based on Similar Facilities (per year)	Difference between the Number of Crashes on the I-25 Central Corridor and Similar Facilities (per year)
Mainline Freeway	FI	133.3	94.0	+39.3
	PDO	565.7	429.4	+136.3
	Total	699.0	523.4	+175.6
Ramp Terminals	FI	21.1	29.3	-8.2
	PDO	41.4	41.8	-0.4
	Total	62.5	71.1	-8.6
Ramp Segments	FI	15.3	19.0	-3.7
	PDO	42.5	33.2	+9.3
	Total	57.8	52.1	+5.7
Overall	FI	169.7	142.3	+27.4
	PDO	649.5	504.4	+145.1
	Total	819.3	646.6	+172.7

[1]FI = Fatality and/or Injury; PDO = Property Damage Only
[2]The number of crashes per year has been normalized using the HSM methodology. Using HSM terminology, this is the "expected" number of crashes.
Source: CDOT, 2017g

In addition to the HSM analysis, crashes also were mapped using geographic information system (GIS) software. Using GIS, crash density analysis was performed to identify crash hotspots. The results of this analysis show that interchanges represent the areas with the highest crash density. This is typical for freeway facilities because interchange areas are where drivers are most likely to weave, merge, or diverge, increasing the likelihood of a crash occurring. Figure 56 shows the density analysis results for all crashes on the I-25 Central corridor.

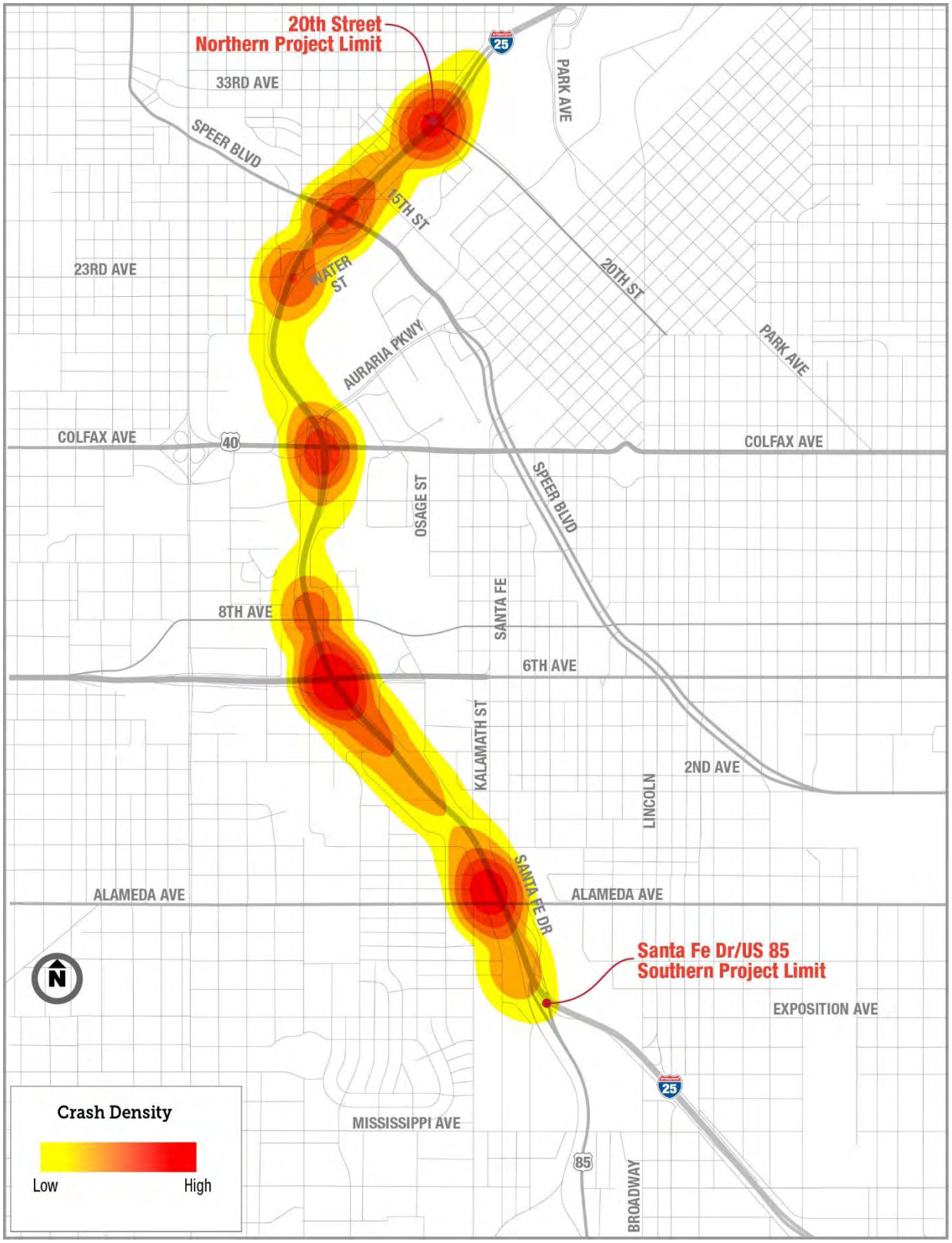
Excluding PDO crashes shows that the distribution of fatal and injury crashes is similar to the overall crash density patterns, with a majority of fatal and injury crashes occurring near interchange locations. The primary difference between the crash densities of all crashes combined and the crash density of only fatal and injury crashes is the distribution between Alameda Avenue and US 6/6th Avenue. Between these two locations, there is a higher density of fatal and injury crashes whereas the overall crash density shows a higher concentration of crashes at the interchanges. Figure 57 shows the crash density analysis results for fatal and injury crashes.

Figure 56. Crash Density



Source: CDOT, 2017g

Figure 57. Fatal and Injury Crash Density



Source: CDOT, 2017g

Environmental Overview

This chapter includes a high-level overview of the existing environmental conditions within the established study area. These environmental resources include both the natural and built environment and are aligned with the environmental resources analyzed under the National Environmental Policy Act (NEPA) process.

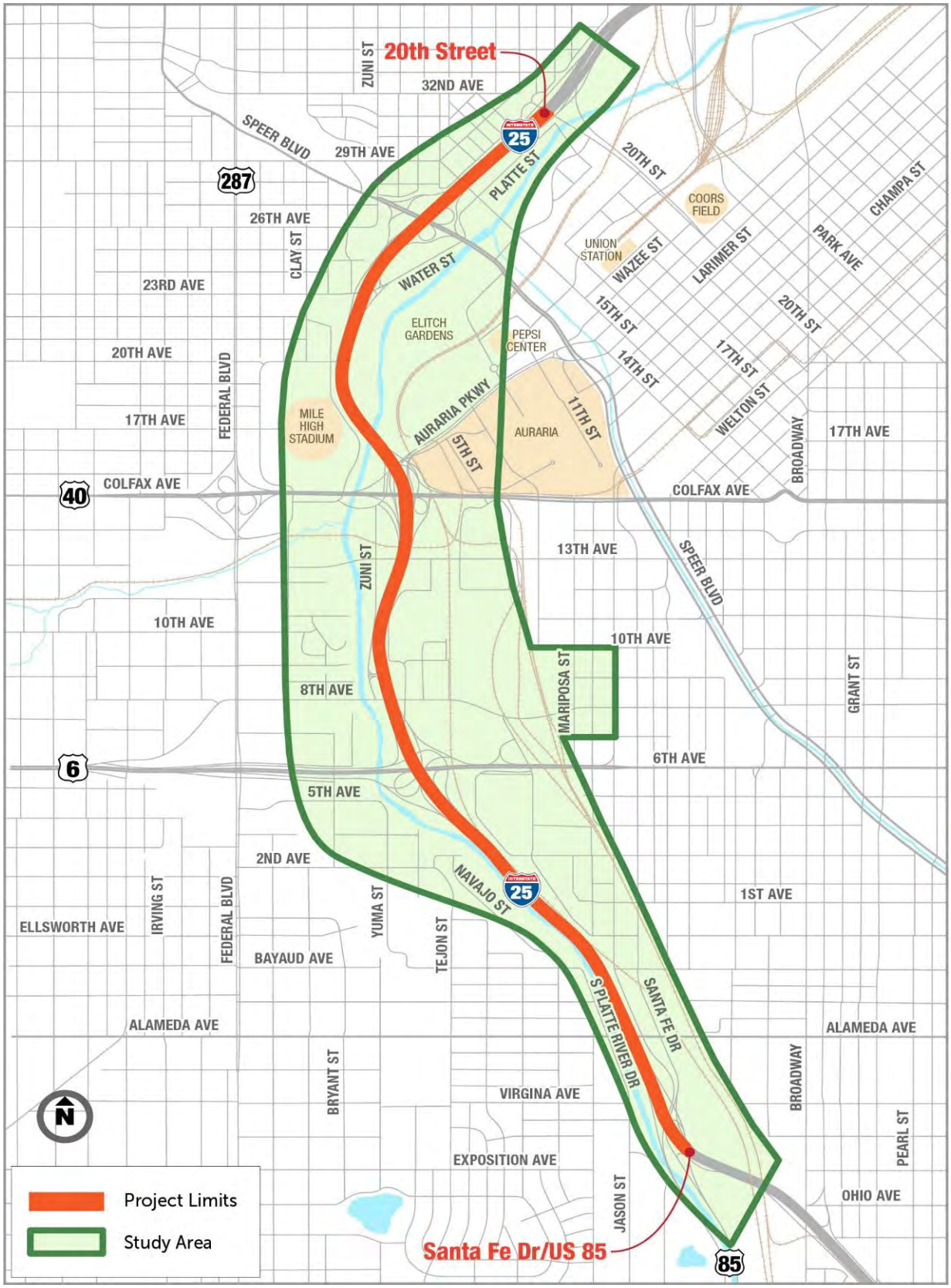
Environmental resources existing conditions data were collected within the established PEL study area, which encompasses the limits of the project on I-25 from 20th Street on the north to Santa Fe Drive/ US 85 on the south. The study area incorporates a broad area, including the project limits, to cover all potential impacts of the project. Figure 58 shows the project limits and the study area.

Each resource section of this report includes a brief description of the resource being evaluated, a summary of the resource's existing conditions within the study area, a listing of applicable laws and regulations pertaining to the resource, and an identification of the relevant stakeholders pertinent to that resource. It should be noted that CDOT, FHWA, and Denver are considered stakeholders for each resource. Due to this consistency, they are not specifically listed in each section.

At the onset of the existing conditions evaluation, CDOT and FHWA agreed that only resources relevant to the study area warranted evaluation at this stage in the planning process. Environmental resources considered relevant to this PEL study are listed below and are organized thematically:

- Socioeconomic Conditions
- Environmental Justice
- Right of Way
- Air Quality
- Noise
- Historic Resources
- Archaeology
- Geologic Resources and Soils
- Hazardous Materials
- Parks and Recreation/Section 6(f) Resources
- Section 4(f) Resources
- Visual and Aesthetics
- Floodplains
- Drainage and Water Quality
- Wetlands and other Waters of the U.S.
- Vegetation and Noxious Weeds
- Wildlife and Fisheries
- Threatened and Endangered Species
- Cumulative Impacts

Figure 58. Study Area



Socioeconomic Conditions

Resource Description

Social resources contribute to the quality of life in the project corridor and define the character of a neighborhood. The social resources of a neighborhood are important because impacts that may occur from the proposed project may impact the character or livability of a neighborhood.

Economic resources that contribute to the economic conditions in the study area include employment and tax base, businesses, housing, infrastructure and public services, and property values. The economic resources of a neighborhood are important because impacts that may occur from the proposed project may increase or decrease business activity, property values, and tax revenues, thus impacting the community's economic livelihood.

Existing Conditions

Characteristics that make this area unique include many of the destinations found within the study area, which are sought after by workers, shoppers, recreationists, and entertainment seekers. There also are numerous hospitals, clinics, and emergency medical services found near the study area to provide medical services and emergency response to the residents in the area. As the Denver Metro Area continues to grow, areas within and adjacent to the study area have seen redevelopment and changes in land uses, which help the induced growth.

The study area intersects with several neighborhoods that are in a high-density urban setting within a major city. These neighborhoods include multi-family units, single-family units, commercial businesses, and destination entertainment venues. Most of the commercial, industrial, and high-density multi-family resident land uses are found closer to I-25 and slowly transition to more single-family residences farther away from I-25. Residents in the study area travel primarily eastward for work in Downtown Denver (Downtown Denver Partnership, 2016). The regional population also uses I-25 to travel to Downtown Denver for work or for longer-distance travel to other locations outside of the Denver Metro Area.

Evaluation of the traffic analysis zones (TAZs) adjacent to the I-25 corridor and in the surrounding area for the Base Year (2015) and for the Forecast Year (2040) also provides an overview of continued projected growth in the number of people, households, and employment that is expected to occur between 2015 and 2040 (see Table 12).

Table 12. DRCOG 2015 and 2040 Land Use

TAZs	2015	2040	Growth between 2015 and 2040	Percentage Growth between 2015 and 2040	Annual Growth Rate
Population					
Study Area	25,836	43,986	18,150	70%	2.8%
Denver	676,065	856,341	180,276	27%	1.1%
Households					
Study Area	12,627	21,891	9,264	73%	2.9%
Denver	298,895	392,507	93,612	31%	1.2%
Employment					
Study Area	39,893	51,377	11,484	29%	1.2%
Denver	501,444	634,364	132,920	27%	1.1%

Source: DRCOG, 2017

Guidance and Regulations

Applicable laws, regulations, and guidance documents for socioeconomics include:

- Sections 109(h) and 128, Title 23 of the USC on Highways (2012)
- Title VI of the Civil Rights Act of 1964, as amended
- Americans with Disabilities Act of 1990
- FHWA Technical Advisory T6640.8a Guidance for Preparing and Processing Environmental and Section 4(f) Documents

Environmental Justice

Resource Description

Environmental justice analyzes impacts to minority and low-income populations. Minority, as it applies to environmental justice, is defined as a person who is Black or African American, Asian American, American Indian or Alaskan Native, and Native Hawaiian or Pacific Islander. Additionally, those who identify themselves as Hispanic or Latino regardless of their race are considered to be part of the minority population.

Low income is defined as a household income at or below the U.S. Department of Health and Human Services poverty guidelines. Low-income populations are determined within a study area by calculating the low-income threshold for the median household income in the county.

Existing Conditions

To determine if the study area is subject to environmental justice analysis, race and ethnicity data were pulled from the latest update to the 2010 U.S. Census for the block groups that intersect the study area

and were compared against the county percentage. 2012-2016 American Community Survey (ACS) five-year estimate data were used for household size and income data.

The county data were compared with the U.S. Census tract/block group data within the study area. If the percentage of low-income households and minority residents is higher than what has been calculated as the county percentage, the study should include an environmental justice analysis. Based on the available data 15 percent of residents in Denver are races other than white and 48 percent are Hispanic or Latino. Within the study area, 12 percent of residents are races other than white and 51 percent are Hispanic or Latino. Therefore, the study area is subject to an environmental justice analysis due to a high population of Hispanic or Latino residents. Figure 59, identifies the individual census block groups which have higher percentages or residents who are races other than with and/or Hispanic or Latino as compared to total percentages of Denver residents.

