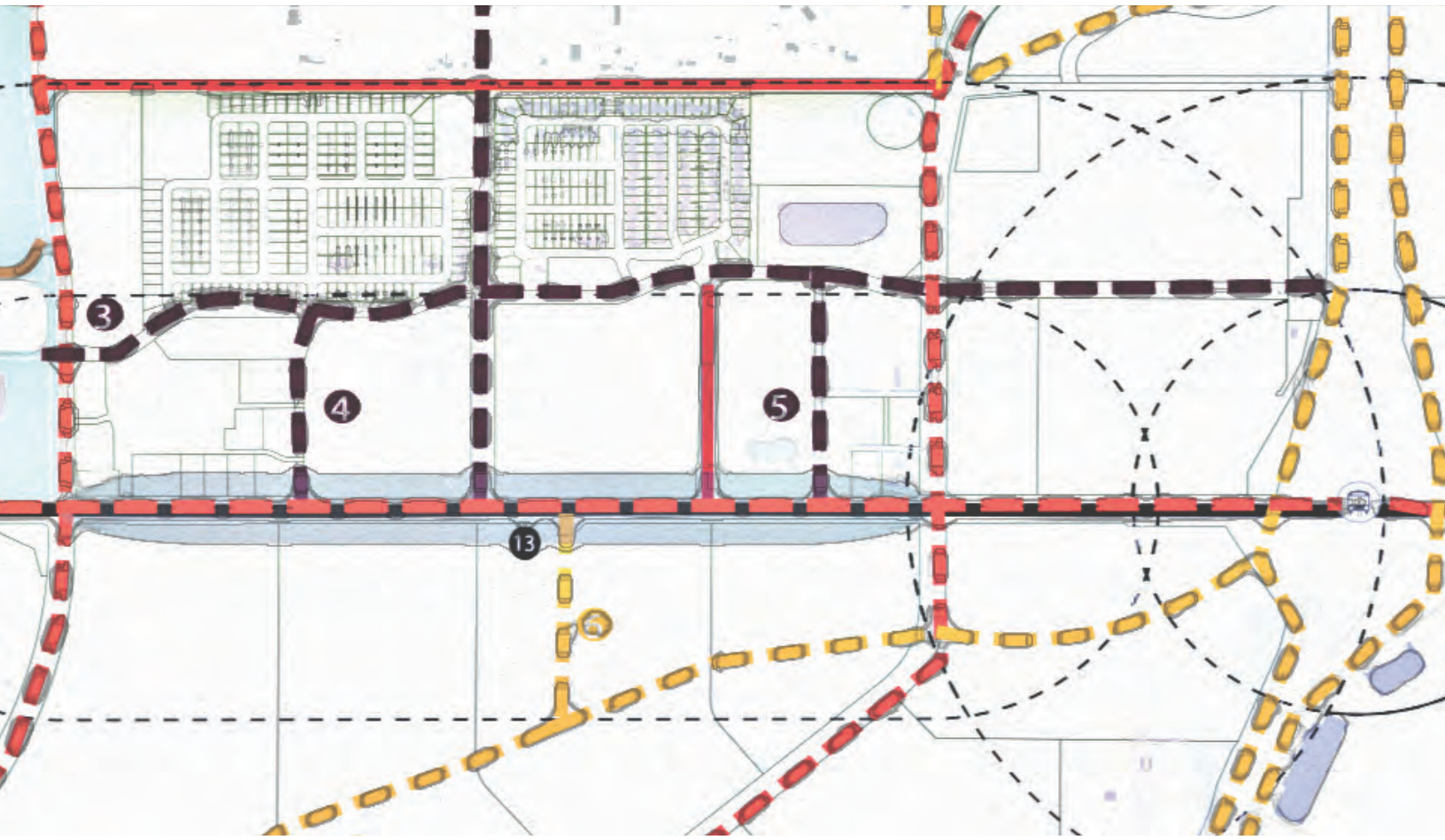
October 2019

State Highway 7 BRT Station Area Design



State Highway 7 Bus Rapid Transit Station Area Design

Prepared For

State Highway 7 Coalition

Prepared By

FOX TUTTLE HERNANDEZ
TRANSPORTATION GROUP

Otak

Pinyon
Environmental, Inc.

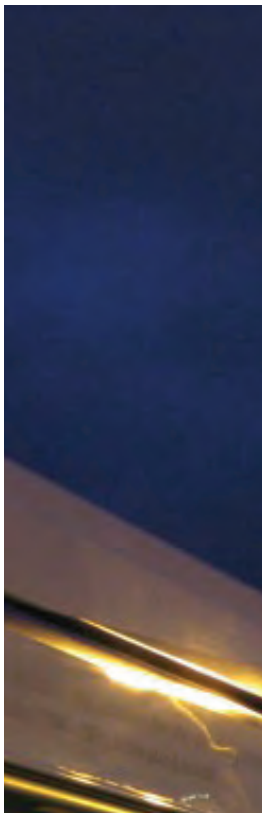
In Collaboration With

Brighton · City of Thornton · Broomfield · City of Lafayette · Town of Erie 1874 · Boulder County

*Terms and Acronyms can be found on page 14 and 15.

TABLE OF CONTENTS

LIST OF FIGURES BY CHAPTER



IN THIS SECTION:

- *»Transit Oriented Development (TOD) Info & Terms*
- *»First and Final Mile (FFM) Info & Terms*
- *»Additional Terms & Acronyms*

1

SH 7 Station Design Background Information & Terms

Transit Oriented Development (TOD) Info & Terms

"TOD is a mixed-use community within an average 2,000-foot walking distance of a transit stop and core commercial area. TODs mix of residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot or car."

- Peter Calthorpe

* Bicycle distances are even longer - one to three miles+ for planning purposes ("first/last mile" thinking)

Basic Design Principles for TOD

- Provide a mix of moderate-to high-density residential, commercial and employment uses that create a place with a high degree of pedestrian activity and a focal point for transit trips within walking distance to the station.
- Locate commercial and civic uses next to transit stops so that a number of errands can be done with only one stop.
- Take a "district" approach to TOD planning, not just a corridor station specific approach.
- Provide multimodal connections from neighborhoods to transit stops and local commercial destinations.
- Design for pedestrians and transit, without excluding the auto.
- ACTIVATE station areas, public spaces and streets leading to stations with active land uses and activities throughout.
- Bring natural features into the urban area and connect to regional green spaces.

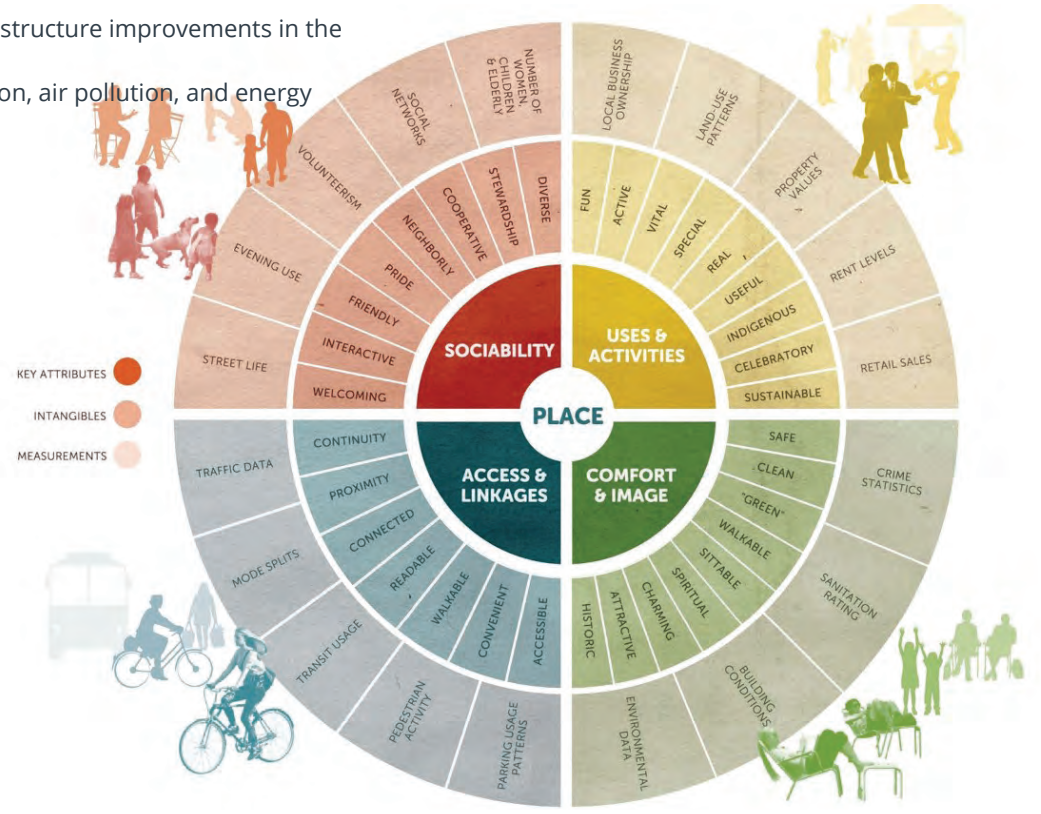
Short List of TOD Benefits

- Increased transportation choices and access for those living and working in proximity to transit.
- Renewed investment and economic revitalization in transit oriented districts.
- Capital investment and infrastructure improvements in the redeveloping area.
- Reduction of traffic congestion, air pollution, and energy consumption.

What makes a great place?

- Uses and Activities
- Access and Linkages
- Comfort and Image
- Sociability

PLACEMAKING: a multi-faceted approach to the planning, design and management of public spaces that capitalizes on a local community's assets, inspiration, and potential, with the intention of creating public spaces that promote health, happiness and well being.

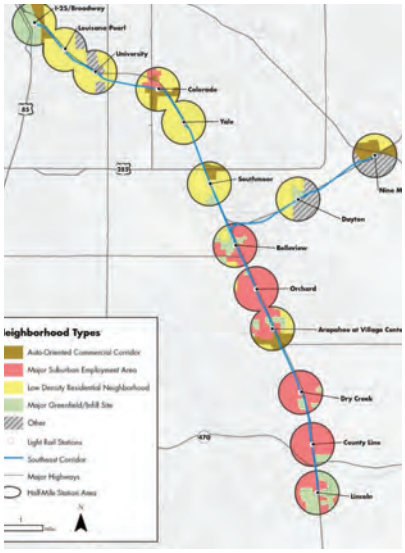


TOD Best Practices

- Intensity of uses in the station area
- Mixed use and compact form is the "ideal"
- Increased CHOICES - housing and transportation
- Housing for all generations of buyers and renters (Boomers, Gen-X, Millennials, Next Gen)
- COMPLETE neighborhoods and streets
- Transit - and pedestrian - oriented design (site layout, parking placement, building design)
- Street and network connectivity (pedestrian and bike but also local transit, rideshare, and general traffic)
- Innovative first and final mile facilities
- Vibrant, healthy businesses/ economic development
- 24-7 activity
- Right-sized Parking
- Transportation demand management = ECO PASS!
- Effective parnerships (public/private) and agencies working toether

Transit Supportive Densities & Land Uses

- There is no "one size fits all"
- FTA Research in Transit Station Areas
  - Urban = 36 du/acre
  - Suburban = 17 du/acre
- Bus Rapid Transit
  - Dwelling units and jobs/employees = "activity units" per acre
  - For BRT 30 - 50/acre is optimal
  - 25 to 32/acre is target
  - 12 to 16/acre is minimum



Station Typologies

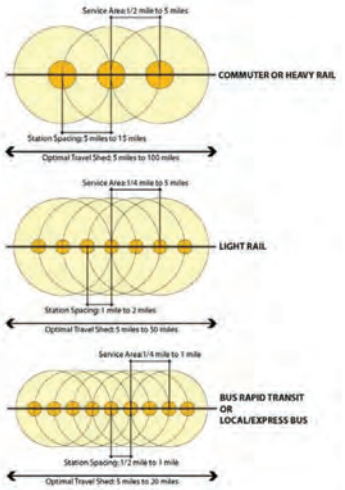
- Urban Core
- Suburban (transforming from auto-oriented to transit-oriented
- Outlying town centers
- Single family neighborhoods
- Employment Centers
- Greenfield/ Undeveloped

Station Area Planning

- Maximize activity units within 5 - 10 minute walk from station
- Reduce surface parking
- Emphasizing mixed use/ intensity of use
- Maximize Density within Walking and Bicycling Distance
  - Walking Distance:
    - 1/4 mile or 5 minute walk = highest intensity of use
    - 1/2 mile or 10 minute walk = TOD sphere
  - Bicycling Distance
    - 1 to 3 miles from station
- Maximize Connectivity
  - Wider, continuous sidewalks
  - Low stress bicycle routes for all ages and abilities
  - Bike share programs and Scooter Share Programs
  - Autonomous Vehicle Shuttles
- Work with smart commute north TMO to implement alternate commuting strategies like EcoPass, Vanpool, etc.

Station Spacing

- Selection Locations:
  - Choose best locations first
  - Identify future potential locations
  - Plan ahead for adding in stations
  - What if BRT becomes LRT?



Today's Land Use + Forecasted Land Use

- Important to not only think about what is there today
- Suburban commercial centers = land banks for TOD
- Infill of greater densities over time as land values increase

Greenfields vs. Retrofits

- Starting from scratch, easier to create the right mix of uses and densities
- Outlying = the battle between park-and-ride and TOD
- Less infrastructure, amenities; have to work harder to place-make

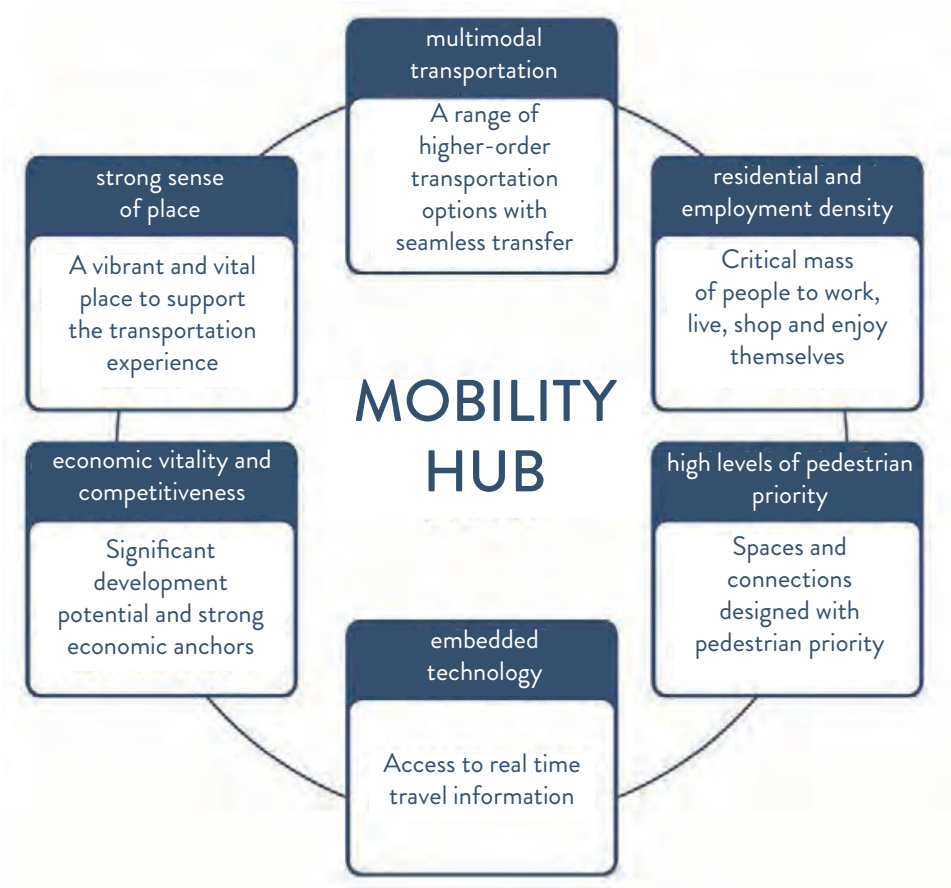
- Challenging, diverse contexts to work within; mix of towns, industrial, suburban neighborhoods
- Look for underutilized properties; opportunities for infill

Low, Medium and High Potential TOD Opportunities

- Low - Areas with significant/ new development that offers little opportunity for infill or redevelopment
- Medium - Areas with some development but that are underutilized and could infill as property values increases
- High - Areas that are largely completely undeveloped and represent greenfield TOD opportunities to develop with TOD in mind from the beginning

What is a Mobility Hub?

A mobility hub is a place of connectivity, where different modes of movement, from walking to high speed rail, come together seamlessly. There is an attractive, intensive concentration of employment, living, shopping and enjoyment around transit (similar to TOD but focused in the core and with facilities, WiFi, etc.)



TOD at the "District" Scale Surrounding Stations

- Variety of residential choices - apartments and condominiums to single family homes (owner and renter occupied)
- Commercial, office, and institutional
- Active use at ground floor level
- PLACEMAKING (public gathering spaces and architectural character)
- Intensive focus on pedestrian-oriented/ walkability
- Park-and-ride (often structured parking 300 to 500 spaces)
- Surface parking that transforms into structured over time

TOD - Parking Considerations

- Look for multiple use opportunities and future-proof parking structures (so they're convertible to other uses in the future)
  - Level floor plates
  - Minimum 11-foot floor to floor heights
- Right-size parking for all development (TOD or not) - parking is expansive; don't require more than needed
- Consider parking maximums vs. minimums
- Maximize on-street parking in the station area
- Facilitate shared parking between complementary land uses
- Add secure bicycle parking as part of parking garages or lots
- Parking generates less ridership than buildings
- Better to increase # of people living and working near station, but not always possible from day one
- Use a corridor-wide approach to park-and-ride
- Park-and-rides can transform into built form over time
- Don't just create park-and-rides; create MOBILITY HUBS

TOD - Getting Ready (Planning Approaches)

- Identify district and site opportunities (primary and secondary)
- Complete station area master planning
- Encourage higher intensity uses near stations including an emphasis on mixed use
- Try to avoid too much parking in the 1/4 mile core area

Transit & Pedestrian Oriented Development Best Practices

- Modify standards to encourage transit supportive development and infrastructure
- Allow for reduced setbacks and narrower landscape buffers
- Modify street standards to prioritize pedestrians and bicyclists/ access to transit
- Buildings oriented to pedestrians and transit/active use at ground floor (doesn't have to be retail)

Planning for Transit Supportive Land Uses along BRT

Active Units vs. Dwelling Units

An important consideration in forecasting transit supportive densities along high capacity transit corridors, including BRT corridors, relates to assessing and calculating all ridership-generating land uses.

- Several resources related to transit oriented development planning evaluate density in terms of dwelling units per acre (du/acre) in proximity to transit stations and transit corridors, however...
  - Employment and commercial land uses can also be important generators for ridership
  - As such, many regional planning entities describe transit supportive land uses in terms of "active units" or the number of people (population) and/or jobs in proximity to the station or within the corridor
  - In Puget Sound Regional Council's Vision 2040 plan, residential densities exceeding 15 to 20 homes per acre, and employment areas with densities of 50+ jobs per acre, are preferred targets for the higher frequency and high-volume service provided by high-capacity transit.
  - New regional growth centers are expected to plan for land use that accommodates at least 45 activity units (number of people/ population + jobs) per gross acre.
  - Increased densities of all types of land uses around transit stations increases ridership. While the scale and mix of uses varies, all types of station areas can play a role in increasing demand for transit trips
    - Strategies Include:
      - Planning for more compact (and dense) residential and commercial development
      - Neighborhoods with a variety of housing choices, including housing that is affordable at a range of incomes
      - Regional and sub-regional employment centers
      - Major Institutions
      - Mixed-use Districts

Additional Best Practices for Planning

- Establish Transit-Supportive Density Goals based on Locally Relevant Data and Policies
- Maximize Land Use Potential within Transit Walksheds
- Promote Employment Growth at Station Areas in Transit Corridors
- Plan for and Encourage Mixed Uses and Transit-Supportive Design
- Incentivize Alternatives to Automobile Travel in Station Areas

Mixed Use Development vs. Synergies Between Station Area Land Uses in the Corridor

- Development of compact, mixed use areas within 1/2 mile (10 minute walk) of high capacity transit stations is a general best practice for land use planning.
- It is also important to recognize that within a transit corridor there can be synergies between transit stops emphasizing a more focused type of land use but land use types that may vary by stop. For example, one transit stop might be in a multi-family residential area where people take transit to their jobs at employment and commercial centers located at other transit stops on the same corridor.
- Mixed use is still an important principle in TOD planning but in analyzing TOD potential within corridors it is also important to consider how various different types of land uses can support ridership patterns to and from different stops in the corridor.

Average Minimum Density Based on Context and Level of Transit Service

- Transit agencies and local jurisdictions are also trending towards planning for average minimum densities based on the level of transit service provided (headway frequency, duration, etc.) and the context of the service.
- The Metropolitan Council for the Minneapolis-Saint Paul metro area suggests average minimum densities (DU/acre) of higher levels along light rail transit, commuter rail, and dedicated bus rapid transit lines, compared to more highway-oriented bus rapid transit. They also recommend standards for average minimum densities that can be seen in the chart on the next page.
  It should be noted that *average minimum* density is NOT the "target density" for planning.
- **The target density should be higher so that the desirable average minimum can be achieved throughout the entire**

corridor, as shown in the second table below. NOTE, the chart only addresses the target density for residential use; it is also important to consider target activity unit density for all types of land uses in the corridor.

- Guideline for land use planning in proximity to highway BRT: each half-mile station area should be planned to achieve a minimum of 7,000 residents, jobs, and/or students within the half-mile distance from the station. So for the 502.4 acre half-mile area surrounding a station, this would equate to a minimum average density of about 14 activity units per acre.

**Full Paper on Planning for Transit Supportive Land Uses along Bus Rapid Transit Corridors can be found in Report Appendix, pages 168, 169, 170 & 171.*

AVERAGE MINIMUM RESIDENTIAL DENSITY REQURIEMENTS (DWELLING UNITS/ACRE)

RIGHT-OF-WAY TYPE	TRANSIT TYPE	GEOGRAPHY (DISTANCE FROM STATION)	URBAN CENTER DU/ACRE	URBAN DU/ACRE	SUBURBAN DU/ACRE	SUBURBAN EDGE/ EMERGING SUBURBAN EDGE DU/ACRE
Fixed or Dedicated Transitway	Light Rail Transit, Commuter Rail, or Dedicated BRT	Half-Mile Radius	50	25	20	15
Highway Transitway (MnPass/ HOV)	Highway BRT	Half-Mile Radius	25	12	10	8
Shared Rights-of-Way	Arterial BRT	Quarter-Mile Radius	15	15	15	15
	Local Bus Routes on High Frequency Network	Quarter Mile Radius	10	10	10	10

AVERAGE MINIMUM RESIDENTIAL DENSITY REQURIEMENTS (DWELLING UNITS/ACRE)

RIGHT-OF-WAY TYPE	TRANSIT TYPE	GEOGRAPHY (DISTANCE FROM STATION)	URBAN CENTER DU/ACRE	URBAN DU/ACRE	SUBURBAN DU/ACRE	SUBURBAN EDGE/ EMERGING SUBURBAN EDGE DU/ACRE
Fixed or Dedicated Transitway	Light Rail Transit, Commuter Rail, or Dedicated BRT	Half-Mile Radius	75-150+	50-100+	40-75+	40-75+
Highway Transitway (MnPass/ HOV)	Highway BRT	Half-Mile Radius	40-75+	25-50+	20-40+	20-40+
Shared Rights-of-Way	Arterial BRT	Quarter-Mile Radius	20-60+	20-60+	20-60+	20-60+
	Local Bus Routes on High Frequency Network	15-50+	15-60+	15-60+	15-60+	15-60+

First and Final Mile (FFM) Info & Terms

First and Final Mile planning refers to the way of getting from your starting point to your end destination using public transit. The first mile is getting from your start (e.g. your home, etc) to a transit station, the last mile is getting from the station to your final destination. The FFM recommendations in this plan analyze and address issues of transit accessibility and connectivity and identify innovative strategies that consider multimodal transportation to stations, improve station connectivity and connect users to end destinations with ease.

FFM Walking

Most transit users incorporate walking into a part of their trip. Walking can be direct from the person's origin/destination or from the person's parking space to the station platform. Creating safe, comfortable places for people to walk is critical to a station's success.

FFM Bicycling

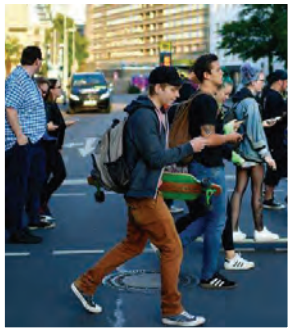
When the distance is too far to quickly walk, some transit users will bike from their origin/destination to the station. Creating safe and comfortable routes for bicycles to complete their trip to the station will increase the likelihood that users will choose a bicycle over a motor vehicle.

FFM AV/Bus Circulator

To connect users with their origin/destination, one option being used in the Denver Metro Area is a circulator bus or autonomous vehicle shuttle. These vehicles will connect people from their origin/destination to the station. The service can be either on-demand from unique origins/destinations to the platform or on a dedicated route.

FFM Shared Mobility

Shared mobility has become a new model for connecting from your origin/destination to the station. The shared mobility devices right now are electric scooters, car share, and bike share. These require you to have a membership or app to start the trip. These mobility devices can be used in place of transit trips as well



Bike Boulevard/ Neighborhood Greenway

These facilities are a type of on-street bicycle facility that shares the roadway with motor vehicles. The roadway has been calmed to encourage slow speeds and to discourage cut-through traffic. These facilities are also designed to give priority to bicycle and pedestrian traffic. There are a variety of techniques to accomplish these goals.

Rail-with-Trail

Rails-with-Trails are trails adjacent to or within an active railroad corridor. They provide increased opportunities for trail systems that enhance local transportation systems and offer safe and attractive community connections for pedestrians and bicyclists

Sidepath

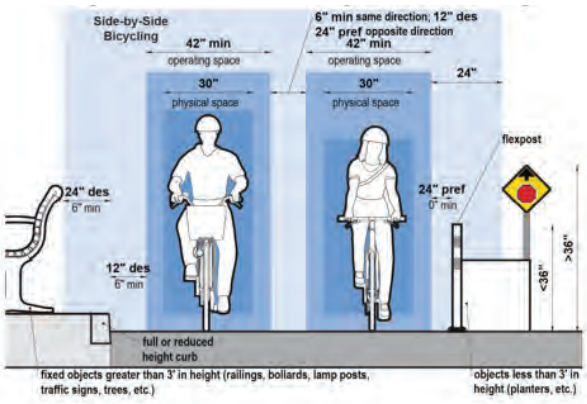
A sidepath is a multi-use trail that is adjacent to a roadway and is located within the roadway right-of-way. These paths should be a little wider (12 feet wide) than a typical multi-use trail because of the increased presence of pedestrians.

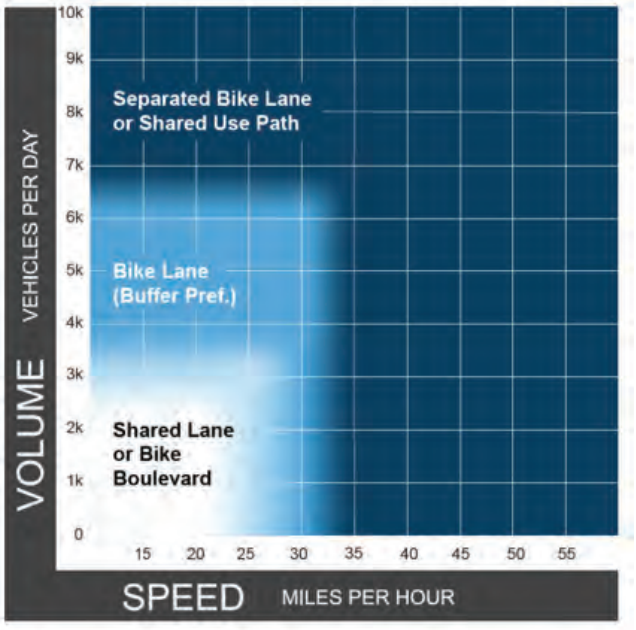
Secure Bike Parking

Secure bike structures allow more bikes to be parked securely at a station in a smaller space than bicycle lockers. There is also typically higher usage over standard bike racks because people feel secure leaving their bikes there for long periods of time.

Bicycle Facilities

Bicycle facilities are the infrastructure which is designed for bicycle operation and travel.

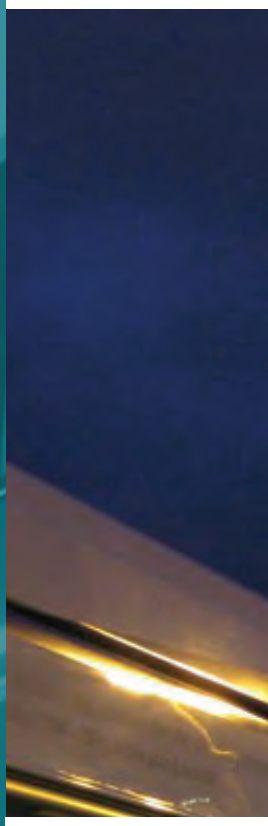




Additional Terms & Acronyms

ADA	Americans with Disabilities Act
ADT	Average Daily Traffic - this is average motor vehicle traffic a road handles in one day
BAT Lanes	Business Access Turn Lanes - Bus, Business Access and Turn Lanes – These lanes facilitate the right in/out into businesses and intersections, but is also a dedicated lane for bus travel
BGEPA	Bald and Golden Eagle Protection Act
CDOT	Colorado Department of Transportation
DRCOG	Denver Regional Council of Governments - The Denver Region Municipal Planning Organization (MPO)
DRS	Driver Relief Station - Facilities for drivers to take a break
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information Systems
ITS	Intelligent Transportation Systems - this is an application that aims to provide innovative services related to different modes of transport/ traffic management and helps users be better informed and make safer, more coordinated and "smart" use of transportation networks
MBTA	Migratory Bird Treaty Act
Micromobility	A category of modes of transport provided by very light vehicles such as electric scooters, electric skateboards, shared bicycles and electric pedal assisted bicycles
MPO	Metropolitan Planning Organization
NEPA	National Environmental Policy Act of 1969
NR-A, NR-C	These are types of roadway classification by CDOT for highways

NRHP	National Register of Historic Places
OAHP	Office of Archaeology and Historic Preservation
OSMP	Open Space and Mountain Parks - Municipal division
PEL	Planning and Environmental Linkage Document - Two of which were completed for this corridor
PIDs	Public Information Displays
Protected Intersection	an intersection in which the bikeway is setback from the parallel motor vehicle traffic. Unlike conventional intersections, people biking are not forced to merge into mixed traffic, instead they are given a dedicated path through the intersection and have the right of way over turning vehicles
ROW	Right-of-Way
RTD	Regional Transportation District
Section 4(f)	Section 4(f) of the US Department of Transportation Act of 1966 prohibits the FTA and other USDOT agencies from using land from publicly owned parks, recreation areas (including recreational trails), and wildlife and water fowl refuges, or public and private historic properties, unless there is no feasible and prudent alternative to that use and the action includes all possible planning to minimize harm to the property resulting from such a use. Section 4(f) protects publicly owned park and recreation areas that are open to the general public, publicly owned wildlife and waterfowl refuges, and public or privately owned historic sites.
Section 6(f)	Section 6(f) refers to a section of the Land and Water Conservation Fund (LWCF) Act of 1965. According to the National Park Service (NPS), "The LWCF Program provides matching grants to States and local governments for the acquisition and development of public outdoor recreation areas and facilities (as well as funding for shared federal land acquisition and conservation strategies). The program is intended to create and maintain a nationwide legacy of high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation resources across the United States." Section 6(f) of the LWCF Act prohibits the conversion of property acquired or developed with grants from this fund to a non-recreational purpose without the approval of the NPS. Importantly, Section 6(f) applies to all transportation projects (and others) involving possible conversions of the property whether or not federal funding is being utilized for the project.
TMA/ TMO	Transportation Management Association/ Transportation Management Organization - These organizations works in the community to encourage travel modes other than single occupancy vehicles. The organizations typically work with employers to educate or help offset costs for commuting programs.
TNC	Transportation Network Companies - These are commonly referred to as Uber or Lyft, sometimes called rideshare apps
WUS	Waters of the U.S



IN THIS SECTION:

- *What is Bus Rapid Transit (BRT)?*
- *SH7 BRT Feasibility Study*
- *State Highway 7 BRT*
- *Station Area Design Project Overview, Station Locations, Station Designs*

2

SH 7 Station Area Design Introduction

What is Bus Rapid Transit (BRT)?

*Bus Rapid Transit is **high-quality bus-based transit** that delivers service at metro-level capacities that is...*

Fast & Reliable	Modern	Comfortable	Convenient
Dedicated Lanes & Signal Priority	Unique Branded Look For Each System	Spacious and Comfortable interiors	Level Boarding Areas (Raised Platforms)
Fast, Frequent Service (10-15 minute headways)	Latest Energy Efficiency and ITS Technology	Enhanced Stations (Not Stops)	Off-Board Fare Collection
Real Time Travel Information			Multiple Doors for Quick Boarding

SH7 BRT Feasibility Study

Total Length: **30** Miles

Stations: **15** to **18**

Spacing: **2.5** Miles Average

Service Hours: **18** Hrs/Day

Peak Service: **7.5** Minutes

Off Peak Service: **15** Minutes

Capital: **$342** Million

Ridership: Up to **9,800**

State Highway 7 BRT

60 Minutes in a dedicated lane/ bus on shoulder

76 minutes in mixed traffic

8,500 to **9,800** daily boardings

6,400 to **7,350** daily boardings in mixed traffic

BRT **Dedicated Lanes** = **Maximum** Ridership and **Minimum** Travel Times

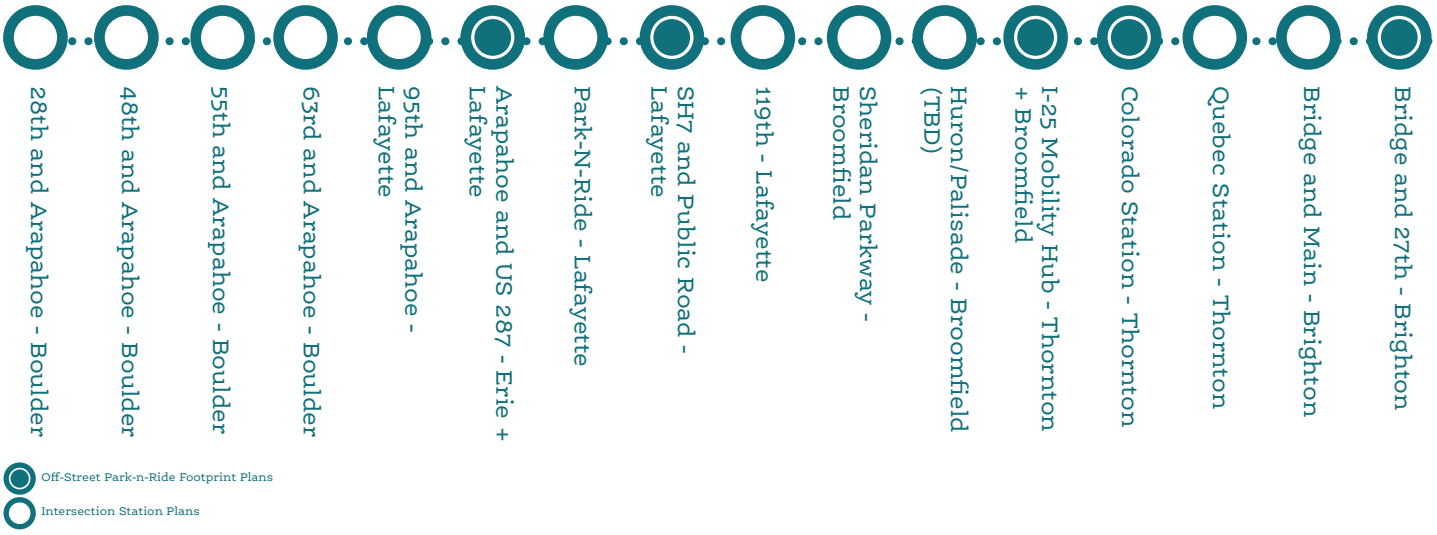
Transit Oriented Development (**TOD**) Around Stations = More **Homes/Jobs Near Transit**

Next Steps...

Station Area Design Project Overview

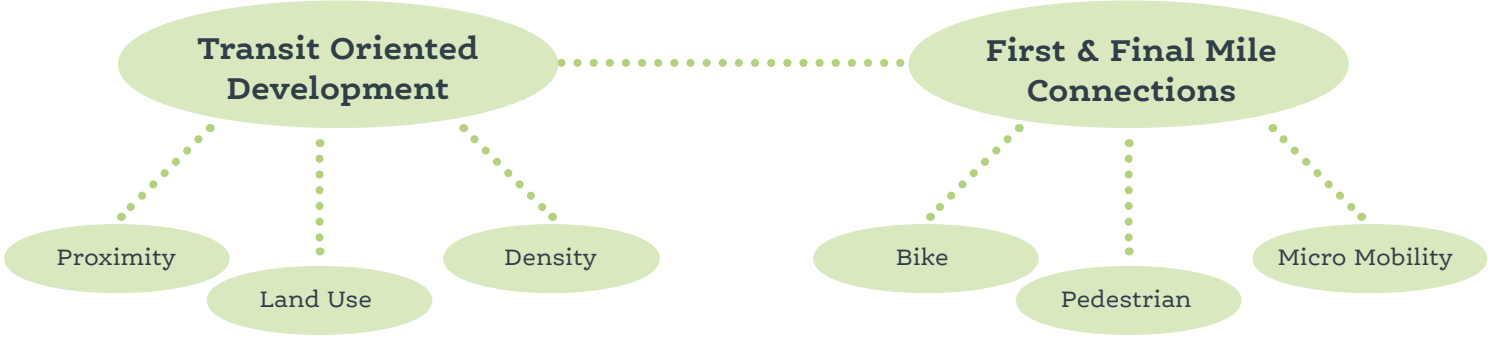
- Identify & Refine **Station Locations**
- Identify **Right Of Way** Needs for **Station Area Footprints**
- Understand First and Final Mile **Connectivity** for Active Modes
- Identify **Station Amenities** for Positive Transit User Experience
- Understand Vehicular, Pedestrian, Bike & Transit **Circulation** to Support BRT

Project Station Locations



6 Meetings ..... **15** Stations ..... **6** Months

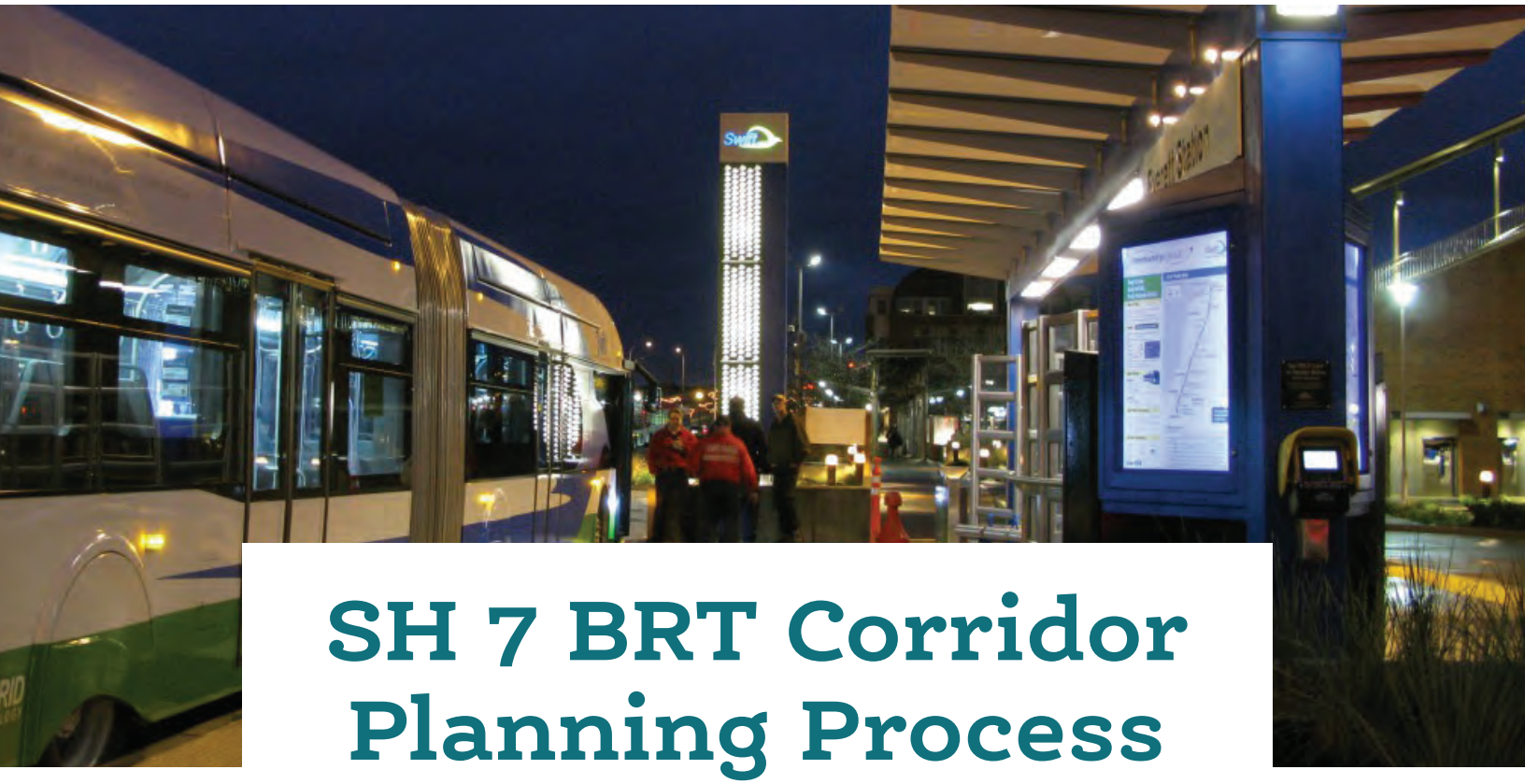
Station Designs Considering...



IN THIS SECTION:

3

- » *Corridor Planning Process*
- » *SH7 BRT Corridor Overview*
- » *Brighton Overview*
- » *Thornton Overview*
- » *Broomfield Overview*
- » *Lafayette Overview*
- » *Erie Overview*
- » *Boulder Overview*



SH 7 BRT Corridor Planning Process

The State Highway 7 BRT Station Area Planning Project was a collaboration between the local communities in the corridor: Brighton, Thornton, Broomfield, Lafayette, Erie, and Boulder, The Colorado Department of Transportation (CDOT), The Regional Transportation District (RTD) and Boulder County.

Over a six-month project timeline each community participated in a series of design workshops to determine future planning locations for Bus Rapid Transit (BRT) stations in the State Highway 7 corridor. The project was funded by a Denver Regional Council of Governments (DRCOG) Urban Center Studies/ Station Area Master Plans grant, with additional local contributions from corridor communities. The planning level concepts and planning level considerations for 15 possible BRT stations in the State Highway 7 corridor were prepared during this project based on the recommendations from the ***2018 Bus Rapid Transit Feasibility Study***. The information is intended to show challenges and opportunities associated with the BRT station planning areas in the corridor.

Stations are generally recommended at intersections, mobility hubs or in town centers due to proximity to existing and future development. Adjacent land uses were reviewed for identified or planned development- and for TOD potential- as defined by existing and likely future development patterns as well as local plans, policies, codes, etc. Conversations with communities also identified further considerations not covered in detail in this report but noted in the "Next Steps" section for consideration in future phases. This effort worked to built relationships, begin necessary conversations, and bring everyone to the table for the first step of many needed for the full realization of this BRT corridor

SH7 BRT CORRIDOR OVERVIEW

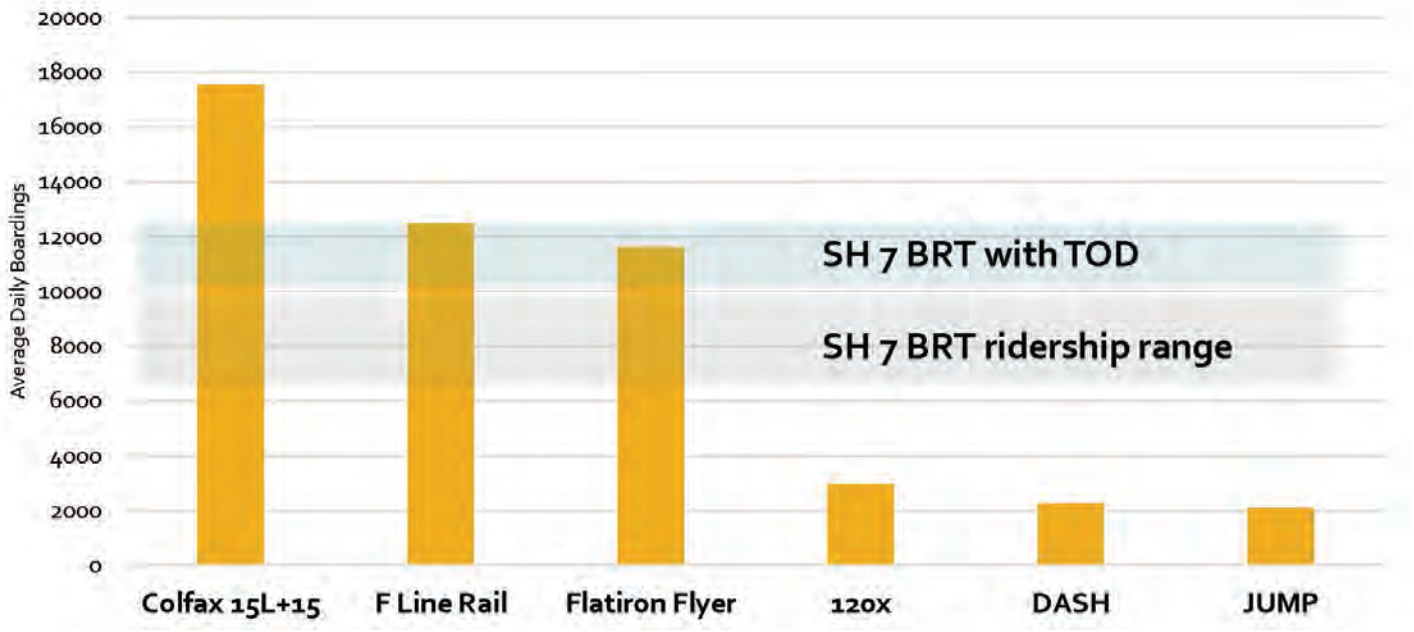
The State Highway 7 BRT planning corridor is approximately 30 miles in length. It is bound on the east in Brighton and on the west in downtown Boulder. There are approximately 18 stations envisioned in the corridor with an average station spacing of 2.5 miles. Communities have multiple stations that are connected to current or planned activity centers.

The ***2018 State Highway 7 Bus Rapid Transit Feasibility Study*** modeled two route patterns serving 12 stations. Numerous operating scenarios were evaluated to determine alternative station locations and to provide information about how BRT would perform in mixed traffic as well as in an exclusive or semi-exclusive right-of-way scenario. One route (Route Pattern 1 on the diagram below) runs between Brighton and Boulder along SH7. The other route (Route Pattern 2 on the diagram below) runs between Brighton and Boulder with a deviation from SH7 to stop at the Lafayette Park-N-Ride. It is possible for the two route patterns to operate concurrently along SH7 with the intent to complement RTD's existing and future bus services. Operating scenario details will be further refined in future studies along this corridor, but the routing patterns from the feasibility study can be seen below.

Diagram from *2018 State Highway 7 Bus Rapid Transit Feasibility Study*

Based on the findings in the ***State Highway 7 Bus Rapid Transit Feasibility Study***, peak service is intended to operate at seven and a half minute headways and off-peak service is envisioned at 15 minutes. The forecasted daily ridership in the corridor varies depending on the final configuration of the BRT right of way. The 2040 ridership forecasting based on ***2018 SH7 BRT Feasibility Study*** modeling is estimated to be between 6,400 and 9,800 people on a weekday basis.

Previous estimates completed during the ***State Highway 7 Bus Rapid Transit Feasibility Study*** estimated the planning level capital costs at approximately $324 million dollars.



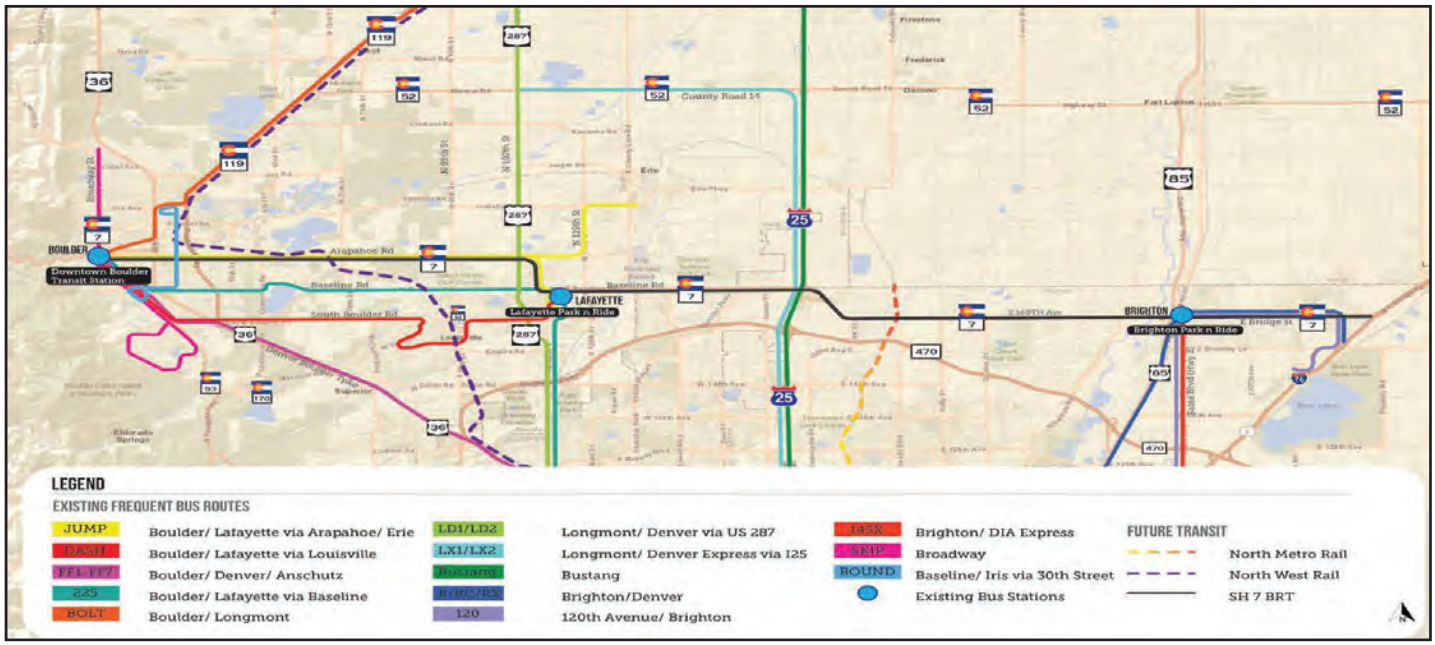


Diagram from *2018 State Highway 7 Bus Rapid Transit Feasibility Study*

The table on the previous page shows ridership ranges for peer transit corridors in the Denver region and the map above shows the routes of those transit lines that intersect SH7. The Colfax Avenue Route 15 and 15L in Denver is in the final stages of BRT planning.

As seen in the diagram above, the F line RTD rail connects Downtown Denver to Parker along I-25. The Flatiron Flyer BRT service operates along the US 36 corridor between Boulder and Denver. Route 120X connects Broomfield and Thornton to Downtown Denver via I-25. The Dash and the Jump are local RTD bus routes that connect Erie, Lafayette and Louisville to Boulder. The Jump currently operates in the western portion of the SH7 Corridor.

The chart below indicates the participants in the workshops that were held in the communities along the SH7 corridor as part of this ***State Highway 7 BRT Station Area Planning Project*** and the text discussion on the following pages provides a summary of the key considerations for the station locations that were studied during the process. Supplemental information can be found in the presentations that were utilized at design workshops with the communities.

PLANNING PROCESS ATTENDEES

Brighton	Thornton	Broomfield	Lafayette	Erie/ Lafayette	Boulder
Community Development Staff	City Development Staff	Community Development Staff	Public Works Staff	Town of Erie Staff	Public Works Transportation Staff
Public Works Staff	Infrastructure Staff	Economic Development Staff	Planning and Building Staff	City of Lafayette Staff	Planning and Development Services Staff
City Administration	Economic Development Staff	Engineering Staff	Boulder County Transportation Staff	CDOT Staff	Boulder County Transportation Staff
RTD Staff	RTD Staff	Planning Staff	RTD Staff	RTD Staff	East Arapahoe Community Working Group Representative
Adams County Public Works Staff	Adams County Public Works Staff	Capital Improvements Program Staff	CDOT Staff	Boulder County Transportation Staff	RTD Staff
	Land Owners and Developers	RTD Staff			CDOT Staff
		CDOT Staff			
		Land Owners and Developers			

BRIGHTON OVERVIEW

The City of Brighton has two proposed stations in the State Highway 7 BRT Corridor. The first station is at Bridge and 27th on the east side of downtown Brighton. The station would be part of a new development area that has a potential for transit-oriented development with a park and ride. The second station is in downtown Brighton. The downtown station is anchored by several historic buildings, retail, restaurants, and popular civic uses.

The downtown Brighton station location was studied at a few locations given the right of way constraints and challenging operational conditions on Bridge Street in downtown Brighton. The planning location for the downtown station was identified at Bridge and Main. This area will become an epicenter for the community as it is located in a new community plaza that is currently under construction.

In downtown Brighton there are several issues and opportunities associated with multimodal access, motor vehicle traffic and BRT vehicle dwelling that will need further consideration in future studies. In addition, the final location of the Park-n-Ride at Bridge and 27th will need additional review of drainage conditions, site access, and grading that were identified during this planning study.

THORNTON OVERVIEW

The City of Thornton will have two stations along the State Highway 7 BRT Corridor and share a station with Broomfield at the I-25 Mobility Hub. The Quebec station is on the east edge of Thornton and the Colorado station is in the center. Both stations will be at intersections and use the suburban intersection station designs (see next sections for details).

The Quebec station is at the corner of the intersection with land uses that are primarily single family residential with future Transit Oriented Development (TOD) opportunities in the southeast and southwest corridors. Trail connections between this station to the adjacent neighborhoods have been identified and will need further evaluation when the sites are developed.

Planning level concepts for a bridge over or underpass under SH7 at the BRT station were also prepared. It will be critical to further evaluate where the SH7 BRT station will be located and how first and final mile mapping can be implemented over time. The Colorado Station planning concepts include options that are “in-line” on the SH7 corridor and others that are located in the proposed TOD on the north side of State Highway 7.

During the design workshops the planning staff, land owners, CDOT and RTD collaborated on options that will need further consideration. This includes details on multimodal access, optimal location for bus routing, parking and the interface with the North Metro Rail station. Thornton’s third station is shared with Broomfield at the I-25 Mobility Hub. The parking for the I-25 mobility Hub is currently identified on the eastern side of I-25 in the City of Thornton. This area will also require additional multimodal connections as outlined in the first and final mile mapping that was completed for this project. Additional information about the I-25 Mobility Hub can also be found on pages 74 &75.

BROOMFIELD OVERVIEW

There are three stations planned in the City and County of Broomfield along the State Highway 7 BRT corridor. The first station is shared with Thornton at the I-25 Mobility Hub. This location will be adjacent to new commercial and residential uses that are currently under development review. Details about this I-25 Mobility Hub can also be found on pages 74 & 75 of this report.

All of the Broomfield SH7 BRT station areas will have significant changes in population and employment in the coming decades. The forecast is approximately 25,000 new residents and 1 million square feet of new commercial uses near the three station areas. This includes a new University of Colorado Health Services Center. Since the areas around the three stations are still under review, the final roadway alignments have not been determined.

During a workshop with stakeholders, staff, and developers, many station options were considered. These include a station at Huron/ Palisade and another at Sheridan Parkway. Additional study is required at both of theses stations to determine the final locations, parking needs and how each would allow for TOD. Additional study is also required to integrate TOD best practices such as walkable station locations, shared parking, structured parking, first and final mile connections and shared ride services.

The planning concepts and considerations identified in this document utilize suburban intersection station designs as a template for more detailed study. Future studies should also consider the first and final mile connections that were prepared during this study. Interconnected transit services, safe walking, citywide trail connections, and on-street bike connections will be critical to people who will make first and final mile connections to and from destinations in this rapidly changing area.

LAFAYETTE OVERVIEW

The City of Lafayette could have up to four possible BRT stations along the State Highway 7 corridor. These possible stations include the 119th and State Highway 7 intersection (shared on one corner with Erie), the Lafayette Park-n-Ride on Public Road, the intersection of Public Road and State Highway 7, the Arapahoe Road and US 287 area, and the 95th and State Highway 7 intersection. The 119th intersection is currently under consideration for improvements that include first and final mile connections, BRT stops, and new roadway geometry that could accommodate future BRT lanes.

The State Highway 7 Feasibility Study identified local and regional BRT routing at the 119th intersection. The regional routing would not turn at this intersection and proceeds to use the east and west bound lanes. The local BRT routing would make turns at this intersection to access the Lafayette Park-n-Ride. Provisions for the local regional BRT routing will be considered in 119th intersection designs. The local BRT routes will make connections at the Lafayette Park-n-Ride. The Lafayette Park-n-Ride is currently being redesigned by RTD to include enhancements that will be constructed in the coming years. This includes accommodations for future interconnected local and regional transit. The Public Road station could serve the local and regional SH7 BRT routes.

The Public Road station is adjacent to the current RTD Jump stops near the Public Road and Baseline Road (SH7) intersection. The Public Road station was given specific consideration during design workshops with city staff, CDOT and RTD given the adjacent land uses, limited right of way and roadway geometries. The Public Road station will require new designs that include first and final mile facilities, bus shelters, pedestrian waiting amenities, lighting and the repurposing of a possible historic building for a station in the future.

Lafayette will also share a SH7 BRT station with Town of Erie near the Arapahoe and US 287 intersection. This station is detailed in the next section.

The 4th Lafayette station that was studied during this planning effort is envisioned at the 95th and Arapahoe intersection. During this station area study process it was determined that the 75th and Arapahoe station, identified during the ***State Highway 7 Feasibility Study***, could serve more of the current and future population if it were relocated to the 95th and Arapahoe intersection. The planning designs at the 95th and Arapahoe intersection would enhance multimodal connections, provide higher quality passenger waiting areas and integrate connections to the adjacent commercial centers. This includes connections to the YMCA, employment centers and local retail that exists at this intersection.

ERIE OVERVIEW

The Town of Erie's primary station will be located at the Arapahoe and US 287 intersection. This intersection is a key location in the State Highway 7 corridor operations plans. This intersection is one of the few places in the corridor that requires turning movements. Likewise, this is one of the few stations that spans two communities on adjacent sides of the streets.

The ***State Highway 7 Bus Rapid Transit Feasibility Study*** did not include specific details on location geometries, operations, parking and first and final mile details for the Arapahoe and US 287 station. A collaborative workshop with staff from Erie, Lafayette, Boulder County, CDOT, and RTD identified multiple station options that could be considered in future planning efforts. The planning level concepts for this area are shown later in this document. The planning options demonstrate what is possible and provide considerations for future study.

Many of the options allow both Erie and Lafayette to build TOD that support increased placemaking, BRT ridership, and economic vitality. Additional study in this area will be required with the stakeholders to determine the final station location that best meets the needs of both communities.

BOULDER OVERVIEW

The City of Boulder has up to seven possible stations along the State Highway 7 BRT corridor. During this study four specific stations received planning level design review given budget time constraints. All of the concepts will need additional consideration from CDOT, RTD and City of Boulder stakeholders. The four stations that were reviewed are near the 63rd and Arapahoe intersection, the 55th and Arapahoe intersection, the 48th and Arapahoe intersection and the 28th and Arapahoe intersection.

The 63rd and Arapahoe station planning concept includes new multimodal designs based on the City of Boulder's recently completed East Arapahoe Transportation Plan. That study recommended outside Bus, Business Access and Turn Lanes (BAT lanes), multi-use paths and protected bikeways in the corridor. Based on this framework, planning concepts at the 63rd and Arapahoe intersection were prepared. The planning concepts highlight how the first and final mile amenities, station area designs, and BAT lanes interface with the existing right of way and structures. Based on the planning concepts at this intersection, it may be difficult to construct all of the first and final mile amenities within the current right of way. Additional design studies will need to make compromises and collaborate with adjacent property owners.

The 55th and Arapahoe intersection also used the recommendations from the ***East Arapahoe Transportation Plan*** to identify where new amenities for people walking and biking to the station could be located. This includes the use

of protected intersections. The planning studies also considered the space requirements for passenger waiting areas that are consistent with BRT projects. The planning concepts show what could fit within the existing right of way and areas where additional study and considerations are needed. The 55th and Arapahoe station area has several driveway access points that also need additional consideration in future studies.

The 48th and Arapahoe station planning concept includes a semi-protected design that integrates first and final mile facilities based on the ***East Arapahoe Plan***. This area also has right of way considerations that will need additional study to determine how all amenities could be provided.

The 29th and Arapahoe intersection was the final intersection studied during this planning effort. Currently there are local and regional RTD transit stops at 30th and Arapahoe and 28th and Arapahoe. 29th and Arapahoe was chosen for planning study as it provides close proximity to both intersections. Many of the BRT station amenities can fit at this location. Likewise, most of the first and final mile connections are established from the 29th and Arapahoe intersection. Additional study of the first and final mile connections and ridership patterns from the RTD stops at the 29th and 28th street intersections should be considered to determine the optimal location for the SH7 BRT station in this area.

IN THIS SECTION:

- *On-Street Stations*
- *Right Turn Island Stations*
- *Park-n-Rides*

4

SH 7 BRT Station Typologies

The following section outlines BRT station typologies that can be used throughout the State Highway 7 (SH7) BRT corridor.

These typologies are provided as a planning tool to use in future years to ensure the areas near the stations are developing and redeveloping with planning envelopes for the future SH7 BRT stations. Typologies also help establish universal designs for stations that increase visibility, predictability, and safety for all users. The typologies provide planning information that can be applied to stations that have similar land uses, roadway geometry, traffic control, or right of way contexts. The typologies in this study will require additional engineering detail as part of future design projects.

Each of the typologies includes space planning details and design considerations for the SH7 BRT station areas. They augment the approved Regional Transportation District (RTD) design manual details and recent recommendations from the RTD ***First and Final Mile Study***. This includes but is not limited to passenger waiting area amenities, locations for public information displays, bicycle parking, pedestrian facilities, local route connections, shared mobility parking, and motor vehicle parking (where applicable).

The typologies should be used for planning purposes until additional design engineering studies are completed.

STATION TYPOLOGY	BASE AMENITIES INCLUDED	PLANNING LEVEL COST
Park-n-Ride	TNC Area RTD Bus Bay Passenger Amenities Bike N Ride Shelters Sidewalks Bikeways Vehicle Parking Internal Roads Connection to Multimodal Network Shared Use Micromobility	$650K-$800K Costs range from surface lots to parking structure costs
On-Street Station	Footprints for BRT Stations Intersection Geometry/ Signal Needs Intersection Signal Operations Shared Use Micromobility	$150-$300K for two stations
Right Turn Island Stations	Footprints for BRT Stations Intersection Geometry/ Signal Needs Intersection Signal Operations ROW Considerations and Needs Shared Use Micromobility	$400-$800K for two islands

ON-STREET STATIONS

Boulder, Lafayette and Brighton have several potential on-street station areas. On-street stations are typically found in developed locations that have been built to the extents of the current right of way. These stations have adjacent land uses that are within 25 feet of the right of way with parking located behind the buildings. The current conditions include wide sidewalks with some design treatments. The adjacent roadway travel lanes have limited setbacks from the station areas. In many instances the right and thru lanes are near attached sidewalks. Most have posted speed limits less than 35 mph.

These station types might be challenged to incorporate all of the standard passenger waiting amenities, such as public information displays (PIDs), bicycle parking and shared mobility parking, into the current right of way. In most situations detailed station designs will need to prioritize the limited space. Staff will need to proactively collaborate with adjacent land owners to identify easement opportunities and compromises might need to be made in these areas. These stations do not provide motor vehicle parking unless there is a shared use agreement with private land owners that have parking in the area.

RIGHT TURN ISLAND STATIONS

A majority of the stations in the SH7 BRT corridor will be at intersections with right turn islands. The right turn island stations are typically found in undeveloped locations that have right of way (ROW) available to construct right turn islands based on the recommendations in the ***2014 State Highway 7 Planning and Environmental Linkage Document*** (PEL). These stations have land uses that are setback more than 25 feet from the future right of way. If there are current or planned parking areas, they will be located between the SH7 BRT station areas and the front of buildings in many instances. The future conditions will include wide detached sidewalks, multi-use paths, pedestrian scale lighting, and urban design treatments. The adjacent roadway travel lanes have setbacks from the station areas in most instances. In all instances the right and thru lanes are separated and provide large islands for the SH7 BRT station areas. The adjacent roadways typically have posted speed limits higher than 35 mph.

The length and width of right turn islands for these stations have been increased from the standard turn lane designs in order to incorporate BRT station features. The islands also have tighter turning radii and raised medians to reduce vehicle speeds and alert drivers of pedestrian crossings.

As shown, some of the first and final mile amenities are located outside of the right turn island stations. The right of way at each station will require additional evaluation to determine the final location of each feature. Provisions for electrical supply, drainage, and maintenance will need to be identified during the final design. In general, these stations do not provide motor vehicle parking. To do so requires a shared use agreement with private land owners that have parking in the area.

PARK-N-RIDES

The ***State Highway 7 Bus Rapid Transit Feasibility Study*** identified RTD Park-n-Ride opportunities in Erie, Lafayette, Broomfield and Brighton. The proposed Park-n-Ride typologies shown in this planning document studied those locations and applied the current RTD design and construction standards. However, specific consideration of how future surface parking at the RTD Park-N-Rides could be converted into structured parking as part of Transit Oriented Development (TOD) is included in the typology.

Most of the land adjacent to stations in the corridor is privately owned. It is recommended that staff in each community continue to collaborate with land owners to plan for transit ready developments, identify existing underutilized parking that can be shared with future stations, and work with pending developments to prepare joint agreements for TOD. Additional study is required at all of the stations to integrate TOD best practices such as walkable station locations, shared parking, structured parking, first and final mile connections and shared ride services.

Examples of these three station typologies can be seen on the following pages. Full size images of Figures 01, 02 and 03 can be found in Report Appendix, pages 138, 139 & 136.

