North Metropolitan Industrial Area Connectivity Study

June 2018

Prepared for:

Commerce CITY COLORADO

ADAMS COUNTY COLORADO

DENVER THE MILE HIGH CITY

CONTENTS

EXECUTIVE SUMMARY 1

1 PURPOSE OF THE STUDY 6
- 1.1 NMIACS 6
- 1.2 Study Area 6
- 1.3 Goals and Objectives for the Study 7
- 1.4 Vasquez Boulevard/I-270 PEL Study 7
- 1.5 Project Team/Stakeholders 9
  - 1.5.1 Project Management Team 9
  - 1.5.2 Technical Advisory Committee 9
  - 1.5.3 Stakeholder and Public Outreach Methods and Summaries 9

2 STUDY AREA CHARACTERISTICS 11
- 2.1 Employment 11
- 2.2 Socioeconomic Information 11
- 2.3 Existing Transportation Issues in the Study Area 12
  - 2.3.1 Freight Railroads 14
  - 2.3.2 Motorized Vehicles 15
  - 2.3.3 Bicycles 19
  - 2.3.4 Walking and Wheelchair Accessibility 21
  - 2.3.5 Transit 21

3 METHODOLOGY 23
- 3.1 Travel Sheds 23
- 3.2 Plan Review 24
- 3.3 Land Use 27
- 3.4 High-Growth Scenario 27
- 3.5 Traffic Modeling 31

4 TRAVEL SHEDS 33
- 4.1 South Platte 33
- 4.2 North-South Core 34
- 4.3 Holly 36
- 4.4 Quebec 37
- 4.5 Cole to Stapleton 38
- 4.6 East-West Core 40
- 4.7 56th Avenue/58th Avenue 41
- 4.8 Derby 42
- 4.9 Welby 44

5 SCREENING AND SCORING OF PROJECTS 46
- 5.1 Scoring Criteria 46

5.1.1 Decision Support Tool 47
6 RESULTS 49
6.1 Top Projects 49
6.1.1 52nd Avenue Extension, Brighton Boulevard to Vasquez Boulevard 53
6.1.2 56th Avenue to 58th Avenue Connection 53
6.1.3 Brighton Boulevard BNSF Underpass Replacement at York Street 54
6.1.4 York Street at Brighton Boulevard Intersection Improvements 55
6.1.5 BNSF and Brighton Boulevard Bridges over Race Court 55
6.1.6 Colorado Boulevard Pedestrian and Landscaping Improvements 56
6.1.7 72nd Avenue Redevelopment 57
6.1.8 O'Brian Canal Loop Trail 57
6.1.9 I-76 Ramps at 74th Avenue 58
7 NEXT STEPS FOR IMPLEMENTATION 59
8 REFERENCES 61

APPENDICES

APPENDIX A. TOP NINE IMPROVEMENTS PROJECTS
APPENDIX B. PROJECT PLAN SETS
APPENDIX C. STAKEHOLDER AND PUBLIC OUTREACH SUMMARY
APPENDIX D. PLAN REVIEW
APPENDIX E. HIGH-GROWTH SCENARIO
APPENDIX F. TRAFFIC ANALYSIS
APPENDIX G. TRAVEL SHED DESCRIPTIONS AND MODE PRIORITIES
APPENDIX H. MASTER LIST OF IMPROVEMENTS

LIST OF FIGURES

Figure 1. NMIACS Study Area 2
Figure 2. NMIACS Study Area and Vasquez Boulevard/I-270 PEL Study Area 8
Figure 3. Employment Density 12
Figure 4. Existing Islands and Barriers 13
Figure 5. Existing Freight Railroads 14
Figure 6. Roadway Classification 16
Figure 7. 2016 Average Daily Traffic Volumes 17
Figure 8. 2016 Daily Truck Volumes 18
Figure 9. Existing Bicycle Facilities 20
Figure 10. 10-Minute Walk Shed for 40th Avenue and Colorado Boulevard Station 21
Figure 11. Existing Transit Facilities 22
Figure 12. Study Area Travel Sheds 23
Figure 13. Identified Improvements by Mode and Primary Purpose 25

Figure 14. Identified Improvements by Jurisdiction and Mode 26
Figure 15. Existing Land Use 29
Figure 16. Future Land Use 30
Figure 17. South Platte Travel Shed 33
Figure 18. North-South Core Travel Shed 34
Figure 19. Holly Travel Shed 36
Figure 20. Quebec Travel Shed 37
Figure 21. Cole to Stapleton Travel Shed 38
Figure 22. East-West Core Travel Shed 40
Figure 23. 56th Avenue/58th Avenue Travel Shed 41
Figure 24. Derby Travel Shed 42
Figure 25. Welby Travel Shed 44
Figure 26. Decision Support Tool – Evaluation Scores 48
Figure 27. Top Nine Improvement Projects 52
Figure 28. Capital Project Development and Financing Process 59

List of Tables

Table 1. Top Nine Project Summary 4
Table 2. Employment Breakdown 11
Table 3. Existing Daily Freeway Traffic 15
Table 4. Overall Employment and Population Estimates for the Entire Traffic and Land Use Model Area 28
Table 5. South Platte Mode Priorities 34
Table 6. North-South Core Mode Priorities 35
Table 7. Holly Mode Priorities 36
Table 8. Quebec Mode Priorities 38
Table 9. Cole to Stapleton Mode Priorities 39
Table 10. East-West Core Mode Priorities 41
Table 11. 56th Avenue/58th Avenue Mode Priorities 42
Table 12. Derby Mode Priorities 43
Table 13. Welby Mode Priorities 45
Table 14. Project Screening Criteria 46
Table 15. Decision Support Tool Criteria Weighting 47
Table 16. Top Nine Improvement Projects 49

ACRONYMS

ADT	Average Daily Traffic
BNSF RR	Burlington Northern Santa Fe Railroad
CDOT	Colorado Department of Transportation
CMCA	Colorado Motor Carriers Association
Commerce City	City of Commerce City
Denver	City and County of Denver
DRCOG	Denver Regional Council of Governments
DRIR	Denver Rock Island Railroad
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
I-25	Interstate 25
I-70	Interstate 70
I-76	Interstate 76
I-270	Interstate 270
MLK	Martin Luther King, Jr.
NATE	Northeast Area Transit Evaluation feasibility study
NATE II	Northeast Area Transit Evaluation II
NDCC	North Denver Cornerstone Collaborative
NMIACS	North Metropolitan Industrial Area Connectivity Study
OTIS	Online Transportation Information System
PEL	Planning and Environmental Linkages
PMT	Project Management Team
RTD	Regional Transportation District
SH 2	State Highway 2
SH 224	State Highway 224
TAC	Technical Advisory Committee
TAZ	Transportation Analysis Zone
TOD	Transit-Oriented Development
UPRR	Union Pacific Railroad
US 6	U.S. Highway 6
US 36	U.S. Highway 36
US 85	U.S. Highway 85

ACKNOWLEDGEMENTS

The North Metropolitan Industrial Area Connectivity Study, funded by the Denver Regional Council of Governments, is a collaborative effort among the City and County of Denver, the City of Commerce City, and Adams County to assess the transportation system for one of the original industrial districts in the Denver Metro Area.

This study could not have been accomplished without the commitment and effort of all parties involved in the project, including the project management team and consultant team.

Project Management Team

Maria D'Andrea, Director of Public Works, Commerce City
Janice Finch, Senior City Planner, City and County of Denver
Jeanne Shreve, Intergovernmental Relations Manager, Adams County
Michelle Halstead, Director of External Affairs | Interim Director of Public Works, Commerce City

Consultant Services

Kirk Webb, Project Manager, Atkins
Jamie Archambeau, Traffic and Planning Lead, Atkins
Mark Lamutt, Design Lead, CH2M/Jacobs
Colleen Kirby Roberts, Environmental Lead, CH2M/Jacobs
Beth Vogelsang, Outreach and Land Use Lead, OV
Elizabeth Suarez, Facilitation and Community Outreach, Avanza

Technical Advisory Committee

The Technical Advisory Committee was composed of technical staff from the public works, traffic engineering, and planning divisions of each of the three jurisdictions, along with experts from the agencies listed below. The participation from the committee provided invaluable stakeholder input for the Study.

- Colorado Department of Transportation
- Federal Highway Administration
- Regional Transportation District
- Union Pacific Railroad
- Denver Regional Council of Governments
- Colorado Motor Carriers Association
- Denver Rock Island Railroad
- Adams County Economic Development

EXECUTIVE SUMMARY

The North Metropolitan Industrial Area Connectivity Study (NMIACS) is a collaborative effort among the City and County of Denver (Denver), the City of Commerce City (Commerce City), and Adams County to assess the transportation system for one of the original industrial districts in the Denver Metro Area (Figure 1). As the birthplace of some of Colorado's oldest working-class neighborhoods, the study area is dotted with islands of heavy industrial uses and warehousing that require access to a web of crisscrossing freight-rail lines and the high-speed road network of Interstate 270 (I-270), Interstate 25 (I-25), Interstate 70 (I-70), and U.S. Highway 85 (US 85). The road and rail connections brought the industrial-intensive land uses to this area, yet these same logistical modes—along with natural features such as the South Platte River and Sand Creek—have created barriers for other needed travel options that have evolved over time. Connecting the dispersed clusters of residential and commercial uses within and outside of the study area has been problematic over the years. Despite these issues and a lack of prior public investment, the area continues to be a core economic driver and significant employment center providing more than 60,000 jobs within the Denver Metro Area.

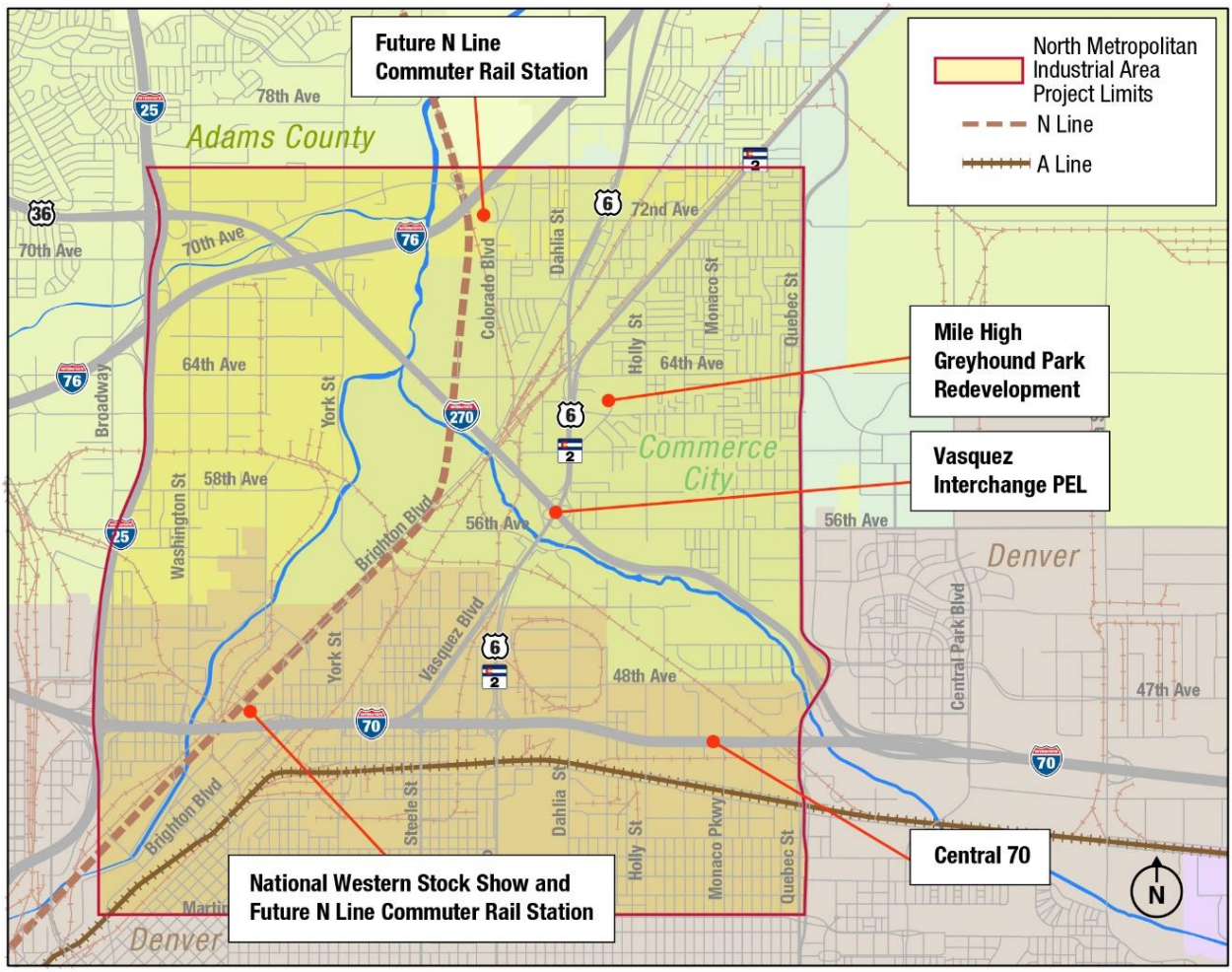
The study area is roughly bounded from west to east by I-25 and Quebec Street, and then from south to north by Martin Luther King, Jr. (MLK) Boulevard/32nd Avenue and I-270/US 85 on the west side and 72nd Avenue to State Highway 2 (SH 2) on the east side. Figure 1 highlights the study area in yellow and outlines the adjoining jurisdictions of Commerce City, Adams County, and Denver. The local jurisdictions want to retain the logistics focus of the study area, while strategically planning around the catalytic reinvestments of the Regional Transportation District (RTD) A-Line and N-Line commuter rail services, as well as the Central 70, Mile High Greyhound Park Redevelopment, and National Western Center initiatives. With these issues in mind, the overarching goal of the Study is to identify a list of priority projects that would provide local connectivity for all modes of travel, including transit, through the area.

This goal is challenging given the need to find a balanced process that could diffuse any potential parochial tendencies to overemphasize jurisdiction-specific transportation needs. The best approach to addressing this balance is to evaluate the study area through the lens of a sub-region where goals, objectives, and criteria would focus on local connectivity regardless of jurisdictional boundaries. Two key elements to ensure a balanced evaluation within the sub-region are integrating the 40-plus local plans the jurisdictions collectively developed for land use and transportation needs while overlaying a series of travel sheds throughout the study area.

Travel sheds are transportation study areas defined by geographical boundaries that have characteristics and facilities serving similar travel patterns.

To better assess the issues at play, the study area was divided into nine travel sheds that encapsulate areas of similar land use and travel patterns. The travel sheds allow local connectivity issues within these sub-regions to be identified and form part of the study area-wide assessment. Existing and future land uses are an important part of determining the needs for each travel shed. Travel modes (pedestrian/bicycle, transit, vehicles, and freight) are ranked in terms of priority for each of these travel sheds.

Figure 1. NMIACS Study Area



With these elements in mind, the Study focuses on identifying travel shed users, how they relate to land uses, and where there might be deficiencies. Using travel sheds provides the opportunity to organize all competing mode priorities and highlight already identified improvements from local plans, but from a sub-regional need perspective. The Study prioritizes the projects already identified in local area planning efforts, but does not develop any new projects.

With the overarching goal and framework set, the project team established a comprehensive screening process to evaluate close to 300 projects identified in local plans. Each project has been individually scored, based on approved criteria. The screening tool ensures the jurisdictions remain unbiased to particular projects they deem to be important to the sub-region and rely on the agreed-upon criteria to score each project. These criteria and scores are weighted to ensure the goals and objectives of the Study are represented in project recommendations.

Each project is scored under the following criteria and associated weighting:

- Fits travel shed mode priority (25 percent)
- Provides scale of benefit (25 percent)
- Improves intermodal connectivity (15 percent)
- Reduces conflict between modes (15 percent)
- Offers multijurisdictional benefit (15 percent)
- Improves transit in underserved areas (5 percent)

The outcomes of the Study lead to this Final Report—along with conceptual layouts, implementation strategies, and high-level conceptual costs—for nine multi-modal priority projects that have been identified to improve connectivity throughout the study area. These nine projects, listed below, are successfully identified as priorities that will address transportation needs regardless of jurisdictional boundaries.

1. 52nd Avenue, Brighton Boulevard to Colorado Boulevard, extend across the Union Pacific Railroad (UPRR)
2. 56th Avenue to 58th Avenue connection over the South Platte River
3. Brighton Boulevard and Burlington Northern Santa Fe Railroad (BNSF RR)—improve clearance, turning angle
4. Brighton Boulevard and York Street intersection, angle improvements to support large truck turns
5. Race Court and BNSF RR and Brighton Boulevard, increase height clearance at underpass
6. Colorado Boulevard from MLK Boulevard to 54th Avenue, improve with enhanced bicycle/pedestrian crossings, improved transit service, streetscaping, and sidewalks
7. 72nd Avenue multi-modal corridor
8. O'Brian Canal loop and connection to South Platte River Trail
9. New Interstate 76 (I-76) interchange ramps, including an additional ramp at SH 224 and I-76

The current estimate of probable costs assesses that the collective sum of these nine projects is in the order of $172.3 million in 2018 dollars. Individual project implementation timeline estimates for the nine projects range from 36 months to 60 months. A summary of the estimated implementation timeline and probable cost in 2018 dollars for each of the nine projects is outlined in Table 1, below. Further detail on these nine projects can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B. Note that concept designs are an interim work product and do not necessarily represent the final configurations or alignments. Further refinement of the designs is necessary to determine the final layouts, improvements, and alignments of all projects.

Table 1. Top Nine Project Summary

	Description	Primary/Secondary Mode Benefitted	Estimated Implementation Timeline	Probable Cost (2018 $)
1	52nd Avenue Extension, Brighton Boulevard to Vasquez Boulevard	Freight/Vehicle	48 months	$44,000,000
2	56th Avenue to 58th Avenue Connection at York Street	Freight/Vehicle	48 months	$22,000,000
3	Brighton Boulevard BNSF Underpass Replacement at York Street	Freight/Vehicle	60 months	$45,000,000
4	York Street at Brighton Boulevard Intersection Improvements	Freight/Vehicle	36 months	$3,000,000
5	BNSF and Brighton Boulevard Bridges over Race Court	Freight/Vehicle	48 months	$30,000,000
6	Colorado Boulevard Pedestrian and Landscaping Improvements	Pedestrian/Bicycle	36 months	$4,000,000
7	72nd Avenue Redevelopment	Vehicle/Pedestrian	42 months	$11,000,000
8	O'Brian Canal Loop Trail	Pedestrian/Bicycle	36 months	$9,000,000
9	I-76 Ramps at 74th Avenue	Vehicle/Pedestrian	36 months	$4,300,000

The Study used a consistent process and scoring to develop a priority list of projects that advance regional connectivity. Without public investment, the engine of this critical economic zone will begin to stall, as congestion chokes access to and from the area. In addition, access to neighborhoods, transit stations, community facilities, and regional trails will remain disconnected and substandard. Jurisdictional partnerships among the local jurisdictions of Adams County, Commerce City, and Denver, which created the Study, must continue to be fostered, collectively advancing implementation strategies that lead to improved regional connections. Each project will require further environmental and engineering analysis.

The NMIACS jurisdictions will collectively:

- Endeavor to incorporate all projects within the DRCOG's 2045 Regional Transportation Plan, appropriately packaging phases or projects to maximize success within the regional prioritization process.
- Strive to include these projects within their respective transportation planning documents and capital improvement and preservation plans, coordinating local funding to advance further environmental and engineering analysis required for each project.