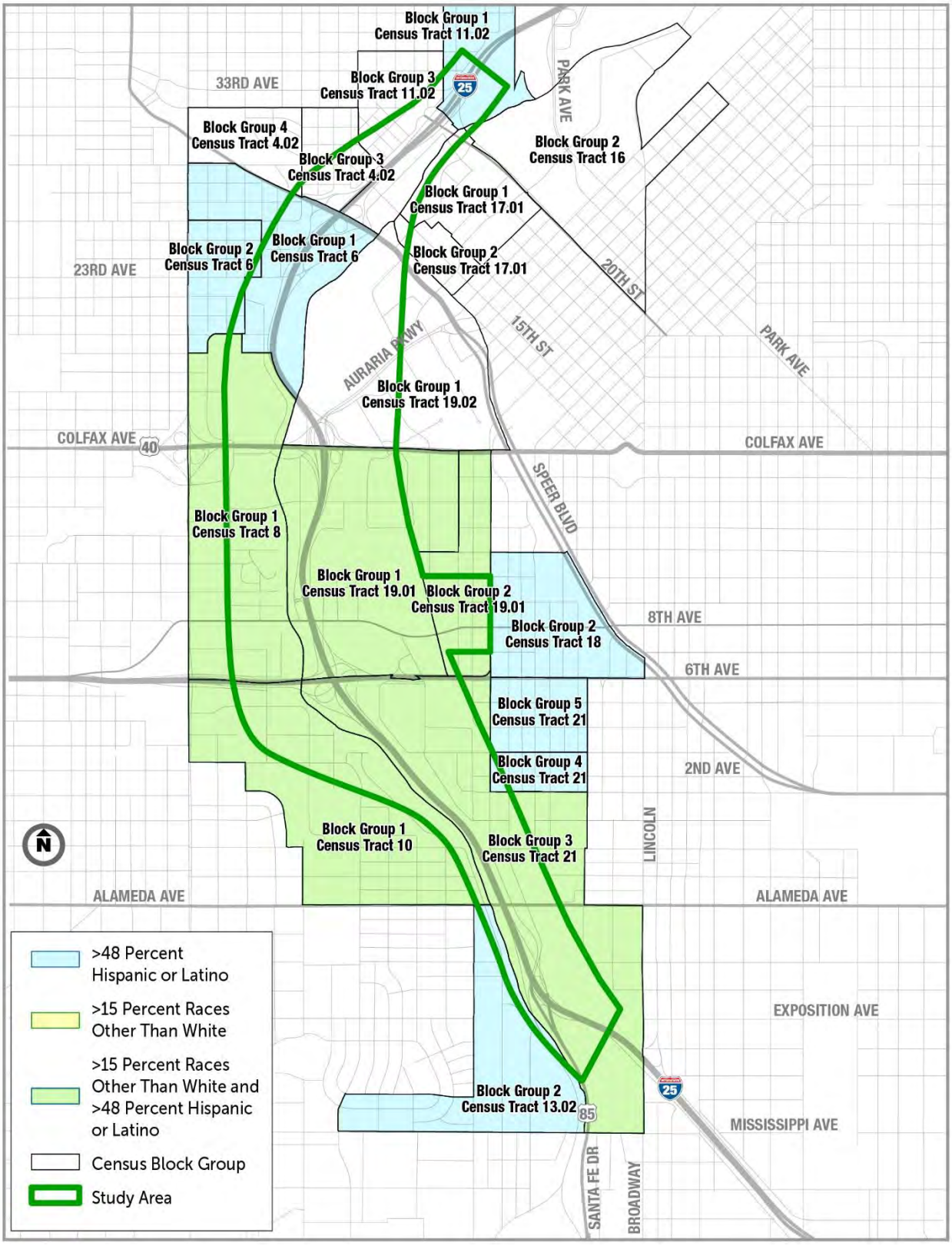
Based on HUD low-income information, households below $24,999 were considered low income (HUD, 2017). In Denver, 22.0 percent of households have an income at or below this threshold. Within the study area, 24.8 percent of household incomes are below this threshold. Therefore, the study area is subject to an environmental justice analysis because it has a higher percentage of low-income households than the county percentage. Figure 60 shows the individual block groups that have a higher percentage of low-income households than the county percentage. .

Guidance and Regulations

Applicable laws, regulations, and guidance documents for environmental justice include:

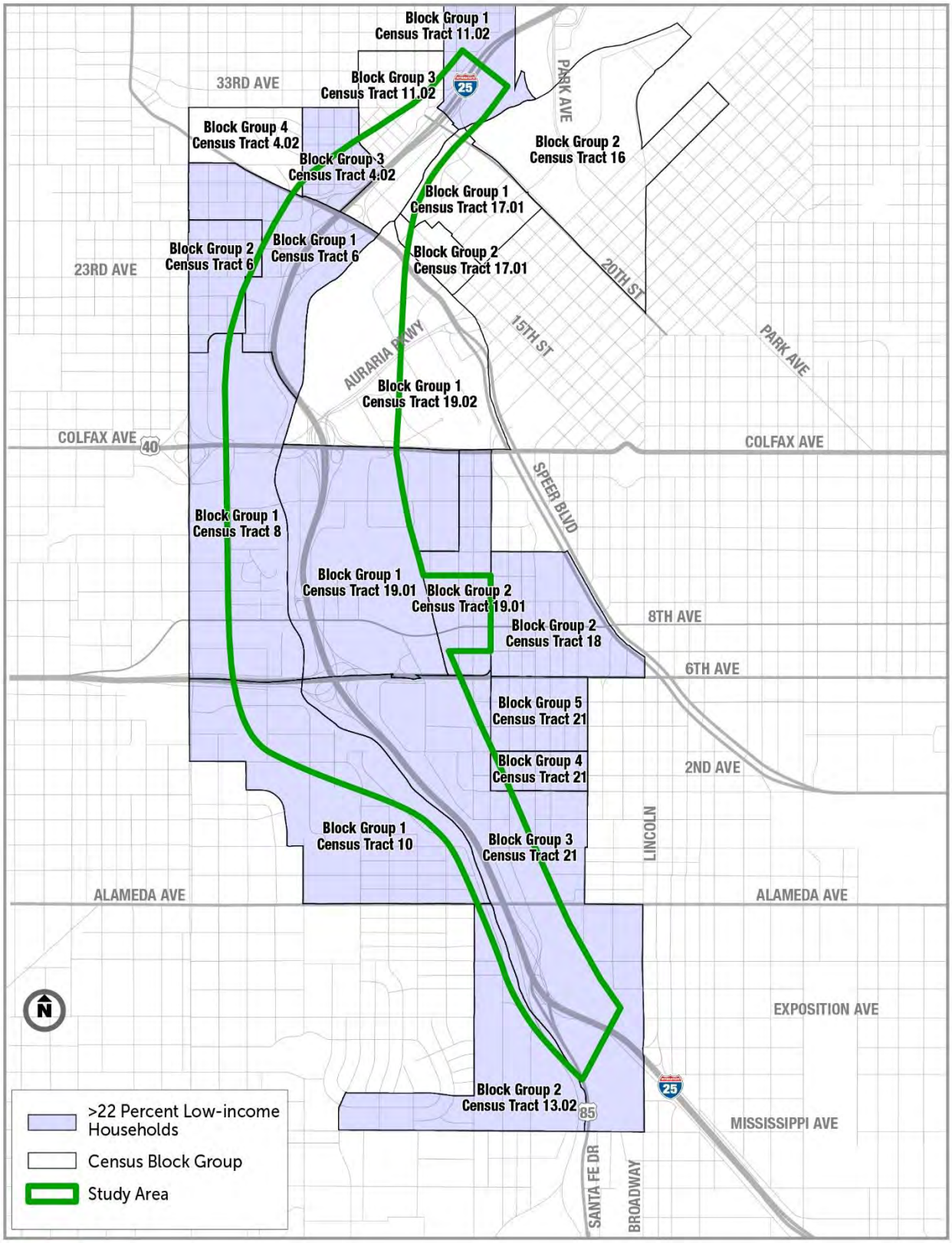
- Executive Order 12898
- Title VI of the Civil Rights Act of 1964, as amended
- Executive Order 13166
- U.S. Department of Transportation (USDOT) Order 5610.2(a) on Environmental Justice
- FHWA Order 6640.23A on Environmental Justice
- FHWA 2011 Guidance on Environmental Justice and NEPA

Figure 59. Minority Populations by Block Group



Source: U.S. Census Bureau, 2017a

Figure 60. Low-Income Populations by Block Group



Source: U.S. Census Bureau, 2017b, 2017c

Right of Way

Resource Description

The *CDOT Right of Way Manual* (CDOT, 2011) defines ROW as real property and rights therein used for the construction, operation, or maintenance of a transportation or related facility under Title 23, USC. A relocation or displacement occurs when it is necessary to acquire an occupied property for ROW and to relocate all occupants within the property.

Existing Conditions

Existing ROW information was collected from archived ROW plan sets on CDOT's OTIS website (CDOT, 2017e), Denver's GIS (Denver, 2017e), and Denver's assessor's records (Denver, 2017) and supplemented by reference to Google Earth aerial photography.

ROW widths vary considerably throughout the 4.5-mile corridor. While CDOT is responsible for the maintenance of the highway facilities within the ROW corridor, Denver is by and large the underlying fee owner of the land. In an effort to widen the corridor, CDOT has since acquired additional ROW in certain areas.

At the southern extent of the study area, west of the Broadway exit, highway facilities are constructed on UPRR and BNSF Railway properties. As the highway traverses north through the corridor, highway facilities again are constructed on BNSF Railway property approximately 0.5 mile south of 6th Avenue, 0.25 mile south of US 6, and approximately 0.25 mile north of Colfax Avenue.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for ROWs include:

- The 5th and 14th Amendments to the U.S. Constitution
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
- Article II, Section 15, Colorado Constitution
- Title 38 and 43, Colorado Revised Statutes
- CDOT ROW Manual

Stakeholders

Primary stakeholders for ROW include:

- UPRR
- BNSF Railway

Air Quality

Resource Description

Air pollution comes from many different sources: stationary sources such as factories, power plants, and dry cleaners; mobile sources such as cars, buses, planes, trucks, and trains; and naturally occurring sources such as windblown dust. Air quality can be affected in many ways by the pollution emitted from these sources.

Existing Conditions

Traffic, local emission sources, topography, climate, and regional background concentrations affect the local air quality in the study area. I-25 carries the highest volume of vehicles in the state. As vehicle technology improves, so does air quality. Stricter Corporate Average Fuel Economy (CAFE) standards for fuel efficiency in vehicles and cleaner fuels have all contributed to improved air quality in the study area.

As numerous studies have shown, air pollution from mobile sources is most likely to affect receptors close to roadways, since the concentration of air pollutants steadily diminishes as it moves out past 400 feet from the highway. Beyond 400 feet, the concentration of air pollutants matches the background concentrations (CDC, 2010). Locations where people spend extended periods of time and places where people spend time outdoors are likely to be the most sensitive receptors, including homes, schools, parks, and hospitals. Several of these receptors exist along roads in the study area.

Air quality monitoring data were taken from the Colorado Department of Public Health and Environment (CDPHE) website. The Air Pollution Control Division (APCD) has an air quality and weather station located very near I-25 within the study area, at 970 Yuma Street in Denver. Carbon monoxide, fine particulate matter, nitric oxide, and nitrogen dioxide emissions and meteorology are monitored at this site.

Nitric oxide was recorded at an annual rate of 31.9 parts per billion (ppb) and had a maximum value of 404 ppb (CDPHE, 2017). While there is no National Ambient Air Quality Standards (NAAQS) for nitric oxide, it can react with hydrocarbons in sunlight to create ozone. These values are published for informational purposes only.

The I-25 monitor recorded the highest maximum 1-hour carbon monoxide average of 3.0 parts per million (ppm), and the highest maximum 8-hour carbon monoxide average of 2.4 ppm in 2016, according to the APCD's 2016 Air Quality Data Report. Both averages are well below the 1-hour standard of 35 ppm and the 8-hour standard of 9 ppm.

The station recorded an annual value of 7.8 micrograms per cubic meter (µg/m^3) for fine particulate matter ($PM_{2.5}$), and the 98th percentile over a three-year average (2014-2016) at 25.4 µg/m^3 (CDPHE, 2017). Both values are below the 24-hour $PM_{2.5}$ standard of 35 µg/m^3.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for air quality include:

- U.S. Environmental Protection Agency (EPA) transportation conformity, 40 Code of Federal Regulations (CFR) Parts 51 and 93, Subpart A
- EPA project-level conformity guidance and other resources
- FHWA's Mobile Source Air Toxic Analysis under NEPA
- Colorado Air Quality Control Commission (AQCC) Regulation No. 10, Criteria for Analysis of Transportation Conformity

Stakeholders

Primary stakeholders to air quality include:

- APCD of the CDPHE
- DRCOG
- EPA

Noise

Resource Description

Noise generally is defined as unwanted sound. Sound levels are expressed in dimensionless units called decibels (dB). Noise is emitted from many natural and man-made sources. Noise can affect daily activities, especially those that occur outdoors. Noise from traffic on roadways can be very disruptive at high levels if it is not mitigated.

Existing Conditions

A review of the existing conditions was performed, using desktop tools such as Google Maps and existing land use data from Denver, to identify noise sensitive activities within the study area. The area for noise analysis extends 500 feet west and east of the I-25 corridor within the project limits. Some portions of the noise analysis area were extended to include areas that potentially could be affected by interchange improvements associated with the project. In addition, locations within 500 feet of both sides of nearby major roadways—including Santa Fe Drive/US 85, Alameda Avenue, US 6/6th Avenue, Colfax Avenue, and Speer Boulevard—were examined to identify noise-sensitive areas due to the uncertainty of project alternatives.

A noise sensitive receptor is any property on which frequent human use occurs and highway traffic noise may be detrimental to the enjoyment and/or function of the property. This includes residences, schools, parks, hospitals, and businesses. CDOT has established acceptable noise levels for noise sensitive receptors based on activity categories. These measures are called Noise Abatement Criteria (NAC) and are defined in CDOT's *Noise Analysis and Abatement Guidelines (2015)* (see Table 13).

Table 13. CDOT Noise Abatement Criteria

Activity Category	Activity Leq (h)[1]	Evaluation Location	Activity Description
A	56 dBA	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	66 dBA	Exterior	Residential.
C	66 dBA	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	51 dBA	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	71 dBA	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in Activity Category A through D or F.
F	N/A	N/A	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, ship yards, utilities (water resources, water treatment, electrical), and warehousing.
G	N/A	N/A	Undeveloped lands that are not permitted for development.