FIGURE 01
On-Street Station

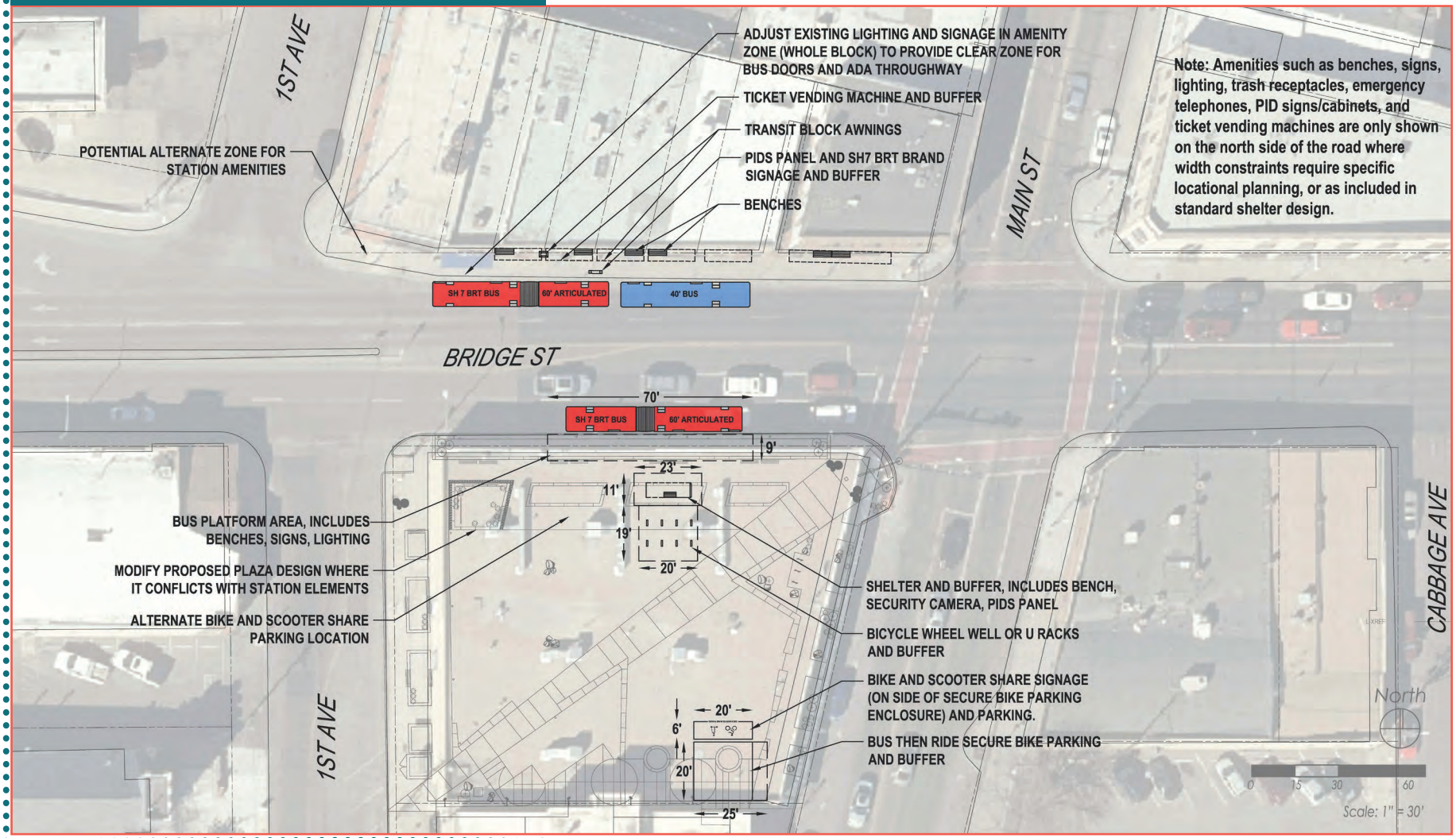


FIGURE 02
Right Turn Island Station

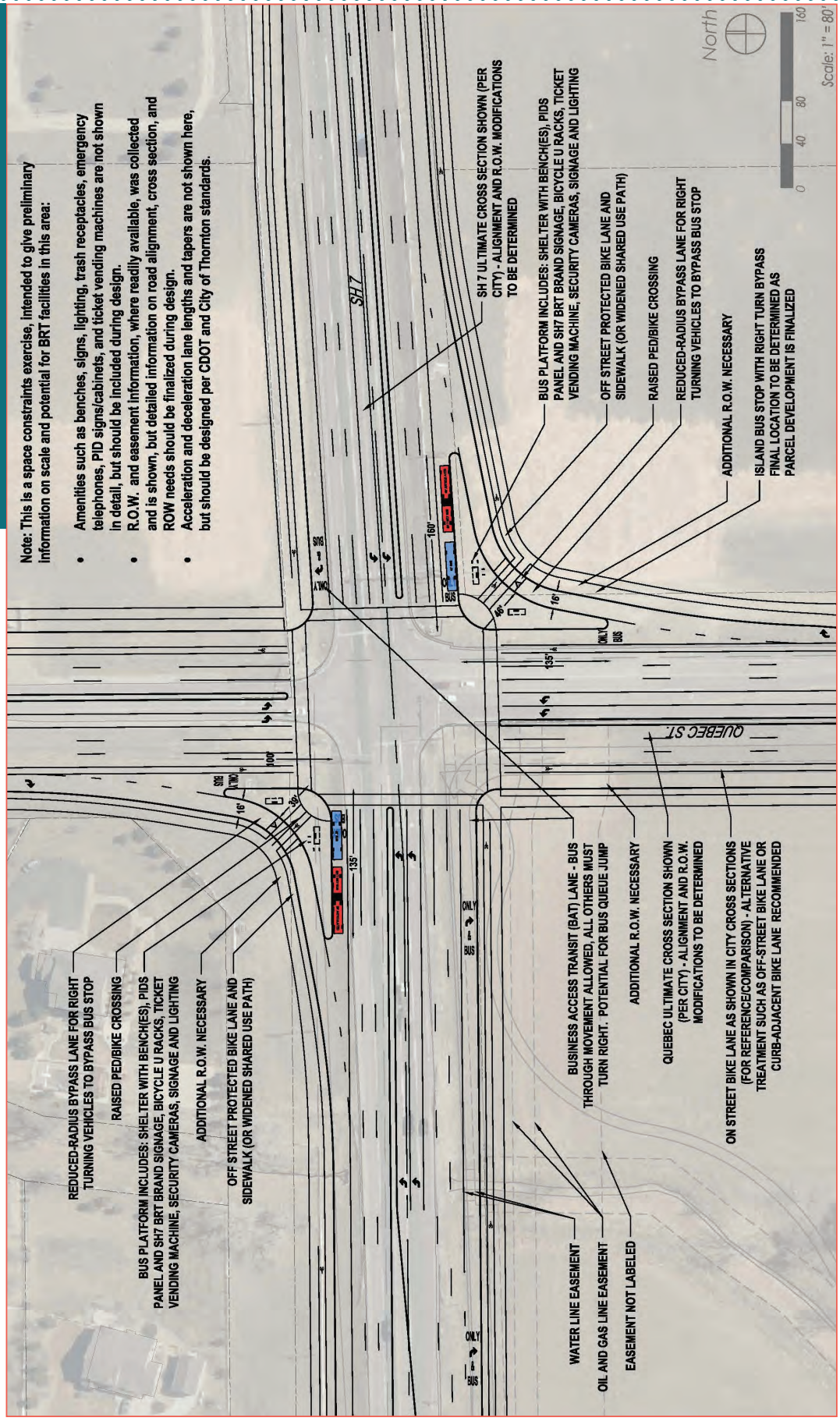
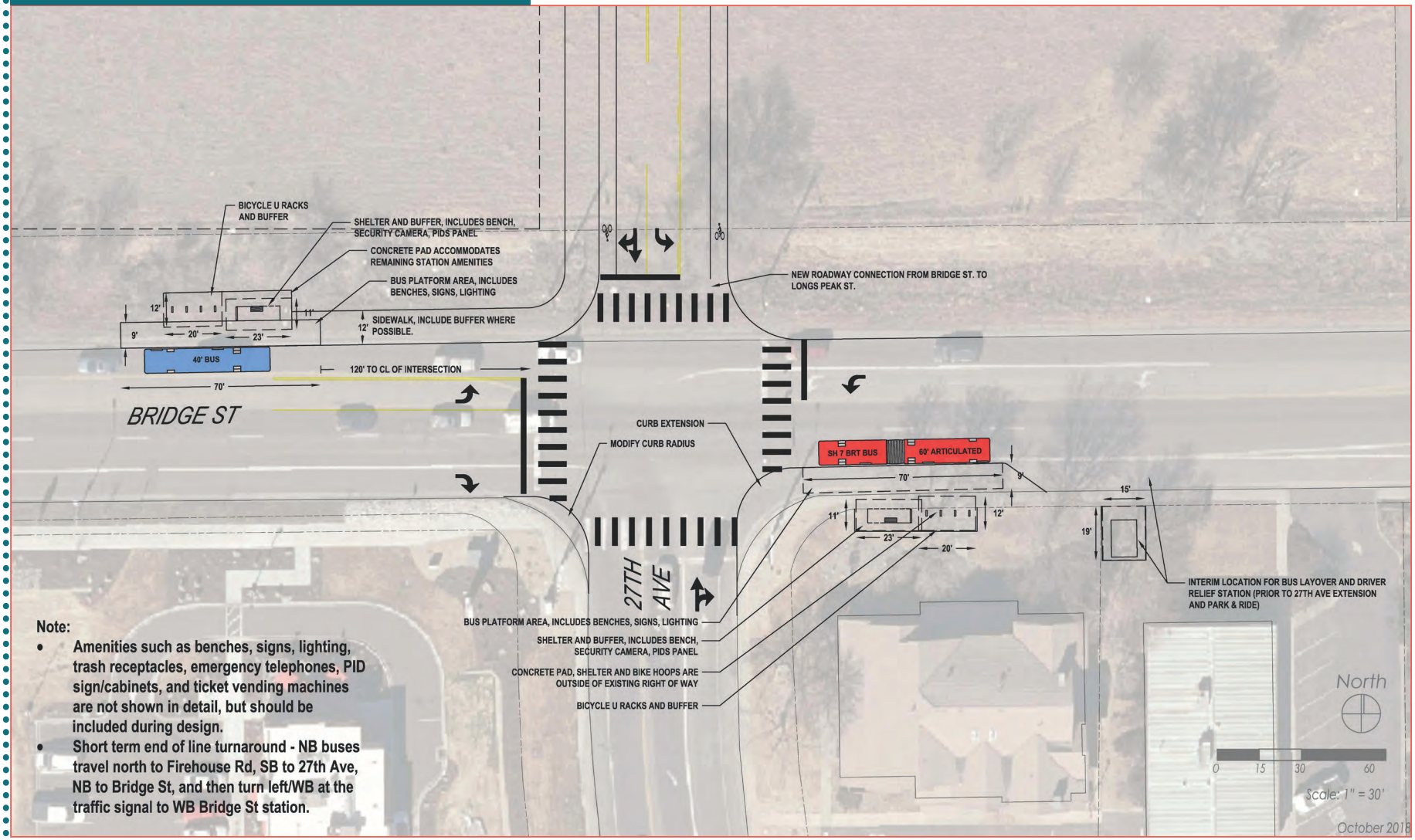


FIGURE 03

Park-N-Ride Station



Note:

- Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID sign/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
- Short term end of line turnaround - NB buses travel north to Firehouse Rd, SB to 27th Ave, NB to Bridge St, and then turn left/WB at the traffic signal to WB Bridge St station.

IN THIS SECTION:

- *Brighton*
- *Thornton*
- *Broomfield*
- *Lafayette/ Erie*
- *Boulder*

5

Communities

Brighton

STATION DETAILS

BRIGHTON BRT STATION OVERVIEW

The City of Brighton is the planned eastern terminus of the State Highway 7 BRT route. The ***State Highway 7 Bus Rapid Transit Feasibility Study*** identified two stations in the City of Brighton. The eastern most station in Brighton is located at Bridge Street and 27th Avenue and the other station is at Bridge Street and Main Street. The Bridge Street and 27th Avenue station was also identified as the end of the SH7 BRT Corridor. The Stations have different land use context, traffic patterns, first and final mile access, and stations designs as outlined on the following pages.

The stations have different land use context, traffic patterns, first and final mile access, and station designs as outlined in the following pages.

The Bridge Street and 27th Avenue station is proposed in this plan with an interim on-street station and a longer-term transit oriented development (TOD) off-street station. The interim on-street station allows buses to make the required turning movements to provide westbound service. It also provides a dwelling area for the buses and a place for a driver break. The interim station is critical to allow the service to begin while the City of Brighton conducts additional drainage and environmental engineering analysis for the off-street TOD station. The following provides specific details for each station.

TRAFFIC AND SAFETY CONSIDERATIONS

The existing roadway cross-section is transitioning in the vicinity of 27th Avenue, with four through lanes to the west and two through lanes to the east. The design of the 27th Avenue station will need to account for future widening in the area to include four lanes. The traffic volume west of 27th Street is currently

23,000 vehicle per day, and traffic is typically traveling between 40 and 45 mph. The signalization of the intersection of Bridge Street and 27th Avenue has mitigated the broadside crashes that were occurring with stop sign control. Bridge Street has four through lanes in the vicinity of Main Street and carries approximately 25,000 to 30,000 vehicles per day. The signalized intersection of Bridge Street and Main Street operates reasonably well during peak hours, with the east-west vehicle queues typically clearing the intersection on each signal cycle. No significant vehicular crash pattern was identified, and there are currently few bicyclists or pedestrians crossing through the intersection during peak hours of the day.

BRIDGE STREET AND 27TH AVENUE DESIGN SUMMARY

As noted previously, the 27th Avenue and Bridge Street station was designed to be constructed in two phases: phase one with on-street BRT stops and phase two with an off-street TOD station. These facilities and reasoning for their development are summarized below.

- Phase One (Figure 04) - On-street stops just east and west of 27th Avenue intersection are intended to be installed in the short term with potential use after an off-street facility is built as well. The westbound stop is an in-line stop in the only westbound through lane under current and near-future conditions. The platform is offset to the west of the intersection per RTD's request to allow for northbound left-turn traffic having to clear the intersection once a southbound leg is constructed. The eastbound stop includes a bumpout in what is currently the acceleration lane to allow buses to stop in the outside eastbound through lane, provide additional space for a loading platform, and reduce pedestrian crossing distance. The shelter and bike racks are currently shown at or behind the existing sidewalk to allow adequate sight distance and reduce the number of fixed objects within the existing curblines; however RTD has noted that these amenities have been included in bumpouts in other locations. The westbound stop also includes a driver relief station (DRS) slightly to the east to accommodate driver needs while this stop is an end-of-the-line facility. This driver relief station is also shown outside of the existing right of way (ROW), while waiting buses would dwell in the "shadow" of the bumpout. Turnaround routing would be via right turns on Firehouse Road and 27th Avenue. These in-line stops would also be ideal in the future if additional stations were installed to the east.

- Phase Two (Figure 05) - An off-street station with potential for parking, bus bays, structured amenities, and TOD is planned for the northwest corner of Bridge Street (SH7) and 27th Avenue. This plan includes an initial surface park and ride to be utilized during construction of the longer-term structured station. The structured station would include bus bays for loading and dwell/layover locations for 60' articulated buses (can be used for 40' buses as well) as well as

typical end-of-line amenities such as secure bike parking, enclosed/covered waiting areas, DRS, security, lighting, and signage on the first level. Upper levels accessed via separate driveway(s) would be for RTD patron or mixed-use parking. This facility also provides significant opportunity for wrapped or adjacent TOD. This structure was sited as shown in the space constraints plan (Figure 05) with the understanding that significant coordination/ modification to future stormwater facility locations would be necessary. As such, the location or orientation may change.

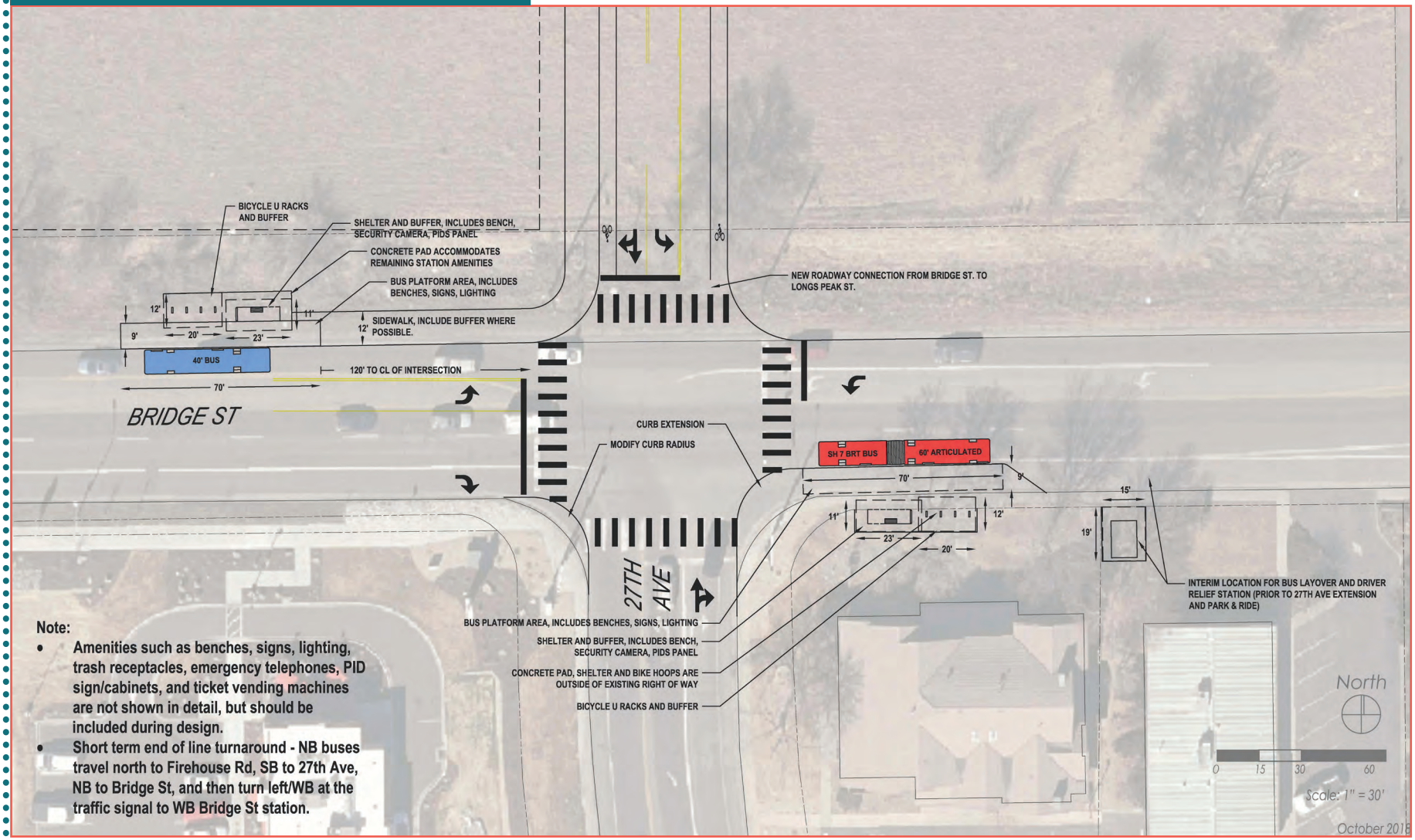
BRIDGE STREET AND MAIN STREET DESIGN SUMMARY

The Bridge Street and Main Street Station (downtown Brighton) includes eastbound and westbound in-line stations, with buses stopping in the outside of two through lanes. The westbound platforms will utilize existing sidewalk space on the north side of Bridge Street between Main Street and 1st Avenue. Due to constrained width between the existing face of curb and face of building, enhanced and unified awnings on the existing buildings are proposed for the whole block in lieu of traditional shelters, creating a "transit block." In addition, unified lighting, signage, and benches would be installed and modified (if existing) to provide clear space for loading and unloading.

The eastbound stop platform and amenities are shown as modifications to the proposed concept design for a new downtown plaza south of Bridge Street, between 1st Avenue and Main Street, where the existing building will be removed. The station would include a shelter, bike parking (including secure bus-then-bike shelter), future bike and scooter share parking zone, and platform space integrated into the plaza design. The bus-then-bike shelter is shown at the southeast corner of the plaza to take advantage of proximity to the mid-block pedestrian crossing and future Main Street bike lanes, as well as to reduce impact to the plaza design.

**Full Size Images of Figures 04, 05 and 06 can be Found in Report Appendix, Pages 137, 136 & 138.*

FIGURE 04
Bridge St. & 27th Ave



Note:

- Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID sign/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
- Short term end of line turnaround - NB buses travel north to Firehouse Rd, SB to 27th Ave, NB to Bridge St, and then turn left/WB at the traffic signal to WB Bridge St station.

FIGURE 05
Bridge St. & 27th Ave

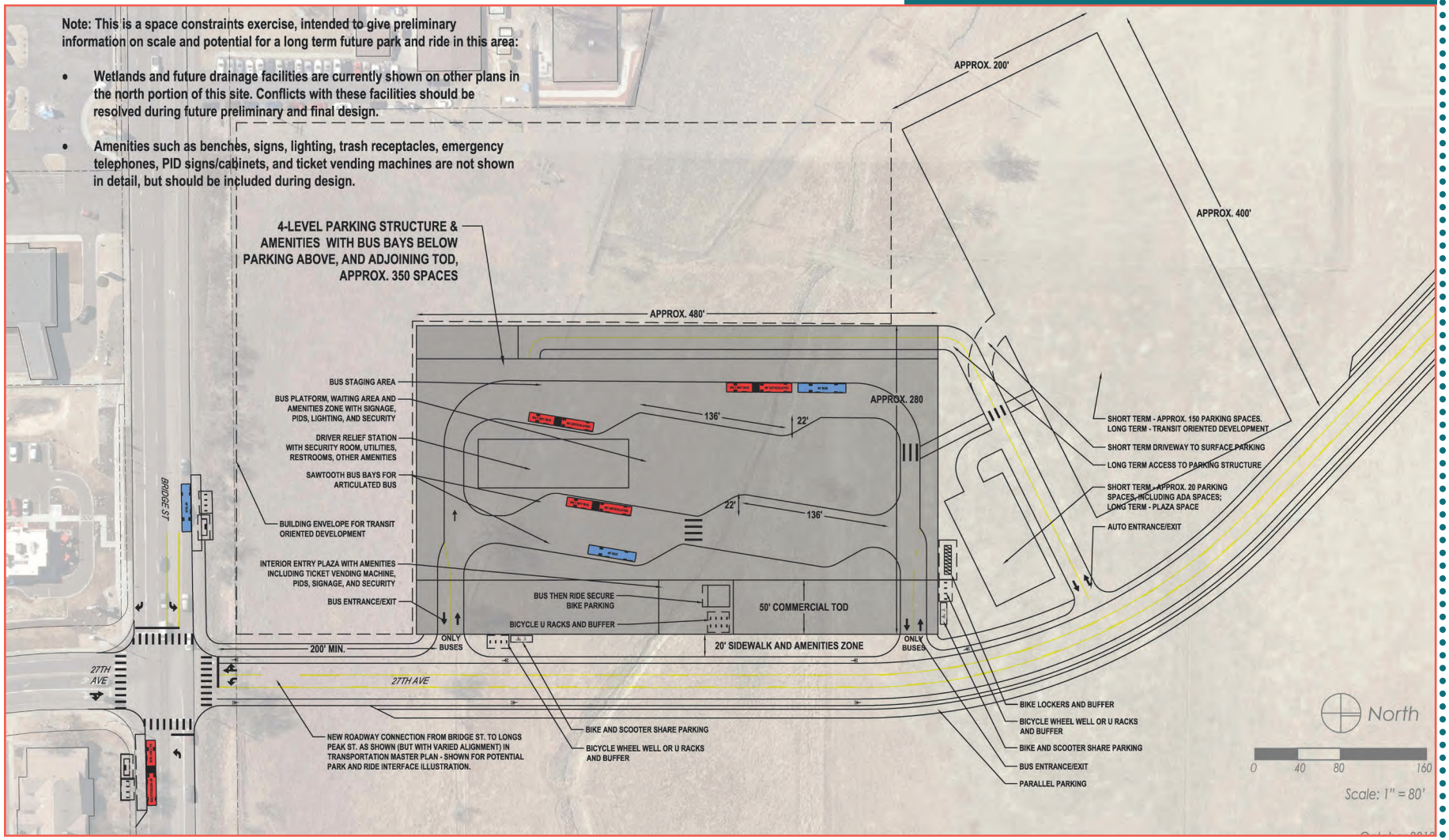
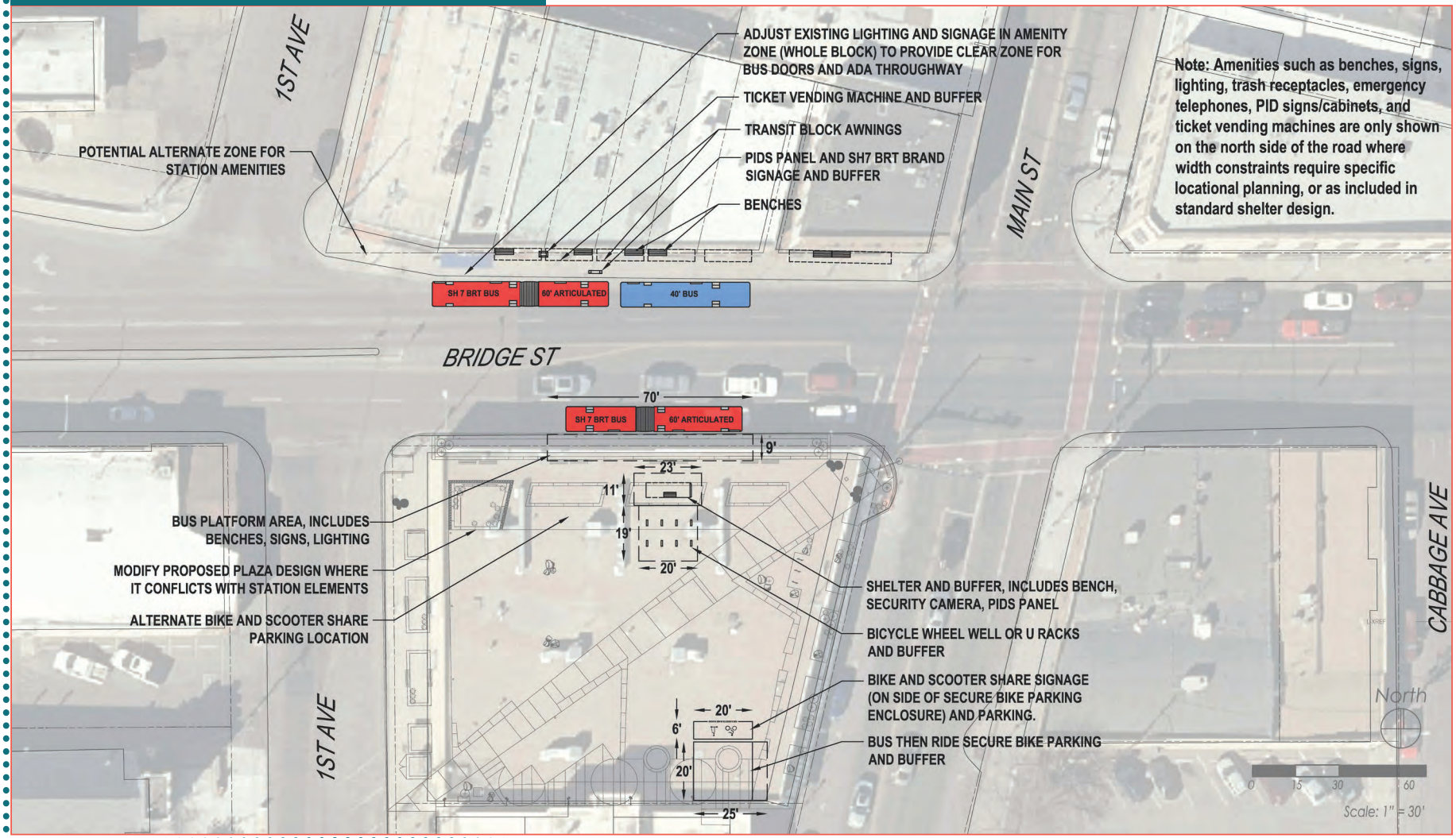


FIGURE 06
Bridge St. & Main St.



FIRST AND FINAL MILE (FFM) SUMMARY AND ACTIONS

The two station locations in the City of Brighton bring a unique opportunity for first and final mile connectivity. Since this area is currently one of the most built up on the corridor, the station connection options are more defined by the existing downtown/urban form. First and Final Mile (FFM) recommendations for Brighton are focused on increasing bicycle and pedestrian connectivity. Additional techniques to explore for first and final mile connectivity are other mobility options, like scooters and bike share. The dockless version of these sharing mobility options allow users to easily go from Point A to Point B with little detour needed to start or end a trip on their mobility device.

- Bridge and 27th - The proposed station location for the Bridge and 27th station is on the eastern edge of Brighton. Getting bicyclists to the station location from existing neighborhoods is accomplished through the use of arterial bicycle networks. The arterial routes are Longs Peak Street, Egbert Street, Proposed 27th Street, 22nd Avenue, Southern Street, and Bridge Street (State Highway 7). Additional treatments could be implemented on collector routes to the arterials. Those routes will need to be evaluated.

  The recommendations for these routes are primarily bicycle lanes. A sidepath (multi-use path that parallels the roadway) is recommended for Bridge Street due to volumes and speeds on the road. The other roads will need to be evaluated for the appropriate treatment based on speeds and volumes on the roadway.

  Since these stations can be placed in vacant land with more space, a secure bicycle parking structure should be implemented with the station.

- Bridge and Main Street - The proposed station location at Bridge and Main is extremely constrained with narrow sidewalks and building frontage right on the edge of the Right-of-Way (ROW). This high usage area can be very congested during peak hour travel times. Due to the constrained nature of the space, first and final mile access to the station is proposed be through the use of side streets, Main Street, and a newly suggested potential Rail-with-Trail.

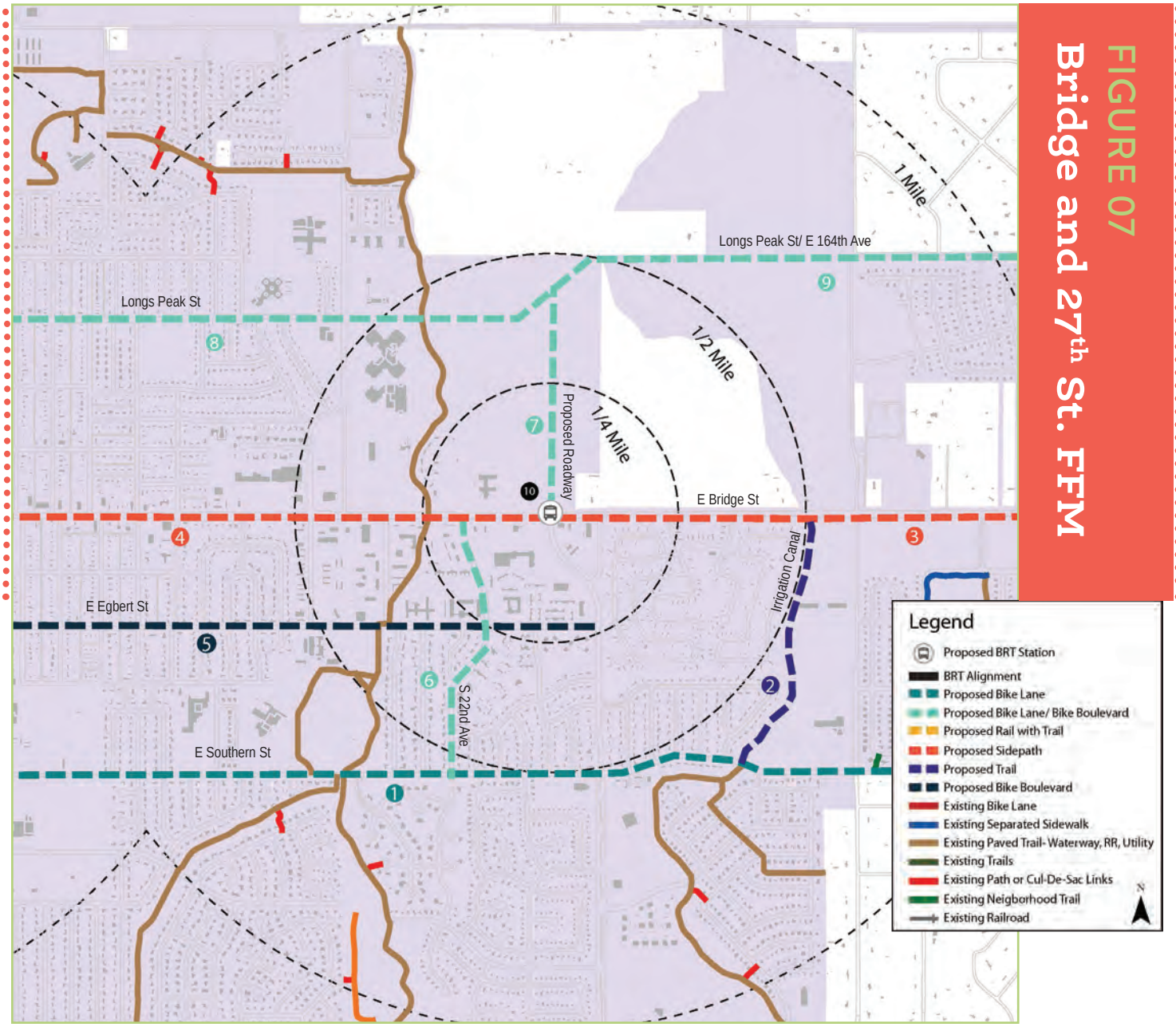
  The arterial routes identified for this station are Main Street, Egbert Street, Southern Street, 4th Avenue, and Longs Peak Street. Egbert and Longs Peak are extremely important as they are two of the few roads that cross the railroad tracks and connect existing residential to Main Street. Main Street will need to be evaluated based on speeds and volume for the appropriate bicycle facility, but a bike lane is recommended at a minimum.

  A plaza being constructed on the south side of Bridge could be a host to the station amenities, like secure bicycle parking, if space allows.

Secure bike parking, such as secure bike structures that allow for more bikes to be parked securely at the station in a smaller space, will be needed at stations. Also providing space for dockless mobility devices to be parked in the same area will be needed. Sidewalk gaps also need to be evaluated, both with respect to pedestrian/ bike access and Americans with Disabilities Act (ADA) accessibility, and filled accordingly.

Full Size Images of FFM Figures 07 and 08 can be Found in Report Appendix, Pages 153 & 154.

FIGURE 07
Bridge and 27th St. FFM



Recommendations

1 Proposed Bike Lane on E Southern Street
Southern Street provides good east-west connectivity. Needs bike lanes due to roadway volumes.

2 Proposed Trail Adjacent to Irrigation Canal
Continue the existing trail along canal to provide north-south connectivity.

3 Proposed Sidepath on E Bridge Street
Adding a sidepath will allow connectivity from the station to adjacent businesses.

4 Proposed Sidepath on E Bridge Street
A sidepath into the core of the city will allow bicycles and pedestrians to access businesses and residences along Bridge Street.

5 Proposed Bike Boulevard on E Egbert Street
This bike boulevard will provide connectivity in a low-speed, low stress roadway.

6 Proposed Bike Lane on S 22nd Avenue
A bike lane on 22nd Avenue will connect proposed facilities on Egbert and Southern Street to the station.

7 Proposed Bike Lane on Proposed Roadway
If the area north of the station develops, a bike lane should be implemented on the roadway to create better access from the north to the station.

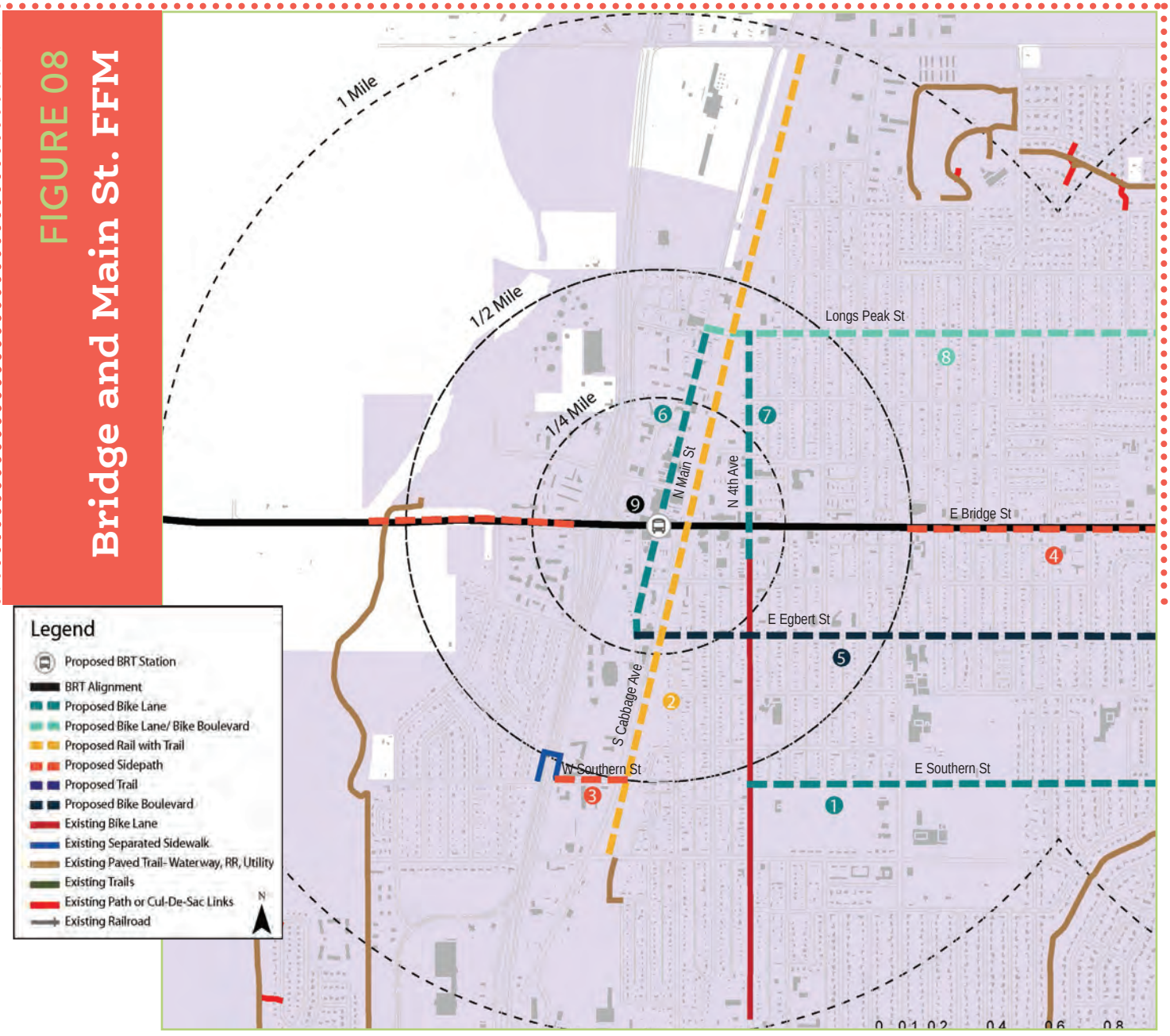
8 Proposed Bike Lane/ Bike Boulevard on Longs Peak Street
The facility on this northern east-west street is dependent on motor vehicle traffic volumes. This is one of the few streets that crosses the tracks near the core of the city.

9 Proposed Bike Lane/ Bike Boulevard on E Longs Peak Street/ E 164th Avenue
The extension of the bike lane or bike boulevard onto 164th Avenue will provide continuity of a major east-west connection in the city.

10 Secure Bicycle Parking at the Station
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

11 Sidewalk Gap Identification and Remediation
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major corridors for walking and then branch to feeder routes to those corridors.

FIGURE 08
Bridge and Main St. FFM



Recommendations

1 Proposed Bike Lane on E Southern Street
A bike lane on Southern Street helps provide connectivity from residences to both proposed stations and existing facilities

2 Proposed Rail with Trail on S Cabbage Avenue
Creating a rail with trail will allow a trail to share right-of-way with the rail and creates a trail with minimal road crossings.

3 Proposed Sidepath on W Southern Street
This small sidepath will connect the existing bike/ped bridge over the highway to a proposed rail with trail.

4 Proposed Sidepath on E Bridge Street
A sidepath will connect businesses along Bridge with proposed stations. Space may not allow a sidepath in the city core.

5 Proposed Bike Boulevard on E Egbert Street
Only two streets cross the tracks other than Bridge Street. This roadway will serve as the bike/ped arterial to the city core for people south of Bridge Street.

6 Proposed Bike Lane on N Main Street
To connect the bike/ped arterials to the station, a facility will be needed on Main Street. This will also benefit the city core, making it more walkable/ bikeable.

7 Proposed Bike Lane on N 4th Avenue
Extending the existing bike lane to Longs Peak Street will provide alternate routes to Main Street to access the station.

8 Proposed Bike Lane/ Bike Boulevard on Longs Peak Street
The facility on this northern east-west street is dependent on motor vehicle traffic volumes. This is one of the few streets that cross the tracks near the core of the city.

9 Secure Bicycle Parking at Station
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

10 Sidewalk Gap Identification and Remediation
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major corridors for walking and then branch to feeder routes to those corridors.

TRANSIT ORIENTED DEVELOPMENT (TOD) REVIEW

Brighton is largely built out along the SH7 corridor. Their comprehensive plan does, however, call for infill and redevelopment of parcels on the corridor and encourages the construction of complete streets with high quality facilities for people using all modes. These strategies will help in supporting BRT and will ensure high quality access to BRT stations in Brighton.

» Bridge and 27th Street - The proposed station location for the Bridge and 27th station is on the eastern edge of Brighton. The land to the north of the proposed station location is largely undeveloped agricultural land with a couple of residences and the Riverdale Rehab and Care Community of Brighton. While the Rehab and Care community will likely remain where it is, the surrounding undeveloped land represents a High Potential Opportunity for Transit Oriented Development that would both support the BRT and greatly benefit from the station proximity.

The area to the south of the Bridge and 27th Station location is largely developed. It has some existing apartments, relatively high-density single-family home developments and an assisted living facility that would already support the BRT line and use this future station (seen in grey on the map below). The land directly south of the station (seen in medium blue on the map below) is developed with some small businesses and business strips in large parking lots. This area represents a Medium Potential TOD Opportunity as there are already existing businesses but due to the parking lots and the spacing of buildings there is still potential for additional supporting density to develop in the future. The areas to the southwest of the station

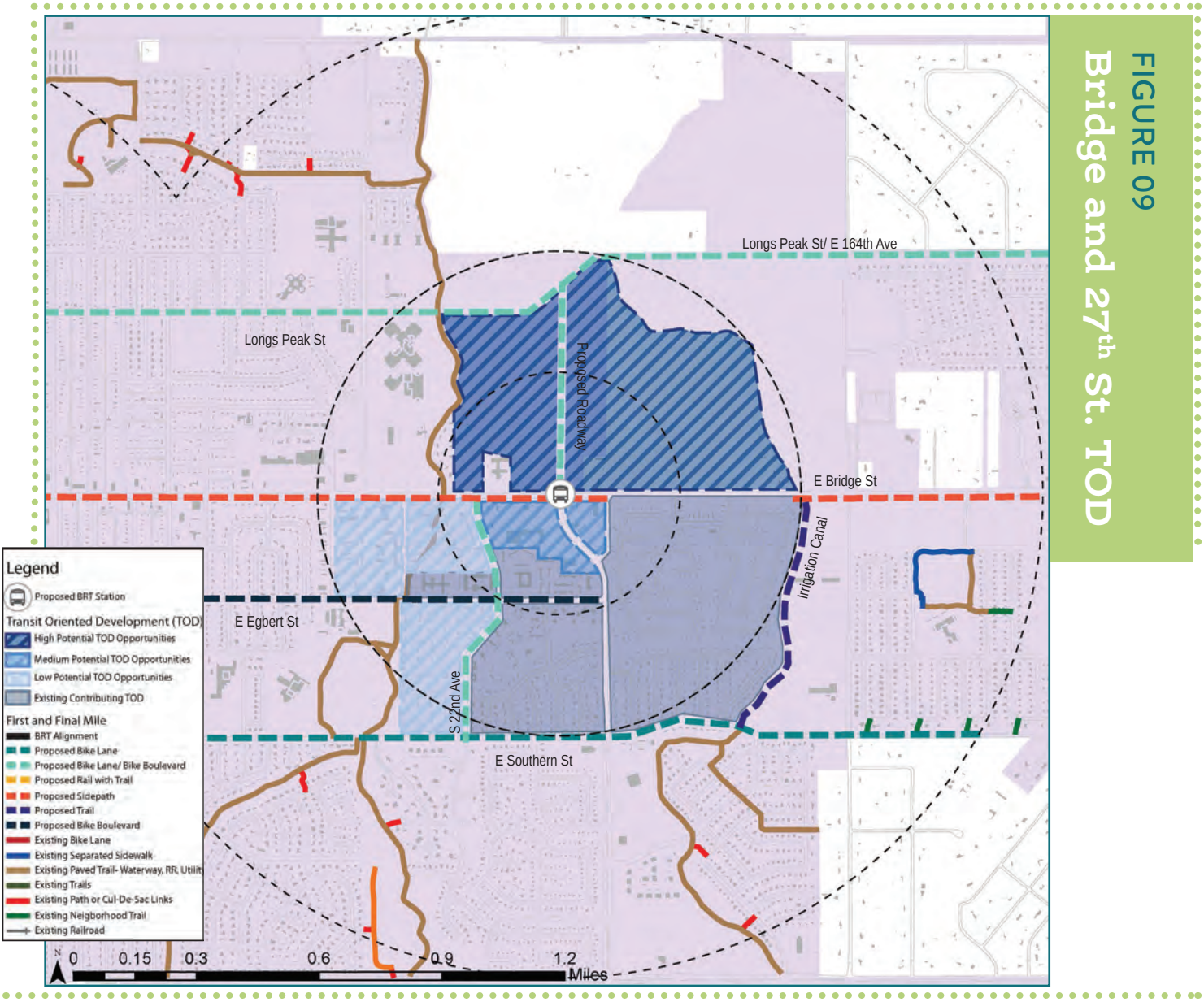


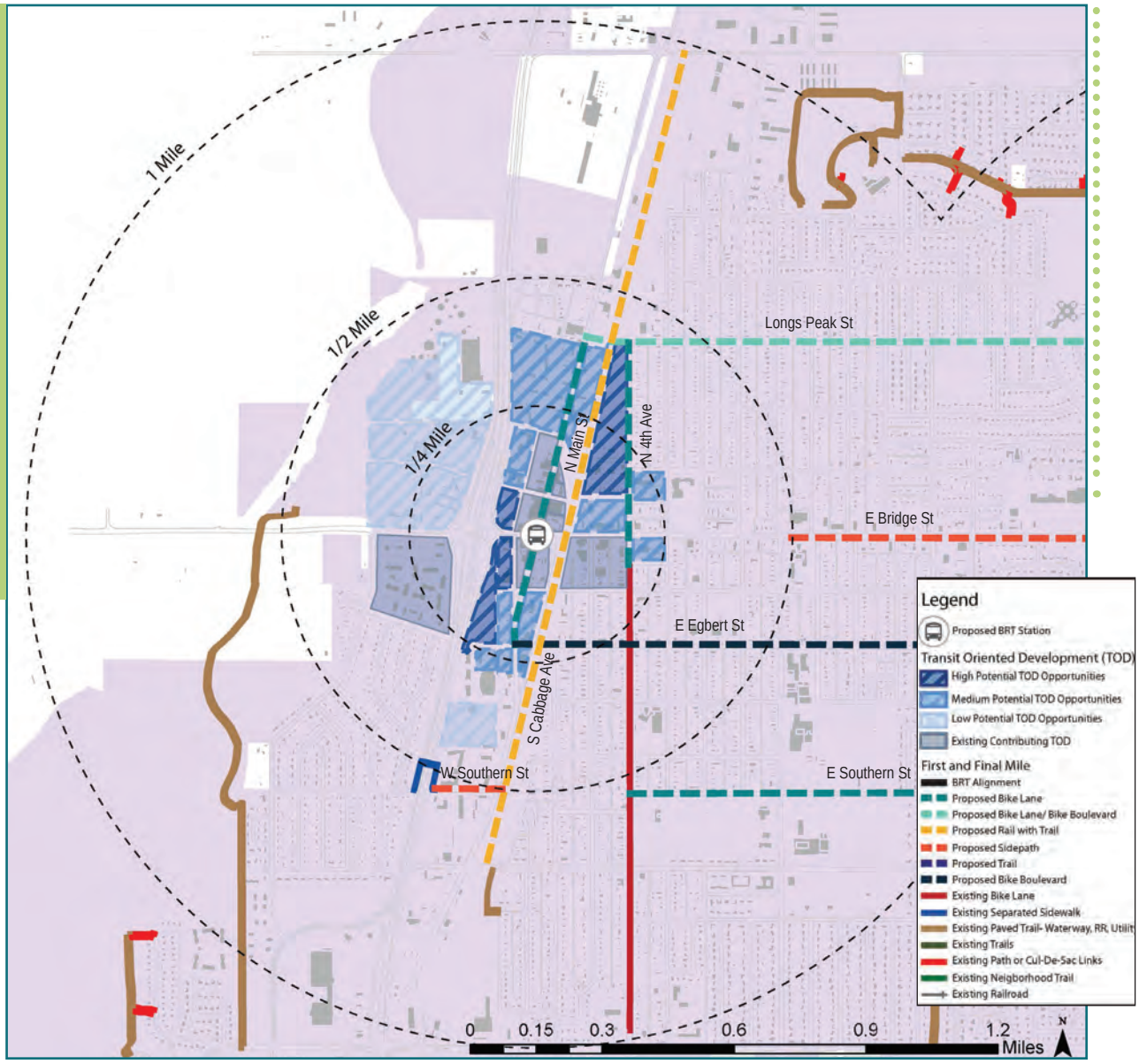
FIGURE 09
Bridge and 27th St. TOD

location (shown in light blue on the map below) are Low Potential TOD Opportunities because they are existing relatively low-density development that could potentially fill in further in the future, but this is less of an opportunity due to the decreased availability of undeveloped land. Extensive further development in this area would be redevelopment and the new look of these developments suggests that is not likely soon.

» Bridge and Main Street - The proposed station location at Bridge and Main is highly constrained by roads, railroads and buildings. The area directly north, south and southeast of the station location (shown in grey on the map below) is largely filled in with restaurants and businesses that would already contribute to TOD development in the area. There is also an existing apartment complex to the southwest, on the other side of Highway 85 that provides potential riders to the area. There are a few areas in the vicinity that are either undeveloped or filled with large surface parking lots (shown in dark blue on the map) and those present the High Potential TOD opportunities in the area as those lots develop or redevelop in the future. There are also some lots (shown in medium blue) that have developments on them currently but could fill in more in the future, representing Medium Potential TOD opportunities. The Low Potential TOD opportunities (shown in light blue) also present opportunities for further BRT supporting development in the area but their distance from the BRT station makes them less desirable than closer lots.

» Any considerations of development or redevelopment in this area would require further discussion with the community, residents, businesses/business owners, and property owners before taking any action.

FIGURE 10
Bridge and Main St. TOD



ENVIRONMENTAL CONSIDERATIONS

The purpose of this review is to identify the existing conditions and the potential environmental impacts to resources as a result of the proposed SH 7 BRT Station Area Design Project. The station areas were evaluated to assess the environmental conditions using the station plans, Geographic Information Systems (GIS), and a desktop review. This review documents existing environmental conditions found in the project area. It should be noted that this study is considered "high level," and the data collected was obtained using desktop surveys. The following table summarizes each resource in the proposed Brighton Station Areas.

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
BRIDGE STREET AND 27TH AVENUE PARK-N-RIDE				
	Habitat for birds protected under the Migratory Bird Treaty Act (MBTA) likely present. Potential for migratory birds to nest in project area and for raptors to nest in, and within, 0.5 mile of project area. Potential for water of the U.S. (WUS), wetlands and non-wetland waters, within the project area (USFWS, 2017). Noxious weeds commonly associated with disturbed roadsides likely present in project area. Habitat for threatened, endangered, or state-sensitive species is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2018; USFWS, 2018).	One electrical transformer is within the southwest corner of project area.	The undisturbed nature of this site has potential for palentological and archaeological resources to be found within the project area. No previous Office of Archaeology and Historic preservation (OAHP) sites or surveys recorded within or adjacent to the project area (History Colorado, 2018). Three parcels with buildings or structures older than 50 years are within or adjacent to the project area, which may retain historic significance.	The planned McCann Ditch multi-use trail will be located along the north side of Bridge Street within the project area (Adams County).
BRIDGE STREET AND MAIN STREET				
	The project area is 0.3 mile from mapped Bald Eagle Winter Forage and Range (along South Platte River) (CPW, 2017). Potential for other raptors to nest within 0.5 mile of project area.	Painted traffic signal poles (potential for lead-based paint) are located at intersection of Bridge Street and Main Street.	Eleven previously surveyed historic resources within station proximity. One parcel with a building or structure older than 50 years within station proximity.	Future multi-use trails are planned along the north side of North Main Street and will connect to trails running north and south along Main Street.

Thornton

STATION DETAILS

THORNTON BRT STATION OVERVIEW

The ***State Highway 7 Bus Rapid Transit Feasibility Study*** identified two stations in the City of Thornton. The stations are located at Quebec Street and Colorado Boulevard. The Quebec station is adjacent to residential neighborhoods and a future commercial development in the southeast corner of the intersection. The Colorado Station will be interconnected with the North Metro FasTracks station that provides passenger rail service to Denver Union Station.

Colorado Station has been identified by the land owner, Regional Transportation District (RTD), and the City of Thornton as a major Transit Oriented Development (TOD).

The Quebec station is adjacent to lower density neighborhoods and has potential in the southwest corner for Transit Oriented Development (TOD). The on-street station will have multimodal first and final mile connections from the station platforms to the neighborhoods. Motor vehicle parking is not possible at this time due to topography and adjacent development patterns.

Colorado Station has been identified by the land owner, Regional Transportation District (RTD), and the City of Thornton as a major TOD. This on-street station will have a variety of nearby land uses and require strategic parking solutions as well as multimodal connections. The following chart provides operational details for each station. Additional details on both stations are provided in the following sections.

	COLORADO STATION	QUEBEC STATION
Park-n-Ride Spaces	Yes	No
North Metro Rail Access	Yes	No
Multimodal Access	Yes	Yes
Secure Bike Parking	Yes	Yes
TNC Loading Zones*	Yes	No
Peak BRT Service	7.5 minutes	7.5 minutes
Off-Peak BRT Service	15 minutes	15 minutes
BRT Service Hours	18 per day	18 per day
Year 2040 Daily BRT Station Ridership Forecast	1,600 boardings	165 boardings

**Transportation Network Companies (TNC) such as Lyft, Uber, etc.)*

TRAFFIC AND SAFETY CONDITIONS

The SH7 cross-section in Thornton varies from two lanes with wide shoulders to the east of Colorado Boulevard to four lanes with an intermittent raised or painted median to the west of Colorado Boulevard (with one additional two-lane segment remaining west of Colorado Blvd). There are turn bays and acceleration/deceleration lanes at intersections throughout this segment. Minor portions of this segment have landscape-separated sidewalks on one side of the road. In this segment, SH7 transitions from a southern east-west alignment (aligned with160th Avenue) to a northern east-west alignment (aligned with 168th) to the west as it approaches I-25.

The roadway is currently classified as R-A (Regional Highway) with a 60 mph speed limit except just as the roadway approaches I-25 where it is NR-A (Non-Rural Principal Highway) and 40 mph. The ***2035 Recommended Alternative Daily Traffic Forecast*** from the ***SH7 Planning and Environmental Linkage Document*** (PEL) is 24,700 east of Holly Street to 54,600 approaching I-25, with ***Post-2035 Capacity Land Use Daily Traffic Forecasts*** varying from 34,800 to 71,900. Bicycle and pedestrian usage is present intermittently through this segment, with most existing usage focused at the west end where

commercial development is adjacent to the roadway. Future bicycle and pedestrian volumes are expected to increase as vacant land adjacent to the station intersection is developed and land uses become more commercial.

Crash histories at Colorado Blvd and Quebec St include primarily approach turn crashes at Colorado Blvd, with one fatality (sideswipe of two opposing vehicles) at Quebec Street. Including appropriate turn bays and acceleration/deceleration lanes in future detailed design, railroad overpass reconstruction, and inclusion of medians in the future at these locations is anticipated to mitigate future similar crashes.

The concept designs at Quebec and Colorado account for widening anticipated by the PEL and as noted by Thornton staff during this process. Additionally, realignment plans have been developed for Colorado Blvd (shifting from its current alignment to about 1/2 mile east of SH7). The project concept for Colorado Blvd represents a station location at "old" Colorado Blvd due to potential for implementation prior to Colorado Blvd realignment and proximity to the potential future commuter rail station and adjacent development.

QUEBEC DESIGN SUMMARY

At the intersection of Quebec Street and State Highway 7 (SH7), the Quebec station was designed as an "intersection" station where riders would arrive at the station by bicycle or on foot. Alternatives to this approach, such as an off-the-shoulder pullout with associated parking/ transit structure or park-n-ride lot in close proximity to the intersection, were considered but determined to be not currently feasible due primarily to access challenges of a 60 mph roadway and ridership estimates when compared with the corridor.

The stops were designed at the southeast and northwest corners of the intersection due to improved operations and the potential for queue jump signal timing that far side stops afford. Eastbound and westbound stops were designed essentially symmetrically on an enhanced right-turn island. The enhanced right-turn design includes long island faces along both roadways where buses stop in the shadow of the deceleration/acceleration lane, with room for one 60' articulated bus and one 40' bus. Right turning cars bypass the island in a reduced radius curve and over a raised pedestrian/bicycle crossing to help keep turning speeds low. Bicycle facilities with the proposed stop design are off-street (either as protected bike lanes or as part of a widened multi-use path to allow the right turn deceleration/acceleration lane to be utilized as a Bus, Business Access and Turn (BAT) lane approaching the intersection. Inclusion of this BAT lane allows for potential queue jump signal timing. Stop amenities such as shelters, benches, bike parking, ticket vending, and signage are shown on the enhanced right-turn island.

This design assumes widened roadway cross sections compared to the 2014 PEL per Thornton and Colorado Department of Transportation (CDOT) staff, who also noted that minor modifications to speed limits and/or access categories may be made in the future. Roadway cross section in relation to existing or future right of way (ROW) shown on the plan is schematic in nature; as such, geometry and alignment of the enhanced right-turn islands may change significantly with additional information and design.

COLORADO DESIGN SUMMARY

The Colorado station is shown as in line stops along SH7 with a structured station northeast of the SH7/ Old Colorado Boulevard intersection. While integration into the planned rail station 1/4 mile north was considered, the delay caused by routing to and from the rail station made an intersection stop more desirable. As such, the stop integrates essentially the same design as the Quebec station, but with a near side stop in the westbound direction due to the rail overpass to the west. A future park and ride envelope is shown in the northwest corner of the intersection that may include surface parking, and/ or bus bays in the near term, and structured parking, bus bays, and other BRT amenities in the future. To allow for connections to the future rail station and transit oriented development (TOD) planned north of the intersection station, a shuttle bus or autonomous vehicle connection between the BRT and rail stations will be critical. Lastly, when the rail bridge is modified to accommodate the future rail service and widened SH7 cross section, a widened section would allow for a grade-separated pedestrian/ bicycle crossing near the intersection.

As with the Quebec station design, this design assumed a widened SH7 roadway cross section as per Thornton and CDOT staff, who also noted that minor modifications to speed limit and/or access category may be made in the future. Roadway cross section in relation to existing or future ROW shown on the plans is schematic in nature; as such, geometry and alignment of the enhanced right-turn islands may change significantly with additional information and design.

Full Size Images of Figures 11 and 12 can be Found in Report Appendix, Pages 139 & 140.

FIGURE 11
Quebec St. & SH7

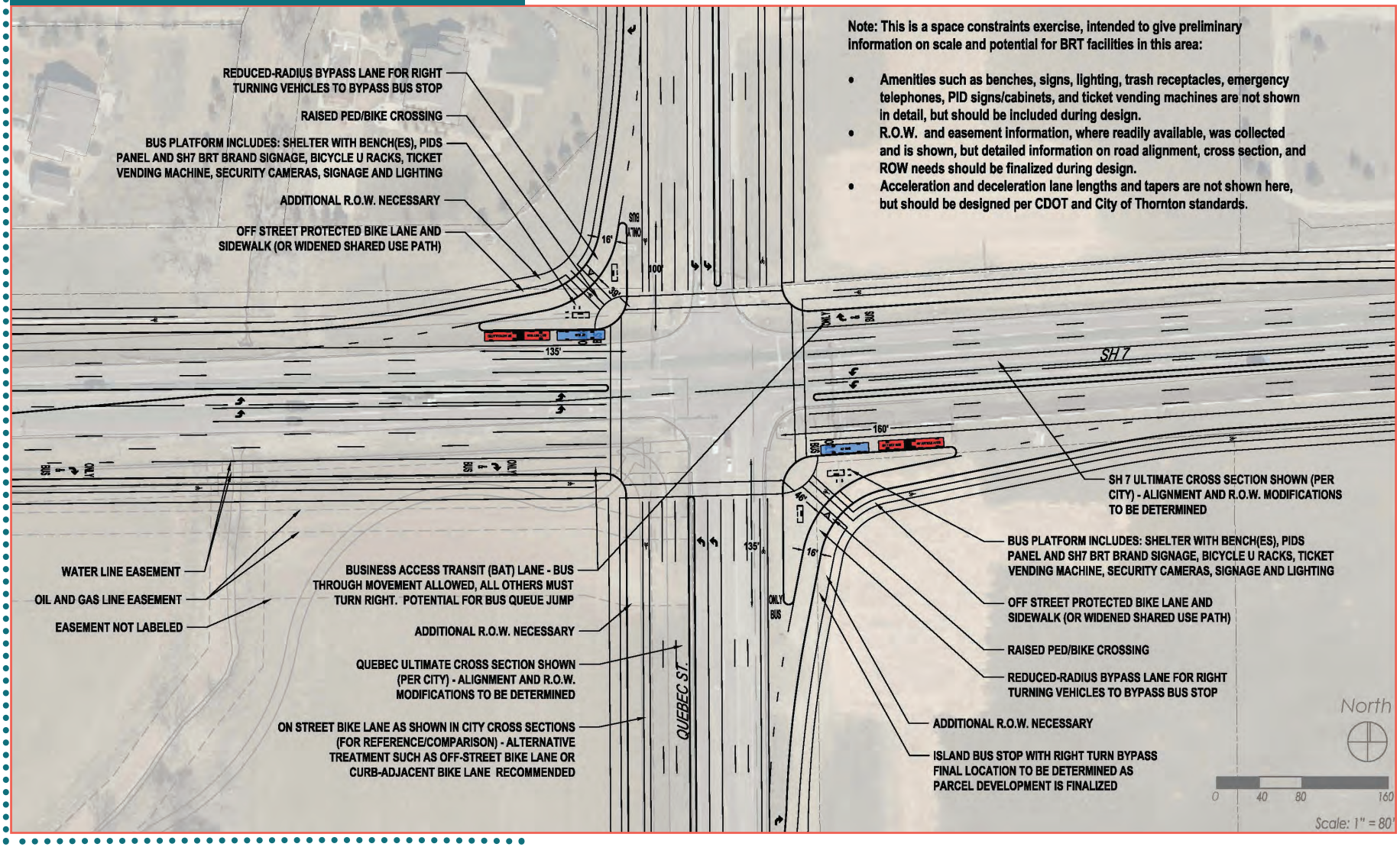
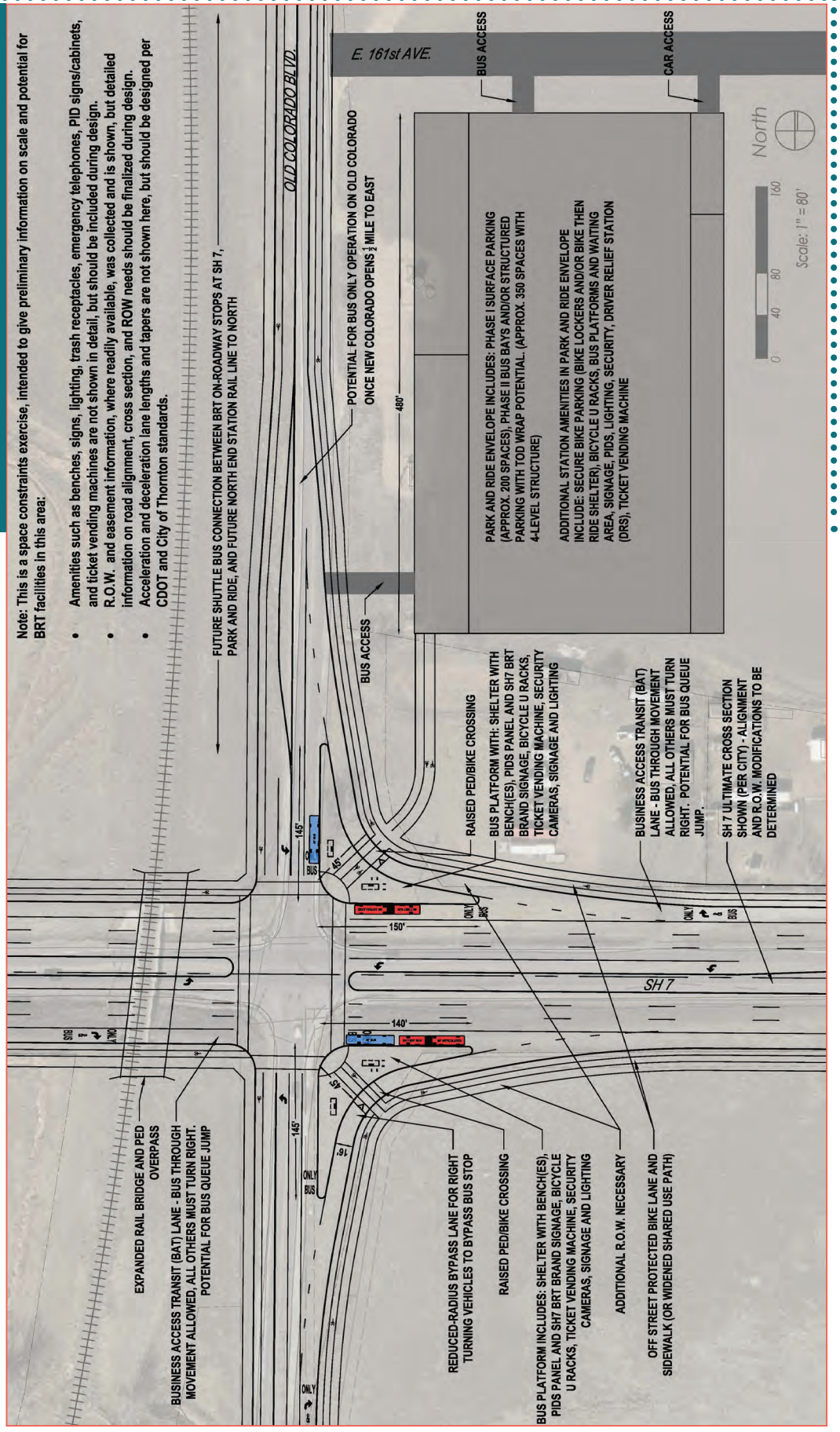


FIGURE 12
Colorado Blvd. & SH7



FIRST AND FINAL MILE (FFM) SUMMARY AND ACTIONS

The proposed SH7 BRT currently has two stop locations in Thornton (Quebec Street and Colorado Boulevard) and one shared stop with Broomfield (I-25 Mobility Hub). With the stops being low to no density now, most of the first and final mile planning was focused on future improvements in proposed developments. The proposed improvements are centered on bicycle and pedestrian travel due to the low density.

- Quebec Station - The current location for the Quebec Station is half developed with single family lots and half currently undeveloped but with proposed single family developments. Due to the low density, there are few arterial routes that are needed to get people to the station.