The North Metropolitan Industrial Area contains core regional economic drivers and is home to many well-established residential neighborhoods. Despite this, the area has been neglected in terms of funding and development in recent years. The NMIACS is the first step to an anticipated long-term collaborative partnership among the local jurisdictions of Adams County, Commerce City, and Denver to improve transportation for the area.

1 PURPOSE OF THE STUDY

The purpose of this Study is to identify and prioritize projects in the study area, provide conceptual layout and cost estimates for the top nine priority projects, and discuss funding and implementation needs. The basis for prioritization was identifying those projects that best provide connectivity in the industrial area, regardless of jurisdictional boundaries.

1.1 NMIACS

NMIACS, the North Metropolitan Industrial Area Connectivity Study, is an assessment of the transportation system in the industrial area that intersects Denver, Commerce City, and Adams County. It provides recommendations for future connectivity projects, as well as costing and phasing plans for implementation. Given the lack of connectivity in the area and the need to improve the local transportation network, Commerce City, Adams County, and Denver jointly committed to addressing some of these connectivity issues that are currently hindering the area. This partnership among local jurisdictions is unique. The three jurisdictions decided to work together after jointly attending coordination meetings for other major projects in the study area (i.e., Central 70, RTD N-Line, National Western Center Redevelopment, Aerotropolis, etc.) and realizing that the industrial area needed additional local investment to ensure that new development doesn't overwhelm existing infrastructure. In partnership, they put together a request to fund this Study through a grant from the Denver Regional Council of Governments (DRCOG). The funding request was approved, due in large part to the inter-jurisdictional nature of the Study and the cooperation between jurisdictions.

1.2 STUDY AREA

The study area is roughly bounded from west to east by I-25 and Quebec Street, and then from south to north by MLK Boulevard/32nd Avenue and I-270/US 85 on the west side and 72nd Avenue and SH 2 on the east side. Figure 1, above, highlights the study area in yellow and outlines the jurisdictions of Commerce City, Adams County, and Denver. The area is bisected with natural and man-made barriers like the South Platte River, Sand Creek, railroads and spurs, and interstates and other arterials.

The study area is the birthplace of some of Colorado's oldest industries and the working-class neighborhoods that supported them. Historical arrangements of heavy industrial uses and warehousing created barriers of freight-supporting infrastructure and a web of high-speed through-routes, surrounded by islands of residential and commercial land uses. Road and rail connections were critical transportation and industrial infrastructure, yet they created barriers for other travel modes that benefit from a higher density of routes and connections.

As old enterprises have been torn down and new uses have sprung up, the transportation network has not been updated and it is a relic of past land use decisions. There are key gaps along and between travel sheds with missing infrastructure for all transportation modes.

Study area jurisdictions agree that transportation investments in the study area must fulfill a common vision and should be implemented in line with the numerous redevelopment opportunities that soon will change the landscape once again. The imminent redevelopment opportunities include increased

growth on the eastern edge of the study area, RTD's A-Line and N-Line Commuter Rail Lines, the reconstruction of Central 70, and the redevelopment and expansion of the National Western Center.

1.3 Goals and Objectives for the Study

The Study considered more than 40 relevant local, regional, and state plans. The transportation goals in these plans were reviewed and those with the greatest commonality to the entire study area were brought forward. The following goals and objectives came out of this review, and were modified at the beginning of this Study to guide the inter-jurisdictional team:

Goals

- Improve mobility in the study area for all modes: cars, freight, bicycle, pedestrians, and transit.
- Respond to the balance of uses in the study area, recognizing there are pockets of residential use and the multi-modal elements they need, as well as the industrial, warehousing, and freight logistics industry with its need for rail connectivity and truck access to the interstates.
- Recognize that access to redevelopment and new development opportunities within all three jurisdictions is important.
- Provide people connections to transit in an area that is underserved by transit. The Study considers transit improvements that could provide service outside of the peak periods.
- Create safe, accessible routes for pedestrians and bicyclists that minimize conflict between modes.

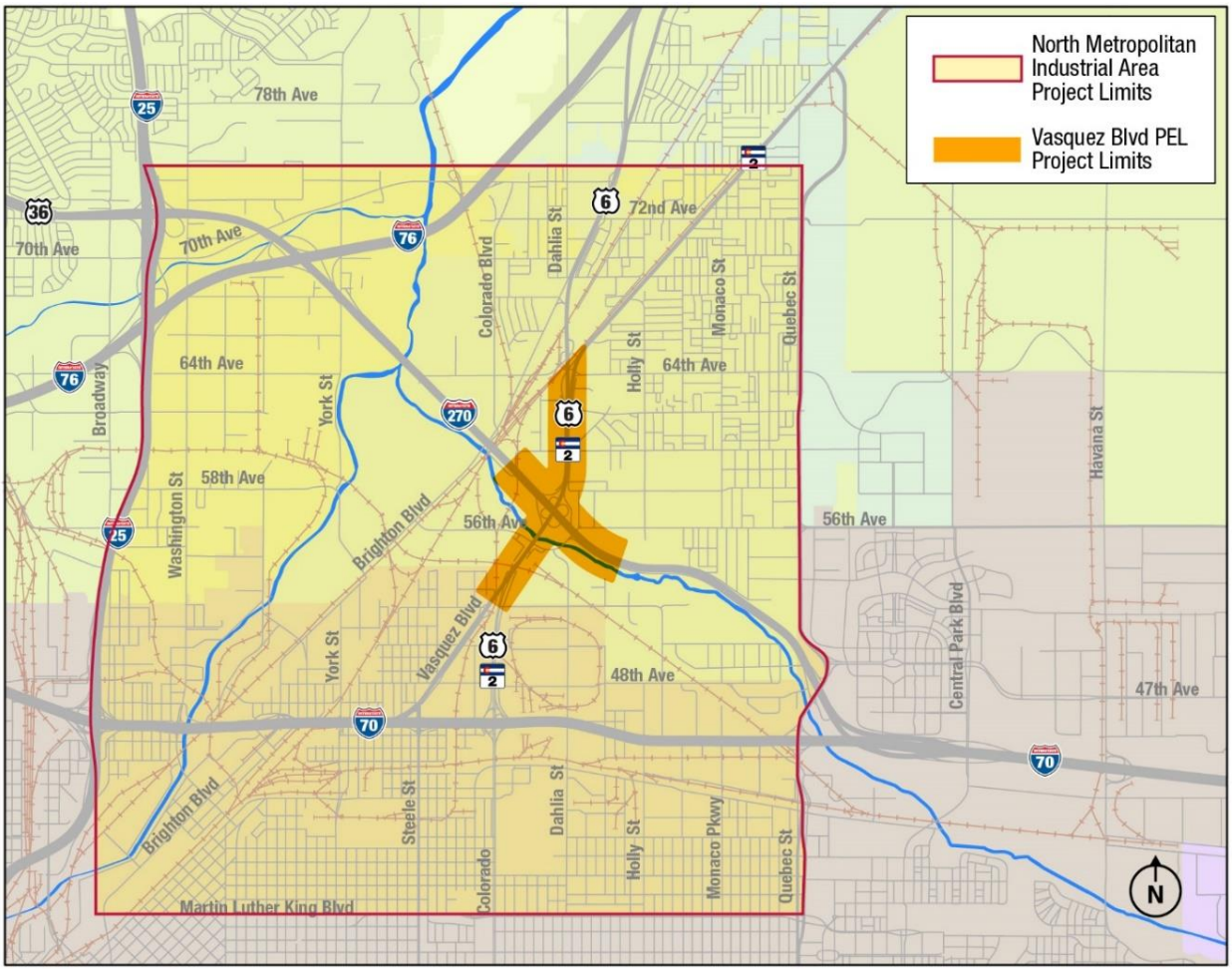
Objectives

- Identify the key travel sheds for different modes.
- Identify those projects that create parallel routes to provide a second tier of connectivity beyond I-25, I-70, Washington Street, and Quebec Street.
- Prioritize projects that create key spines for freight carriers, transit, and passenger vehicles to use through the study area, and transit hubs within the study area.
- Describe the potential for new trends, such as car-sharing services, to remove some of the barriers.
- Replace and refurbish obsolete and substandard infrastructure.

1.4 Vasquez Boulevard/I-270 PEL Study

The Colorado Department of Transportation (CDOT) is conducting a Planning and Environmental Linkages (PEL) Study for the Vasquez Boulevard/I-270 interchange, and for Vasquez Boulevard between 52nd Avenue on the south and 64th Avenue on the north. This study is a cooperative effort among CDOT, the Federal Highway Administration (FHWA), Commerce City, Adams County, and Denver. The PEL Study lies within the NMIACS boundary and was carried out concurrently with this Study. Figure 2, below, outlines the Vasquez Boulevard PEL study area in relation to the study area for the NMIACS.

Figure 2. NMIACS Study Area and Vasquez Boulevard/I-270 PEL Study Area



The purpose of the transportation improvements in the vicinity of I-270 and Vasquez Boulevard is to enhance operations, mobility, and safety for vehicles and freight at the I-270/Vasquez Boulevard interchange; improve its connection to the Vasquez Boulevard/56th Avenue and Vasquez Boulevard/60th Avenue intersections and the surrounding local road system; and improve transportation connectivity for all modes.

The two concurrent studies relate to each other, but have differing focuses; the Vasquez Boulevard/ I-270 PEL focuses on the interchange complex while the NMIACS focuses on the local area connections. Since CH2M/Jacobs and Atkins were working on both the NMIACS and Vasquez Boulevard PEL, this provided an opportunity to overlap some of the main project tasks. For example, the traffic analysis for both studies was undertaken through one comprehensive traffic operations model. Also, the NMIACS collaborated with the Vasquez Boulevard PEL on public outreach and stakeholder engagement, since both studies cooperatively seek to enhance transportation in the region.

With improvements being proposed to the I-270/Vasquez Boulevard interchange, the Vasquez Boulevard/56th Avenue intersection, and the Vasquez Boulevard/60th Avenue intersection and surrounding roadway, improvements to these systems were not considered as part of the NMIACS.

Projects surrounding the I-270 and Vasquez Boulevard interchange that were not included in the PEL were considered as part of NMIACS. The top nine projects reviewed in the NMIACS are expected to enhance the operations of any of the improvements recommended in the PEL.

1.5 PROJECT TEAM/STAKEHOLDERS

The NMIACS is the product of three closely coordinated elements including the Project Management Team (PMT), Technical Advisory Committee (TAC), and Stakeholder and Public Outreach.

1.5.1 Project Management Team

The PMT was composed of public works representatives and transportation administrators from Commerce City, Denver, Adams County, and consultant staff. The PMT was responsible for discussing, reviewing, and guiding project workflow and outcomes. Having representatives from all jurisdictions ensured the needs of all jurisdictions were balanced in the discussions throughout the Study's lifespan. The PMT convened bi-weekly at the onset of the project and then monthly as the team moved through project milestones.

1.5.2 Technical Advisory Committee

The TAC was composed of technical staff from the public works, traffic engineering, and planning divisions of each of the three jurisdictions, along with experts from the following agencies:

- CDOT
- FHWA
- RTD
- UPRR
- DRCOG
- Colorado Motor Carriers Association (CMCA)
- Denver Rock Island Railroad (DRIR)
- Adams County Economic Development

A total of five TAC meetings were held during the Study, allowing stakeholders to provide input and seek clarification at various milestones. The TAC reviewed and commented on the following items, which were revised based on their expert knowledge:

- Goals and objectives
- Traffic analysis
- Travel shed definition and mode prioritization
- Project scoring and goal weighting
- Top project list

1.5.3 Stakeholder and Public Outreach Methods and Summaries

Business and resident outreach provided opportunities for meaningful involvement and input during the early part of the Study, as well as at key milestones throughout the process. The PMT held stakeholder meetings throughout the Study.

Stakeholders included residents, representatives of neighborhood organizations and community associations, and advocacy groups with an interest in active transportation, such as Walk Denver and Adelante. Business stakeholders included freight businesses, the Suncor refinery, railroads, CMCA members, and other area industry and business organizations.

The NMIACS public outreach strategy focused on using the input that the local jurisdictions had already gathered in the development of recently adopted local plans. This was done to address concern that study area residents have limited availability for public meetings and have been overburdened with public meetings associated with the numerous plans that have been recently adopted. The public has had the opportunity to comment on the transportation goals and needs for their local communities, as reflected in the local plans and planning efforts undertaken by each local jurisdiction, and the project team wished to respect their past public involvement processes. NMIACS did not develop any new projects to review; instead, it prioritized projects that had already been identified for the region, respecting previously recorded public input and comments.

A summary of the main stakeholder and public outreach undertaken during the Study is included in APPENDIX C.

2 STUDY AREA CHARACTERISTICS

2.1 EMPLOYMENT

There are about 60,000 jobs in the NMIACS area. The top-four industry sectors make up nearly 65 percent of the total jobs, as shown in Table 2, below.

Table 2. Employment Breakdown

Sector	Count	Percentage of All Jobs
Wholesale Trade	10,889	18.3%
Manufacturing	10,783	18.2%
Transport and Warehousing	10,020	16.9%
Construction	6,774	11.4%

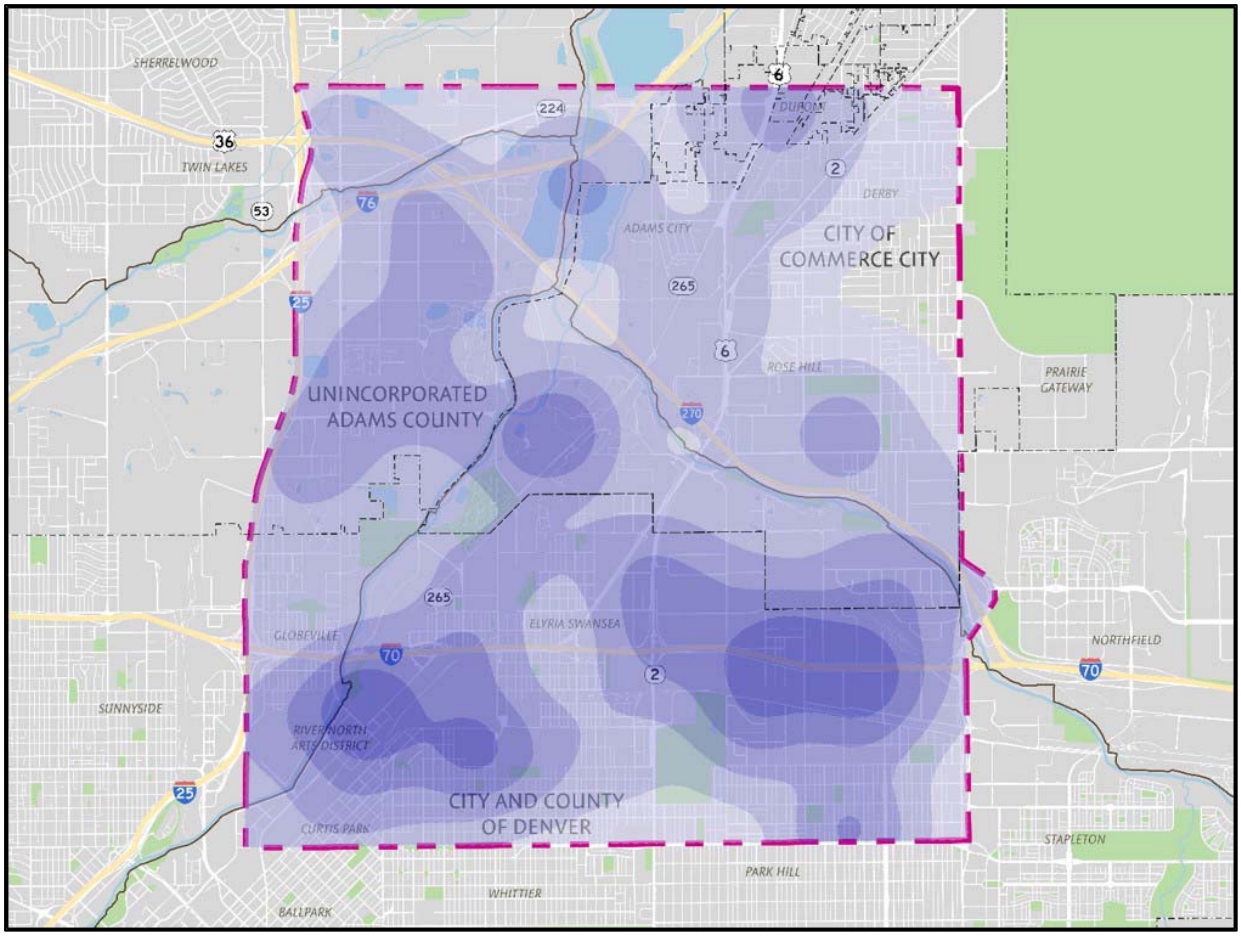
The job sectors listed in the table are all reliant to vehicle and freight for operation, and accommodating and enhancing connectivity to these industries is important to economic success in the study area. This employment data is taken from the transportation analysis zones (TAZ) used in DRCOG travel demand modeling. Figure 3, below, outlines the employment density in the study area. Of the 60,000 jobs, the areas of dark purple have the highest job density, and, therefore, trip attractions. Most of these will remain industrial-based jobs and freight traffic as the region redevelops in the future.

2.2 SOCIOECONOMIC INFORMATION

The NMIACS area has residential uses dispersed around the industrial core. As described in the local plans reviewed for the study (see Section 3.2 and APPENDIX D), these working-class neighborhoods have helped fuel the local and Denver metro economy since the 1870s. As multi-generationally-diverse communities with a high concentration of Hispanic and Latino residents, these areas represent one of the most affordable areas for working-class families in metro Denver, with a distinctively high home ownership rate, despite lower income levels. Some of the real challenges for the communities include access to health care and fresh food, as many must travel outside of their neighborhoods to provide for their daily needs. Given these challenges, Environmental Justice is a concern in these neighborhoods, as a lack of local-scale investment in transportation has greatly limited their access to these services.