[1]*Leq(h) = hourly equivalent steady state sound level*

Source: CDOT, 2015

Figure 61 highlights the existing noise-sensitive areas within the study area. These noise-sensitive areas were identified by clusters of same or similar land use activities. For example, NAC B land uses are labeled primarily by neighborhood. In addition, specific receptors within the study area were identified in both Categories B and C. These include apartments, schools, churches, libraries, hospitals, etc. These receptors may or may not exist within the noise-sensitive areas.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for noise include:

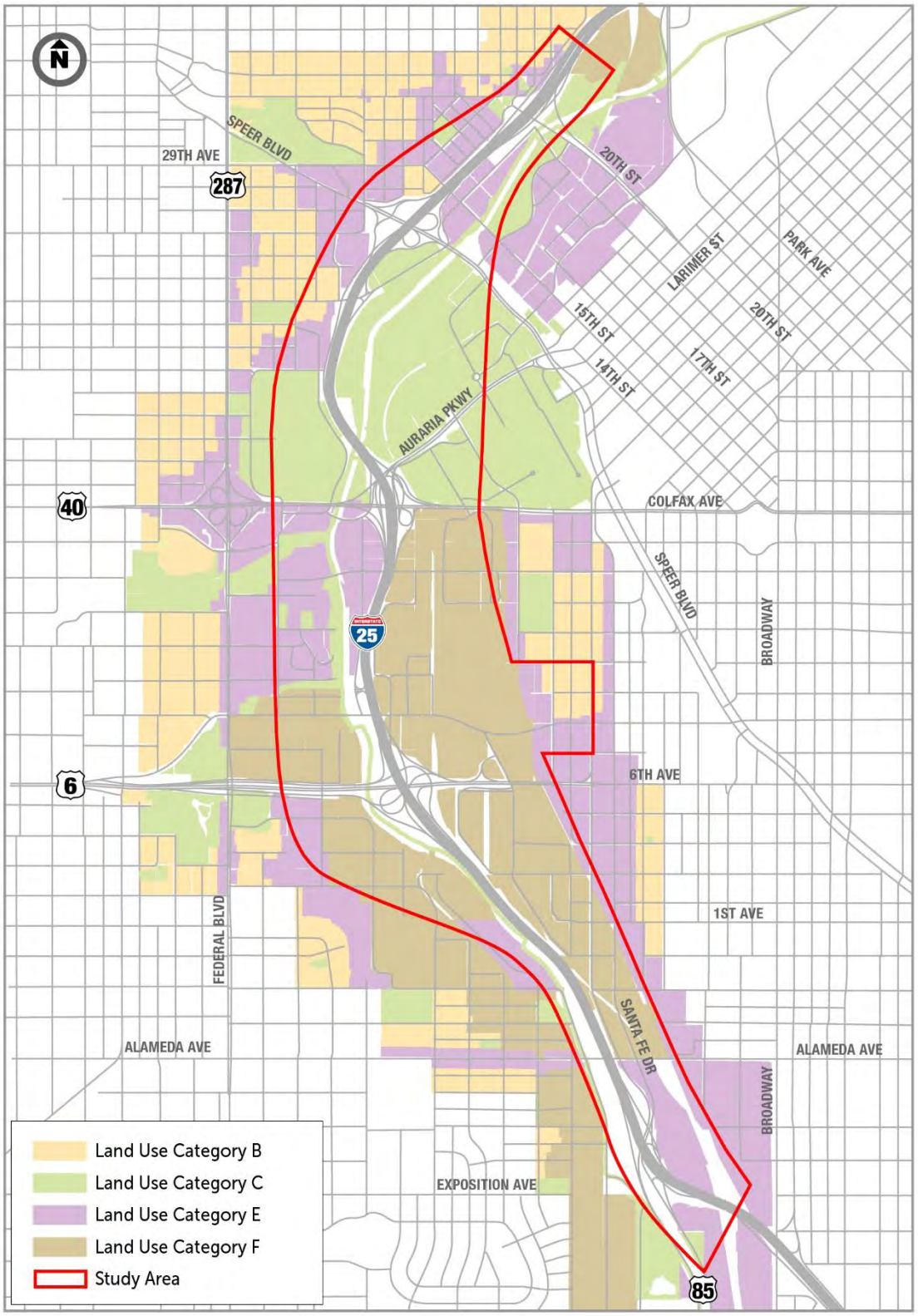
- Title 23 CFR §772
- FHWA's Highway Traffic Noise Analysis and Abatement Policy and Guidance
- CDOT *Noise Analysis and Abatement Guidelines*
- Denver's Code of Ordinances, Chapter 36: Noise Control

Stakeholders

Primary stakeholders for noise include:

- Local property owners and residents

Figure 61. Existing Noise-Sensitive Areas



Source: Denver, 2002 and Denver, 2017g

Historic Resources

Resource Description

Historic resources are any prehistoric- or historic-age site, building, structure, district, or object that is included on or eligible for inclusion on the National Register of Historic Places (NRHP). In addition, property of traditional religious and cultural importance to a Native American tribe also is considered a historic resource.

Existing Conditions

The study area includes a combination of commercial/industrial land uses, as well as residential neighborhoods. It also includes linear resources—railroads and agricultural ditches—and below-ground resources—buried streetcar lines and brick sewers. The following classifications were used to simplify the categories of historic resources within the study area. Data for this study was gathered from a variety of sources, including the Colorado Office of Archaeology and Historic Preservation (OAHP) database COMPASS, City and County of Denver Assessor records, and City of Denver Landmark Preservation data. Information on the historic streetcar lines came from the City of Denver data and an open-source data map. Finally, the location of the existing historic brick sewers came from City of Denver wastewater data. Historic maps were examined to inform the study regarding the potential for additional built environment resources—such as trails, roads, railroads, and ditches—that would need to be considered in potential future investigations.

The OAHP data was received in November 2017 and included both a request for sites and surveys in the area and a search of the COMPASS database, which includes previously recorded cultural resource investigations. The following categories of eligibility of previously surveyed properties was created from the combined data with Denver Landmark and State Historic Preservation Office (SHPO).

- **Listed:** NRHP, Colorado State Register of Historic Places (CRHP), Denver Landmark, NRHP District, Denver Landmark District
- **Eligible:** NRHP Eligible; Field Eligible, but no official determination by the SHPO
- **Not Eligible:** NRHP Not Eligible, Field Not Eligible
- **Unevaluated:** Needs data, Undetermined, from either SHPO or Denver Landmark Data
- **Assessor:** Construction year from Denver Assessor's parcel data

Table 14 lists the number of previously surveyed historic resources in the study area. These are shown graphically in Figure 62 (see Table 16 for the identification of historic districts). Table 15 lists historic resources by the year they were built, as determined from the Denver Assessor's parcel data. A desktop review of previously recorded sites and assessor's data was conducted through Google Streetview and Bing Bird's Eye review to determine which properties were still remaining. No field verification occurred.

Table 14. Previously Recorded Historic Resources

Eligibility Determinations	Number of Resources
Listed	19
Eligible	25
Not Eligible	101
Unevaluated	16
Total Previously Surveyed	**161**

Source: Colorado Historical Society Office of Archaeology and Historic Preservation, 2017

Table 15. Denver Assessor's Parcel Year Built Data

Assessor's Year Built	Number of Resources
Before 1900	40
1900-1919	28
1920-1939	9
1940-1959	28
1960-1979	23
1980-1999	9
2000-2018	6
Parcels with no built date	40
Total Parcels in Study Area	**183**

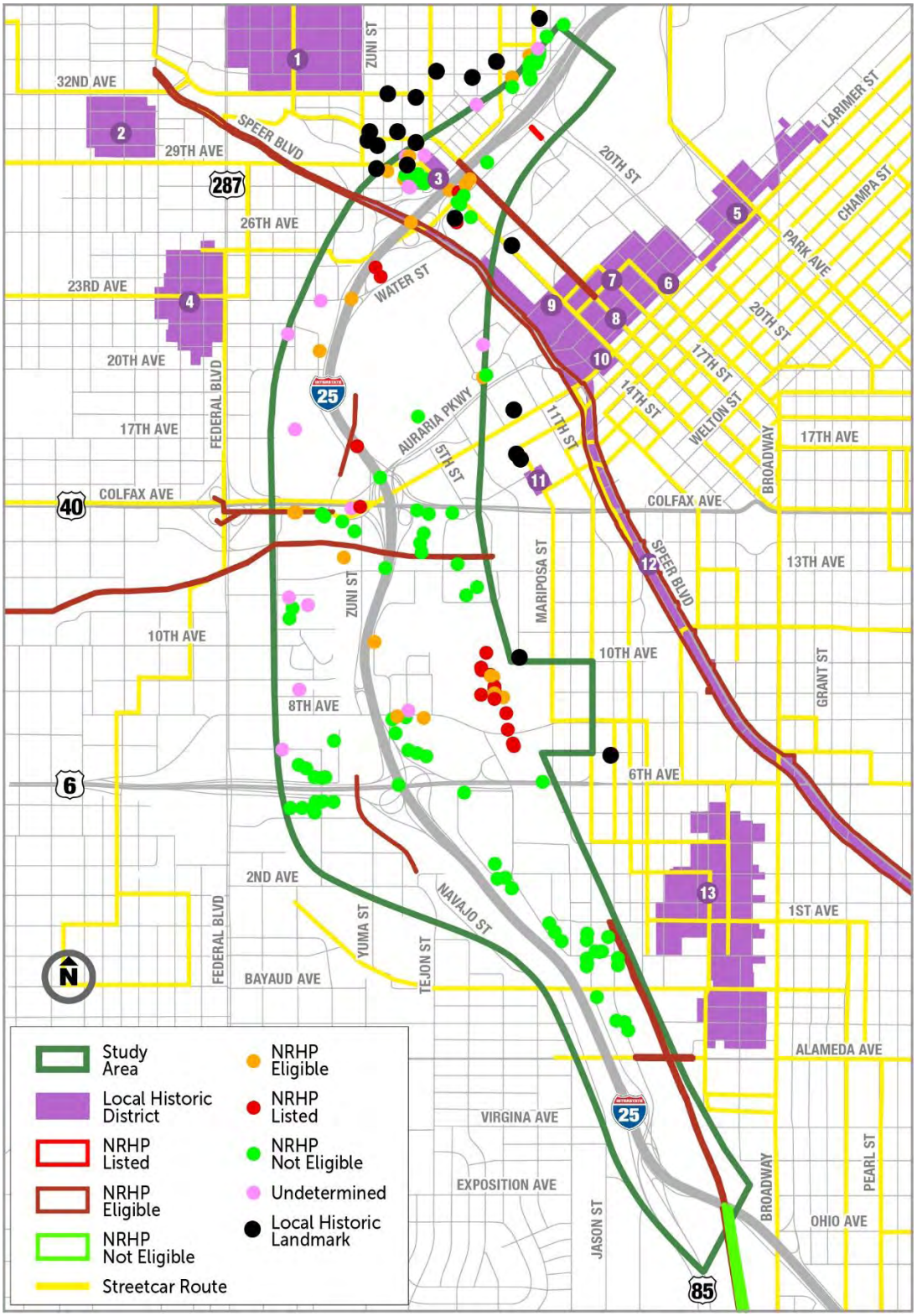
Source: Denver, 2017f

Table 16. Historic Districts (see Figure 62)

ID (see Figure 62)	Historic District	ID (see Figure 62)	Historic District
1	Potter Highlands	8	LODO Spec Rev Dist 2
2	Allen M. Ghost	9	LODO Spec Rev Dist 4 (HUED)
3	Old Highland Business District	10	Larimer Square
4	Witter—Cofield	11	Ninth Street Park
5	Ballpark Neighborhood	12	Speer Boulevard
6	LODO Spec Rev Dist 1	13	Baker Neighborhood
7	Lower Downtown		

Source: Denver, 2018

Figure 62. Previously Recorded Historic Resources



Source: Identified historic resource data is from the Colorado Historical Society Office of Archaeology and Historic Preservation, 2017. Historic district information is from Denver shapefiles (Denver, 2018f). Historic streetcar route information is from Denver shapefiles (Denver, 2018i).

In addition, there are three bridge structures on I-25 that are of historic value and are officially NRHP Eligible.They are the two bridges that carry Speer Boulevard over I-25 (5DV.7052 and 5DV.7054) and the 23rd Avenue bridge across I-25 (5DV.7068). They are 1952 concrete rigid frame structures dating from the original Valley Highway construction, and they are NRHP Eligible because they exhibit the potential first use of this type of bridge on the interstate system. The two Speer Boulevard bridges also are within the Speer Boulevard Historic District, which is officially listed in the NRHP and also is a Denver Landmark District.

While most features of the interstate system are exempt from both Section 106 and Section 4(f) processes, there is a list of "nationally and exceptionally significant features" that are exceptions. These three bridges are exceptions, considered to be exceptionally significant and subject to Section 106 and Section 4(f) processes. Speer Boulevard is a historic parkway designed using certain aesthetic principles. Denver has adopted design guidelines for the parkway, which it has followed on new improvement.

Within the study area are potentially eligible streetcar lines. However, they are most likely buried under pavement, making it difficult to assess their integrity. Denver street car routes contributed to the development of Denver. Any streetcar routes should be treated as potentially eligible to the NRHP and then assessed for integrity if found in the work area. Additional underground historic resources in the study area include brick lined sewers. An Interagency Programmatic Agreement (IPA) was signed by CDOT, FHWA and the SHPO in 2013 for a ten-year period. This IPA gives guidance if any brick sewers are found in the study area for the evaluation, review and mitigation requirements.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for historic resources include:

- National Historic Preservation Act of 1966 (16 USC 470f; 36 CFR Part 800); especially Section 106
- Section 4(f) of the USDOT Act of 1966 (49 USC 303 and 23 USC 138)
- NEPA of 1970 (42 USC 4321; 40 CFR 1500-1508)
- Colorado Historical, Prehistorical, and Archaeological Resources Act of 1973 (CRS 240-80-401, CRS 24-4-101; 8 CCR 1504-7)
- 2013: Programmatic Agreement Among the Federal Highway Administration, the Colorado State Historic Preservation Officer, and the Colorado Department of Transportation Regarding Brick-Lined Sewers in the City and County of Denver.

Stakeholders

Primary stakeholders for historic resources include:

- SHPO
- Participating Native American tribes
- Denver Landmark Preservation Office and other consulting parties

Archaeology

Resource Description

Archaeological resources are defined as material evidence of human activity. They range in time from prehistoric periods to modern day. In a regulatory sense, archaeological resources can be treated as historic properties if they meet one of the four criteria needed for listing on the NRHP (36 CFR 60.4). For this assessment, linear features such as roads and railroads are excluded from archaeological resources and considered historic resources.

Existing Conditions

All data were taken from the results of a SHPO file search completed in December 2017. Based on the file search, there are 28 archaeological resources within the study area. Most of them are either isolated finds or are listed as ruins, foundations, or having “total disturbance.” Most are not eligible for the NRHP, or are listed as Field Not Eligible, meaning the original assessment was that the resource was not eligible, but it has not been put to SHPO for concurrence. It is very likely that none or few of these sites remain, and those that do likely are not eligible for the NRHP.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for archaeology include:

- National Historic Preservation Act (54 United States Code [USC] §300101 et seq.)
- Colorado State Register Act (CRS 24-80.1)
- National Register of Historic Places

Stakeholders

Primary stakeholders to archaeology include:

- SHPO
- Participating Native American tribes
- Denver Landmark Preservation Office and other consulting parties

Geologic Resources and Soils

Resource Description

This section summarizes existing soils and geologic conditions in the study area and describes consequences of geologic hazards and considerations, including stability of surficial deposits, erosion of surficial materials, difficulty of excavation in bedrock units, earthquakes, and high groundwater levels.

Existing Conditions

The existing geologic condition was taken from the current geologic maps and descriptions of layers and formations included on the reviewed geologic maps.

The project corridor is in an area of broadly rolling topography, with local steepening of the terrain where resistant bedrock units crop out. The area's most significant topographic feature is the broad valley of the South Platte River, which lies 10 feet to 50 feet below the surrounding surface. I-25 lies largely in the South Platte River Valley, generally close to the west bank of the river except near the northern end of the study area. The Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture (USDA) has not conducted a formal soil survey for Denver. Urbanization has altered the natural soils due to fill, excavation, and other construction activities.

The study area has been developed over an extended period. Construction of roads and railroads, as well as of industrial, commercial, and residential buildings, has modified the native earth materials with cuts and, locally, several generations of fills. In addition, many segments of the river have been engineered, including realignment, straightening, and profile changes (drop structures). Industrial, commercial, and residential development all have resulted in numerous local modifications to the topography, including cuts, fills, and installation of retaining walls.

The study area, which lies within the Denver Basin geologic province, consists largely of a sequence of sedimentary rock formations deposited and preserved in the Denver Basin, a structural depression in north-central Colorado. Underlying the area is the west-central portion of the Denver Basin, a major north-south trending structural depression containing sediments ranging in age from late Pennsylvanian through Quaternary.

Much of I-25 in the study area, particularly at the interchanges, is constructed on artificial fill. This artificial fill is composed of varying amounts of clay, silt, sand, gravel, and other debris including concrete, brick, wood, vegetation, and trash, ranging in thickness from 5 feet to 40 feet.

The Denver Formation, of late Cretaceous and early Paleocene age, is present beneath alluvial materials and/or fill materials at depths from 10 feet to 60 feet.

Stakeholders

Primary stakeholders to geologic resources and soils include:

- USGS
- Colorado Geological Survey (CGS)
- USDA NRCS

Hazardous Materials

Resource Description

The EPA defines hazardous material as anything causing harm to people, plants, or animals when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment.

Existing Conditions

An environmental database records search, including federal and state environmental resources, was obtained for the study area. A limited reconnaissance survey of the study area and vicinity was completed on November 15, 2017, to evaluate the potential presence of regulated materials sources. The study area was surveyed visually via a "windshield survey" by driving the study area and vicinity via public ROW. The reconnaissance survey included an assessment of the current land uses and observable activities associated with properties in and adjacent to the study area. Access to some areas, including private property and ROW, was limited.

A total of 825 facilities were identified in the database report. Numerous point sources and area sources were identified within and near the study area. Figure 63 shows the locations of these sites.