  The arterial routes to get people to the stations are focused on sidepaths on Quebec Street and State Highway 7 and implementation of regional trail networks in proposed developments. One of the proposed regional trails is adjacent to the irrigation ditch crossing through the station area. The other is platted through a new development on the southeast corner of the intersection.

  Since this station can be placed in vacant land with more space, a secure bicycle parking structure should be implemented with the station.

  The trail network aids in giving pedestrians a more direct route from the existing neighborhoods to the station area. Completing a few trail connectivity projects and filling in sidewalk gaps will make pedestrian travel to the station easier.

- Colorado Station - The Colorado Station today has very little development around it. Planning was focused on future routes and arterial routes to the station. The proposed station will be approximately 1/4 mile from a proposed rail station for the RTD North Metro Line. Connecting these two stations through first and final mile techniques is important.

  The arterial routes identified for this station area are Colorado Boulevard, Big Dry Creek Trail, Rail-with-Trial, and State Highway 7. All of the arterial routes in this area are recommend to have either multi-use trails or sidepaths along the road. This is because these roadways have higher volumes and speeds so the physical separation is necessary to make users comfortable.

  A benefit of all major arterial routes having trails is they work well for pedestrians as well. It will be a comfortable and more direct route than using the roadway network. The trail width should be 12 feet wide to accommodate three “lanes” of traffic (bicycles and pedestrians) on it.

  Secure bike parking should be provided either at the station area or in between the proposed rail station and the proposed SH7 station.

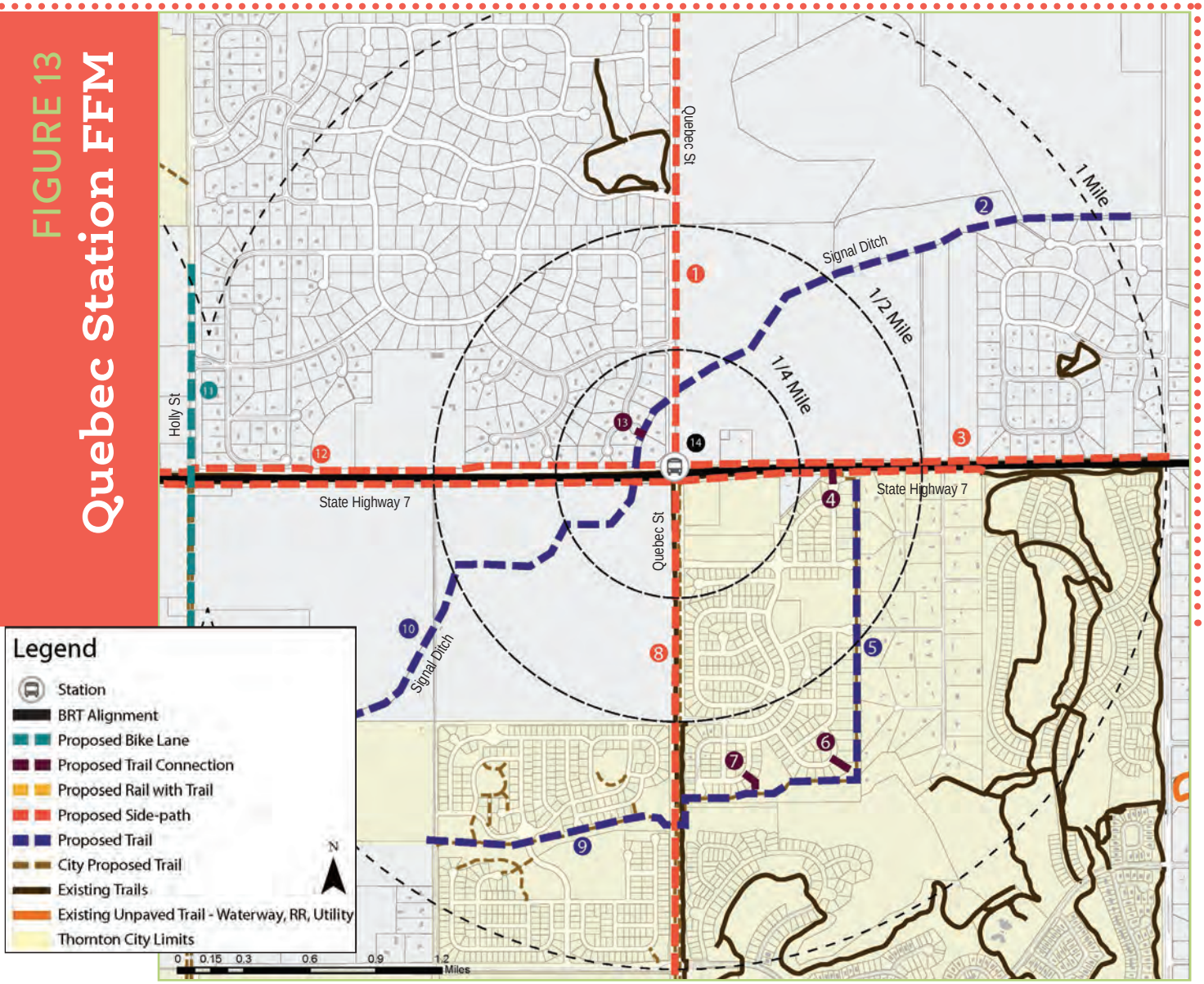
- I-25 Mobility Hub - The I-25 Mobility Hub is proposed for the interchange of I-25 and SH7. The southeast corner of this station is Thornton City Limits with the rest of the interchange being surrounded by Broomfield. This section will focus on the Thornton recommendations. For the Broomfield recommendations, see the Broomfield Section.

  The mobility hub is proposed to have a park-and-ride on the Thornton part of the interchange. To connect to the mobility hub, sidepaths are recommended on Washington Street and State Highway 7. Washington Street could be bike lanes, but study is needed to understand volumes and speeds of the roadways. Bike Lanes are proposed for 168th Avenue to connect existing developments to the station area. The mobility hub will also have trail connections to all corners of the interchange. To achieve first and final mile connectivity to the station, it will be important to provide facilities to connect to these trail connections. Adding trails adjacent to I-25 will also aid in providing connections for the proposed developments to the mobility hub. These trails will also aid pedestrians in connecting to the station.

Secure bike parking, such as secure bike structures that allow for more bikes to be parked securely at the station in a smaller space, will be needed at stations. Sidewalk gaps also need to be evaluated, both with respect to pedestrian/ bike access and Americans with Disabilities Act (ADA) accessibility, and filled accordingly.

*****Full Size Images of FFM Figures 13, 14 and 15 can be Found in Report Appendix, Pages 155, 156 & 157.***

FIGURE 13
Quebec Station FFM



Recommendations

1. **Proposed Sidepath on Quebec Street**
   Provide a sidepath on one side of Quebec to provide connectivity to the station.
2. **Proposed Trail along Signal Ditch**
   Provide a trail along signal ditch to connect neighborhoods to the station location. As development occurs around the ditch, provide connectivity to the trail.
3. **Proposed Sidepath along State Highway 7**
   Due to lack of potential crossings in the area, create sidepaths on the North and South side of State Highway 7.
4. **Proposed Trail Connection to Spruce Court**
   Provide a grade separated crossing of Highway 7 for the proposed trail network.
5. **Proposed Trail between neighborhoods (Mostly Complete)**
   As development occurs, construct trails to connect neighborhood to State Highway 7.
6. **Proposed Trail Connection to Spruce Circle**
   Provide trail connection from neighborhood to proposed trail.
7. **Proposed Trail Connection to Syracuse Way**
   Provide trail connection from neighborhood to proposed trail.
8. **Proposed Sidepath on Quebec Street**
   Provide a sidepath on one side of Quebec to provide connectivity to the station.
9. **Proposed Trail between neighborhoods**
   As development occurs, construct trail to connect neighborhood to State Highway 7.
10. **Proposed Trail along Signal Ditch**
    Provide a trail along signal ditch to connect neighborhoods to the station location. As development occurs around the ditch, provide connectivity to the trial.
11. **Proposed Bike Lane on Holly Street**
    Add a bicycle lane on Holly Street to connect neighborhoods to State Highway 7.
12. **Proposed Sidepath on State Highway 7**
    Due to lack of potential crossings in the area, create sidepaths on the north and south side of State Highway 7.
13. **Proposed Trail Connection to Poplar Street**
    Connect existing neighborhood to proposed ditch trail.
14. **Secure Bike Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycling parking.
15. **Sidewalk Gap Identification and Remediation**
    Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

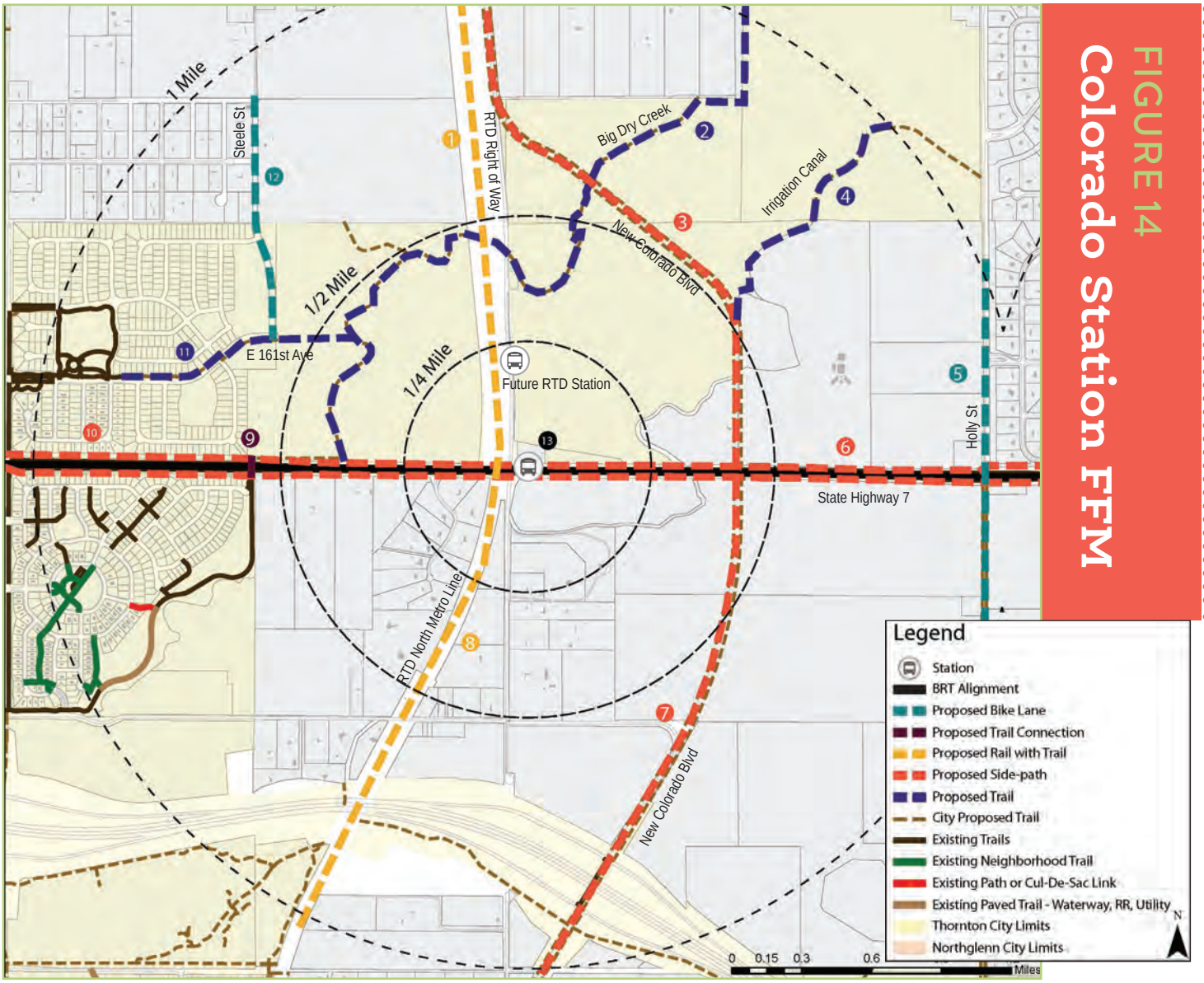
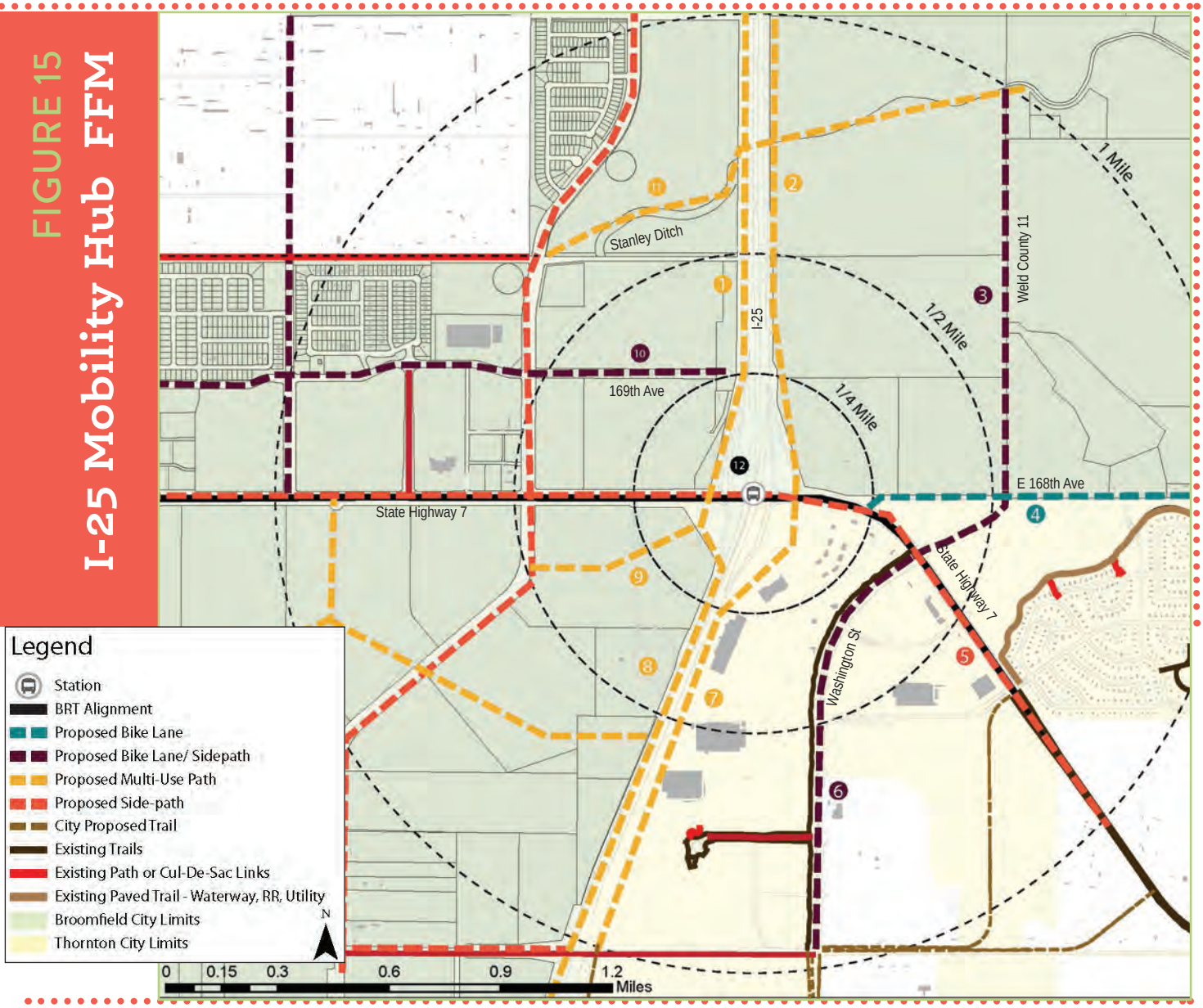


FIGURE 14
Colorado Station FFM

Recommendations

1. **Proposed Rail with Trail in RTD Right-of-Way**
   Complete a multi-use trail along the old rail bed that is proposed to be the North Metro Rail Line.
2. **Proposed Trail along Big Dry Creek**
   Create a trail along Big Dry Creek as part of the regional trail network.
3. **Proposed Sidepath along (New) Colorado Boulevard**
   Create a sidepath on at least one side along the proposed Colorado Boulevard.
4. **Proposed Trail along Irrigation Canal**
   Provide a path along irrigation canal as development occurs.
5. **Proposed Bike Lane on Holly Street**
   Add a bicycle lane on Holly Street to connect neighborhoods to State Highway 7.
6. **Proposed Sidepath along State Highway 7**
   Due to lack of potential crossings in the area, create sidepaths on the north and south side of State Highway 7.
7. **Proposed Sidepath along (New) Colorado Boulevard**
   Create a sidepath on at least one side along proposed Colorado Boulevard.
8. **Proposed Rail with Trail on RTD North Metro Line**
   To connect the bike/ped arterials to the station, a facility will be needed on Main Street. This will also benefit the city core, making it more walkable/ bikeable.
9. **Proposed Trail Connection across State Highway 7**
   Implement an above or below grade crossing of State Highway 7 so bicycles and pedestrians can cross.
10. **Proposed Sidepath along State Highway 7**
    Due to lack of potential crossings in the area, create sidepaths on the north and south side of State Highway 7.
11. **Proposed Trail on E 161st Avenue**
    Continue existing trail to connect to Dry Creek Trail. This will provide a connection to the station without crossing or running along a major road.
12. **Proposed Bike Lane on Steele Street**
    Create a bike lane to connect proposed trails to Dry Creek Trail. This will connect more people to the station.
13. **Secure Bicycle Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers or long-term bicycle parking.
14. **Sidewalk Gap Identification and Remediation**
    Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

FIGURE 15
I-25 Mobility Hub FFM



Recommendations

1. **Proposed Multi-Use Path along I-25**
   Provide a multi-use path along each side of I-25 to provide a north-south connection.
2. **Proposed Multi-Use Path along Stanley Ditch**
   Provide a multi-use path along the side of Stanley Ditch. This was identified in trail master plans and provides a connection across I-25.
3. **Proposed Bike Lane/ Sidepath on Weld County 11**
   Provide a bike lane or sidepath on Weld County Road 11 based on traffic volumes and speeds. This will provide a key north-south connection.
4. **Proposed Bike Lane on E 168th Avenue**
   Provide a bike lane to provide an east-west connection from neighborhoods to the station. Review volumes and speeds to determine type of bike lane.
5. **Proposed Sidepaths on State Highway 7**
   Provide a 12' minimum sidepath on both sides of State Highway 7 to provide connectivity through the corridor. Consider widening path in areas with higher volumes of bicyclists and walkers. (i.e. station areas, destinations, etc.)
6. **Proposed Bike Lane/ Sidepath on Washington Street**
   Provide a bike lane or sidepath along Washington Street to provide a connection from the station to the commercial development.
7. **Proposed Multi-Use Path Between I-25 and Huron Street**
   Provide multi-use path through the proposed development to a proposed I-25 multi-use path to provide a low-stress connection through the neighborhood.
8. **Proposed Multi-Use Path Connection to Mobility Hub**
   Provide a low-stress connection to the mobility hub from Huron Street. The multi-use paths should be a minimum 12' wide to allow for multiple modes.
9. **Proposed Multi-Use Path Connection to Mobility Hub**
   Provide a low-stress connection to the mobility hub from Huron Street. The multi-use paths should be a minimum of 12' wide to allow for multiple modes.
10. **Proposed Bike Lane/ Sidepath on 169th Avenue**
    Provide either a bike lane or a sidepath on 169th Avenue. The facility will depend on the planned traffic volumes and speed for 169th Avenue.
11. **Proposed Multi-Use Path along Stanley Ditch**
    Provide a multi-use path along the side of Stanley Ditch. This was identified in trail master plans and provides a connection across I-25.
12. **Secure Bike Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycling parking.

NON-SPECIFIC LOCATION RECOMMENDATIONS

Sidewalk Gap Identification and Remediation
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

Circulator Bus/ AV Vehicle
Provide a route for a circulator bus or Autonomous Vehicle shuttle to connect people from the proposed developments to the stations. This could be a fixed route or on-demand.

TRANSIT ORIENTED DEVELOPMENT (TOD) REVIEW

The proposed SH7 BRT currently has two stop locations in Thornton (Quebec Street and Colorado Boulevard) and one shared with Broomfield (I-25 Mobility Hub). Currently the area around the stops is low to no density so there is a lot of opportunity for greenfield development around the station that could be developed in a transit oriented manner to both benefit from and serve the proposed future BRT line.

- Quebec Station - The current location for the Quebec Station is half developed with single family lots and half undeveloped with proposed single-family development. Due to the low density, there is not any significant existing transit oriented development or contributing density. The already developed single family housing and the proposed single-family development is not likely to fill in much more or to change soon but it will contribute some riders to the BRT system.

  However, the land to the northeast and southwest of the station (pictured in dark blue on the map) is largely undeveloped agricultural land with a few private residences scattered throughout so this represents High Potential TOD opportunities for the future.

- Any considerations of development or redevelopment in this area would require further discussion with the community, residents, businesses/ business owners, and property owners before taking any action.

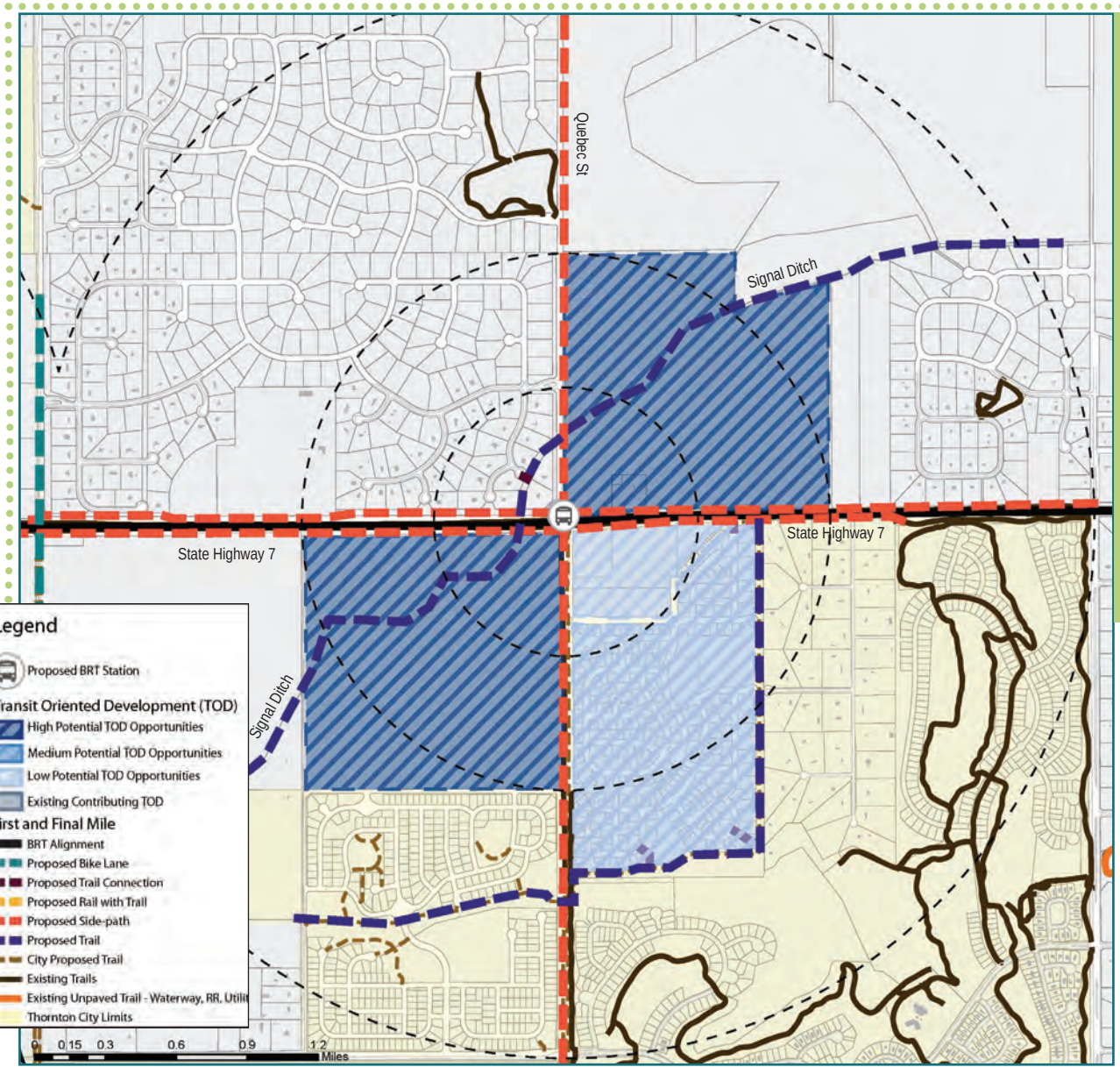


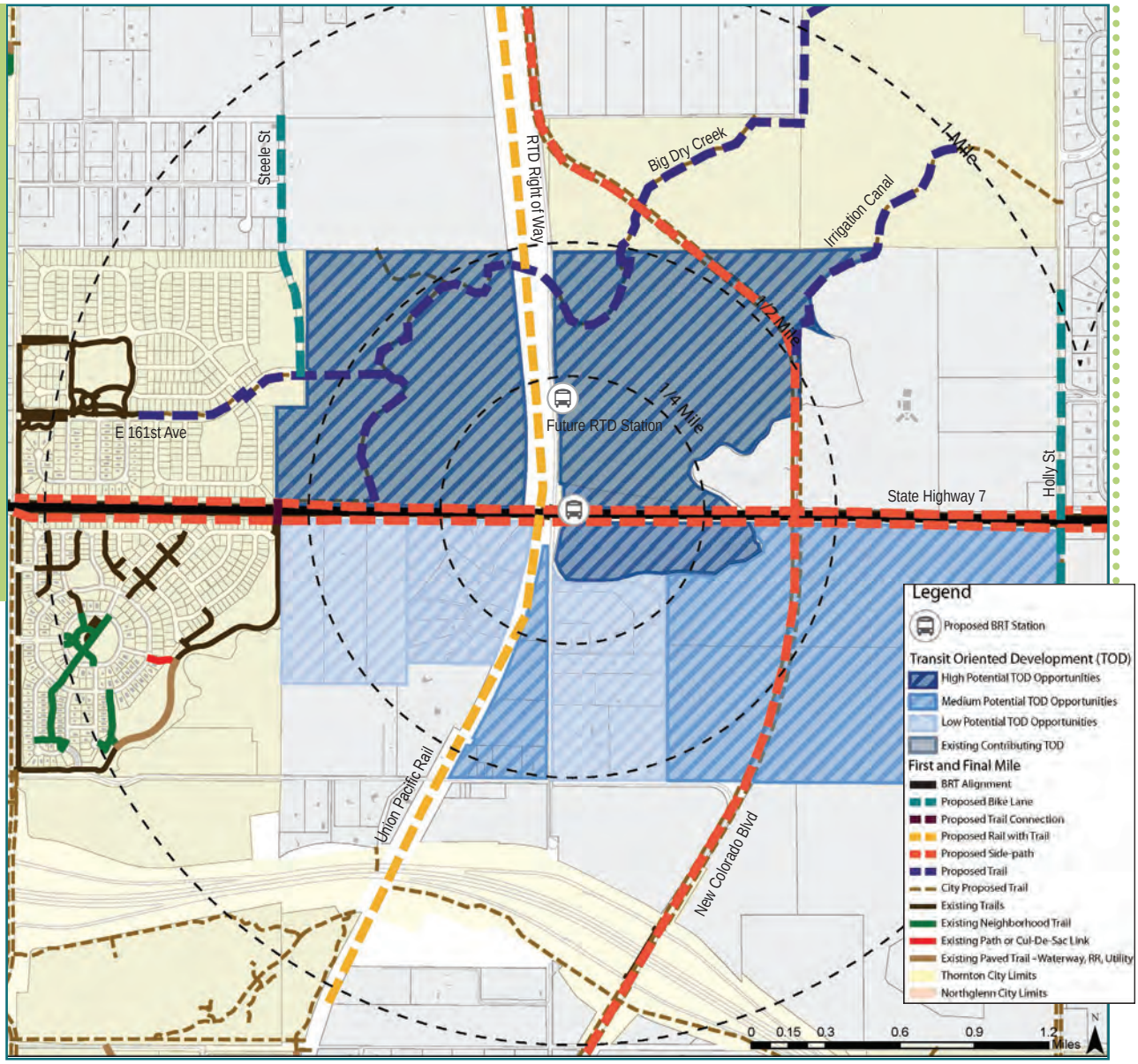
FIGURE 16
Quebec Station TOD

» Colorado Station - The Colorado Station area currently also has very little development around it, but it will be approximately 1/4 mile from a proposed rail station for the RTD North Metro Line which contributes additional transit-oriented development potential to that area. It also presents an opportunity to connect the two stations.

The land to the northwest, northeast and directly to the southeast is largely undeveloped so it represents a High Potential opportunity for transit-oriented development. There is also a large amount of undeveloped land further to the southeast of the station but the increased distance from the station decreases the potential slightly. There are also areas of single-family home developments (shown in light blue on the map) that are low density and unlikely to develop further soon. While they will contribute some ridership to any potential BRT lines and other transit in the area, they are at a density that does not contribute existing transit oriented development.

» Any considerations of development or redevelopment in this area would require further discussion with the community, residents, businesses/ business owners, and property owners before taking any action.

FIGURE 17
Colorado Station TOD



» I-25 Mobility Hub - The I-25 Mobility Hub is proposed for the interchange of I-25 and SH7. The southeast corner of this station is Thornton City Limits with the rest of the interchange being surrounded by Broomfield. This section will focus on the Thornton transit-oriented development potential. For the Broomfield TOD opportunities, see the Broomfield Section.

The area directly southeast of the mobility hub largely consist of big box stores and smaller strip mall type developments surrounded by large parking lots. While the parking lots and the low density of the area present opportunities for future transit-oriented development, the fact that there is development that has already happened there makes it slightly more difficult to redevelop in the future, thus the area is a Low Potential for TOD development. The area further east between this retail development and a single family home neighborhood is undeveloped but is a Medium Potential TOD opportunity due to its increased distance from the proposed mobility hub.

» Any considerations of development or redevelopment in this area would require further discussion with the community, residents, businesses/ business owners, and property owners before taking any action.

» ***Additional Information about the I-25 Mobility Hub can be found in the Broomfield Sections, Pages 74 & 75.***

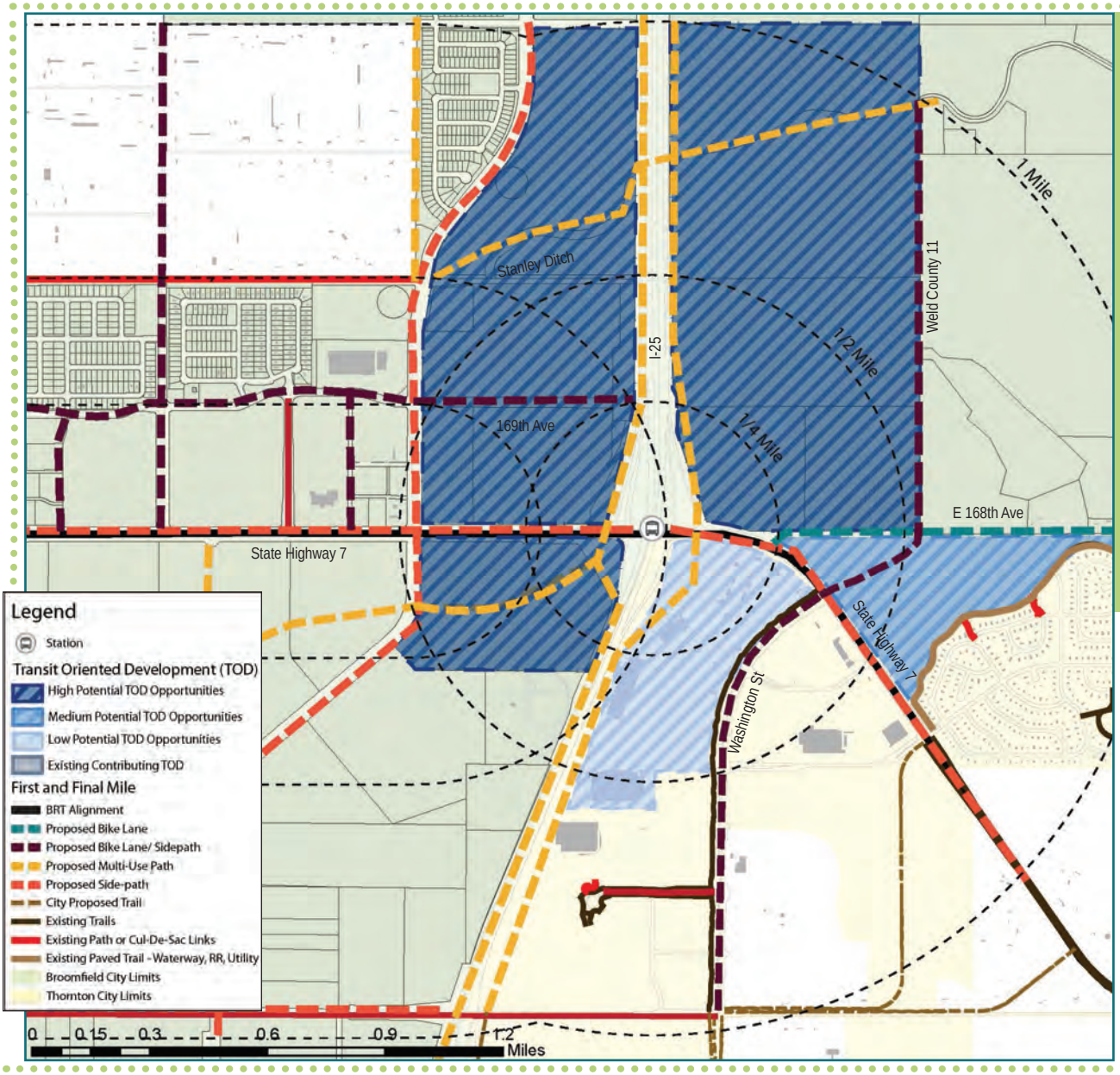


FIGURE 18
I-25 Mobility Hub TOD

ENVIRONMENTAL CONSIDERATIONS

The purpose of this review is to identify the existing conditions and the potential environmental impacts to resources as a result of the proposed SH 7 BRT Station Area Design Project. The station areas were evaluated to assess the environmental conditions using the station plans, Geographic Information Systems (GIS), and a desktop review. This review documents existing environmental conditions found in the project area. It should be noted that this study is considered "high level," and the data collected was obtained using desktop surveys. The following table summarizes each resource in the proposed Thornton Station Areas.

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
QUEBEC STREET AND SH7				
	Grasses within the project area may provide potential nest sites for birds protected under the MTBA. Additionally, large trees within 0.5 mile of the project area may provide nest sites for raptors habituated to human presence. Signal Ditch crosses the project area; therefore, there is potential for WUS, wetlands and non-wetland waters, to occur within the project area (USFWS, 2017). There is potential for black-tailed prairie dog colonies within the project area. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area Habitat for threatened, endangered or state-sensitive species is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2018; USFWS, 2018).	Two pad-mounted transformers are located in the project area, on in the northwestern corner of the intersection and the other in the southeastern corner of the intersection. Two oil and gas tank batteries are near the project area: approximately 250 feet northeast of the intersection and approximately 830 feet southwest of the project area. One oil and gas production facility is located approximately 1,450 feet southwest of the project area. One oil and gas pipeline runs east-west along SH7 until Quebec Street, where it turns north-south.	The undisturbed nature of this site has potential for paleontology and archaeology resources to be found within the project area. No previous OAHP sites or surveys recorded within or adjacent to the project area (History Colorado, 2018). No parcels with a building or structure older than 50 years within station proximity.	According to the Thornton Parks, Open Space, Trails User Map, a proposed trail with "adjacent jurisdiction" traverses the project area. It follows SH7 from the west, veers north on the east side of Quebec Street, and heads north along Quebec Street (Thornton, 2017). Another spur of this proposed trail follows SH7 east of Quebec Street. A bike lane/route runs along SH7 from York Street to Yosemite Street and traverses the study area. Another bike lane/ route heads north along Quebec Street but ends at SH7 (Thornton, 2017). These bike lanes/routes are most likely considered transportation resources and not Section 4(f) resources. No Section 6(f) resources are located near this proposed station.

Environmental Resources Continued

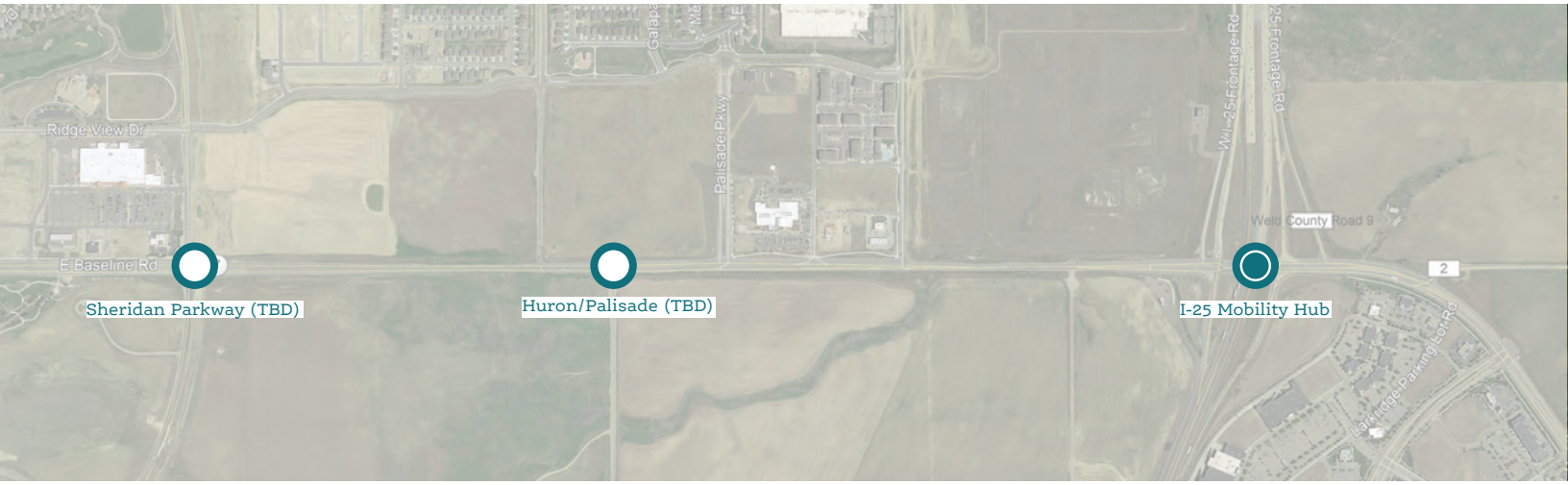
	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
COLORADO AVENUE AND SH7				
	Trees, shrubs, and grasses within the project area may provide potential nest sites for birds protected under the MBTA. Additionally, large trees within 0.5 mile of the project area may provide nest sties for raptors habituated to human presence. The German Ditch crosses the project area; therefore, there is potential for WUS, wetlands and non-wetland waters, within the project area (USFWS, 2017). There is potential for black-tailed prairie dog colonies within the project area. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat for threatened, endangered, or state-sensitive species is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2018; USFWS, 2018). The project is located within 1% Chance of Flood Hazard Zone (FEMA, 2019)	Painted traffic signal poles (potential for lead-based paint) are located at the intersection. Three oil and gas tank batteries are located in or near the study area: one within the northern portion of the project area, one approximately 430 feet northeast of the project area, and one approximately 630 feet northwest of the project area. One oil and gas production facility is located approximately 950 feet northeast of the project area. Two oil and gas wells are located near the project area: approximately 660 feet northwest of the project area and approximately 1,130 feet northwest of the project area. A Regional Transportation District railroad track runs near the western project area boundary.	Four previously surveyed historic resources are found within the project area. Two parcels with a building or structure older than 50 years are found within the project area.	Proposed Adams County open space along Big Dry Creek is located at the northwest corner of the Colorado Boulevard and SH7 intersection. It also extends south of SH7 and west of Colorado Boulevard, part of which may be within the future project area. Additionally, the proposed German Ditch Trail runs east-west along the southern portion of the project area (Adams County, 2018). A bike lane/route runs along SH7 from York Street to Yosemite Street and traverses the study area. The bike lane/route is most likely considered a transportation resource and not a Section 4(f) resource. No Section 6(f) resources are located near this proposed station.

Broomfield

STATION DETAILS

BROOMFIELD BRT STATION OVERVIEW

Three BRT station locations were proposed for the City and County of Broomfield in the ***BRT Feasibility Study***. The eastern station will be the I-25 Mobility Hub, shared with the City of Thornton, the western station was proposed at Sheridan Boulevard, both were identified to have Park-N-Ride facilities. A third optional station was incorrectly identified at Huron in the study. Due to the rerouting of the southern leg of Huron Street to the east, the actual station location referred to in the BRT Study is intended to be in the vicinity of the Palisade Parkway intersection. Optional station are intended to serve alternative station stop patterns to increase access.



The station areas will have a significant change in population and employment in the coming decades - approximately 25,000 new residents and 1 million square feet of new commercial uses

The station areas will have a significant change in population and employment in the coming decades. The forecast is approximately 25,000 new residents and 1 million square feet of new commercial uses near the three station areas.

During this planning process, the final layout of the new roadways and intersections in this area was still under consideration by staff and the developers. The planning concepts shown in this section provide templates for the future station location(s) at Huron/ Palisade and Sheridan Parkway based on the BRT Study recommendations. The City and County of Broomfield does not own any property along SH7 and will need active collaboration with SH7 land owners and developers to realize the station vision. The I-25 Mobility Hub initial concept design and location was determined by the Colorado Department of Transportation (CDOT) and stakeholders prior to this planning process. A summary presentation from the workshop with staff and developers has additional details on integrating these station areas with the future land uses using Transit Oriented Development (TOD) best practices. First and final mile (FFM) mapping

was also prepared as part of this planning effort and is included in this section.

TRAFFIC AND SAFETY CONSIDERATIONS

This roadway segment currently varies from two to four lanes in each direction with added turn lanes at intersections. Painted medians are present along portions of this segment. The Planning and Environmental Linkage (PEL) document for this roadway anticipates an average daily traffic (ADT) of over 50,000 vehicles under future conditions, creating a need for a six-lane section with added turn lanes at intersections. As such, the design of stations in this section will need to account for future widening or additional analysis to determine if lower ADTs are likely. The existing roadway classification is NR-A, with a 55 mph speed limit. Currently, few bicyclists and pedestrians are present in the area, but development of proposed land uses and the 30 mile regional bikeway will create demand for both in the future.

The roadway network in the area is anticipated to change in the future. Changes include realignment of the southern leg of Huron Street to meet SH7 where the northern leg currently intersects SH7, and additional roadway connections with development, especially in the southeast quadrant of Sheridan and SH7. The following three station typologies were developed.

BROOMFIELD STATION DESIGN SUMMARY

After much discussion with stakeholders on ideal location(s) for stations in Broomfield (between Sheridan and I-25), it was determined that the ideal location for one Broomfield station may be between Sheridan Parkway and CR 7 and additional process should take place with corridor stakeholders before finalizing station location selection. To help in determining station locations, the project team and Broomfield working group developed station layout concepts that could potentially be applied to SH7 in Broomfield after location selection. The concepts were developed for existing and potential future roadway configurations along this section of SH7. These options would depend on the roadway classification of the intersecting street.

- 6-Lane Bypass with Acceleration Lanes: This station concept includes “bypass islands” that allow right turning vehicles to bypass the bus stop area, and includes Business Access Transit (BAT) lanes at the intersections. See Thornton station discussions for additional details. This concept could be applied at most of the intersections along SH7 in Broomfield with its current configuration and speed limit or with the future 6-lane section and speed limit as currently planned (NR-A classification) with the addition of a BAT lane.
- 6-Lane In-Line without Acceleration Lanes: In this concept, two options are shown - Option A with buses stopping in a BAT lane, which requires reducing the number of general purpose lanes to two in each direction, and Option B with the bus stopping in the outside general purpose lane. Option A would reduce BRT delay through this section, but should only be considered if more detailed analysis concludes that ADTs in this area are anticipated to be 40,000 - 45,000 maximum (as opposed to the 50,000+ anticipated in the PEL). It is likely that Option B would function acceptably with the PEL-anticipated 50,000+ ADT but BRT operations would be slowed due to the bus operation in the outside general purpose lanes. Both options are more indicative of an urban or even suburban arterial condition, where transit riders arrive at the station on foot or bicycle and the right of way (ROW) may be more constrained due to smaller building setbacks. A speed limit of 45 MPH or lower is critical for this concept, representing conditions similar to a NR-B roadway classification.
- Mid-block Pull-Off - The mid-block pull-off is a station concept that can be applied anywhere intersection spacing allows adequate acceleration and deceleration for the given speed limit and adequate ROW for the additional width necessary. In this concept, buses have a pull-off dwell lane and a pull-off access lane that allows a following bus to pass a dwelling bus within the pull-off. Also key to this concept is a grade-separated pedestrian and bicycle crossing, with enhancements to discourage at grade crossing (jay walking). This concept allows longer bus dwell times (for transfers, for example) and provides pedestrians and bicyclists additional protection, with the added benefit of trail connectivity if it is incorporated into the adjacent planned trail network. This concept creates longer walking and bicycling access routes to the station from adjacent roadways. The mid-block pull-off station concept is not new to the Front Range, as similar pull-offs can be found along US36 used by the Flatiron Flyer.

Full Size Images of Figures 19, 20 and 21 can be Found in Report Appendix, Pages 141, 142 & 143.

FIGURE 19

SH7 in Broomfield

Concept Notes:

- This is a potential station configuration and space constraints exercise, intended to give preliminary information on scale and BRT station components only. This station configuration is intended to provide information for consideration at a number of potential SH7 locations in Broomfield.
  - Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
  - Detailed information on road alignment, cross section, and ROW needs should be finalized during design.
  - Acceleration and deceleration lane lengths and tapers have not been detailed here and should be designed per CDOT and City and County of Broomfield standards.
- This concept is appropriate with the existing NR-A classification and existing speed limits.
- A multi-use path is planned for the whole SH7 BRT corridor, but is not shown in this concept.

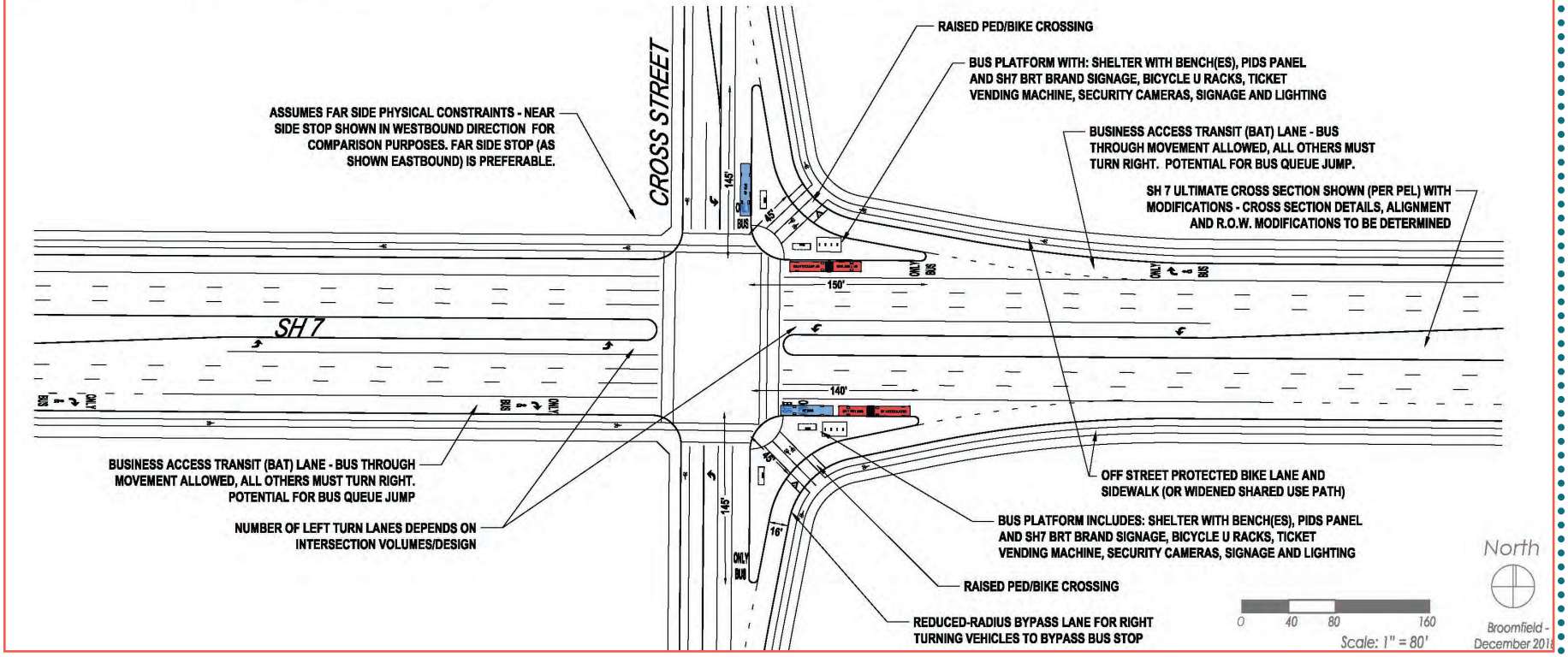


FIGURE 20

SH7 in Broomfield

Concept Notes:

- This is a potential station configuration and space constraints exercise, intended to give preliminary information on scale and BRT station components only. This station configuration is intended to provide information for consideration at a number of potential SH7 locations in Broomfield.
  - Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
  - Detailed information on road alignment, cross section, and ROW needs should be finalized during design.
  - Acceleration and deceleration lane lengths and tapers have not been detailed here and should be designed per CDOT and City and County of Broomfield standards.
- This concept (with option Option A or Option B lane assignment) should be considered if SH7 were to be re-assigned to NR-B classification and the speed limit lowered to 45 mph or less.
- Lane assignment and configuration:
  - OPTION A (shown on North side of intersection) - BAT lane shown should be considered with max. ADT of 40,000 - 45,000.
  - OPTION B (shown on the South side of intersection) - bus stop utilizes the outside general purpose lane. This would create occasional stoppages and queuing in the outside lane, but is more appropriate for the projected 50,000+ ADT in the area.
  - The SH7 PEL shows over 50,000 ADT for this area - additional detailed traffic projections for this area should be completed to determine appropriate lane configuration.
- These concepts are possible with bypass lanes (as shown in "Bypass" concept) as well.
- A multi-use path is planned for the whole SH7 BRT corridor, but is not shown in this concept.

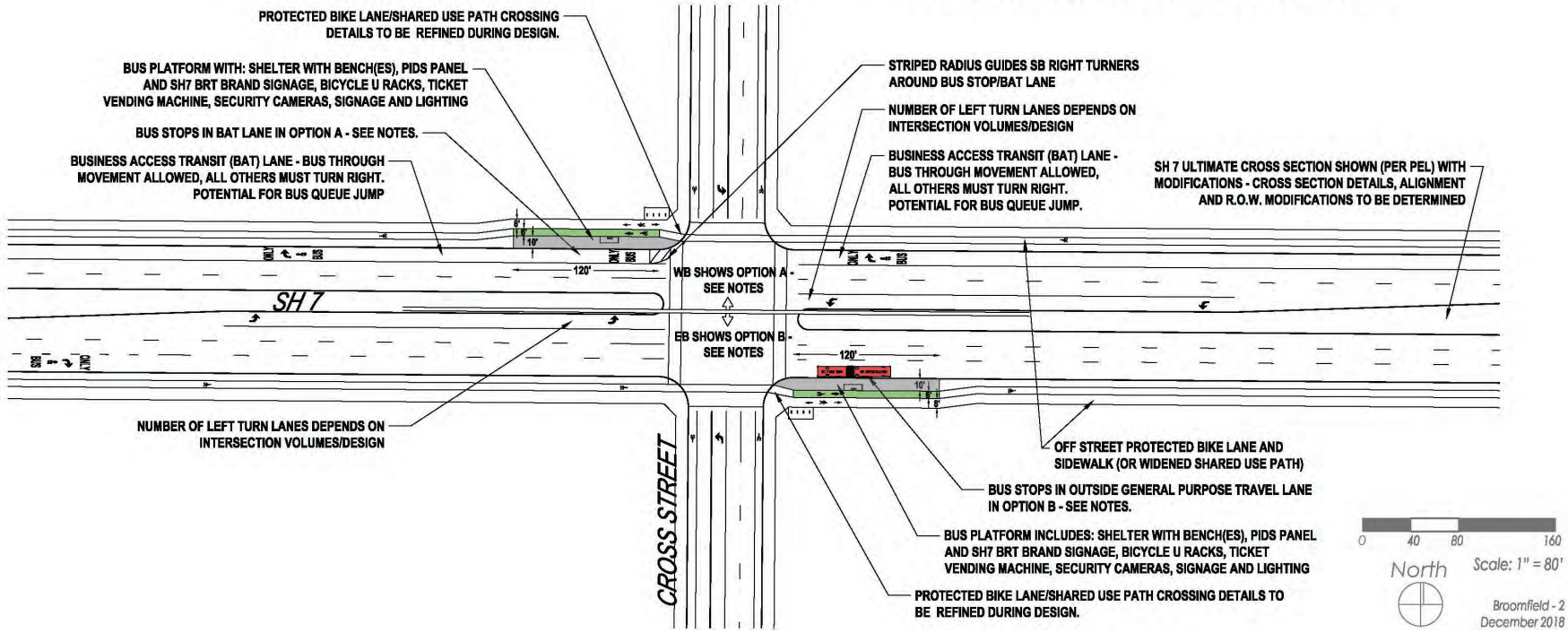
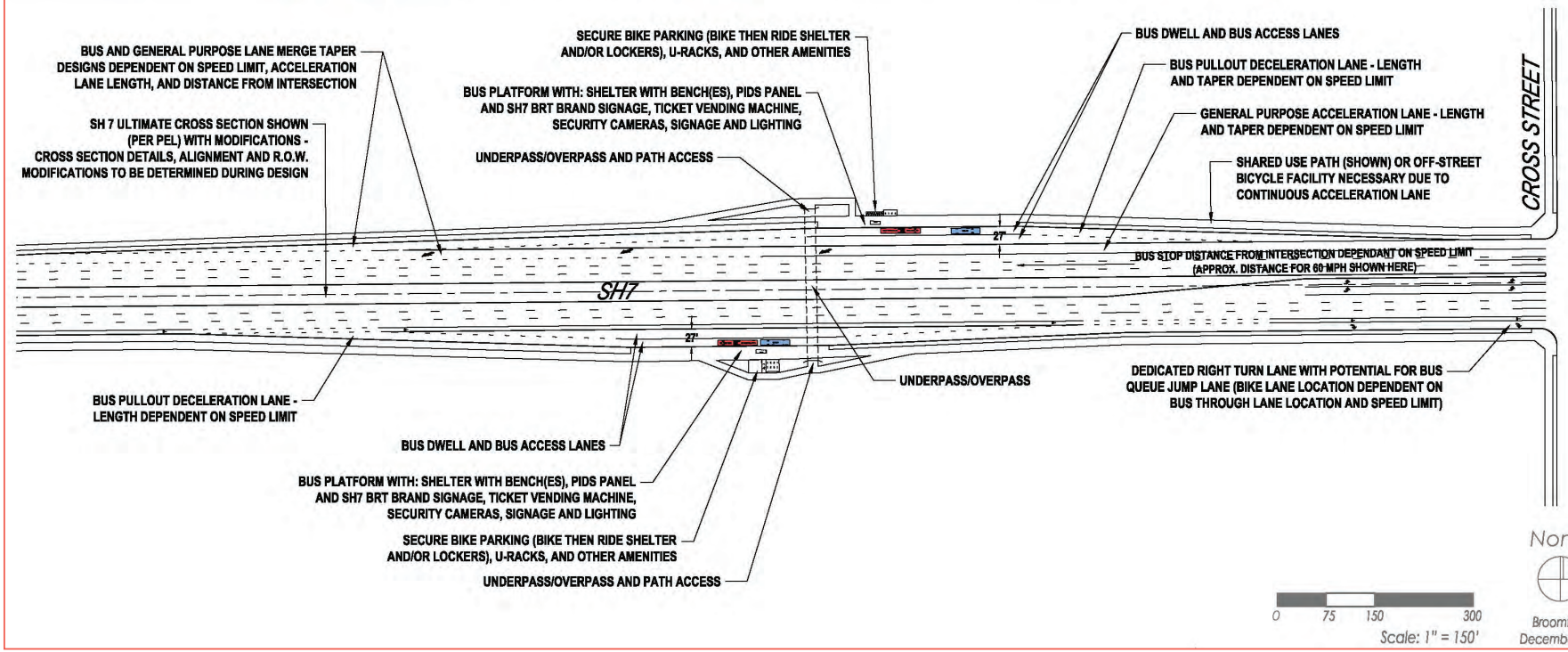


FIGURE 21
SH7 in Broomfield

Concept Notes:

- This is a potential station configuration and space constraints exercise, intended to give preliminary information on scale and BRT station components only. This station configuration is intended to provide information for consideration at a number of potential SH7 locations in Broomfield.
  - Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
  - Detailed information on road alignment, cross section, and ROW needs should be finalized during design.
  - Acceleration and deceleration lane lengths and tapers have not been detailed here and should be designed per CDOT and City and County of Broomfield standards.
- A multi-use path is planned for the whole SH7 BRT corridor, but is not shown in this concept.
- Underpass/overpass location to be determined based on engineering feasibility of utilities, grading and drainage, etc.



FIRST AND FINAL MILE (FFM) SUMMARY AND ACTIONS

The proposed SH7 BRT currently has one stop location in Broomfield (between the Sheridan and Huron intersections) and one shared with Thornton (I-25 Mobility Hub). The stop(s) between Sheridan and Huron have a mix of residential and employment uses which will require strong first and final mile connectivity. With future development anticipated that is also supportive of BRT, planning first and final mile connectivity into the proposed development is key to reducing single occupancy vehicle (SOV) trips to access transit.

To reduce the SOV trips, access by other means needs to be safe, reliable, frequent and comfortable. Creating wide sidewalks and low-stress bikeway networks is one method to achieve these goals. Making predictable and frequent shuttle or circulator loops is another method. Reducing the need for SOV trips will also reduce the need for parking at stations, making the BRT line less expensive to implement.

With future development coming on the corridor, there are potential options to build in park-and-ride facilities, micromobility options, and TNC circulation patterns as part of the adjacent development. Integrating these into the development will make the other methods for accessing the station easier and lower stress.

For both of the Broomfield stops, the study recommends high-quality pedestrian and bicycle facilities with new development and the consideration of a circulator bus/ or an autonomous vehicle (AV) shuttles. The purpose of an AV shuttle is to connect people from their residence or employment center to the transit stations. The shuttle could be on a dedicated route or be an on-demand service. This could also bring transit to help the transit-starved Anthem development generally southwest of SH7 and Sheridan Parkway.

- SH7 Station in Broomfield - The study looked at stop(s) between Sheridan and Huron for Broomfield. Since these two stations would be close to each other, the study combined these into one map of improvements. The recommendations are focused on arterial routes to the station areas. These arterial routes are a mix of multi-use paths, sidepaths, and bike lanes.

  The arterial routes to get people to the stations are focused on sidepaths on State Highway 7, Sheridan, Huron and multi-use trails through proposed development and along the Interstate. The proposed trails should be a minimum of 12' wide to provide three "lanes" of traffic for pedestrians and bicyclists.

  Since this station can be placed in vacant land with more space, a secure bicycle parking structure should be implemented with the station.

  Many of the existing developments have sidewalks and trails implemented, giving pedestrians choices on routing to the station. This practice should continue with all new development. Trail connections between the streets and sidewalks should also be considered in the layout and not be placed in locations not convenient for users.

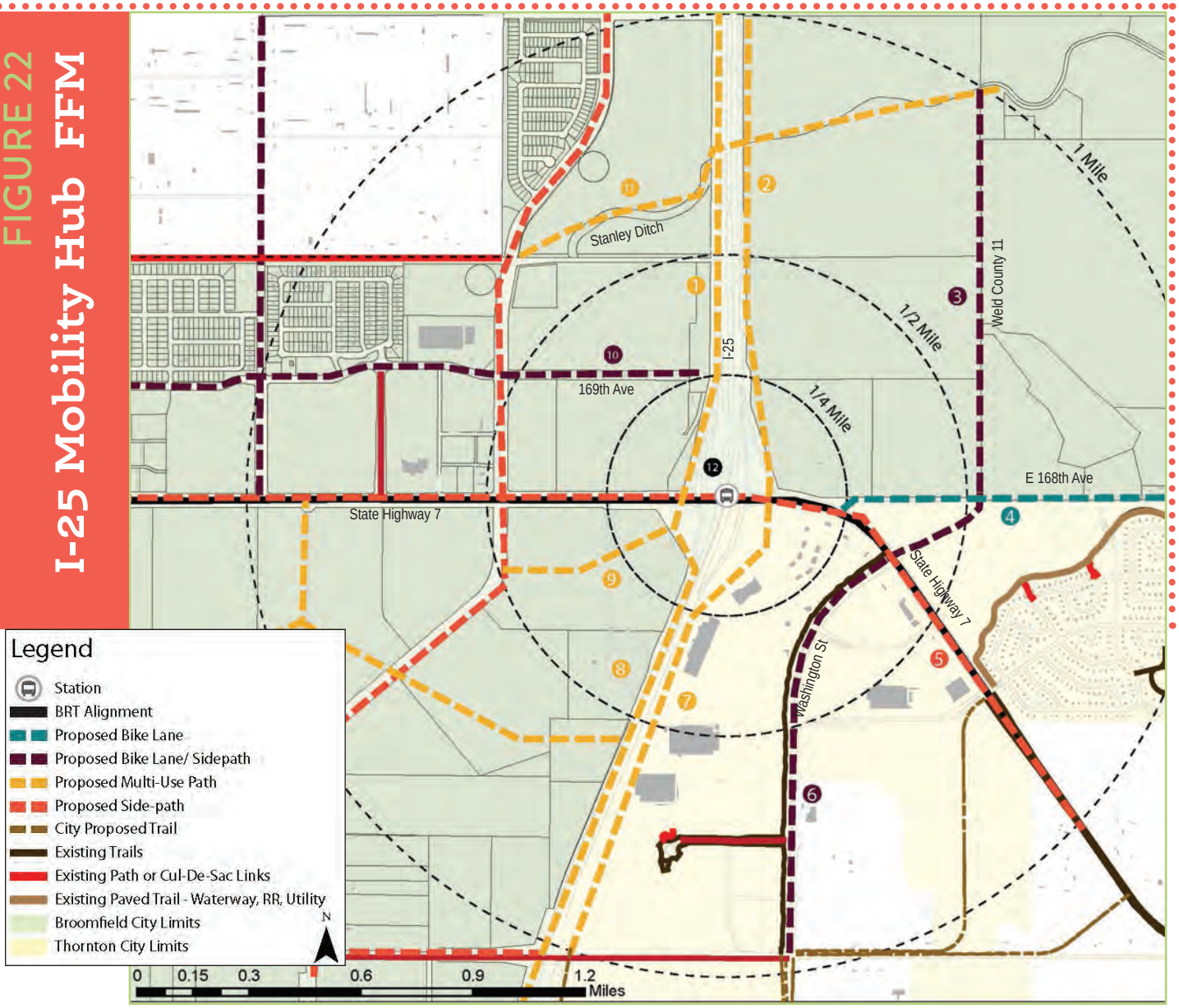
- I-25 Mobility Hub - The I-25 Mobility Hub is proposed for the interchange of I-25 and SH7. The southeast corner of this station is Thornton City Limit with the rest of the interchange being surrounded by Broomfield. This section will focus on the Broomfield recommendations. For Thornton recommendations, see the Thornton Section.

  The mobility hub will have trail connections to all corners of the interchange. To achieve first and final mile connectivity to the station, it will be important to provide facilities to connect to these trail connections. Adding trails adjacent to I-25 will also aid in providing connections for the proposed development to the mobility hub.

Secure bike parking, such as secure bike structures that allow for more bikes to be parked securely at the station in a smaller space, will be needed at stations. Sidewalk gaps also need to be evaluated, both with respect to pedestrian/ bike access and Americans with Disabilities Act (ADA) accessibility, and filled accordingly.

*****Full Size Images of FFM Figures 22 and 23 can be Found in Report Appendix, Pages 157 & 158-159.***

FIGURE 22
I-25 Mobility Hub FFM



Recommendations

1. **Proposed Multi-Use Path along I-25**
   Provide a multi-use path along each side of I-25 to provide a north-south connection.
2. **Proposed Multi-Use Path along Stanley Ditch**
   Provide a multi-use path along the side of Stanley Ditch. This was identified in trail master plans and provides a connection across I-25.
3. **Proposed Bike Lane/ Sidepath on Weld County 11**
   Provide a bike lane or sidepath on Weld County Road 11 based on traffic volumes and speeds. This will provide a key north-south connection.
4. **Proposed Bike Lane on E 168th Avenue**
   Provide a bike lane to provide an east-west connection from neighborhoods to the station. Review volumes and speeds to determine type of bike lane.
5. **Proposed Sidepaths on State Highway 7**
   Provide a 12' minimum sidepath on both sides of State Highway 7 to provide connectivity through the corridor. Consider widening path in areas with higher volumes of bicyclists and walkers. (i.e. station areas, destinations, etc.)
6. **Proposed Bike Lane/ Sidepath on Washington Street**
   Provide a bike lane or sidepath along Washington Street to provide a connection from the station to the commercial development.
7. **Proposed Multi-Use Path Between I-25 and Huron Street**
   Provide multi-use path through the proposed development to a proposed I-25 multi-use path to provide a low-stress connection through the neighborhood.
8. **Proposed Multi-Use Path Connection to Mobility Hub**
   Provide a low-stress connection to the mobility hub from Huron Street. The multi-use paths should be a minimum 12' wide to allow for multiple modes.
9. **Proposed Multi-Use Path Connection to Mobility Hub**
   Provide a low-stress connection to the mobility hub from Huron Street. The multi-use paths should be a minimum of 12' wide to allow for multiple modes.
10. **Proposed Bike Lane/ Sidepath on 169th Avenue**
    Provide either a bike lane or a sidepath on 169th Avenue. The facility will depend on the planned traffic volumes and speed for 169th Avenue.
11. **Proposed Multi-Use Path along Stanley Ditch**
    Provide a multi-use path along the side of Stanley Ditch. This was identified in trail master plans and provides a connection across I-25.
12. **Secure Bike Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycling parking.