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

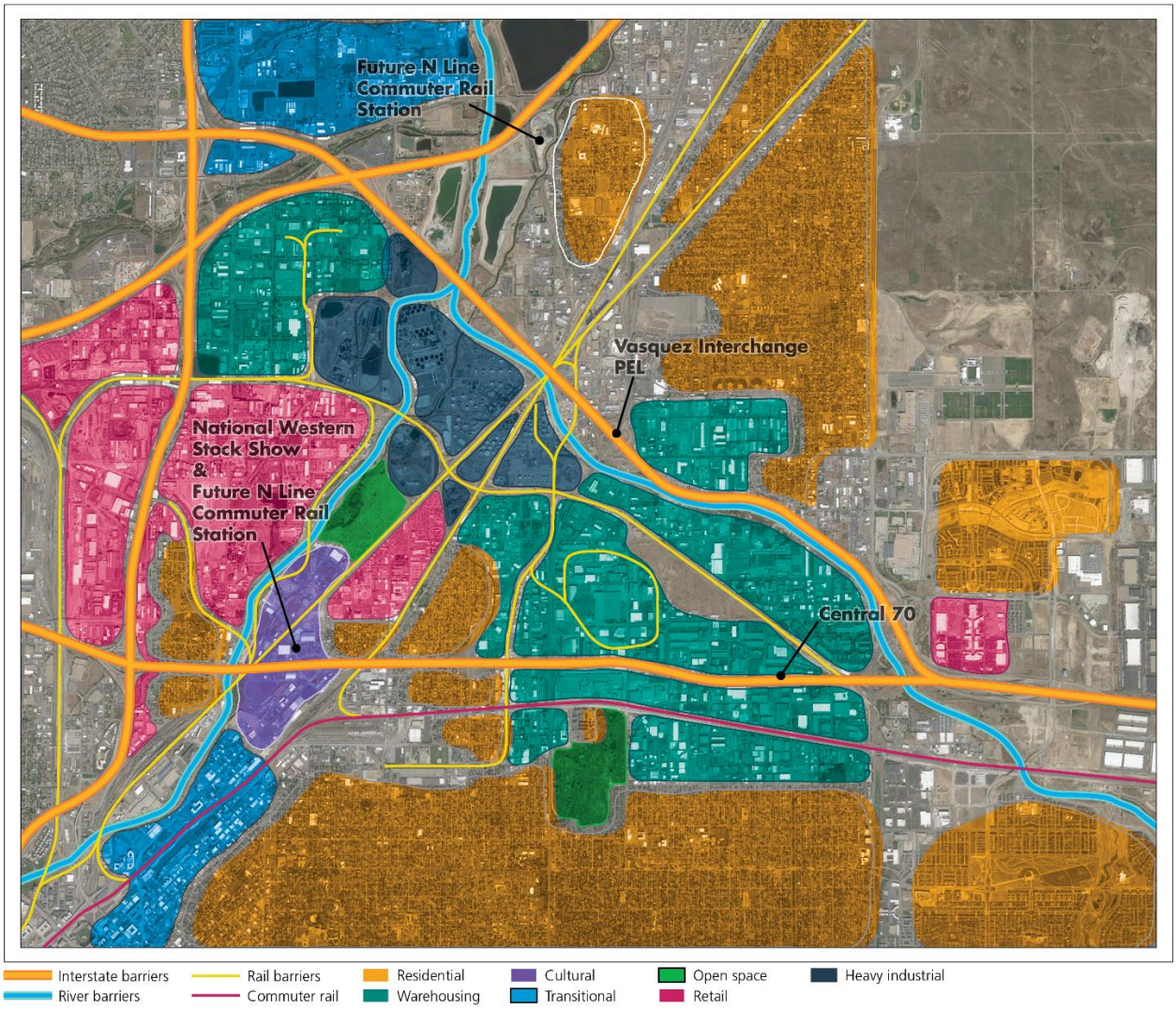
Figure 3. Employment Density



2.3 Existing Transportation Issues in the Study Area

Land uses define a transportation network, and the transportation network defines travel patterns. In the study area, historical arrangements of heavy industrial uses and warehousing have created an arrangement of freight-supporting infrastructure and a web of high-speed through-routes, surrounded by islands of residential and commercial uses. Road and rail connections are critical transportation and industrial infrastructure, yet these are barriers for other travel modes that benefit from a higher density of routes and connection nodes. Figure 4, below, depicts existing islands and barriers in the study area and outlines some of the major future infrastructure planned in the area.

Figure 4. Existing Islands and Barriers



With the predicted continued growth in the study area, there is an increasing urgency to enhance mobility for residential, commuter, and commercial users. Based on transportation modeling and the development of travel shed boundaries, the Study applied a land use and multi-modal gap analysis to prioritize options that create a positive influence on travel sheds, and, ultimately, improve the transportation system as a whole. The NMIACS approach to increasing multi-modal connectivity and transportation usability sought to take advantage of the best attributes of each travel mode and allow for the shifting travel patterns to maintain an acceptable level of flexibility, speed, and reliability. The NMIACS investigated existing multi-modal accommodations in the study area in conjunction with future land use planning to provide feasible solutions to create a complete transportation network.

The preliminary analysis of multi-modal gaps in Figure 4 served as a starting point for increasing connectivity in the study area. Through this preliminary analysis, patterns were identified in the transportation system that were used as inputs to a travel shed study and detailed multi-modal gap analysis. Existing issues identified for individual modes of transportation are described below.

2.3.1 Freight Railroads

There are numerous private railroads among the rail lines in the study area. These include UPRR, BNSF RR, DRIR, and private spur lines to individual businesses. Most of the railroad crossings are at-grade and are in poor condition, lacking safe crossing accommodations for pedestrians, wheelchairs, and bicycles. For many of the ideal connections, railroad corridors are the major obstacle and a technical challenge for implementation. Figure 5, below, highlights the connectivity barrier created by these freight railroads.

Figure 5. Existing Freight Railroads

2.3.2 Motorized Vehicles

Roadway travel is flexible and fast until there is congestion, at which time it becomes less reliable. Roadway travel reliability in the study area impacts personal vehicle, buses, and truck safety and efficiency. Providing travel reliability within the study area are four freeways: I-25, I-70, I-270/ U.S. Highway 36 (US 36), and I-76. These facilities enable major local, regional, and interstate travel demands. A summary of the volume and type of traffic handled by these facilities was obtained from CDOT's Online Transportation Information System (OTIS) database and is shown in Table 3, below.

Table 3. Existing Daily Freeway Traffic

Facility	CDOT OTIS Station ID	Average Annual Daily Traffic	Percent of Traffic Comprised of Trucks	Number of Existing Travel Lanes (bi-directional)
I-25 (just north of 58th Avenue	101016	227,000	9.8%	11 GP* 2 ML**
I-270/US 36 (just south of Vasquez Boulevard)	105076	102,000	11.4%	4
I-76 (between I-25 and I-270)	103383	80,000	10.5%	7
I-70 (east of Dahlia Street)	000511	135,000	8.3%	6

*GP = General Purpose Lane

**ML = Managed Lane

In addition to the major freeways in the study area, there is also a network of major and minor arterials. These roadways are a key component of the travel network because they provide connectivity over and through the major travel barriers within the study area. These barriers include the South Platte River, Sand Creek, the Suncor refinery, and major railroads. Figure 6, below, outlines the roadway network through the study area and provides a classification for each of the streets. Figure 7, below, outlines the 2016 average daily traffic (ADT) volume for the main roadways through the study area.

In 2040, highways in the study area will produce close to three million vehicle trips per day, with more than 17 percent of those trips made by commercial vehicles. Some of the streets within the study area will have up to 33 percent daily truck modal split. I-270 will have up to 11 percent daily truck modal split, accommodating more than 10,000 trucks per day. For comparison, a typical roadway modal split is about 2 percent trucks. Figure 8, below, outlines the daily truck volumes and daily percentage trucks on the major roadways through the study area.

Modal split is the percentage of travelers using a particular type of transportation.

Figure 6. Roadway Classification

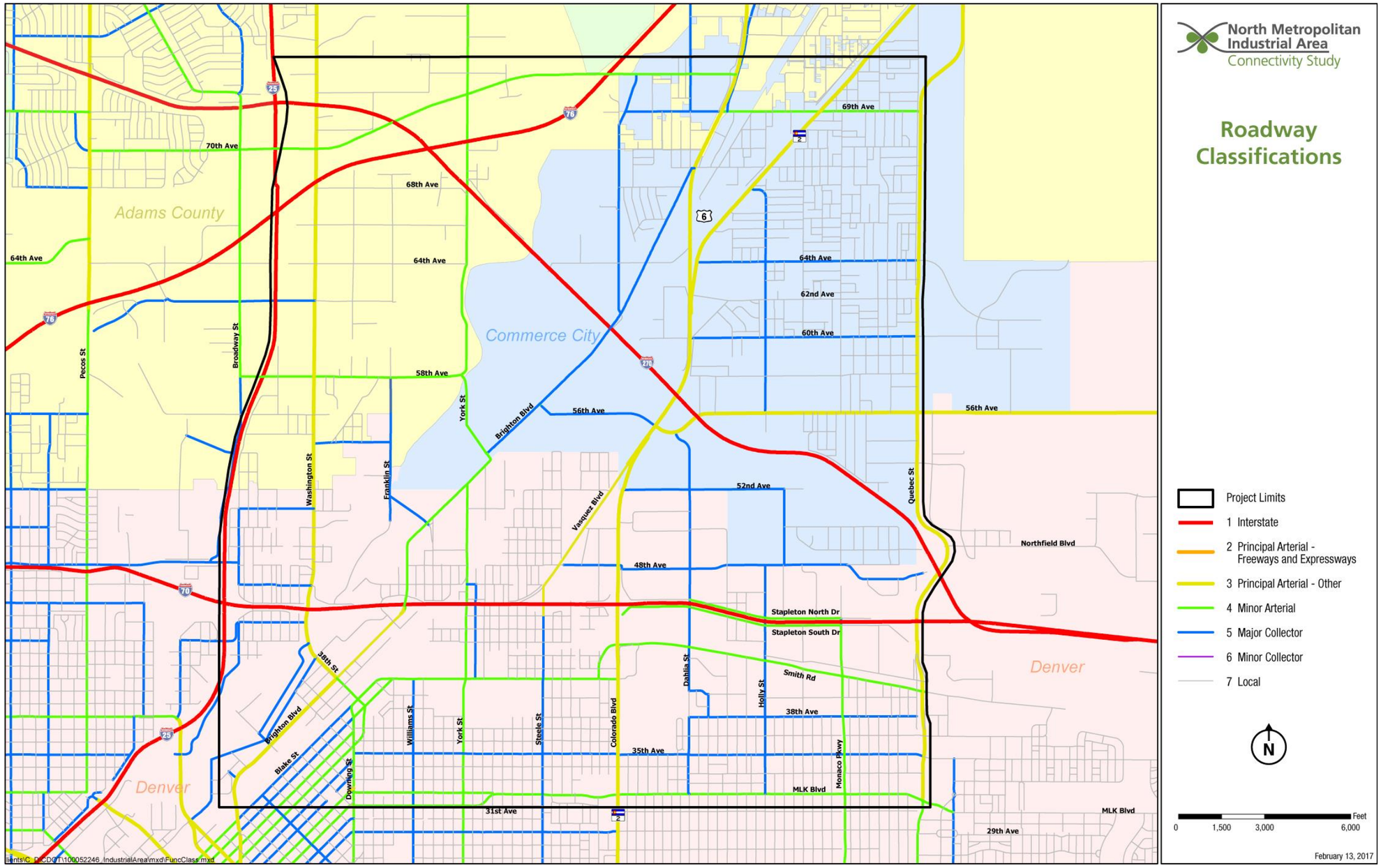


Figure 7. 2016 Average Daily Traffic Volumes

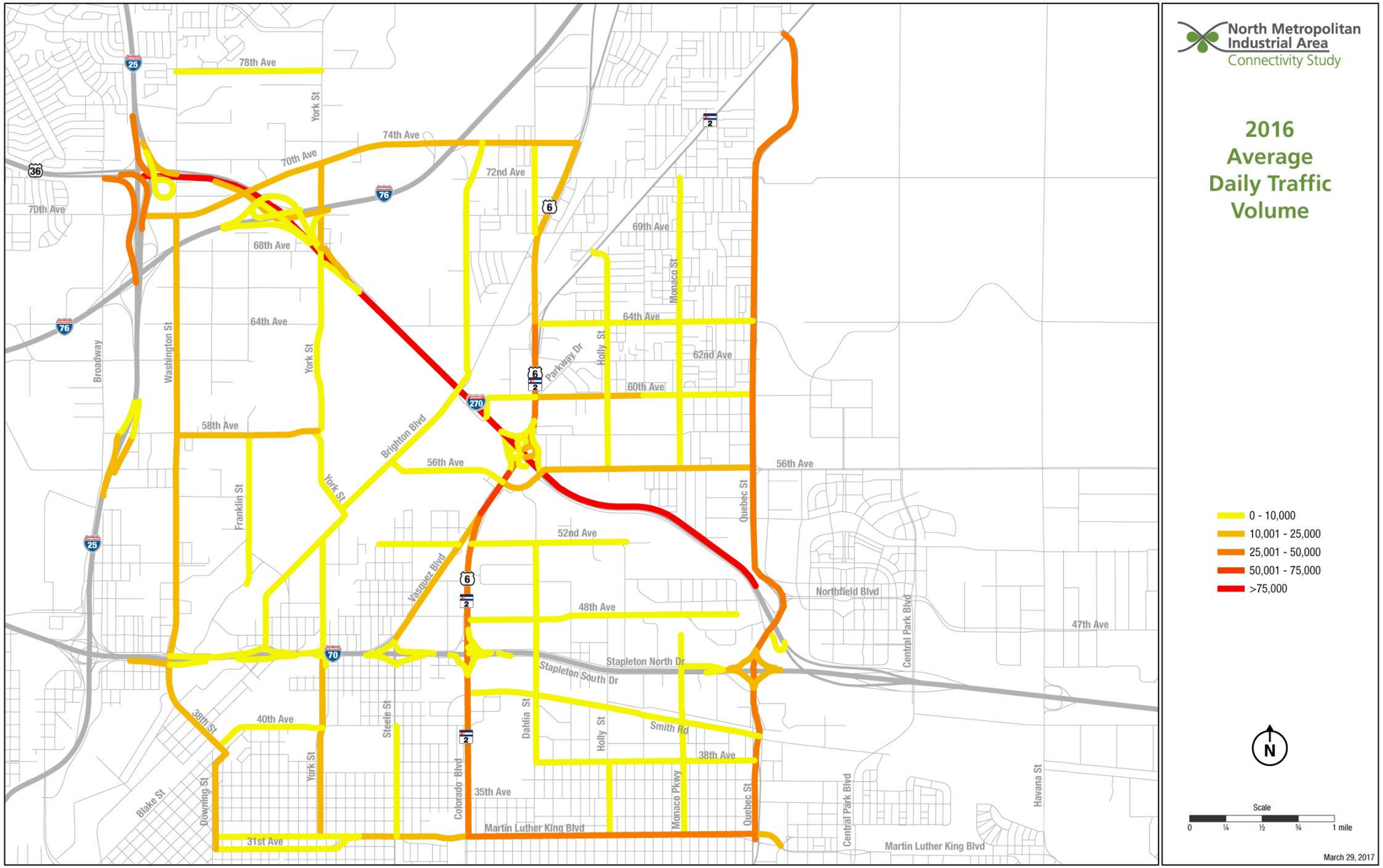
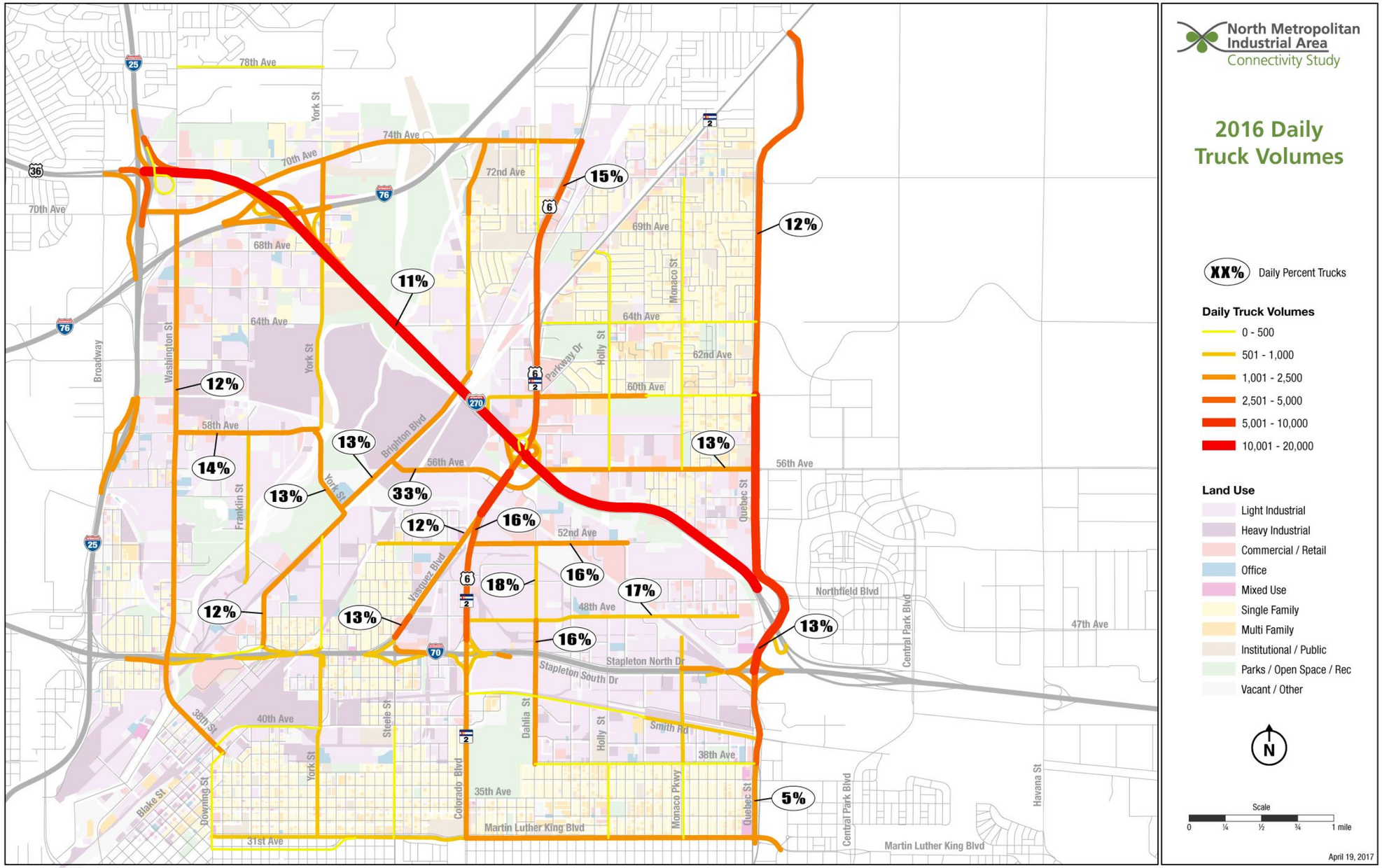


Figure 8. 2016 Daily Truck Volumes

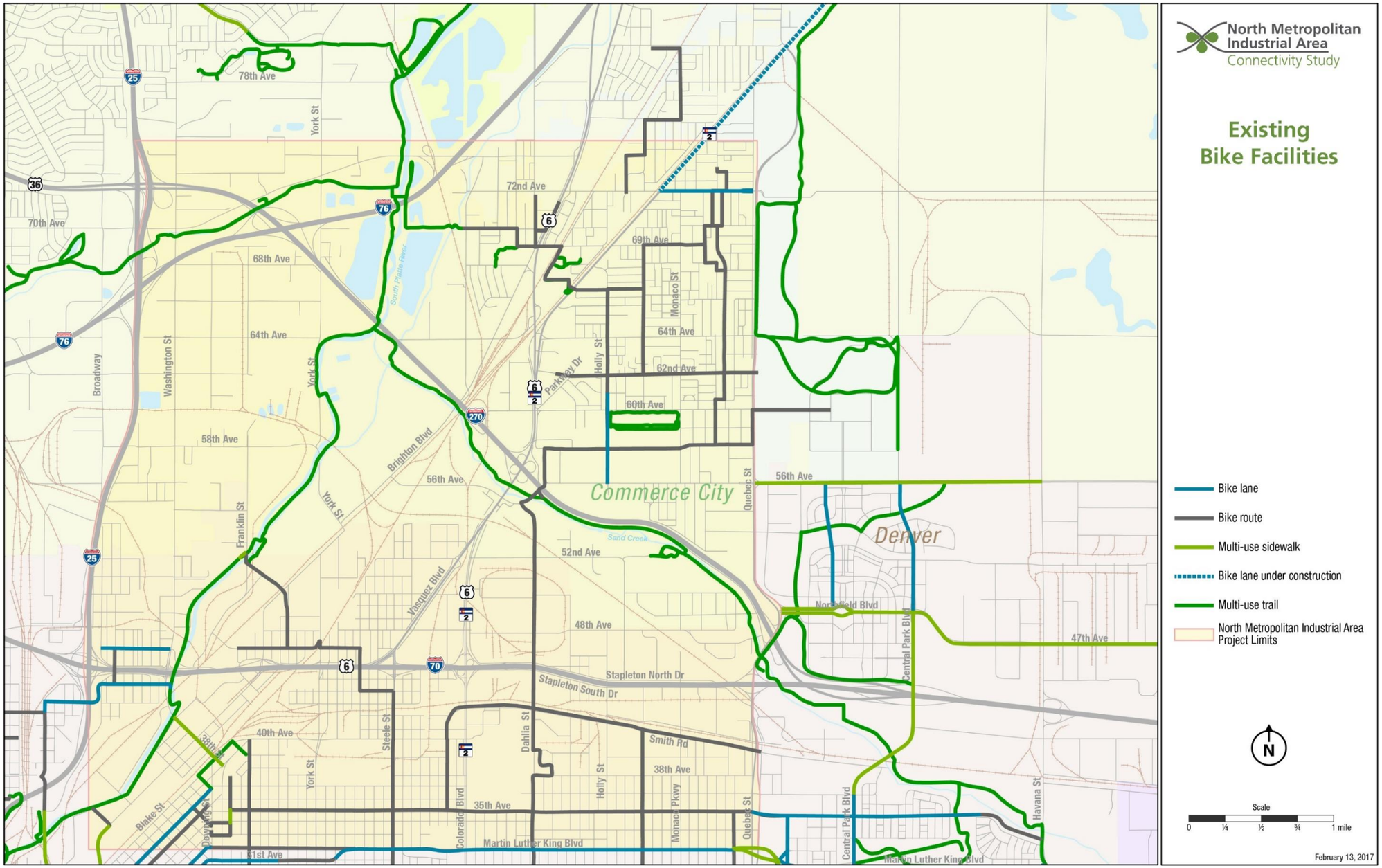


2.3.3 Bicycles

Several environmental justice communities exist within the study area. A larger percentage of households in these neighborhoods are likely to not have access to a private vehicle, and so they would benefit from having alternate modes to travel to work, school, and recreational destinations. Increasing access to and within neighborhoods such as the Elyria Swansea Neighborhood, where 12 percent of the households do not have access to a private vehicle, is an example of providing a benefit from improved bicycle infrastructure.