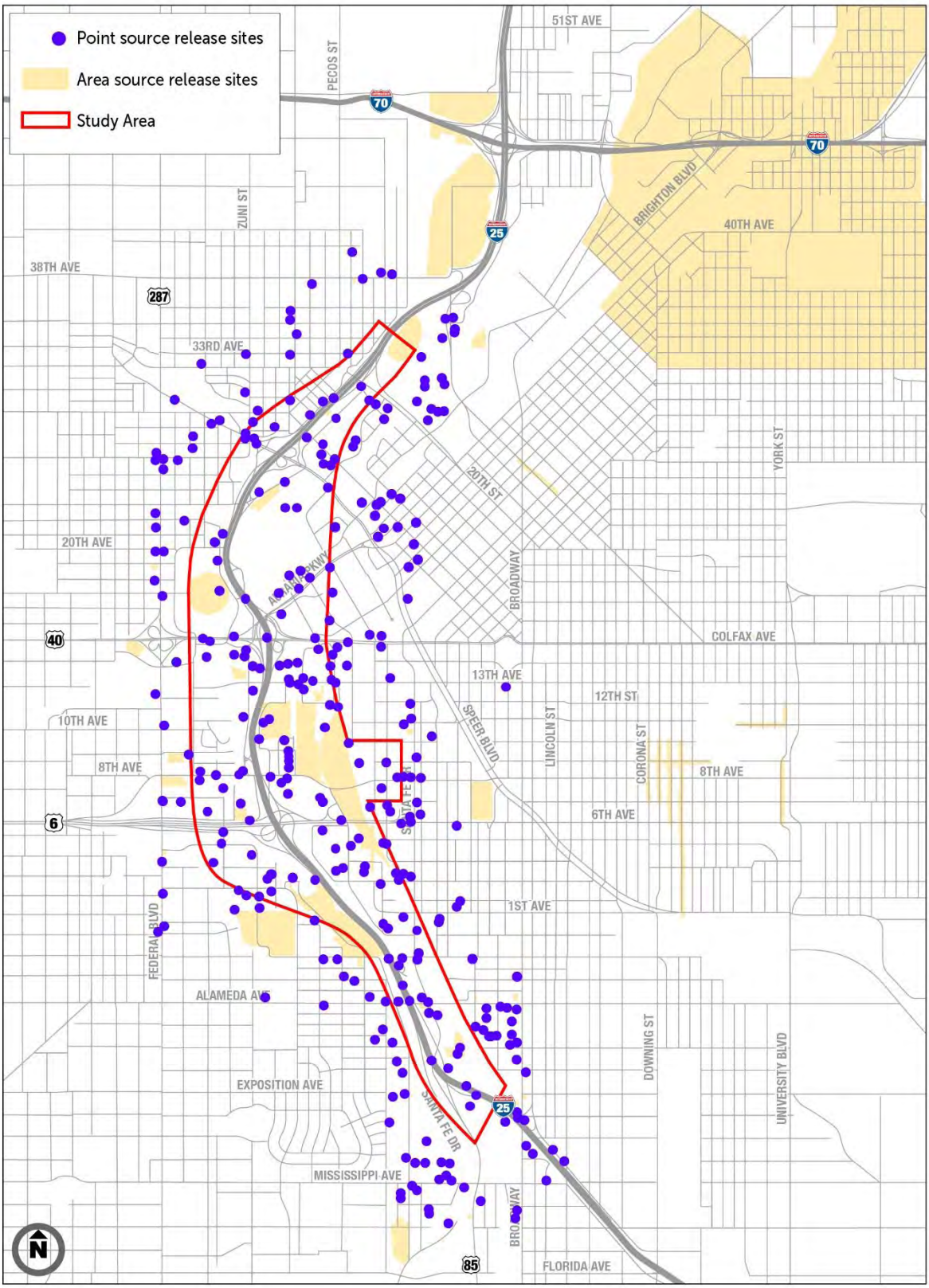
Table 17 presents a list of facilities identified on databases as having a higher likelihood of impacts from regulated hazardous materials and/or environmental contamination from Recognized Environmental Conditions (RECs), Controlled RECs (CRECs), and Historical RECs (HRECs), as well as a higher potential to impact the study area.

Table 17. Facilities with a Potential to Impact the Study Area

Facility Type	Facilities Identified	Facility Type	Facilities Identified
Underground Storage Tank	245	National Priorities List	1
Leaking Underground Storage Tank	296	Brownfields Management System	19
Aboveground Storage Tanks	149	Record of Decision System	2
Resource Conservation Recovery Act (RCRA) generators	77	Historical Solid Waste Landfills	47
RCRA Non-Generators	161	Voluntary Cleanup and Redevelopment Program Sites	176
Superfund Enterprise Management System	6	Superfund Sites	2
Superfund Enterprise Management System Archived Site Inventory	17	Spills	110
Emergency Response Notification System	46	Hazardous Waste Sites—Generator	32

Source: GeoSearch, 2017

Figure 63. Hazardous Material Sites



Source: GeoSearch, 2017

Guidance and Regulations

Applicable laws, regulations, and guidance documents for hazardous materials include:

- Resource Conservation Recovery Act (RCRA) (40 CFR Parts 260–299)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC Part 103, Sec. 9601 et seq.)
- EPA Standards and Practices for All Appropriate Inquiry (AAI)/ASTM (40 CFR Part 312)
- Initial Site Assessment (ISA) Checklist/Form 881, a Modified Environmental Site Assessment (MESA), or a Phase I Environmental Site Assessment (ESA)
- Underground Storage Tank (UST) Remediation, Colorado Department of Labor and Employment (CDLE), Division of Oil and Public Safety (OPS) (7CCR 1101-14)
- Colorado Hazardous Waste Regulations (6 CCR 1007-3, Part 260)
- Radiation Control, Colorado Department of Health and Environment, Hazardous Materials and Waste Management Division (6 CCR 1007-1)

Stakeholders

- At this time, stakeholders for this resource have not been identified. As projects move into the NEPA process, stakeholders for this resource will be identified as needed.

Parks and Recreation/Section 6(f) Resources

Resource Description

Recreation resources, including parks, open space, and major trail networks, are important community facilities that provide environmental, aesthetic, and recreational benefits. Section 6(f)(3) of the Land and Water Conservation Fund (LWCF) Act of 1965 contains provisions to protect properties that are purchased or improved with grant monies from the LWCF. Section 6(f) applies to all transportation projects that could involve possible conversion of the use of these public outdoor recreational properties.

Existing Conditions

GIS data were obtained through the Denver Open Data Catalog and CDOT's OTIS to identify parks, open space and greenway trails, and Section 6(f) resources within the study area boundary.

Identified resources within the study area all are managed by Denver and are shown in Figure 64 and listed in Table 18, along with their location, facilities available, and if they are considered a Section 6(f) resource. Numbers on the figure correspond to IDs in the table.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for parks and recreation/Section 6(f)(3) include:

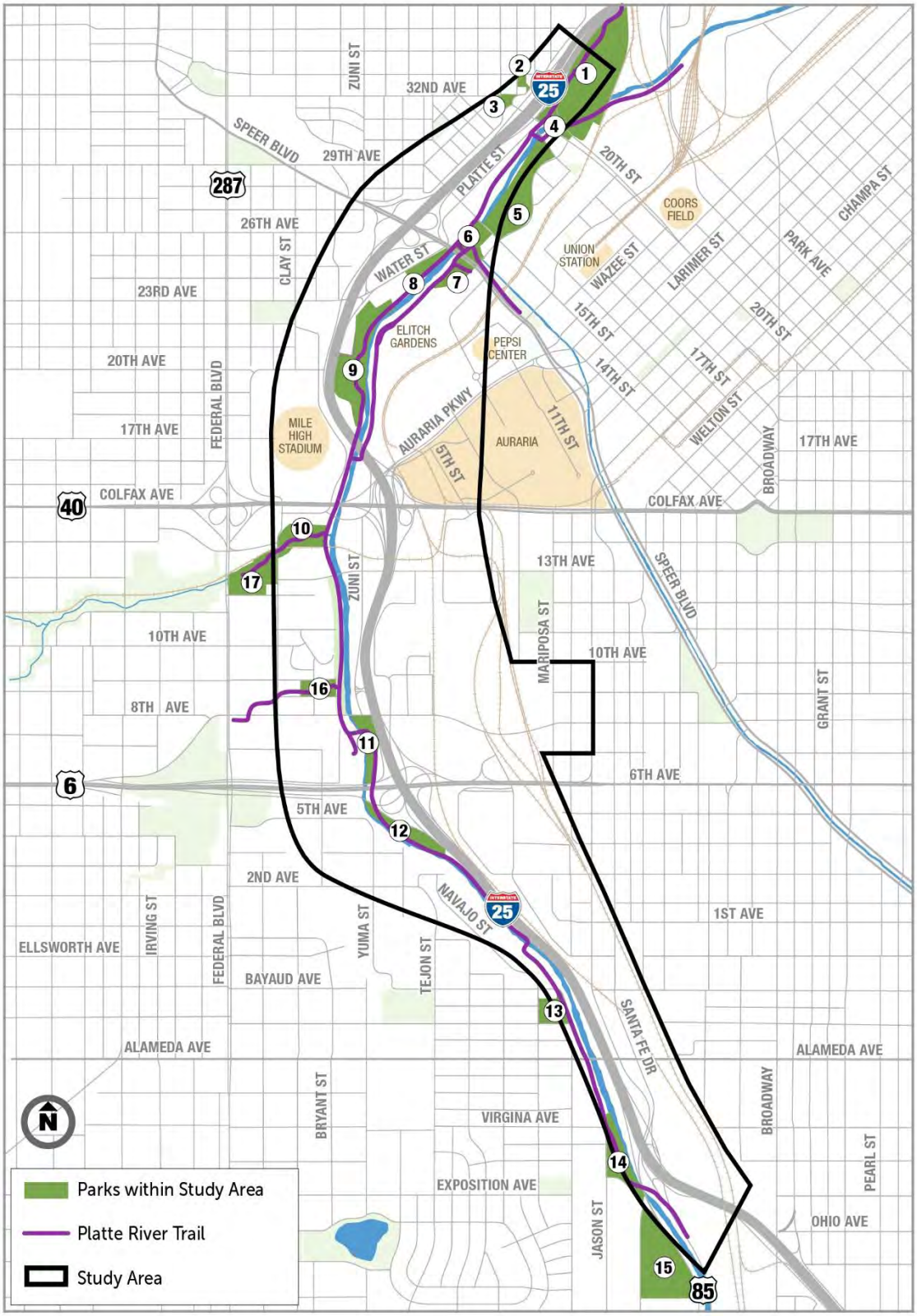
- LWCF Act of 1965
- USDOT Act of 1966, Section 4(f)

Stakeholders

Primary stakeholders for parks and recreation/Section 6(f)(3) include:

- U.S. Department of the Interior (DOI)
- National Park Service (NPS)
- Colorado Parks and Wildlife (CPW)
- Greenway Foundation
- Urban Drainage and Flood Control District (UDFCD)
- Local residents and business owners
- Outdoor recreation, greenway, and cycle groups

Figure 64. Parks and Section 6(f) Resources



Source: Denver, 2018b

Table 18. Parks and Recreational Resources in the Study Area

ID	Resource Name	Location[1]	Facilities[2]	Section 6(f)[3]
N/A	South Platte River Greenway Trail	N/A	Recreational trail, bicycle/pedestrian path	Yes
1	City of Cuernavaca Park	3500 Rockmont Dr	Drinking fountain, picnic tables, picnic shelter, public art, baseball/softball field, natural areas, bicycle/pedestrian path, South Platte River Trail	Yes
2	Community Plaza Park	3250 N. Osage St	Plaza, benches	No
3	Highland Gateway Park	2533 19th St	Picnic tables, playground, basketball court, benches	No
4	Denver Skate Park	2205 19th St	Benches, skate park, picnic shelter, picnic tables, drinking fountain	No
5	Commons Park	2101 15th St	Benches, restroom, drinking fountain, bicycle/pedestrian path, South Platte River Trail, walking/jogging paths, natural areas	No
6	Confluence Park	2250 15th St	Bicycle/pedestrian path, South Platte River Trail, Cherry Creek Trail, kayak course, benches, flower beds, Shoemaker Plaza	Yes
7	Centennial Gardens	1301 Elitch Cir	Benches, fountain, bicycle/pedestrian path, South Platte River Trail, flower beds, natural areas, restroom, drinking fountain	Yes
8	Fishback Park	818 Water St	Drinking fountain, picnic shelter, picnic tables, bicycle/pedestrian path, South Platte River Trail, natural areas, benches	Yes
9	Gates Crescent Park	2100 Children's Museum Dr	Picnic tables, bicycle/pedestrian path, South Platte River Trail, sand volleyball court, natural areas, playground, drinking fountain	Yes
10	Lower Lakewood Gulch Park	1401 Morrison Rd	Lakewood Gulch Trail	No
11	Frog Hollow Park	2350 W. 8th St	Drinking fountain, picnic tables, bicycle/pedestrian path, South Platte River Trail	No
12	Phil Milstein Park	Between the S Platte River, US 6, and I-25	Picnic tables, bicycle/pedestrian path, South Platte River Trail	No
13	Valverde Park	150 S. Navajo St	Baseball/softball field complex, basketball court, football field, bicycle/pedestrian path, picnic shelter	Yes
14	Johnson Habitat Park	610 Jason St	Benches, picnic shelter, South Platte River Trail, natural areas, river access, playground, interpretive overlook, outdoor classroom	Yes
15	Vanderbilt Park	855 S. Platte River Dr	Restroom, bicycle/pedestrian path, baseball/softball field, bleachers, lake, natural areas, benches, picnic tables	Yes
16	Weir Gulch Park	2620 W. 9th Ave	Weir Gulch Trail, South Platte River Trail	No
17	Rude Park	2855 W. Holden Pl	Lakewood Gulch Trail, natural areas, baseball/softball field, bleachers, benches, recreation center	Yes

[1]*Source: Denver, 2018b*
[2]*Source: Google Maps*
[3]*Source: CDOT, 2017d*

Section 4(f) Resources

Resource Description

Section 4(f) of the Department of Transportation Act affords protection to publicly owned land in the form of a public park, recreation area, or wildlife and/or waterfowl refuge of national, state, or local significance, and land of an historic site of national, state, or local significance. Section 4(f) protected properties usually are considered in two categories: historic and non-historic.

Historic Section 4(f) properties are any properties listed on the NRHP, or that are eligible for nomination to the NRHP, and that warrant preservation in place. The final list of historic properties identified in a Section 106 process will constitute the list of historic Section 4(f) properties, with the common exception of archaeological sites, which usually do not warrant preservation in place.

Non-historic Section 4(f) properties include existing and planned publicly owned recreation facilities, where recreation is the significant purpose of the facility. Bicycle and pedestrian trails, for example, may have a major commuting or transportation purpose. In demonstrated cases, then, they would not warrant Section 4(f) protection. For this report, no effort has been made to separate recreation from other purposes. All publicly owned trails and parks have been identified as Section 4(f) protected. “Planned” means specific facilities are identified in the appropriate master planning document.

No publicly owned wildlife or waterfowl refuges exist in the study area.

Existing Conditions

GIS data for recreation facilities was obtained through Denver’s Open Data Catalog. Parks, open space, and greenway trails were identified within the study area boundary. In addition, the Denver Parks and Recreation Department was contacted regarding any proposed parks or open space projects.

Data regarding potential historic properties were gathered from a SHPO file search using the Colorado Office of Archaeology and Historic Preservation’s (OAHP) COMPASS database, Denver’s assessor’s database, and from other sources of information.

Historic Section 4(f) Properties

As discussed previously, historic Section 4(f) properties are those that are listed or are eligible for listing on the NRHP. Currently identified properties meeting this criterion were identified in the historic section of this report and are shown in Figure 62. It should be noted that there are additional properties within the study area that may be eligible for listing on the NRHP; however, further review of these properties will be needed before such a determination is made. Therefore, there may be additional, unidentified properties eligible for Section 4(f) protections.