NON-SPECIFIC LOCATION RECOMMENDATIONS

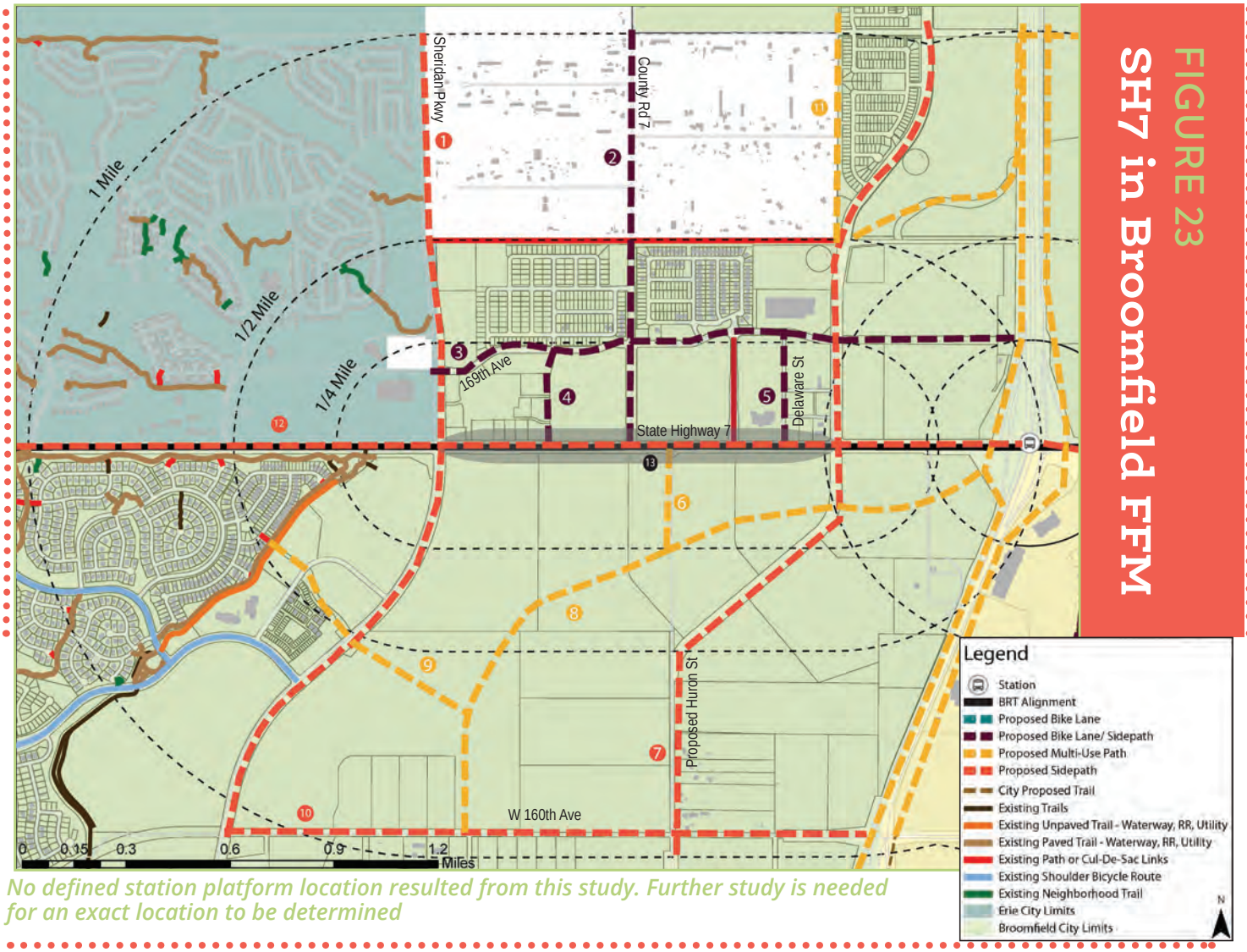
Sidewalk Gap Identification and Remediation

Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or other long-term bicycle parking. Provide space for micromobility options as well.

Circulator Bus/ AV Vehicle

Provide a route for a circulator bus or Autonomous Vehicle shuttle to connect people from the proposed developments to the stations. This could be a fixed route or on-demand.

FIGURE 23
SH7 in Broomfield FFM



No defined station platform location resulted from this study. Further study is needed for an exact location to be determined

Recommendations

1. **Proposed Sidepath on Sheridan Parkway**
   Provide a minimum 12' sidepath along at least one side of Sheridan Parkway to provide a low-stress north-south connection to the proposed station.
2. **Proposed Bike Lane/ Sidepath on County Road 7**
   Provide either a bike lane or a sidepath on County Road 7. The facility will depend on the planned traffic volumes and speeds for County Road 7.
3. **Proposed Bike Lane/ Sidepath on 169th Avenue**
   Provide either a bike lane or a sidepath on 169th Avenue. The facility will depend on the planned traffic volumes and speed for 169th Avenue.
4. **Proposed Bike Lane/ Sidepath through proposed development**
   Provide either a bike lane or a sidepath along roadway in proposed development. The facility will depend on planned traffic volumes and speeds for the road. This will also provide a connection to the #13 recommendation of an underpass.
5. **Proposed Bike Lane/ Sidepath on Delaware Street**
   Provide either a bike lane or a sidepath on Delaware Street. The facility will depend on the traffic volumes and speeds for Delaware Street.
6. **Proposed Multi-Use Path through proposed Development**
   Provide a multi-use path through the proposed development and a grade-separated crossing of State Highway 7 (exact location TBD based on development patterns and uses) to connect both sides of the sidepath along the road.
7. **Proposed Sidepath along the proposed Huron Street**
   Provide a minimum 12' sidepath on at least one side of the proposed Huron Street. This will serve as a collector to the main arterial routes to stations.
8. **Proposed Multi-Use Path through proposed development**
   Provide a multi-use path in the proposed development to connect the proposed development to the stations through a low-stress facility with limited roadway crossings.
9. **Proposed Multi-Use Path through proposed development**
   Provide a multi-use path through the proposed development connecting to the existing grade separated crossing of Sheridan Parkway.
10. **Proposed Sidepath on W 160th Avenue**
    Provide a minimum 12' sidepath along 160th Avenue to provide a low-stress east-west connection.
11. **Proposed Multi-Use Trail through dedicated right-of-way provided by Palisade Park Development**
    Provide a multi-use trail on dedicated right-of-way set aside in the development process of the Palisade Park development. This trail will help provide more low-stress connectivity north of SH7.
12. **Proposed Sidepath on State Highway 7**
    Create a 12' sidepath on both sides of State Highway 7 to provide connectivity throughout the corridor from the station to surrounding areas.
13. Provide a grade separated crossing of State Highway 7. The crossing should connect to the major employers planned for the corridor, retail, commercial and residential. The placement is critical to encouraging high usage and will be determined based on development patterns and uses.

NON-SPECIFIC LOCATION RECOMMENDATIONS

Secure Bicycle Parking at Station
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or other long-term bicycle parking. Provide space for micromobility options as well.

Sidewalk Gap Identification and Remediation
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

Circulator Bus/ AV Vehicle
Provide a route for a circulator bus or Autonomous Vehicle shuttle to connect people from the proposed developments to the station. This could be a fixed route or on-demand.

TRANSIT ORIENTED DEVELOPMENT (TOD) REVIEW

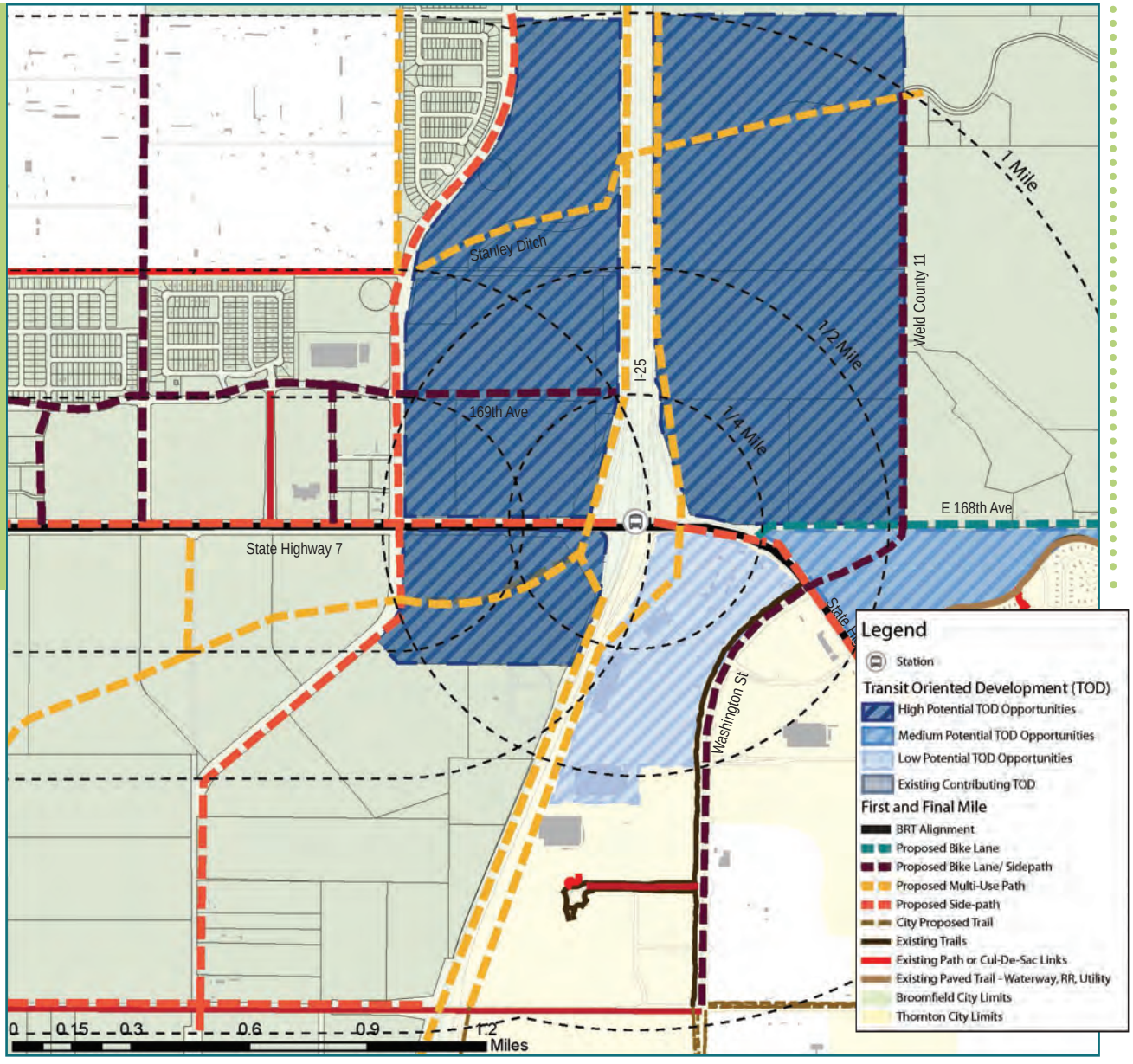
The proposed SH7 BRT currently has one to two stop locations in Broomfield (Sheridan and/or east of Palisade Parkway) and one shared with Thornton (I-25 Mobility Hub). The stop(s) between Sheridan and Palisade Parkway have a mix of residential and employment uses that constitute existing contributing TOD. With further opportunities for transit-oriented development to come that will also support the BRT line, connectivity between proposed developments and the BRT stations will be important if the developments are to be TOD.

For both Broomfield stops the study recommends the consideration of high-quality pedestrian and bicycle facilities and circulator buses or AV shuttles. The purpose of the shuttles is to connect people from their residences or employment centers to the transit stations. The shuttle could be a dedicated route or an on-demand service. This could also help improve transit access from existing transit-starved existing developments such as Anthem, the Palisade neighborhood and Children's Hospital as well as help future neighborhoods south of SH7 in Broomfield became more transit oriented.

- I-25 Mobility Hub - The I-25 Mobility Hub is proposed for the interchange of I-25 and SH7. The southeast corner of this station is Thornton City Limits with the rest of the interchange being surrounded by Broomfield. This section will focus on the Broomfield TOD opportunities. For the Thornton opportunities, see the Thornton Section.

  The mobility hub will have trail connections to all

FIGURE 24
I-25 Mobility Hub TOD



corners of the interchange, this offers opportunities to connect riders to transit supportive development around the stations despite potential access challenges presented by I-25. The entire area surrounding the proposed I-25 Mobility Hub on the three Broomfield corners is undeveloped land with a couple private residences. This whole area represents a High Potential TOD opportunity for the future that would support the proposed BRT in the area and serve to much better connect the area.

» SH7 Stop in Broomfield - The study looked at stops(s) between Sheridan and Huron in Broomfield. Since these two stations were close to each other, the study combines these into one map of potential TOD opportunities. Most of the area directly around SH7 between Sheridan and Huron is largely undeveloped agricultural land with a couple of residences. This presents High Potential opportunities for TOD (shown on the map in dark blue) in the area directly around the proposed BRT line that would provide additional support. For example, Baseline is a large master planned mixed-use community located southwest of I-25 and SH7. This 1,020+ acre development anticipates 17 million square feet of mixed commercial development and up to 9,000 residential units. The Children's Hospital is also located along this stretch of SH7 (shown in light blue) so that area is unlikely to develop further density, but the hospital provides a significant source of employment in the area that would contribute to BRT and any future TOD. The National Archives and Records Center is also unlikely to develop further (also shown in light blue) however there is a large amount of vacant land surrounding it that could offer potential, but it is slightly further from the station. The land shown in medium blue on the map represents a Medium Potential TOD opportunity since it is currently somewhat developed with small businesses and associated parking, but these could potentially fill in further and house more retail or residential development that would support BRT.

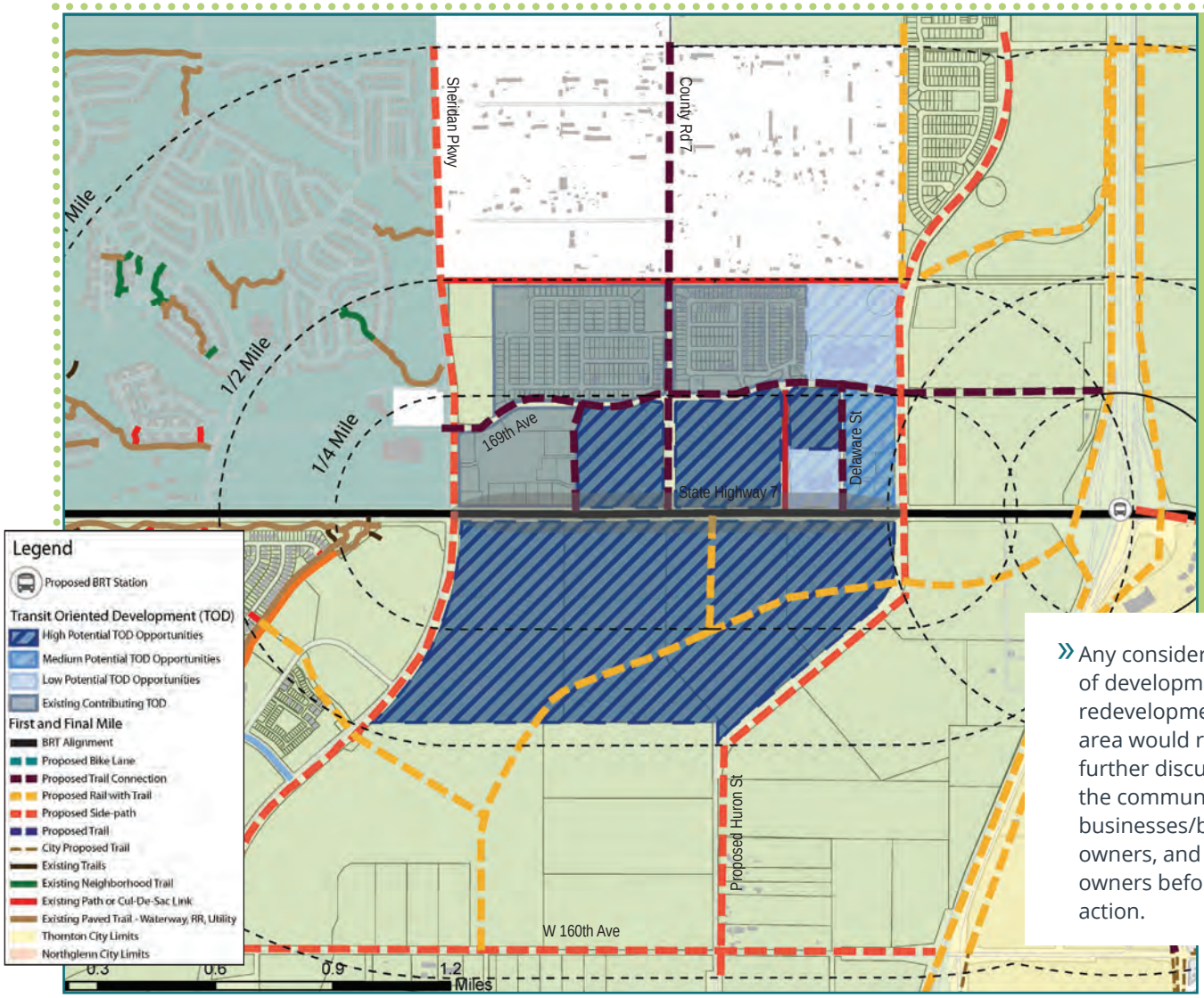


FIGURE 25
SH7 in Broomfield TOD

» Any considerations of development or redevelopment in this area would require further discussion with the community, residents, businesses/business owners, and property owners before taking any action.

I-25 and State Highway 7 Mobility Hub

State Highway 7 is well-positioned to develop as a corridor of local livability and multimodal regional access serving the North Metro area. The communities located immediately east and west of I-25 are poised for significant growth and development. The interchange at I-25 and State Highway 7 is not only critical to the multimodal success of both SH7 and I-25 corridors as well as regional transit services but is a visionary concept as a three-level mobility station serving local, regional and state transit services, with access to the N-Line station and future Front Range Passenger Rail.

The State Highway 7 interchange is planned to be a diverging diamond and accommodate center loading transit stations both for SH7 on the top level and for I-25 on the bottom level with direct access to and from the interstate manged lanes. Currently, a Park-N-Ride is planned in the southeast corner in Thornton. The other three corners are in Broomfield with a variety of potential land uses planned including commercial, residential and mixed-use. All four corners of the interchange are planned to be accessible to people walking and bicycling to the station by a multi-use path along SH7 with grade separations from the highway as well as on and off-ramps serving as a mid-level mezzanine.

In 2018 CDOT completed a concept design fro the Mobility Hub and interchange along with the I-25 North Segment 3 design with input from stakeholders including RTD, Broomfield, and Thornton. Appropriate designs for first and final mile access and amenities will need to be refined in the next phase of design for the Mobility Hub. The facility will be an integral link for local, regional and state transit operations access.

The I-25 and SH7 corridors will experience significant growth in the immediate future years. CDOT estimates that the interchange will reach failing operational levels in less than 10 years. Community stakeholders envisioned that interchange upgrades, including multimodal investments that increase the reliability, safety, and accessibility of transit, walking and bicycling, as a cost-effective and efficient way to increase capacity in the long term.

I-25/SH7 Interchange Mobility Hub, Source: CDOT

Key Benefits of the I-25/SH7 Mobility Hub as a Key Component of the SH7 Project and I-25 Investments:

- Accommodates current regional RTD LX service to Longmont, CDOT Bustang service connecting Fort Collins, Loveland/ Greeley Park-N-Ride to Denver
- Accommodates future SH7 BRT from Brighton to Boulder, regional Express Bus or BRT along I-25 corridor to other North Front Range communities beyond the Denver metro and RTD service area
- Accommodates extension of RTD end of line services to SH7, an extension of 6 miles from the current end of line station at I-25/120th Avenue Wagon Road Park-N-Ride
- The interchange is a state-of-the-art multi-modal facility, and the first of its kind in the country, connecting two

median transit stations on I-25 and SH7 with a fully grade-separated pedestrian/cyclist mezzanine. The project showcases Colorado's forward-thinking and CDOT's innovation in multimodal transportation

- Grade-separated pedestrian/ cyclist mezzanine allows for safer navigation for people of all ages and abilities walking and bicycling through the diverging diamond interchange without crossing traffic at-grade while also reducing delays for all modes
- The interchange equitably serves all four quadrants of the interchange and supports future development of major mixed-use TOD, residential, and commercial property
- Opportunities for federal grants, local agency partnerships, and public-private partnerships
- Planned development on the North Metro I-25 corridor, provides a significant opportunity to secure the ROW and construct the interchange before it becomes cost-prohibitive due to adjacent vacant land being built out

The mobility hub has been strategically designed to optimize transit movements for both SH7 and I-25, as well as provide an exclusive grade-separated multimodal mezzanine between the I-25 bus platform and the SH7 bus platform to allow for the most efficient transfer between bus and future innovative mobility services. The mobility hub also provides convenient passage for pedestrians and bikes to safely crossover I-25, with fully integrated first and final mile trail connections, to adjacent development along SH7 and I-25 as well as the regional trial system.

The I-25 and SH7 Mobility Hub was designed at the same time as the I-25 managed lanes project from E-470 to SH7. The importance of this is that ease of multimodal access above and beyond standard compliance was incorporated into the design of both the mobility hub and the I-25 managed lanes project. For instance, the I-25 managed lanes are designed with lower grades approaching SH7 to accommodate more gradual slopes to/from the mobility hub - translating into a more accessible, comfortable walk or bike ride to and from adjacent development and the regional trail system. Another important synergy between building the I-25 and SH7 mobility hub at the same time as the I-25 managed lanes from E-470 to SH7 is CDOT Region 1 estimates the remaining lifespan of the existing interchange will operationally fail in less than 10 years. Strategically investing in the mobility hub at I-25 and SH7 will ensure the I-25/SH7 interchange will operate for decades to come while adding multimodal capacity that currently does not exist.

ENVIRONMENTAL CONSIDERATIONS

The purpose of this review is to identify the existing conditions and the potential environmental impacts to resources as a result of the proposed SH 7 BRT Station Area Design Project. The station areas were evaluated to assess the environmental conditions using the station plans, Geographic Information Systems (GIS), and a desktop review. This review documents existing environmental conditions found in the project area. It should be noted that this study is considered "high level," and the data collected was obtained using desktop surveys. The following table summarizes each resource in the proposed Broomfield Station Areas.

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
PALISADE PARKWAY AND SH7				
	There is potential for black-tailed prairie dog (Cynomys ludovicianus) colonies within the project area. Black-tailed prairie dog burrows may provide potential nest sites for Burrowing Owls (Athene cunicularia). Burrowing Owls are a state threatened species and are protected under the Migratory Bird Treaty Act (MBTA). Grasses within the project area may provide potential nest sites for other birds protected by MBTA. Minimal large trees were noted within 0.5 mile of the project area; therefore, there is a low potential for raptor nests within 0.5 mile of the project area. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat for threatened, endangered, or state-sensitive species (other than for Burrowing Owls, described above) is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2018; USFWS, 2018). No natural drainages or ditches were visible in the project area; therefore, it is unlikely that WUS are present.	Painted light poles, with potential for lead-based paint, are located within the project area and north of the project area. A gas station is located approximately 440 feet northeast of the northeastern project area boundary.	The previously disturbed nature of this site has low potential for paleontology and archaeology resources to be found within the project area. The previously undisturbed nature of the parcel to the southwest has some potential for paleontology and archaeology resources to be found within the project area. One previous OAHP survey was recorded within or adjacent to the project area (History Colorado COMPASS database, 2018). No resources eligible for the National Register of Historic Places (NRHP) were identified in or adjacent to the project area. No parcels with a building or structure older than 50 years are located within or adjacent to the project area.	Hard surface trails in the form of detached sidewalks are located north of SH7 at Palisade Parkway, which are part of Broomfield Trail Links. These sidewalks run along the east side of Palisade Parkway, along Delaware Street, and on the north side of SH7 from the west side of Palisade Parkway to Huron Street (City and County of Broomfield, 2916). Proposed trails will be located along the north and south sides of SH7 from Sheridan Parkway to Huron Street (north of SH7). These trails are within the project area at Palisade Parkway and SH7 (City and County of Broomfield, 2016). No Section 6(f) resources are located near this proposed station.

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
HURON STREET AND SH7				
	Based on aerial imagery, black-tailed prairie dog colonies were noted within the southwest portion of the project area. Black-tailed prairie dog burrows may provide potential nest sites for Burrowing Owls. Burrowing Owls are a state threatened species and are protected under the MBTA. Grasses within the project area may provide potential nest sites for other birds protected under the MBTA. Minimal large trees were noted within 0.5 mile of the project area; therefore, there is low potential for raptor nests within 0.5 mile of the project area. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat for threatened, endangered, or state-sensitive species (other than for Burrowing Owls, described above) is minimal within the project area; therefore, it is unlikely these species occur in the project area (CHNP, 2018; USFWS, 2018). There is a small roadside ditch along the south side of SH7; however, it is unlikely that this ditch will be considered a WUS.	A pipeline, likely oil and gas-related, is located in the north central portion of the project area. A pole-mounted transformer is located in the project area, north of the Huron Street and SH7 intersection.	The previously disturbed nature of the parcels to the north and southeast of the proposed station location have low potential for paleontology and archaeology resources to be found within the project area. One previous OAHP survey was recorded within or adjacent to the project area (History Colorado COMPASS database, 2018). No resources eligible for the NRHP were identified in or adjacent to the project area. No parcels with a building or structure older than 50 years are located within or adjacent to the project area.	The City and County of Broomfield 2005 Open Space, Parks, Recreation, and Trails Master Plan shows proposed Preble Creek Open Lands southeast of the Sheridan Parkway and SH7 intersection and in additional locations south of SH7 between Sheridan and Huron Street (City and County of Broomfield, 2005). According to the 2016 Broomfield Trail Map, proposed trails will be located along the north and south sides of SH7 from Sheridan Parkway to Huron Street (north of SH7). These trails are within the project area at Huron Street and SH7 (City and County of Broomfield, 2016). No Section 6(f) resources are located near this proposed station.
COUNTY ROAD 7 AND SH7				
	Based on aerial imagery, black-tailed prairie dog colonies were noted within the southern portion of the project area. Black-tailed prairie dog burrows may provide potential nest sites for Burrowing Owls. Burrowing Owls are a state threatened species and are protected under the MBTA.	There is one pad-mounted electrical transformer approximately 20 feet north of the northern project area boundary. An additional pad-mounted	The previously disturbed nature of the parcels to the north and southeast of the proposed station location have low potential for paleontology and archaeology resources to be found within the project area.	According to the 2016 Broomfield Trail Map, proposed trails will be located along the north and south sides of SH7 from the Sheridan Parkway to Huron Street (north of SH7). These trails are within the project area at County Road 7 and SH7.

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
COUNTY ROAD 7 AND SH7 CONTINUED				
	Grasses within the project area may provide potential nest sites for other birds protected under the MBTA. Minimal large trees were noted within 0.5 mile of the project area; therefore, there is low potential for raptor nests within 0.5 mile of the project area. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat for threatened, endangered, or state-sensitive species (other than for Burrowing Owls, described above) is minimal within the project ates; therefore, it is unlikely these species occur in the project area (CHNP, 2018; USFWS, 2018). There is a small roadside ditch along the south side of SH7; however, it is unlikely that his ditch will be considered a WUS.	transformer is located in the project area, northwest of the intersection. One pole-mounted transformer is located in the project area, northwest of the intersection and west of the pad-mounted transformer. There is one likely-oil and gas-related pipeline approximately 350 feet west of the project area.	The previously undisturbed nature of the parcel to the south has some potential for paleontology and archaeology resources to be found within the project area. One previous OAHP survey was recorded within or adjacent to the project area (History Colorado COMPASS database, 2018). No resources eligible for the National Register of Historic Places (NRHP) were identified in or adjacent to the project area. No parcels with a building or structure older than 50 years are located within or adjacent to the project area.	A proposed trail will also be located along the east side of County Road 7 north of SH7 (City and County of Broomfield, 2016). No Section 6(f) resources are located near this proposed station.
SHERIDAN PARKWAY AND SH7				
	There is potential for black-tailed prairie dog colonies within the project area. Black-tailed prairie dog burrows may provide potential nest sites for Burrowing Owls. Burrowing Owls are a state threatened species and are protected under the MBTA. Grasses within the project area may provide nest sites for other birds protected under the MBTA. Minimal large trees were noted within 0.5 mile of the project area; therefore, there is a low potential for raptor nests within 0.5 mile of the project area.	A gas station is located approximately 100-feet north of the northwestern project area boundary. Painted light poles, with potential for lead-based paint, are located along SH7 in the project area.	The previously disturbed nature of this site has low potential for paleontology and archaeology resources to be found within the project area. Three previous OAHP surveys were recorded within or adjacent to the project area (History Colorado, COMPASS database, 2018). No resources eligible for the NRHP were identified in or adjacent to the project area.	The City and County of Broomfield 2005 Open Space, Parks, Recreation and Trails Master Plan shows proposed Preble Creek Open Lands southeast of the Sheridan Parkway and SH7 intersection and in additional locations south of SH7 between Sheridan Parkway and Huron (City and County of Broomfield, 2005) According to the 2016 Broomfield Trail Map, an on-street bike lane is located along

Environmental Resources

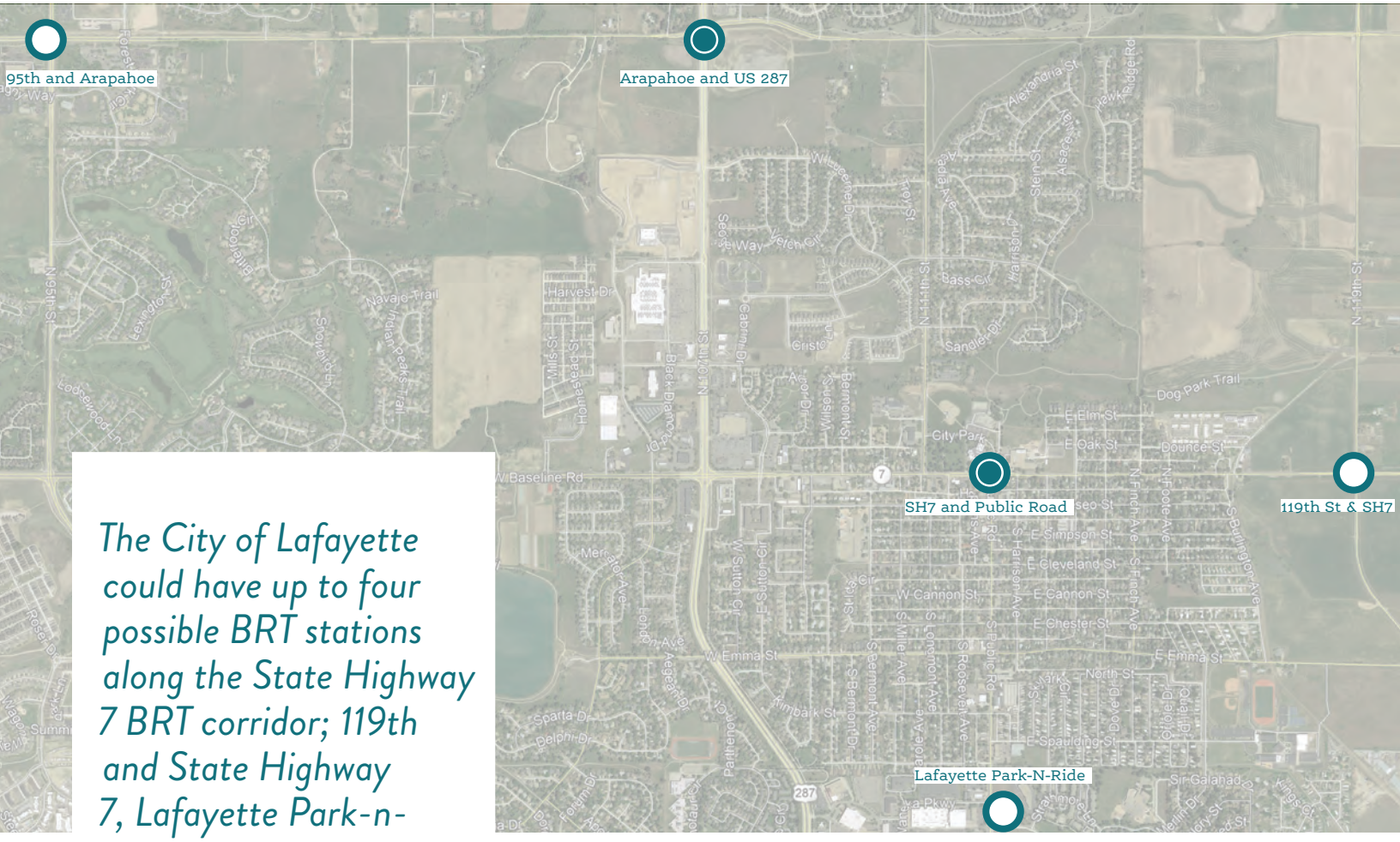
	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
SHERIDAN PARKWAY AND SH7 CONTINUED				
	Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat for threatened, endangered, or state-sensitive species (other than for Burrowing Owls, described above) is minimal within the project area; therefore, it is unlikely these species occur in the project area (CHNP, 2018; USFWS, 2018). No natural drainages or ditches were visible in the project area; therefore, it is unlikely that WUS are present.	Five pad-mounted transformers are located in the project area: three in the southeastern portion, one in the northeastern portion, and one in the southwestern portion. Additionally, four pad-mounted transformers are located northwest of the project area within 500-feet.	No parcels with a building or structure older than 50 years are located within or adjacent to the project area.	Sheridan Parkway south of SH7, but it does not appear to extend north of SH7. On-street bike lanes are usually not considered 4(f) resources. A regional trail is shown extending north of SH7 along Sheridan Parkway. In addition, proposed trails will be located along the north and south sides of SH7 from Sheridan Parkway to Huron Street (north of SH7). These trails are within the project area at Sheridan Parkway and SH7 (City and County of Broomfield, 2016) Proposed trails will also be located on either side of Sheridan Parkway, south of SH7. According to the Broomfield Open Space, Parks, Recreation, and Trails Master Plan Community and Regional Missing Links map these are depicted as the proposed Preble Creek Trails (Broomfield, 2005). "Other Private/Public Open Space" exists at the southwest corner of Sheridan Parkway and SH7 (City and County of Broomfield 2016 Trails Map. It is unknown if this open space is considered a 4(f) resource. No Section 6(f) resources are located near this proposed station.

Lafayette/Erie

STATION DETAILS

LAFAYETTE BRT STATION OVERVIEW

The City of Lafayette could have up to four possible BRT stations along the State Highway 7 BRT corridor. The possible stations include the 119th and State Highway 7 intersections, the Lafayette Park-n-Ride on Public Road, the intersection of Public Road and State Highway 7, the Arapahoe Road and US 287 area, and the 95th and State Highway 7 intersection. The ***State Highway 7 Bus Rapid Transit Feasibility Study*** identified local and regional BRT Routes that deviate at the 119th intersection. The regional routing would not turn at this intersection, it proceeds east and west using BRT lanes. The local BRT routing would make turns at this intersection to access the Lafayette Park-n-Ride.



The City of Lafayette could have up to four possible BRT stations along the State Highway 7 BRT corridor; 119th and State Highway 7, Lafayette Park-n-Ride on Public Road, Public Road and SH7, Arapahoe Road and US 287, and 95th and State Highway 7.

The stations in Lafayette are a mix of on-street, right turn island, and Park-n-Ride designs. Some of the proposed stations are at locations that reconfigure the current RTD Jump bus stops with enhanced features found at BRT stations. The planning concepts identified during this planning process are being integrated into designs underway at the 119th, Lafayette Park-N-Ride and 95th street intersections. First and final mile (FFM) mapping was prepared as part of this planning effort and is included in this section. The US 287 and

Arapahoe first and final mapping will be completed in future planning efforts when the final station location is determined.

LAFAYETTE/ERIE STATION OVERVIEW

The City of Lafayette and the Town of Erie have shared SH7 BRT stations planned at the 119th intersection and the Arapahoe and US 287 intersection. Staff from both communities worked together during this process to identify collaborative solutions for integrating the stations into their communities. During this process planning level concepts were identified as a starting point for future engineering and evaluation studies. These shared station areas will be adjacent to future mixed-use development projects that will change the current travel patterns in the area. The communities will continue to use the planning concepts in this section when they collaborate on future land use and multimodal transportation plans for this area. The US 287 and Arapahoe first and final mile mapping will be completed in a future planning effort when the final station location is determined.

TRAFFIC AND SAFETY CONDITIONS

This roadway segment currently has one lane in each direction with added turn lanes at intersections and a two way left turn lane for a portion of this segment east of US 287. SH7 joins US 287 to make a north-south jog in the middle of this roadway segment. In the one-mile section of US 287 shared by SH7 there are two lanes in each direction with added turn lanes at intersections. Painted and raised medians occur at points throughout this segment.

SH7 east of 287 in the Lafayette/Erie segment is anticipated to remain between 19,800 and 15,100 average daily traffic in future build-out conditions (with ***Planning and Environmental Linkage*** (PEL) document improvements). The average daily traffic (ADT) west of US 287 is anticipated to be between 19,900 and 24,600 in 2040 conditions according to PELs done for these segments. The cross section is anticipated to remain the same in this segment in future conditions, with only minor modifications throughout. The existing roadway classification is NR-A with a 45 mph speed limit on SH7 east of 119th Street, NR-C and 30 to 65 mph between 119th Street and US 287, NR-A and 50 mph on US 287, and NR-A with a 50 mph speed limit on SH7 west of US 287.

Currently, people on bicycle and on foot frequently use SH7 and intersecting roadways near the proposed Public Road station, with less frequent pedestrian and bicyclists use at the 119th Street, US 287, and 95th Street station area.

119TH STATION DESIGN SUMMARY

The 119th Street station, which is in the City of Lafayette on three corners and in the Town of Erie on one corner, was designed as an in-line "intersection" station where riders primarily arrive at the station on bicycle or on foot due to potential future developments in the station area. Improvements currently being designed for this intersection show through lane and turn lane additions on all approaches to accommodate PEL recommendations. The proposed station concept accommodates these proposed improvements and slightly modified the right turn bypass (right-turn) islands to allow for inclusion of an island bus stop.

The stops at the 119th Street station are proposed on the northwest and southwest corners due to the Regional Transportation District (RTD)'s preference for far-side stops and to accommodate the potential for bus queue-jump from the right turn lane. The modifications to the proposed right-turn islands necessary to accommodate a BRT station mean that the intersection's footprint

slightly increases on these two corners. In addition, a potential future bus stop downstream of the enhanced right-turn island station stop is shown on the northwest and southeast corners to accommodate buses turning onto SH7 from intersecting routes. Those on bicycles or traveling on foot along SH7 would approach this station using the proposed multi-use path rather than an on-street bicycle facility as originally shown in intersection improvement plans.

As with all concepts and designs in this report, roadway cross section in relation to existing or future right of way (ROW) shown on the plan is schematic in nature; as such, geometry and alignment of the enhanced right-turn islands may change significantly with additional information and design.

PUBLIC ROAD DESIGN SUMMARY

The Public Road station, which is in the City of Lafayette, was designed as an in-line "intersection" station with access to the station primarily by bicycle or on foot due to existing buildings and constrained right of way in the station area. Few roadway or right of way modifications are anticipated for SH7 at Public Road, so the roadway cross section and intersection configuration is anticipated to remain as it currently is. As such, the proposed station was designed to fit into the existing roadway configuration to the extent possible.

The stops are proposed on the western leg of the intersection due to intersection configuration and bus routing accommodation. The eastbound stop is proposed to be setback from the intersection at the beginning of the eastbound right turn lane due to building proximity to the existing roadway and potential future right of way availability for necessary amenities (shelter, platform, etc). The westbound stop is set back 120 feet from the intersection to allow buses turning northbound to westbound off of Public Road to "square up" to the curb and to provide a queuing space for northbound left turners that doesn't block the intersection.

Most bus station amenities at this station may have potential right of way impacts. Ideal configuration of these amenities in relation to the proposed platform should be refined when additional right of way potential has been identified. People traveling on bicycles and on foot will be accommodated adjacent to this station on existing sidewalks, which are proposed to be widened and enhanced to provide a multi-use path configuration.

US 287 DESIGN SUMMARY

The median station on US 287 station, which has potential to be in the City of Lafayette and/or Town of Erie, is proposed somewhere near the northern intersection of US 287 and SH7. The project team and stakeholders from Lafayette, Erie, RTD, and the Colorado Department of Transportation (CDOT) explored numerous ideas for station configuration and location, ranging from a median station of US 287 on the south leg of the intersection to a park and ride in a future town center-type development to the southeast or southwest of the intersection, to an in-line station along the western leg of the intersection. Alternate routing of the BRT service to not run along US 287 was also considered. See pages 87 and 88 for a matrix of alternative station configurations and their relative merits. In addition, rough concepts for center-running stations and roadside "pull-out" stations were developed but not finalized as formal concepts at this stage. Ultimately, station type or location selection was not made, as additional data, near-term future development decisions, and agency input are pending.

95TH STREET DESIGN SUMMARY

The 95th Street station location is in Lafayette, and is designed as an in-line station within a business access turn (BAT) lane. The roadway configuration shown in the proposed concept was developed in coordination with Boulder County and CDOT, based on extending the East Arapahoe concept cross section through 95th. As such, it shows an additional through lane and BAT lane on SH7 (Arapahoe Road) and an additional turn lane and bike lanes on 95th Street. This station is designed to accommodate buses stopping in the BAT lane on the southeast and northwest corners of the intersection, which also allows potential for queue jumps at the intersection.

An enhanced multi-use path along both the north and south sides of the roadway is proposed to accommodate bicycle and pedestrian access to the station. While there are currently separated sidewalks on every corner of the intersection (northwest corner does not connect with the intersection), available GIS-based right of way information does not give enough definition to determine whether these sidewalks are within the right of way and therefore usable for station access purposes. As such, roadway-adjacent multi-use paths are shown as a placeholder.

As with all stations, typical station amenities such as shelter, ticket vending machines, bicycle parking, and signage will be necessary at this station but is not shown in detail on these plans. In addition, while the proposed concept fits within the existing right of way, grading and drainage challenges on multiple corners may require modification to the design or work outside of the right of way.

FIGURE 26
119th St. and SH7

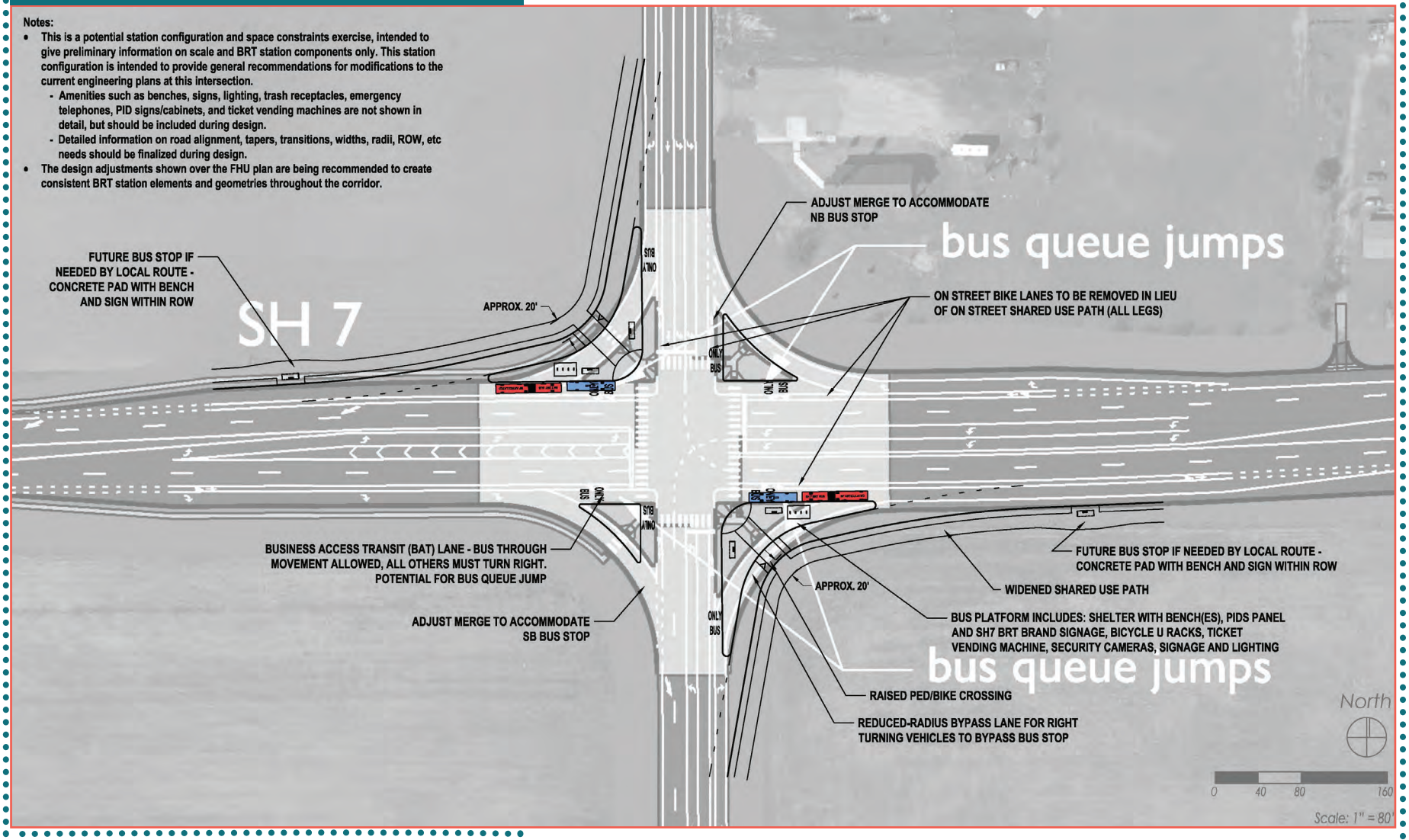


FIGURE 27
Public Rd & Baseline Ave

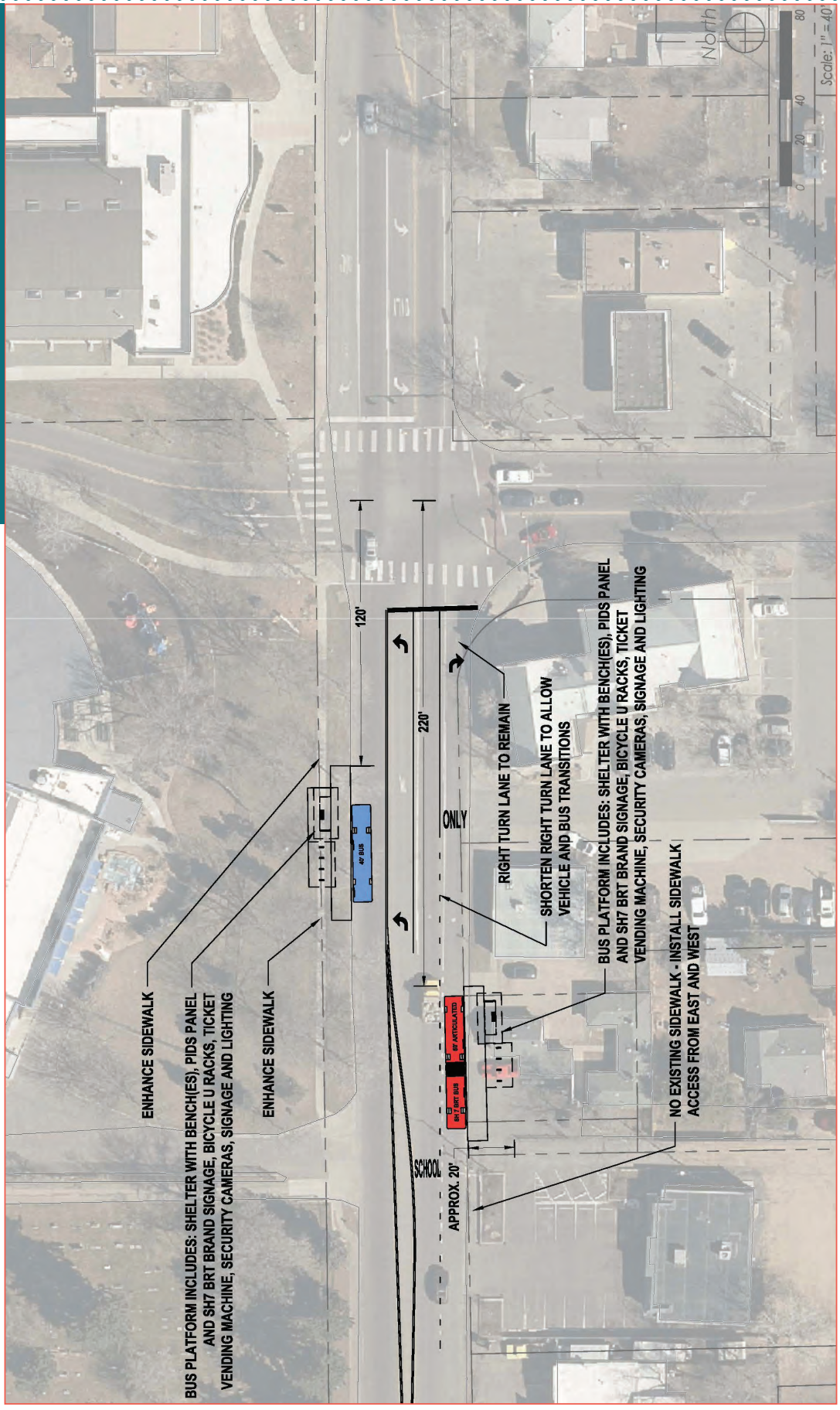


FIGURE 28
US 287

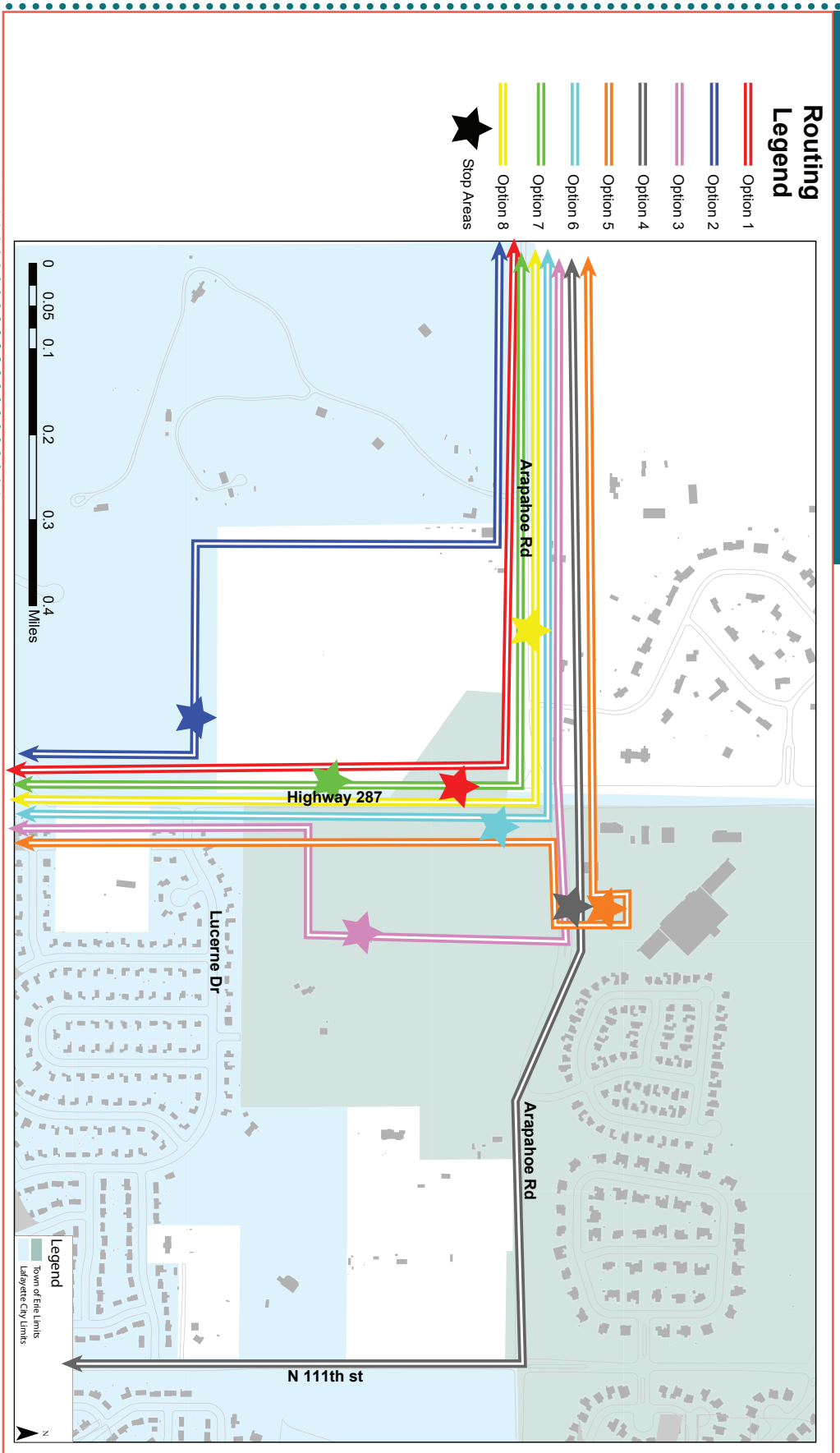
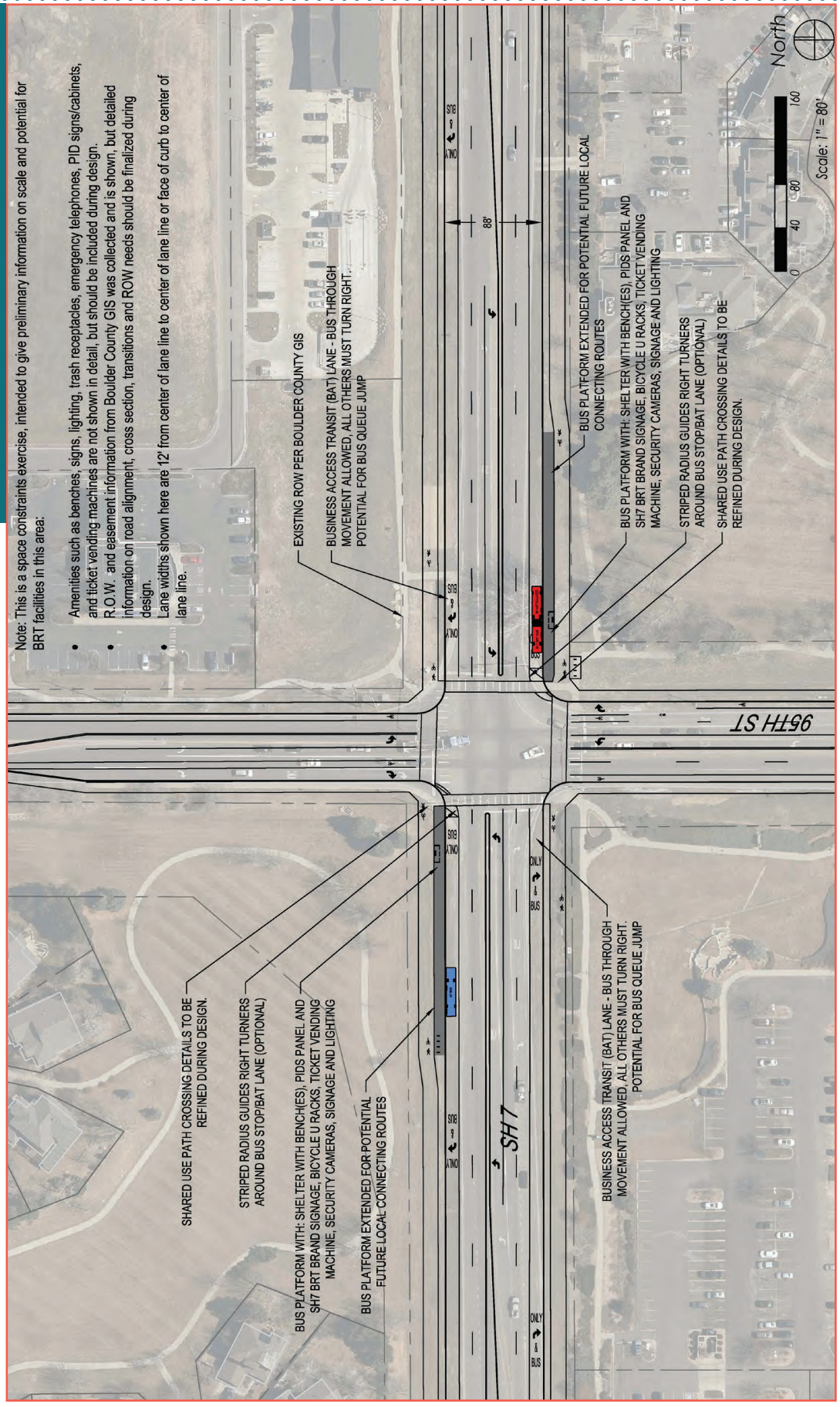


FIGURE 29
95th St. and SH7



US 287 AND SH7 STATION ALTERNATIVES MATRIX

STATION OPTIONS	SH7 BRT STOP LOCATIONS AND INTERSECTION DESIGN	TRANSIT SIGNAL PRIORITY (TSP)	FIRST AND FINAL MILE (FFM)	TRANSIT ORIENTED DEVELOPMENT (TOD)	BUS CONNECTIVITY	BUS OPERATIONS AND SPEED	TRAFFIC OPERATIONS	ECONOMIC DEVELOPMENT	CAPITOL COSTS (COMPARED TO ALL 8 OPTIONS)	PARKING	STATION USABILITY
1 287 Station (US 287 Routing)	Both stations south leg of 287/ Arapahoe	Transit signal priority required for WB buses	New connections required for this location	Low to Moderate	Buses on US 287 can access stations	Minimal bus delay with TSP	TSP could increase delay for people in cars	Low to Moderate	Low	Shared parking for Park N Ride	Passengers must cross high speed US 287 Intersection
2 287 Station (with 111th Routing)	Both stations on Arapahoe, near side at the 287 intersection	TPS to extend green for uses at near side stops traveling east and west	New connections required for this location	Low to Moderate	Buses on US 287 would require additional stations	Minimal bus delay with TSP	TSP could increase delay for people in vehicles	Low to Moderate	Low	Shared parking for Park N Ride	Passengers must cross high speed US 287 intersection
3 287 CFI Station	Reconstruct as Continuous Flow Intersection (CFI) with stops in the southwest corner	None	New connections required for this location	Low to Moderate	Buses on US 287 would require additional stations	Minimal bus delay with CFI design	CFI could reduce delay for people driving and riding bus	Low to Moderate	High	Shared parking for Park N Ride	Passengers have cross platform connections and reduced crossing distances
4 287 Center Station	Reconstruct with center station between Arapahoe and Lucerne with stops on the western leg	TSP required to get BRT in and out of center station	Overpass connects future Erie and Lafayette FFM network	Moderate	Buses on US 287 could use the SH7 BRT center station	Minimal bus delay with TSP and center station	Center station could reduce delay for people driving	Moderate	High	Adjacent parking for Park N Ride	Passengers have cross platform connections and overpass
5 287 West Super Stations	On street stations west of 287	Not Required	New connections required for this location	Low	Buses on US 287 would require additional stations	Increased bus delay without intersection TSP	Increased vehicle delay on Arapahoe for dwelling buses	Low	Low	Shared Parking for Park N Ride	Passengers must cross Arapahoe with mid-block RRFB

US 287 AND SH7 STATION ALTERNATIVES MATRIX CONTINUED

STATION OPTIONS	SH7 BRT STOP LOCATIONS AND INTERSECTION DESIGN	TRANSIT SIGNAL PRIORITY (TSP)	FIRST AND FINAL MILE (FFM)	TRANSIT ORIENTED DEVELOPMENT (TOD)	BUS CONNECTIVITY	BUS OPERATIONS AND SPEED	TRAFFIC OPERATIONS	ECONOMIC DEVELOPMENT	CAPITOL COSTS (COMPARED TO ALL 8 OPTIONS)	PARKING	STATION USABILITY
6 Lucerne Station	Buses use existing and planned intersection geometry on west leg of Lucerne/287 intersection	Not Required	Connects to Lafayette's FFM network	Moderate	Buses on US 287 would require additional stations	Reduced travel time on lower volume roads	No change for people in vehicles	Moderate	Low	Shared parking for Park N Ride	Passengers must cross high speed US 287 intersection
7 Nine Mile Town Center Station	Buses use existing and planned intersection geometry for stations in proposed Town Center development	Not Required	Connects to Erie's FFM network	Moderate	Buses on US 287 would require additional stations	Increased travel time circulating in Town Center	No change for people in vehicles	Moderate	Moderate	Shared parking in structured parking	Passengers connect on Transit Street
8 New Erie 287 Park N Ride	Off-street bus bays in undeveloped parcel south of Safeway	Not Required	Connects to Erie's FFM network	Low	Buses on US 287 could utilize this Park N Ride with minor detour	Increased travel time accessing new Erie Park N Ride	No change for people in vehicles	Low	Moderate	Shared parking in structured parking	Passengers have cross platform connections at Park N Ride

**Full Size Images of Figures 26, 27 and 29 can be Found in Report Appendix, Pages 144, 145, and 146.*

***Full Size Images of FFM Figures 30, 31, 32 and 33 can be Found in Report Appendix, Pages 160, 161, 162 & 163.*

FIRST AND FINAL MILE (FFM) SUMMARY AND ACTIONS

The proposed SH7 BRT currently has five stop locations in Lafayette/Erie. The stops are at 119th Street, Public Road, the existing Park-and-Ride, 95th street and a stop on 287. The stop on 287 was only evaluated for routing options at this time and has it's own section. The 119th stop is mostly in greenfield development, and the other three stops are mostly fully developed around the station area. The main goal of the first and final mile planning for these stations is connecting Lafayette residents and businesses to the stations in a low-stress manner.

- 119th Street Station - The 119th Street station is surrounded completely with undeveloped land. It is assumed this land will be developed and it is essential that facilities be planned to provide connectivity for first and final mile. Other connectivity will come through the use of arterial routes that consist of sidepaths, bike lanes, and bike boulevards, all of which need to be evaluated to see if they are the appropriate facility for the proposed route.

  The arterial routes to get people to the stations are focused on sidepaths on State Highway 7 and 119th/ 120th Street, multi-use trails through proposed development and bike lanes/ bike boulevards on several streets through Old Town Lafayette. The proposed trails should be a minimum of 12' wide to provide three "lanes" of traffic for pedestrians and bicyclists.

  Since this station can be placed in vacant land with more space, a secure bicycle parking structure should be implemented with the station.

  Sidewalks need to be evaluated to fill in any gaps in the sidewalks to access the station. The sidewalk gaps need to be evaluated using the arterial routes first then move into collector routes once arterial routes are completed. While the vacant land will not have sidewalks, proposed sidepaths will aid users in accessing the station.

- SH7 and Public Road Station - The SH7 and Public Road Station is located at the Northern end of the main commercial street in Old Town Lafayette and is immediately surrounded by a school, residential and commercial development and the recreation center. Since the surrounding area is completely built out, the recommendations focused on arterial routes and existing infrastructure.

  The arterial routes for the station are Public Road, State Highway 7, and a network of bike boulevards in Old Town Lafayette. Due to the constrained section of State Highway 7, the proposed facility will need more study if a sidepath is possible or a combination of protected bicycle lane and sidewalk.

  A secure bicycle parking shelter may be hard to place at the station area due to space constraints. Adaptive reuse of vacant buildings or areas that may be acquired to facilitate BRT and roadway improvements could be utilized.

- Lafayette Park and Ride - The Lafayette Park and Ride is located at the southern end of the main commercial street in Old Town Lafayette and exists today as a park and ride. While there is some connectivity to the existing station, better connectivity is possible with facilities on arterial routes.

  The arterial routes for the station are Public Road, Waneka Parkway, Avalon Avenue, Miners Drive and Coal Creek Drive. Other roads are shown as proposed routes to connect to these main routes, creating a network of options for users to access the station area. The proposed improvements will need to be evaluated to confirm the appropriate facility for the road type.

  The existing site may be difficult to place a secure bicycle shelter, but it could be possible on land adjacent to the station. The site will need to be evaluated for the feasibility of such a secure bike shelter.

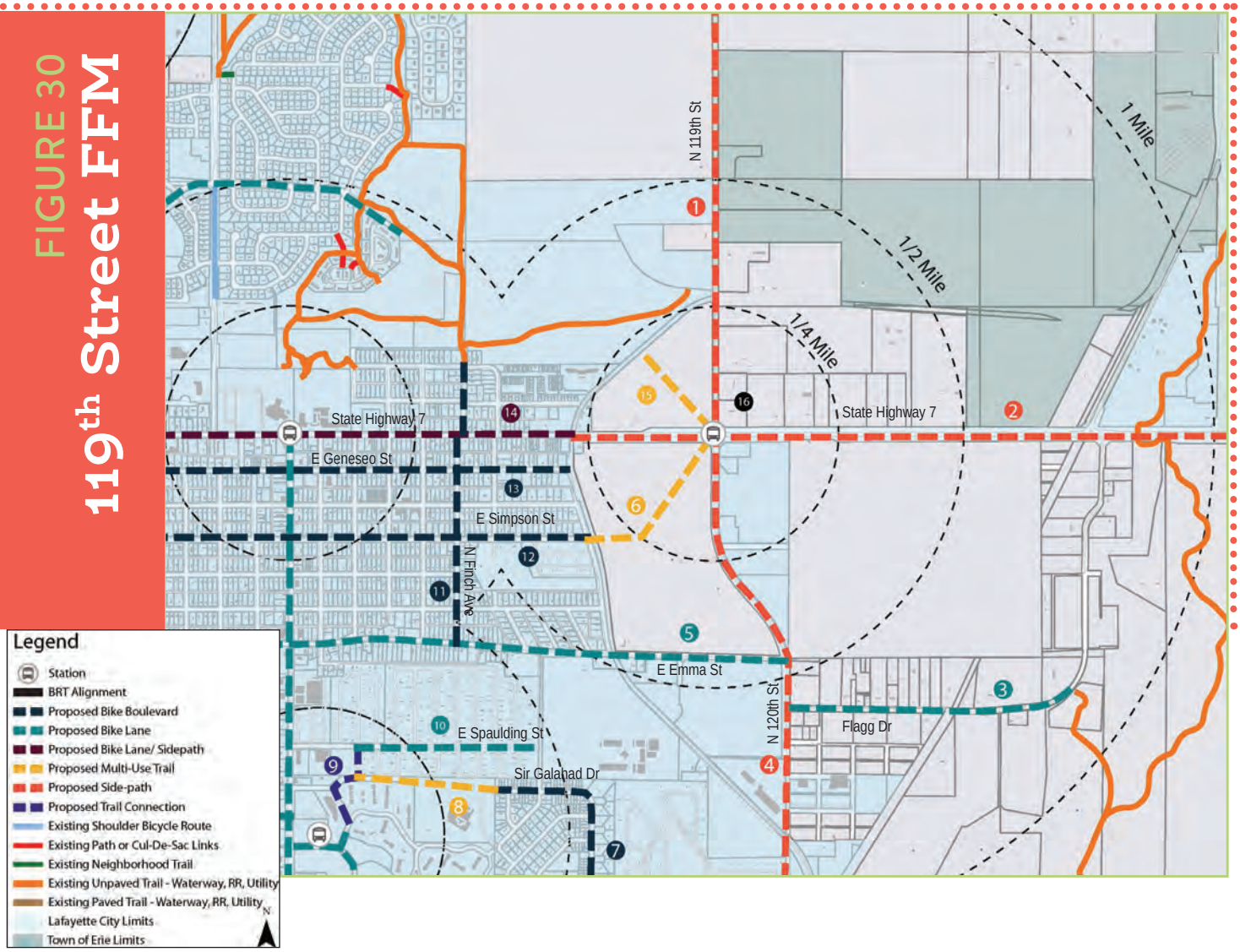
- 95th Street - The 95th Street station is located at the intersection of 95th Street and SH7. The existing intersection is mostly developed with commercial and residential surrounding the intersection. To connect users to the station area is much more difficult due to the existing development patterns.

  The arterial routes to the station are 95th Street and SH7. Those roads will need to be evaluated for the appropriate facility. Proposed trails between existing developments and along vacant parcels will help connect users to the arterial routes.