Figure 9, below, outlines the bicycle network within the study area. Note that there is a strong multi-use path spine system created by the Platte River and Sand Creek Greenways. However, the Globeville, Elyria Swansea, and Welby neighborhoods have limited access to these facilities because of the barriers created by the UPRR and other rail lines in the area.

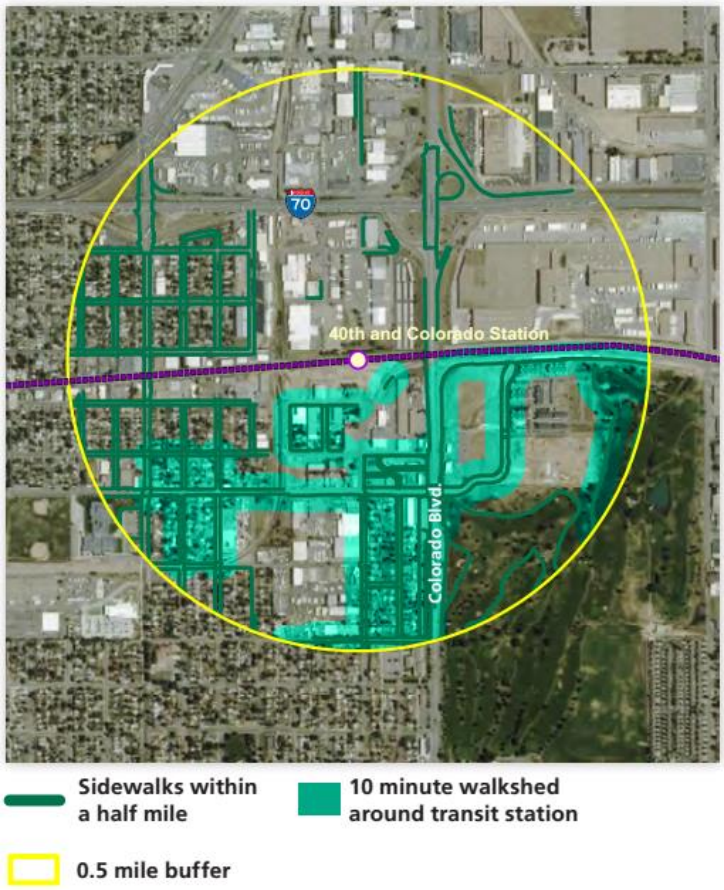
Figure 9. Existing Bicycle Facilities



2.3.4 Walking and Wheelchair Accessibility

Where there are critical connections between travel modes, or within areas where people live and work, NMIACS jurisdictions believe that there should be a robust pattern of sidewalk connectivity.

Figure 10. 10-Minute Walk Shed for 40th Avenue and Colorado Boulevard Station



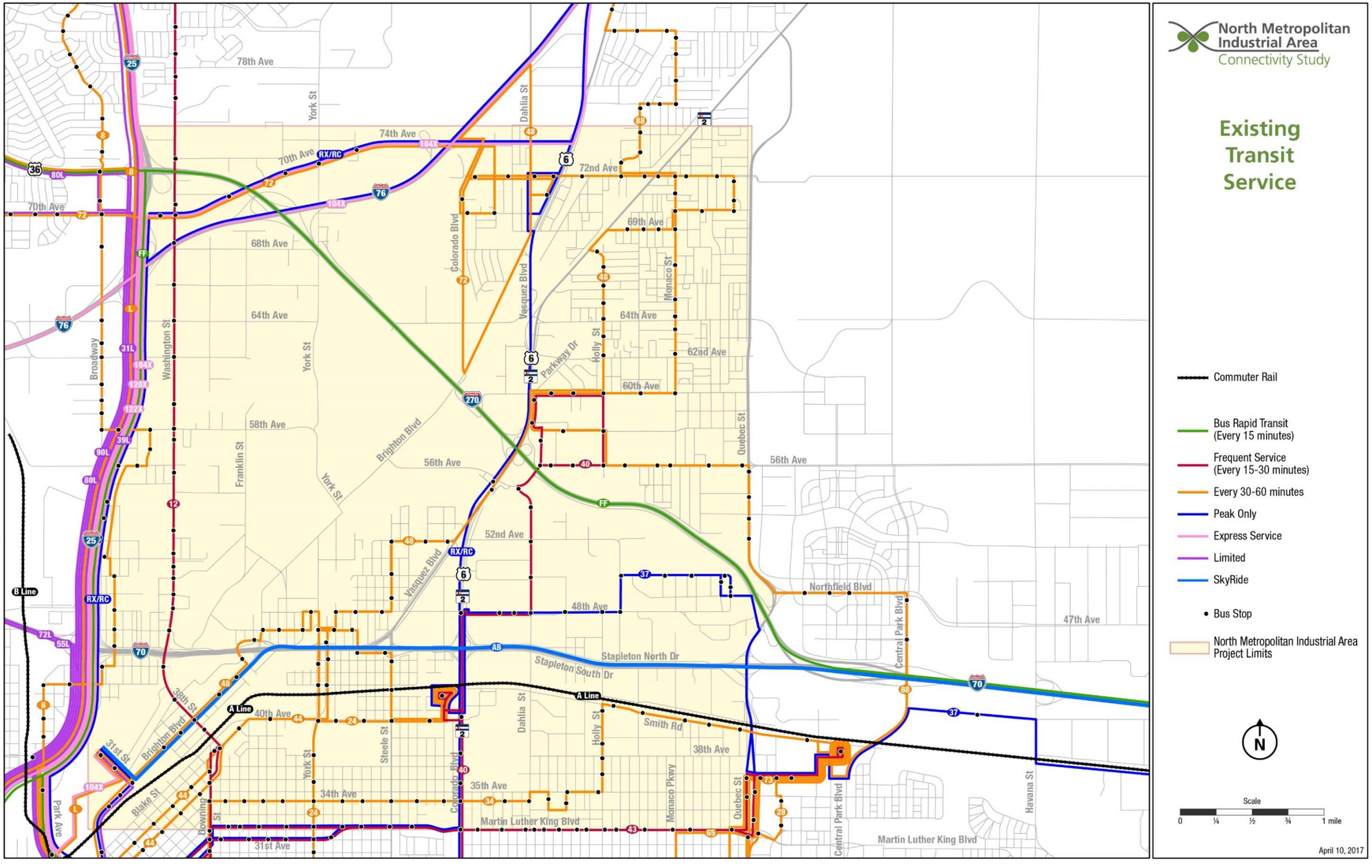
New transit stations in the area will attract more people to walk, but for these places to be safe and accessible, there needs to be convenient connections between stations, housing, and places of employment.

As an example, the 10-minute walk shed for the 40th Avenue and Colorado Boulevard Station on the A-Line is shown in Figure 10, to the left. While neighborhood and commercial areas to the south and east are accessible to the station, parts of the neighborhood to the west are impacted by the barrier caused by the railroad. This not only reduces access, but places emphasis on the nearby rail crossing at Steele Street to be comfortable for people moving to the station.

2.3.5 Transit

Existing transit service in the study area consists of local, limited, express, regional, and Sky Ride bus routes. Figure 11, below, outlines the existing transit facilities within the study area. Recently added and future-planned commuter rail and bus rapid transit service will expand the transit network through the study area. The RTD A-Line commuter rail from Union Station to Denver International Airport runs through the southern portion of the study area with stations at 38th Avenue and Blake Street, 40th Avenue and Colorado Boulevard, and Central Park Boulevard. The RTD N-Line (North Metro rail line), a proposed commuter rail line from Thornton to Union Station, is currently under construction and is due to be operational in late 2019. Within the study area, the N-Line will have stations at 48th Avenue and Brighton Boulevard (National Western Center) and at 72nd Avenue in Commerce City.

Figure 11. Existing Transit Facilities

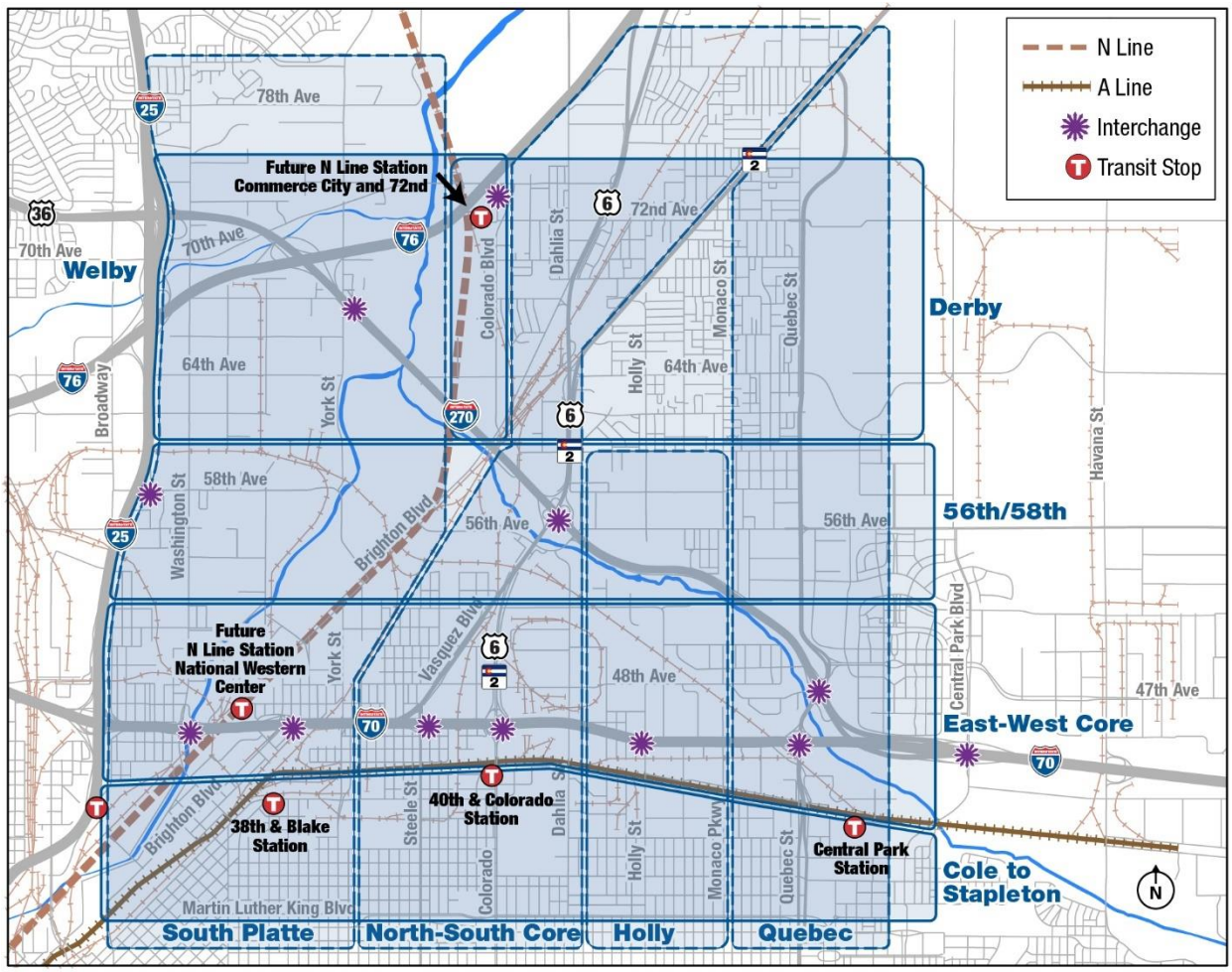


3 METHODOLOGY

3.1 TRAVEL SHEDS

To better assess connectivity issues and needs, the study area was divided into nine travel sheds, which encompass areas of similar land use and travel patterns. Travel sheds are study areas defined by geographical boundaries that have characteristics and facilities serving similar travel patterns. By analyzing travel sheds rather than measuring demand on high-traffic corridors, the project team recognizes the importance of moving people, not just vehicles (Denver, 2008). The travel sheds allowed issues within these sub-regions to be assessed individually and form an overall assessment of the study area. Figure 12, below, outlines the nine travel sheds that were created for the Study.

Figure 12. Study Area Travel Sheds



The existing transportation network of each travel shed was assessed individually, and considered roadway classifications, transit routes/stops, bicycle and pedestrian facilities, etc. Other characteristics such as future and existing land use, employment, population, and traffic patterns also were used to define travel sheds. Travel modes (pedestrian/bicycle, transit, automobile, and freight) were ranked in terms of importance for each travel shed. The TAC reviewed mode priorities for each travel shed, and modified them based on their input to better reflect community knowledge and development plans. Each of these individual travel sheds are described in more detail in APPENDIX G.

3.2 Plan Review

The projects prioritized for the NMIACS were derived from more than 40 local plans. Local jurisdictions have spent time and effort determining the needs of their individual communities, and this Study avoided undoing or duplicating those efforts. As well as planning documents, the project team reviewed other sources such as webpages and maps to identify additional proposed connectivity improvements. The list of planning documents and other sources reviewed as part of the Study is provided in APPENDIX D. Approximately 300 proposed enhancements to study area connectivity were identified from these sources. A list of these projects is included in APPENDIX H.

The project team's approach to reviewing the large number of relevant local, regional, and state plans and data for the study area was to create a structured framework that allowed a focused review for topics relevant to the goals, objectives, and purpose and need of the NMIACS. The approach involved building a review matrix whereby all plans and data were analyzed by the same criteria. The use of a highly structured matrix ensured that all desired data—including planned improvements and priorities—were identified, noted, and tracked in one systematic and organized process. The important review matrix issues were vetted and approved by the PMT before plan review began. Not only did the process provide comprehensive, consistent, and well-documented plan reviews, but the organized matrix structure allowed for analysis and reporting of issues to be addressed by the Study goals and objectives.

Figure 13 and Figure 14, below, provide an overview of these identified improvements by mode, primary purpose, and jurisdiction. These graphics are examples of some of the outputs from the review matrix that enabled the project team to quickly analyze the plan review data.