Non-Historic Section 4(f) Properties

Because there are no privately-owned recreational facilities within the study area, all parks and recreational facilities identified in the Parks and Recreation section of this report are considered to be Section 4(f) properties. This list can be found in Table 18 and is depicted in Figure 64.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for Section 4(f) include:

- USDOT Act of 1966, Section 4(f)
- 23 CFR 774
- FHWA's Section 4(f) Policy Paper (USDOT 2012)

Stakeholders

Primary stakeholders for Section 4(f) include:

- DOI
- HUD
- SHPO
- Officials with jurisdiction of publicly owned recreation facilities

Visual and Aesthetics

Resource Description

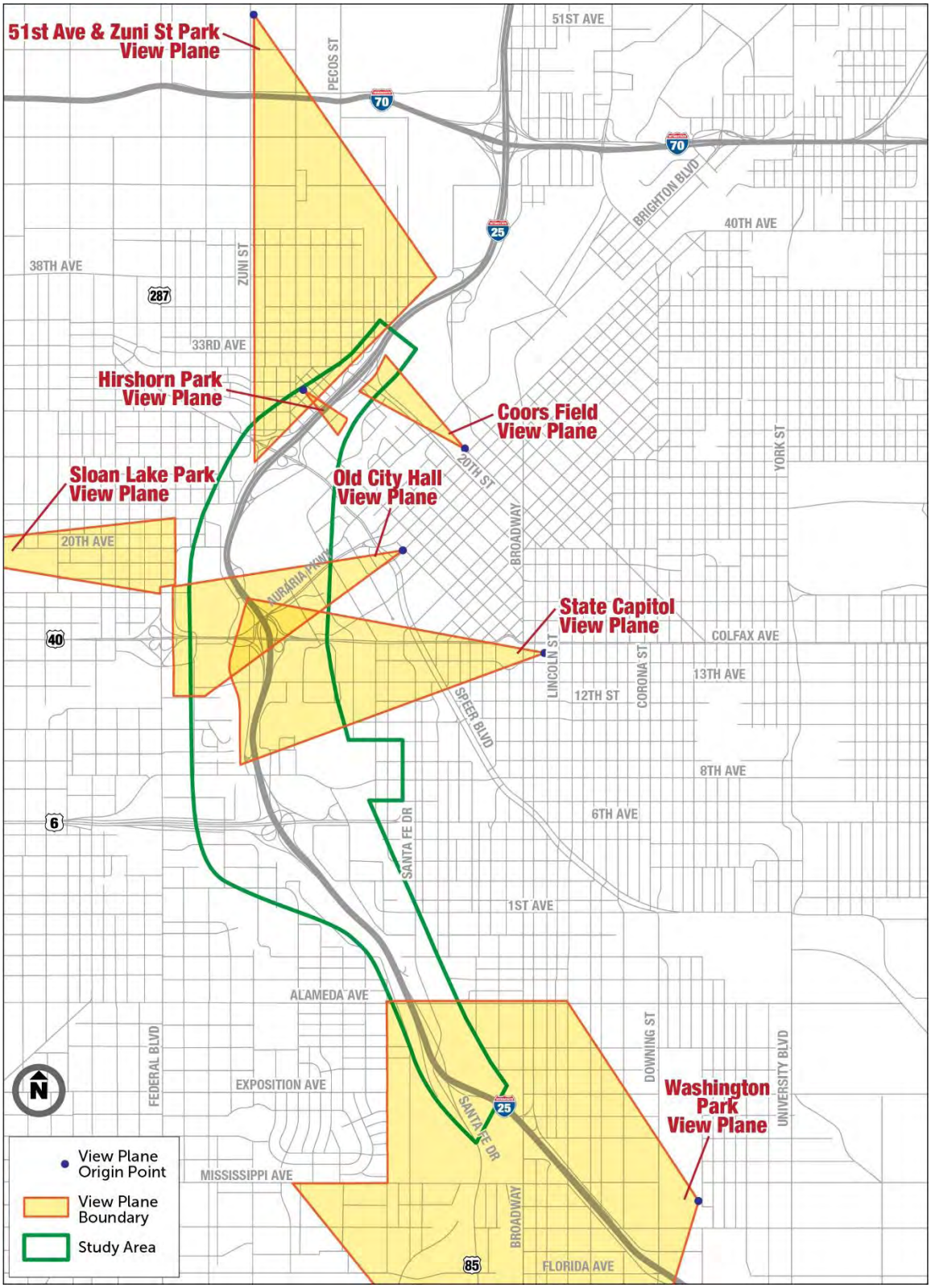
Visual resources are present in the environment and derive from the view of natural and man-made elements. All elements of the landscape (such as landform, water, vegetation, and human development) contribute to or detract from the quality of the visual environment.

Existing Conditions

The study area is located within the Front Range Urban Zone, per the CDOT *Landscape Architecture Manual* (CDOT, 2014d), which is a highly developed, relatively dense urban and suburban land use of high, medium, and low density.

Denver protects certain valued views by establishing view planes by council ordinance (Denver Building Code, RMC Section 10-61.5) in which the height of structures is limited. There are six view planes that intersect the study area, and a seventh (Sloan's Lake Park) that is within 500 feet of the study area. The Revised Municipal Code of Denver, Colorado, identifies the locations and limitations within each of these view planes. Figure 65 shows the view planes in the study area.

Figure 65. View Planes Crossing the Study Area



Source: Denver, 2018h

Land Use and Visual Character

A visual inventory was conducted for the corridor to identify the landscape character type of the foreground (within 0.5 mile), middle ground (between 0.5 and 1 mile), and background (greater than 1 mile) of the corridor. The visual resource in the study area is the urban landscape unit of the entire corridor.

Land use along the existing I-25 highway and study area includes a wide mix of commercial, industrial, residential, educational, recreational, cultural, transit-oriented development, parks and open areas, and highway facilities. Some of the existing foreground views in the study area are dominated by large industrial facilities such as the Zuni Generating Station and the Denver Wastewater Management facility, highway infrastructure, and Mile High Stadium, with occasional middle ground/background views of Downtown Denver and local residential and commercial uses. Additionally, occasional views of vegetation associated with the South Platte River riparian corridor are present on both sides of the roadway as the river crosses beneath I-25 just north of the Colfax Avenue and I-25 interchange. Background views of the Front Range of the southern Rocky Mountains are present to the west. Residential land use along the corridor is mostly comprised of mid-rise condominiums and apartment buildings overlooking I-25.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for visual resources include:

- FHWA *Guidelines for the Visual Impact Assessment of Highway Projects* (2015)
- CDOT *NEPA Manual*
- CDOT *Landscape Architecture Manual*
- CDOT *Region 1 Urban Design Guidelines*
- Denver view plane ordinances

Stakeholders

Primary stakeholders for visual resources include:

- Local agencies (Denver, Office of Community Planning and Development)
- Local residents and business owners
- Outdoor recreation, greenway, and bicycling groups

Floodplains

Resource Description

A floodplain is the area surrounding a waterway that will be inundated during a flooding event. Any construction that could affect the delineation of these floodplains must prevent any increase to the elevation of flood waters and any adverse spreading of these flood waters.

Existing Conditions

The Federal Emergency Management Agency (FEMA) has different classifications for floodplain delineation, according to zone and percent chance of flooding every year and whether flood water surface elevations or Base Flood Elevations (BFEs) have been established.

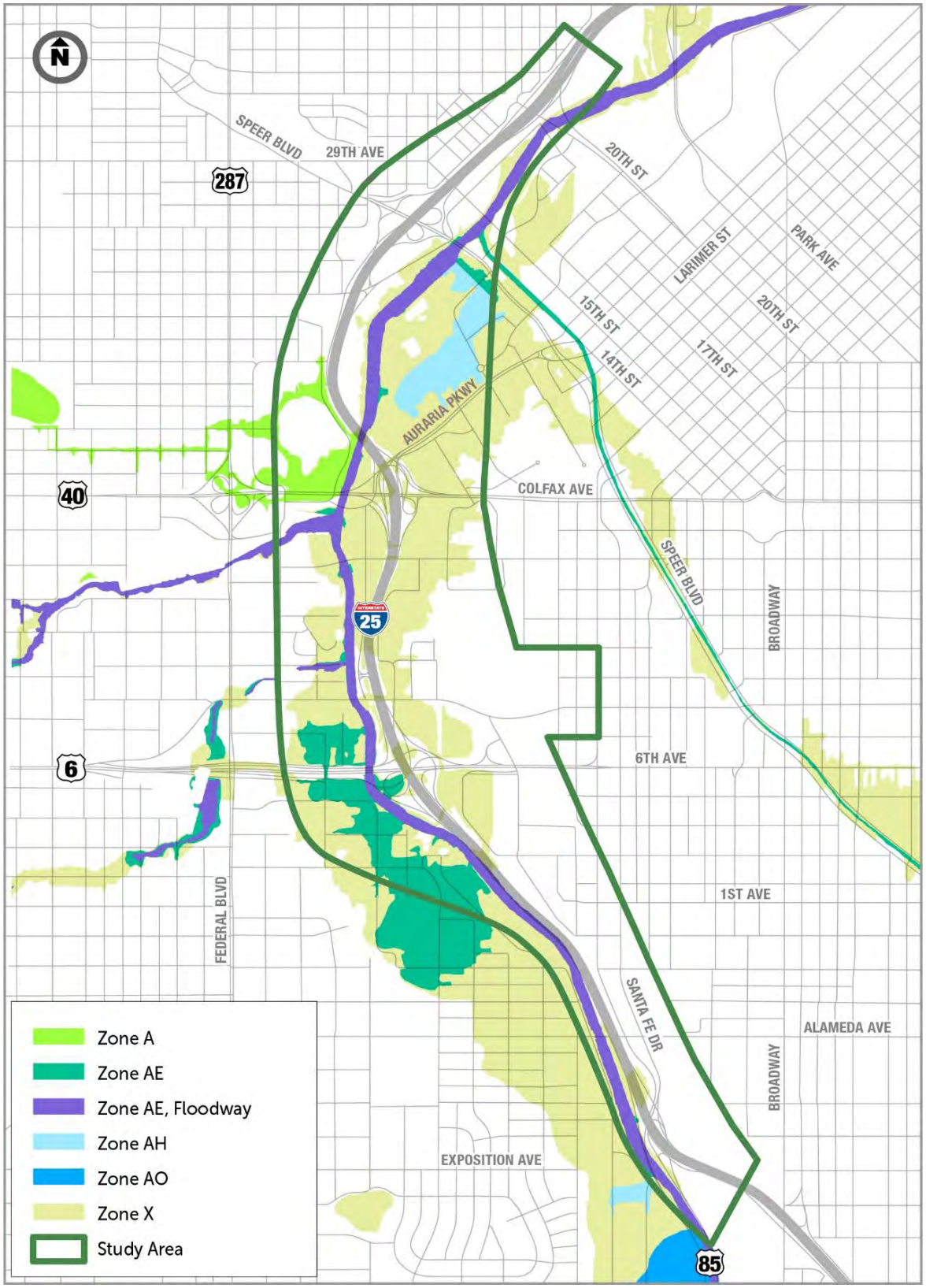
The I-25 Central study area covers six different FEMA floodplain categories. These categories are described in Table 19. The South Platte River within the study area is a Zone AE floodplain with floodways. This means that the area is subject to inundation by the 1-percent-annual-chance flood event and BFEs have been established by FEMA. Figure 66 shows the FEMA Flood Zones affected by this project.

Table 19. FEMA Floodplain Categories

Zone	Description
A	• Areas subject to flooding in a 1-percent-annual-chance flood as determined by approximate methodologies. • No BFEs or flood depths have been established.
AE	• Areas subject to flooding in a 1-percent-annual-chance flood as determined by detailed methodologies. • BFEs have been established.
AE, Floodway	• Areas subject to flooding in a 1-percent-annual-chance flood as determined by detailed methodologies. • BFEs have been established. • Area must be kept free of encroachment so that floodwaters can be carried without substantial increases in flood heights
AH	• Areas subject to flood depths of one to three feet (usually ponding) in a 1-percent-annual-chance flood. • BFEs have been established.
AO	• Areas subject to flood depths of one to three feet (usually flowing water) in a 1-percent-annual-chance flood. • BFEs have been established.
X	• Areas outside the 0.2-percent-annual-chance flood. • Areas subject to flood depths of less than 1 foot in a 1-percent-annual-chance flood. • Areas protected by levees from a 1-percent-chance-annual flood.

Source: FEMA, 2017

Figure 66. Floodplains within Study Area



Source: FEMA, 2018

The South Platte River runs from southwest to northeast within the Denver Metro Area. According to U.S. Geological Survey (USGS) StreamStats, the South Platte River has a contributing area of approximately 3,420 square miles when it enters the study area. According to the November 2013 Flood Insurance Study for Denver, the 1-percent-chance-annual flood peak flow is 31,500 cubic feet per second (cfs) at the upstream project limits and increases to 35,000 cfs near the downstream project limits.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for floodplains include:

- Executive Order 11988, Floodplain Management
- FHWA 23 CFR 650, Subpart A
- USDOT Order 5650.2, Floodplain Management and Protection
- FEMA policy

Stakeholders

Primary stakeholders to floodplains include:

- FEMA
- U.S. Army Corps of Engineers (USACE)
- UDFCD

Drainage and Water Quality

Resource Description

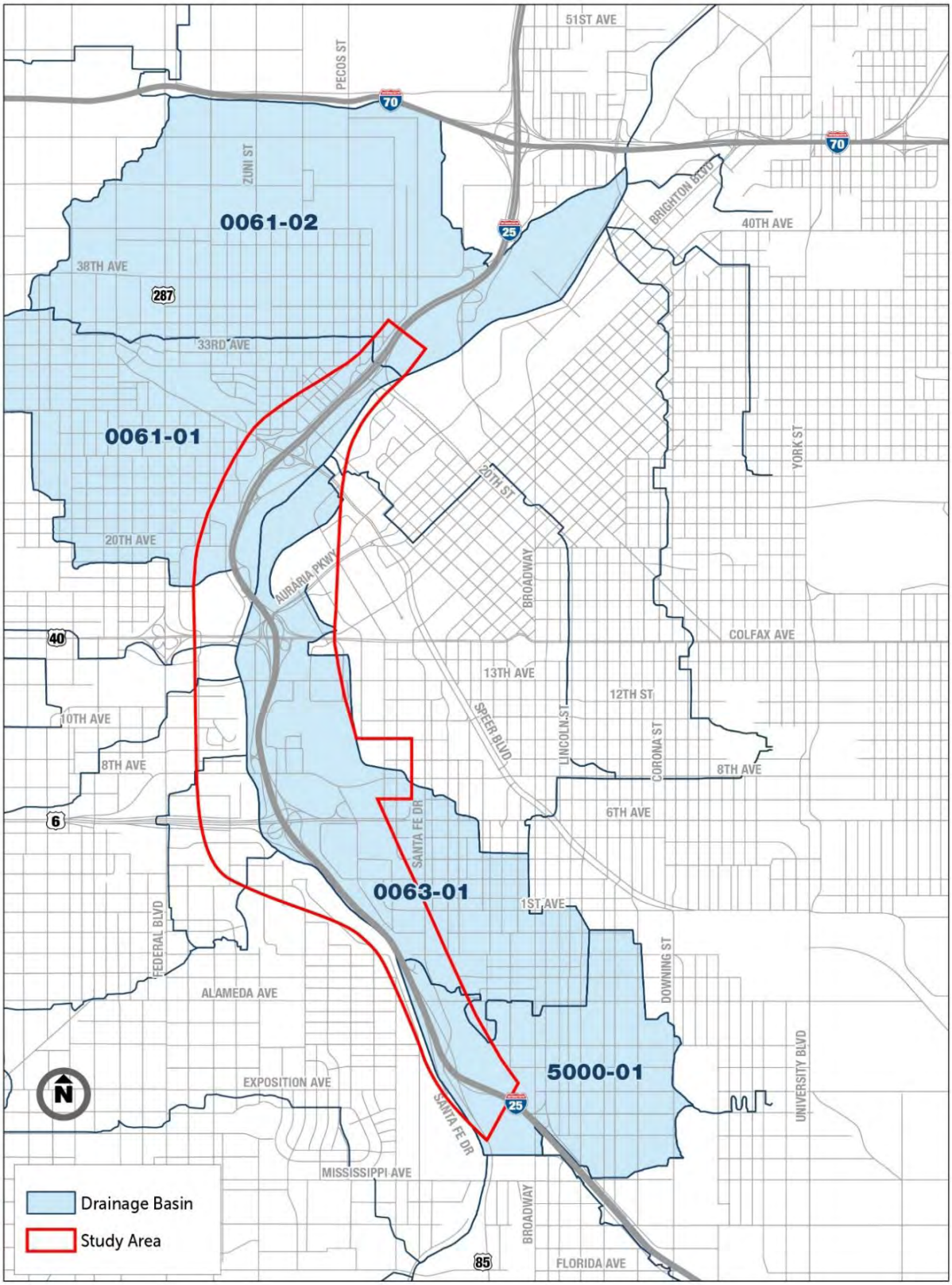
Drainage and water quality resources include consideration of surface water, groundwater, climate, topography, geology, land use, beneficial uses as defined by the Colorado Water Quality Control Commission (WQCC), EPA Clean Water Act, and local stormwater regulations. Transportation projects can impact drainage and water quality resources during construction and maintenance/operation phases.