  There is some room adjacent to the proposed station to place a secure bike parking shelter.

Secure bike parking, such as secure bike structures that allow for more bikes to be parked securely at the station in a smaller space, will be needed at stations. Sidewalk gaps also need to be evaluated, both with respect to pedestrian/ bike access and Americans with Disabilities Act (ADA) accessibility, and filled accordingly.

FIGURE 30
119th Street FFM



Recommendations

1. **Proposed Sidepath on N 119th Street**
   Provide a sidepath on at least one side of 119th Street to provide a low-stress facility.
2. **Proposed Sidepath on State Highway 7**
   Provide a sidepath on at least one side of State Highway 7 to provide connectivity through the corridor.
3. **Proposed Bike Line on Flagg Drive**
   Provide a bike line on Flagg Drive to connect trails and neighborhoods to 120th Street.
4. **Proposed Sidepath N 120th Street**
   Provide a sidepath on at least one side of 120th Street to provide a low-stress facility.
5. **Proposed Bike Lane on E Emma Street**
   Review existing bicycle facilities on Emma Street to upgrade existing facilities to create a major east/west low-stress facility in Lafayette.
6. **Proposed Multi-Use Trail to E Simpson Street**
   Provide a trail to connect Simpson Street to 119th Avenue Station.
7. **Proposed Bike Boulevard on Sir Galahad Drive**
   Develop a bicycle boulevard on Sir Galahad Drive to connect neighborhoods to trail network.
8. **Proposed Multi-Use Trail from Sir Galahad to existing trail**
   Expand existing trails near the Park-and-Ride to connect existing neighborhoods.
9. **Proposed Trail Connection from Spaulding Street**
   Provide a trail connection from the mobile home neighborhoods to the Lafayette Park-and-Ride. This is an existing desire line path.
10. **Proposed Bike Lane on E Spaulding Street**
    Add a dedicated bicycle facility on Spaulding Street to provide dedicated space for people who bike.
11. **Proposed Bike Boulevard on N Finch Avenue**
    Develop a bicycle boulevard on Finch Avenue to provide a low-stress north/south connection.
12. **Proposed Bike Boulevard on E Simpson Street**
    Develop a bike boulevard on Simpson Street to provide an east/west low-stress facility to connect to 119th Avenue Station.
13. **Proposed Bike Boulevard on E Geneseo Street**
    Develop a bike boulevard on Geneseo Street to provide a low-stress facility one block away from State Highway 7.
14. **Proposed Bike Lane/Sidepath on State Highway 7**
    Create a protected bike lane or sidepath along State Highway 7 to provide a low-stress facility.
15. **Proposed Multi-Use Trail to connect Regional Trail to Station**
    Connect proposed regional trail on old rail line ROW to station as development occurs.
16. **Secure Bicycle Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers or long-term bicycle parking.
17. **Sidewalk Gap Identification and Remediation**
    Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

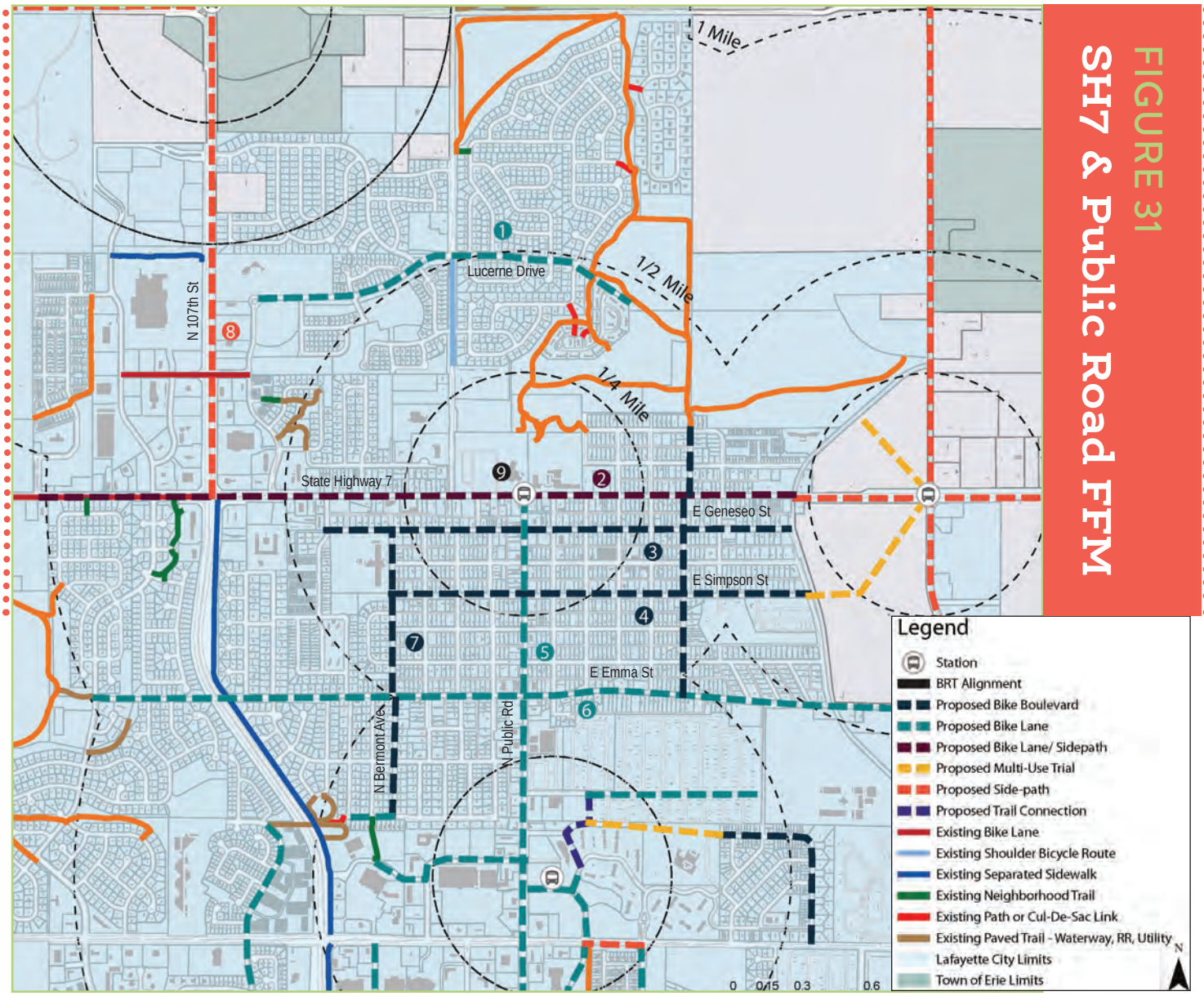


FIGURE 31
SH7 & Public Road FFM

Recommendations

1. **Proposed Bike Lane on Lucerne Drive**
Add a dedicated bicycle facility on Lucerne Drive to provide dedicated space for people who bike.

2. **Proposed Bike Lane/ Sidepath on State Highway 7**
Create a protected bike lane or sidepath along State Highway 7 to provide a low-stress facility.

3. **Proposed Bike Boulevard on E Geneseo Street**
Develop a bike boulevard on Geneseo Street to provide a low-stress facility one block away from State Highway 7.

4. **Proposed Bike Boulevard on E Simpson Street**
Develop a bike boulevard on Simpson Street to provide an east/west low-stress facility to connect to 119th Avenue Station.

5. **Proposed Bike Lane on N Public Road**
Provide a dedicated bicycle facility on Public Road to provide dedicated space for people who bike.

6. **Proposed Bike Lane on E Emma Street**
Review existing bicycle facilities on Emma Street to upgrade existing facilities to create a major east/west low-stress facility in Lafayette.

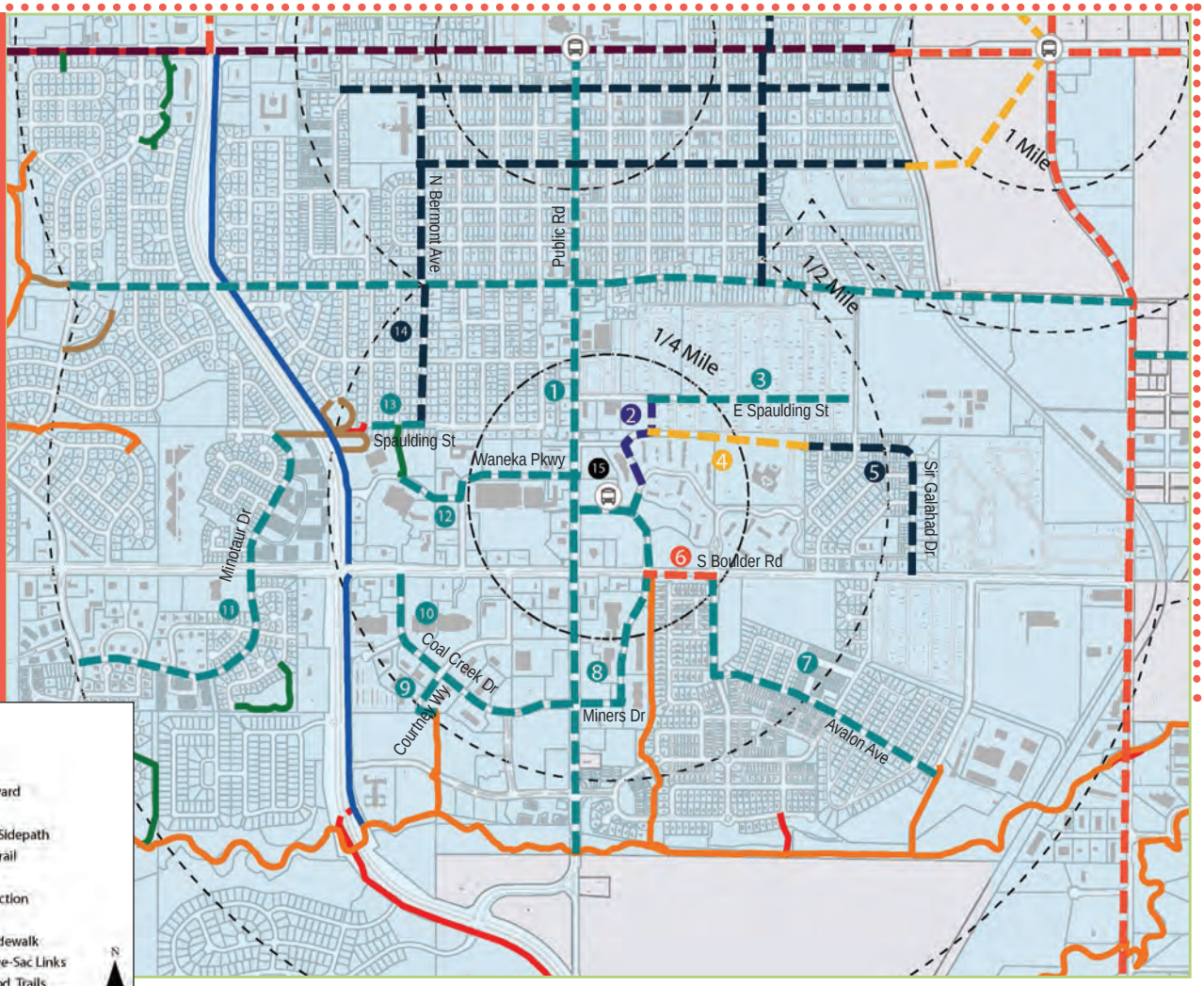
7. **Proposed Bike Boulevard on N Bermont Avenue**
Develop a bicycle boulevard on Bermont Avenue to provide a low-stress north/south connection.

8. **Proposed Sidepath on N 107th Street**
Create a sidepath at least on one side of N 107th Street to provide a low-stress connection along the BRT corridor.

9. **Secure Bike Parking at Station**
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycling parking.

10. **Sidewalk Gap Identification and Remediation**
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

FIGURE 32
Lafayette Park & Ride FFM



Legend
- Station
- BRT Alignment
- Proposed Bike Boulevard
- Proposed Bike Lane
- Proposed Bike Lane/ Sidepath
- Proposed Multi-Use Trail
- Proposed Side-path
- Proposed Trail Connection
- Existing Bike Lane
- Existing Separated Sidewalk
- Existing Path or Cul-De-Sac Links
- Existing Neighborhood Trails
- Existing Paved Trail - Waterway, RR, Utility
- Existing Unpaved Trail - Waterway, RR, Utility
- Lafayette City Limits

N

Recommendations

1. **Proposed Bike Lane on Public Road**
Provide a dedicated bicycle facility on Public Road to provide dedicated space for people who bike.

2. **Proposed Trail Connection from Spaulding Street**
Provide a trail connection from the mobile home neighborhoods to the Lafayette Park-and-Ride. This is an existing desire line path.

3. **Proposed Bike Lane on E Spaulding Street**
Add a dedicated bicycle facility on Spaulding Street to provide dedicated space for people who bike.

4. **Proposed Multi-Use Trail from Sir Galahad to existing trail**
Expand existing trails near the Park-and-Ride to connect existing neighborhoods.

5. **Proposed Bike Boulevard on Sir Galahad Drive**
Develop a bicycle boulevard on Sir Galahad Drive to connect neighborhoods to trail network.

6. **Proposed Sidepath on E South Boulder Road**
Create small sidepath on South Boulder Road to connect low-stress facilities in neighborhoods on the south to the low-stress facility on the north.

7. **Proposed Bike Lane on Avalon Avenue**
Add a dedicated bicycle facility on Avalon Avenue to provide dedicated space for people who bike.

8. **Proposed Bike Lane on Miners Drive**
Add a dedicated bicycle facility on Miners Drive to provide dedicated space for people who bike.

9. **Proposed Bike Lane on Courtney Way**
Provide a bike lane connection on Courtney Way to connect trail to bike lanes.

10. **Proposed Bike Lane on Coal Creek Drive**
Add a dedicated bicycle facility on Coal Creek Drive to provide dedicated space for people who bike.

11. **Proposed Bike Lane on Minotaur Drive**
Add a bicycle lane on Minotaur Drive to connect neighborhoods to existing overpass.

12. **Proposed Bike Lane on Waneka Parkway**
Add a dedicated bicycle facility on Waneka Parkway and Robin Street to provide dedicated space for people who bike and connect to existing trail.

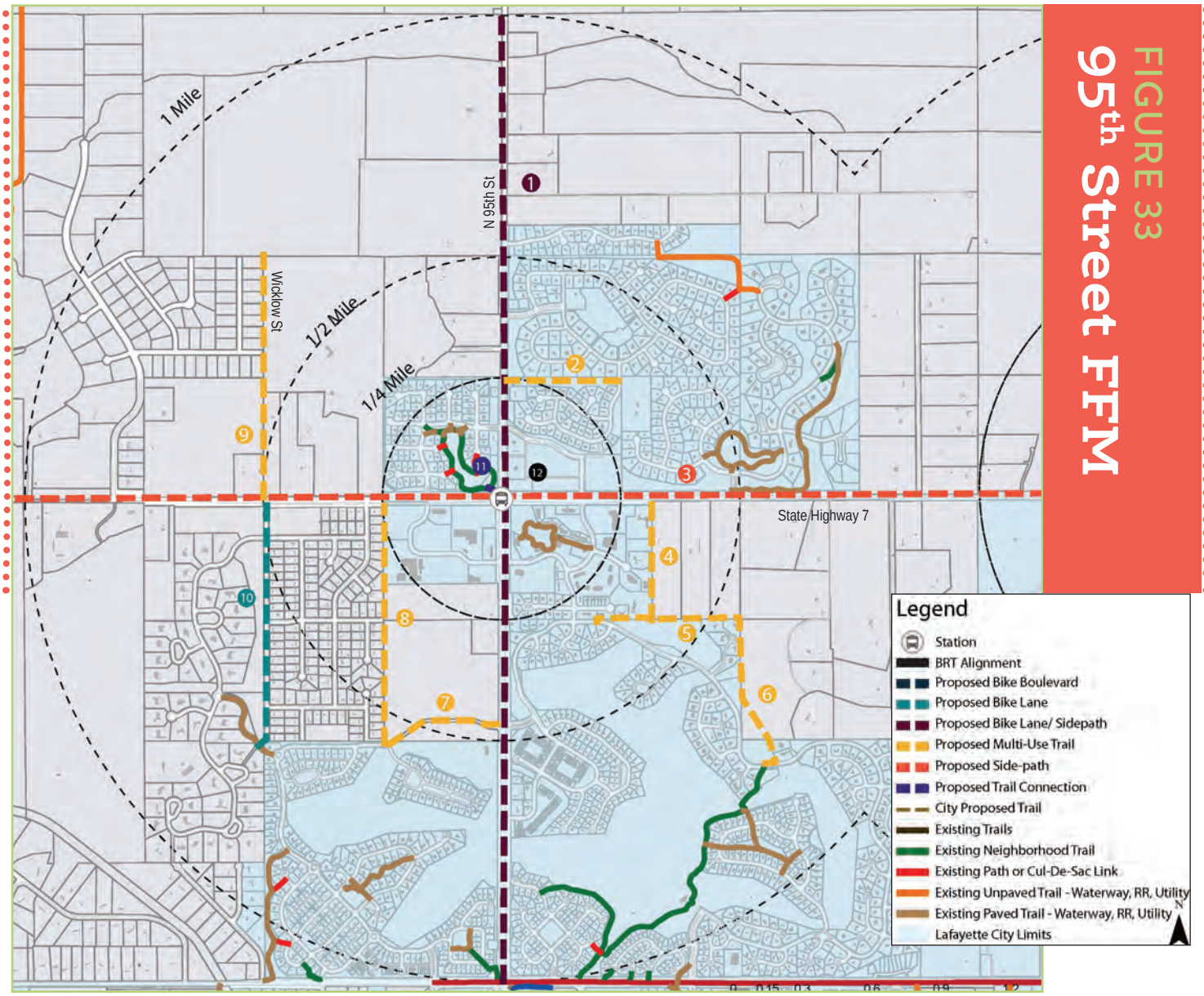
13. **Proposed Bike Lane on Spaulding Street**
Provide a bike lane to connect existing trails/ overpasses and proposed bicycle boulevard on Bermont Avenue.

14. **Proposed Bike Boulevard on N Bermont Avenue**
Develop a bicycle boulevard on Bermont Avenue to provide a low-stress north/south connection.

15. **Secure Bicycle Parking at Station**
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers or long-term bicycle parking.

Sidewalk Gap Identification and Remediation
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

FIGURE 33
95th Street FFM



Recommendations

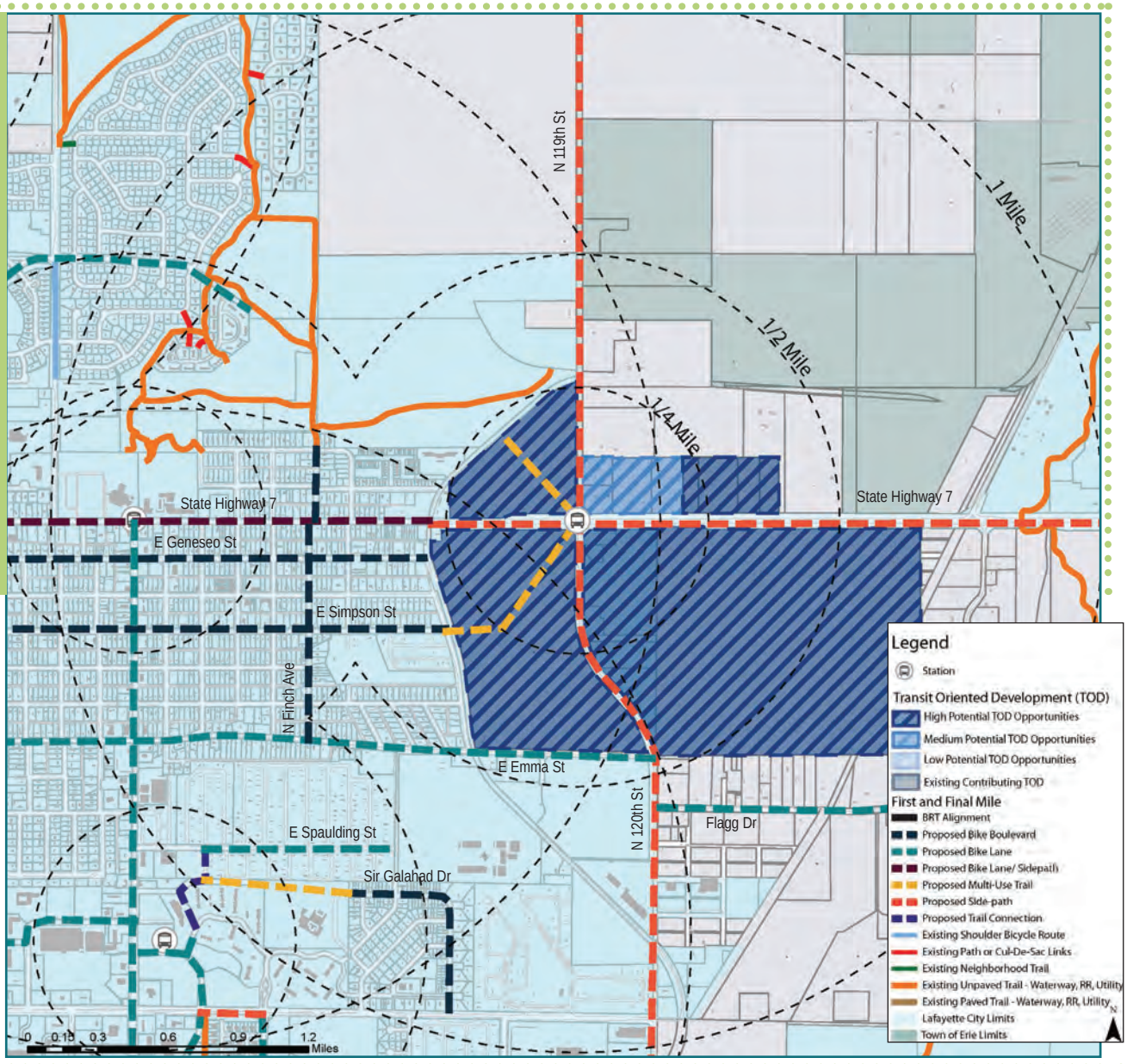
1. **Proposed Bike Lane/ Sidepath on N 95th Street**
   Evaluate existing bikable shoulder for upgrade to bike lane or sidepath to create a low-stress facility connecting to the station
2. **Proposed Multi-Use Trail in Blue Heron Estates**
   Upgrade existing trail to provide connectivity from neighborhoods to 95th Street.
3. **Proposed Sidepath on State Highway 7**
   Create a sidepath on at least one side along State Highway 7.
4. **Proposed Multi-Use Trail from State Highway 7 to Indian Peaks Neighborhood**
   Provide a trail behind commercial development to connect neighborhood to State Highway 7.
5. **Proposed Multi- Use Trail Through Indian Peak Neighborhood**
   Add a trail along edge of Indian Peaks Neighborhood to connect neighborhood to State Highway 7.
6. **Proposed Multi-Use Trail to Indian Peaks Trail**
   Provide a trail along edge of Indian Peaks neighborhood and other parcels when development occurs to connect Indian Peaks Trail to State Highway 7.
7. **Proposed Multi-Use Trail from N 95th Street to Indian Peaks Trail W**
   Provide a trail through existing un-used right-of-way to connect neighborhoods to 95th Street.
8. **Proposed Multi-Use Trail from State Highway 7 to Indian Peaks Trail W**
   Provide a trail on the edge of the neighborhood to connect neighborhoods to State Highway 7.
9. **Proposed Multi-Use Trail on Wicklow Street**
   Provide a trail as development occurs to connect neighborhood to State Highway 7.
10. **Proposed Bike Lane to Neighborhood**
    Provide Bike Lanes along Wicklow Street to connect neighborhood to State Highway 7.
11. **Proposed Trail Connection to Neighborhood**
    Create a trail connection from trails in neighborhood to station.
12. **Secure Bike Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycling parking.
13. **Sidewalk Gap Identification and Remediation**
    Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

TRANSIT ORIENTED DEVELOPMENT (TOD) REVIEW

The proposed SH7 BRT currently has five stop locations in Lafayette/Erie. The stops are at 119th Street, Public Road, the existing Park-and-Ride, 95th street and a stop on 287. The stop on 287 was only evaluated for routing options at this time and has it's own section. The 119th stop is mostly in greenfield development, and the other three stops are mostly fully developed around the station area, presenting varied levels of existing TOD and opportunities for future additions.

- 119th Street Station - The 119th Street station is surrounded almost completely with undeveloped land, so there is a lot of High Potential TOD opportunities around this station location (shown in dark blue on the map). The area shown as a Medium Potential TOD opportunity is an area with a few scattered businesses and developments, including a church. This area could redevelop or fill in a lot more in the future but as it is not completely undeveloped currently it is a slightly lower potential opportunity.

FIGURE 34
119th Street TOD



» SH7 and Public Road Station - The SH7 and Public Road Station is located at the Northern end of the main commercial street in Old Town Lafayette and is immediately surrounded by a school, residences, commercial development and the recreation center. Since the surrounding area is completely built out, there is a reasonable amount of Existing Contributing TOD (shown in grey on the map) and less opportunity for future additional development.

The area directly to the south of the proposed station along SH7 is developed with small retail stores and associated parking lots so there is some potential for further development in this area to simply fill in the area further but there is only low potential for that. The same is the case along Public Road to the south of the proposed station location, both areas are shown in light blue on the map.

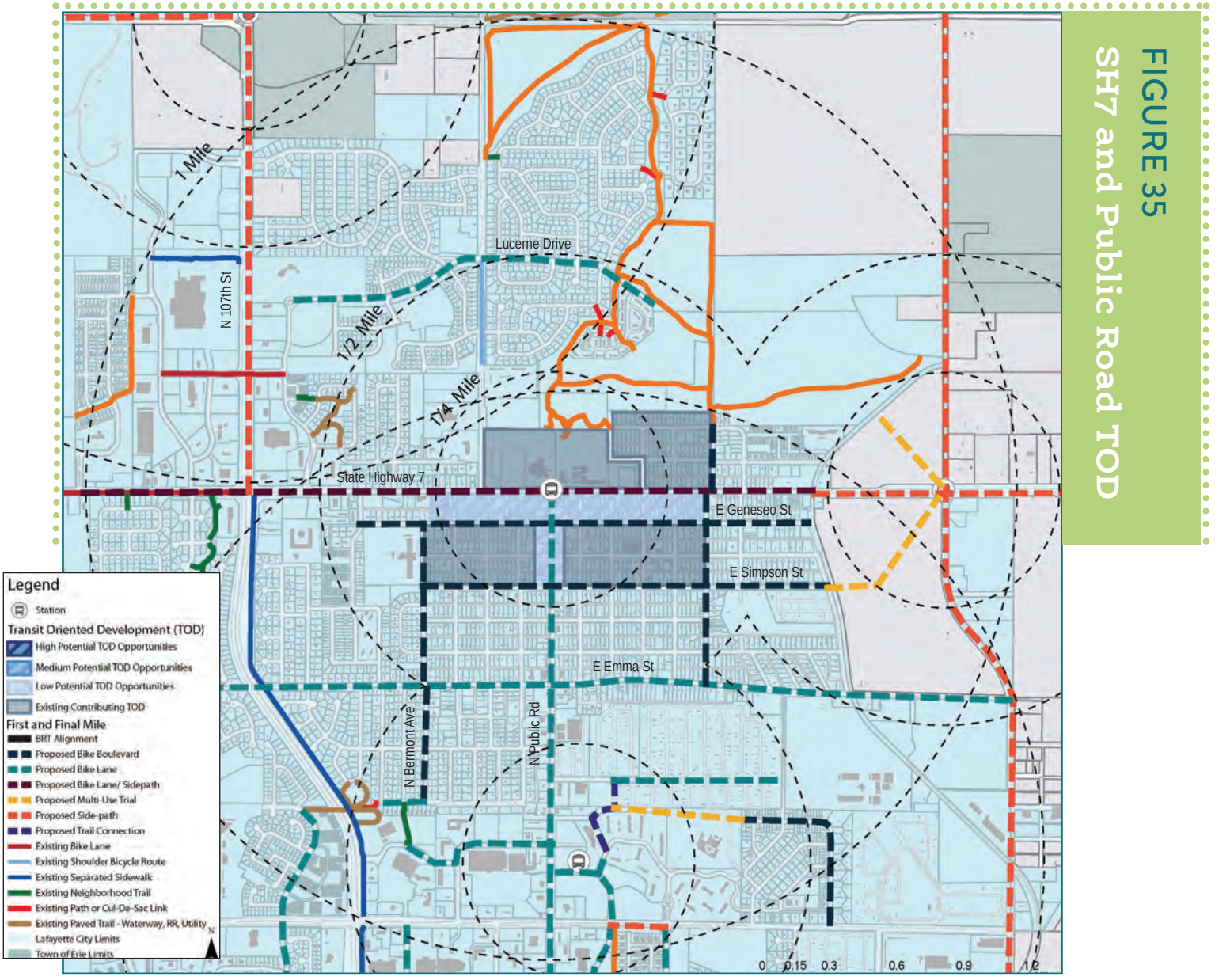


FIGURE 35
SH7 and Public Road TOD

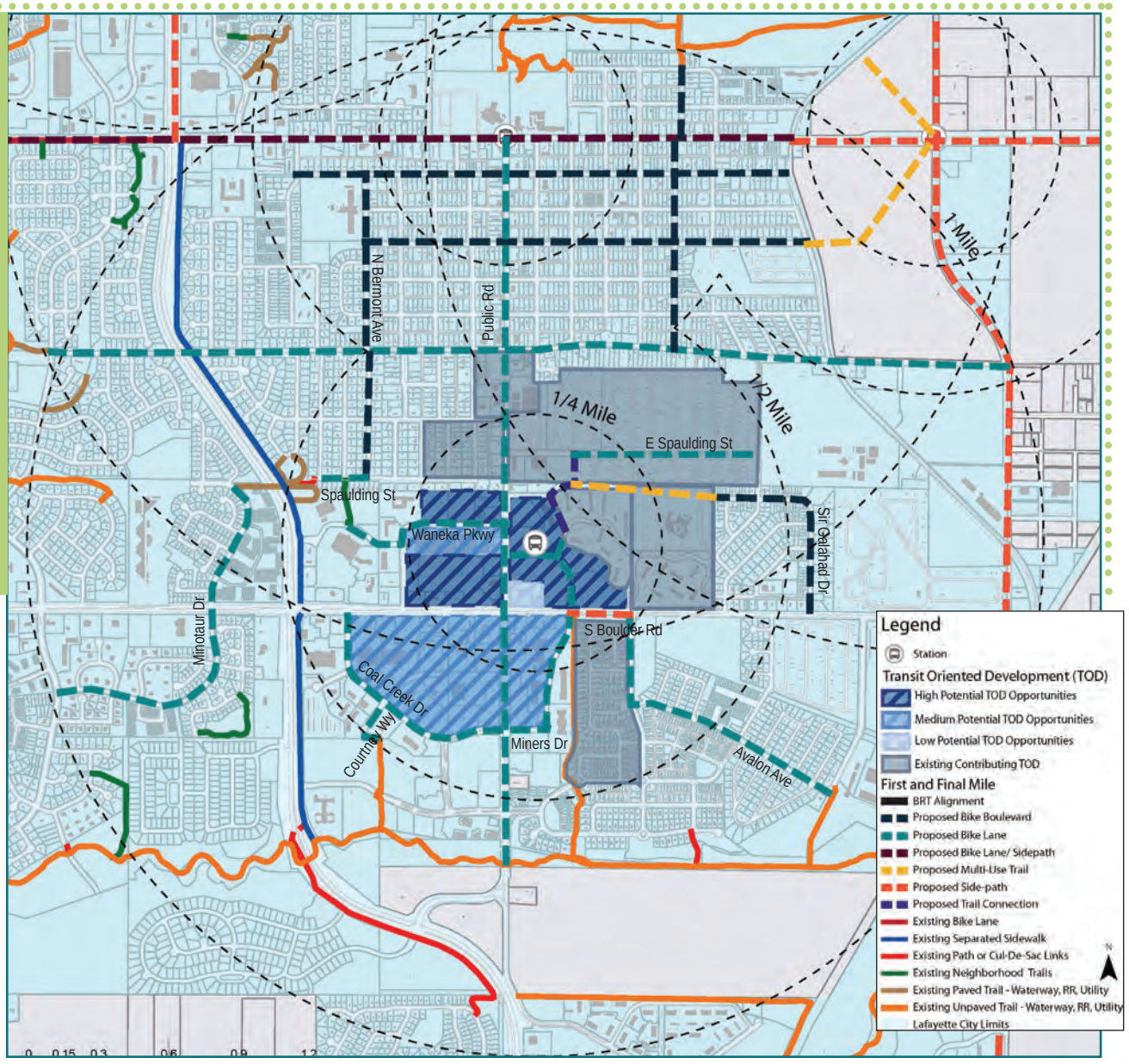
» Lafayette Park and Ride - The Lafayette Park and Ride is located at the Southern end of the main commercial street in Old Town Lafayette and exists today as a park and ride which presents significant High Potential TOD opportunity. There is a significant amount of parking and largely undeveloped land around the existing park and ride that could become transit-oriented development in the future. There are also a couple of large parking lots on the other side of S Public Road that could also become TOD in the future as the area around the proposed BRT station develops. These areas are all shown on the map in dark blue.

There is also a 207 unit mixed commercial and residential development that is currently under construction immediately south of the park-n-ride that will contribute significant density to the area and support a BRT line.

Lafayette City Hall and the Chamber of Commerce is also in the vicinity and while it is less likely to densify or redevelop in the immediate future, it could contribute as an employer and point of interest to the ridership on the BRT line.

The area to the west and southwest of the Lafayette Park and Ride station consists of small retail locations and strip mall type development around large surface parking lots that could redevelop and fill in with more transit-oriented development in the future. These areas are not undeveloped, but they are underdeveloped, so they are a Medium Potential TOD Opportunity around this station location.

FIGURE 36
Lafayette Park & Ride TOD



» 95th Street Station - The 95th Street station is located at the intersection of 95th Street and SH7. The existing intersection is mostly developed with commercial and residential surrounding the intersection. The northwest and southeast corners of the intersection are pretty much completely developed with single family residential and a park so those offer contributing density for TOD development but not much further infill opportunity. The northeast corner of the intersection is less developed with a couple small retail locations, so the area could be further built up as the area develops.

The southwest corner of the intersection is developed with mostly retail locations and associated large parking lots, so this area represents a Medium Potential opportunity to fill in further with transit supportive development around the proposed station location.

There is also space further south of this area that is largely undeveloped, so this could also become developments that would support the BRT in the area. There is also a strip of land to the southeast of the station location that is small mostly service related businesses with parking, this could potentially fill in further and contribute businesses and employers to the area but as it is already pretty developed there is less potential here.

» Any considerations of development or redevelopment in this area would require further discussion with the community, residents, businesses/ business owners, and property owners before taking any action.

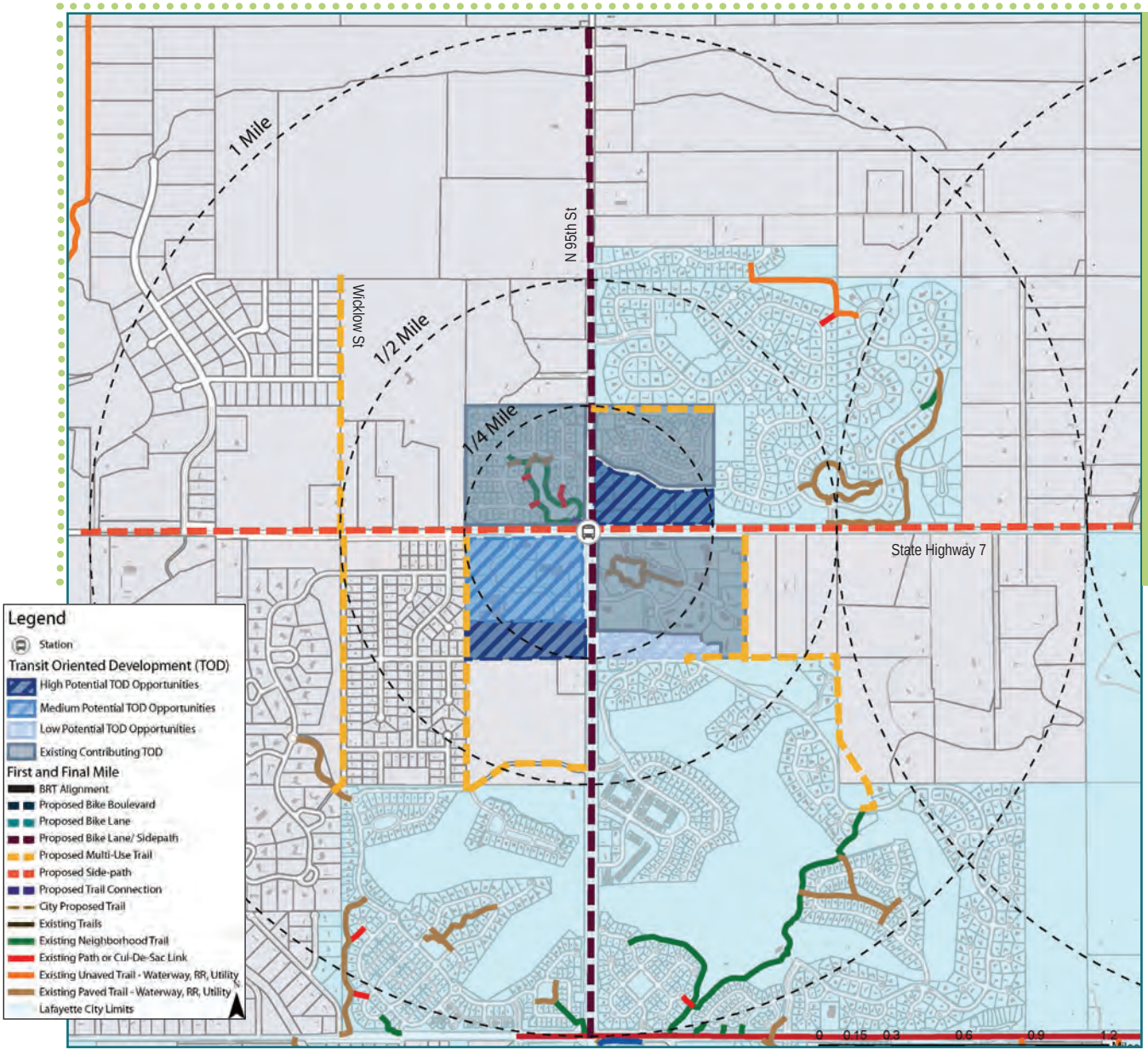


FIGURE 37
95th Street TOD

ENVIRONMENTAL CONSIDERATIONS

The purpose of this review is to identify the existing conditions and the potential environmental impacts to resources as a result of the proposed SH 7 BRT Station Area Design Project. The station areas were evaluated to assess the environmental conditions using the station plans, Geographic Information Systems (GIS), and a desktop review. This review documents existing environmental conditions found in the project area. It should be noted that this study is considered "high level," and the data collected was obtained using desktop surveys. The following table summarizes each resource in the proposed Lafayette/ Erie Station Areas.

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
95TH STREET AND SH7				
	There is no suitable habitat for black-tailed prairie dogs within the project area. The project area is within mapped Bald Eagle (Haliaeetus leucocephalus) Winter Range (CPW, 2018). The Bald Eagle is a State Species of Special Concern and is also protected under the MBTA and the Bald and Golden Eagle Protection Act (BGEPA). Large trees within 0.5 mile of the project area may provide potential nest sites for Bald Eagles and other raptors. Trees, shrubs, and grasses within the project area may provide potential nest sites for other birds protected under the MBTA. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat was evaluated for threatened, endangered, or state-sensitive species with the potential to occur in Boulder County: American peregrine falcon (Falco peregrinus anatum), Bald Eagle, black-tailed prairie dog, Burrowing Owl, Canada lynx (Lynx canadensis), Colorado butterfly plant (Oenothera coloradensis), common garter snake (Thamnophil sirtalis), greenback cutthroat trout (Oncorhynchus clarkii stomias), Mexican spotted owl (Strix occidentalis), northern leopard frog	There are two pad-mounted transformers in the project area, located northeast of the intersection. An additional pad-mounted transformer is located just outside the project area, approximately 143 feet northeast of the 95th Street and SH7 intersection. A possible natural gas feature is located in the study, southwest of the 95th and SH7 intersection. The feature has the appearance of a pad-mounted transformer with a vent sticking through the top. It is possible a natural gas pipeline also runs through the area. A gas station is located approximately 400 feet northeast of the northern project area boundary.	The previously disturbed nature of the site has low potential for paleontology and archaeology resources to be found within the project area. No previous OAHP survey were recorded within or adjacent to the project area (History Colorado COMPASS database, 2018). No resources eligible for the National Register of Historic Places (NRHP) were identified in or adjacent to the project area. No parcels with a building or structure older than 50 years are located within or adjacent to the project area.	Crossridge Park is located on the northwest corner of this intersection but appears to be outside of the project area boundaries (Lafayette, 2016). Sidewalks are located on the northeast, southeast, and southwest corners of the intersection that are at least partially located in the project area. None of these sidewalks are designated as trails on the Lafayette Parks, Open Space & Trails Map and are therefore not considered a 4(f) resource. No proposed trails are designated on the 2016 Lafayette Parks, Open Space & Trails Map at this intersection. No Boulder County trails or open space exists at this intersection (Boulder County, 2019). No Section 6(f) resources are located near this proposed station (CDOT, 2019).

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
95TH STREET AND SH7 CONTINUED				
	(Rana pipiens), northern redbelly dace (Phoxinus eos), Preble's meadow jumping mouse (Zapus hudsonius preblei), Townsend's big-eared bat (Corynorhinus townsendii pallescens), Ute ladies'-tresses orchid (Spiranthes diluvialis), and wolverine (Gulo gulo). Habitat for these species is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2019; USFWS, 2019) A drainage swale associated with the culvert under 95th Street on the south side of SH7 is present; however, this feature is unlikely to be jurisdictional. No SB 40 resources are visible within the project area.			
119TH STREET AND SH7				
	No black-tailed prairie dog burrows are visible within the area. However, there is suitable habitat for black-tailed prairie dogs in and adjacent to the project area. Black-tailed prairie dog burrows may provide potential nest sties for Burrowing Owl (Athene cunicularia). The Burrowing Owl is a state threatened species and is protected under the MBTA. Additionally, the project area is within mapped Bald Eagle Winter Range, although there is no suitable habitat for the species within the project area (CPW, 2018). Large trees within 0.5 mil of the project area may provide potential nest sites for Bald Eagles and other raptors. Grasses within the project area may provide potential nest sites for other birds protected under the MBTA.	Painted signal poles are located at the intersection of 119th Street and SH7. These poles could contain lead paint and should be sampled during further environmental investigations. An oil and gas well is located approximately 150 feet southwest of the southern project area boundary. One pole-mounted transformer is located northeast of the SH7 and 119th Street intersection.	The previously disturbed nature of this site has low potential for paleontology and archaeology resources to be found within the project area. No previous OAHP surveys were recorded within or adjacent to the project area (History Colorado COMPASS database, 2018). Two parcels with a building or structure older than 50 years are located within or adjacent to the project area.	No existing or proposed parks or trails are located at this intersection according to the 2016 Lafayette Parks, Open Space & Trails Map. No Boulder County trails or open space exist at this intersection (Boulder County, 2019). No Section 6(f) resources are located near this proposed station (CDOT, 2019).

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
119TH STREET AND SH7 CONTINUED				
	Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat was evaluated for threatened, endangered, or state-sensitive species with the potential to occur in Boulder County (same species as those listed for the 95th Street and SH7 intersection). Habitat for these species (other than for Burrowing Owls, above) is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2019; USFWS, 2019). One concrete-lined ditch on the southeast corner of the 119th Street and Baseline Road intersection is visible within the project area; however, these features have been determined to be non-jurisdictional. No SB 40 resources are visible within the project area.	Two additional pole-mounted transformers are located approximately 30 feet north of the eastern project area boundary. One pad-mounted transformer is located approximately 40 feet east of the northern project area boundary. Additionally, the project area is located in an undermined area of Colorado due to mining activities in the area from 1890 to 1928. While not a hazardous materials concern, this poses a potential geological concern. A geotechnical study may provide more information on the suitability of the study area for development.		
PUBLIC ROAD AND BASELINE ROAD				
	There is no suitable habitat for black tailed prairie dogs within the project area. The project area is within mapped Bald Eagle Winter Range, although there is no suitable habitat for the species in the project area (CPW, 2018). Large trees within 0.5 mile of the project area may provide potential nest sties for Bald Eagles and other raptors. Trees, shrubs, and grasses within the project area may provide potential nest sites for other birds protected under the MBTA. Noxious weeds commonly associated with disturbed roadsides are likely	The southwestern signal pole the Public Road and Baseline Avenue intersection is painted. This pole could contain lead paint and should be sample during further environmental investigations. A gas station is located approximately 80 feet southeast of the southeastern project area boundary.	The previously disturbed nature of this site has low potential for paleontology and archaeology resources to be found within the project area. One previous OAHP survey was recorded within or adjacent to the project area (History Colorado COMPASS database, 2018).	The Bob L. Burger Recreation Center and park are located on the north side of the property. Sidewalks exist on the south and north sides of Baseline Avenue but these are not designated as trails on the 2016 Lafayette Parks, Open Space & Trails Map. No Boulder County trails or open space exist at this intersection (Boulder County, 2019).

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
PUBLIC ROAD AND BASELINE ROAD CONTINUED				
	to be present in the project area. Habitat was evaluated for threatened, endangered, or state-sensitive species with the potential to occur in Boulder County (same species as those listed for the 95th Street and SH7 intersection). Habitat for these species is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2019; USFWS, 2019). No natural drainages or ditches are visible in the project area; therefore, it is unlikely that WUS or non-jurisdictional wetlands are present. There are no SB 40 resources within the project area.	A dry-cleaning facility is located approximately 750 feet east of the eastern project area boundary. The project area is an undermined area of Colorado due to mining activities from 1890 to 1928. While not a hazardous materials concern, this is a potential geological concern. A geotechnical study may provide more information on the suitability of the study area for development.	No resources eligible for the NRHP were identified in or adjacent to the project area. Two parcels with a building or structure older than 50 years are located within or adjacent to the project area. Parcels are to the northwest and southwest of the station location.	No Section 6(f) resources are located near this proposed station (CDOT, 2019).
US 287 AND SH7/ ARAPAHOE ROAD				
	Black-tailed prairie dogs burrow are visible within the project area. Black-tailed prairie dog burrows may provide potential nest sites for Burrowing Owls. Additionally, the project area is within mapped Bald Eagle Winter Range, although there is minimal habitat for the species within the project area (CPW, 2018). Large trees in and within 0.5 mile of the project area may provide potential nest sites for Bald Eagles and other raptors. Trees, shrubs, and grasses within the project area may provide potential nest sties for other birds protected by MBTA. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat was evaluated for threatened, endangered, or state-sensitive species with the potential to	Three pole-mounted transformers are located along Arapahoe Road in the western section of the project area, approximately 250 feet west of, 1,000 feet west of , and 350 feet west of the intersection. One pad-mounted transformer is located along Arapahoe Road just north of the project area. One gas station is located immediately north of the project area. One dry-cleaning facility is located approximately 220 feet north of the project area.	The previously disturbed nature of this site has low potential for paleontology and archaeology resources to be found within the project area. Four previous OAHP surveys were recorded within or adjacent to the project are (History Colorado COMPASS database, 2018) No resources eligible for the NRHP were identified in or adjacent to project area. However, because two of the resources do not have an official	A 'sidewalk connector' is located along Arapahoe Road east of US 287 according to the Town of Erie 2018 Recreation Trail Map (Erie, 2018). No existing or proposed trails are located within this project area (Lafayette, 2016 and Boulder County GIS data, 2019). Boulder County Open Space is located north of the western portion of the project area, although it is unknown if this open space is considered a 4(f) resource (Boulder County GIS Data, 2019).

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
US 287 AND SH7/ ARAPAHOE ROAD CONTINUED				
	occur in Boulder County (same species as those listed for the 95th Street and SH7 intersection). Habitat for these species (other than for Burrowing Owl, above) is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2019; USFWS, 2019). There is potential for WUS, including wetland and non-wetland waters, within the project area (USFWS, 2018). These features include a cattail march on the southwest corner of the intersection, Prince Lake Number 1, and the South Boulder Canyon Ditch. No SB 40 resources are visible within the project area.	There are three abandoned oil and gas wells located throughout the project area: the southwestern corner approximately 2,745 feet from the intersection, the central portion approximately 1,094 feet from the intersection, and the eastern portion of the project area, approximately 1,410 feet from the intersection. Additionally the project area is located in an undermined area of Colorado due to mining activities in the area in 1918. While not a hazardous materials concern, this poses a potential geological concern.	determination these sites would need to be reevaluated to update their COMPASS record. Five parcels with a structure older than 50 years are located within or adjacent to the project area, including two previously recorded resources mentioned above. Three other parcels contain a building or structure constructed on before 1973.	No Section 6(f) resources are located near this proposed station (CDOT, 2019).

Boulder

STATION DETAILS

BOULDER BRT STATION OVERVIEW

The City of Boulder has up to seven possible stations along the State Highway 7 BRT corridor. During this study four specific stations received planning level design review given budget and time constraints. The four stations that were reviewed are near the 63rd and Arapahoe intersection, the 55th and Arapahoe intersection, the 48th and Arapahoe intersection, and the 28th and Arapahoe intersection. The City of Boulder, the Regional Transportation District (RTD), and the Colorado Department of Transportation (CDOT) prepared the ***East Arapahoe***

The City of Boulder has up to seven possible stations along the State Highway 7 BRT corridor. During this study four specific stations received planning level review given budget and time constraints.

Transportation Plan prior to this planning process. The ***East Arapahoe Transportation Plan*** is a long-range plan that will consider a number of potential transportation improvements within the East Arapahoe Corridor, including biking and walking enhancements, Bus Rapid Transit (BRT) and local business service and automobile travel. The purpose of the plan is to address existing & future transportation needs, facilitate safe travel & access by people using all modes, and support existing & future land use in the corridor. The roadway planning concepts in the ***East Arapahoe Transportation Plan*** were applied during this planning process. The planning concepts shown in this section include information about future right of way considerations, protected intersection designs, driveway consolidation needs, and possible locations for shared ride amenities. Although the Boulder planning concepts in this section are more detailed than others in the corridor, there remains a considerable amount of input that is needed from CDOT, RTD, property owners, and the community moving forward. First and final mile mapping was prepared as part of this planning effort and is included in this section.

TRAFFIC AND SAFETY CONDITIONS

State Highway 7 transitions through several configurations along the length of the project area in Boulder. Starting at the west end, between 28th Street and Foothills Parkway (containing the 28th St station) the road has a six-lane cross-section with a raised median, single or dual left-turn auxiliary lanes at all intersections and accesses, and intermittent right-turn auxiliary lanes. The two outside travel lanes would be re-purposed as Business Access and Transit (BAT) lanes to accommodate the BRT. The road has a posted speed limit of 35 mph and carries roughly 30,000 average daily traffic (ADT).

East of Foothills Parkway the speed limit increases to 45 mph. The traffic volume is similar through 48th Street, where the 48th St station and Foothills Hospital are located, then drops to roughly 25,000 ADT further to the east. The cross-section is maintained through 55th Street (location of the 55th St station), but one of the eastbound through lanes ends with a merge just east of 55th St.

Continuing to the east the cross section is unbalanced with three westbound and two eastbound through lanes, raised median, and on-street bicycle lanes. At 63rd Street (location of the final Boulder station) the traffic volume drops to roughly 20,000 ADT. East of 63rd Street the cross-section changes to one vehicle through-lane, one shared Bus/HOV lane, and an on-street bicycle lane in each direction plus a Two-Way Left Turn Lane (TWLTL) in the center.

Safety concerns were not specifically identified through this section of the corridor because the City of Boulder proactively prioritizes and addresses safety issues through their Vision Zero program.

28TH STREET DESIGN SUMMARY

This station is designated as "28th St" to remain consistent with the ***State Highway 7 Bus Rapid Transit Feasibility Study*** but could be located adjacent to 29th St to be closer to intersecting bus routes. This in-line station is proposed to be designed with station areas on the southeast and northwest corners in order to provide a "far side" stop for both eastbound and westbound BRT vehicles. It is anticipated that riders will arrive using several modes including walking, transferring from another bus, bicycle, scooter, or ride share. Park-n-ride is not planned for this location due to existing adjacent land uses and the station's more urban context.

Arapahoe Road is currently three through lanes and a left turn lane in each direction. The outside lane is proposed to be converted to a Business Access and Transit (BAT) lane; no additional changes to lane arrangement are proposed. The BAT lane would be open to buses and right-turning vehicles at driveway accesses and the 29th St intersection and open to buses only at all other points. Turning movement volumes from the side street onto Arapahoe Ave are low enough that channelized turns are not warranted, so no relocation of curb and gutter at the intersection is required.

A 12'-wide Multi-Use Path (MUP) and 7'-wide raised, protected bicycle lane (per the ***East Arapahoe Transportation Plan***) are proposed behind the curb on both sides of Arapahoe Ave, and no bicycle facilities are proposed on-street. Right-of-Way (ROW) acquisition would be required on all four quadrants, but the southeast quadrant is currently a public park so the ROW may be available. Several driveways on the southwest quadrant should be considered for consolidation to avoid having several crossings in rapid succession. A single driveway on the north side of Arapahoe Ave between 29th St and 30th St (accessing the Home Depot parking lot) can be more easily accommodated. Station amenities, including

benches, shelters, ticket vending, signage, scooter parking, outdoor bicycle parking, and secure bicycle parking are shown in the station areas.

48TH STREET DESIGN SUMMARY

The 48th St station is shown as an in-line station with bus stops on the southeast and northwest quadrants of the intersection to provide operations and potential for queue jump signal timing. Setbacks for the surrounding land uses are wide relative to other locations in Boulder, providing more space to locate station amenities and east-west bicycle and pedestrian facilities behind the curb. There are no intersecting transit routes running on 48th St and no space available to provide park-n-ride spaces so it's anticipated that rider at this station will arrive by bicycle or on foot. It's likely that many riders will be employees of the nearby Foothills Hospital.

The station design proposes converting the existing channelized southbound right turn at 48th St into a smaller non-channelized radius to provide a safer and more intuitive crossing for the MUP and bicycle facilities. The outside lane is proposed to be converted to a Business Access and Transit (BAT) lane; no additional changes to lane arrangement are proposed. A 12'-wide MUP and 7'-wide protected bicycle lane are proposed behind the curb on both sides of Arapahoe Ave and no bicycle facilities are proposed on-street. The driveway access to Foothills Hospital just west of the station must be maintained but otherwise there are no driveways nearby. Station amenities, including benches, shelters, ticket vending, signage, scooter parking, outdoor bicycle parking, and secure bicycle parking are shown in the station areas.

55TH STREET DESIGN SUMMARY

The 55th St station is designed around a protected intersection concept incorporating off-street bicycle and pedestrian facilities on both sides of Arapahoe Ave and 55th St. The station areas are located further from the intersection than at the other locations because more space is needed both to transition the bicycle and pedestrian facilities into and out of the protected intersection and to accommodate buses turning onto Arapahoe Ave from 55th St. There are several driveways close to the intersection which create MUP and bicycle lane crossings in rapid succession. These driveways may be difficult to consolidate or eliminate, especially the gas station access on the southeast corner, but some modification will have to be made in order to create space for the bus stop.

ROW is narrow and the building on the northwest corner has very little setback from the intersection. Some additional space can be made available by relocating the curb and gutter on 55th St in toward the centerline by several feet on each side and moving the bicycle facility behind the curb. Additionally a different protected intersection design is used on the northwest corner than the other three corners due to the lack of available space. A 12'-wide MUP and 7'-wide protected bicycle lane are proposed behind the curb on both sides of Arapahoe Ave but the cross-section and widths will vary approaching the intersection. Some station amenities, including benches, shelters, ticket vending, and signage will be located at the station area while scooter parking, outdoor bicycle parking, and secure bicycle parking are shown in different configurations on three intersection quadrants to indicate that different arrangements of these facilities may be required in order to fit with available ROW (or minimize ROW acquisition).

63RD STREET DESIGN SUMMARY

The 63rd St station is designed as an in-line station with bus stops on the southeast and northwest quadrants of the intersection to provide improved operations and potential for queue jump signal timing. This station is in the least-urban area relative to the other three Boulder stations, but some ROW acquisition may still be necessary on the southeast and southwest quadrants and especially in the vicinity of a potentially historic structure on the northeast quadrant. There are no intersecting transit routes on 63rd St.

The station design proposed converting the existing channelized southbound right turn at 63rd St into a smaller non-channelized radius to provide a safer and more intuitive crossing for the MUP and bicycle facilities. The outside lane on Arapahoe Rd would be converted to a BAT lane. A 12'-wide MUP and 7'-wide protected bicycle lane are proposed behind the curb on both sides of the roadway; the curb and gutter would be relocated toward the centerline of Arapahoe Ave by several feet and that space would be repurposed for the protected bicycle lane. Relocating the curbs would minimize the amount of ROW acquisition that would be required. Station amenities, including benches, shelters, ticket vending,, signage, scooter parking, outdoor bicycle parking, and secure bicycle parking are shown in the station areas.

Full Size Images of Figures 38, 39, 40, 41 and 42 can be Found in Report Appendix, Pages 147, 148, 149, 150, & 151.

****Full Size Images of FFM Figures 43, 44, 45 and 46 can be Found in Report Appendix, Pages 164, 165, 166, & 167.***

FIGURE 38
29th St. and SH7

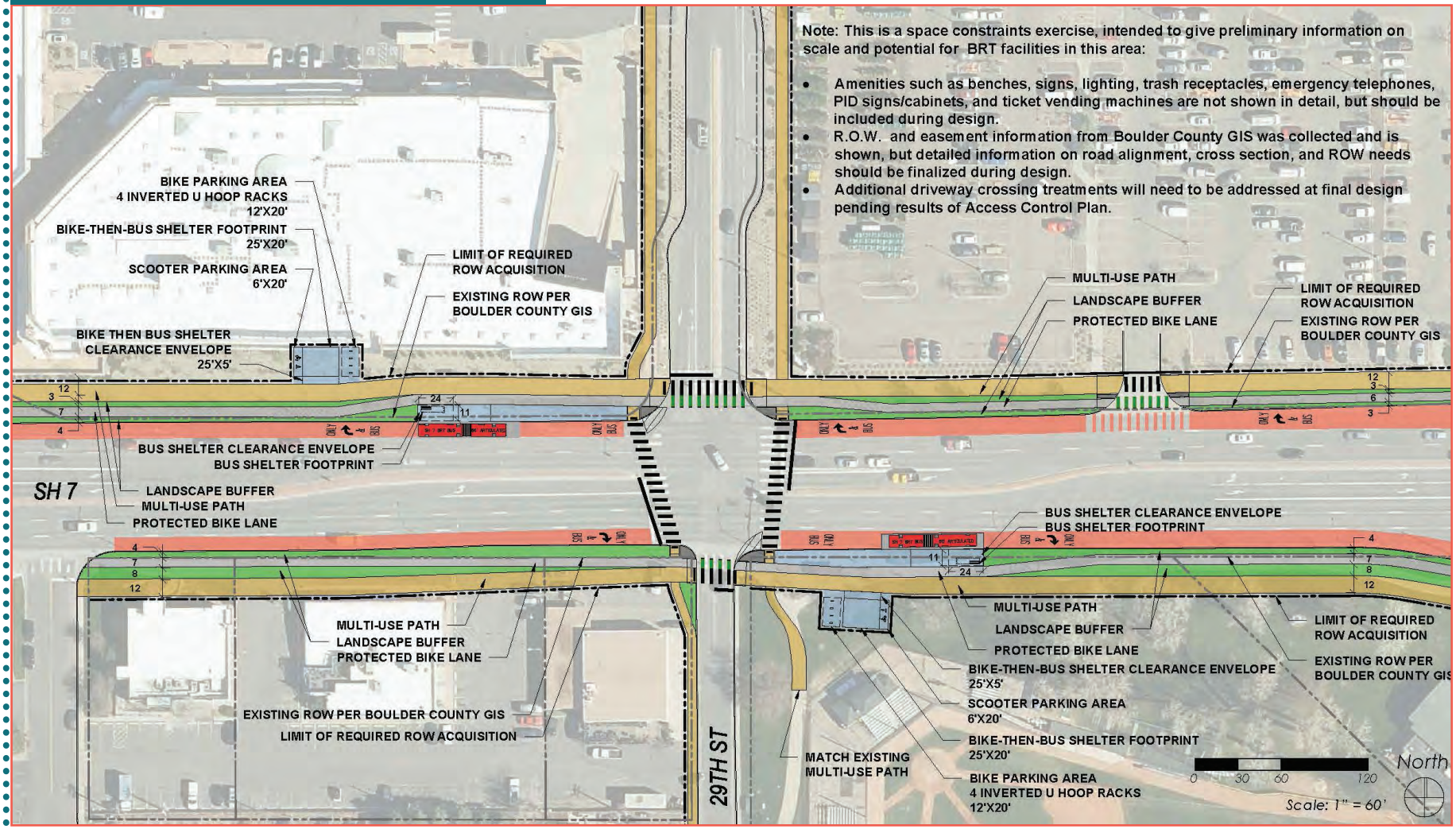


FIGURE 39
48th St. and SH7

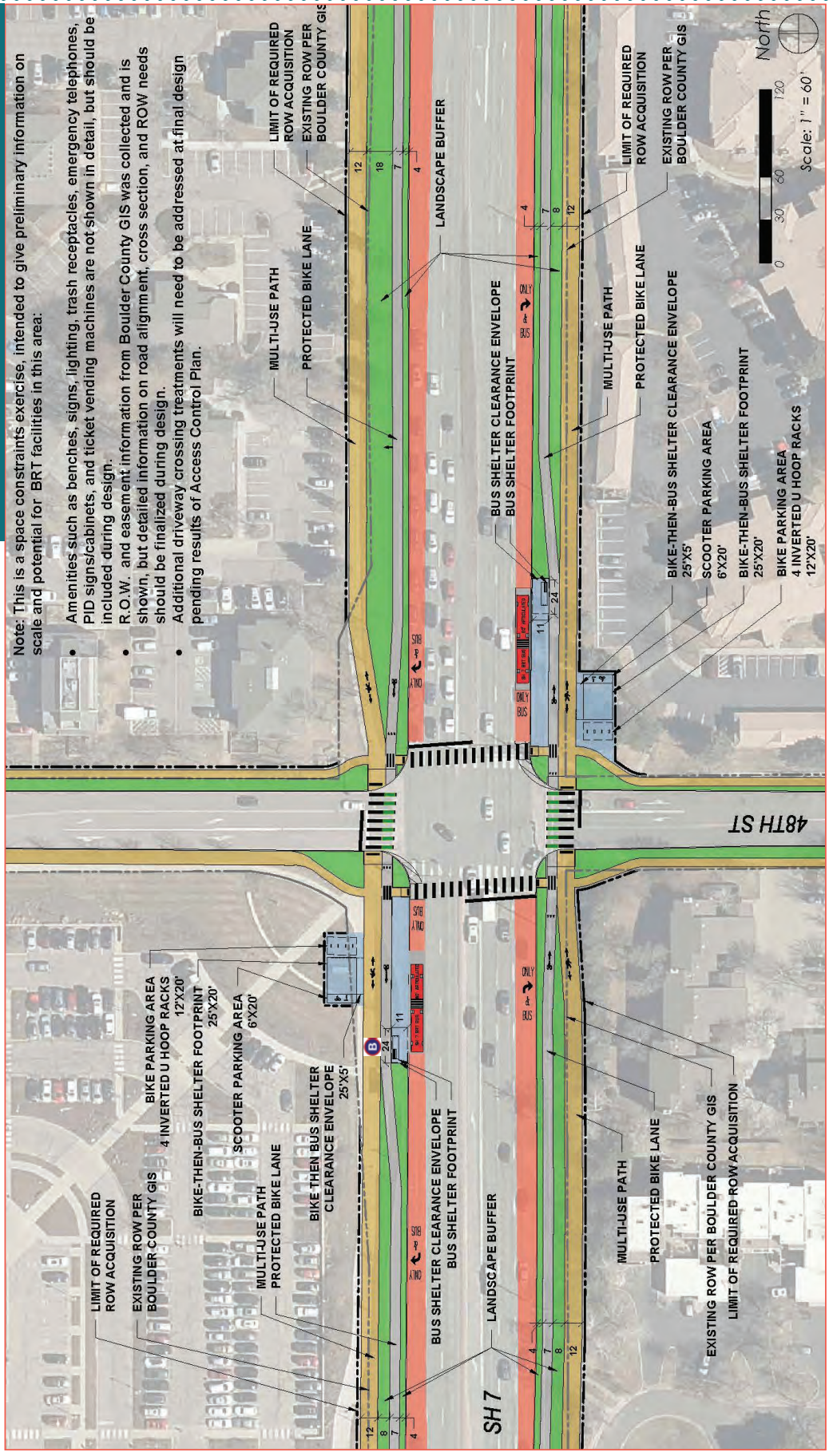
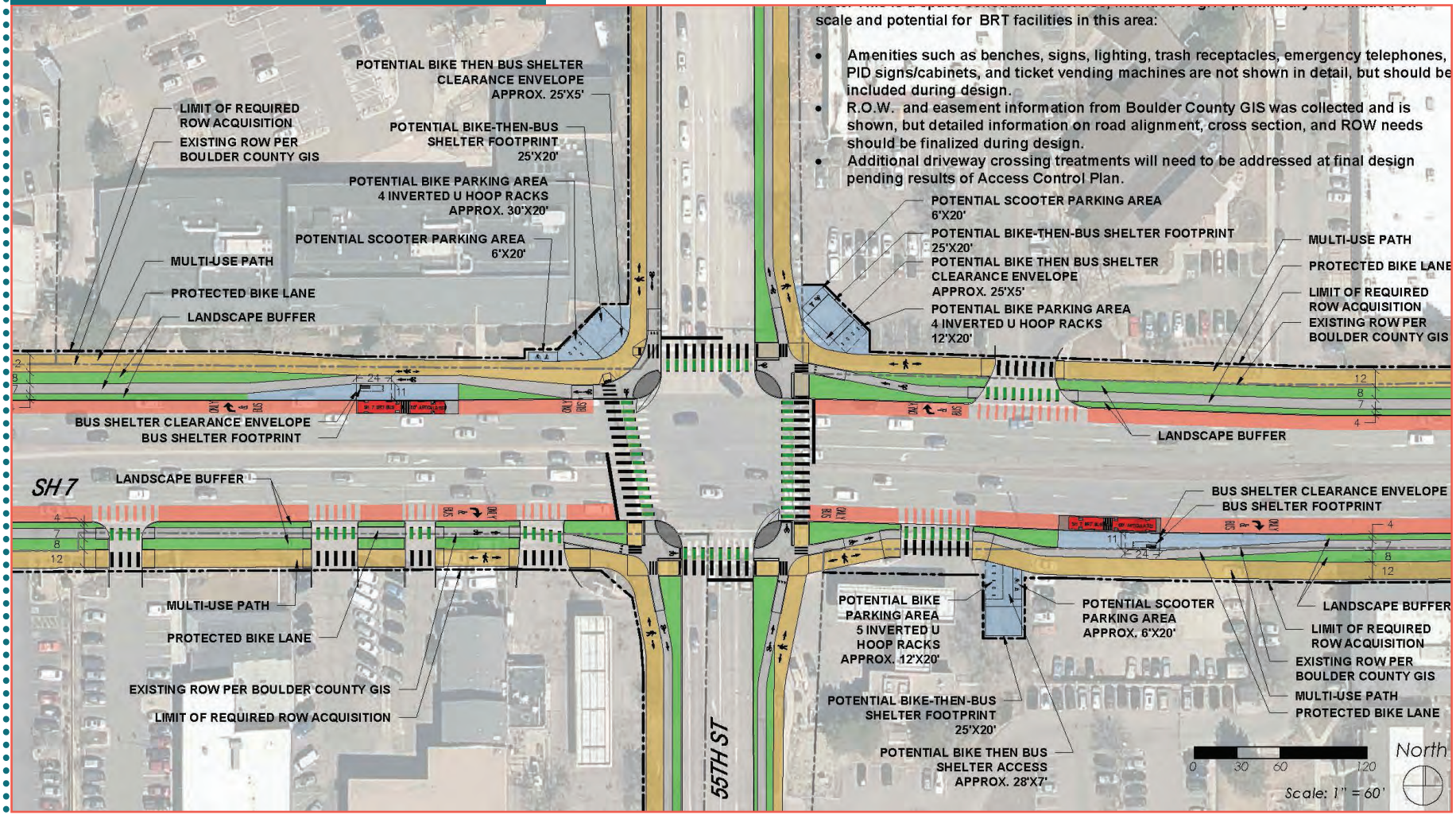


FIGURE 40

55th St. and SH7



scale and potential for BRT facilities in this area:

- Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
- R.O.W. and easement information from Boulder County GIS was collected and is shown, but detailed information on road alignment, cross section, and ROW needs should be finalized during design.
- Additional driveway crossing treatments will need to be addressed at final design pending results of Access Control Plan.