Figure 13. Identified Improvements by Mode and Primary Purpose

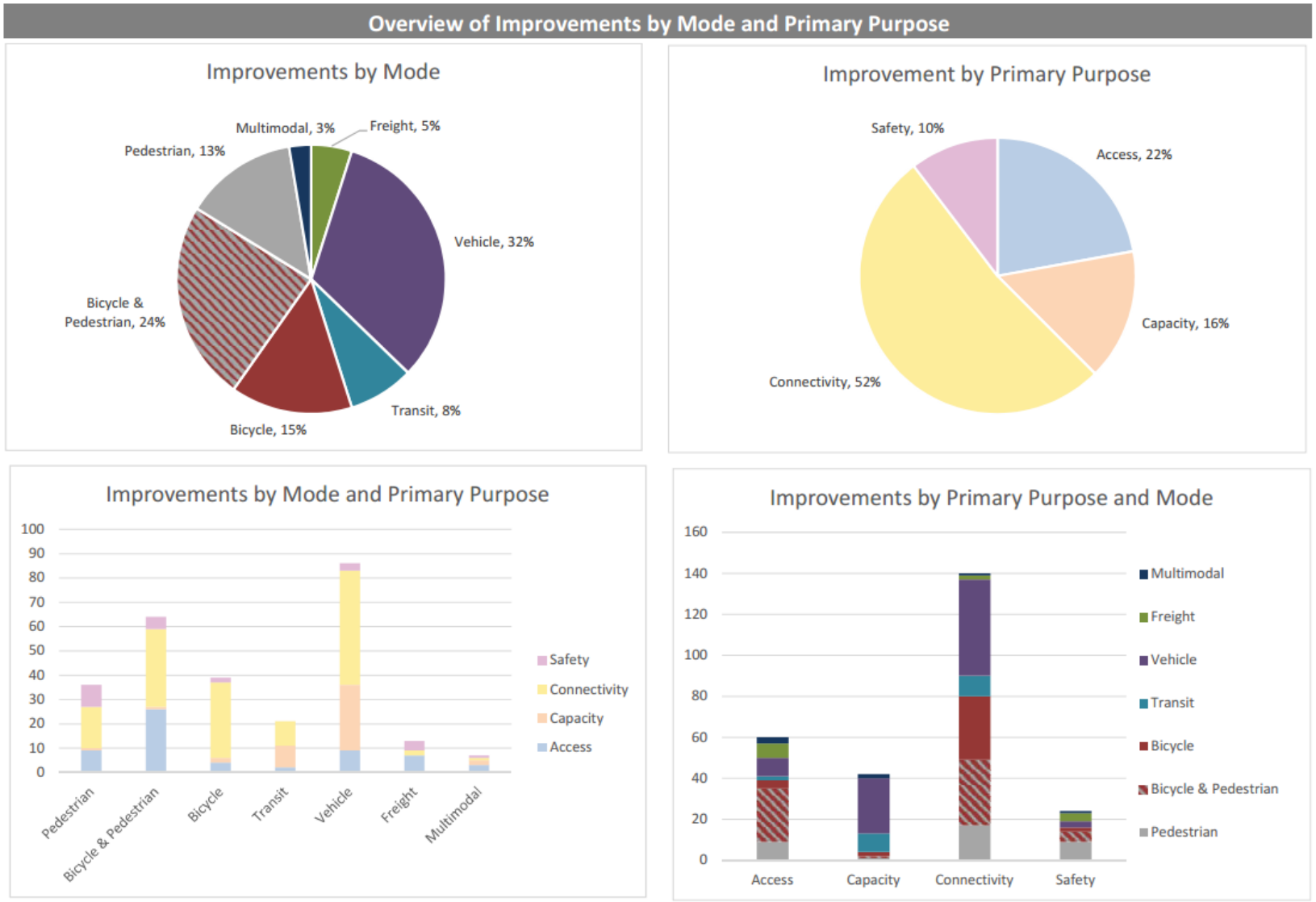
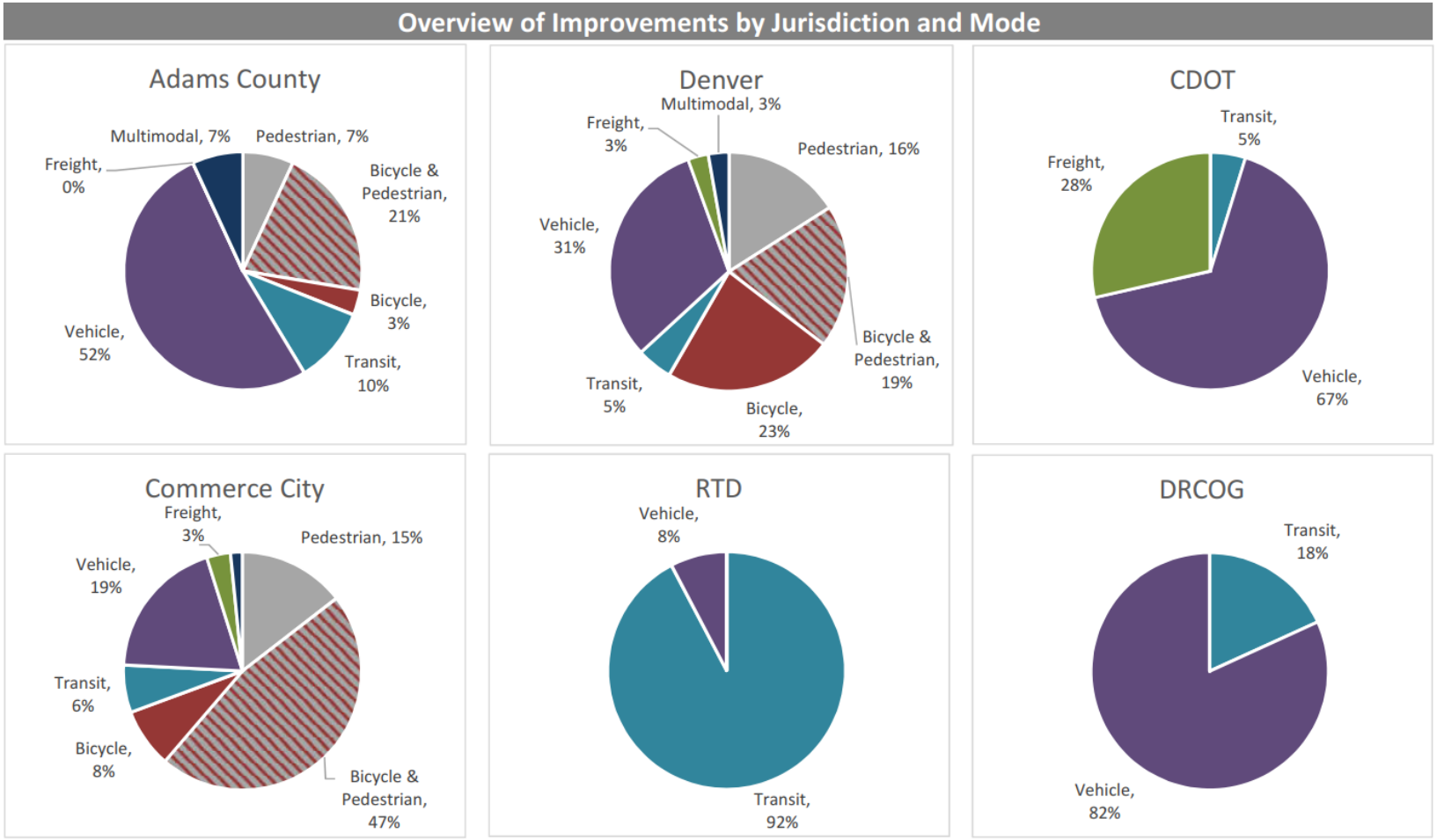


Figure 14. Identified Improvements by Jurisdiction and Mode



3.3 Land Use

The Study examined existing and future land use data from the three NMIACS jurisdictions, and aggregated this data to create coherent generalized land use categories for the study area. The future land use categories represent the individual jurisdiction's land zoning and vision for development. The future land use data, which are designed to represent a maximum build-out scenario, were developed with the three jurisdictions, using the most recent local area plan updates to the following three primary sources:

- Blueprint Denver (2002)—City and County of Denver
- Imagine Adams County Comprehensive Plan (2014 Update)—Adams County
- City of Commerce City C3 Vision Comprehensive Plan (2010)—City of Commerce City

The land use data gave the project team greater understanding of the needs of the travel sheds within the overall study area. Figure 15 and Figure 16, below, show the existing and future land use for the study area.

3.4 High-Growth Scenario

The primary geography for this analysis is a Transportation Analysis Zone (TAZ), a common unit used in conventional transportation planning models. TAZs vary in size, ranging from larger sizes in rural areas to smaller sizes in denser urban environments. Boundaries often are defined using Census block information, allowing researchers to attribute key demographic data to each zone. In the NMIACS, the standard DRCOG projections, and the High-Growth Scenario relied on TAZ information to conduct the analysis.

DRCOG publishes future employment and population projections in each TAZ for the entire region, updated in five-year increments, with the latest numbers projecting to 2040. These projections provide crucial details to help agencies allocate appropriate funding, assess infrastructure needs, and generally conduct long-range planning. In this Study, DRCOG projections informed travel shed characteristics and the traffic demand model.

In addition to DRCOG projections, the NMIACS provides a High-Growth Scenario. The High-Growth Scenario was developed with three jurisdictions and designed to represent a maximum build-out scenario. This scenario helped determine which roadways, corridors, or trails may be most affected by a higher-than-predicted growth schedule. The 2040 High-Growth Scenario was a key task in the land use planning and analysis that informed the traffic analysis and project recommendations. Table 4, below, represents the overall employment and population numbers for the Traffic and Land Use Model Area.

Table 4. Overall Employment and Population Estimates for the Entire Traffic and Land Use Model Area

	2040 DRCOG Standard Growth	2040 High Growth	Amount Higher	Percent Higher
Employment	685,990	729,674	43,684	**6.3%**
Population	1,173,195	1,215,564	42,369	**3.6%**

To best incorporate influencing factors outside of the NMIACS study area, a Traffic and Land Use Model Area was designed. It represents an area approximately three times larger than the primary study area. Demographics and travel habits from this area are used in both the standard-growth scenario and the High-Growth Scenario.

Further details on the 2040 High-Growth Scenario and TAZ data can be found in APPENDIX E.

Figure 15. Existing Land Use

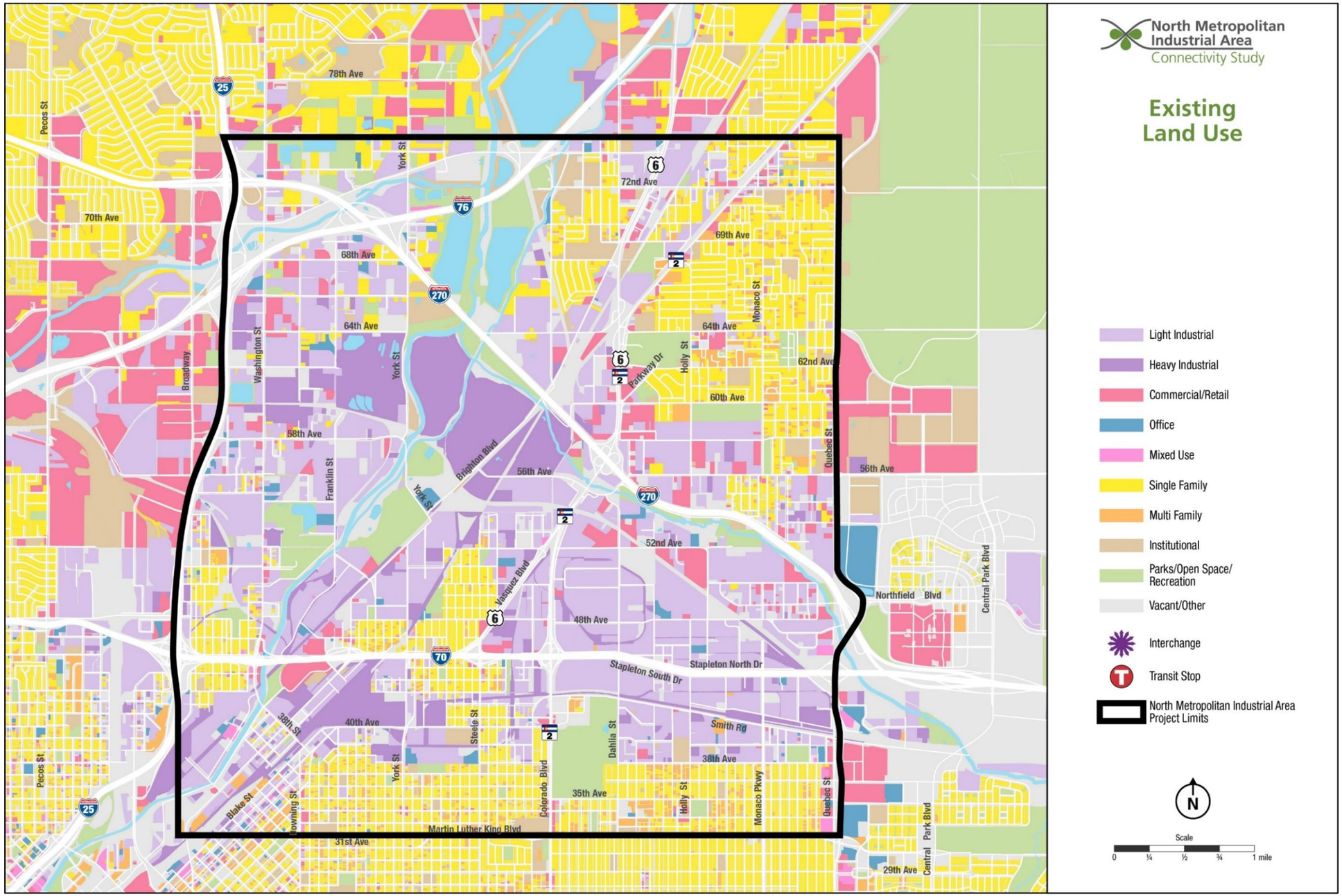
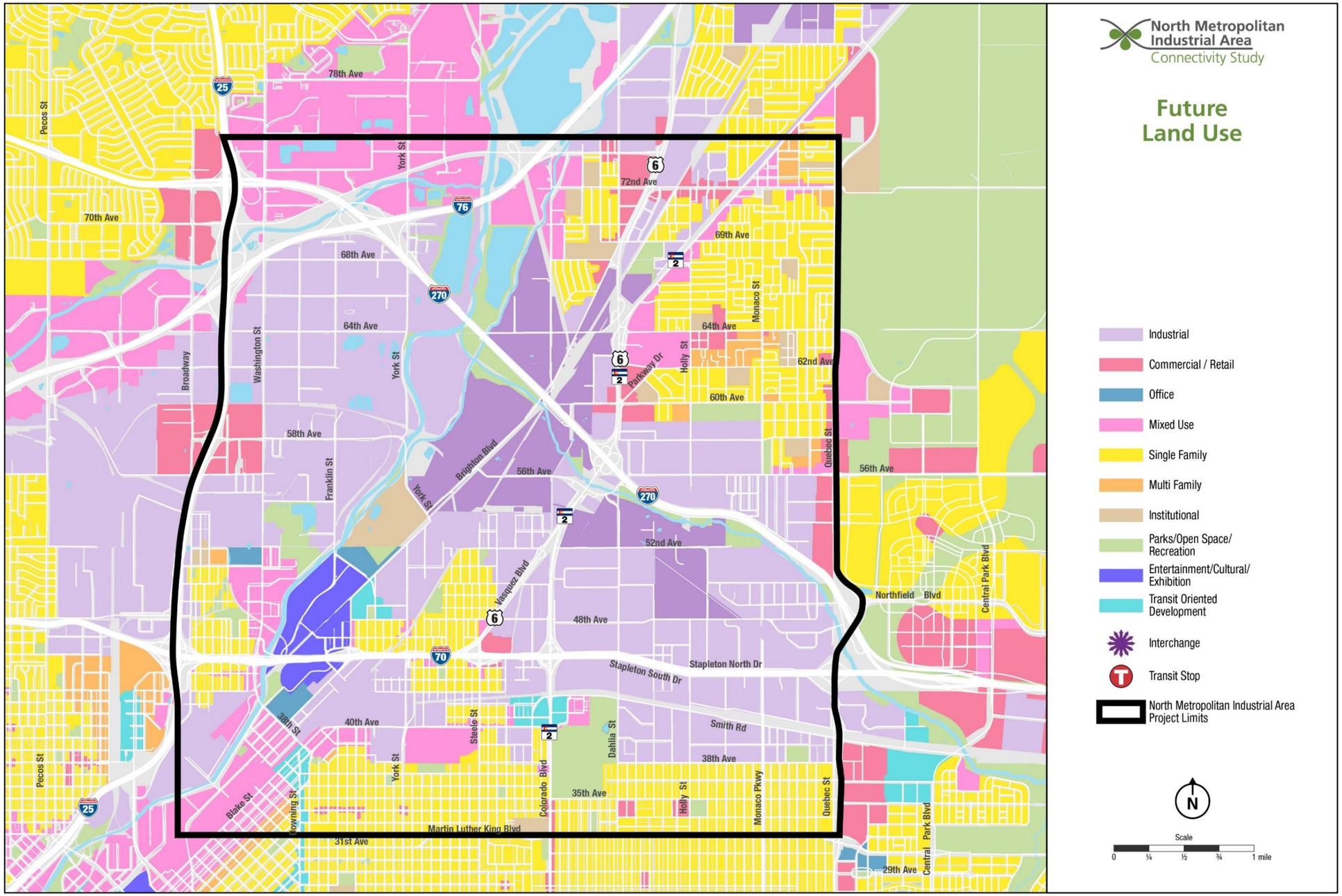


Figure 16. Future Land Use



3.5 TRAFFIC MODELING

With significant industrial land use and the presence of several interstate and arterial facilities within the study area, traffic analysis formed an important element of the Study. The traffic operations analysis used existing (2016) and projected (2040) traffic information to satisfy requirements from the CDOT Planning and Environmental Linkages Handbook and used FHWA approved traffic operations analysis software.

The Vasquez Boulevard/I-270 PEL Study lies within the boundary of this Study and was carried out concurrently with the NMIACS. With the same consultants working on both the NMIACS and Vasquez Boulevard PEL, traffic analysis for both studies was assessed through one comprehensive traffic operations model. Details on the traffic model can be found in APPENDIX F.

Traffic operations analysis relied on an extensive data collection effort to develop and calibrate the traffic operations models. The following traffic data were collected and used in the traffic operations model development and calibration process:

- ADT volumes
- Peak hour turning movement counts
- Travel times/speeds

The process used the regional travel demand model (macroscopic tool) to develop origin-destination and future traffic projection data that then were used as input into a traffic operation tool to evaluate the operations of the scenarios/alternatives (mesoscopic and microscopic tool). For these evaluations, the following tools were used:

- Most current adopted version of the DRCOG Regional Travel Demand Model
- TransModeler

The future travel demand growth within the study area is predicted to outpace current planned improvements. This will result in worsening congestion within the study area. Figures included in APPENDIX F show the density, by vehicles per mile per lane, for both 2040 morning and evening peak periods.

Some of the proposed roadway projects recommended in the NMIACS were assessed in the 2040 future network, allowing sensitivity analysis to be undertaken to assess to impact of these improvements on the network traffic patterns, with a focus on the 56th Avenue/58th Avenue connection. Results from this analysis indicated that the connection would lead to a net increase of between 10 percent and 11 percent using the 56th Avenue/58th Avenue connection compared to the 2040 No-Build scenario. TransModeler, like other traffic simulation software, can be assumed to have a margin of error on the order of 10 percent. Therefore, it is difficult to validate and assess a net increase of between 10 percent and 11 percent on the 56th Avenue/58th Avenue connection.

In addition, the 2016 network and 2040 No-Build network built in TransModeler gave the PMT an understanding of existing and future traffic patterns within and outside the study area. However, the results described above showed that the projects under review should be prioritized using criteria based on the goals and objectives of this Study, rather than the results of traffic analysis.

4 TRAVEL SHEDS

Travel sheds are areas defined by geographical boundaries that have characteristics and facilities serving similar travel patterns. The Study established nine travel sheds within the study area, outlined in Figure 12, allowing these sub-regions to be assessed individually. As part of the project improvements assessment, the travel shed boundaries were overlaid on the projects to identify what travel shed(s) each of the improvements benefitted and this map was incorporated into the screening process described in Section 5. A summary of each of the nine travel sheds is outlined below, with more detailed write-ups of each travel shed included in APPENDIX G.

4.1 SOUTH PLATTE

The South Platte Travel Shed runs north-south on the western side of the study area. The travel shed is roughly bounded by 30th Avenue on the south, 80th Avenue on the north and Interstate 25 on the west. On the east, the travel shed is bounded by Columbine Street, the UPRR line, and the South Platte River as it travels north. Figure 17, to the right, displays the boundary and area encompassed by the South Platte Travel Shed.

Figure 17. South Platte Travel Shed

Currently, the land use within the travel shed is predominantly industrial with some key residential pockets in the northern and southern portions, including the Globeville and Welby neighborhoods. It is anticipated that the industrial lands surrounding the National Western Center and the Denver Coliseum will be classified as entertainment/cultural land use in the future. The remainder of land use within the travel shed will be largely unchanged.

Washington Street is the highest classified north-south roadway within this travel shed as a principal arterial. York Street is the second highest classified north-south roadway as a minor arterial. Currently, the travel shed is bisected by two multi-use trails: Clear Creek Trail north of I-76 and the South Platte River Trail, which runs in a north-south direction through the travel shed. There is connection to the A-Line commuter rail at the 38th Avenue and Blake Street Station south of the South Platte River, and several RTD bus routes run through the travel shed. North of I-70, there are limited bicycle facilities in the travel shed. The Study prioritized freight to accommodate the predominantly and well-established industrial land use in the middle of the travel shed, and to provide access to I-25. Bicycle/pedestrian facilities are prioritized second to enhance the multi-modal offering of corridors in the travel shed, addressing land use changes within the travel shed. Table 5, below, outlines the prioritized modes for the South Platte Travel Shed and introduces the travel shed goals and priorities that influenced these mode choices.

Table 5. South Platte Mode Priorities

Prioritized Modes	Travel Shed Goals and Priorities
1. Freight	• Address constraints that currently hinder freight mobility within the industrial areas of the corridor. • Confirm interchange accesses accommodate all truck traffic.
2. Bicycle/Pedestrian	• Establish network of bicycle/pedestrian routes within residential portion of travel shed. • Solidify neighborhood access to trails and transit hubs.
3. Transit	• Improve neighborhood access to transit stations and bus services or bicycle and pedestrian facilities that lead to transit services. • Develop transit as a viable alternative to private vehicle use.
4. Vehicles	• Establish Washington Street as the second tier north-south corridor parallel to I-25. • Improve vehicle access and connectivity to the industrial areas.