Existing Conditions

Offsite Basins

Drainage basins are areas of land where precipitation collects and drains to a common outlet such as a river. Multiple offsite basins flow toward and across I-25 on their way to the South Platte River. Major offsite basins have been identified in the Denver *Storm Drainage Master Plan* (Denver, 2014a). From this plan, four basins have been identified within the study area that include offsite flows directed toward or across I-25. These Denver basins include West Washington Park (5000-01), Central Platte Valley (0063-01), Highlands (0061-01), and 27th Avenue and Federal Boulevard (0061-02). Figure 67 shows the location of these drainage basins. Existing cross drains and storm drain systems convey these offsite flows through the I-25 corridor to the South Platte River.

Figure 67. Denver Drainage Basins



Source: Denver, 2014

Surface Water

Surface water resources within the project study area include the South Platte River. Per the EPA Clean Water Act, this segment of the river has a status of good for agriculture and aquatic life support. The status is impaired for recreation and water supply. The causes of impairment include arsenic, *Escherichia Coli* (*E. Coli*) and nitrate. Arsenic is listed as a pollutant of concern for CDOT's permanent water quality program.

Groundwater

Groundwater resources within the PEL study area include the Denver formation, which has both shallow and deep-water aquifers. Reported groundwater depths vary between 0.7 feet to 20 feet below ground. However, detailed reviews of available groundwater samples have not been conducted. Samples will need to be reviewed as part of final design.

Drainage Infrastructure

CDOT drainage infrastructure has been identified within the study area. Major cross drains (≥48-inch diameter) are listed in Table 20. Additional storm drains and cross drains are located within the study area but have not been reviewed due to their limited size and capacity. They will need to be inventoried as part of final design.

Table 20. Existing Major Drainage Infrastructure

Cross Drain Location (MP)	Approximate Cross Street	Size	Direction of Flow
207.4	E Center Ave	54-inch	East to West
207.7	E Dakota Ave	616/123-inch	East to West
208.2	W Bayaud Ave	54-inch	East to West
208.8	W 23rd Ave	60-inch	East to West
209.3	W 7th Ave	72-inch	East to West
210.8	W 20th St	50-inch	West to East
211.2	N Zuni St	72/48-inch	North to South
212.0	20th St	96/60-inch	Northwest to Southeast
212.2	N Lipan St	87/42-inch	North to South

Source: Denver, 2014

Existing CDOT Municipal Separate Storm Sewer System (MS4) Permanent Water Quality features also have been identified within the study area and are listed in Table 21. These include extended detention ponds (EDPs) constructed as part of previous CDOT projects. As part of final design, the inventory will be updated and the area treated will be investigated.

Table 21. Existing Major Water Quality Infrastructure

Water Quality Location (MP)	Approximate Cross Street	Control Measure
207.4	S Santa Fe Dr	EDP
207.8	E Dakota Ave	Lined holding pond
207.9	E Nevada Ave	EDP
209.1	6th Ave	EDP
209.2	6th Ave	EDP

Source: CDOT, 2018c

See Figure 68 for the proximity of major CDOT drainage infrastructure and water quality features within the study area.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for water quality include:

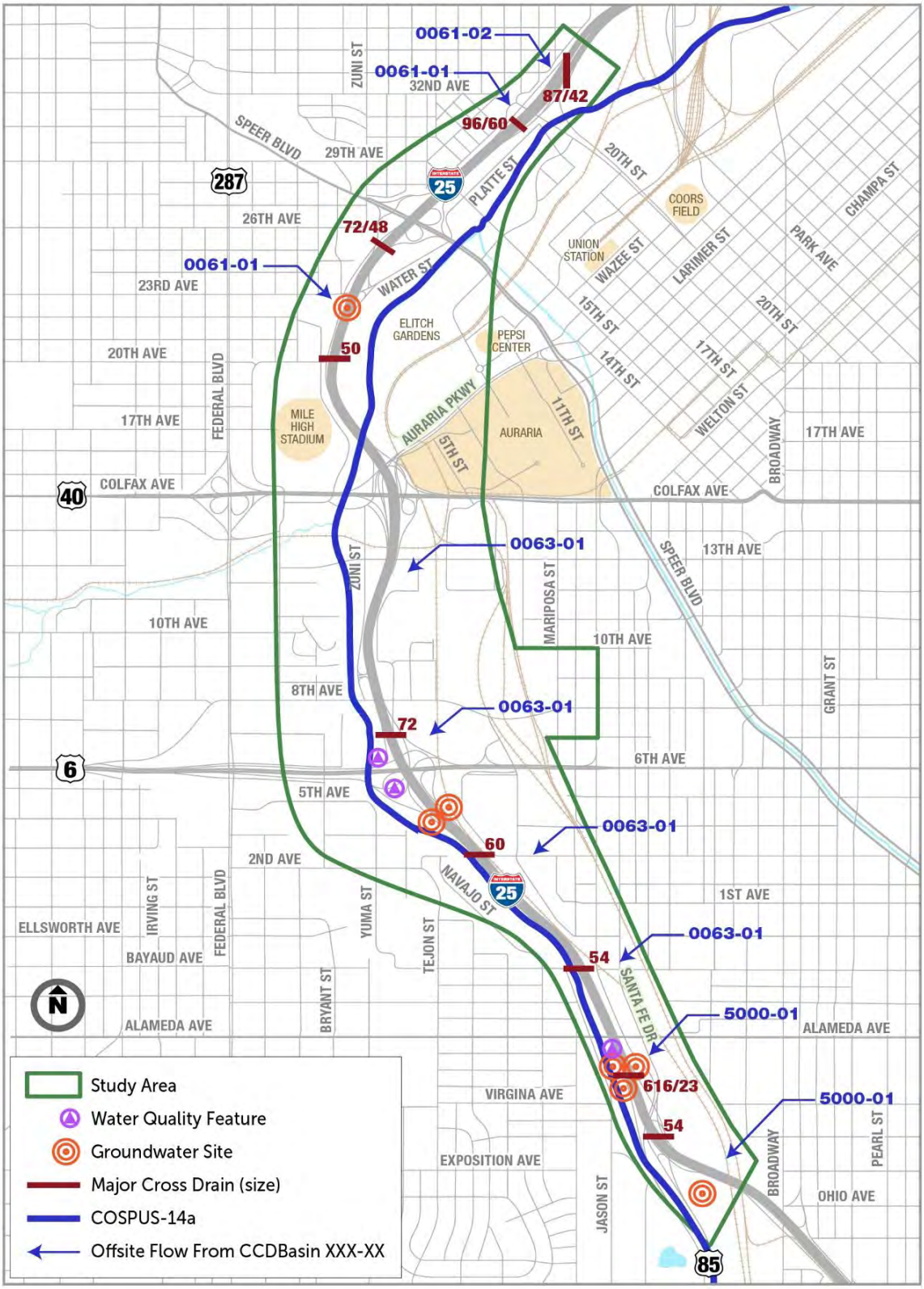
- Clean Water Act (Sections 401, 402)
- Safe Drinking Water Act (40 CFR Parts 141-143)
- Erosion and Sediment Control on Highway Construction Projects (25 CFR 650 Subpart B)
- Colorado Water Quality Control Act (Colorado Revised Statutes (CRS) Title 25, Article 8)
- Colorado Senate Bill 15-212
- CDOT *Drainage Design Manual*
- CDOT MS4 Permit
- CDOT *Erosion Control and Stormwater Quality Guide*
- Denver *Storm Drainage Design and Technical Criteria Manual*
- UDFCD *Urban Storm Drainage Criteria Manual*

Stakeholders

Primary stakeholders for water quality include:

- CDPHE
- EPA
- UDFCD

Figure 68. Drainage Infrastructure and Water Quality Features



Source: CDOT, 2018c

Wetlands and other Waters of the U.S.

Resource Description

The term “waters of the U.S.” includes rivers, streams, canals, lakes, and ponds. Wetlands are "… those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." (USACE, 1987).

Existing Conditions

High resolution aerial photography available through Google Earth Pro was reviewed and data available online from the U.S. Fish and Wildlife (USFWS) National Wetland Inventory were obtained on potential wetlands in the study area.

The South Platte River and its tributaries Cherry Creek, Lakewood Gulch, and Weir Gulch are the predominant waters in the study area and virtually all the wetlands in the National Wetland Inventory are adjacent to these streams (see Table 22 and Figure 69; ID numbers in the table match numbers on the figure). Through the study area, the South Platte River (“Riverine” in Figure 69) has been extensively channelized and is constrained within a steep-sloped, riprap-lined trapezoidal channel with a narrow wetland fringe. Most of the wetlands in the study area are narrow herbaceous wetlands dominated by reed canarygrass (*Phalaris arundinacea*), with plains cottonwood (*Populus deltoides*) and sandbar willow (*Salix exigua*)-dominated freshwater forested/shrub wetlands scattered throughout. The wetlands adjacent to the tributaries are similar. Sometimes documented by the National Wetland Inventory as freshwater ponds, isolated waters and wetlands associated with stormwater management facilities such as detention facilities, outfall channels, and poorly drained roadside ditches are present as well.

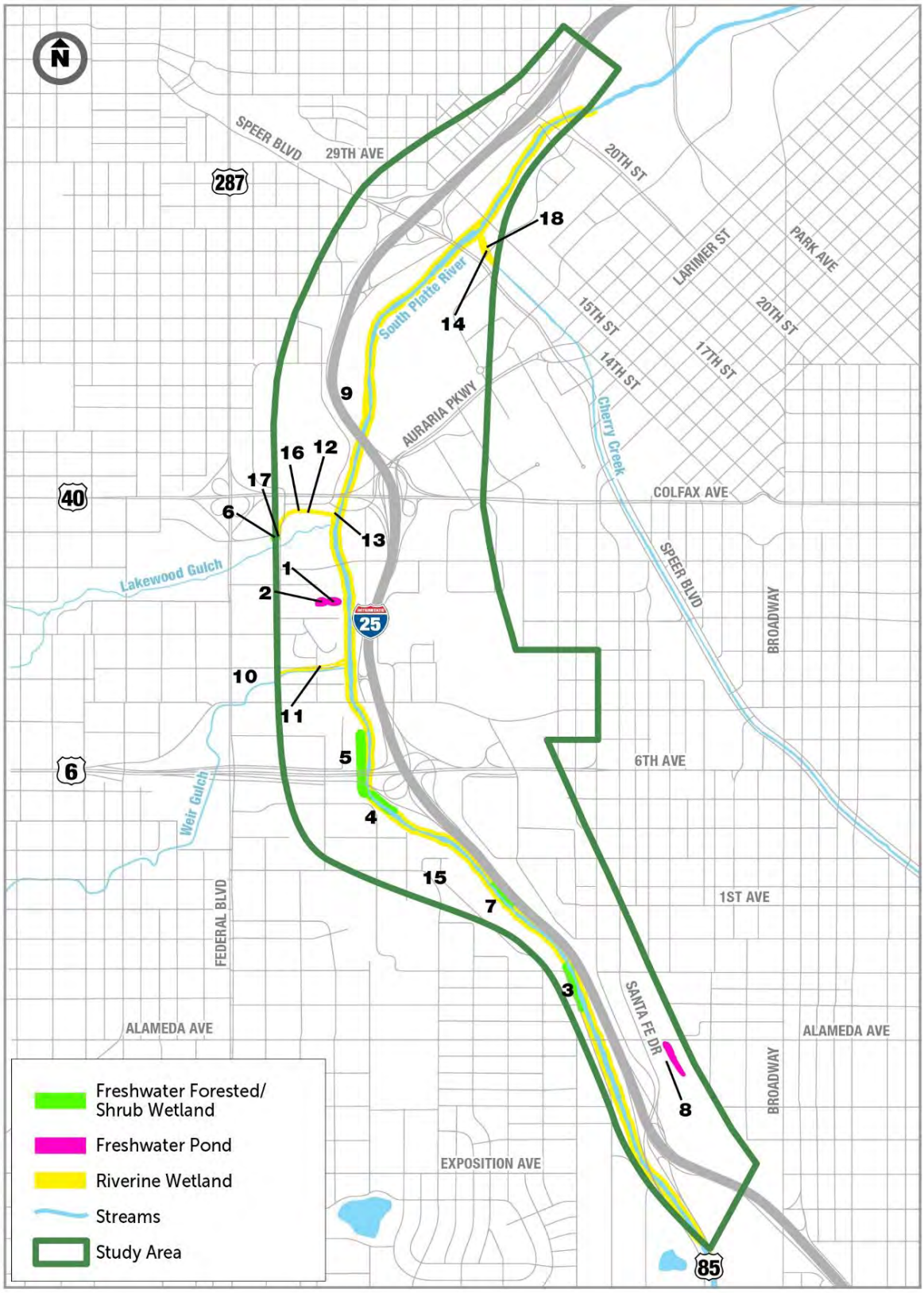
The USACE has previously determined that the South Platte River, Cherry Creek, Lakewood Gulch, and Weir Gulch, and wetlands adjacent to them, are jurisdictional waters of the U.S. regulated under the Clean Water Act. Isolated wetlands and wetlands associated with some stormwater facilities would not be regulated under Section 404, but CDOT policy requires impacts be avoided and minimized; unavoidable impacts must be mitigated for.

Table 22. National Wetland Inventory Wetlands and Waters in the Study Area

ID	National Wetland Inventory Mapping Code[1]	Wetland and Water Type	Acres
1	PABGx	Freshwater Pond	0.39
2	PABGx	Freshwater Pond	0.32
3	PFOA	Freshwater Forested/Shrub Wetland	0.39
4	PFOA	Freshwater Forested/Shrub Wetland	0.24
5	PFOA	Freshwater Forested/Shrub Wetland	0.53
6	PFOAx	Freshwater Forested/Shrub Wetland	0.01
7	PSSA	Freshwater Forested/Shrub Wetland	0.21
8	PUBFx	Freshwater Pond	0.65
9	R2USC	Riverine	0.64
10	R4SBC	Riverine	0.21
11	R4SBCx	Riverine	0.82
12	R4SBCx	Riverine	0.37
13	R5UBH	Riverine	0.17
14	R2UBH	Riverine	0.48
15	R2UBH	Riverine	58.02
16	R4SBAx	Riverine	0.62
17	R4SBCx	Riverine	0.11
18	R2UBGx	Riverine	0.43

[1]*Source: USFWS, 2018*
PABGx—Palustrine aquatic bed, intermittently flooded, exposed, excavated
PFOA—Palustrine forested, temporarily flooded
PFOAx—Palustrine forested, temporarily flooded, excavated
PSSA—Palustrine scrub-shrub, temporarily flooded
PUBFx—Palustrine unconsolidated bottom, semi-permanently flooded, excavated
R2USC—Riverine, lower perennial, unconsolidated shore, seasonally flooded
R4SBCx—Riverine, intermittent, streambed, seasonally flooded
R5UBH—Riverine, unknown perennial, unconsolidated bottom, permanently flooded
R4SBAx—Riverine, intermittent, streambed, temporarily flooded
R2UBGx—Riverine, lower perennial, unconsolidated bottom, intermittently exposed, excavated

Figure 69. National Wetland Inventory Wetlands and Waters in the Study Area



Source: USFWS, 2018

Guidance and Regulations

Applicable laws, regulations, and guidance documents for wetlands and other waters of the U.S. include:

- Executive Order 11988, Protection of Wetlands
- Section 404 of the Clean Water Act

Stakeholders

Primary stakeholders for wetlands and other waters of the U.S. include:

- USACE
- EPA

Vegetation and Noxious Weeds

Resource Description

Vegetation is important because it holds soil in place and prevents erosion; removes carbon dioxide from the atmosphere and releases oxygen; provides diverse materials that are used by people and other animals as food, for structures, and other products; and contributes to shade, aesthetic views, and recreation. Plant communities support diverse species and provide particular niches for specialized plants and animals. A noxious weed is a weed that has been designated by an agricultural authority as one that is harmful to agricultural crops, natural habitats or ecosystems, or humans or livestock.