FIGURE 41
63rd St. and SH7

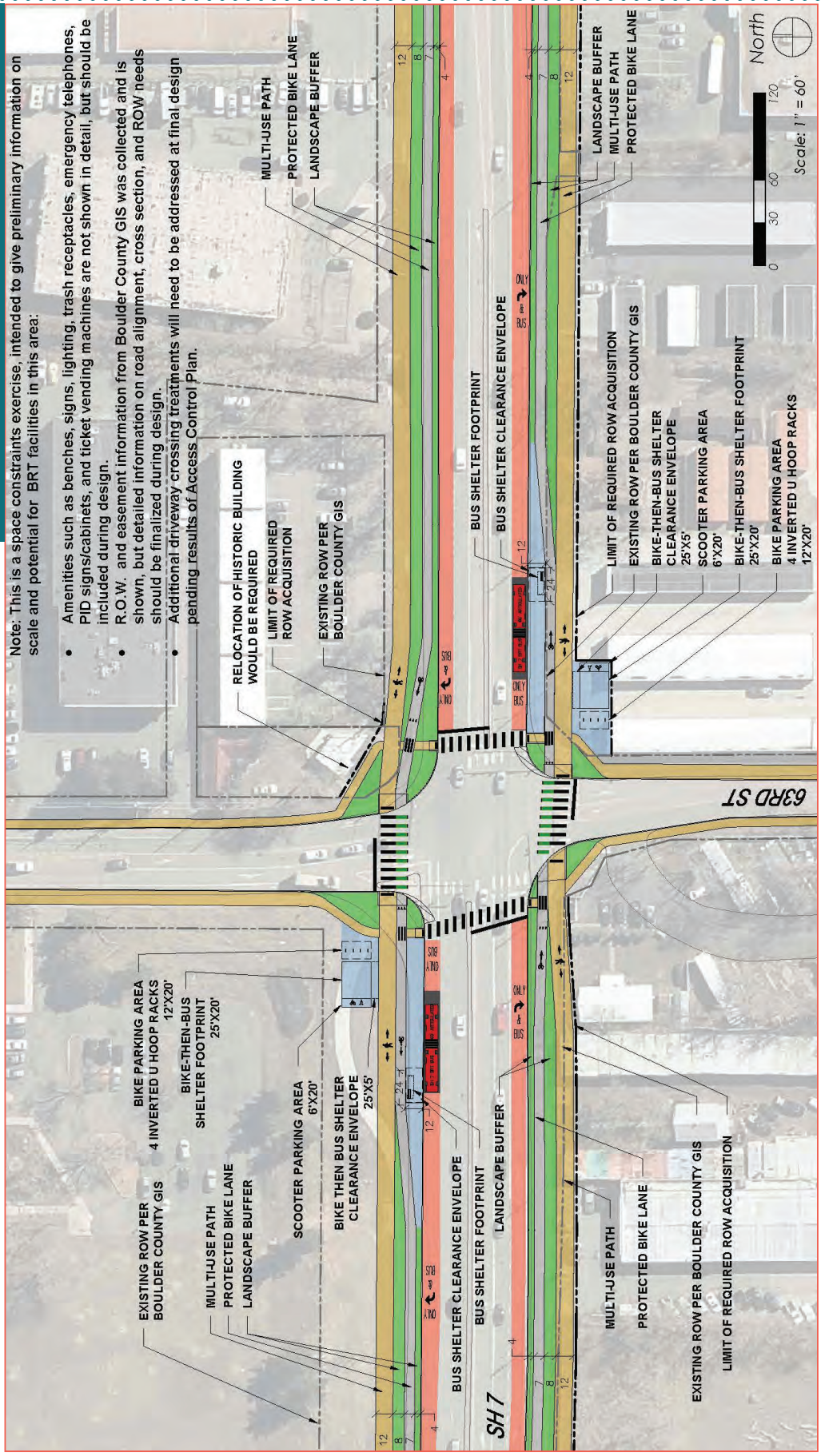
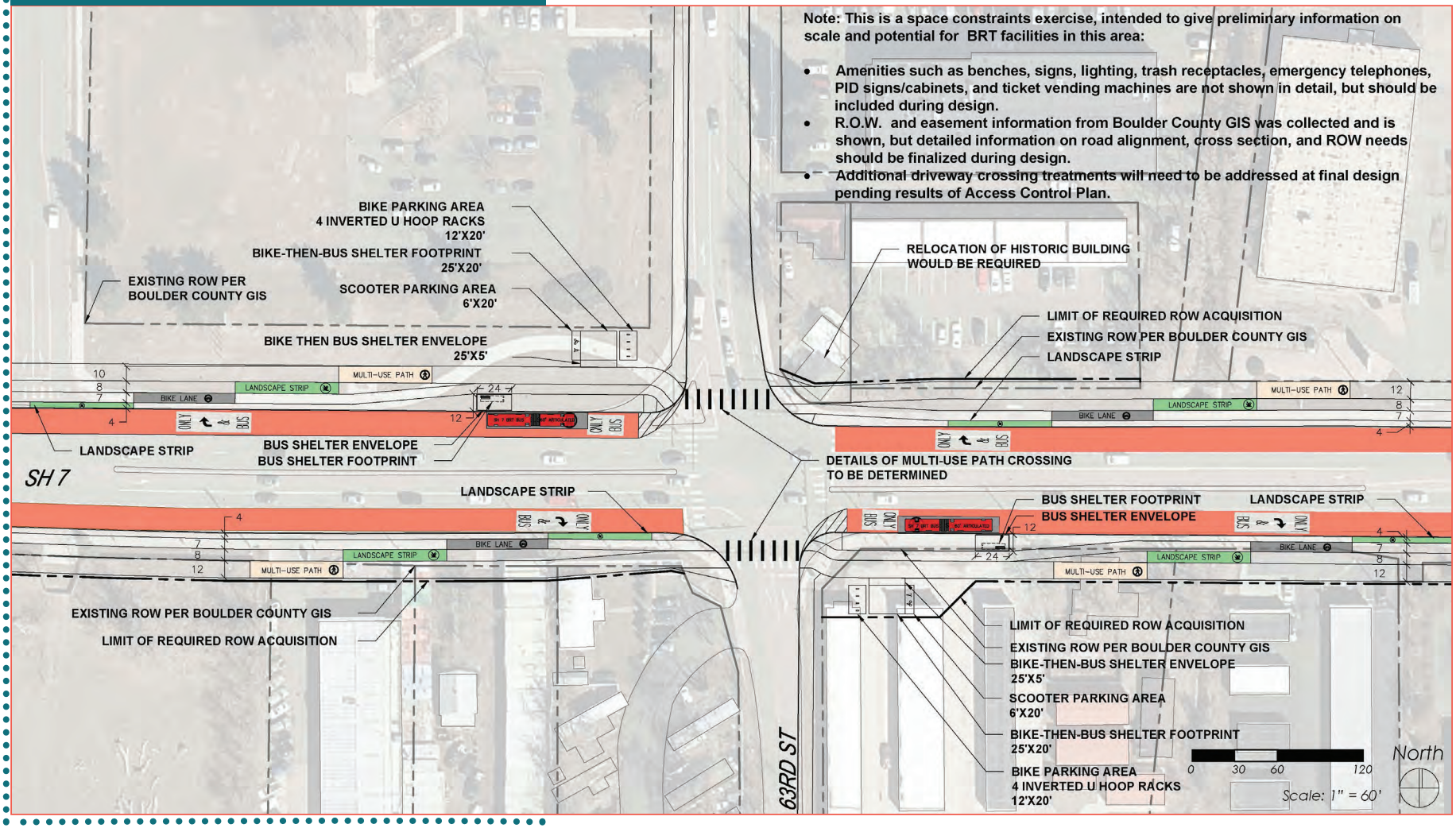


FIGURE 42
63rd St. and SH7



FIRST AND FINAL MILE (FFM) SUMMARY AND ACTIONS

The proposed SH7 BRT currently has a number of proposed stops in Boulder, with the project team evaluating four stops. The four stops in Boulder were 63rd and Arapahoe, 55th and Arapahoe, 48th and Arapahoe, and 28/30th and Arapahoe. These stops are primarily in a commercial corridor with some residential close to the station, which will help lead to higher demand for good first and final mile connections. As redevelopment occurs in the area, which is already happening in some parts of the corridor in Boulder, it will be important to consider first and final mile strategies.

The stops studied in the plan are the most dense and developed station areas, besides the Brighton stations. Due to the nature of these stations, the recommendations for first and final mile strategies was a little different. Much of the pedestrian and bicycle network have been built out or proposed in other planning documents.

Special recommendations that come with each of the stations is implementation of shared-mobility as a FFM solution. Shared-mobility comes in many forms with the most coming from bikeshare and electric scooter share. Planning for space for these mobility forms at the station and a deployment area around the stations will allow users to access the station in different ways other than their personal cars.

Another recommendation for several of the stations was the inclusion of a Transportation Management Association or Organization (TMA or TMO). These groups will help promote the use of the BRT line, adjoining transit with first and final mile solutions to connect to the stations. These groups have been very successful in Colorado and could potentially partner with the existing official Boulder TMA, Boulder Transportation Connections.

- 63rd and Arapahoe - The proposed station at 63rd and Arapahoe is on the east edge of Boulder and has a combination of single family residential, civic and industrial land-uses. Connectivity to Arapahoe Ridge High School is one of the most important connections for FFM connectivity. Also, a proposed commuter rail station at 63rd will be an important future connection.

  As space allows at the station, secure bicycle parking will be key to getting more users to bicycle to the station.

- 55th and Arapahoe - The proposed station at 55th and Arapahoe is developed with many land uses in the area. The station has a combination of residential, commercial, and industrial land uses. This station will serve as the primary station for the Flatiron Business Park, one of the most concentrated employment areas for private businesses in Boulder. This station is anticipated to be studied in a station area plan in late 2019/ early 2020 and will provide more details for connectivity for the station area.

  As space allows at the station, secure bicycle parking will be key to getting more users to bicycle to the station.

- 48th and Arapahoe - The proposed station at 48th and Arapahoe is developed with many land uses in the area. The station has a combination of residential, commercial, and industrial land-uses. This station will serve as the primary station for the Boulder Community Health, a major employer and destination for people.

  Working with the hospital, space could be dedicated at the station area for secure bicycle parking.

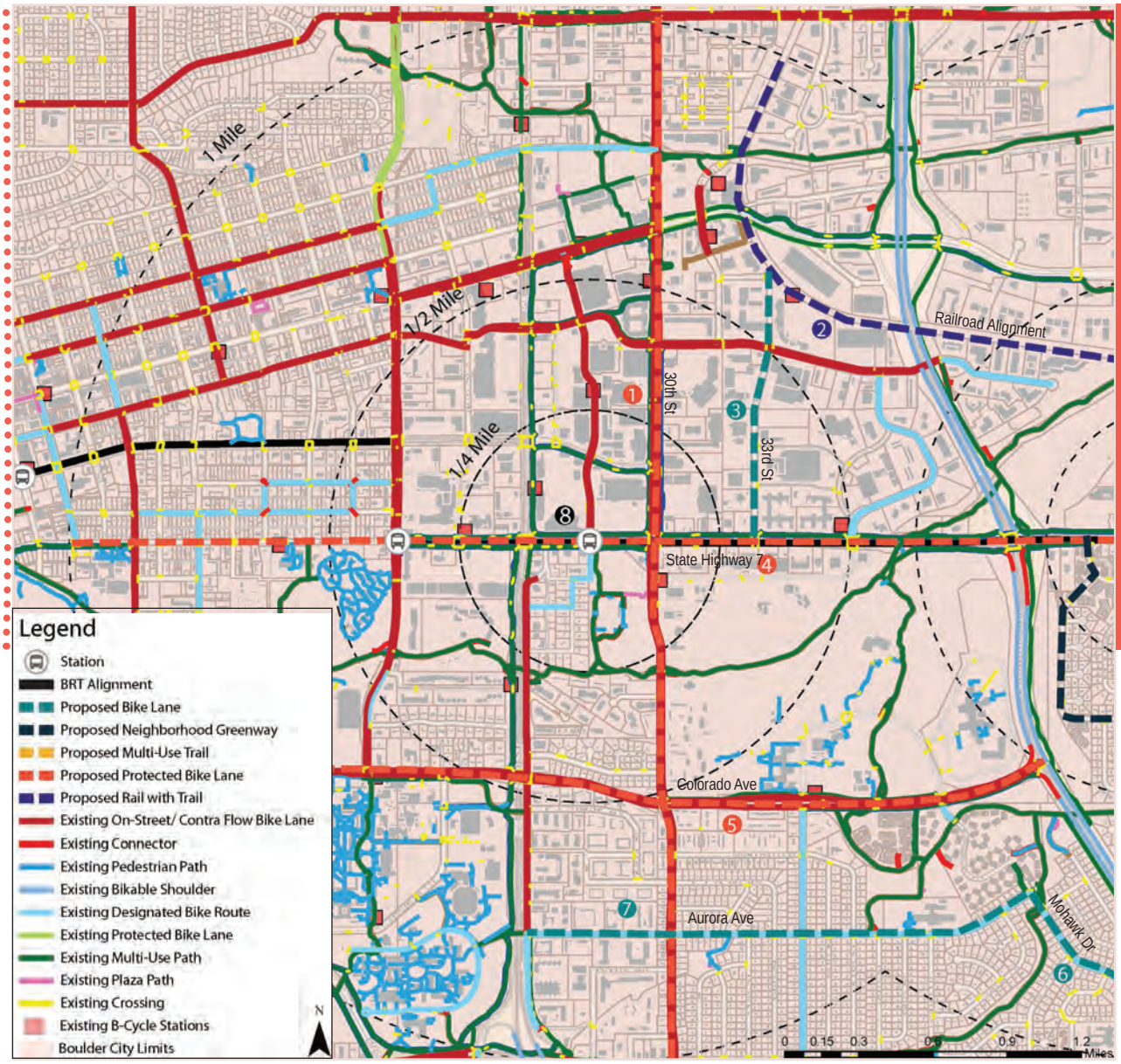
- 28th/30th and Arapahoe - The proposed station at 28th/30th and Arapahoe is developed with primarily commercial land-uses surrounding the station area. This station will serve as the primary station for 29th Street Mall and their surrounding retail, as well as one of the stations for CU Boulder staff and students to connect to campus.

  Bicycle parking for this area could be difficult due to constrained right-of-way. Working with adjacent landowners to get space to implement secure bicycle parking will be key task.

** Arapahoe has been visioned in the East Arapahoe study to have both protected bicycle lanes and a sidepath in the right-of-way. These options in facilities will help bicyclists of all comfort levels to travel in the corridor. The goal of the rest of the recommendations for these areas was to identify arterial routes to get to Arapahoe and connect to the station. As Boulder implements a low-stress bicycle network, the implementation will aid in bring bicyclists on the arterial routes leading to the station.*

**Secure bike parking, such as secure bike structures that allow for more bikes to be parked securely at the station in a smaller space, will be needed at stations. Sidewalk gaps also need to be evaluated, both with respect to pedestrian/ bike access and Americans with Disabilities Act (ADA) accessibility, and filled accordingly. Many of the existing developments have sidewalks and trails implemented giving pedestrians routing choices, this practice should continue with all new development and trail connections between streets and sidewalks should be considered in the layout and placed in convenient locations.*

FIGURE 43
29th Street FFM



Recommendations

1. **Proposed Protected Bike Lane on 30th Street**
Provide a protected bike lane on 30th Street as part of the Boulder low-stress bikeway network.

2. **Proposed Rail with Trail along Railroad Alignment**
Provide a trail along the existing rail line north of the State Highway 7 corridor. Coordination with adjacent landowners will be needed in some areas.

3. **Proposed Bike Lane on 33rd Street**
Create a bike lane on 33rd Street to connect the Rail-with-Trail to State Highway 7

4. **Proposed Protected Bike Lane along State Highway 7**
Provide a protected bike lane along State Highway 7 as identified in East Arapahoe Corridor Plan.

5. **Proposed Protected Bike Lane on Colorado Avenue**
Provide a protected bike lane on Colorado Avenue as part of the Boulder low-stress bikeway network.

6. **Proposed Bike Lane on Mohawk Drive**
Provide the appropriate bike lane based on speeds and volume of the roadway to connect neighborhood users to Aurora Avenue and neighborhood trails.

7. **Proposed Bike Lane on Aurora Avenue**
Provide the appropriate bike lane based on speeds and volume of the roadway to connect neighborhood users to 30th Street

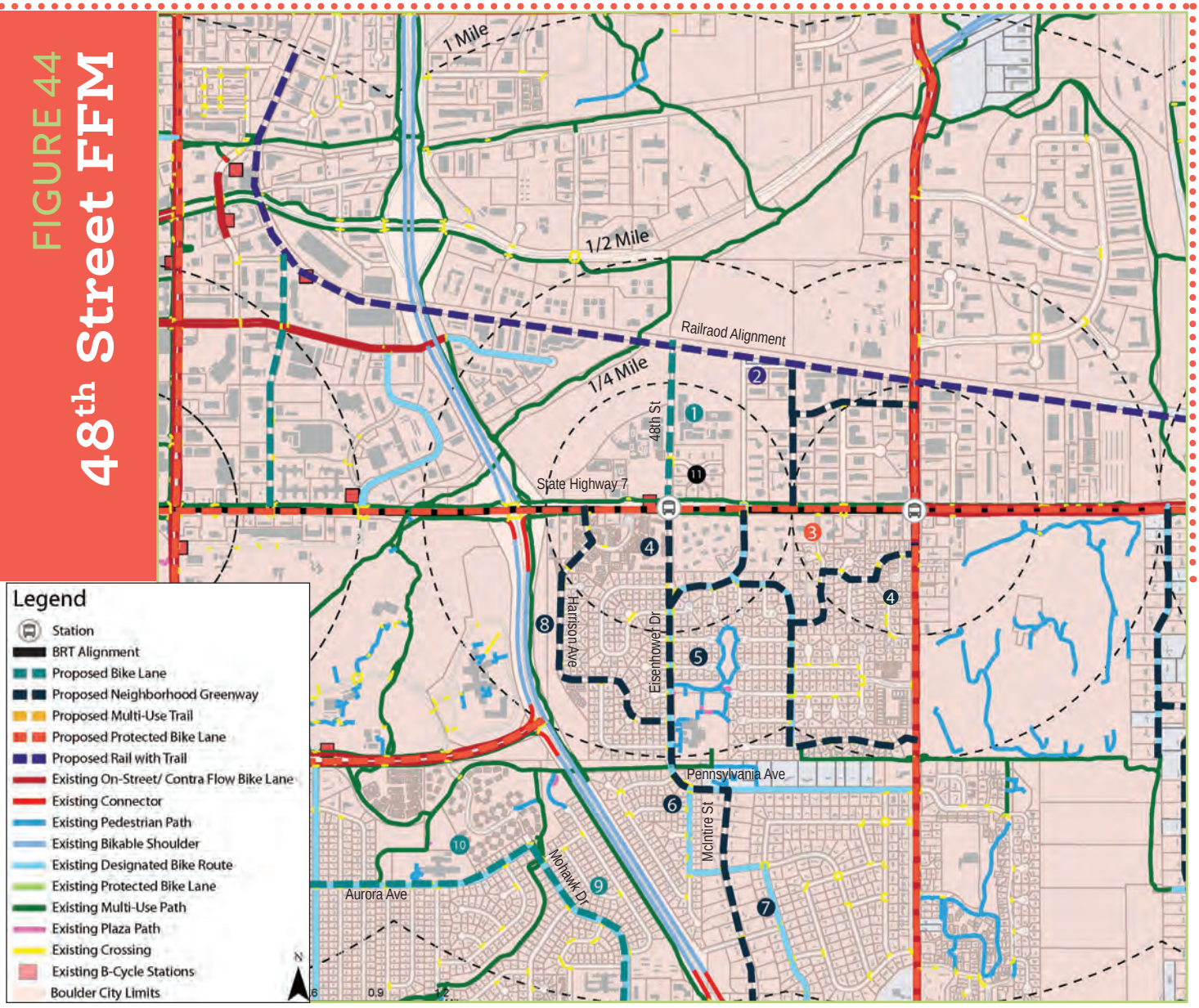
8. **Secure Bicycle Parking at Station**
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

9. **Sidewalk Gap Identification and Remediation**
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

10. **Employer/ Neighborhood Transit Benefit**
Work with existing employers and neighborhoods to provide incentives for transit passes, bicycle share and other methods to reduce vehicle miles traveled.

11. **Circulator/Shuttle Bus**
Implement a shuttle/circulator bus to connect users to the many destinations in the area. Explore the usage of autonomous vehicle like the EasyMile for use in the 29th Street Mall.

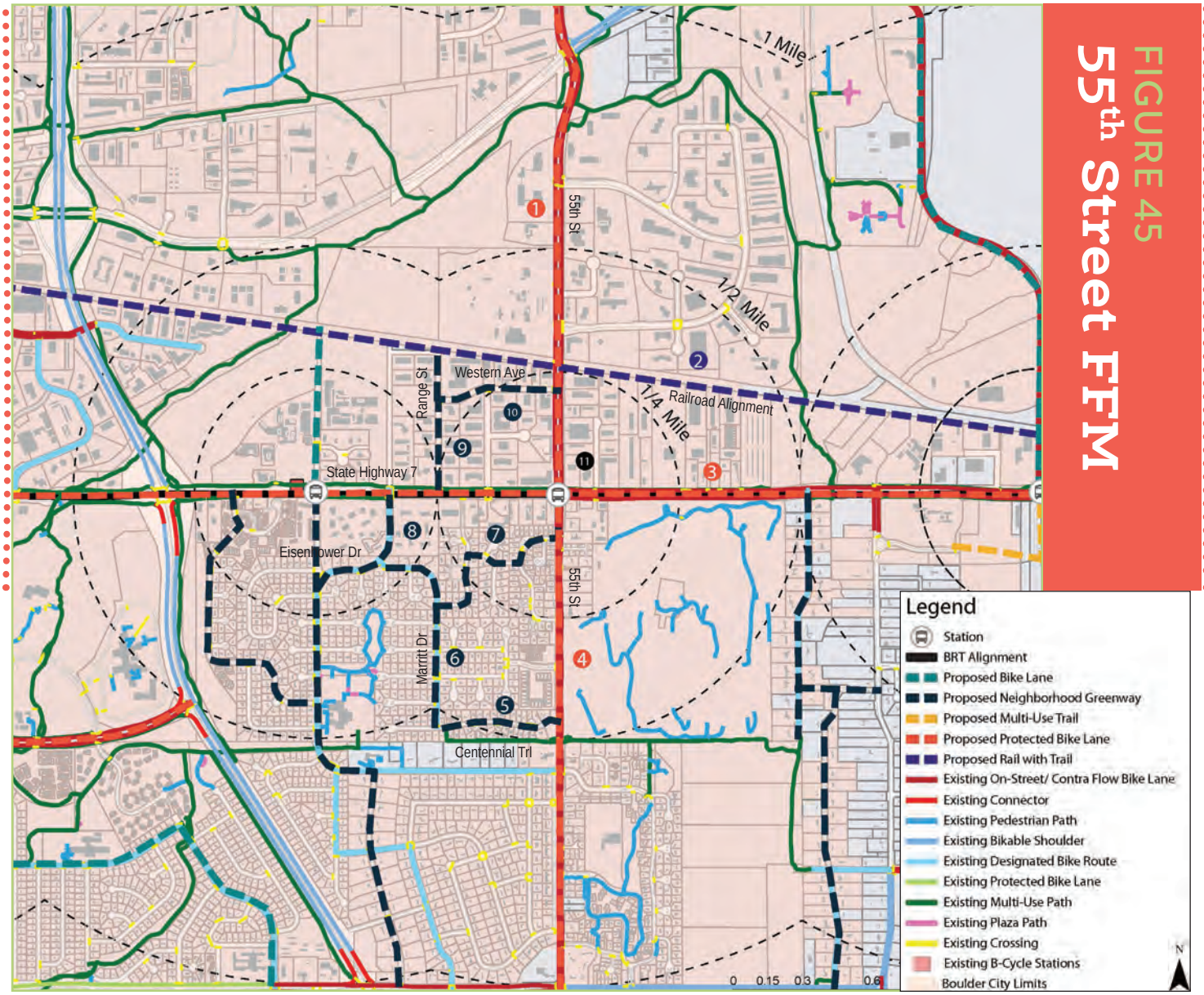
FIGURE 44
48th Street FFM



Recommendations

1. **Proposed Bike Lane on 48th Street**
   Provide a bike lane to connect existing trail network to the station at 48th street.
2. **Proposed Rail with Trail along Railroad Alignment**
   Provide a trail along the existing rail line north of the State Highway 7 corridor. Coordination with adjacent landowners will be needed in some areas.
3. **Proposed Protected Bike Lane along State Highway 7**
   Provide a protected bike lane along State Highway 7 as identified in East Arapahoe Corridor Plan.
4. **Proposed Neighborhood Greenway on 48th Street**
   Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations
5. **Proposed Neighborhood Greenway on Eisenhower Drive**
   Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations
6. **Proposed Neighborhood Greenway on Pennsylvania Avenue**
   Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations
7. **Proposed Neighborhood Greenway on McIntire Street**
   Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations
8. **Proposed Neighborhood Greenway on Harrison Avenue**
   Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations
9. **Proposed Bike Lane on Mohawk Drive**
   Provide bike lane on Mohawk Drive to connect neighborhood to low-stress bikeway on 30th.
10. **Proposed Bike Lane on Aurora Avenue**
    Provide bike lane on Aurora Avenue to connect neighborhood to low-stress bikeway on 30th.
11. **Secure Bicycle Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.
12. **Sidewalk Gap Identification and Remediation**
    Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.
13. **Employer/ Neighborhood Transit Benefit**
    Work with existing employers and neighborhoods to provide incentives for transit passes, bicycle share and other methods to reduce vehicle miles traveled.

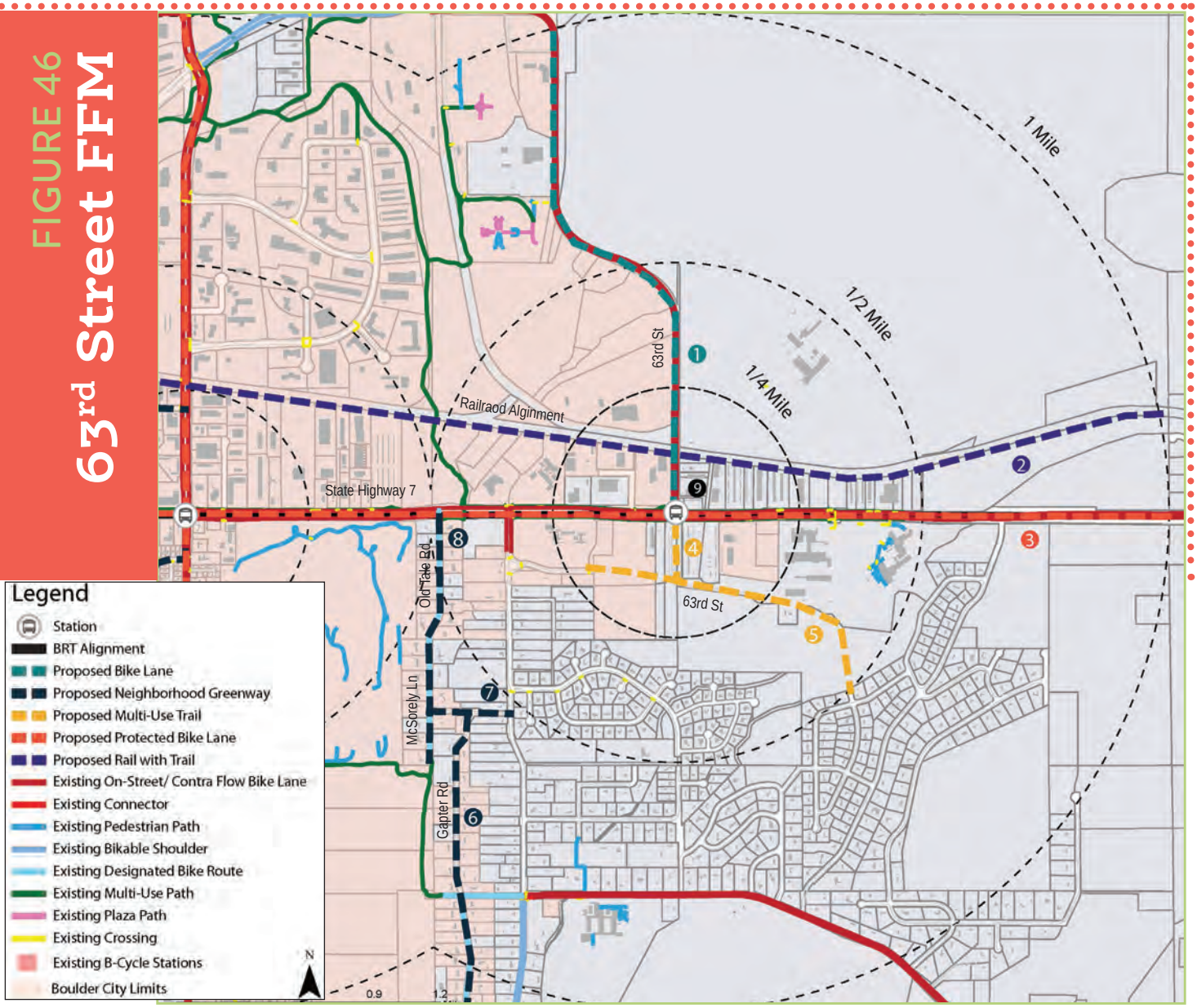
FIGURE 45
55th Street FFM



Recommendations

1. **Proposed Protected Bike Lane on 55th Street**
   Provide a protected bike lane along 55th Street as part of the Boulder Low-Stress Bikeway Network.
2. **Proposed Rail with Trail along Railroad Alignment**
   Provide a trail along the existing rail line north of the State Highway 7 corridor. Coordination with adjacent landowners will be needed in some areas.
3. **Proposed Protected Bike Lane along State Highway 7**
   Provide a protected bike lane along State Highway 7 as identified in East Arapahoe Corridor Plan.
4. **Proposed Protected Bike Lane on 55th Street**
   Provide a protected bike lane along 55th Street as part of the Boulder Low-Stress Bikeway Network.
5. **Proposed Neighborhood Greenway on Centennial Trail**
   Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations
6. **Proposed Neighborhood Greenway on Marritt Drive**
   Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations.
7. **Proposed Neighborhood Greenway on Patton Drive/ Gandhi Drive/ Lodge Lane**
   Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations
8. **Proposed Neighborhood Greenway on Eisenhower Drive**
   Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations
9. **Proposed Neighborhood Greenway on Range Street**
   Develop a bike boulevard on Range Street to connect 55th and State Highway 7 in a low-stress solution.
10. **Proposed Neighborhood Greenway on Western Avenue**
    Develop a bike boulevard on Western Avenue to connect 55th, Rail-with-Trail and State Highway 7 in a low-stress solution.
11. **Secure Bike Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycling parking.
12. **Sidewalk Gap Identification and Remediation**
    Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.
13. **Employer/ Neighborhood Transit Benefit**
    Work with existing employers and neighborhoods to provide incentives for transit passes, bicycle share and other methods to reduce vehicle miles traveled.
14. **Circulator/Shuttle Bus**
    Implement a shuttle/circulator bus to connect users to the many destinations in the area, specifically the Flatiron Business Park.

FIGURE 46
63rd Street FFM



Recommendations

1. **Proposed Bike Lane on 63rd Street**
Evaluate existing bike lane on 63rd Street for the appropriate bicycle lane treatment based on vehicle volumes and speed.

2. **Proposed Rail with Trail Along Railroad Alignment**
Provide a trail along the existing rail line north of the State Highway 7 corridor. Coordination with adjacent landowners will be needed in some areas.

3. **Proposed Protected Bike Lane along State Highway 7**
Provide a protected bike lane along State Highway 7 as identified in East Arapahoe Corridor Plan.

4. **Proposed Multi-Use Trail Connection along 63rd Street**
Provide a multi-use trial south of State Highway 7 along 63rd Street.

5. **Proposed Multi-Use Trail Connection to Neighborhoods**
Provide a trail to connect to 63rd Street, Oreg Street and Ravenwood Road.

6. **Proposed Neighborhood Greenway on Gapter Road**
Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations.

7. **Proposed Neighborhood Greenway on McSorley Lane**
Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations

8. **Proposed Neighborhood Greenway on Old Tale Road**
Develop a bike boulevard network in neighborhood south of State Highway 7 to get users to stations.

9. **Secure Bike Parking at Station**
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycling parking.

10. **Sidewalk Gap Identification and Remediation**
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

TRANSIT ORIENTED DEVELOPMENT (TOD) REVIEW

The proposed SH7 BRT currently has a number of proposed stops in Boulder, with this project team evaluating four stops: 63rd and Arapahoe, 55th and Arapahoe, 48th and Arapahoe, and 28th/30th and Arapahoe. These stops are in a primarily commercial corridor with some residential close to the stations and are among the densest and most developed station areas in the study. This results in higher demand for good connections and less high potential TOD opportunities. As redevelopment and infill development occurs in the area, which is already happening in some parts of the corridor, it will be critical to consider transit-oriented development planning and design practices.

» 29th Street Station - The area surrounding the 29th and Arapahoe Street station is largely developed with retail uses that are already contributing locations for TOD. There are a lot of shops and restaurants in the area already, shown in grey on the map, but there is also a lot of parking associated with these businesses. This parking represents a prime opportunity to fill in further with TOD in the future or potentially turn into shared structured parking as the land values in the area rise. The space could also fill in with additional businesses and/or residential development in the future building on the development that is already there and creating "district" level TOD around the proposed station.

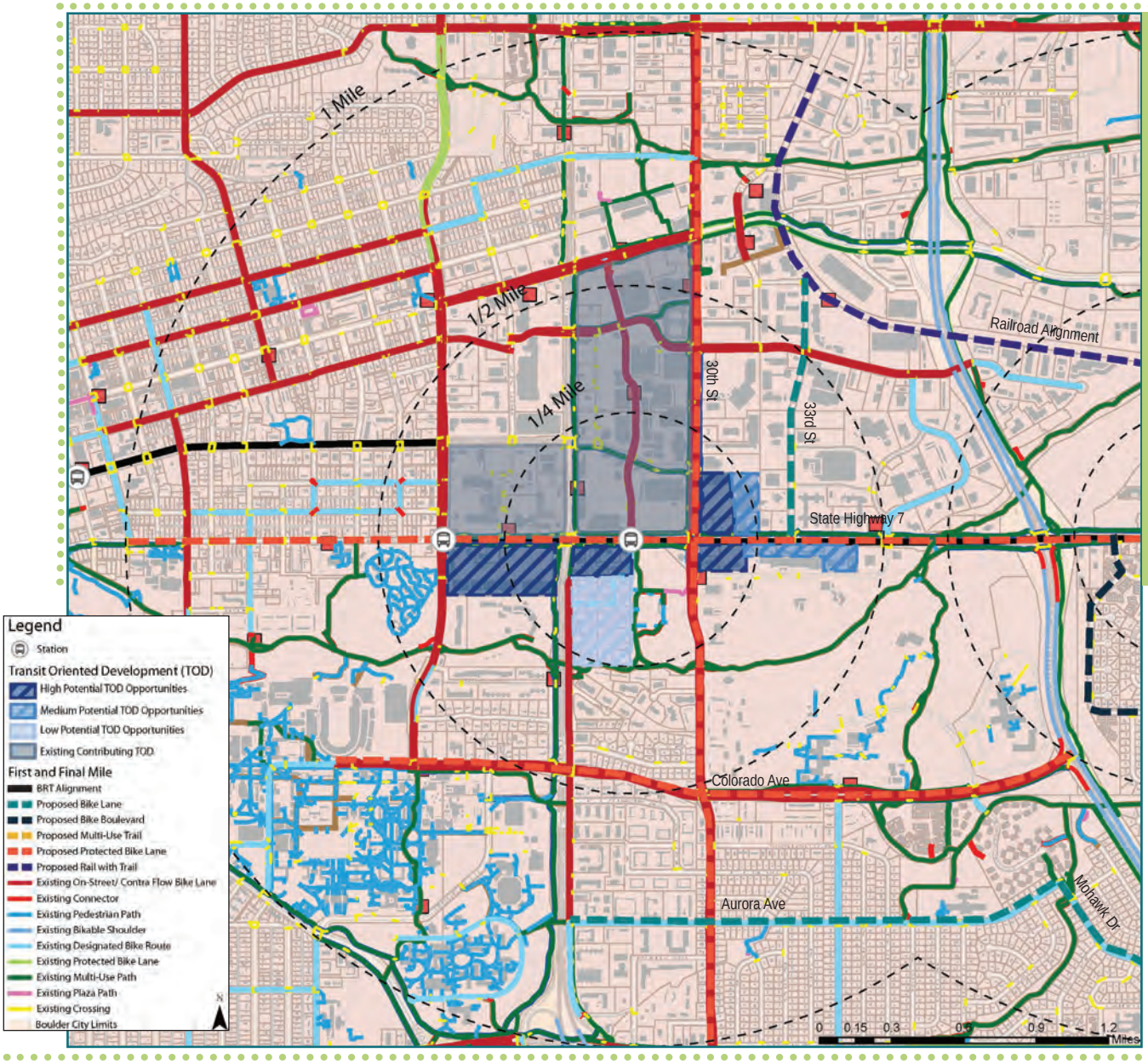
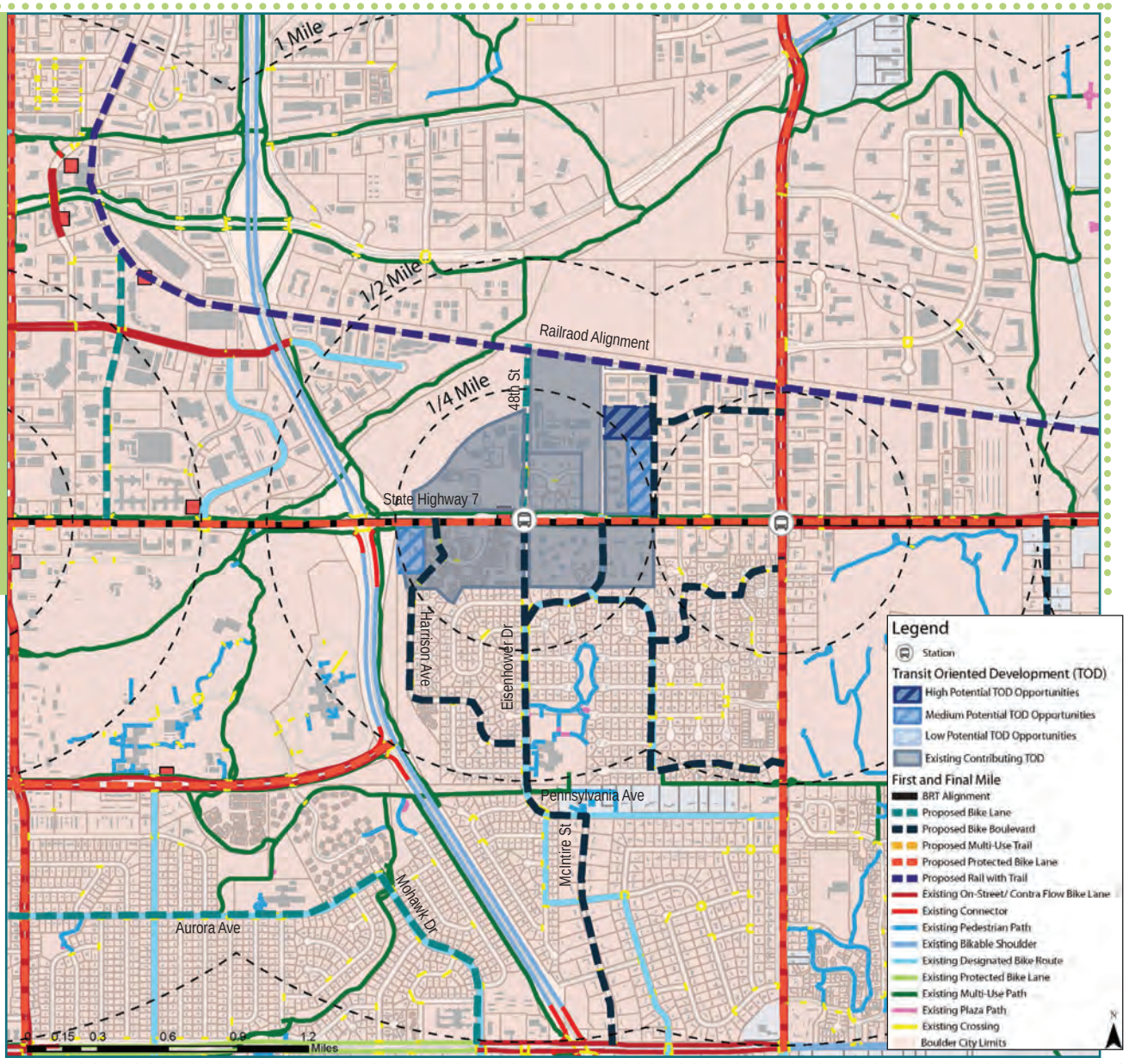


FIGURE 47
29th Street TOD

» 48th Street Station - The 48th and Arapahoe station area is largely developed already, meaning that there is not much real potential for additional transit-oriented development right around that station. However, there is existing contributing density that could benefit from the BRT line and be an asset to it. The area to the south of the proposed station is filled with residential development, both apartments and reasonably dense single-family residences, and which provide a significant number of potential riders for the station provided they can access it easily. The area to the north of the station is dominated by the Foothills Hospital and other associated medical businesses. While these uses are likely to stay where they are and not develop much further, they represent a significant employment center in the vicinity that could greatly benefit from increased transit options in the area.

The TOD opportunity areas shown in medium blue and dark blue on the map are parking lots in the area that could potentially fill in as the station and the area around it develop. Their distance from the station would make connectivity and access important to potential future successful TOD.

FIGURE 48
48th Street TOD



» 55th Street Station - The 55th and Arapahoe station is moving slightly further out of Boulder but the area is still mostly developed with businesses, and a decent amount of parking. The areas shown in dark blue directly to the northeast of the station is a large parking area that could develop or structure in the future to include more transit-oriented development. The dark blue strip to the southwest of the station is also large parking areas with small businesses that could fill in significantly in the future as the transit line and the land around it develop.

The Medium Potential TOD opportunities to the northwest and southeast of the station are all areas that are developed but underutilized and could potentially fill in and densify in the future to accommodate additional businesses and densities. The undeveloped areas are smaller and some of the businesses are newer therefore it is a sightly lower potential opportunity. The light blue area represents a relatively new looking business park that is unlikely to develop additionally in the future and its distance from the station makes it slightly less desirable.

The area in grey further southwest is relatively densely developed single family residences that represent existing contributing density that would benefit from the proximity to transit that the proposed station represents.

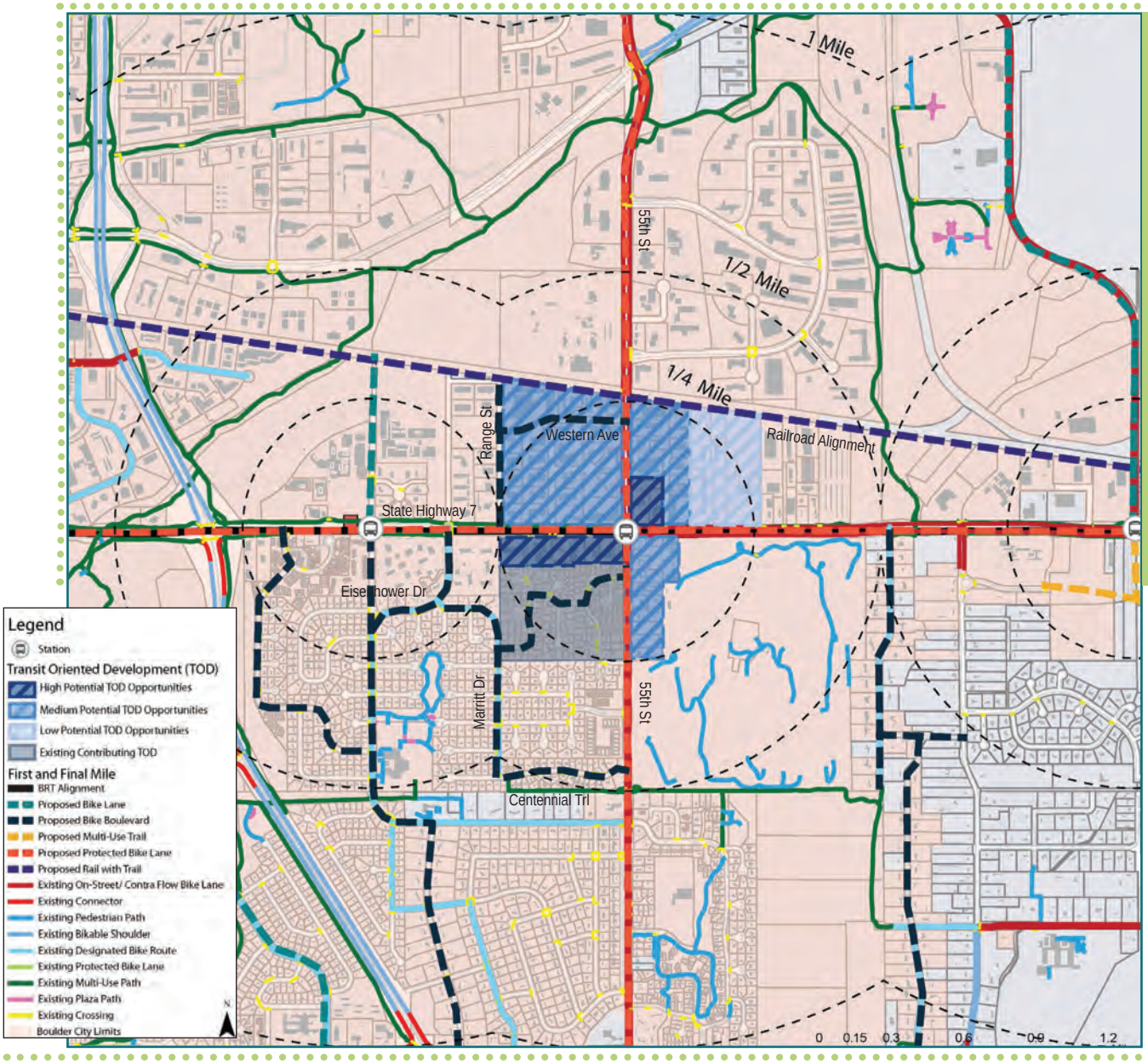


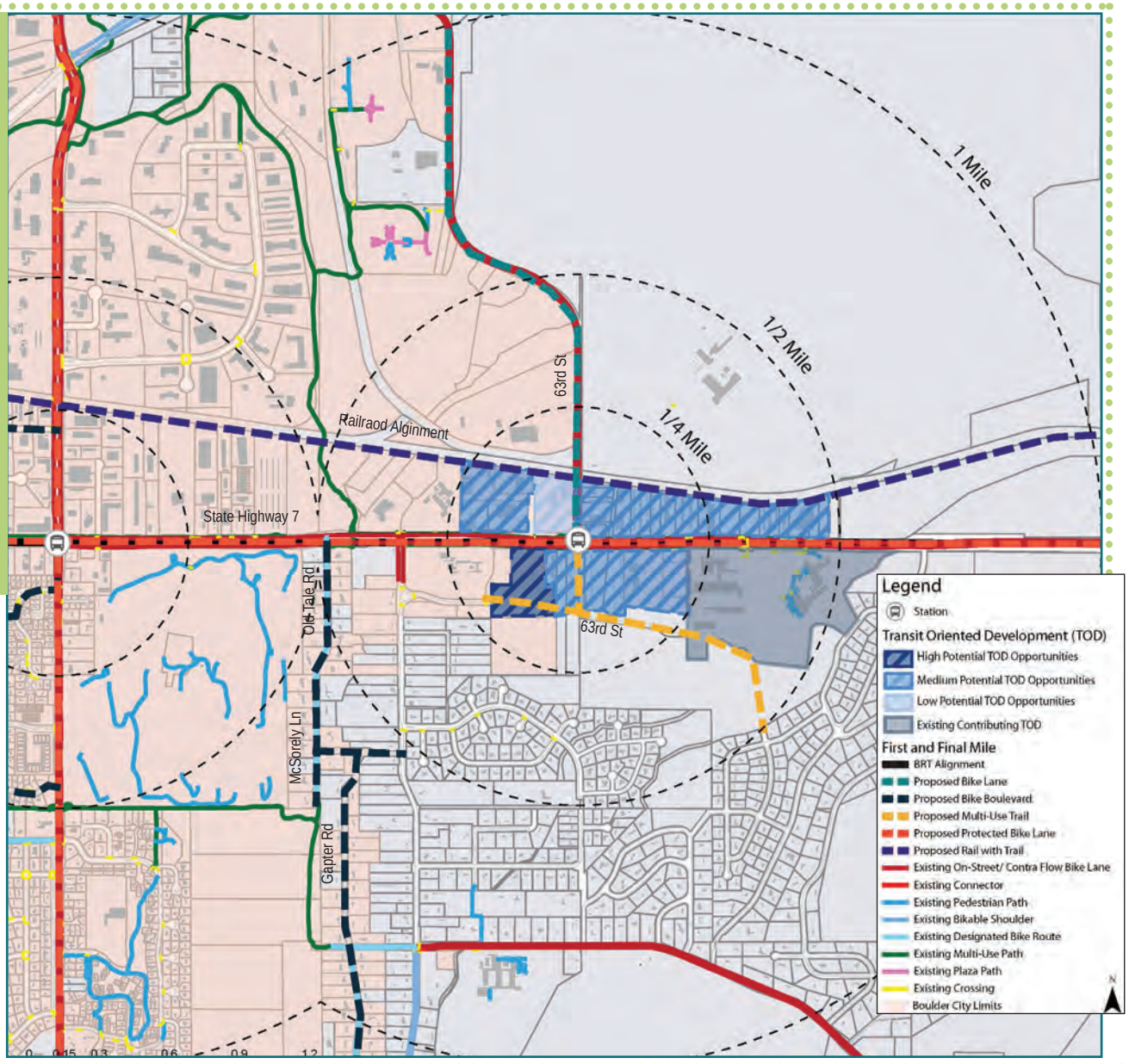
FIGURE 49
55th Street TOD

» 63rd Street Station - The proposed station at 63rd and Arapahoe street is at the outskirts of Boulder and is therefore slightly less developed than the other station locations evaluated. The area directly northeast of the station is developed with a few scattered small business, self-storage facilities, auto repair dealers and associated parking. The area directly southeast of the station location also contains similar types of development, however it also contains a Boulder Valley School District facility. Both areas represent a Medium Potential TOD opportunity (shown in medium blue on the map) since they contain development but are highly underutilized and likely to infill or completely redevelop as land values rise around the station. The other Medium Potential TOD opportunity shown on the map is a similar area that includes spaced out small to medium sized businesses surrounded by parking that all has the potential to fill in relatively easily in the future to accommodate higher density development around the proposed transit station.

There is only a relatively small area to the southwest of the station that is not currently developed and therefore is a High Potential TOD opportunity shown in dark blue on the map below. The area directly northwest of the station location is the Naropa University Campus so it is likely to stay where it is and not develop much TOD, however it would contribute riders to the BRT line and benefit from the proximity of the proposed station.

» Any considerations of development or redevelopment in this area would require further discussion with the community, residents, businesses/ business owners, and property owners before taking any action.

FIGURE 50
63rd Street TOD



ENVIRONMENTAL CONSIDERATIONS

The purpose of this review is to identify the existing conditions and the potential environmental impacts to resources as a result of the proposed SH 7 BRT Station Area Design Project. The station areas were evaluated to assess the environmental conditions using the station plans, Geographic Information Systems (GIS), and a desktop review. This review documents existing environmental conditions found in the project area. It should be noted that this study is considered "high level," and the data collected was obtained using desktop surveys. The following table summarizes each resource in the proposed Boulder Station Areas.

Environmental Resources

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
29TH STREET AND SH7				
	There is no suitable habitat for black-tailed prairie dogs within the project area. Large trees in and within 0.5 mile of the project area, such as along Boulder Creek, may provide potential nest sites for raptors. Trees and shrubs within the project area may provide potential nest sites for other birds protected under MBTA. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat was evaluated for the following threatened, endangered, or state-sensitive species with the potential to occur in Boulder County: American peregrine falcon (Falco peregrinus anatum), Bald Eagle (Haliaeetus leucocephalus), black-tailed prairie dog, Burrowing Owl (Athene cunicularia), Canada lynx (Lynx canadensis), Colorado butterfly plant (Oenothera coloradensis), common garter snake (Thamnophis sirtalis), greenback cutthroat trout (Oncorhynchus clarkii stomias), Mexican spotted owl (Strix occidentalis), northern leopard frog (rana pipiens), northern redbelly dace	Painted light poles and traffic signals are located at the intersection of 29th Street and SH7 and in the project area. These poles could contain lead paint and should be sampled during further environmental investigations. A gas station is located approximately 210 feet east of the intersection. Three dry cleaners are located near the intersection, 540 feet west of the intersection, 555 feet northwest of the intersection, and 729 feet northeast of the intersection. One pad-mounted transformer is located at the northwest corner of the intersection. An additional pad-mounted transformer is located approximately 30 feet south of the southern project area boundary.	The previously disturbed nature of the project area has low potential for paleontology and archaeology resources to be found within the project area. No previous OAHP sites were recorded within or adjacent to the project area (History Colorado COMPASS database, 2018). No resources eligible for the National Register of Historic Places (NRHP) were identified in or adjacent to project area. Three parcels with a building or structure older than 50 years are located within or adjacent to the project area.	Access to the Boulder Creek Path via a paved sidewalk, is located at the southeast corner of this intersection within Scott Carpenter Park, both of which may be Section 4(f) resources (City of Boulder Multi-Use Path Maintenance Management Map, 2011). According to the Boulder OSMP System-Wide Map (City of Boulder, 2018), a non-OSMP multi-use trail extends east-west along SH7 in the project area. According to the City of Boulder Multi-Use Path Maintenance Management Map (City of Boulder, 2011), this multi-use path is maintained by a private party and is likely not a Section 4(f) resource. According to the Boulder Valley Comprehensive Plan Trails Map, a planned trail will be located on the south side of SH7 in the vicinity of this proposed station (Boulder, 2010). Scott Carpenter Park is considered a Section 6(f) resource (CDOT, 2019)

Environmental Resources Continued

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
29TH STREET AND SH7 CONTINUED				
	(Phoxinus eos), Preble's meadow jumping mouse (Zapus hudsonus preblei), Townsend's big-eared bat (Corynorhinus townsendii pallescens), Ute ladies'-tresses orchid (Spiranthes diluvialis), and wolverine (Gulo gulo). Habitat for these species is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP,2019;USFWS,2019). No natural drainages or ditches were identified in the project area; therefore, it is unlikely that WUS or non-jurisdictional wetlands are present. No SB 40 resources were identified within the project area. The project area is located within 1% Chance of Flood Hazard Zone (FEMA, 2019)	Scott Carpenter park is located at the southeast corner of the project area. This facility was used as a former sewage treatment and dumping area from 1895 to circa 1960. It is possible that impacted soils and groundwater still exist at this location.		
30TH STREET AND SH7				
	There is no suitable habitat for black-tailed prairie dogs within the project area. Large trees in and within 0.5 mile of the project area, such as along Boulder Creek, may provide potential nest sites for raptors. Trees and shrubs within the project area may provide potential nest sites for other birds protected under the MBTA. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat was evaluated for threatened, endangered, or state-sensitive species with the	Painted signal poles are located at the intersection of 30th Street and SH7 and in the project area. These poles could contain lead paint and should be sampled during further environmental investigation. A gas station is located on the northeastern property, adjacent to the intersection of 30th Street and SH7. An additional gas station is located approximately 240 feet east of the eastern project area boundary.	The previously disturbed nature of the project area has low potential for paleontology and archaeology resources to be found within the project area. No previous OAHP sites were recorded within or adjacent to the project area (History Colorado COMPASS database, 2018). No resources eligible for NRHP were identified in or adjacent to project	According to the Boulder OSMP System-Wide Map (City of Boulder, 2018), a non-OSMP multi-use trail extends along SH7 (east-west and north directions) in the project area. According to the City of Boulder Multi-Use Path Maintenance Management Map (City of Boulder, 2011), this multi-use path is maintained by a private party and is likely not a Section 4(f) resource. According to the Boulder Valley Comprehensive Plan Trails Map, a planned trail will be located on the south side of SH7 in the vicinity of this proposed station

Environmental Resources Continued

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
30TH STREET AND SH7 CONTINUED				
	potential to occur in Boulder County (same species as those listed for the 29th Street and SH7 intersection). Habitat for these species is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2019; USFWS, 2019). No natural drainages or ditches were identified in the project area; therefore it is unlikely that WUS or non-jurisdictional wetlands are present. No SB 40 resources were identified within the project area. The project area is located within 1% Change of Flood Hazard Zone (FEMA, 2019)	A former dry cleaner is located approximately 677 feet northeast of the northern study area boundary. An active dry cleaner is located approximately 420 feet northeast of the northern project area boundary. Scott Carpenter park is located approximately 795 feet southwest of the project area. This facility was used as a former sewage treatment and dumping area from 1895 to circa 1960. It is possible that impacted soils and groundwater still exists at this location.	area. One parcel with a building or structure older than 50 years are located within or adjacent to the project area.	(Boulder, 2010). Scott Carpenter Park, a Section 6(f) resource is located southwest of the project area (CDOT, 2019).
48TH STREET AND SH7				
	There is no suitable habitat for black-tailed prairie dogs within the project area. Large trees in and within 0.5 mile of the project area, such as along Boulder Creek, may provide potential nest sites for raptors. Trees and shrubs within the project area may provide potential nest sites for other birds protected under the MBTA. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat was evaluated for threatened, endangered, or state-sensitive species with the	Traffic signals and light poles at the intersection of 48th Street at SH7 and in the project area are painted. The poles could contain lead paint and should be sampled during further environmental investigations. Five pole-mounted transformers are located in the project area, one in the southeast corner of the study area and four in the southeast corner of the intersection of 48th Street and SH7. An additional pole-	The previously disturbed nature of the project area has low potential for paleontology and archaeology resources to be found within the project area. No previous OAHP sites were recorded within or adjacent to the project area (History Colorado COMPASS database, 2018). No resources eligible for the NRHP were identified in or adjacent to the project area.	No Boulder County or Boulder OSMP trails or open spaces exist at this proposed station (Boulder County, 2019) According to the Boulder OSMP System-Wide Map (City of Boulder, 2018), a non-OSMP multi-use trail extends east-west along SH7 in the vicinity of this proposed station. According to the City of Boulder Multi-Use Path Maintenance Management Map (City of Boulder, 2011), this multi-use path is maintained by the City of Boulder Transportation Maintenance with a portion on the southern side of SH7

Environmental Resources Continued

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
48TH STREET AND SH7 CONTINUED				
	potential to occur in Boulder County (same species as those listed for the 29th Street and SH7 intersection). Habitat for these species is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2019; USFWS, 2019). No natural drainages or ditches were identified in the project area; therefore, it is unlikely the WUS or non-jurisdictional wetlands are present. No SB 40 resources were identified within the project area. The project area is located within 1% Chance of Flood Hazard Zone (FEMA, 2019).	mounted transformer is located approximately 85 feet west of the western project area boundary.	No parcels with a building or structure older than 50 years are located within or adjacent to the project area.	designated as "Management Undetermined." This path is likely not a Section 4(f) resource. No Section 6(f) resources are located near this proposed station (CDOT, 2019).
55TH STREET AND SH7				
	There is no suitable habitat for black-tailed prairie dogs within the project area. Large trees in and within 0.5 mile of the project area, such as along Boulder Creek, may provide potential nest sites for raptors. Trees and shrubs within the project area may provide potential nest sites for other birds protected under the MBTA. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat was evaluated for threatened, endangered, or state-sensitive species with the	Painted signal poles are located at the intersection of 55th Street and SH7 and in the project area. These poles could contain lead paint and should be sampled during further environmental investigation. Two gas stations are located on the southeast and southwest properties adjacent to the study area. Five pole-mounted transformers are located in the project area, on in the northwestern portion of the study area, three	The previously disturbed nature of the project area has low potential for paleontology and archaeology resources to be found within the project area. No previous OAHP sites were recorded within or adjacent to the project area (History Colorado COMPASS database, 2018). No resources eligible for NRHP were identified in or adjacent to project	No Boulder County or Boulder OSMP trails or open space exist at this proposed station (Boulder County, 2019). According to the Boulder OSMP System-Wide Map (City of Boulder, 2018), a non-OSMP multi-use trail extends east-west along SH7 in the project area. According to the City of Boulder Multi-Use Path Maintenance Management Map (City of Boulder, 2011), this multi-use path is maintained by the City of Boulder Transportation Maintenance and is likely not a Section 4(f) resource.

Environmental Resources Continued

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
30TH STREET AND SH7 CONTINUED				
	potential to occur in Boulder County (same species as those listed for the 29th Street and SH7 intersection). Habitat for these species is minimal within the project area; therefore, it is unlikely these species occur in the project area (CNHP, 2019; USFWS, 2019). No natural drainages or ditches were identified in the project area; therefore it is unlikely that WUS or non-jurisdictional wetlands are present. No SB 40 resources were identified within the project area. The project area is located within 1% Change of Flood Hazard Zone (FEMA, 2019)	approximately 100 feet west of the intersection of 55th Street and SH7, and one approximately 250 feet west of the intersection of 55th Street and SH7. One pad-mounted transformer is located in the southern area of the project area, approximately 100 feet south of the intersection of 55th Street and SH7.	area. Four parcels with a structure older than 50 years are located within or adjacent to the project area.	According to the Boulder Valley Comprehensive Plan Trails Map, a planned trail will be located on the south side of SH7 in the vicinity of this proposed station (Boulder, 2010). No Section 6(f) resources are located near this proposed station (CDOT, 2019).
63RD STREET AND SH7				
	Black-tailed prairie dog burrows are visible within the project area. Black-tailed prairie dog burrows may provide potential nest sites for Burrowing Owls. The Burrowing Owl is a state threatened species and is protected under the MBTA. Additionally, the project area is within mapped Bald Eagle Winter Range and within 0.5 mile of mapped Bald Eagle Winter and Summer Forage (CPW, 2018). The Bald Eagle is a State Species of Special Concern and is also protected under the MBTA and the Bald and Golden Eagle Protection Act (BGEPA). However, there is minimal habitat for Bald Eagle within the project area. Large trees within 0.5 mile of the project area may provide	Painted traffic signal poles and light poles are present at the intersection of 63rd Street and SH7. These poles could contain lead paint and should be sampled during further environmental investigations. One former dry cleaner is located approximately 130 feet north of the eastern project area boundary. Four pole-mounted transformers are located in the study area, one approximately 137 feet east of the intersection of 63rd Street and SH7	The previously disturbed nature of the project area has low potential for paleontology and archaeology resources to be found within the project area. Four previous OAHP sites were recorded within or adjacent to the project area (History Colorado COMPASS database, 2018). One resource is Eligible - Officially for the NRHP.	No Boulder County or Boulder OSMP trails or open space exist at this intersection (Boulder County, 2019 and City of Boulder, 2018). No other trails or parks are depicted on municipal planning maps within this project area. According to the Boulder Valley Comprehensive Plan Trails Map, a planned trail will be located on both sides of SH7 in the vicinity of this proposed station (Boulder, 2010). No Section 6(f) resources are located near this proposed station (CDOT, 2019).

Environmental Resources Continued

	BIOLOGICAL RESOURCE	HAZARDOUS MATERIALS	CULTURAL RESOURCES	PARKS AND RECREATION RESOURCES SECTION 4(F)/ SECTION 6(F)
63RD STREET AND SH7 CONTINUED				
	potential nest sites for Bald Eagles and other raptors. Trees, shrubs, and grasses within the project area may provide potential nest sties for other birds protected under MBTA. Noxious weeds commonly associated with disturbed roadsides are likely to be present in the project area. Habitat was evaluated for threatened, endangered, or state-sensitive species with the potential to occur in Boulder County (same species as those listed for the 29th Street and SH7 intersection). Habitat for these species (other than for Burrowing Owl, above) is minimal within the project area;p therefore, it is unlikely these species occur in the project area (CNHP, 2019; USFWS, 2019). East Boulder Ditch flows north under SH7, on the east side of the 63rd Street and SH7 intersection. This feature is unlikely to be jurisdictional; however, only the U.S. Army Corps of Engineers (USACE) has the authority to make jurisdictional determinations. No SB 40 resources were identified within the project area.	and three in the northern portion of the project area. Two additional pole-mounted transformers are located approximately 30 feet west of the western project area boundary and approximately 10 feet north of the eastern project area boundary.	Three parcels with a structure older than 50 years are located within or adjacent to the project area.	

6

IN THIS SECTION:

SH 7 Station Design Next Step Design Considerations

The plans included with this document were developed with the right-of-way (ROW), geometry, current and future development information available.

During the course of this project, comments on conceptual station area design were received from numerous sources via many different mediums at various times throughout the project. These comments were incorporated into the final concept station area designs as scope and timeline would allow. However, in many cases additional site information, future service planning information, and additional input will be necessary before incorporating these changes into design. Although they are not all included in the concept designs shown in this report, the input and design considerations included in this supplement were critical to the concept design process and as such have been included here for further considerations during future design phases.

Future designs need to be further evaluated with local, state and Regional Transportation District (RTD) engineers to determine or confirm correct dimensions per standards, traffic and connectivity needs, existing geometry and ROW, current/ future plans and road layout implications, final bus type selection, review parking agreements, etc.