Detailed information and graphics on existing facilities, land use, traffic demand, and improvement considerations associated with each travel shed can be found in APPENDIX G.

4.2 North-South Core

The North-South Core Travel Shed runs north-south through the middle of the study area. The travel shed is roughly bounded by 30th Avenue on the south, 82nd Avenue on the north, and Eudora Street/UPRR line on the east. To the west, the travel shed is roughly bounded by Columbine Street, the UPRR line, Colorado Boulevard, and I-76. Figure 18, to the right, outlines the North-South Core Travel Shed.

Figure 18. North-South Core Travel Shed

Currently, the majority of land use within the North-South Core is industrial, most of which is concentrated in the middle section of the travel shed and along SH 2 and U.S. Highway 6 (US 6)/US 85. The northern and southern portions of the travel shed are primarily residential with elements of institutional/public, commercial/retail, and park land use. It is anticipated that the land use in this travel shed will remain largely unchanged in the future.

Because there is a lack of full-service grocery stores and retail outlets in the Globeville and Elyria Swansea neighborhoods in the Denver portion of the study area, the retail locations at the intersection of Vasquez Boulevard and 60th Avenue in Commerce City have become a shopping destination.

However, transit, bicycle, and pedestrian connections to this area are missing because of the barriers created by railroad spurs, Sand Creek, I-270, and Vasquez Boulevard, and travelers must use vehicles to access the retail hub.

The travel shed contains two north-south highway facilities, SH 2 and US 6/US 85, which become Vasquez Boulevard and Colorado Boulevard south of I-270. These heavily trafficked corridors are the highest classified streets within the travel shed, both as principal arterials. The 40th Avenue and Colorado Boulevard Station on the A-Line commuter rail is located within the southern portion of the travel shed. The station is serviced by RTD bus routes 24, 37, 40, and 44. Additionally, the station has parking for 200 cars and racks for 18 bicycles. However, access to the station on foot or by bike is not easily achieved from every direction within the travel shed.

The Study prioritized transit in this travel shed since SH 2 and US 6/US 85 have the potential to better service transit and provide an alternative to private car use. This decision also is designed to improve access issues to existing transit. Vehicles are the second-highest prioritized mode in the travel shed due to the employment needs of industrial uses and the travel shed as a whole, and to accommodate desired connections between Brighton and Denver. Table 6, below, outlines the prioritized modes for the North-South Core Travel Shed and the travel shed goals and priorities that influenced these mode choices.

Table 6. North-South Core Mode Priorities

Prioritized Modes	Travel Shed Goals and Priorities
1. Transit	• Improve neighborhood access to transit stations and bus services. • Develop transit as a viable alternative to private vehicle use.
2. Vehicles	• Ensure neighborhoods have adequate access to the highway and interstate network. • Improve vehicle access and connectivity to the industrial areas.
3. Freight	• Increase freight capacity for anticipated demand (if needed). • Confirm interchange accesses accommodate all truck traffic.
4. Bicycle/Pedestrian	• Solidify neighborhood access to trails, neighborhood facilities, and transit hubs.

Detailed information and graphics on existing facilities, land use, traffic demand, and improvement considerations associated with each travel shed can be found in APPENDIX G.

4.3 HOLLY

The Holly Travel Shed runs north-south through the study area from 60th Avenue on the north to 30th Avenue on the south. The travel shed is roughly bordered by Dahlia Street/Glencoe Street on the west and Monaco Street on the east. Figure 19, to the right, outlines the Holly Travel Shed. The travel shed runs through all three jurisdictions in the study area: Denver, Adams County, and Commerce City.

Figure 19. Holly Travel Shed

Currently, the land use within the travel shed is primarily industrial with a residential pocket in the northern and southern extents. I-70, I-270, the A-Line commuter rail and the UPRR lines all run through the travel shed. It is anticipated that land use within the travel shed will remain largely unchanged in the future.

Holly Street, a major collector, is the highest classified north-south road in the travel shed. The corridor runs under I-70, continues north, and terminates at a T-intersection with 48th Avenue. Holly Street begins again at 56th Avenue, continuing north to SH 2. North-south movements through the area must be made via Dahlia Street, which joins 56th Avenue and runs under I-270. The 34, 40, 48, and 88 RTD bus routes all run on portions of Holly through the travel shed, with additional RTD services running east-west through the travel shed.

Due to the well-established and increasingly industrial land use within the travel shed, and the proximity to major regional connections (I-70 and I-270), the Study prioritized freight first and vehicles second in this travel shed. Table 7, below, outlines the prioritized modes for the Holly Travel Shed and the travel shed goals and priorities that influenced these mode choices.

Table 7. Holly Mode Priorities

Prioritized Modes	Travel Shed Goals and Priorities
1. Freight	• Enhance connectivity of road network and increase access to industrial areas.
2. Vehicles	• Enhance connectivity of road network and increase access to industrial areas.
3. Bicycle/Pedestrian	• Establish network of bicycle routes within residential portions of the travel shed. • Solidify neighborhood access to trails, neighborhood facilities, and transit hubs.
4. Transit	• Improve neighborhood access to transit stations, or to bicycle/pedestrian facilities that lead to transit stations.

Detailed information and graphics on existing facilities, land use, traffic demand, and improvement considerations associated with each travel shed can be found in APPENDIX G.

4.4 QUEBEC

The Quebec Travel Shed runs north-south along the eastern extent of the study area. The travel shed is roughly bounded by Monaco Street to the west, SH 2 to the north, Xanthia Street to the east, and 30th Avenue to the south. Figure 20, to the right, outlines the boundary and area encompassed by the Quebec Travel Shed.

Figure 20. Quebec Travel Shed

The land use within the Quebec travel shed is diversified. The southern end of the travel shed (south of the A-Line commuter rail) is predominantly residential and commercial, the middle of the travel shed near I-70 is mainly industrial, and the northern end of the travel shed (north of 56th Avenue) is a mix of residential, commercial, and open space. It is anticipated that the land use in this travel shed will remain largely unchanged in the future.

Quebec Street is the only north-south arterial that runs through this travel shed. Two interchanges, at Quebec Street/I-70 and at Quebec Street/I-270, provide access to and from the highways. In addition, main east-west connections include 56th Avenue, Smith Road, MLK Boulevard, and SH 2 at the northern end of the travel shed. In the southern portion of the travel shed (south of 56th Ave), there is a connection to the A-Line commuter rail at the Central Park Station on Smith Road in the Stapleton Neighborhood. Central Park Station also serves as a major bus transfer center for several other frequent bus routes along or across Quebec Street, including routes 28, 34, 37, 42, 43, 62, 73, 88, 89, and 105. The northern portion of the travel shed currently has very limited transit services with bus stops located mainly north of 69th Avenue.

The 2016 Northeast Area Transit Evaluation (NATE II) report has identified Quebec Street as an important transit corridor. Quebec Street acts as a barrier to people trying to access the Central Park Station from neighborhoods to the west of Quebec Street. For these reasons, the PMT decided transit should be the prioritized mode in the travel shed. Quebec Street's proximity to several interstates eases access for vehicle and freight traffic; however, both I-70 and I-270 can be barriers and limit connectivity for pedestrians and bicyclists to and from the north. Pedestrians and bicycles are the second-highest prioritized mode in this travel shed, to accommodate access to transit. Table 8, below, outlines the prioritized modes for the Quebec Travel Shed and the travel shed goals and priorities that influenced these mode choices.

Table 8. Quebec Mode Priorities

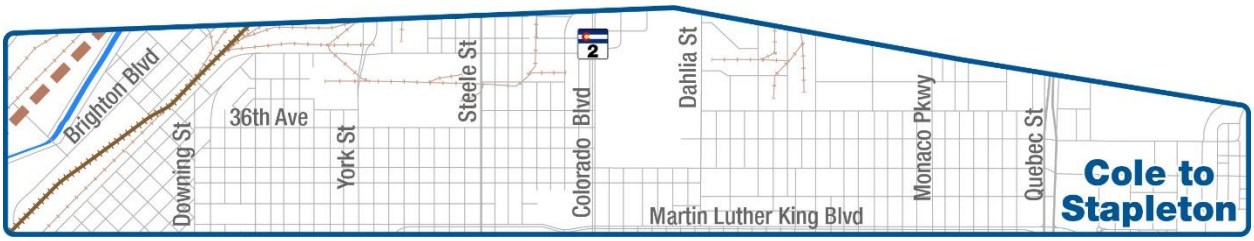
Prioritized Modes	Travel Shed Goals and Priorities
1. Transit	• Improve access from neighborhoods to transit stations.
2. Bicycle/Pedestrian	• Establish connected bicycle networks and multi-use paths.
3. Vehicles	• Provide safe and reliable access for passenger vehicles.
4. Freight	• Provide safe and efficient movement of freight.

Detailed information and graphics on existing facilities, land use, traffic demand, and improvement considerations associated with each travel shed can be found in APPENDIX G.

4.5 COLE TO STAPLETON

The Cole to Stapleton Travel Shed runs east-west through the study area roughly bounded by Xanthia Street on the east, Broadway Boulevard on the west, Smith Road/43rd Avenue on the north, and 31st Avenue on the south. Figure 21, below, outlines the boundary and area encapsulated by the Cole to Stapleton Travel Shed.

Figure 21. Cole to Stapleton Travel Shed



38th Avenue currently divides land uses within the travel shed. To the north of 38th Avenue, the land use is predominantly industrial with a small mix of commercial, institutional/public, and residential. The proximity to I-70 makes this an attractive location for industry. South of 38th Avenue, the majority of land use within the travel shed is residential, capturing sections of the Stapleton, Northeast Parkhill, Clayton, and Cole neighborhoods. In the future, some of the industrial land use west of Steele Street is set to become increasingly mixed use, and lands surrounding the 38th Avenue and Blake Street Station, 40th Avenue and Colorado Boulevard Station, and Central Park Station are due to experience an increase in Transit-Oriented Development (TOD). It is anticipated that the remainder of land use within the Cole to Stapleton Travel Shed will be largely unchanged.

MLK Boulevard is the highest classified east-west roadway in the travel shed as a principal arterial, and Smith Road and 40th Avenue both are classified as minor arterials. MLK Boulevard, 35th Avenue, and Smith Road, which transitions into 40th Avenue via Albion Street, are the only east-west corridors through the travel shed. All other east-west roadways are severed by the Park Hill Golf Club.

The travel shed currently is serviced by both bus and commuter rail. The 34 RTD bus route runs from the Central Park A-Line Station to the 30th Avenue and Downing Street D-Line Station. The route follows Smith Road from Central Park Boulevard to Holly Street, down Holly Street and along 35th Avenue and Bruce Randolph Street. The A-Line commuter rail has three stops within the travel shed—Central Park Station, 40th Avenue and Colorado Boulevard Station, and 38th Avenue and Blake Street Station—each of which has multiple connections to bus routes. The travel shed includes several dedicated bicycle routes, and Sand Creek Regional Greenway and South Platte River Trail are located to the eastern and western extents of the travel shed, respectively.

With three A-Line commuter rail stations within the travel shed, and an array of buses serving these stations, the travel shed is reasonably well serviced by transit. However, pedestrians and bicyclists desire lines to these transit stops are not always accommodated. Bicycle/Pedestrian is the highest prioritized mode for the travel shed, with transit second, to connect the existing and future land uses to transit. Table 9, below, outlines the prioritized modes for the Cole to Stapleton Travel Shed and the travel shed goals and priorities that influenced these mode choices.

Table 9. Cole to Stapleton Mode Priorities

Prioritized Modes	Travel Shed Goals and Priorities
1. Bicycle/Pedestrian	• Solidify neighborhood facilities and access to transit hubs.
2. Transit	• Improve access to transit stations, or to bicycle/pedestrian facilities that lead to transit stations.
3. Vehicles	• Improve vehicle connectivity and access to the industrial lands north of 38th Avenue. • Ensure neighborhoods have adequate access to the interstate network.
4. Freight	• Increase freight connectivity and access to the industrial lands north of 38th Avenue.

Detailed information and graphics on existing facilities, land use, traffic demand, and improvement considerations associated with each travel shed can be found in APPENDIX G.

4.6 East-West Core

The East-West Core Travel Shed runs east-west through the middle of the study area. The travel shed is roughly bounded by Xanthia Street on the east, I-25 on the west, Smith Road/43rd Avenue on the south and 52nd Avenue on the north. Figure 22, below, outlines the boundary and area encapsulated by the East-West Core Travel Shed.

Figure 22. East-West Core Travel Shed

Currently, the land use within the East-West Core Travel Shed is predominantly industrial. The Elyria Swansea Neighborhood and Globeville Neighborhood form two pockets of residential land use within the travel shed. In the eastern extent, the travel shed captures some of the Northfield at Stapleton retail center. The RTD N-Line, from Thornton to Union Station, currently is under construction and is planned to be operational in late 2019. The commuter rail will have a station at 48th Avenue and Brighton Boulevard (National Western Center). TOD proposed for the area surrounding this station will alter some of the currently industrial land use. It is anticipated that industrial lands surrounding the National Western Center and the Denver Coliseum will become entertainment/cultural land use in the future. West of the South Platte River, the industrial lands are due to become mixed use. It is anticipated that the remainder of land use within the travel shed will remain largely unchanged in the future.

Currently, I-70 between I-25 and Tower Road is one of the most heavily traveled and congested highway corridors in the state and, as an interstate highway, it is the highest-classified road in the travel shed. There are currently some bus services running through the travel shed, including RTD bus routes 8, 12, 44, and 48. The RTD A-Line light rail between Denver International Airport and Union Station runs along the southern boundary of the travel shed with the 40th Avenue and Colorado Boulevard Station and the Central Park Station located on the edge of the travel shed. The travel shed serves mainly vehicle and freight movements in the east-west direction. Local transit, pedestrians, and bicycles typically are not serviced through the travel shed, but north-south connections across I-70 are important for these modes.

The I-70 East Final Environmental Impact Statement (EIS) completed by CDOT in 2016 proposes upgrades to the I-70 corridor between I-25 and Tower Road to address transportation infrastructure deficiencies, increased transportation demand, limited transportation capacity, and safety concerns. These improvements will be implemented throughout the travel shed, with construction scheduled to begin in 2018.

Due to the well-established and predominantly industrial land use within the travel shed and the proximity to major regional connections such as I-25, I-70, and I-270, freight and vehicles are the prioritized modes within the travel shed. Table 10, below, outlines the prioritized modes for the East-West Core Travel Shed and the travel shed goals and priorities that influenced these mode choices.

Table 10. East-West Core Mode Priorities

Prioritized Modes	Travel Shed Goals and Priorities
1. Freight	• Improve freight access and connectivity from industrial areas to the major roadway network. • Address constraints that currently hinder freight mobility within the industrial areas of the corridor.
2. Vehicles	• Improve vehicle access and connectivity to the industrial lands. • Ensure neighborhoods have adequate access to the interstate network.
3. Bicycle/Pedestrian	• Solidify neighborhood access to trails, neighborhood facilities, and transit hubs.
4. Transit	• Make sure neighborhoods have access to transit stations, or to bicycle/ pedestrian facilities that lead to transit stations.

Detailed information and graphics on existing facilities, land use, traffic demand, and improvement considerations associated with each travel shed can be found in APPENDIX G.

4.7 56TH AVENUE/58TH AVENUE

The 56th Avenue/58th Avenue Travel Shed runs east-west through the middle of the study area. The travel shed is roughly bounded by Xanthia Street on the east, I-25 on the west, 52nd Avenue on the south, and 60th Avenue on the north. Figure 23, below, outlines the boundary and area encapsulated by the 56th Avenue/58th Avenue Travel Shed.

Figure 23. 56th Avenue/58th Avenue Travel Shed

The land use within the 56th Avenue/58th Avenue Travel Shed is predominantly industrial but becomes more diverse in the eastern extent, with a mix of residential, commercial/retail, and institutional land uses. In the future, land use within the travel shed is predicted to remain largely unchanged.

Through the travel shed, both 56th Avenue and 58th Avenue are classified as minor arterials. 56th Avenue does not exist between Brighton Boulevard and Washington Street, and 58th Avenue does not exist between Vasquez Boulevard and York Street; the Suncor Energy facility and the South Platte River both are in this area. Currently, the travel shed has limited east-west bicycle facilities, a reflection

of the predominantly industrial land use. The 40, 48, 62, and 88 RTD bus routes all run east-west through portions of the travel shed.

Due to the well-established and predominant industrial land uses west of Vasquez Boulevard, the proximity and access to major regional connections such as I-270 and I-25, and with many of the proposed improvements seeking to increase the connectivity and access within this area, freight and vehicles are the prioritized modes for this travel shed. Table 11, below, outlines the mode priorities for the 56th Avenue/58th Avenue Travel Shed and the travel shed goals and priorities that influenced mode choices.

Table 11. 56th Avenue/58th Avenue Mode Priorities

Prioritized Modes	Travel Shed Goals and Priorities
1. Freight	• Improve freight access and connectivity from industrial areas to the major roadway network. • Confirm interchange accesses accommodate all truck traffic.
2. Vehicles	• Provide a continuous east-west facility within the travel shed.
3. Transit	• Increase neighborhood access to transit stations or to bicycle/pedestrian facilities that lead to transit stations.
4. Bicycle/Pedestrian	• Solidify neighborhood access to trails, neighborhood facilities, and transit hubs.

Detailed information and graphics on existing facilities, land use, traffic demand, and improvement considerations associated with each travel shed can be found in APPENDIX G.

4.8 DERBY

The Derby Travel Shed, for the most part, encapsulates the Derby Neighborhood in the northeastern extent of the study area. The travel shed is roughly bounded by 60th Avenue on the south, 76th Avenue on the north, the South Platte River on the west, and, to the east, it extends into the Rocky Mountain Arsenal National Wildlife Refuge/Dick's Sporting Goods Park. Figure 24, to the right, outlines the boundary and area encapsulated by the Derby Travel Shed.

Figure 24. Derby Travel Shed

The Derby Travel Shed spans several communities, parks, and recreational areas and touches a broad range of land uses. The western portion of the travel shed, west of US 85, consists of open space, residences, schools, and Adams County Social Services. The land use surrounding the future N-Line commuter rail station at 72nd Avenue and Colorado Boulevard is predicted to become increasingly mixed-use, with the remainder of land use in the travel shed likely to remain largely unchanged.

Four major arterials run through the Derby Travel Shed, including I-76, US 85 (south of I-76), SH 2, and Quebec Street. In addition, UPRR and BNSF RR and several other major north-south roadways pass through this travel shed, including Colorado Boulevard, Brighton Boulevard and Holly Street. Three local bus routes (48, 72, and 88) and one regional bus route (RX/RC) are operated within this travel shed with bus stops located along Holly Street, Monaco Street, 69th Avenue, and 72nd Avenue.

Multiple on-street bicycle routes are located along some of the residential collectors in the travel shed, such as Kearney Street and Olive Street in the north-south direction and 62nd Avenue and 69th Avenue in the east-west direction.

Currently, this travel shed is bisected by many major arterials and mainline railroads, which act as barriers to east-west connectivity for pedestrians and bicyclists. For this reason, and with established residential land use in the eastern portion of the travel shed, bicycle/pedestrian is the highest-prioritized mode for this travel shed. With the introduction of a new light rail station, improving access to the station will be important. For this reason, transit is the second-highest prioritized mode. Table 12, below, outlines the mode priorities for the Derby Travel Shed and the travel shed goals and priorities that influenced these mode choices.