Existing Conditions

CPW Riparian Data, aerial imagery, and Colorado Natural Heritage Program (CNHP) tracked communities list were reviewed. The evaluation of the potential for vegetation to be present in the study area or be affected by activities in the study area was based on an understanding of the habitat requirements for each species and on best professional judgement gained from experience on other evaluations in the study area. Information from CDOT OTIS (noxious weed mapping along CDOT ROW) and Denver noxious weed mapping was obtained as well.

The study area generally is characterized by Eastern plains cottonwood (*Populus deltoides*) riparian fringes, also consisting of common urban tree species such as Siberian elm (*Ulmus pumila*), honeylocust (*Gleditsia triacanthos*), green ash (*Fraxinus pennsylvanica*), occasional catalpa (*Catalpa speciosa*), and escaped ornamentals, and a herbaceous understory often dominated by smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), and common roadside weedy species, such as cheatgrass (*Bromus tectorum*), Canada thistle (*Cirsium arvense*), common mullein (*Verbascum thapsus*), and others.

There are some planted landscape and native trees at Gates Crescent, Centennial, Commons, Confluence, Vanderbilt, and City of Cuernavaca Parks. These parks are mostly manicured lawn grasses, and native or “zone appropriate” introduced species and varieties of shrubs and broadleaf and coniferous trees. The shrubs and trees in these parks can provide wildlife habitat and often are protected under both city code and by CDOT standard specifications.

There are no vegetation communities categorized by the CNHP as critically imperiled, imperiled, or vulnerable to extirpation in the study area.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for vegetation and noxious weeds include:

- Colorado Senate Bill 40, Wildlife Certification
- Section 404 of the Clean Water Act
- The Federal Noxious Weed Act
- Federal Executive Order 13112, Invasive Species
- Colorado Noxious Weed Act
- The Weed Free Forage Crop Certification Act (CRS 35-27.5)
- Rules and Regulations Pertaining to the Weed Free Forage Crop Certification Act
- State of Colorado Executive Order D 06 99—Development and Implementation of Noxious Weed Management Programs
- State of Colorado Executive Order D 002 03—Directing State Agencies to Coordinate Efforts for the Eradication of Tamarisk on State Lands
- Denver Noxious Weed Management Program

Stakeholders

Primary stakeholders for vegetation and noxious weeds include:

- CPW
- Colorado Department of Agriculture
- USFWS

Wildlife and Fisheries

Resource Description

Fish and wildlife are vital components of ecosystems and contribute to their diversity, provide a source of enjoyment for recreationists, and provide a source of food for people and other animals. It is important that populations of fish and wildlife species and the habitats that support them remain healthy.

Existing Conditions

The CPW Species Activity Mapping (SAM) web page was reviewed for mapped data on wildlife species (CPW, 2011), as well as the CPW Riparian Mapping data (CPW, 2012). The evaluation of the potential for fish and wildlife species to be present in the study area was based on an understanding of the habitat requirements for each species and on best professional judgement gained from experience on other evaluations in the study area.

The highly urbanized nature of the study area significantly limits potentially available habitat to small, low-quality patches of vegetation. The highest-quality undeveloped habitat is along the South Platte

River, Cherry Creek, Lakewood Gulch, and Weir Gulch. Vegetation along the streams is dominated by a mix of introduced and native trees, shrubs, and herbaceous plants. Other potential habitat includes parks and areas landscaped with cultivated species of trees and shrubs. Plant and animal species likely present in the study area are those commonly associated with disturbance, urbanization, and human-altered landscapes. For these reasons, very few other wildlife species, prairie dogs, raptors, or sensitive fish are expected to be present (Table 23).

Table 23. Wildlife and Fish in the Study Area

Resource	Potentially Present?	Summary
Game Animals	Yes	Winter range for mule deer
Other Wildlife	Yes	Urban Wildlife—Mammal species potentially using or passing through the study area may include coyote (*Canis latrans*), fox squirrel (*Sciurus niger*) striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), rodents (including mice and voles), reptiles such as the common garter snake (*Thamnophis sirtalis*), and possibly amphibians such as frogs and toads.
Black-Tailed Prairie Dogs	Yes—but unlikely	N/A
Migratory Birds	Yes	Passerines and raptors mainly—Canada Goose (*Branta canadensis*), House Finch (*Haemorhous mexicanus*), and American Robin (*Turdus migratorius*), Mourning Dove (*Zenaida macroura*), Black-Billed Magpie (*Pica hudsonia*), or medium to smaller raptors.
Bald and Golden Eagles	Yes—but unlikely	Bald Eagle may roost in winter in some areas. No known nests or habitat are present. No Golden Eagle nests or habitat are present.
Fish—Game	Yes	Warm and cool water species—carp, rainbow trout, brown trout, perch, large and small mouth bass, and walleye.
Fish—Non-sensitive	Yes	Common South Platte species—minnow species, darters, shiners, and other smaller native species
Fish—Protected or Listed	No	None documented

Source: CPW, 2011

Guidance and Regulations

Applicable laws, regulations, and guidance documents for wetlands and other waters of the U.S. include:

- CRS Title 33 Parks and Wildlife
- 2009 CDOT Impacted Black-Tailed Prairie Dog Policy
- Migratory Bird Treaty Act
- Bald and Golden Eagle Protection Act (16 USC 668-668c), enacted in 1940
- Colorado Senate Bill 40 Wildlife Certification (33-5-101-107, CRS 1973 as amended) (SB 40)
- Statute 33-2-101, known as the “Nongame, Endangered, or Threatened Species Conservation Act”

Stakeholders

Primary stakeholders for wetlands and other waters of the U.S. include:

- CPW
- USFWS

Threatened and Endangered Species

Resource Description

Threatened and endangered species are species listed by the USFWS and CPW as being vulnerable to extinction within all or parts of the United States or the State of Colorado. Species typically are vulnerable to extinction due to habitat loss, over hunting, disease, and predation or competition by invasive and exotic species.

Existing Conditions

The study area was assessed for potential habitat for species listed as threatened or endangered. A list of threatened and endangered species was requested and received from the USFWS.

Due to the highly urbanized nature of the study area, threatened, endangered, or Colorado species of concern are not expected to be present in the area.

The USFWS lists seven species as either potentially present in or affected by activities in the study area (see Guidance and Regulations

Applicable laws, regulations, and guidance documents for threatened and endangered species include:

- CRS Title 33, Parks and Wildlife
- 2009 CDOT Impacted Black-Tailed Prairie Dog Policy
- Migratory Bird Treaty Act
- Bald and Golden Eagle Protection Act (16 USC 668-668c), enacted in 1940
- Colorado Senate Bill 40, Wildlife Certification (33-5-101-107, CRS 1973 as amended) (SB 40)
- Statute 33-2-101, known as the “Nongame, Endangered, or Threatened Species Conservation Act”

Stakeholders

Primary stakeholders for threatened and endangered species include:

- CPW
- USFWS

Table 24).

Guidance and Regulations

Applicable laws, regulations, and guidance documents for threatened and endangered species include:

- CRS Title 33, Parks and Wildlife
- 2009 CDOT Impacted Black-Tailed Prairie Dog Policy
- Migratory Bird Treaty Act
- Bald and Golden Eagle Protection Act (16 USC 668-668c), enacted in 1940
- Colorado Senate Bill 40, Wildlife Certification (33-5-101-107, CRS 1973 as amended) (SB 40)
- Statute 33-2-101, known as the “Nongame, Endangered, or Threatened Species Conservation Act”

Stakeholders

Primary stakeholders for threatened and endangered species include:

- CPW
- USFWS

Table 24. Federally Threatened and Endangered Species Potentially Found in the Study Area

Species	Preferred Habitat**	Potential to Affect	Status
Birds			
Interior Least Tern (*Sterna antillarum*)*	Nest on barren to sparsely vegetated sandbars along rivers, sand and gravel pits, and lake and reservoir shorelines.	Potential for indirect effects	Endangered
Piping Plover (*Charadrius melodus*)*	Plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands of major river systems.	Potential for indirect effects	Threatened
Whooping Crane (*Grus americana*)*	Breeds, migrates, winters, and forages in a variety of wetland and other habitats in the central Great Plains.	Potential for indirect effects	Endangered
Fishes			
Pallid sturgeon (*Scaphirhynchus albus*) *	The pallid sturgeon is a bottom-oriented, large river obligate fish inhabiting the Missouri and Mississippi rivers and some tributaries from Montana to Louisiana	Potential for indirect effects	Endangered
Flowering Plants			
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	Moist meadows associated with perennial stream terraces, floodplains, oxbows, and human-modified wetlands, such as gravel pits and irrigation canals, at elevations between 4,300 and 6,850 feet.	Suitable habitat absent, no potential to affect. South Platte River is in block clearance zone (although tributaries are not)	Threatened
Western prairie fringed orchid (*Platanthera praeclara*)*	Found most often on unplowed, calcareous prairies and sedge meadows.	Potential for indirect effects	Threatened
Mammals			
Preble's meadow jumping mouse (*Zapus hudsonius preblei*)	Well-developed riparian habitat with adjacent, relatively undisturbed grassland communities, and a nearby water source. Well-developed riparian habitat includes a dense combination of grasses, forbs and shrubs; a taller shrub and tree canopy may be present. Preble's meadow jumping mouse has been found to regularly use uplands at least as far out as 100 meters beyond the 100-year floodplain.	In block clearance zone, no potential to effect	Threatened

Source: USFWS, 2017.
**Water-related activities/use in the N. Platte, S. Platte, and Laramie River basins may affect listed species in Nebraska.*
***Preferred habitat descriptions from USFWS ECOS Species Profiles.*

Cumulative Impacts

Resource Description

Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” (CEQ, 40 CFR 1508.7). The purpose of this analysis is to assess the potential for combined impact of the proposed project and other projects that may occur within the community study area.

Cumulative impacts result when the effects of an action are added to or interact with the effects of other actions in a particular place and within a particular time. It is the combination of these effects, and any resulting environmental degradation, that is the focus of the cumulative impact analysis. While impacts can be differentiated by direct, indirect, and cumulative impacts, the concept of cumulative impacts takes into account all disturbances because an action can be viewed as the total effects on a resource, ecosystem, or human community of that action, and all other activities affecting that resource no matter what entity (federal, non-federal, or private) is taking the action. Comprehensive information on resources that could be affected in indirect or cumulative ways is described in previous sections.

Cumulative Impacts Study Area and Time Frame

A geographic area of analysis has been identified for the cumulative impacts assessment, which is larger than the project study area (Figure 70). Limits were established for individual resources based on their proximity to the study area and the potential for cumulative impacts.

To focus the assessment of cumulative impacts, it is important to establish an appropriate time frame for analysis. The time frame for cumulative impacts analysis for the I-25 Central PEL project extends from approximately 1950 to approximately 2040. Brief descriptions of resources are broken down to the temporal limits presented below.

- **Past Actions.** Past actions are those undertaken between approximately 1950 to the present day. Past actions are pertinent to discuss as they dictate the resources in present day.
- **Present Actions.** Present actions are ongoing or reasonably foreseeable projects that are already being implemented or those that are reasonably expected to be implemented within a 5-year to 10-year timeframe in the study area.
- **Future Actions.** Future actions look at future potential trends that could affect the resource in the study area. This time frame extends 10 to 20 years into the future.

The cumulative impacts analysis looks at general past, present, and future trends of the resource. It will not include a detailed analysis or provide a comprehensive list of previous, present, or future actions. Figure 71 shows the locations of the present and reasonably foreseeable projects. These projects are numbered and referenced in Table 25 and Table 26.