ALL STATIONS

- Refine amenities that will be included at each station - many design concepts showed example amenities or amenities zones, but aren't all-inclusive
- Refine multi-use path and/or protected bike lane configurations and dimensions in relation to stations and intersections
- Determine placement of signage and wayfinding
  - Public Information Display (PID) needs to be facing north to northeast due to sun - RTD
- Continue to consider clear zone with station amenity placement (35' or less depending on speed, which is from the through travel lane) - CDOT
- Include multi-use path or separate accommodation for those on bicycle and on foot at each station
- Refine lane width needs with each agency / municipality

RIGHT-TURN ISLAND STATIONS

- Lengthen "right-turn" island leg length to support additional pedestrian space on island, including 8' setback from arterial curb to bus shelter - RTD
- Optimize placement of amenities, particularly bus shelter, away from travel lanes - RTD
- Consider need for buses to make right turns in channelized path as well as around right-turn island and adjust radii as necessary - RTD

BRIGHTON STATIONS

- Bridge and 27th
  - One-way, counter clockwise bus circulation - RTD
  - Turning radii considerations - RTD
  - Wider access driveways - RTD
  - Move shelter into bumpout - RTD
  - Include additional buffer area along sidewalk and make sidewalk 12' wide - RTD
  - Rather than using proposed building awnings, move ticket vending machine to east - RTD
  - Move bike and scooter share towards station - RTD/City
  - Additional intersecting bus routes may require even longer platforms - RTD
  - Keep branding from the rest of the system consistent even though constrained - RTD
  - Consider a lean-bar in this constrained scenario - RTD
- Bridge and Main
  - Consider installing shelters against buildings, rather than using proposed building awnings, and move ticket vending machine to east - RTD
  - Move bike and scooter share towards station - RTD/City of Brighton
  - Additional intersecting bus routes may require even longer platforms - RTD
  - Keep branding from rest of the system consistent even though constrained - RTD
  - Consider a lean-bar in this constrained scenario - RTD

THORNTON STATIONS

- Quebec Station
  - Consider how to accommodate turning bus platform needs - RTD
  - Re-consider need for acceleration lanes on Quebec, and SW corner right-turn island - City
  - EB near-side stop consideration (not preferred) - City/ RTD
- Colorado Station
  - One-way, counter clockwise bus circulation - RTD
  - Turning radii consideration - RTD
  - Wider access driveways - RTD
  - Additional consideration for TNC accommodation - City
  - Include rail overpass reconstruction as a priority upgrade in order to get left turn lane onto NB old Colorado
  - Add connections to the overpass from the station
  - Turn around and DRS Station

BROOMFIELD STATIONS

- Consider turnaround function and DRS in short term at the CR 7 location if there is phased service implementation - RTD
- Determine park-n-ride location and implementation strategies
- Need to continue conversations with land owners to determine best development and operational location for the station, could be a "gateway" feature
- Opportunities to plan for high-quality ped/bike and FFM with new development opportunities to support transit
- Consider planning for microtransit facilities and circulator and AV shuttles
- Need to be cognizant of density needed to bring transit east with new development

LAFAYETTE/ERIE STATIONS

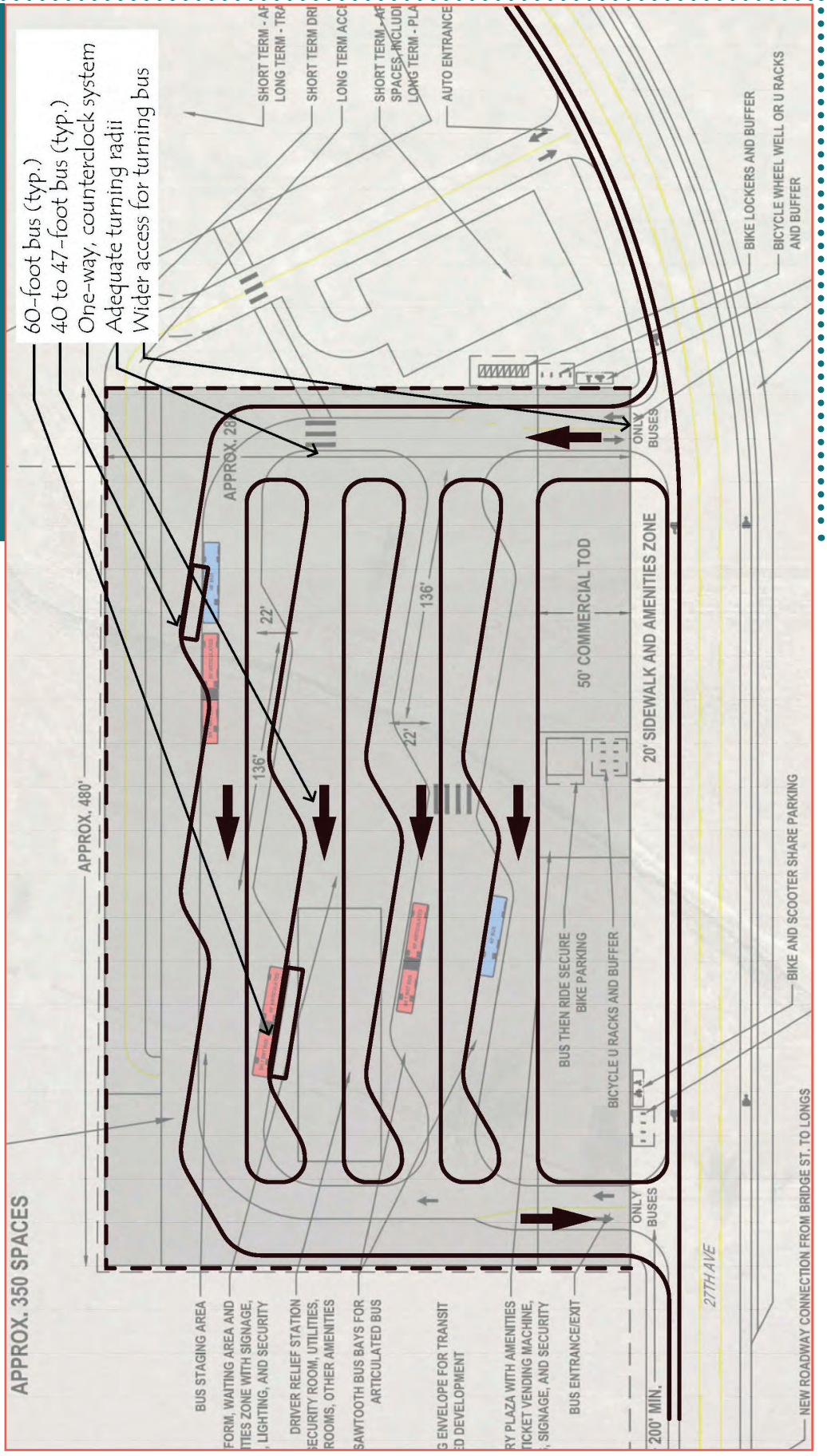
- 119th
  - Background point of clarification - Lafayette and Boulder County have been coordinating on laneage needs in this location. Laneage needs may have evolved since this concept was developed
  - Consider bicycle facility needs in conjunction with corridor (those shown were from previous outside design)
  - Consider parking needs as future development is refined

- Baseline and Public Road
  - Significant ROW information required and building impacts/ integration shown (as with many other stops)
- 95th and Arapahoe
  - Utilize existing sidewalks on NE, SE, and SW side, and possibly change multi-use path into a protected bike lane - Boulder County
- Arapahoe and US 287
  - Additional study and identification of station options

BOULDER STATIONS

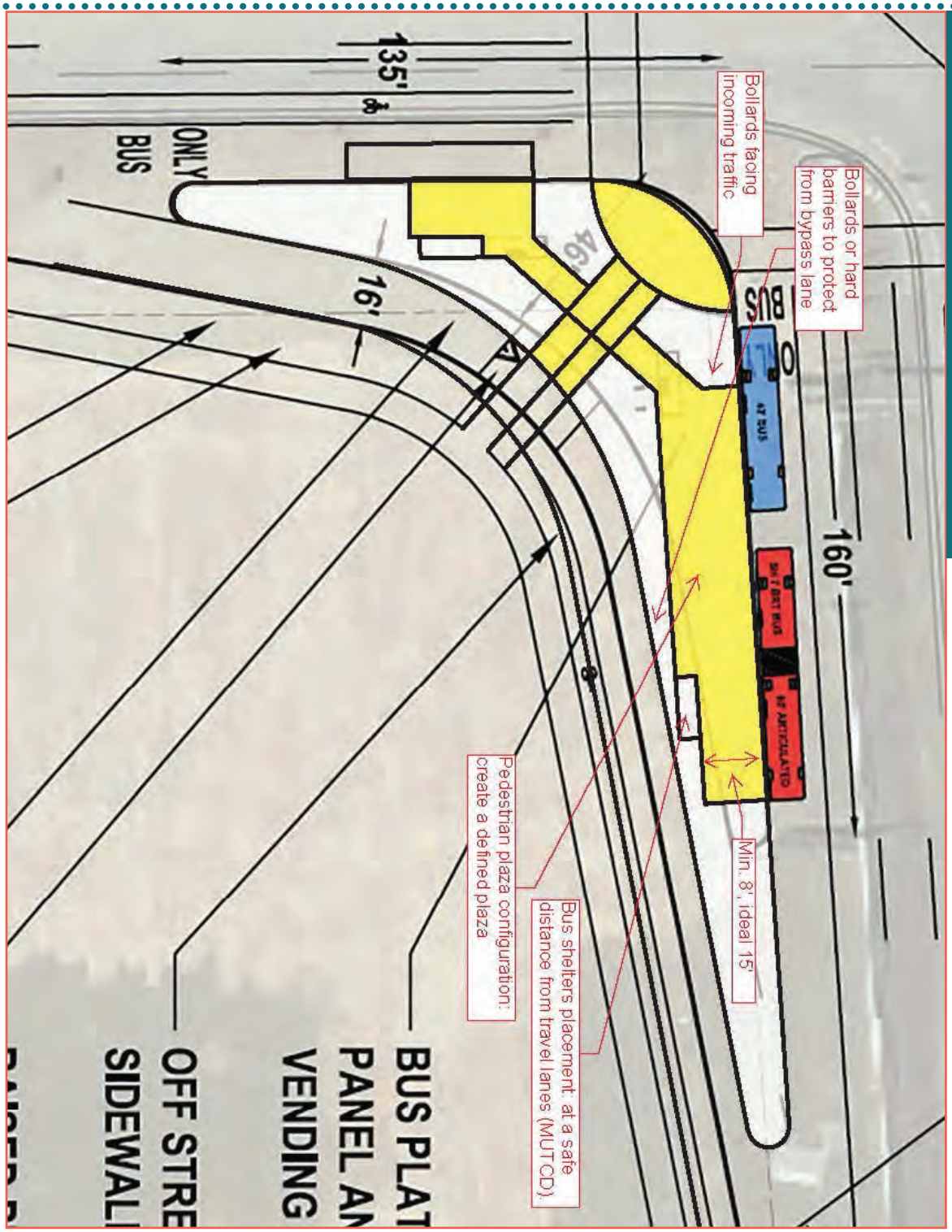
- 63rd and Arapahoe
  - Refine separation distance between bike lane and multi-use path - Boulder
  - Additional driveway modifications will be necessary
  - Several nearby driveways are nearing CDOT maximum slope of 10%
  - The building on the northeast corner has historic preservation concerns, and the low income housing on the southwest corner has environmental justice concerns
- 55th and Arapahoe
  - Additional driveway modifications will be necessary, including separate parcels on SE corner and 57th Street to the north
  - Taper bicycle facilities into the protected facilities shown
- 48th and Arapahoe
  - Consider curb-side drop-off and pickup location - City of Boulder
  - Bicycle stop bars should be added
  - Show existing B-Cycle station
- 28th/29th/30th and Arapahoe
  - Additional driveway modifications will be necessary
  - Consider impacts to transit vehicles that may get stuck when right-turning automobiles yield to pedestrians using east-west crosswalks

FIGURE 51 Comments

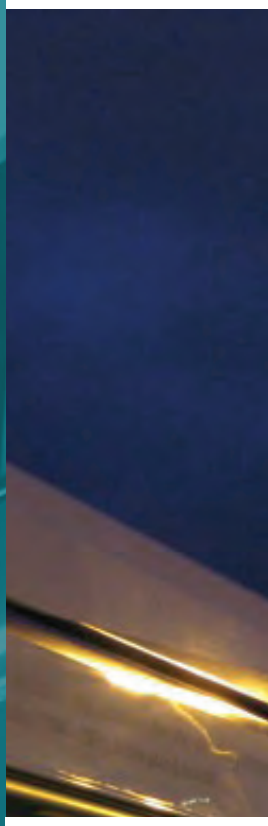


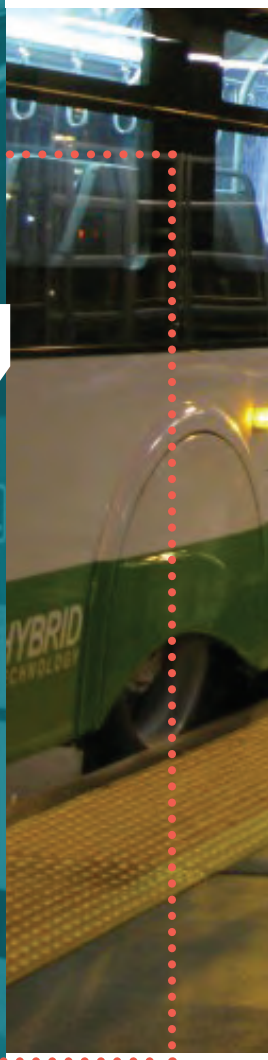
Bridge & 27th Station Design.2/12/19

FIGURE 52 Comments



Quebec Plaza Layout





IN THIS SECTION:

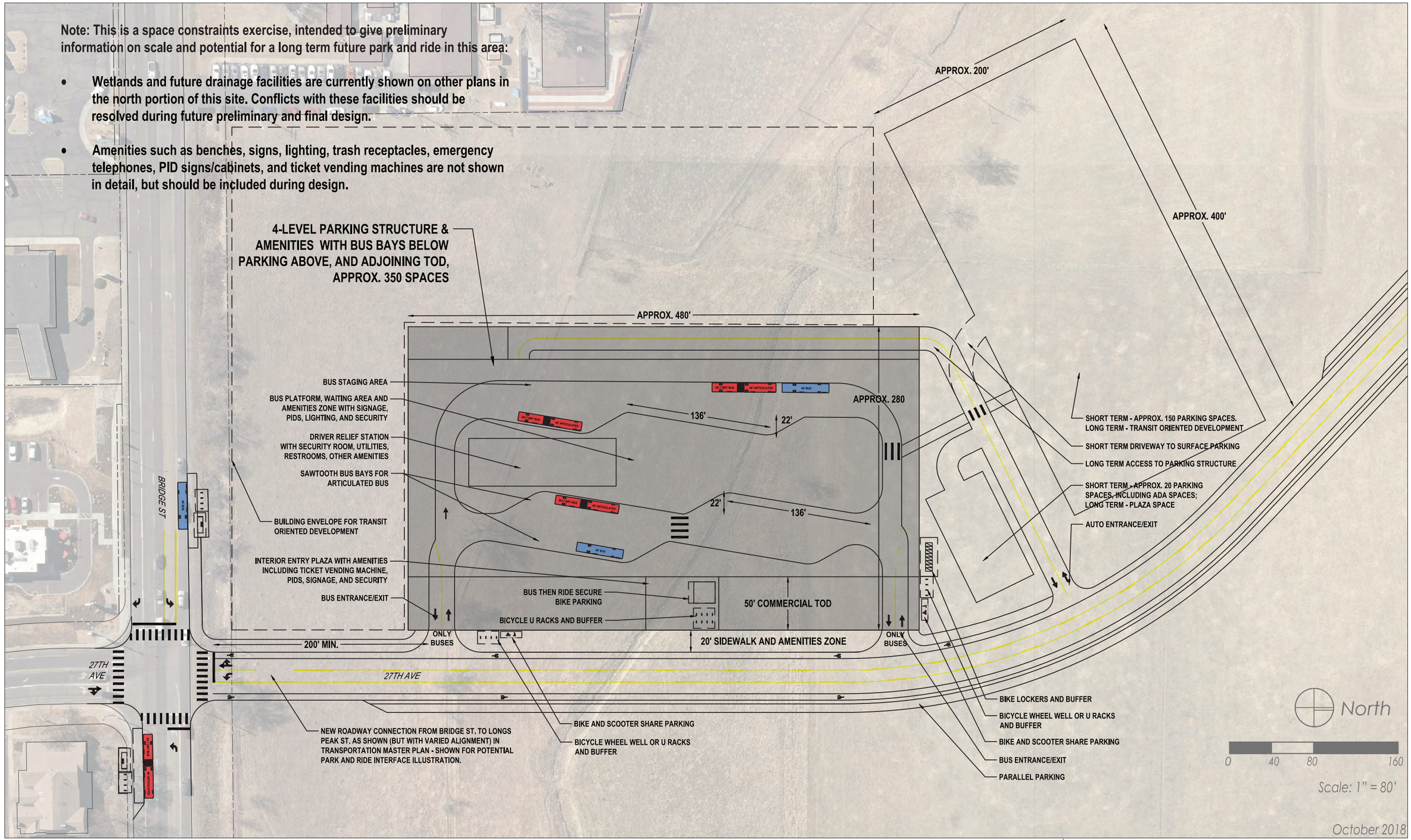
7

- *Station Area Plans*
- *First and Final Mile Plans*
- *Planning for Transit Supportive Land Uses along Bus Rapid Transit Corridors - Full Paper by Mandi Roberts, AICP, PLA*

SH 7 Station Design Appendix

Note: This is a space constraints exercise, intended to give preliminary information on scale and potential for a long term future park and ride in this area:

- Wetlands and future drainage facilities are currently shown on other plans in the north portion of this site. Conflicts with these facilities should be resolved during future preliminary and final design.
- Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.

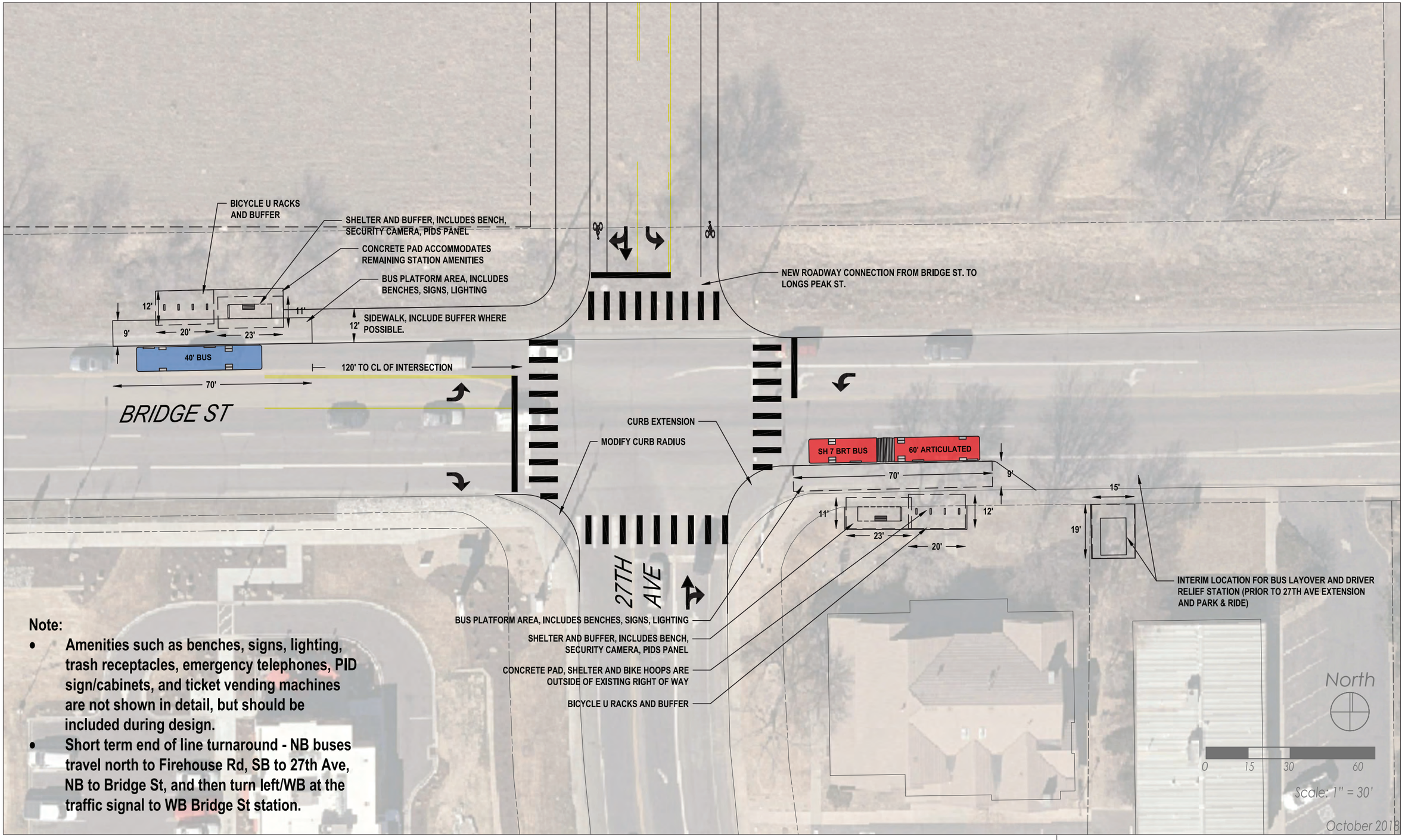


Bridge St. & 27th Ave. – PARK & RIDE SPACE CONSTRAINTS EXERCISE

Brighton BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP · Otak · Pinyon Environmental, Inc.



Note:

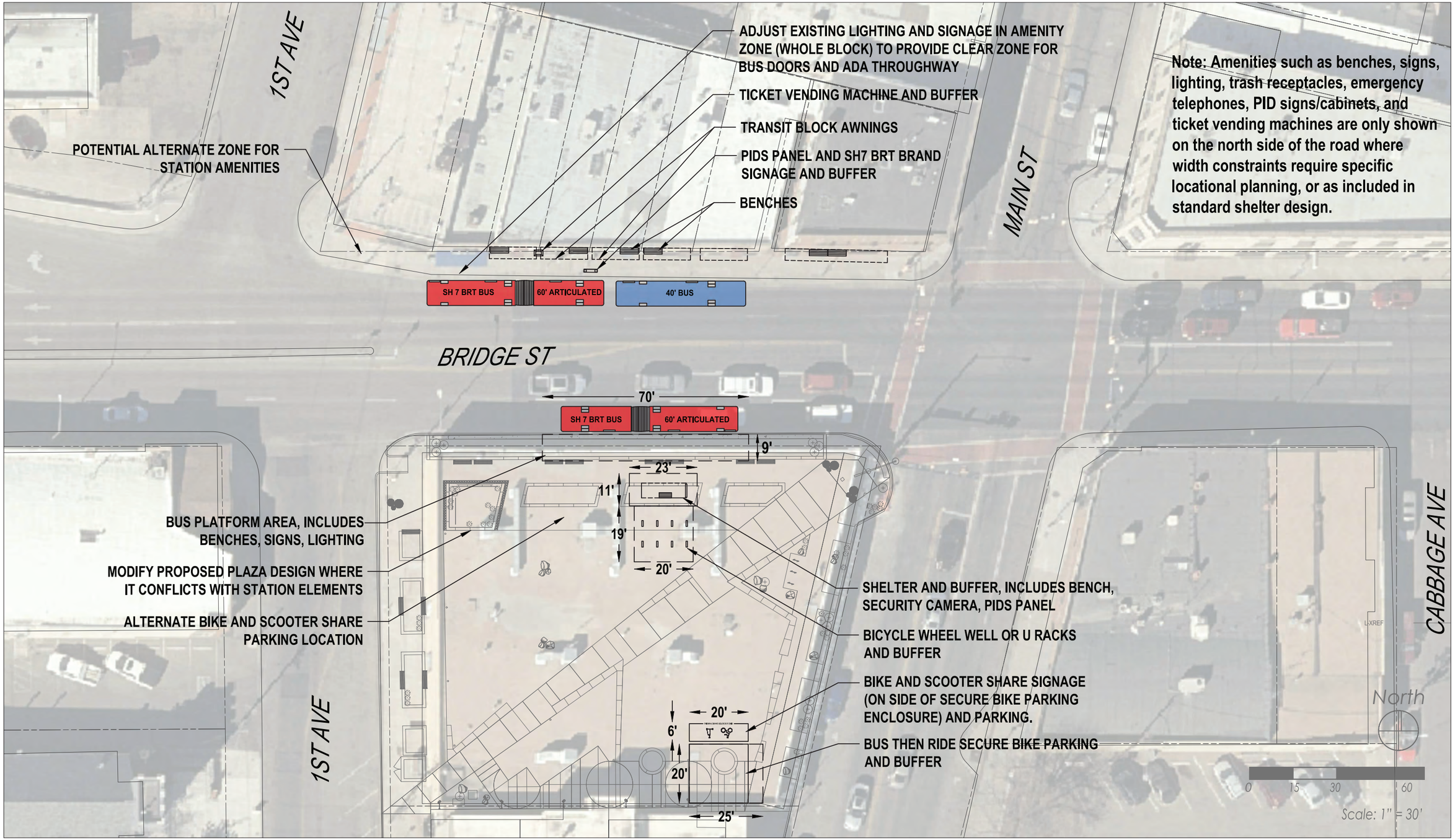
- Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID sign/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
- Short term end of line turnaround - NB buses travel north to Firehouse Rd, SB to 27th Ave, NB to Bridge St, and then turn left/WB at the traffic signal to WB Bridge St station.

Bridge St. & 27th Ave Station - Short Term Station Concept

Brighton BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP | Otak | Pinyon



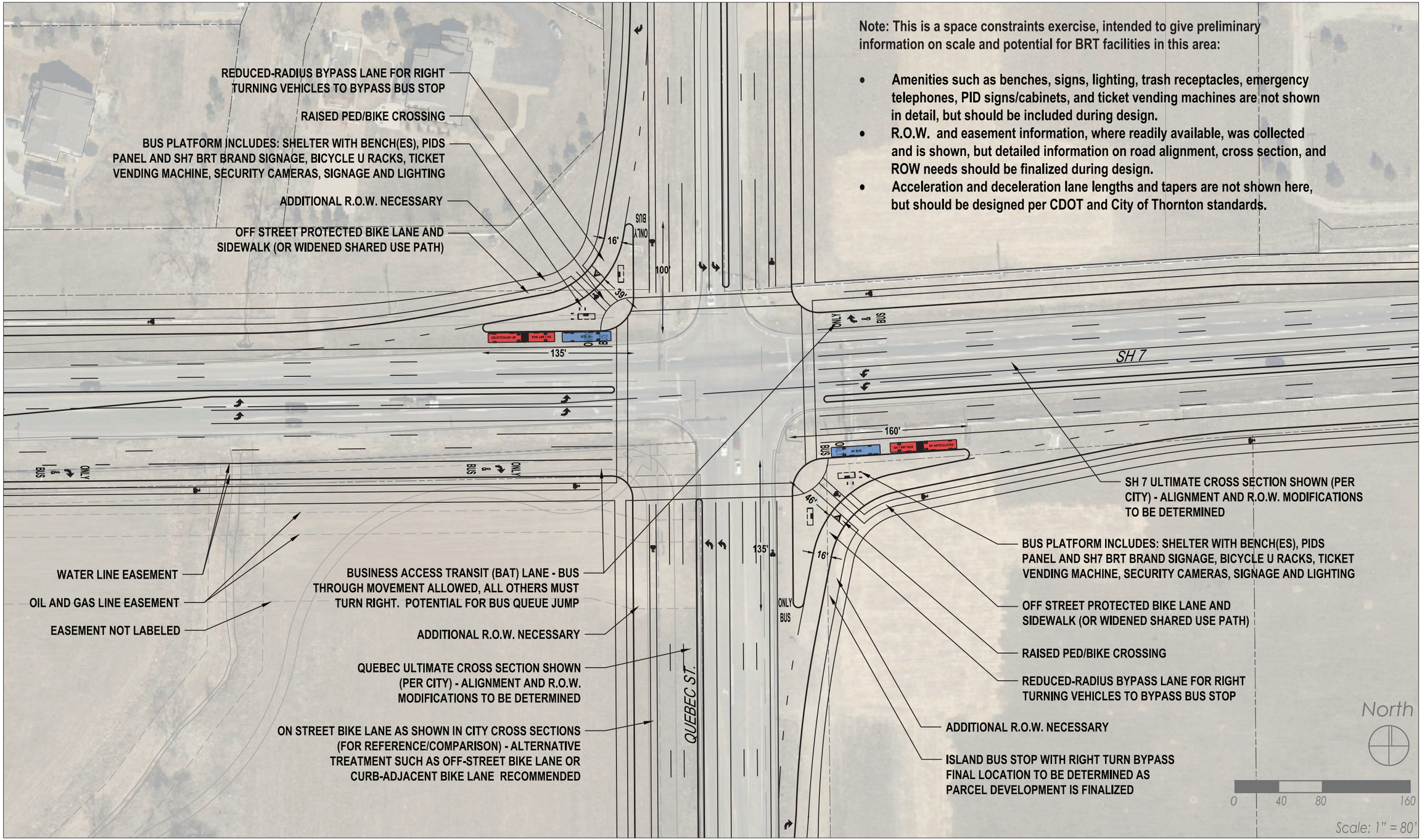
October 2018

Bridge St. & Main St. Station - Station Concept

Brighton BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP
Otak
Pinyon Environmental, Inc.



Note: This is a space constraints exercise, intended to give preliminary information on scale and potential for BRT facilities in this area:

- Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
- R.O.W. and easement information, where readily available, was collected and is shown, but detailed information on road alignment, cross section, and ROW needs should be finalized during design.
- Acceleration and deceleration lane lengths and tapers are not shown here, but should be designed per CDOT and City of Thornton standards.

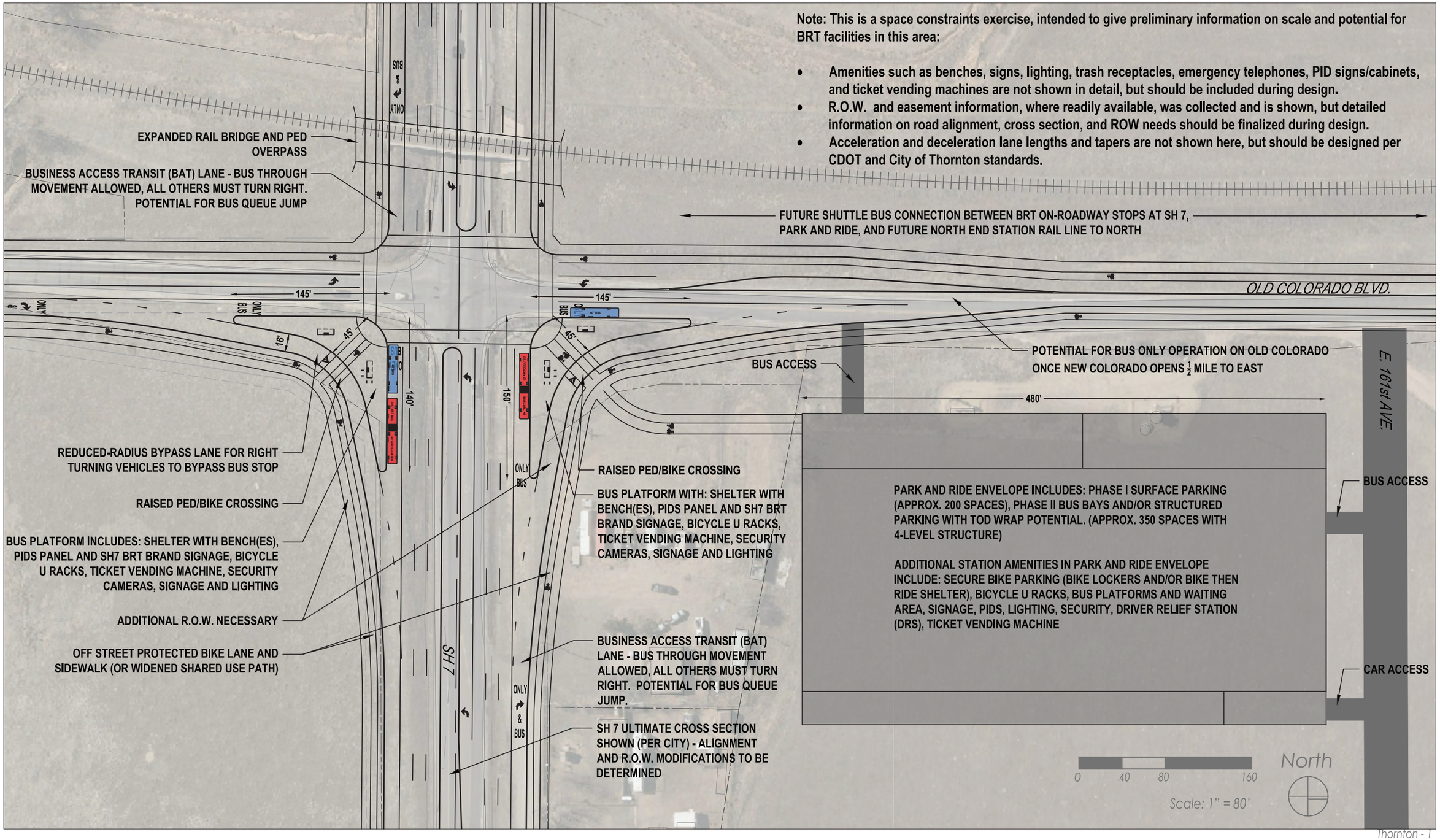
Thornton - 2
November 2018

Quebec St. and SH 7- STATION CONCEPT

Thornton BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP | Otak | Pinyon Environmental, Inc.



Thornton - 1
November 2018

Colorado Blvd. and SH 7- STATION CONCEPT

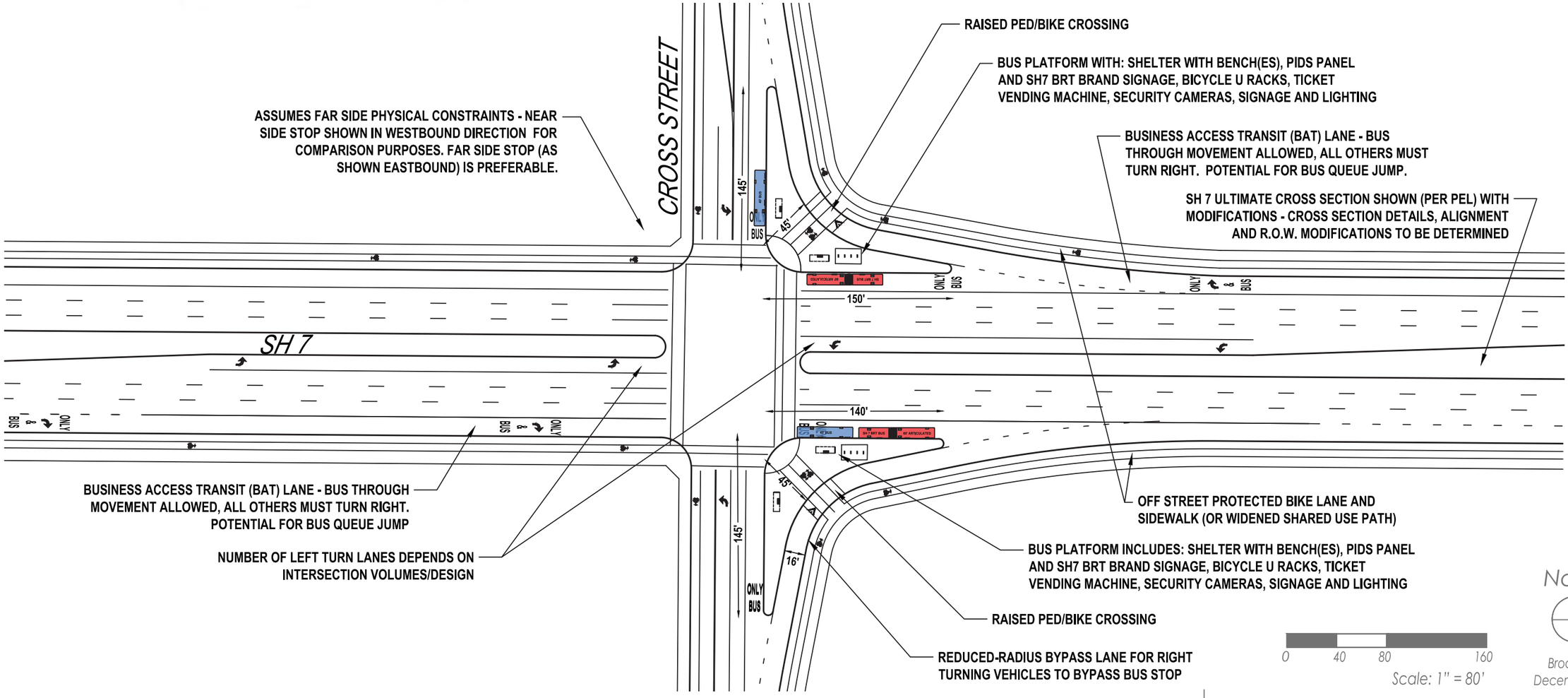
Thornton BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP · Otak · Pinyon Environmental, Inc.

Concept Notes:

- This is a potential station configuration and space constraints exercise, intended to give preliminary information on scale and BRT station components only. This station configuration is intended to provide information for consideration at a number of potential SH7 locations in Broomfield.
  - Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
  - Detailed information on road alignment, cross section, and ROW needs should be finalized during design.
  - Acceleration and deceleration lane lengths and tapers have not been detailed here and should be designed per CDOT and City and County of Broomfield standards.
- This concept is appropriate with the existing NR-A classification and existing speed limits.
- A multi-use path is planned for the whole SH7 BRT corridor, but is not shown in this concept.



Broomfield - 1
December 2018

Broomfield – 6-LANE BYPASS WITH ACCELERATION LANES STATION CONCEPT

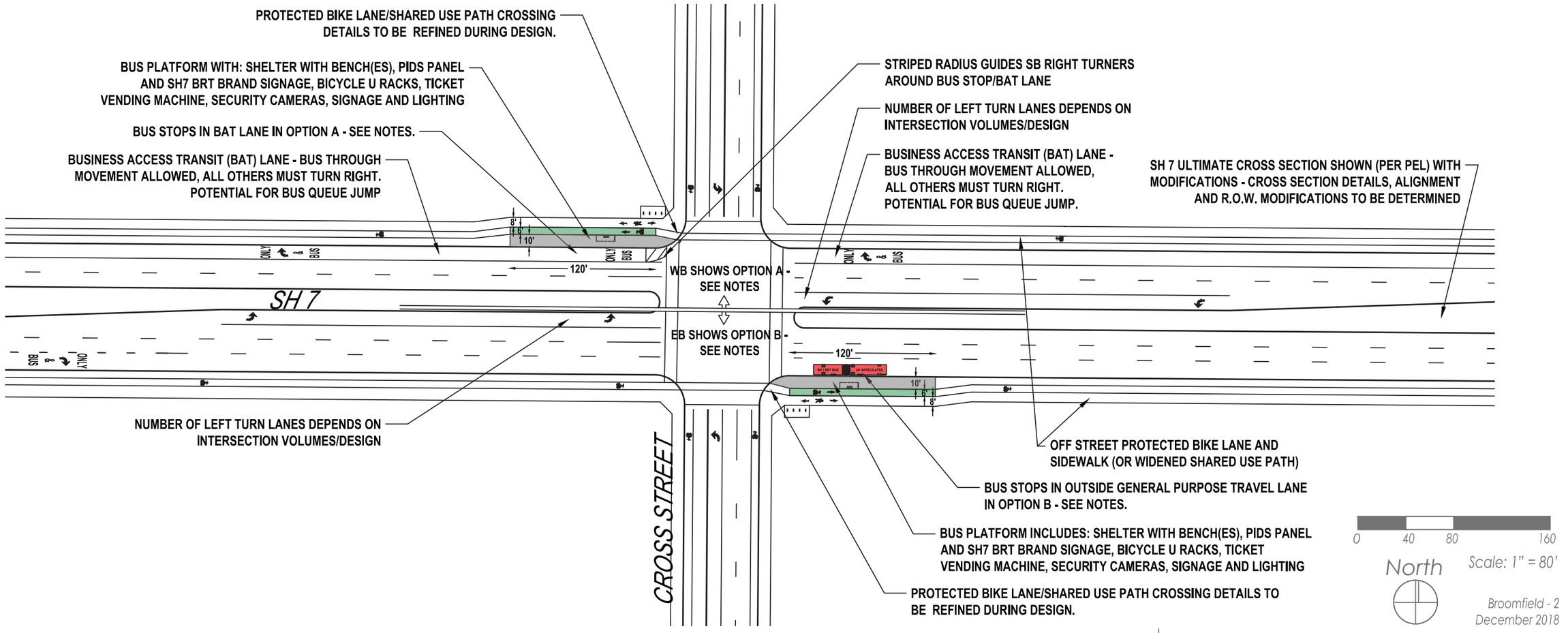
Broomfield BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP | Otak | Pinyon

Concept Notes:

- This is a potential station configuration and space constraints exercise, intended to give preliminary information on scale and BRT station components only. This station configuration is intended to provide information for consideration at a number of potential SH7 locations in Broomfield.
  - Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
  - Detailed information on road alignment, cross section, and ROW needs should be finalized during design.
  - Acceleration and deceleration lane lengths and tapers have not been detailed here and should be designed per CDOT and City and County of Broomfield standards.
- This concept (with option Option A or Option B lane assignment) should be considered if SH7 were to be re-assigned to NR-B classification and the speed limit lowered to 45 mph or less.
- Lane assignment and configuration:
  - OPTION A (shown on North side of intersection) - BAT lane shown should be considered with max. ADT of 40,000 - 45,000.
  - OPTION B (shown on the South side of intersection) - bus stop utilizes the outside general purpose lane. This would create occasional stoppages and queuing in the outside lane, but is more appropriate for the projected 50,000+ ADT in the area.
  - The SH7 PEL shows over 50,000 ADT for this area - additional detailed traffic projections for this area should be completed to determine appropriate lane configuration.
- These concepts are possible with bypass lanes (as shown in "Bypass" concept) as well.
- A multi-use path is planned for the whole SH7 BRT corridor, but is not shown in this concept.



Broomfield – 6-LANE IN-LINE W/O ACCELERATION LANES STATION CONCEPT

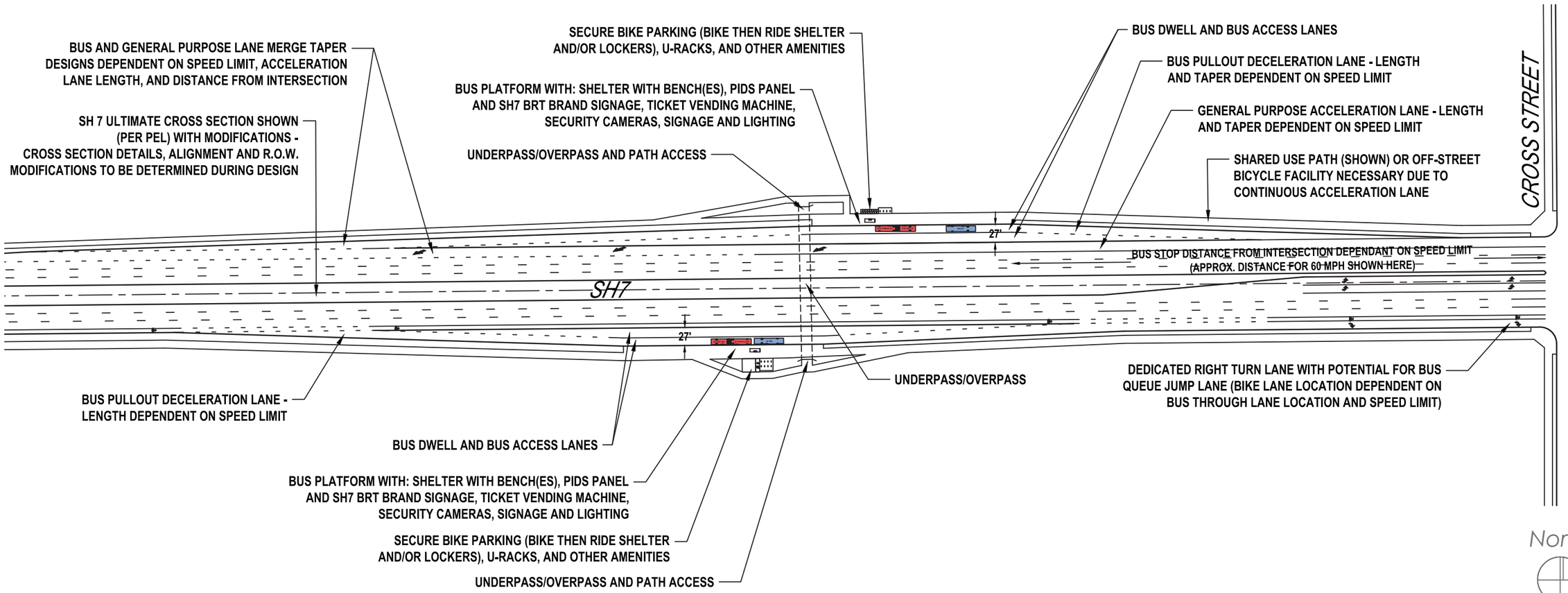
Broomfield BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP
Otak
Pinyon Environmental, Inc.

Concept Notes:

- This is a potential station configuration and space constraints exercise, intended to give preliminary information on scale and BRT station components only. This station configuration is intended to provide information for consideration at a number of potential SH7 locations in Broomfield.
  - Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
  - Detailed information on road alignment, cross section, and ROW needs should be finalized during design.
  - Acceleration and deceleration lane lengths and tapers have not been detailed here and should be designed per CDOT and City and County of Broomfield standards.
- A multi-use path is planned for the whole SH7 BRT corridor, but is not shown in this concept.
- Underpass/overpass location to be determined based on engineering feasibility of utilities, grading and drainage, etc.



North

0 75 150 300

Scale: 1" = 150'

Broomfield - 3
December 2018

Broomfield – MIDBLOCK PULL-OFF STATION CONCEPT

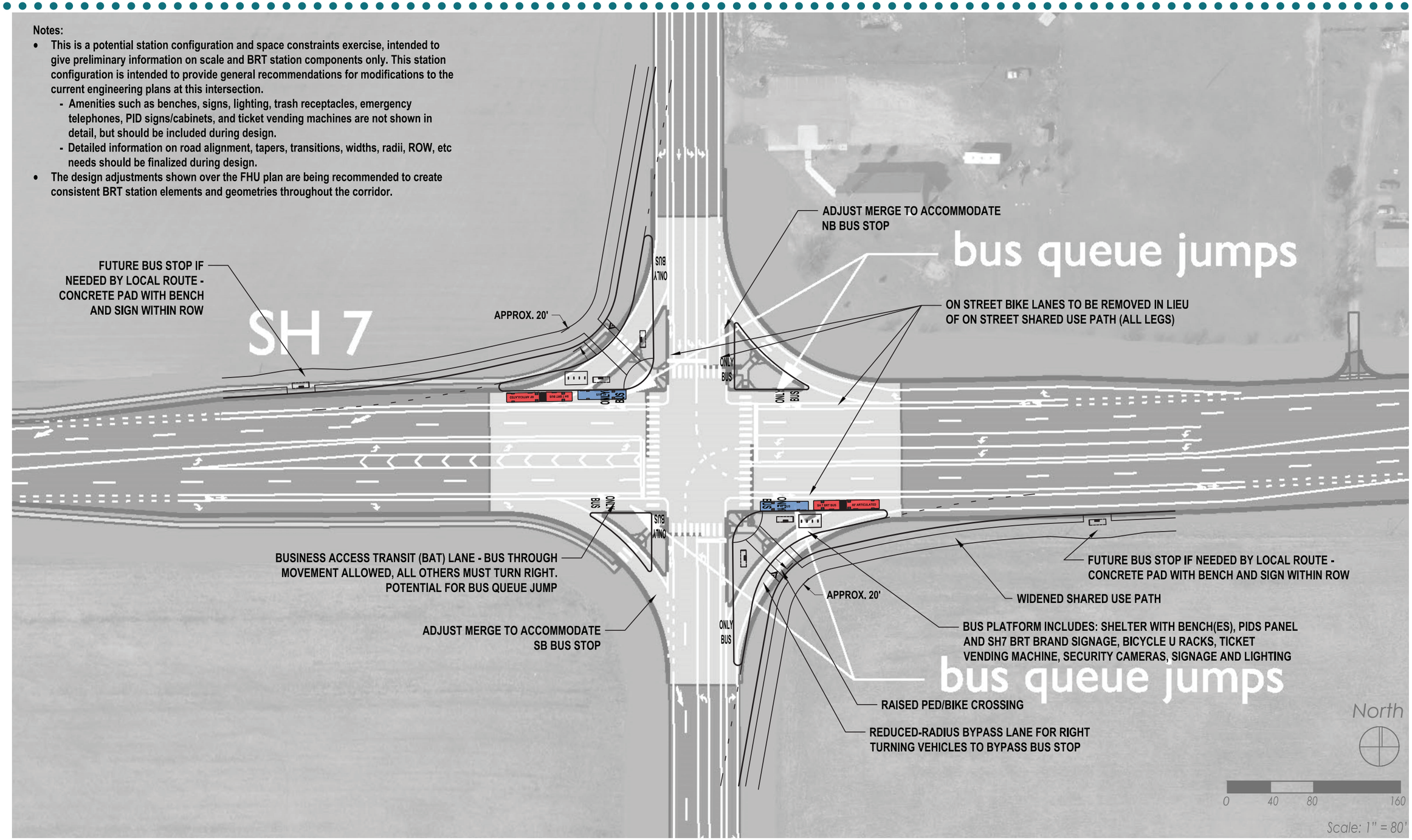
Broomfield BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

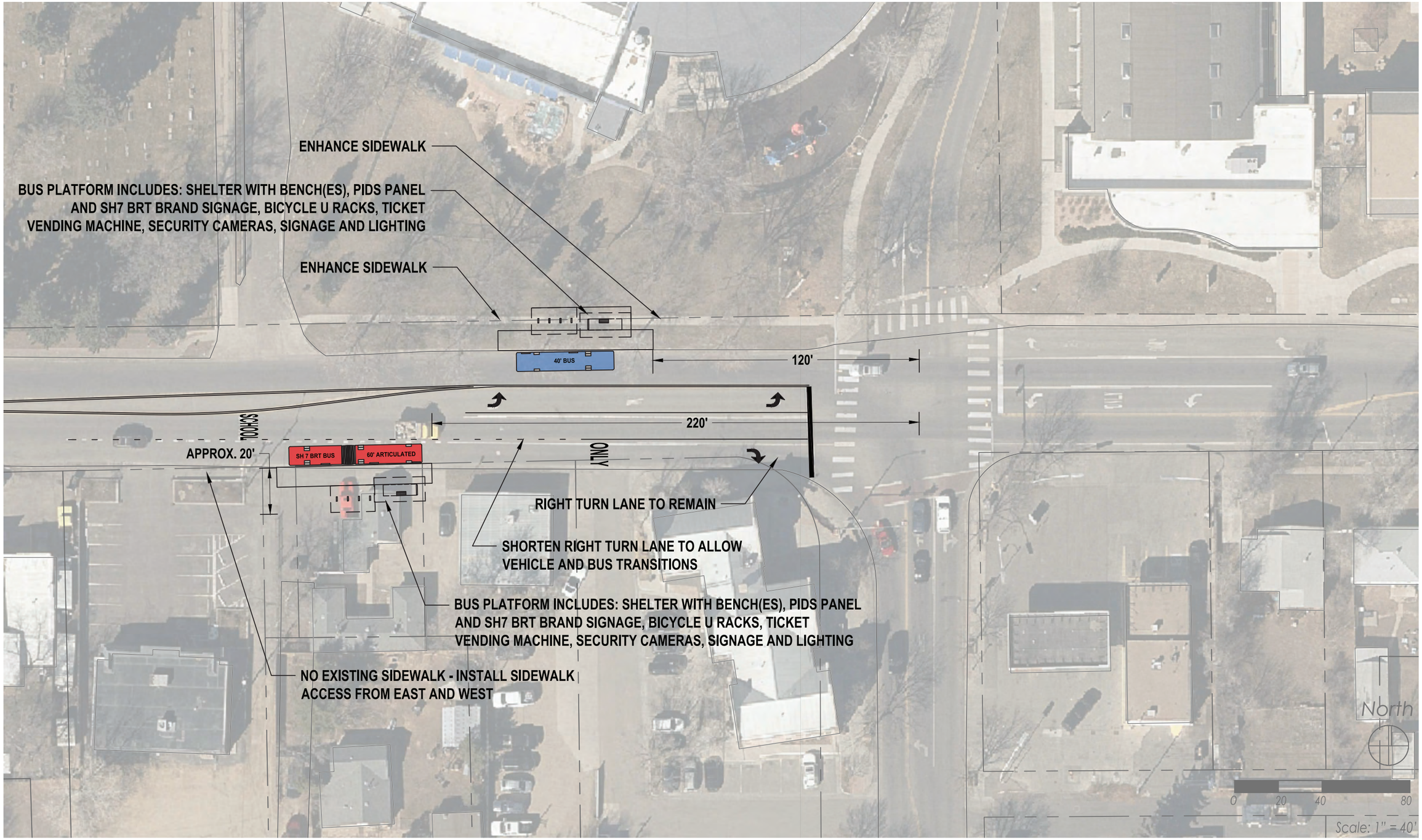
FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP
Otak
Pinyon Environmental, Inc.

Notes:

- This is a potential station configuration and space constraints exercise, intended to give preliminary information on scale and BRT station components only. This station configuration is intended to provide general recommendations for modifications to the current engineering plans at this intersection.
  - Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.
  - Detailed information on road alignment, tapers, transitions, widths, radii, ROW, etc needs should be finalized during design.
- The design adjustments shown over the FHU plan are being recommended to create consistent BRT station elements and geometries throughout the corridor.



Lafayette - 1
February 2019



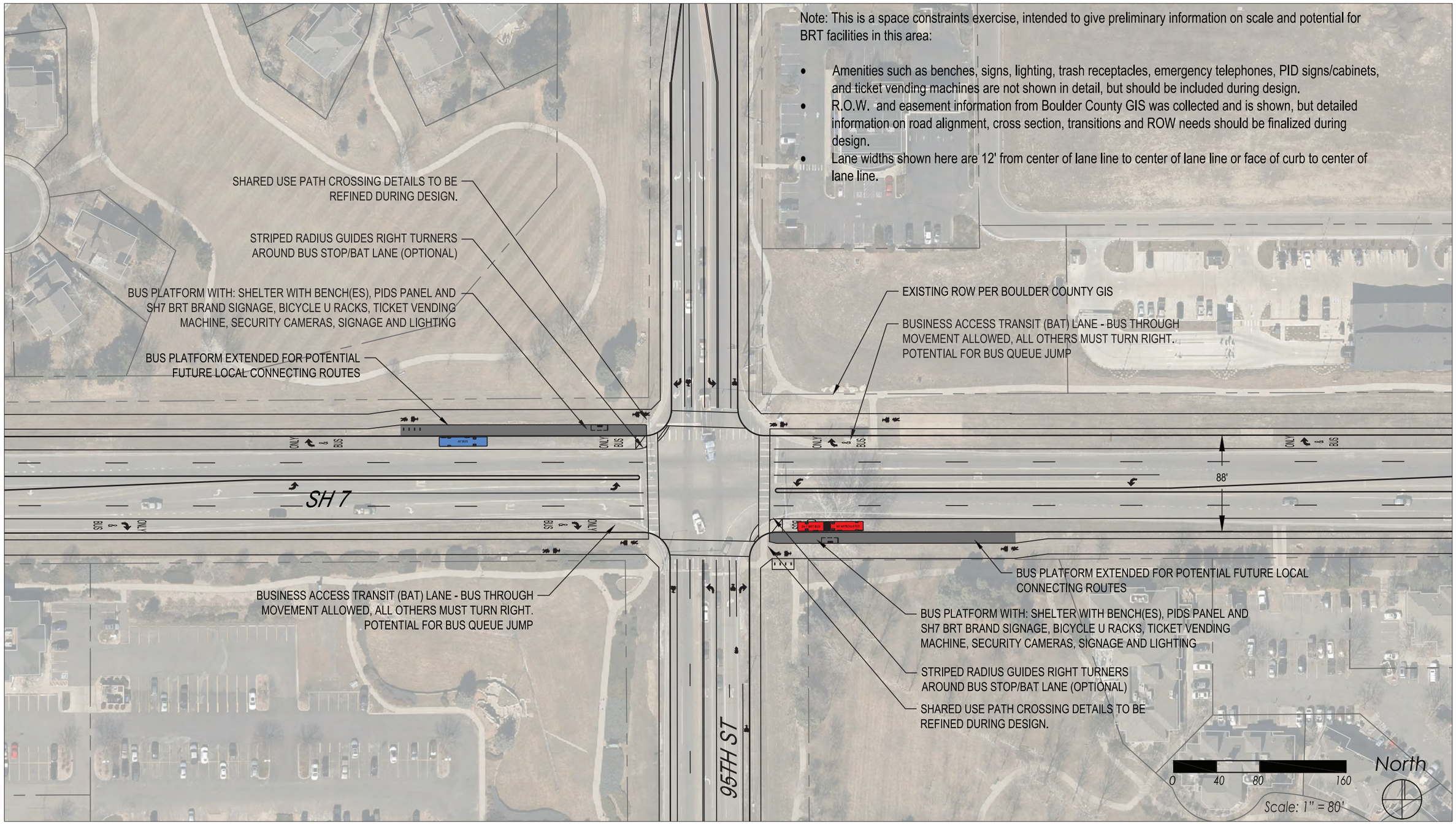
Lafayette - 2
February 2019

Public Road and Baseline Ave- STATION CONCEPT

Lafayette BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP
Otak
Pinyon



Lafayette 3
February 2019

95th St and SH 7- STATION CONCEPT

Lafayette BRT Stations - State Highway 7 BRT Project

Note: This is a space constraints exercise, intended to give preliminary information on scale and potential for BRT facilities in this area:

- **Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.**
- **R.O.W. and easement information from Boulder County GIS was collected and is shown, but detailed information on road alignment, cross section, and ROW needs should be finalized during design.**
- **Additional driveway crossing treatments will need to be addressed at final design pending results of Access Control Plan.**

BIKE PARKING AREA
4 INVERTED U HOOP RACKS
12'X20'

BIKE-THEN-BUS SHELTER FOOTPRINT
25'X20'

SCOOTER PARKING AREA
6'X20'

BIKE THEN BUS SHELTER
CLEARANCE ENVELOPE
25'X5'

LIMIT OF REQUIRED
ROW ACQUISITION

EXISTING ROW PER
BOULDER COUNTY GIS

BUS SHELTER CLEARANCE ENVELOPE
BUS SHELTER FOOTPRINT

SH 7

LANDSCAPE BUFFER
MULTI-USE PATH
PROTECTED BIKE LANE

MULTI-USE PATH
LANDSCAPE BUFFER
PROTECTED BIKE LANE

EXISTING ROW PER BOULDER COUNTY GIS
LIMIT OF REQUIRED ROW ACQUISITION

29TH ST

MATCH EXISTING
MULTI-USE PATH

MULTI-USE PATH
LANDSCAPE BUFFER
PROTECTED BIKE LANE

LIMIT OF REQUIRED
ROW ACQUISITION

EXISTING ROW PER
BOULDER COUNTY GIS

BUS SHELTER CLEARANCE ENVELOPE
BUS SHELTER FOOTPRINT

MULTI-USE PATH
LANDSCAPE BUFFER
PROTECTED BIKE LANE

BIKE-THEN-BUS SHELTER CLEARANCE ENVELOPE
25'X5'

SCOOTER PARKING AREA
6'X20'

BIKE-THEN-BUS SHELTER FOOTPRINT
25'X20'

BIKE PARKING AREA
4 INVERTED U HOOP RACKS
12'X20'

0 30 60 120
Scale: 1" = 60'

North

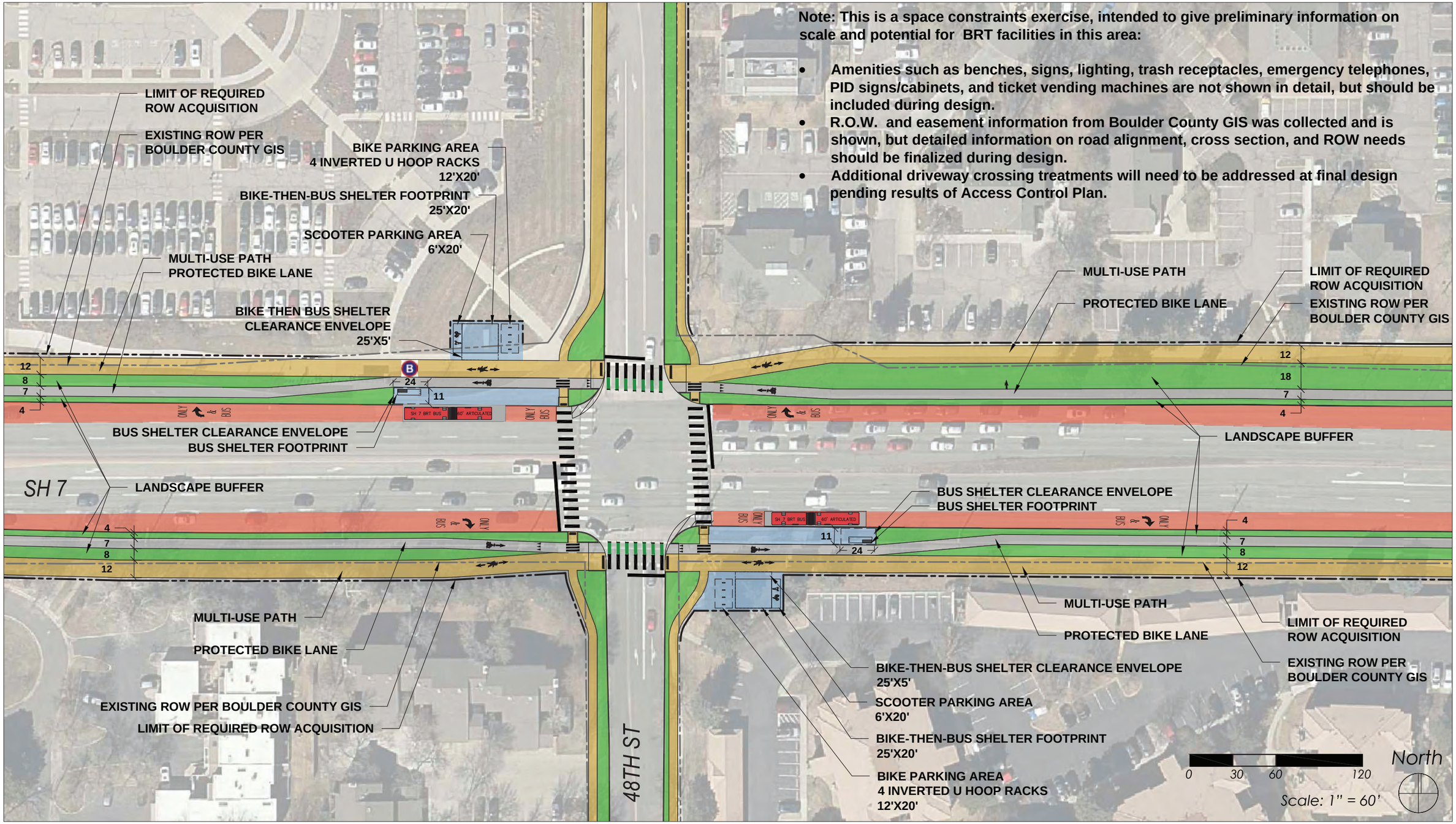
Boulder 4
March 2019

29th St and SH 7- STATION CONCEPT

Boulder BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP
Otak
Pinyon



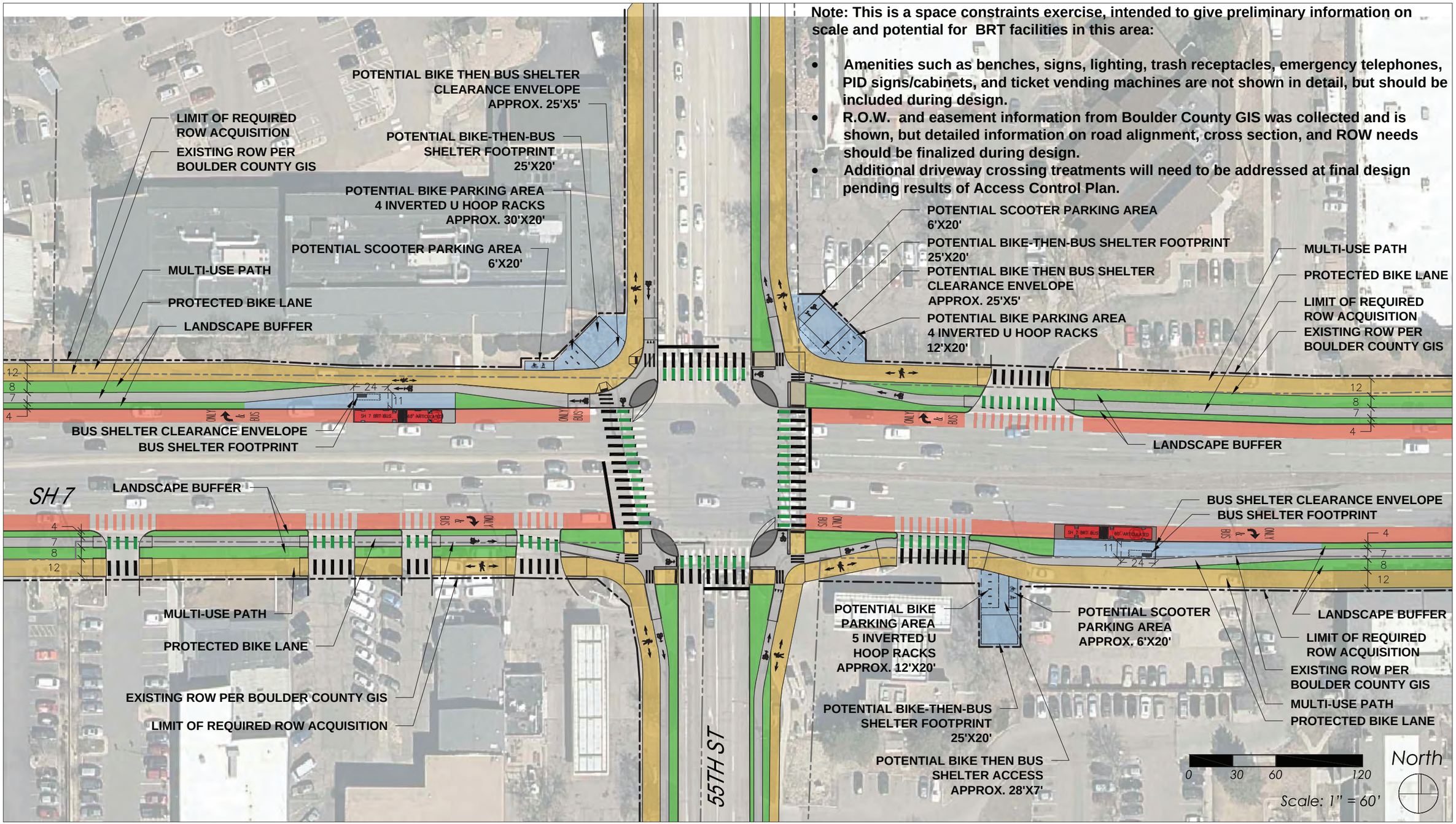
Boulder 3
March 2019

48th St and SH 7- STATION CONCEPT

Boulder BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP
Otak
Pinyon



Note: This is a space constraints exercise, intended to give preliminary information on scale and potential for BRT facilities in this area:

- **Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.**
- **R.O.W. and easement information from Boulder County GIS was collected and is shown, but detailed information on road alignment, cross section, and ROW needs should be finalized during design.**
- **Additional driveway crossing treatments will need to be addressed at final design pending results of Access Control Plan.**

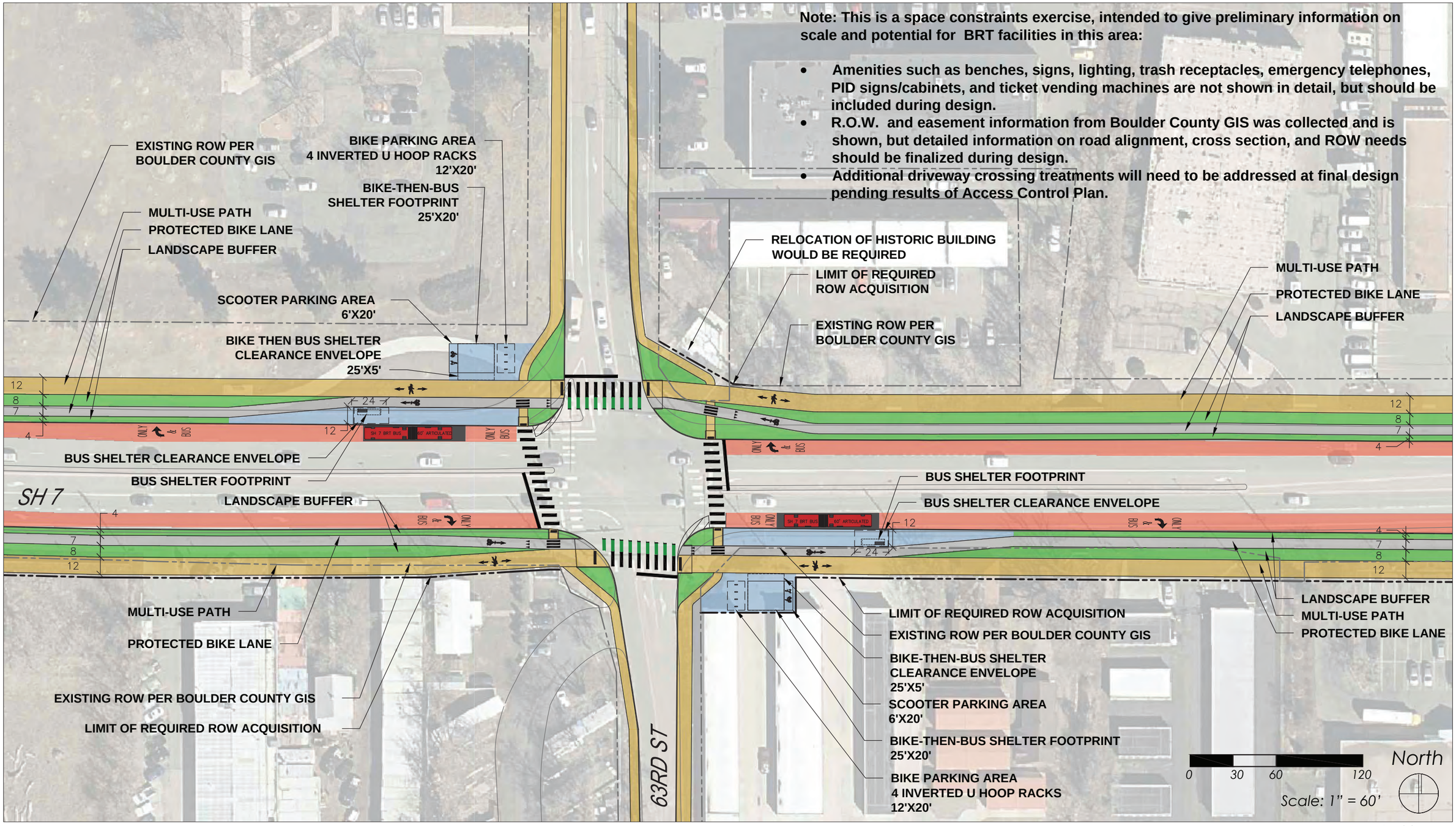
Boulder 2
March 2019

55th St and SH 7- STATION CONCEPT

Boulder BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP · Otak · Pinyon



Boulder 1
March 2019

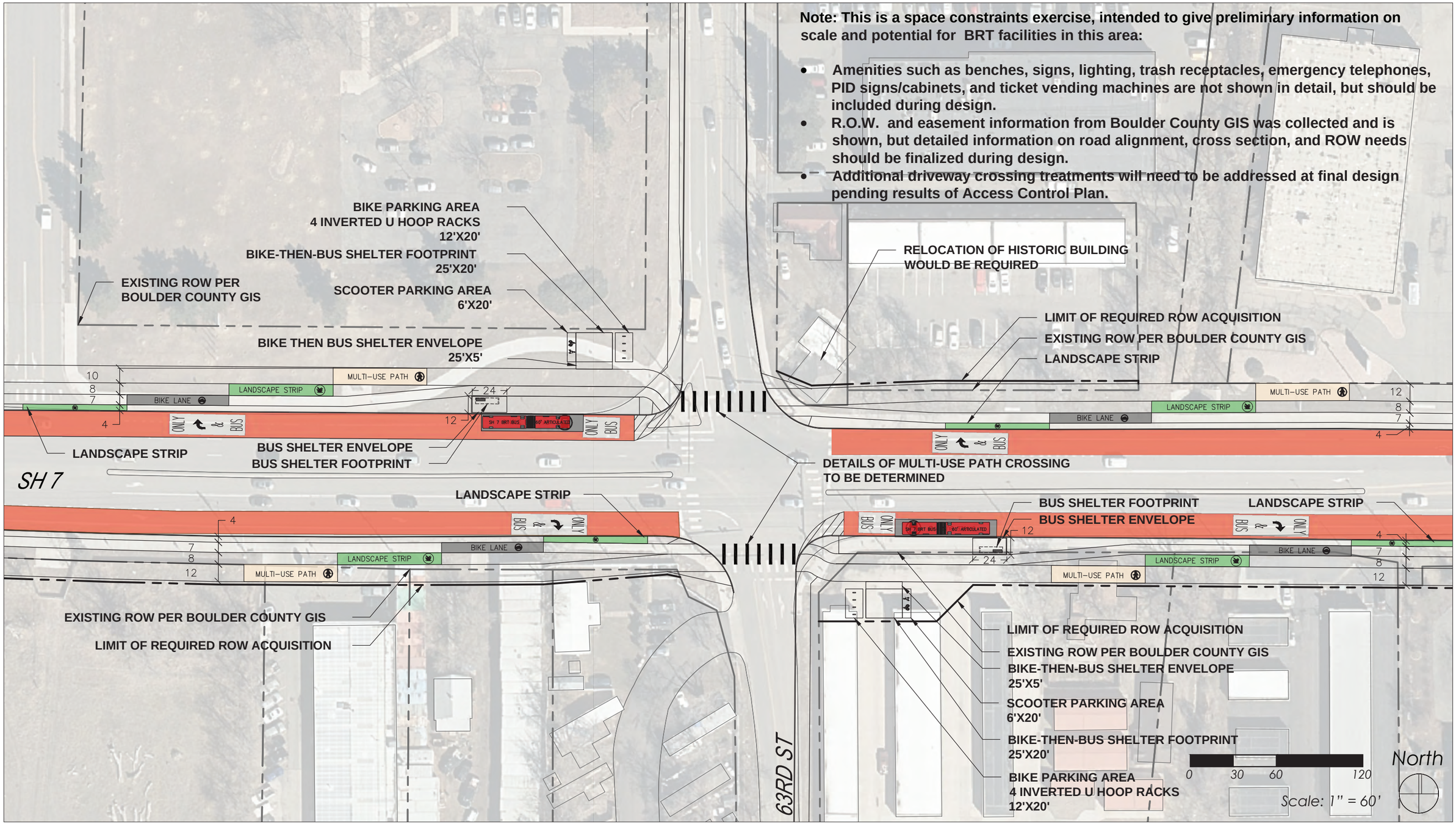
63rd St and SH 7- STATION CONCEPT - MINIMIZE ROW REQUIREMENT

Boulder BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design
FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP
Otak
Pinyon

Note: This is a space constraints exercise, intended to give preliminary information on scale and potential for BRT facilities in this area:

- **Amenities such as benches, signs, lighting, trash receptacles, emergency telephones, PID signs/cabinets, and ticket vending machines are not shown in detail, but should be included during design.**
- **R.O.W. and easement information from Boulder County GIS was collected and is shown, but detailed information on road alignment, cross section, and ROW needs should be finalized during design.**
- **Additional driveway crossing treatments will need to be addressed at final design pending results of Access Control Plan.**



Boulder 1
March 2019

63rd St and SH 7- INTERIM DESIGN - NO RELOCATION OF CURBS

Boulder BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP · Otak · Pinyon

Note: This is a space constraints exercise, intended to give preliminary information on scale and potential for BRT facilities in this area.