Table 12. Derby Mode Priorities

Prioritized Modes	Travel Shed Goals and Priorities
1. Bicycle/Pedestrian	• Establish connected bicycle networks and multi-use paths.
2. Transit	• Improve access from neighborhoods to transit stations and major destinations.
3. Vehicles	• Provide for safe and reliable access for passenger vehicles.
4. Freight	• Maintain freight access to industrial land uses within the travel shed.

Detailed information and graphics on existing facilities, land use, traffic demand, and improvement considerations associated with each travel shed can be found in APPENDIX G.

4.9 WELBY

The Welby Travel Shed, for the most part, encapsulates the Welby Neighborhood in the northwestern portion of the study area. The travel shed is roughly bounded by Ash Street on the east, I-25 on the west, 60th Avenue on the south, and 76th Avenue on the north. Figure 25, to the right, outlines the boundary and area encompassed by the Welby Travel Shed.

Figure 25. Welby Travel Shed

Currently, there are a variety of land uses within the Welby Travel Shed. I-270, I-25, and 60th Avenue are in an area that is predominantly industrial, with some commercial/retail and institutional/public. In the northwestern portion of the travel shed, north of I-270 and I-76, land uses are a mix of industrial, residential, parks, and commercial/retail. The RTD N-Line, from Thornton to Union Station, currently is under construction and is due to be operational in 2019. A new station on this line will be added at 72nd Avenue and Colorado Boulevard. The land surrounding this station is anticipated to become mixed use with the arrival of the N-Line. Land use north of I-76 is anticipated to change to mixed use in the future. For the remainder of the travel shed, land use is set to be largely unchanged in the future.

I-76 and I-270 both run through the travel shed and intersect at a system-level interchange west of York Street. State Highway 224 (SH 224), which runs on 70th Avenue and transitions to 74th Avenue east of York Street, is classified as a minor arterial.

Currently, the travel shed includes several multi-use trails: Clear Creek Trail, the South Platte River Trail, the Colorado Front Range Trail, Sand Creek Trail, and the Fernald Trail. There are limited provisions for on-street bicycle travel through the travel shed.

The travel shed currently is serviced by some local bus service (RTD bus routes 12 and 72) and, in the future, will be serviced by commuter rail. Regional bus services from Brighton and Commerce City to Denver also run through the travel shed.

There are many improvements proposed that aim to increase the capacity of existing corridors and enhance connectivity. Since Welby is identified as a commuter neighborhood, and with its proximity to the major regional connections (I-76, I-270, I-25, SH 2), vehicles are the highest-prioritized mode for this travel shed. Although freight is not a high priority for this travel shed, it is noted that the vehicle improvements also will offer benefit to freight. Due to the arrival of the N-Line commuter rail in late 2019 and the subsequent TOD proposed, bicycle/pedestrian is the second-highest prioritized mode for the travel shed. Table 13, below, outlines the mode priorities for the Welby Travel Shed and the travel shed goals and priorities that influenced these mode choices.

Table 13. Welby Mode Priorities

Prioritized Modes	Travel Shed Goals and Priorities
1. Vehicles	• Enhance connectivity of roadway network and increase capacity of existing corridors.
2. Bicycle/Pedestrian	• Establish network of bicycle/pedestrian routes within residential portion of travel shed. • Solidify neighborhood access to trails and transit hubs.
3. Transit	• Improve neighborhood access to transit stations and bus services, or to bicycle/pedestrian facilities that lead to transit services.
4. Freight	• Improve freight access to interstate and road network surrounding industrial areas.

Detailed information and graphics on existing facilities, land use, traffic demand, and improvement considerations associated with each travel shed can be found in APPENDIX G.

5 SCREENING AND SCORING OF PROJECTS

5.1 SCORING CRITERIA

Because the reviewed plans were published between the years of 2002 and 2017, further investigation revealed that some of the 300 identified projects already have received funding, are currently under construction, or have been completed. Since the purpose of this Study was to prioritize projects to enhance the connectivity of the study area, projects that are already funded, are under construction, or have been completed were eliminated, leaving 230 projects for consideration.

To rank these remaining projects to the top nine, a list of criteria was created with input from both the PMT and TAC. The criteria aligned with the goals of the Study and provided a list against which each project could be assessed. Each one of the criteria was assigned a range of scores to assess how much any one project benefitted the study area. Scores ranged from zero to three, zero typically meaning the project provided no additional benefit to the study area, three meaning the project would provide significant benefit to the study area. The list of criteria is outlined in Table 14, below.

Table 14. Project Screening Criteria

What is the scale of the benefit to the study area?
1 = Alternative provides benefit at a local scale 2 = Alternative provides benefit at a regional scale 3 = Alternative provides significant benefit at a study area scale
Is there benefit to multiple jurisdictions?
0 = Alternative primarily benefits one jurisdiction 1 = Alternative benefits two jurisdictions 2 = Alternative benefits three jurisdictions
Are transit connections in underserved areas improved?
0 = Alternative does not improve transit connections in underserved areas 1 = Alternative does improve transit connections in underserved areas 2 = Alternative significantly improves transit connections in underserved areas
Are conflicts between modes reduced?
0 = Alternative does not reduce conflict between modes 1 = Alternative does reduce conflict between modes 2 = Alternative significantly reduces conflict between modes
Is intermodal connectivity improved?
0 = Alternative does not improve intermodal connectivity 1 = Alternative does improve intermodal connectivity 2 = Alternative significantly improves intermodal connectivity
Does the alternative fit the travel shed mode prioritization?
0 = Alternative's primary benefit matches travel shed's 4th priority 1 = Alternative's primary benefit matches travel shed's 3rd priority 2 = Alternative's primary benefit matches travel shed's 2nd priority 3 = Alternative's primary benefit matches travel shed's 1st priority

Each of the projects was individually assessed and scored using the criteria, resulting in a score for each of the projects. A project that fully satisfied all the criteria would receive a perfect score. This scoring process ensured unbiased screening of projects and avoided moving projects forward based on individual jurisdictional preference. The assessment criteria and project scoring results were presented to the PMT and TAC, who agreed with method.

5.1.1 Decision Support Tool

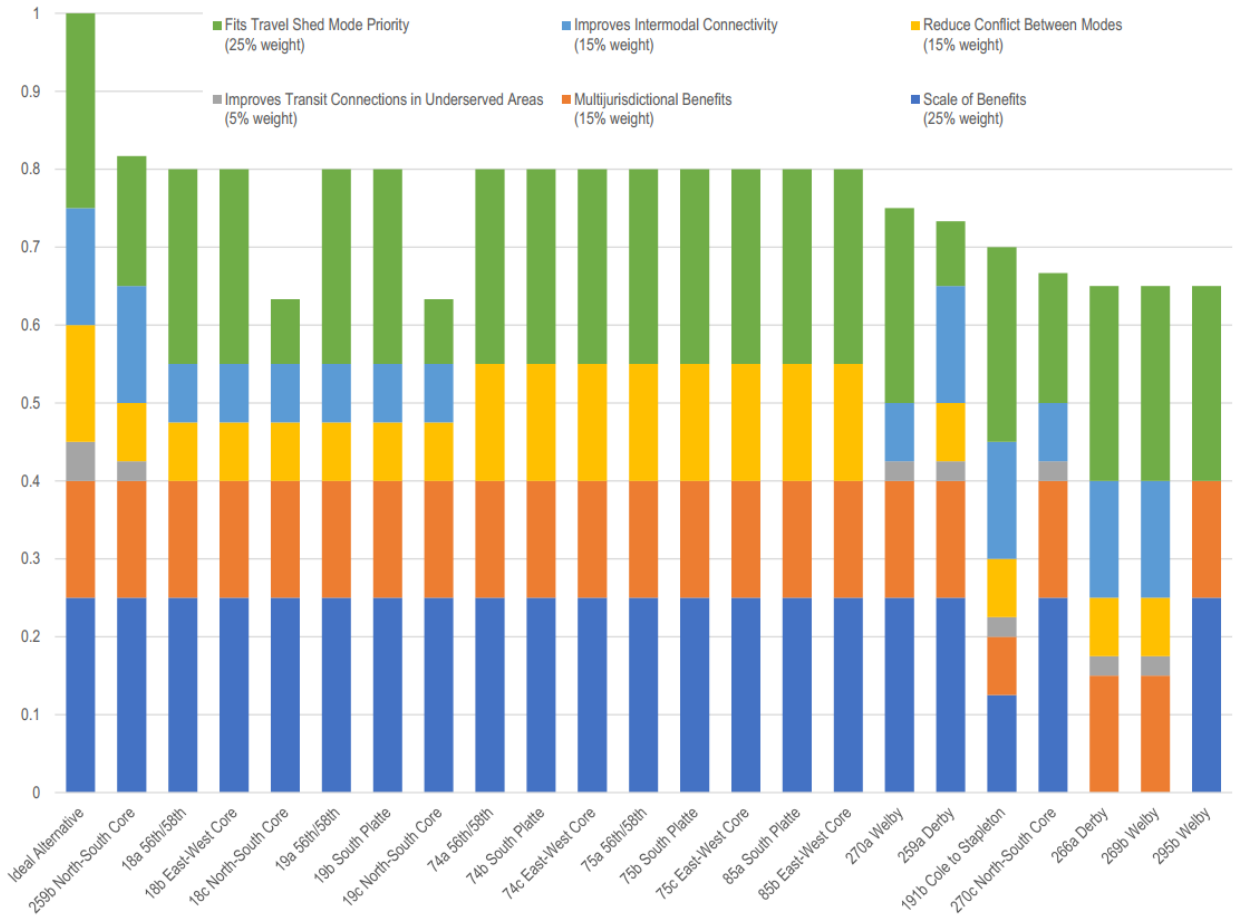
The project team used Criterium DecisionPlus, a decision support tool that scored the projects based on the alternative evaluation criteria listed in Table 6. The tool allowed weighting to be applied to these criteria to directly reflect the shared multi-jurisdictional goals. Thus, the higher the score, the more the project was deemed to align with the project goals. The weighting used for each of the criteria, agreed upon by the PMT and reviewed by the TAC, is outlined in Table 15, below. A low weighting was assigned to the "improves transit connections in underserved areas" criterion because although this Study has the potential to improve access to transit, service is managed by RTD. Another criterion, "improves intermodal connectivity," promotes projects that enhance access to transit. A separate list of only transit projects was generated under the same criteria and shared with each of the jurisdictions, allowing them to consult with RTD in relation to potential transit improvements.

Table 15. Decision Support Tool Criteria Weighting

Criteria	Weighting
Scale of benefit to study area	25%
Benefit to multiple jurisdictions	15%
Improves transit connections in underserved areas	5%
Reduces conflict between modes	15%
Improves intermodal connectivity	15%
Fits travel shed mode priority	25%
Total	**100%**

The decision support tool allowed the project team to quickly evaluate trade-offs between alternatives and provided confidence in alternative rankings. The use of Criterium DecisionPlus added transparency to the alternatives evaluation process because the analytical hierarchy, inputs, and weighting were documented in one central location. Figure 26, below, outlines the project ranking output from the tool, providing a scale of how each of the projects scored against the criteria. The score is based on a scale where 1 is a perfect score.

Figure 26. Decision Support Tool—Evaluation Scores



6 RESULTS

6.1 TOP PROJECTS

Each project was scored out of 1.0, based on the screening and scoring process outlined in Section 5, resulting in a ranked list of projects. The higher the score, the more the project was suited to enhancing connectivity in the study area. The nine highest-scoring projects were selected for conceptual-level planning, design, and cost estimates, as listed in Table 16. Projects that may have been scored separately in the process because they supported more than one travel shed or improve connections for more than one mode, were grouped with other like projects that had the same geography or enhanced connectivity in similar ways.

Table 16. Top Nine Improvement Projects

Project ID and Travel Sheds		Description	Primary/Secondary Mode Benefitted	Project Score*	Estimated Implementation Timeline	Probable Cost (2018 $)
18	56th/58th, East-West Core, North-South Core	52nd Avenue Extension, Brighton Boulevard to Vasquez Boulevard	Freight/Vehicle	0.8	48 months	$44,000,000
19	56th/58th, South Platte, North-South Core	56th Avenue to 58th Avenue Connection at York Street	Freight/Vehicle	0.8	48 months	$22,000,000
74	56th/58th, South Platte, East-West Core	Brighton Boulevard BNSF Underpass Replacement at York Street	Freight/Vehicle	0.8	60 months	$45,000,000
75	56th/58th, South Platte, East-West Core	York Street at Brighton Boulevard Intersection Improvements	Freight/Vehicle	0.8	36 months	$3,000,000
85	South Platte, East-West Core	BNSF and Brighton Boulevard Bridges over Race Court	Freight/Vehicle	0.8	48 months	$30,000,000
191	North-South Core, Cole to Stapleton, East-West Core	Colorado Boulevard Pedestrian and Landscaping Improvements	Pedestrian/Bicycle	0.7	36 months	$4,000,000
259	Derby, North-South Core	72nd Avenue Redevelopment	Vehicle/Pedestrian	0.7	42 months	$11,000,000

Project ID and Travel Sheds		Description	Primary/Secondary Mode Benefitted	Project Score*	Estimated Implementation Timeline	Probable Cost (2018 $)
266/ 42	Derby, Welby, North-South Core	O'Brian Canal Loop Trail	Pedestrian/Bicycle	0.6	36 months	$9,000,000
270	Welby, Derby, North-South Core	I-76 Ramps at 74th Avenue	Vehicle/Pedestrian	0.6	36 months	$4,300,000

* Note: The score is based on a scale where 1 is a perfect score.

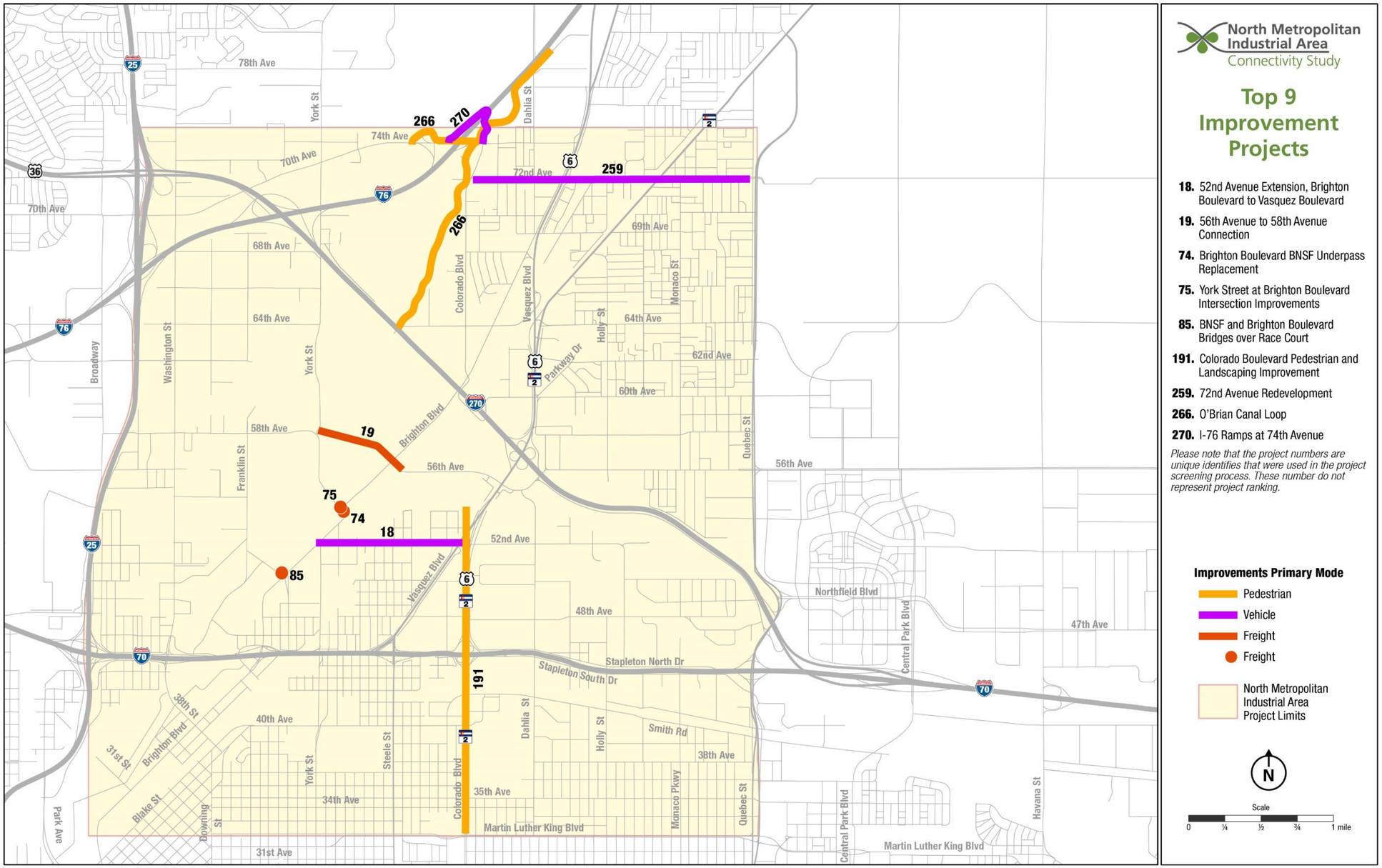
The current estimate of probable costs assesses that the collective sum of these nine projects is $172.3 million in 2018 dollars. These cost estimates were developed using the 10-percent design conceptual layouts found in APPENDIX B. Individual project implementation timeline estimates for the nine projects range from 36 months to 60 months. The timeline estimates were developed considering the time needed to accomplish these steps: develop preliminary and final design, environmental clearance, property acquisition, railroad coordination, and construction. Further detail on these nine projects project can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B. Note that concept designs are an interim work product and do not necessarily represent the final configurations or alignments. Further refinement of the designs is necessary to determine the final layouts, improvements, and alignments of all projects.

Figure 27, below, outlines the location of these priority projects, which are reasonably spread throughout the study area and accommodate a mix of modes. It should be noted that most freight projects provide a secondary benefit to vehicle projects and vice versa; similarly, most bicycle projects provide secondary benefit to pedestrian users and vice versa.

Although there are no transit improvements in the top nine projects, many of the pedestrian and bicycle improvements enhance access to transit, providing a secondary benefit. Many of the transit projects identified within the Study focus on improvements to service, which is outside the scope of the jurisdictions and instead is the responsibility of RTD.

The project numbers in the table, above, and the graphic, below, are unique identifiers that were assigned to the projects for the screening process; a full list of project numbers can be found in APPENDIX H. These numbers do not represent project ranking. Each project is discussed in more detail, including brief cost estimation and environmental impact, below.

Figure 27. Top Nine Improvement Projects



North Metropolitan Industrial Area Connectivity Study

Top 9 Improvement Projects

18. 52nd Avenue Extension, Brighton Boulevard to Vasquez Boulevard

19. 56th Avenue to 58th Avenue Connection

74. Brighton Boulevard BNSF Underpass Replacement

75. York Street at Brighton Boulevard Intersection Improvements

85. BNSF and Brighton Boulevard Bridges over Race Court

191. Colorado Boulevard Pedestrian and Landscaping Improvement

259. 72nd Avenue Redevelopment

266. O'Brian Canal Loop

270. I-76 Ramps at 74th Avenue

Please note that the project numbers are unique identifies that were used in the project screening process. These number do not represent project ranking.