Figure 70. Cumulative Impacts Analysis Area

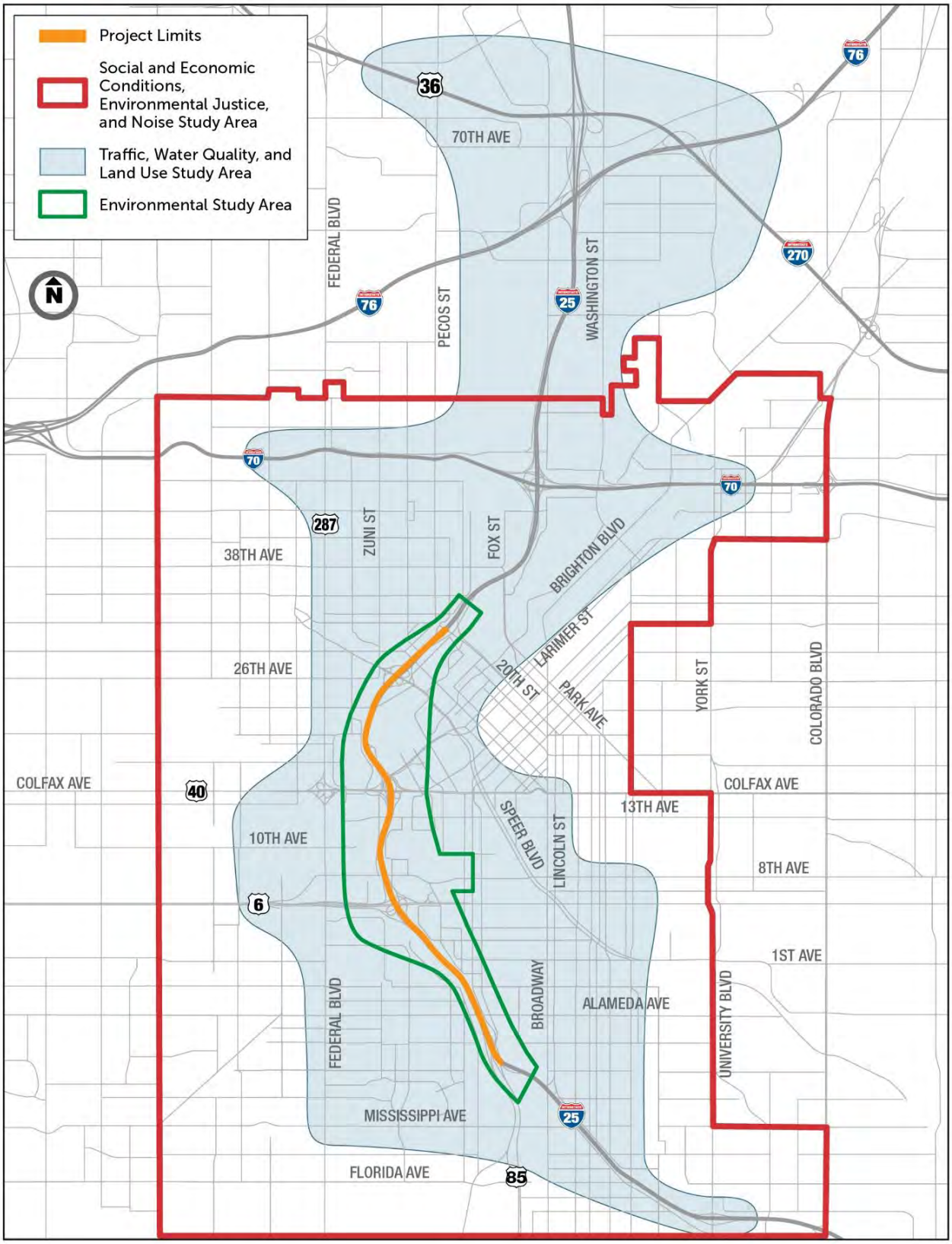
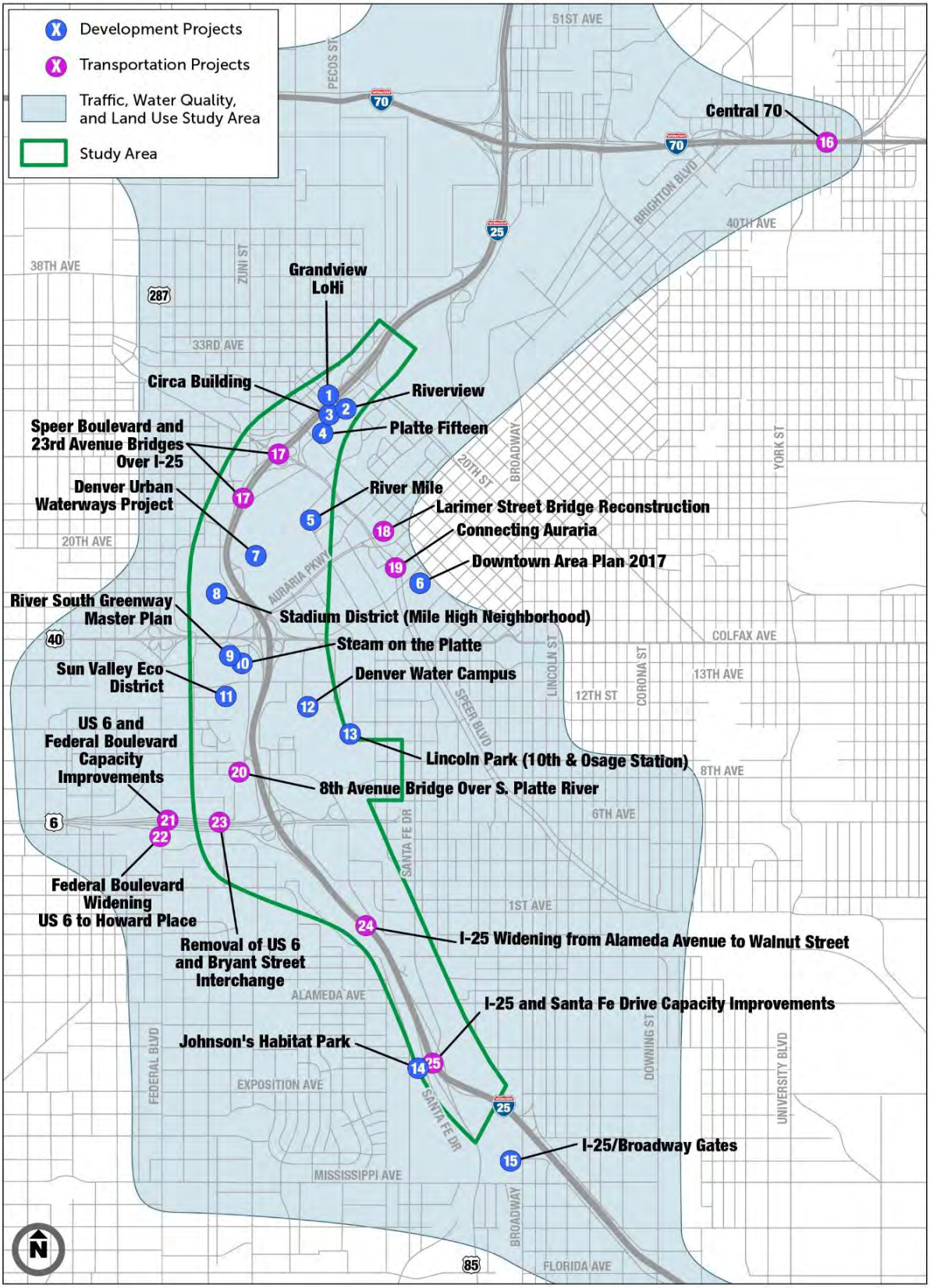


Figure 71. Present and Reasonably Foreseeable Projects



Land Use

Past Actions. Primary land uses within the study area were established already in the 1950s, much as they are today. Between the 1970s and 1980s, Denver's population decreased as people moved out of the historic, urban neighborhoods to the growing suburb region. By the mid-1980s, there was renewed interest in redeveloping the city's core areas. Several bonds were approved to improve aging infrastructure and revitalize the city, including libraries, parks, and bridges, which resulted in substantive changes in land use. Changes initiated by these bonds have continued to the present day, with a general trend of increasing development density along the I-25 corridor.

Present Actions. Today, most of the current and proposed land use developments are concentrated toward the central and northern portion of the study area near the Sun Valley, Highlands, and Lower Downtown neighborhood. According to *Blueprint Denver* (Denver, 2002), the integrated land use and transportation plan, much of Denver's growth will be accommodated by infill development on vacant land or redevelopment of existing sites. There are also areas that Denver recognizes are land uses in need of change. This includes the central industrial spine adjacent to the Platte River and railroad tracks south of Downtown Denver. The proximity to transit creates opportunities for higher-density housing and mixed-use development. Denver will continue to retain and designate industrial land uses adjacent to the I-25 corridor. Industrial and commercial development will continue to provide additional opportunities for access to employment, housing, and open space/recreation land use within the study area.

Future Actions. Land uses in the study area are poised for much more dramatic change in the coming decades, with more dense infill development and adaptive reuses occurring in remaining historic buildings. Ongoing and planned projects will bring economic growth and increased vitality to the area, but also will require careful planning by project stakeholders and developers to ensure that the quality of life is maintained for existing and new residents alike. The steady increase in population and employment from continued development would continue to increase pressure on the existing and planned future facilities in the study area. It is likely to have minor impacts through acquisition of small amounts of right of way and/or modification or removal of certain access points. It may have more meaningful impact in certain areas that require larger areas of property acquisition or disposition. Table 25 provides a list of sites in the study area with plans for major development or redevelopment in the next 20 years.

Table 25. Locations with Major Planned Development or Redevelopment in the Next 20 Years

ID (see Figure 71)	Project	ID (see Figure 71)	Project
1	Grandview LoHi	8	Stadium District (Mile High Neighborhood)
2	Riverview	9	River South Greenway Master Plan
3	Circa Building	10	STEAM on the Platte
4	Platte Fifteen	11	Sun Valley Eco District
5	River Mile	12	Denver Water Campus
6	Downtown Area Plan 2017	13	Lincoln Park (10th & Osage Station)
7	Denver Urban Waterways Project		

Transportation

Past Actions. Since the mid-1950s, the transportation system in the study area has undergone a series of changes in response to the relatively steady growth in population and travel demand within the Denver Metro Area. Construction of the Valley Highway (now I-25) and the US 6 freeway initially were completed in 1958 and expanded over time in response to increasing traffic volumes. There were additional expansion projects to key arterial roadways, including Broadway/Lincoln Street and Santa Fe Drive/Kalamath Street, to improve access to and from Downtown Denver.

Present Actions. Denver's continuing growth is putting steadily increasing demands on the I-25 corridor, the surrounding arterials, and the light rail system, all of which regularly experience congestion, even in off-peak hours. Denver's Union Station has developed into a multimodal transportation hub for light rail, commuter rail, and buses. The quality of pedestrian and bicycle facilities within the project corridor currently is mixed. I-25, the Consolidated Main Line railroad, and the South Platte River act as barriers to east-west pedestrian and bicycle mobility through the corridor. Table 26 provides a list of ongoing and planned transportation projects for the foreseeable future.

Table 26. Transportation Projects Planned in the Next 20 Years

ID (see Figure 71)	Project
16	Central 70
17	Speer Boulevard and 23rd Avenue bridges
18	Larimer Street Bridge
19	Connecting Auraria
20	8th Ave Bridge over the South Platte River
21	US 6/6th Ave & Federal Blvd Capacity Improvements
22	Federal Blvd Widening
23	US 6/6th Ave & Bryant St Interchange
24	I-25 widening from Alameda Avenue to Walnut Street
25	I-25 and Santa Fe Drive Capacity Improvements

Future Actions. The population of the Denver region is expected to increase from 3.1 million in 2015 to 4.3 million by 2040 (DRCOG, 2018). By 2040, people living in, working in, and visiting the region will make more than 20 million total trips per day. New technologies providing connected, autonomous, shared, and electric mobility options are rapidly evolving and could have significant implications on the transportation networks being planned today. Denver is committed to increasing the percentage of non-automobile travel options available, including expanding transit services and coverage and improving on-street and off-street bicycle and pedestrian facilities. Investments in the highway and major arterials also will continue to be identified and programmed in regional transportation plans. Denver, CDOT, and DRCOG will continue to coordinate the regional transportation infrastructure expansion concurrent with the vision for the region's growth and development.

Parks and Recreational Resources

Past Actions. Composed of 15 parks and 16 parkways, the Denver Parks and Parkway System was among the earliest comprehensive systems listed on the National Register of Historic Places when it was designated in 1986. In 2003, Denver developed a master plan that provided the vision for Denver's parks and recreation. The Game Plan outlined new directions for the parks and recreation system, based on values and priorities identified by Denver's residents. Outdated land uses, such as former railyards along the South Platte River in the Central Platte Valley, have been converted to open spaces such as Commons Park.

Present Actions. Today, Denver's park system consists of 260 parks totaling more than 6,000 acres, as well as five designated natural areas. There are more than 80 miles of off-street trails within the city. Beyond the city, these trails are critical commuter routes, providing connections between residential neighborhoods and downtown.

There are more than $710 million of assessed property values surrounding Denver's downtown riverfront parks (Denver, 2012), indicating the benefits of park and recreational resources in the study area. Access to parks and recreational resources is an important asset for the city and Denver continues to support opportunities to enhance access to these assets. In November 2018, Denver voters approved a sales tax increase to dedicate approximately $45 million per year in additional funding to support the city's parks. Recently constructed or planned projects in the study area include the following:

- Johnson's Habitat Park
- Denver Urban Waterways Project
- River Mile

Future Actions. In the future, Denver will continue to invest in and improve parks and recreational resources. Future projects include completing missing links in the off-street trail system to improve connections, increasing the acreage of park land, and restoring/protecting existing natural open space. The study area contains several parks adjacent to the South Platte River. It is highly likely that Denver will seek opportunities to expand existing parks or develop new ones, especially near the River Mile redevelopment and in other portions of the study area.

Environmental Justice

Past Actions. Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations," was issued in 1994 to address environmental justice impacts. Prior to enactment of this order, neighborhoods were built and established in Denver long before the Valley Highway was built in the 1950s. Over the years, several factors have reduced neighborhood cohesion along the corridor as I-25 was developed and major arterials were built. The highway, combined with the South Platte River, severed connections in existing neighborhoods containing environmental justice populations and restricted east-west travel in the study area. The following neighborhoods are located within the study area:

- Sun Valley
- Valverde
- Baker
- Athmar Park
- Lincoln Park
- Auraria
- Highlands
- Jefferson Park
- Five Points
- Union Station
- Washington Park
- Platt Park

Present Actions. Today, many of the study area neighborhoods to the north (Highlands, Union Station, and Jefferson Park) are experiencing considerable growth and infill development, some of which has displaced minority populations and low-income groups. As neighborhoods become more desirable places to live, there is an increasing risk of displacing environmental justice populations. There is a larger population of minority residents in the study area southeast of Downtown Denver, in neighborhoods such as Sun Valley, Valverde, and Athmar Park.

Future Actions. The forecast of increasing housing costs and modest wages will continue to push more rental units in Denver out of reach for low- and moderate-income households. Athmar Park, Valverde, and Sun Valley are areas susceptible to future gentrification, which could include involuntary displacement of long-time residents and businesses. Environmental justice populations in the study area have been, and will continue to be, impacted primarily by large-scale property redevelopment, but also by new transportation projects.

Air Quality

Past Actions. Air quality in the Denver region has fluctuated over the past 50 years. The Denver region was designated nonattainment for carbon monoxide in 1978, subsequent to the Clean Air Act Amendments of 1977. From the 1950s to the late 1980s, air quality became steadily worse due primarily to increased traffic tied to population growth in the region. The Denver Metro Area air quality routinely exceeded the National Ambient Air Quality Standards (NAAQS) in the1980s and was classified as a nonattainment area. Since 1995, Denver is in attainment for all pollutants except ozone.

On December 12, 2008, the Colorado Air Quality Control Commission approved the Ozone Action Plan, including revisions to the State Implementation Plan (SIP) for the Denver Metro Area/North Front Range Nonattainment Area. The Ozone Action Plan identified specific control measures designed to bring the region into compliance with the ozone standard by 2015.

Present Actions. Ozone continues to be a persistent problem in Denver, especially during the summer (Denver, 2018). Current activities are focused on reducing ground-level ozone in the region. As one of the fastest growing U.S. cities, Denver is experiencing significant increases in construction and traffic congestion, worsening the city's air quality.

Future Actions. Future air quality will remain a concern for the region collectively. However, improved transportation technologies and the availability of alternative modes of transportation in a densifying city will help per capita impacts to air quality to decline and regional air quality will improve.

Water Quality

Past Actions. Historic land use patterns and continued urbanization have influenced water quality by changing stormwater runoff levels and composition in the study area. The nature of runoff is directly related to land uses and the geographic coverage of urbanized areas. Since the 1970s, this trend of deteriorating water quality has begun to change. This has been a direct result of strengthening water quality regulations, beginning with the federal Water Pollution Control Act of 1972 and later, in 1974, with the passage of the Safe Drinking Water Act. The resulting National Pollutant Discharge Elimination System permit program places limits on the amount of pollutants that may be discharged from point sources. These regulations require operators of large municipal storm sewer systems—such as Denver, Aurora, and CDOT—to obtain permits and develop stormwater management programs. These

programs have led to the development of numerous water quality features throughout the study area, usually being included as a required feature of larger development projects.

Present Actions. Potential land development projects in the study area will continue to add impervious surfaces, which would replace some of the pervious green space near the South Platte River. However, any development projects in the study area, including those along the South Platte River, are required to include features to continue to improve water quality.

Future Actions. Future transportation projects and planned land development projects will add impervious surfaces, which may continue to impact water quality in the future as they have in the past. With continued regulatory requirements to reduce water pollution, water quality should remain stable.

Noise

Past Actions. Noise levels have been influenced by increasing urban density and intensity of use over time. These changes occur when unbuilt areas are replaced or become encroached upon by more intensive (and noisy) land uses, such as roads or urban development. Major transportation projects that previously have increased noise levels include the construction and expansion of I-25 and US 6/6th Avenue. Increased density of land uses, as well as intensity of uses in Denver (i.e., construction of Mile High Stadium, Pepsi Center, and increasing building density adjacent to I-25) also have contributed to the rise in noise pollution.

Present Actions. Noise along the corridor currently is worsened as a result of increased traffic growth within the study area. Present and foreseeable projects likely will contribute to additional increases in noise in the study area.

Future Actions. With population continuing to increase, land uses intensifying, and the transportation system requiring more complex facilities and sometimes elevated structures, noise levels in the urban area are expected to increase in the study area. Redevelopment and population growth also will add to the noise levels, although these would occur regardless of the implementation of the project. The extent to which noise levels may change, however, may depend largely on the trends and changes in future technology. Noise could continue to grow, but as transportation infrastructure considers new technology —such as electric vehicles—on the road, this may reduce the potential for noise impacts and mitigate noise levels in the study area.

Guidance and Regulations

Applicable laws, regulations, and guidance documents for cumulative impacts include:

- CDOT *NEPA Manual*
- FHWA NEPA and cumulative effects guidance

Stakeholders

Primary stakeholders for cumulative impacts should include those agencies that have jurisdictions over resources that could be impacted as determined in future NEPA clearance. At this time, these stakeholders have not been identified because they will likely change as time moves forward. Stakeholders for this resource will be identified in future studies.

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