Improvements Primary Mode

- Pedestrian
- Vehicle
- Freight
- Freight

North Metropolitan Industrial Area Project Limits

N

Scale

0 ¼ ½ ¾ 1 mile

6.1.1 52nd Avenue Extension, Brighton Boulevard to Vasquez Boulevard

The project is located within the following travel sheds: 56th Avenue/58th Avenue, East-West Core, North-South Core. This project scored high under many of the project criteria, including scale of benefits, multi-jurisdictional benefits, and fitting travel shed mode priority. This project was cited in the Elyria Swansea Neighborhood Plan (2015) and the North Denver Cornerstone Collaborative (NDCC) Mobility Master Plan Maps (2016), both published by Denver. The plans describe extending 52nd Avenue from Brighton Boulevard to Colorado Boulevard, with a grade-separated underpass at the UPRR, to connect industrial areas in the north Elyria Swansea Neighborhood to 58th Avenue and I-25 in Adams County, and to reduce pressure on the I-70 interchanges at Brighton Boulevard, Steele Street/ Vasquez Boulevard, and Colorado Boulevard.

Between Ivy Street and Colorado Boulevard/SH 2, 52nd Avenue currently is classified as a minor collector accommodating two lanes of traffic. Between Colorado Boulevard and Brighton Boulevard, 52nd Avenue is a local street that primarily serves industrial uses. This section of street is non-continuous, severed by highways, railroads, and industrial land use. Connecting 52nd Avenue would link two predominantly industrial areas and enhance freight mobility. The project also provides potential to accommodate pedestrians and bicycles in the cross section.

The following issues have been identified to be resolved during the next project phase:

- UPRR operations and coordination
- Property acquisition
- Environmental clearance, including potential Section 4(f) clearance due to Swansea Neighborhood Park
- Potential environmental cleanup around the railroad, industrial parcels west of the railroad, and the Vasquez Boulevard/I-70 Superfund site
- Geotechnical investigation
- Utility investigation and relocation
- Stormwater drainage, at grade and from the underpass

Further detail on this project can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B.

6.1.2 56th Avenue to 58th Avenue Connection

This project is located within the following travel sheds: 56th Avenue/58th Avenue, South Platte, North-South Core. This project scored high under many of the project criteria, including scale of benefits, multi-jurisdictional benefits, and fitting travel shed mode priority. This project was cited in the Commerce City Transportation Plan (Commerce City, 2010), and NATE II (RTD, 2015).

Currently, neither 56th Avenue or 58th Avenue run completely through the study area from east to west. To make this maneuver, traffic must jog south to the Brighton Boulevard/York Street intersection. Connecting the arterials 56th Avenue and 58th Avenue would provide a more direct east-west link across the South Platte River to the I-25 and 58th Avenue interchange. The extension would be between 56th Avenue and Brighton Boulevard, connecting to York Street northwest of the Brighton Boulevard/

York Street intersection, and widening York Street north to the bridge. The new road connection would cross low-lying private property and a spur railroad track.

The following project issues have been identified to be resolved during the next phase of the project:

- UPRR operations and coordination to cross the spur with grade separation
- Property acquisition at the southern end of Suncor and near a Denver Water wastewater treatment plant
- Environmental clearance—potential wetlands and federally threatened plants around Burlington Ditch, open space around the wastewater treatment plant
- Potential environmental cleanup around the railroad spur
- Geotechnical investigation
- Utility investigation and relocation
- Stormwater drainage

Further detail on this project can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B.

6.1.3 Brighton Boulevard BNSF Underpass Replacement at York Street

The project is located within the following travel sheds: 56th Avenue/58th Avenue, South Platte, East-West Core. This project scored high under many of the project criteria, including scale of benefits, multi-jurisdictional benefits, reducing conflict between modes, and fitting travel shed mode priority. This project was cited in the Elyria Swansea Neighborhood Plan (2015) and the NDCC Mobility Master Plan Maps (2016) published by Denver. It is included in CDOT's Very-Low Clearance Structures database (2017). The project proposes to realign Brighton Boulevard and replace the underpass to provide increased vertical clearance and accommodation for pedestrians and bicycle traffic.

North-south movements on York Street through the study area involve joining Brighton Boulevard for approximately 0.3 mile. Within this section, Brighton Boulevard runs under a low BNSF RR bridge with a signed maximum clearance of 11 feet, 5 inches. There is a sharp bend on the southern approach to this underpass, reducing visibility. The sharp bend and low underpass act as a barrier to freight and large vehicles serving the primarily industrial land uses in this section of the study area. Rebuilding the Brighton Boulevard and BNSF Underpass to increasing the clearance and improve the turning angle would enhance freight mobility and provides potential to accommodate pedestrians and bicycles in the cross section.

The following issues have been identified to be resolved during the next phase of the project:

- BNSF operations and coordination—to maintain BNSF operations, a separate track structure may be needed to be constructed off the main track line to replace the underpass
- Coordination with the RTD N-Line light rail line
- Property acquisitions
- Environmental clearance—the Riverside Cemetery is located to the west of the underpass, directly west of the railroad tracks
- Potential environmental cleanup in the vicinity of the railroad and industrial parcels east of Brighton Boulevard

- Geotechnical investigation
- Utility investigation and relocation
- Stormwater drainage

Further detail on this project can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B.

6.1.4 York Street at Brighton Boulevard Intersection Improvements

This project is located within the following travel sheds: 56th Avenue/58th Avenue, South Platte, East-West Core. This project scored high under many of the project criteria, including scale of benefits, multi-jurisdictional benefits, reducing conflict between modes, and fitting travel shed mode priority. This project was cited in the Elyria Swansea Neighborhood Plan (2015).

The acute angle of the Brighton Boulevard/York Street intersection is a barrier to freight and large vehicles serving the primarily industrial land uses in this section of the study area. Improving this intersection would enhance freight mobility by providing an alternative route and improving access to the primarily industrial lands surround the intersection.

The following project issues have been identified to be resolved during the next phase of the project:

- Property acquisition
- Environmental clearance—potential cleanup of the diesel fuel station
- Geotechnical investigation/pavement design
- Utility investigation and relocation
- Stormwater drainage

Further detail on this project can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B.

6.1.5 BNSF and Brighton Boulevard Bridges over Race Court

Located within the following travel sheds: South Platte, East-West Core. This project scored high under many of the project criteria, including scale of benefits, multi-jurisdictional benefits, reducing conflict between modes, and fitting travel shed mode priority. This project was cited in the Elyria Swansea Neighborhood Plan (2015) and the NDCC Mobility Master Plan Maps (2016), both published by Denver. It also is included in CDOT's Very Low Clearance Structures Database. The plans describe replacement of the bridges to improve the vertical clearances, providing width to accommodate pedestrian and bicycle traffic, and improving the sharp turning movement from Brighton Boulevard to the underpasses.

In the southwest portion of the study area, Race Court runs under Brighton Boulevard and under a BNSF RR bridge; the height and width of these underpasses currently impede freight mobility and do not accommodate pedestrians and bicycles. Improving the Race Court underpass by increasing the current height clearance and including pedestrian and bicycle facilities in the cross section would improve connectivity for all modes.

The following issues have been identified to be resolved during the next phase of the project:

- BNSF RR operations and coordination
- Property acquisition
- Environmental clearance—the Vasquez Boulevard/I-70 Superfund site is nearby
- Potential environmental cleanup in the vicinity of the railroad
- Geotechnical investigation
- Utility investigation and relocation
- Stormwater drainage
- Community engagement

Further detail on this project can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B.

6.1.6 Colorado Boulevard Pedestrian and Landscaping Improvements

The project is located within the following travel sheds: Cole to Stapleton, East-West Core, North-South Core. This project scored high under many of the project criteria, including improving intermodal connectivity and fitting travel shed mode priority. This project was cited in the Elyria Swansea Neighborhood Plan (2015) and the NDCC Mobility Master Plan Map (2016), both published by Denver. The plans outline improvements to pedestrian and bicycle infrastructure across Colorado Boulevard for better connections and access to destinations and transit service, including incorporation of street trees and other landscaping to improve water quality and introduce a better gateway.

Currently, the sidewalks along Colorado Boulevard, north of 42nd Avenue, are substandard or non-existent. Secondly, access to the 40th Avenue and Colorado Boulevard Station on foot or by bicycle is not easily achieved from Colorado Boulevard. This has resulted in the creation of several social trails between Colorado Boulevard and the station, highlighting the current issues with access. Improvements to the pedestrian and bicycle infrastructure along and across Colorado Boulevard would improve safety for these users and enhance multi-modal connectivity by improving access to the station.

The following issues have been identified to be resolved during the next phase of the project:

- Property acquisition
- Environmental clearance—nearby Superfund sites, park
- Railroad crossing improvements
- Utility investigation and relocation
- Stormwater drainage
- Community engagement

Further detail on this project can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B.

6.1.7 72nd Avenue Redevelopment

The project is located within the following travel sheds: North-South Core, Derby. This project scored high scale of benefits and improves intermodal connectivity project criteria. The project was cited in the Commerce City Station Area Master Plan (2013) and Walk Bike Fit (2012), a multi-modal active transportation plan, published by Commerce City. The plans describe designing a mixed-use multi-modal corridor with bicycle lanes and sidewalk improvements; pedestrian crossing improvements at Quebec Street, SH 2, and US 85; converting 72nd Avenue from four lanes to three lanes between Quebec Street and US 85; and adding bike lanes and sidewalks between US 85 and the station.

72nd Avenue currently is classified as a minor arterial between Quebec Street and US 85, supporting two lanes of traffic in each direction. This project proposes transforming 72nd Avenue into a Complete Street design by converting the current four lanes between Quebec Street and US 85 to three lanes and upgrading the street to add bicycle lanes and sidewalks from US 85 to the future light rail station at Colorado Boulevard. This improvement would establish 72nd Avenue as a multi-modal corridor, enhancing facilities for pedestrians and bicyclists.

The following issues have been identified to be resolved during the next phase of the project:

- Property acquisition
- Environmental clearance—potential issues include Burlington Ditch, Skelly Oil Refinery, Chemical Sales Company, nearby Superfund sites, and prairie dogs and ferrets around Quebec Street
- Railroad crossing improvements
- Utility investigation and relocation
- Stormwater drainage

Further detail on this project can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B.

6.1.8 O'Brian Canal Loop Trail

Located within the following travel sheds: Derby, Welby, and North-South Core. This project scored high under many of the project criteria, including improving intermodal connectivity and fitting travel shed mode priority. The project team identified proposed improvements to the O'Brian Canal in several planning documents; these were grouped together to form an overall O'Brian Canal Loop project. The project was cited in the Commerce City Transportation Plan (2010), the Commerce City Station Area Master Plan (2013), and Walk Bike Fit (2012), all published by Commerce City. The plans describe adding trails to the existing system to provide new pedestrian and bicycle connections to the station across the O'Brian Canal, a new loop trail, a new connection to the South Platte River trail, and new segments to the Fernald Trail.

Currently, there is a ditch service road along the O'Brian Canal. Proposals involve developing a trail that follows the service road linking the existing Second Creek Greenway Trail near Chambers Road and 104th Avenue to the Rocky Mountain Arsenal National Wildlife Refuge, the Platte River Trail, and the Sand Creek Trails. This project would link multiple neighborhoods and destinations with thousands of residents around the north and west periphery of Commerce City, transforming the canal to a community amenity.

The following project issues have been identified to be resolved during the next phase of the project:

- Property acquisition
- Environmental clearance—potential issues include wetlands, threatened and endangered species (Ute ladies' tresses, Colorado butterfly plant); a higher level of coordination and permitting will be required, working around the rivers and ditches
- Geotechnical investigation
- Utility investigation and relocation

Further detail on this project can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B.

6.1.9 I-76 Ramps at 74th Avenue

This project is located within the following travel sheds: 56th Avenue/58th Avenue, South Platte, North-South Core. This project scored high under many of the project criteria, including scale of benefits, multi-jurisdictional benefits, and fitting travel shed mode priority. This project was cited in the Commerce City Station Area Master Plan (2013). Completing the interchange would provide significant local and regional traffic and mobility enhancements, reduce vehicular traffic impacts on 74th Avenue, and create conditions for new office uses, employment, and transit-supported retail near the new station.

Currently, the I-76/74th Avenue interchange accommodates southbound entrance movements to I-76 and northbound exit movements from I-76. Northbound entrance movements to I-76 and southbound exit movements from I-76 are not accommodated. Building new ramps to accommodate these missing movements would enhance vehicle movement in the area and provide access to new developments, including the planned Commerce City/72nd Avenue transit station. At the same intersection, the Commerce City Council identified a new ramp from westbound 74th Avenue to northbound I-76 that would further enhance vehicle mobility in the area.

The following issues have been identified to be resolved during the next phase of the project:

- Property acquisition
- Environmental clearance—potential issues include wetlands, threatened and endangered species (Ute ladies' tresses, Colorado butterfly plant, Eagles)
- Geotechnical investigation
- Utility investigation and relocation
- Stormwater drainage
- Community engagement

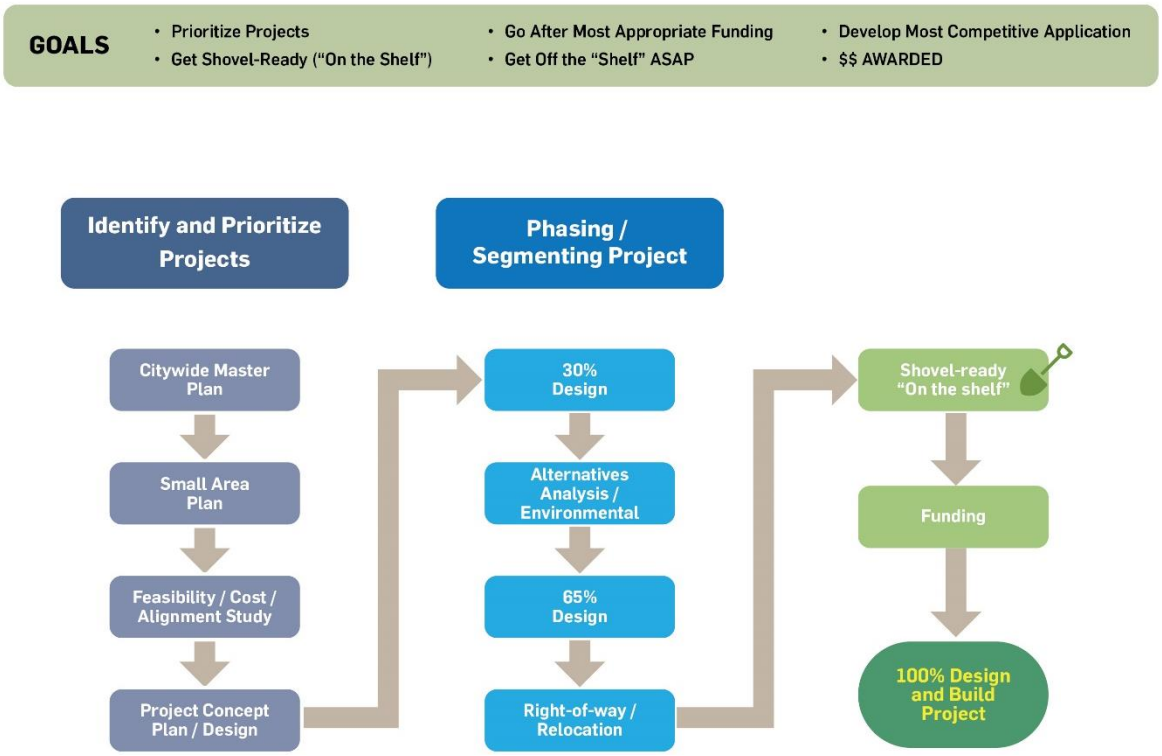
Further detail on this project can be found in APPENDIX A; conceptual layout and cost estimates can be found in APPENDIX B.

7 NEXT STEPS FOR IMPLEMENTATION

The Study used a consistent process and scoring to develop a priority list of projects that advance regional connectivity. Without public investment, the engine of this critical economic zone will begin to stall, as congestion chokes access to and from the area. In addition, access to neighborhoods, transit stations, community facilities, and regional trails will remain disconnected and substandard. Jurisdictional partnerships that created the Study must continue to be fostered, collectively advancing implementation strategies that lead to improved regional connections. Each project will require further environmental and engineering analysis.

Incorporating priority projects within regional and local planning efforts will be necessary to maximize federal funding for future implementation phases and to ensure that planning for the projects occurs. The projects will be further evaluated to determine the next steps to advance all the projects to make them more "shovel-ready." Shovel-readiness is a term used to identify and pursue the steps necessary to complete all the planning, evaluation of community and environmental impacts, design, and any necessary property acquisition required for the project to be ready for construction. As highlighted in Figure 28 below, numerous steps are necessary for implementation of a project, and each step requires funding. Detailed plans, phasing plans, and cost estimates often are required before seeking outside funding sources for implementation and to make the project more competitive, especially for state and federal funding.

Figure 28. Capital Project Development and Financing Process



The NMIACS jurisdictions will collectively:

- Endeavor to incorporate all projects within the DRCOG's 2045 Regional Transportation Plan, appropriately packaging phases or projects to maximize success within the regional prioritization process.
- Strive to include these projects within their respective transportation planning documents and capital improvement and preservation plans, coordinating local funding to advance further environmental and engineering analysis required for each project.

Coordinating with CDOT also is critical to implementation activities from a planning and construction perspective. The state's freight plan will help guide future investments, and several projects currently are underway within the study area (I-270, Vasquez Boulevard/I-270 interchange, Central 70) that could impact future project implementation activities. NMIACS jurisdictions will strive to amend the state's existing freight plan to include priority projects, seek state support for grant funds that improve freight movements, and identify resources that could be pooled to maximize taxpayer-funded investments.

In addition, identification of opportunities for faster, more convenient, safer, and more reliable transit service and connectivity throughout the area should be a significant consideration as travel corridors are improved for motor vehicles. Continuing the collaboration with RTD that has been established in previous planning efforts will be a focus for the local jurisdictions.

8 REFERENCES

Adams County. (2012, December). *Adams County Comprehensive Plan.* Retrieved from http://www.adcogov.org/imagine-adams-county-comprehensive-plan.

Adams County. (2012, December). *Adams County Transportation Plan.* Retrieved from http://www.adcogov.org/transportation-plan.

Adams County. (2014, April). *Welby Neighborhood Plan.* Retrieved from http://www.adcogov.org/welby-subarea-plan.

Colorado Department of Transportation. (2009, December). *US 36 Record of Decision (ROD).* Retrieved from https://www.codot.gov/projects/us36eis/documents/us-36-record-of-decision-rod.

CDOT. (n.d.). *CDOT Very Low Clearance Structures .* Retrieved from http://cdot.maps.arcgis.com/apps/PublicInformation/index.html?appid=c9b75a67b4bf4bc3a213f75b9cd0cbeb.

City and County of Denver. (2008) *Strategic Transportation Plan*. Retrieved from http://www.denvergov.org/content/denvergov/en/homepage.html

City and County of Denver. (2012). *Blueprint Denver.* Retrieved from https://www.denvergov.org/content/denvergov/en/community-planning-and-development/planning-and-design/blueprint-denver.html.

City and County of Denver. (2015, February). *Elyria Swansea Neighborhood Plan.* Retrieved from https://www.denvergov.org/content/denvergov/en/community-planning-and-development/planning-and-design/completed-plans/denver-statistical-neighborhoods/elyria-swansea.html.

City and County of Denver. (2016). *North Denver Cornerstone Collaborative Mobility Masterplan Maps.*

City of Commerce City. (2010). *Transportation Plan.*

City of Commerce City. (2012, March). *Walk.Bike.Fit.* Retrieved from http://www.c3gov.com/government/city-charter-master-plans

City of Commerce City. (2013, October). *Commerce City Station Area Master Plan.* Retrieved from http://www.c3gov.com/government/city-charter-master-plans

Regional Transportation District (RTD). (2015). *North Area Transit Evaluation feasibility study draft concept.*