- **Additional driveway crossing treatments will need to be addressed at final design pending results of Access Control Plan.**

SH 7

30TH ST

0 30 60 120

North

Scale: 1" = 60'

March 2019

30th St and SH 7- PROTECTED INTERSECTION CONCEPT

Boulder BRT Stations - State Highway 7 BRT Project

State Highway 7 BRT Station Area Design

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

Otak Pinyon

Recommendations

1 Proposed Bike Lane on E Southern Street
Southern Street provide good east-west connectivity. Needs bike lanes due to roadway volumes.

2 Proposed Trail adjacent to Irrigation Canal
Continue the existing trail along canal to provide north-south connectivity.

3 Proposed Side-path on E Bridge Street
Adding a sidepath will allow connectivity from the station to adjacent businesses.

4 Proposed Side-path on E Bridge Street
A side path into the core of the city will allow bicycles and pedestrians to access businesses and residences along Bridge Street.

5 Proposed Bike Boulevard on E Egbert Street
This bike boulevard will provide connectivity in a low-speed, low-stress roadway.

6 Proposed Bike Lane on S 22nd Avenue
A bike lane on 22nd Avenue will connect proposed facilities on Egbert and Southern Street to the station.

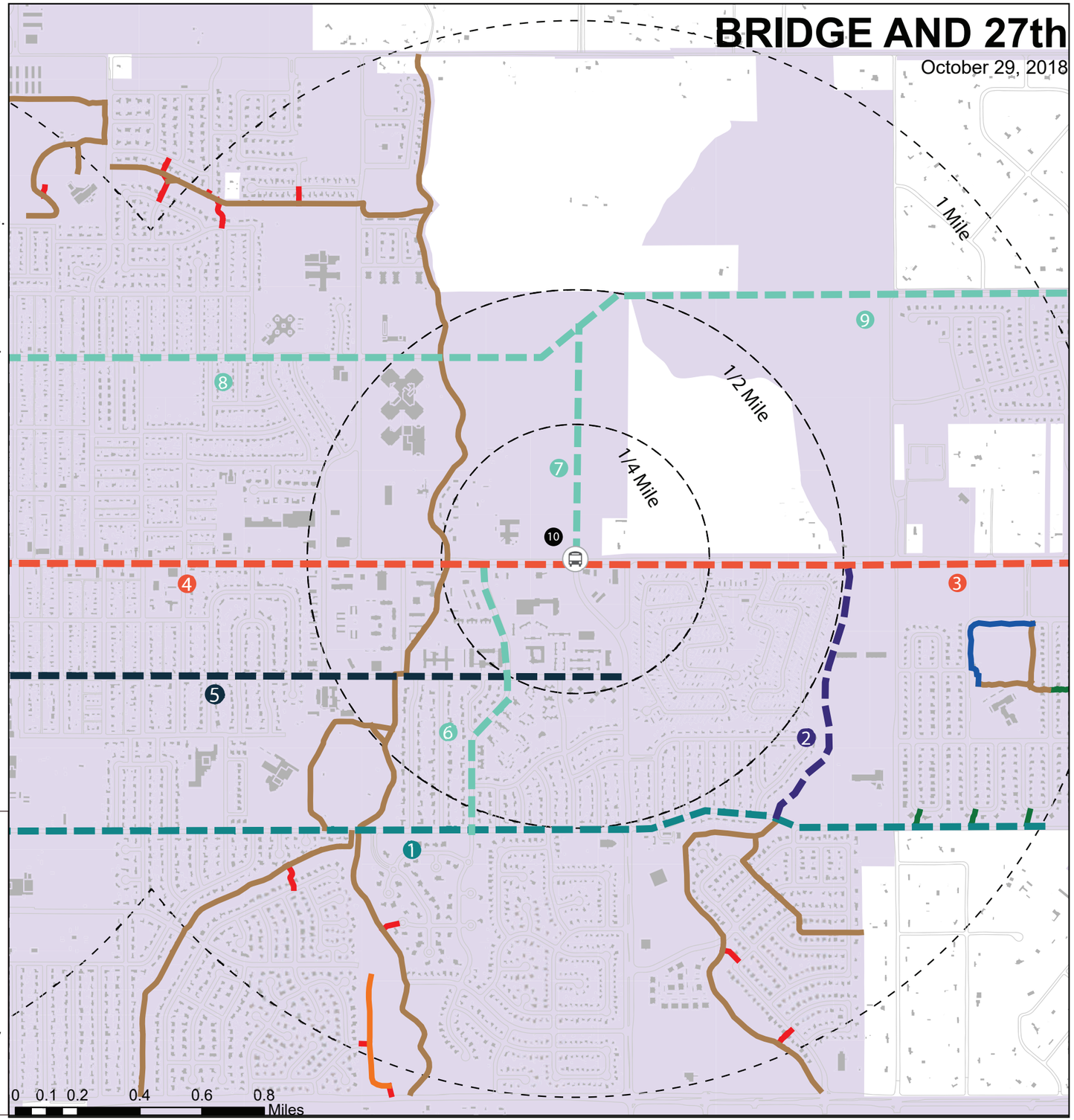
7 Proposed Bike Lane on Proposed Roadway
If the area north of the station develops, a bike lane should be implemented on the roadway to create better access from the north to the station.

8 Proposed Bike Lane/ Bike Boulevard on Longs Peak Street
The facility on this northern east-west street is dependant on motor vehicle traffic volumes. This is one of the few streets that cross the tracks near the core of the city.

9 Proposed Bike Lane/ Bike Boulevard on E Longs Peak Street/ E 164th Avenue
The extension of the bike lane or bike boulevard onto 164th Avenue will provide continuity of a major east-west connection in the city.

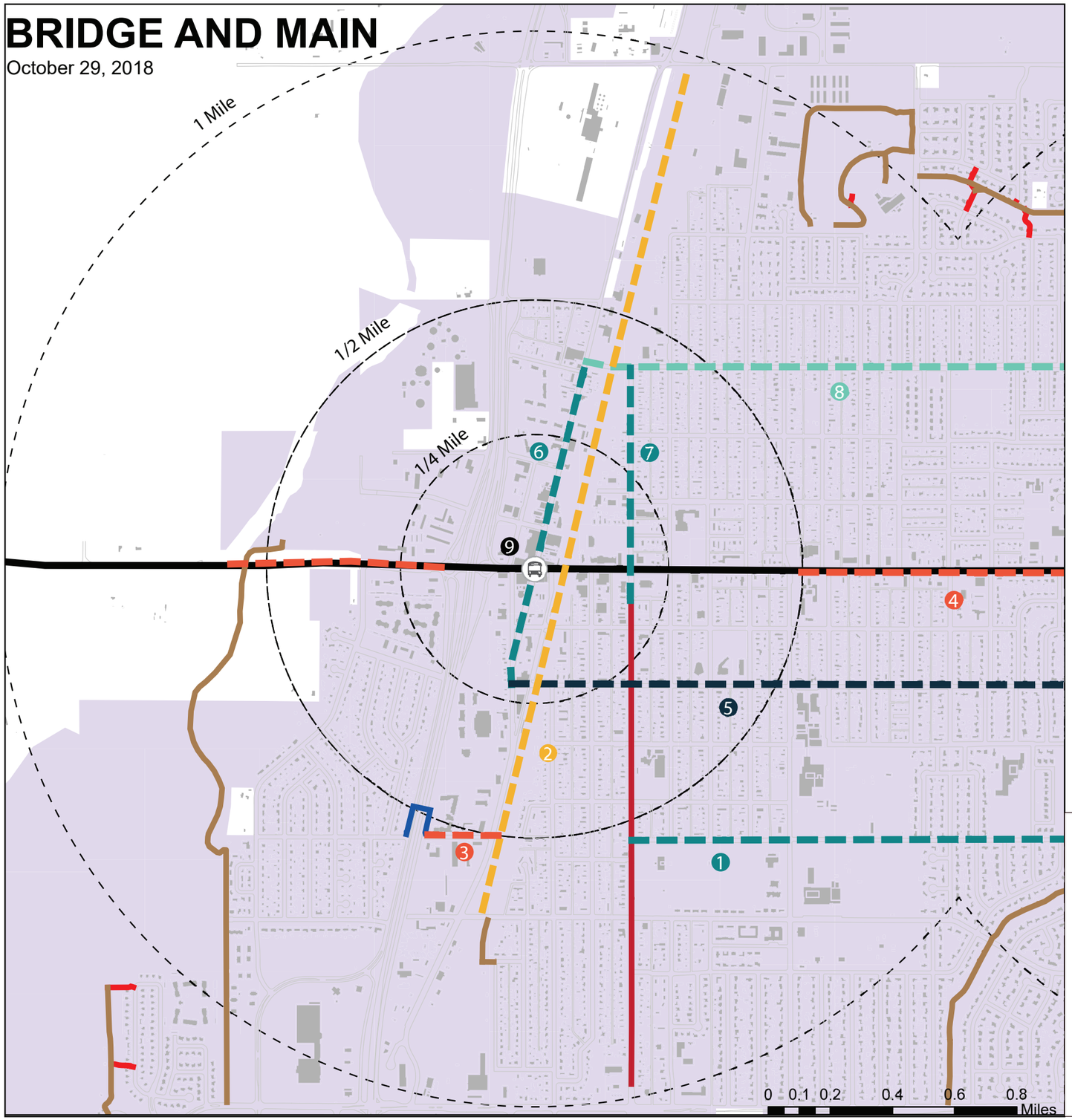
10 Secure Bicycle Parking at Station
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

11 Sidewalk Gap Identification and Remediation
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major corridors for walking and then branch to feeder routes to those corridors.



State Highway 7 BRT Station Area Design

Brighton Pinyon Otak FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP



Recommendations

1 Proposed Bike Lane on E Southern Street
A bike lane on Southern Street helps provide connectivity from residences to both proposed stations and existing facilities.

2 Proposed Rail with Trail on S Cabbage Ave
Creating a rail with trail will allow a trail to share right-of-way with the rail and creates a trail with minimal road crossings.

3 Proposed Sidepath on W Southern Street
This small sidepath will connect the existing bike/ped bridge over the highway to a proposed rail with trail.

4 Proposed Sidepath on E Bridge Street
A sidepath will connect businesses along bridge with proposed stations. Space may not allow a sidepath in the city core.

5 Proposed Bike Boulevard on E Egbert Street
Only two streets cross the tracks other than Bridge Street. This roadway will serve as the bike/ped arterial to the city core for people south of Bridge Street.

6 Proposed Bike Lane on N Main Street
To connect the bike/ped arterials to the station, a facility will be needed on Main Street. This will also benefit the city core, making it more walkable/ bikeable.

7 Proposed Bike Lane on N 4th Avenue
Extending the existing bike lane to Longs Peak Street will provide alternate routes to Main Street to access the station

8 Proposed Bike Lane/ Bike Boulevard on Longs Peak Street
The facility on this northern east-west street is dependant on motor vehicle traffic volumes. This is one of the few streets that cross the tracks near the core of the city.

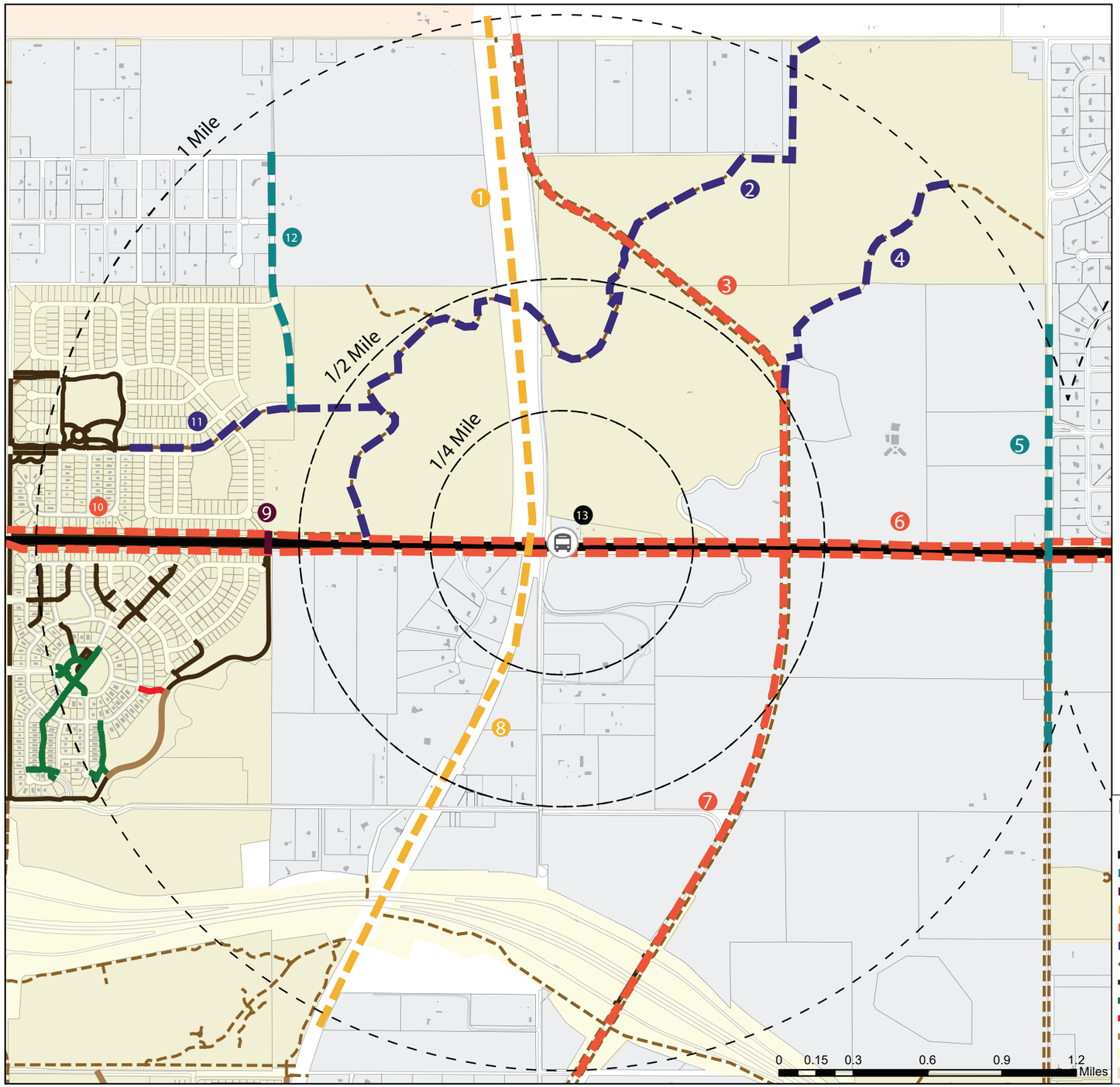
9 Secure Bicycle Parking at Station
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

10 Sidewalk Gap Identification and Remediation
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major corridors for walking and then branch to feeder routes to those corridors.

State Highway 7 BRT Station Area Design
Brighton Pinyon Otak FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

Colorado Station

November 29, 2018



Recommendations

1. **Proposed Rail with Trail in RTD Right-of-Way**
   Complete a multi-use trail along the old rail bed that is proposed to be the North Metro Rail Line.
2. **Proposed Trail Along Big Dry Creek.**
   Create a trail along Big Dry Creek as part of the regional trail network.
3. **Proposed Side-path along (New) Colorado Boulevard**
   Create a sidepath on at least one side along the proposed Colorado Boulevard.
4. **Proposed Trail Along Irrigation Canal**
   Provide a path along irrigation canal as development occurs.
5. **Proposed Bike Lane on Holly St**
   Add a bicycle lane on Holly Street to connect neighborhoods to State Highway 7.
6. **Proposed Sidepath along State Highway 7**
   Due to lack of potential crossings in the area, create sidepaths on the North and South side of State Highway 7.
7. **Proposed Side-path along (New) Colorado Boulevard**
   Create a sidepath on at least one side along the proposed Colorado Boulevard.
8. **Proposed Rail with Trail on RTD North Metro Line**
   To connect the bike/ped arterials to the station, a facility will be needed on Main Street. This will also benefit the city core, making it more walkable/ bikeable.
9. **Proposed Trail Connection across State Highway 7**
   Implement an above or below grade crossing of State Highway 7 so bicycles and pedestrians to cross.
10. **Proposed Sidepath along State Highway 7**
    Due to lack of potential crossings in the area, create sidepaths on the North and South side of State Highway 7.
11. **Proposed Trail on E 161st Ave**
    Continue existing trail to connect to Dry Creek Trail. This will provide a connection to the station without crossing or running along a major road.
12. **Proposed Bike Lane on Steele St**
    Create a bike lane to connect proposed trails to Dry Creek Trail. This will connect more people to the station.
13. **Secure Bicycle Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.
14. **Sidewalk Gap Identification and Remediation**
    Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

State Highway 7 BRT Station Area Design

City of Thornton · Pinyon · Otak · Fox Tuttle Hernandez Transportation Group

Recommendations

1. **Proposed Side-path on Quebec St**
Provide a side-path on one side of Quebec to provide connectivity to the station.

2. **Proposed Trail Along Signal Ditch**
Provide a trail along signal ditch to connect neighborhoods to the station location. As development occurs around the ditch, provide connectivity to the trail.

3. **Proposed Sidepath along State Highway 7**
Due to lack of potential crossings in the area, create sidepaths on the North and South side of State Highway 7.

4. **Proposed Trail Connection to Spruce Ct**
Provide a grade separated crossing of Highway 7 for the proposed trail network.

5. **Proposed Trail between neighborhoods (Mostly Complete)**
As development occurs, construct trail to connect neighborhood to State Highway 7.

6. **Proposed Trail Connection to Spruce Cir**
Provide trail connection from neighborhood to proposed trail.

7. **Proposed Trail Connection to Syracuse Way**
Provide trail connection from neighborhood to proposed trail.

8. **Proposed Side-path on Quebec St**
Provide a side-path on one side of Quebec to provide connectivity to the station.

9. **Proposed Trail between neighborhoods**
As development occurs, construct trail to connect neighborhood to State Highway 7.

10. **Proposed Trail Along Signal Ditch**
Provide a trail along signal ditch to connect neighborhoods to the station location. As development occurs around the ditch, provide connectivity to the trail.

11. **Proposed Bike Lane on Holly St**
Add a bicycle lane on Holly Street to connect neighborhoods to State Highway 7.

12. **Proposed Side-path on State Highway 7**
Due to lack of potential crossings in the area, create sidepaths on the North and South side of State Highway 7.

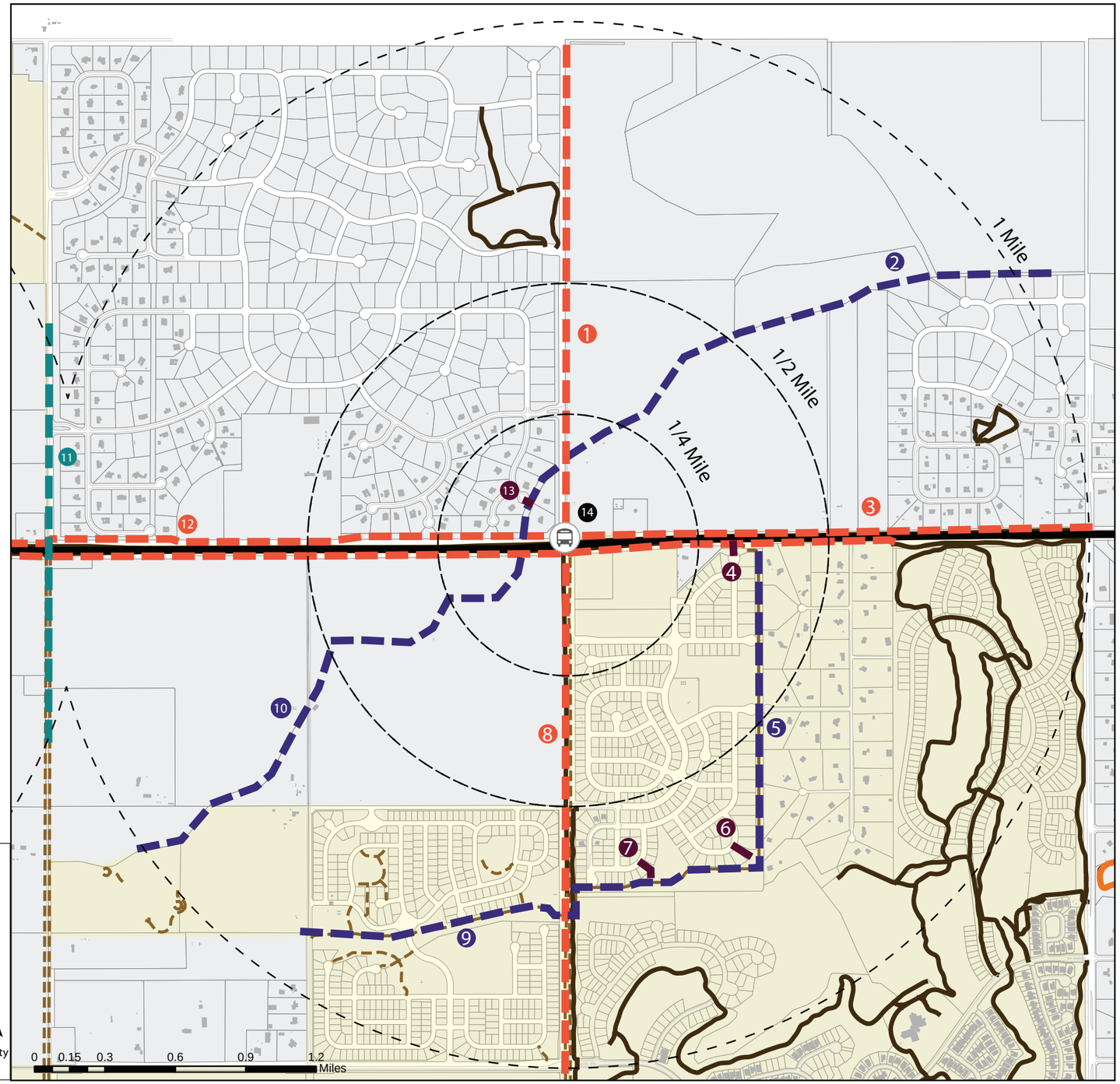
13. **Proposed Trail Connection to Poplar St**
Connect existing neighborhood to proposed signal ditch trail.

14. **Secure Bicycle Parking at Station**
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

15. **Sidewalk Gap Identification and Remediation**
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

Quebec Station

November 29, 2018



State Highway 7 BRT Station Area Design

City of Thornton Pinyon Otak FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

Recommendations

1 **Proposed Multi-Use Path along I-25**
Provide a multi-use path along each side of I-25 to provide a north-south connection.

2 **Proposed Multi-Use Path along Stanley Ditch**
Provide a multi-use path along the side of Stanley Ditch. This was identified in trail master plans and provides a connection across I-25.

3 **Proposed Bike Lane/ Sidepath on Weld County 11**
Provide a bike lane or sidepath on Weld County Road 11 based on traffic volumes and speeds. This will provide a key north-south connection.

4 **Proposed Bike Lane on E 168th Ave**
Provide a bike lane to provide an east-west connection from neighborhoods to the station. Review volumes and speeds to determine type of bike lane.

5 **Proposed Sidepaths on State Highway 7**
Provide a 12' minimum sidepath on both sides of State Highway 7 to provide connectivity through the corridor. Consider widening path in areas with higher volumes of bicyclists and walkers. (i.e. station areas, destinations, etc.)

6 **Proposed Bike Lane/ Sidepath on Washington Street**
Provide a bike lane or trail along Washington Street to provide a connection from the station to the commercial development.

7 **Proposed Multi-Use Path on Between I-25 and Huron Street**
Provide multi-use path through the proposed development to a proposed I-25 multi-use path to provide a low-stress connection through the neighborhood.

8 **Proposed Multi-Use Path connection to Mobility Hub**
Provide a low-stress connection to the mobility hub from Huron Street. The multi-use paths should be a minimum 12' wide to allow for multiple modes.

9 **Proposed Multi-Use Path connection to Mobility Hub**
Provide a low-stress connection to the mobility hub from Huron Street. The multi-use paths should be a minimum of 12' wide to allow for multiple modes.

10 **Proposed Bike Lane/ Sidepath on 169th Avenue**
Provide either a bike lane or a sidepath on 169th Avenue. The facility will depend on the planned traffic volumes and speed for 169th Avenue.

11 **Proposed Multi-Use Path along Stanley Ditch**
Provide a multi-use path along the side of Stanley Ditch. This was identified in trail master plans and provides a connection across I-25.

12 **Secure Bicycle Parking at Station**
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

Non-Specific Location Recommendations

Sidewalk Gap Identification and Remediation
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

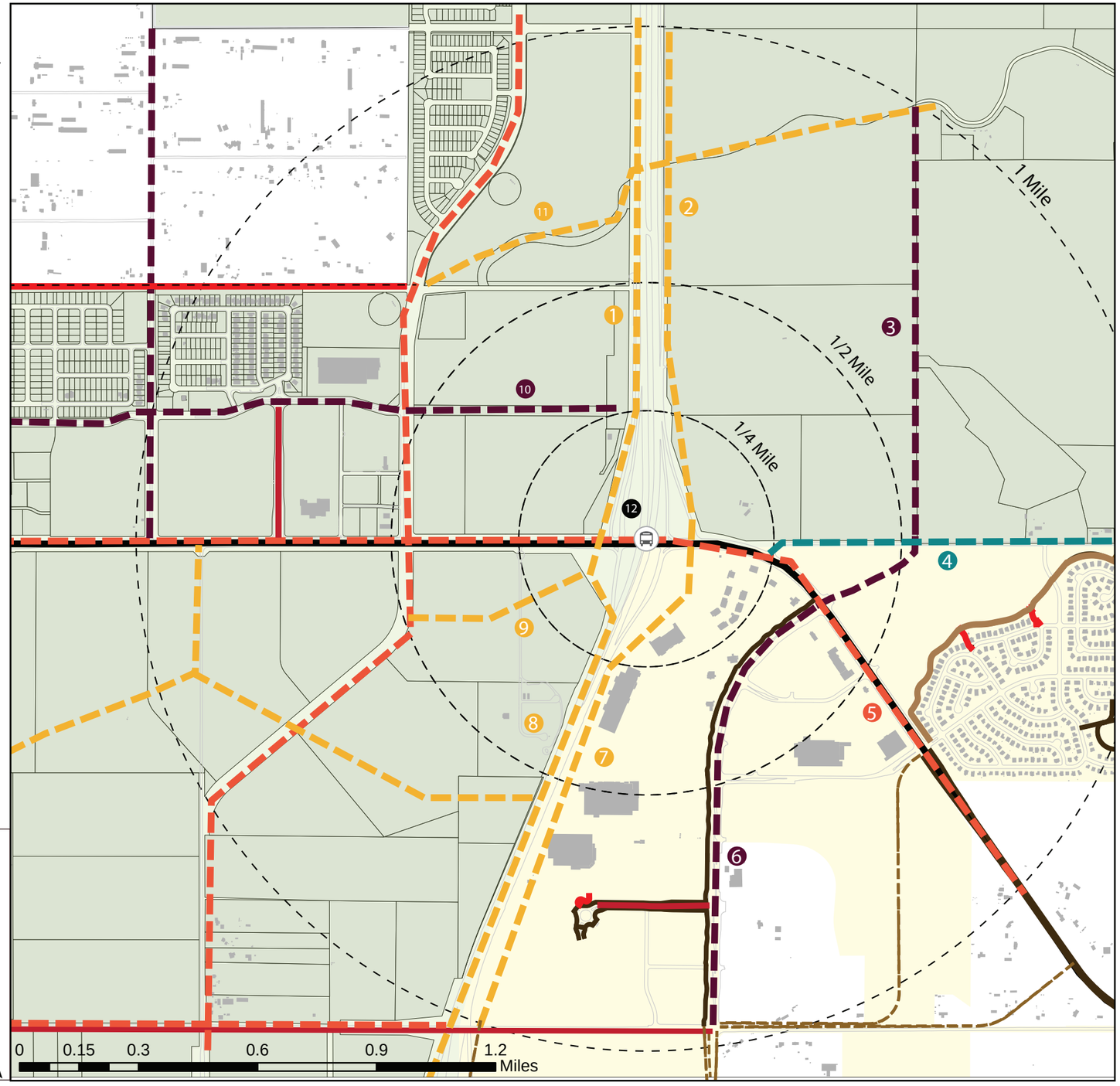
Circulator Bus/ AV Vehicle
Provide a route for a circulator bus or Autonomous Vehicle shuttle to connect people from the proposed developments to the stations. This could be a fixed route or on-demand.

State Highway 7 BRT Station Area Design

BROOMFIELD Pinyon Otak FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

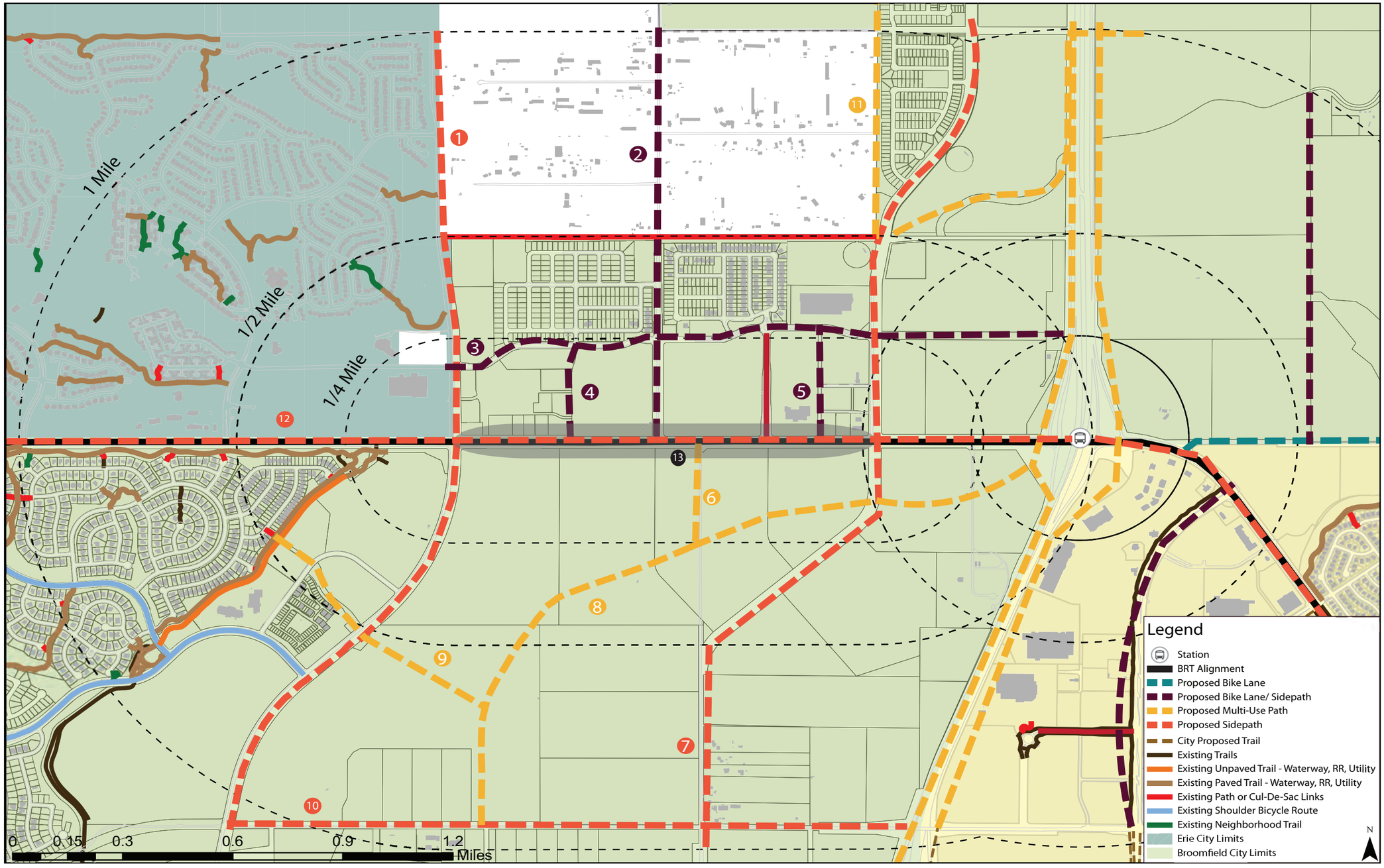
I-25 Mobility Hub

February 14, 2019



SH 7 in Broomfield

2019



SH 7 in Broomfield - Recommendations

2019

1. **Proposed Sidepath on Sheridan Parkway**
Provide a sidepath along at least one side of Sheridan Parkway to provide a low-stress north-south connection to the proposed station.

2. **Proposed Bike Lane/ Sidepath on County Road 7**
Provide either a bike lane or a sidepath on County Road 7. The facility will depend on the planned traffic volumes and speeds for County Road 7.

3. **Proposed Bike Lane/ Sidepath on 169th Avenue**
Provide either a bike lane or a sidepath on 169th Avenue. The facility will depend on the planned traffic volumes and speed for 169 Avenue.

4. **Proposed Bike Lane/ Sidepath through proposed development**
Provide either a bike or a sidepath along roadway in proposed development. The facility will depend on planned traffic volumes and speeds for the road. This will also provide a connection to the #13 recommendation of an underpass.

5. **Proposed Bike Lane/ Sidepath on Delaware Street**
Provide either a bike lane or a sidepath on Delaware Street. The facility will depend on the traffic volumes and speeds for Delaware Street.

6. **Proposed Multi-Use Path through proposed development**
Provide a multi-use path through the proposed development and a grade-separated crossing of State Highway 7 to connect both sides of the sidepath along the road.

7. **Proposed Sidepath along the proposed Huron Street**
Provide a sidepath on at least one side of the proposed Huron Street. This will serve as a collector to the main arterial routes to stations.

8. **Proposed Multi-Use Path through proposed development**
Provide a multi-use path in the proposed development to connect the proposed development to the stations through a low-stress facility with limited roadway crossings.

9. **Proposed Multi-Use Path through proposed development**
Provide a multi-use path through the proposed development connecting to the existing grade separated crossing of Sheridan Parkway.

10. **Proposed Sidepath Path on W 160th Avenue**
Provide a sidepath along 160th Avenue to provide a low-stress east-west connection.

11. **Proposed Multi-Use Trail through dedicated right-of-way provided by Palisade Park Development**
Provide a multi-use trail on dedicated right-of-way set aside in the development process of the Palisade Park development. This trail will help provide more low-stress connectivity north of SH7.

12. **Proposed Sidepath on State Highway 7**
Create a 12' sidepath on both sides of State Highway 7 to provide connectivity throughout the corridor from the station to surrounding areas.

13. Provide a grade separated crossing of State Highway 7. The crossing should connect to the major employers planned for the corridor, retail, commercial and residential. The placement is critical to encouraging high usage.

Non-Specific Location Recommendations

Sidewalk Gap Identification and Remediation

Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

Circulator Bus/ AV Vehicle

Provide a route for a circulator bus or Autonomous Vehicle shuttle to connect people from the proposed developments to the stations. This could be a fixed route or on-demand.

Secure Bicycle Parking at Station

Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

Recommendations

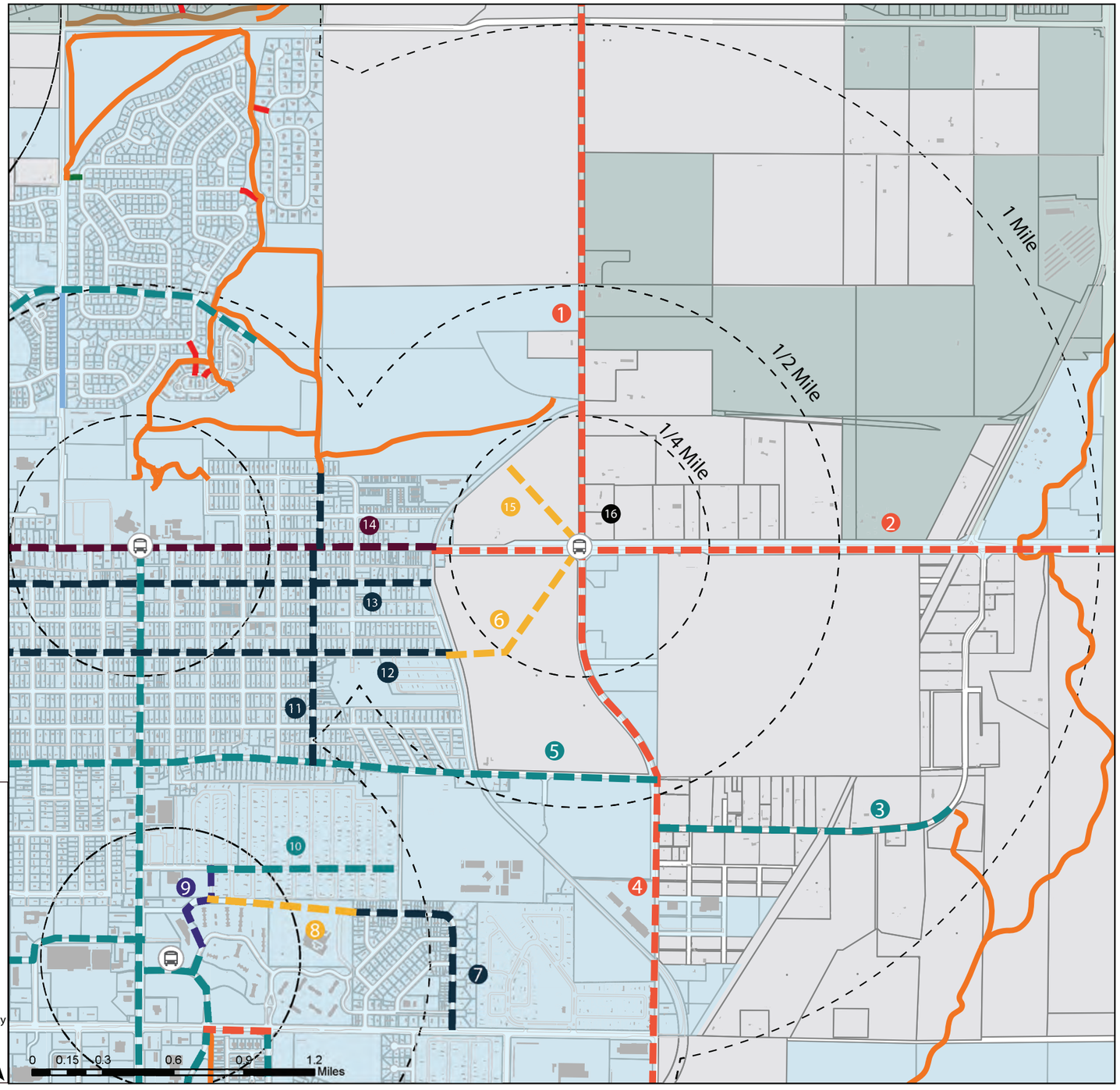
1. **Proposed Sidepath on N 119th Street**
Provide a sidepath on at least one side of 119th Street to provide a low-stress facility.
2. **Proposed Sidepath on State Highway 7**
Provide a sidepath on at least one side of State Highway 7 to provide connectivity through the corridor.
3. **Proposed Bike Line on Flagg Drive**
Provide a bike line on Flagg Drive to connect trails and neighborhoods to 120th Street.
4. **Proposed Sidepath N 120th Street**
Provide a sidepath on at least one side of 120th Street to provide a low-stress facility.
5. **Proposed Bike Lane on E Emma Street**
Review existing bicycle facilities on Emma Street to upgrade existing facilities to create a major east/west low-stress facility in Lafayette.
6. **Proposed Multi-Use Trail to E Simpson Street**
Proivde a trail to connect Simpson Street to 119th Avenue Station.
7. **Proposed Bike Boulevard on Sir Galahad Drive**
Develop a bicycle boulevard on Sir Galahad Drive to connect neighborhoods to trail network.
8. **Proposed Multi-Use Trail from Sir Galahad to existing trail**
Expand existing trails near the Park-and-Ride to connect existing neighborhoods.
9. **Proposed Trail Connection from Spaulding Street**
Provide a trail connection from the mobile home neighborhoods to the Lafayette Park-and-Ride. This is an existing desire line path.
10. **Proposed Bike Lane on E Spaulding Street**
Add a dedicated bicycle facility on Spaulding Street to provide dedicated space for people who bike.
11. **Proposed Bike Boulevard on N Finch Avenue**
Develop a bicycle boulevard on Finich Avenue to provide a low-stress north/south connection.
12. **Proposed Bike Boulevard on E Simpson Street**
Develop a bike boulevard on Simpson Street to provide an east/west low-stress facility to connect to 119th Avenue Station.
13. **Proposed Bike Boulevard on E Geneseo Street**
Develop a bike boulevard on Geneseo Street to provide a low-stress facility one block away from State Highway 7.
14. **Proposed Bike Lane/Sidepath on State Highway 7**
Create a protected bike lane or sidepath along State Highway 7 to provide a low-stress facility.
15. **Proposed Multi-Use Trail to connect Regional Trail to Station**
Connect proposed regional trail on old rail line ROW to station as development occurs.
16. **Secure Bicycle Parking at Station**
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.
17. **Sidewalk Gap Identification and Remediation**
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

State Highway 7 BRT Station Area Design

City of Lafayette · Pinyon · Otak · FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

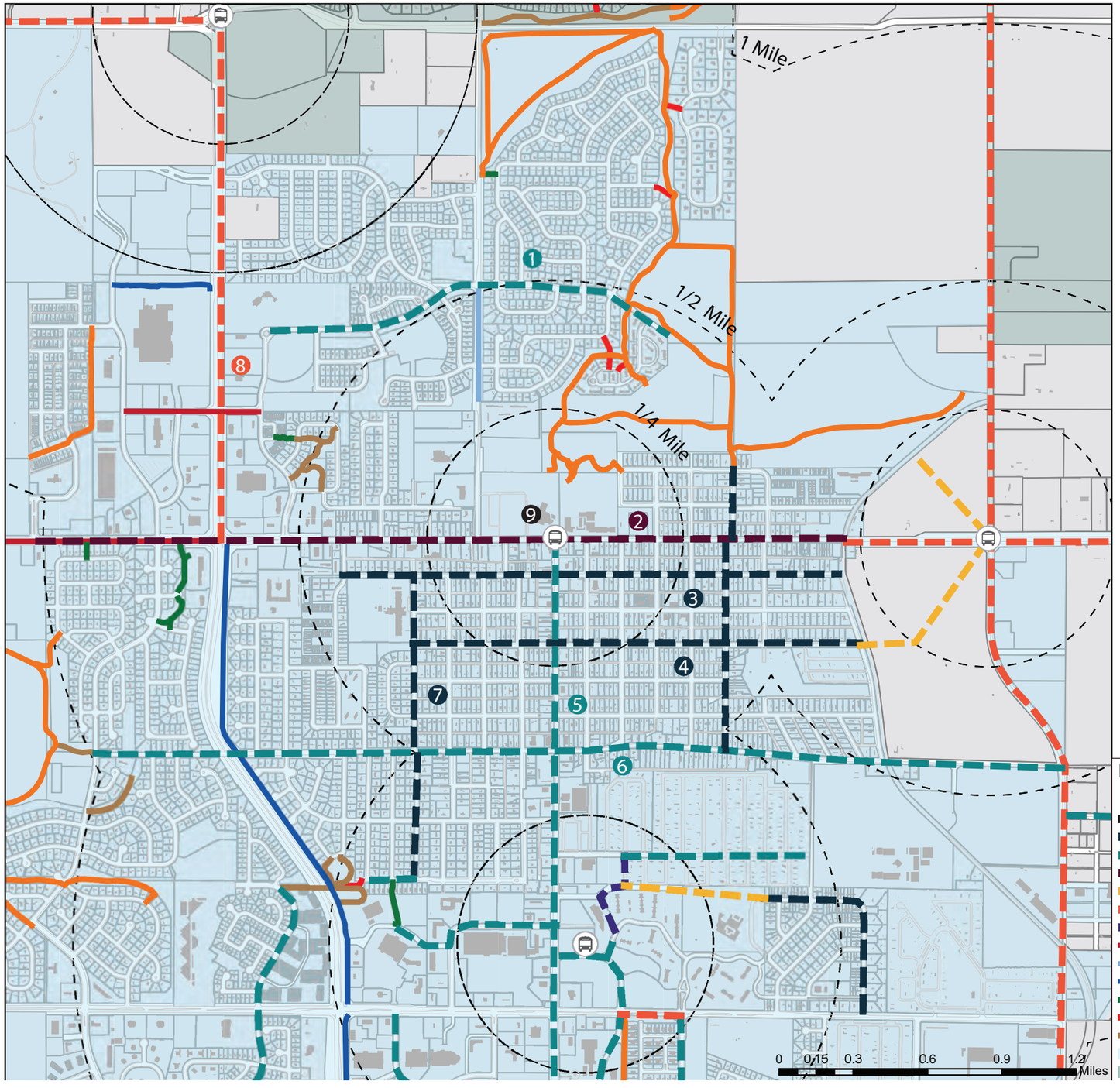
119th Street Station

April 2019



SH7 and Public Road Station

April 2019



Recommendations

1. **Proposed Bike Lane on Lucerne Drive**
   Add a dedicated bicycle facility on Lucerne Drive to provide dedicated space for people who bike.
2. **Proposed Bike Lane/ Sidepath on State Highway 7**
   Create a protected bike lane or sidepath along State Highway 7 to provide a low-stress facility.
3. **Proposed Bike Boulevard on E Geneseo Street**
   Develop a bike boulevard on Geneseo Street to provide a low-stress facility one block away from State Highway 7.
4. **Proposed Bike Boulevard on E Simpson Street**
   Develop a bike boulevard on Simpson Street to provide an east/west low-stress facility to connect to 119th Avenue Station.
5. **Proposed Bike Lane on N Public Road**
   Provide a dedicated bicycle facility on Public Road to provide dedicated space for people who bike.
6. **Proposed Bike Lane on E Emma Street**
   Review existing bicycle facilities on Emma Street to upgrade existing facilities to create a major east/west low-stress facility in Lafayette.
7. **Proposed Bike Boulevard on N Bermont Avenue**
   Develop a bicycle boulevard on Bermont Avenue to provide a low-stress north/south connection.
8. **Proposed Sidepath on N 107th Street**
   Create a sidepath at least on one side of Highway 287 to provide a low-stress connection along the BRT corridor.
9. **Secure Bicycle Parking at Station**
   Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.
10. **Sidewalk Gap Identification and Remediation**
    Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

State Highway 7 BRT Station Area Design

Recommendations

1. **Proposed Bike Lane on Public Road**
Provide a dedicated bicycle facility on Public Road to provide dedicated space for people who bike.
2. **Proposed Trail Connection from Spaulding Street**
Provide a trail connection from the mobile home neighborhoods to the Lafayette Park-and-Ride. This is an existing desire line path.
3. **Proposed Bike Lane on E Spaulding Street**
Add a dedicated bicycle facility on Spaulding Street to provide dedicated space for people who bike.
4. **Proposed Multi-Use Trail from Sir Galahad to existing trail**
Expand existing trails near the Park-and-Ride to connect existing neighborhoods.
5. **Proposed Bike Boulevard on Sir Galahad Drive**
Develop a bicycle boulevard on Sir Galahad Drive to connect neighborhoods to trail network.
6. **Proposed Sidepath on E South Boulder Road**
Create small sidepath on South Boulder Road to connect low-stress facilities in neighborhoods on the south to the low-stress facility on the north.
7. **Proposed Bike Lane on Avalon Avenue**
Add a dedicated bicycle facility on Avalon Ave. to provide dedicated space for people who bike.
8. **Proposed Bike Lane on Miners Drive**
Add a dedicated bicycle facility on Miners Drive to provide dedicated space for people who bike.
9. **Proposed Bike Lane on Courtney Way**
Provide a bike lane connection on Courtney Way to connect trail to bike lanes.
10. **Proposed Bike Lane on Coak Creek Drive**
Add a dedicated bicycle facility on Coal Creek Drive to provide dedicated space for people who bike.
11. **Proposed Bike Lane on Minotaur Drive**
Add a bicycle lane on Minotaur Drive to connect neighborhoods to existing overpass.
12. **Proposed Bike Lane on Waneka Parkway**
Add a dedicated bicycle facility on Waneka Parkway and Robin Street to provide dedicated space for people who bike and connect to existing trail.
13. **Proposed Bike Lane on Spaulding Street**
Provide a bike lane to connect existing trails/ overpasses and proposed bicycle boulevard on Bermont Avenue.
14. **Proposed Bike Boulevard on N Bermont Avenue**
Develop a bicycle boulevard on Bermont Avenue to provide a low-stress north/south connection.
15. **Secure Bicycle Parking at Station**
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

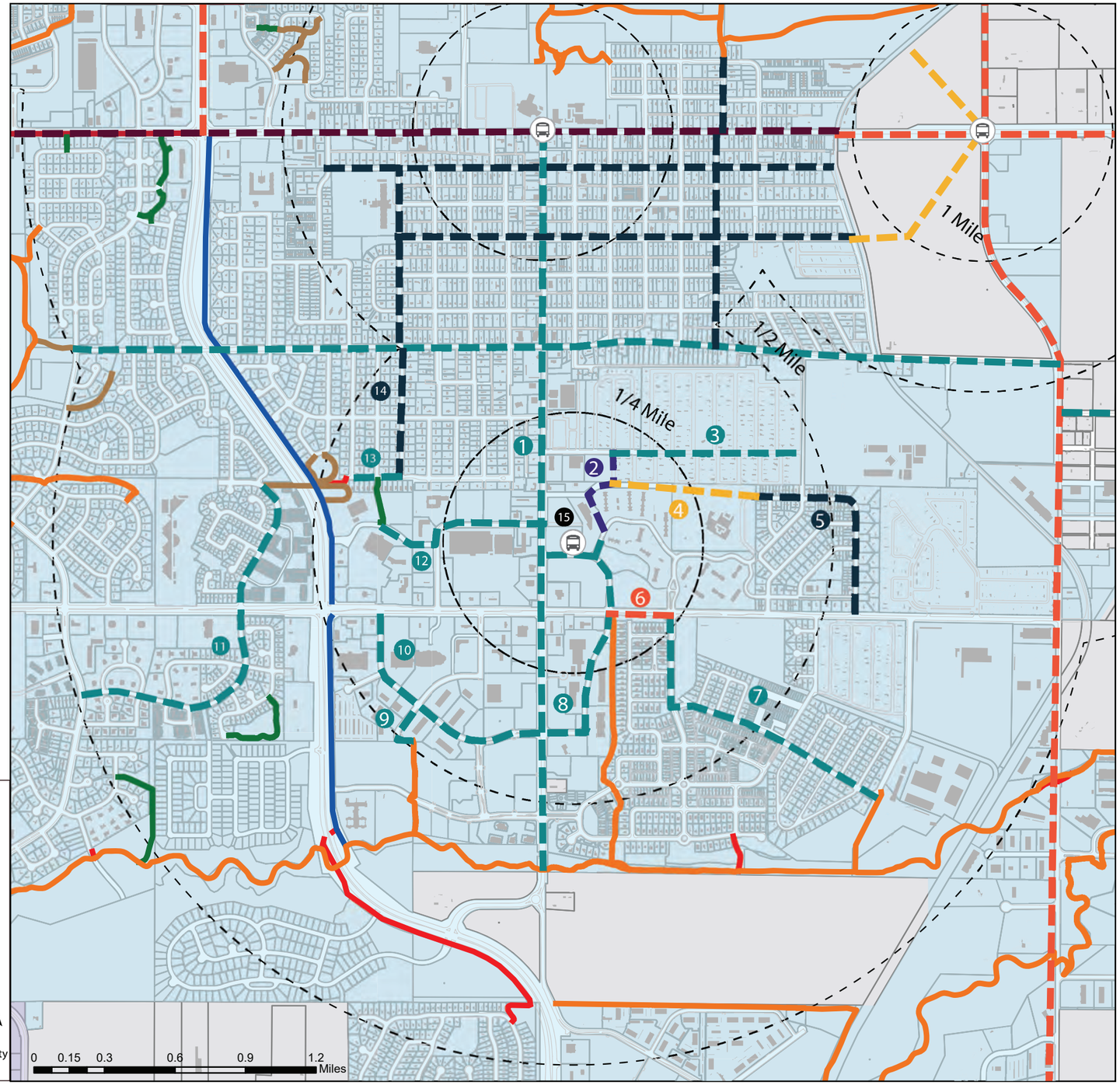
Sidewalk Gap Identification and Remediation
Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

State Highway 7 BRT Station Area Design

City of Lafayette · Pinyon · Otak · FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

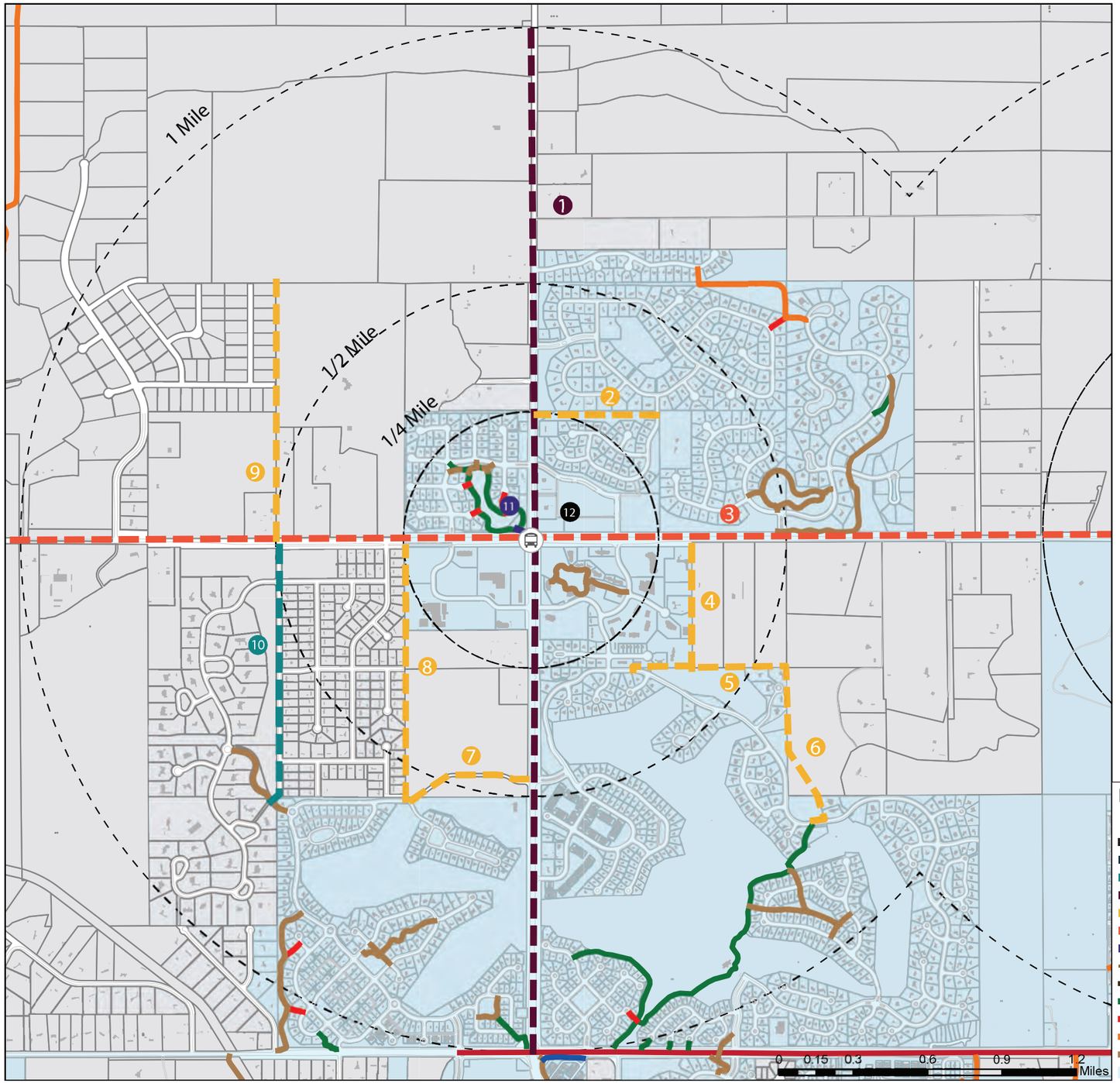
Lafayette Park and Ride Station

April 2019



95th Street Station

April 2019



Recommendations

1. **Proposed Bike Lane/ Sidepath on N 95th Street**
   Evaluate existing bikable shoulder for upgrade to bike lane or sidepath to create a low-stress facility connecting to the station
2. **Proposed Multi-Use Trail in Blue Heron Estates**
   Upgrade existing trail to provide connectivity from neighborhoods to 95th Street.
3. **Proposed Sidepath on State Highway 7**
   Create a sidepath on at least one side along State Highway 7.
4. **Proposed Multi-Use Trail from State Highway 7 to Indian Peaks Neighborhood**
   Provide a trail behind commercial development to connect neighborhood to State Highway 7.
5. **Proposed Multi- Use Trail Through Indian Peak Neighborhood**
   Add a trail along edge of Indian Peaks Neighborhood to connect neighborhood to State Highway 7.
6. **Proposed Multi-Use Trail to Indian Peaks Trail**
   Provide a trail along edge of Indian Peaks neighborhood and other parcels when development occurs to connect Indian Peaks Trail to State Highway 7.
7. **Proposed Multi-Use Trail from N 95th Street to Indian Peaks Trail W**
   Provide a trail through existing un-used right-of-way to connect neighborhoods to 95th Street.
8. **Proposed Multi-Use Trail from State Highway 7 to Indian Peaks Trail W**
   Provide a trail on the edge of the neighborhood to connect neighborhoods to State Highway 7.
9. **Proposed Multi-Use Trail on Wicklow Street**
   Provide a trail as development occurs to connect neighborhood to State Highway 7.
10. **Proposed Bike Lane to Neighborhood**
    Provide Bike Lanes along Wicklow Street to connect neighborhood to State Highway 7.
11. **Proposed Trail Connection to Neighborhood**
    Create a trail connection from trails in neighborhood to station.
12. **Secure Bicycle Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.
13. **Sidewalk Gap Identification and Remediation**
    Sidewalk gaps need to be identified and remediated to encourage walking. Start using major pedestrian corridors and then branch to feeder routes to those corridors.

Legend

- Station
- BRT Alignment
- Proposed Bike Boulevard
- Proposed Bike Lane
- Proposed Bike Lane/ Sidepath
- Proposed Multi-Use Trail
- Proposed Side-path
- Proposed Trail Connection
- City Proposed Trail
- Existing Trails
- Existing Neighborhood Trail
- Existing Path or Cul-De-Sac Link
- Existing Unpaved Trail - Waterway, RR, Utility
- Existing Paved Trail - Waterway, RR, Utility
- Lafayette City Limits

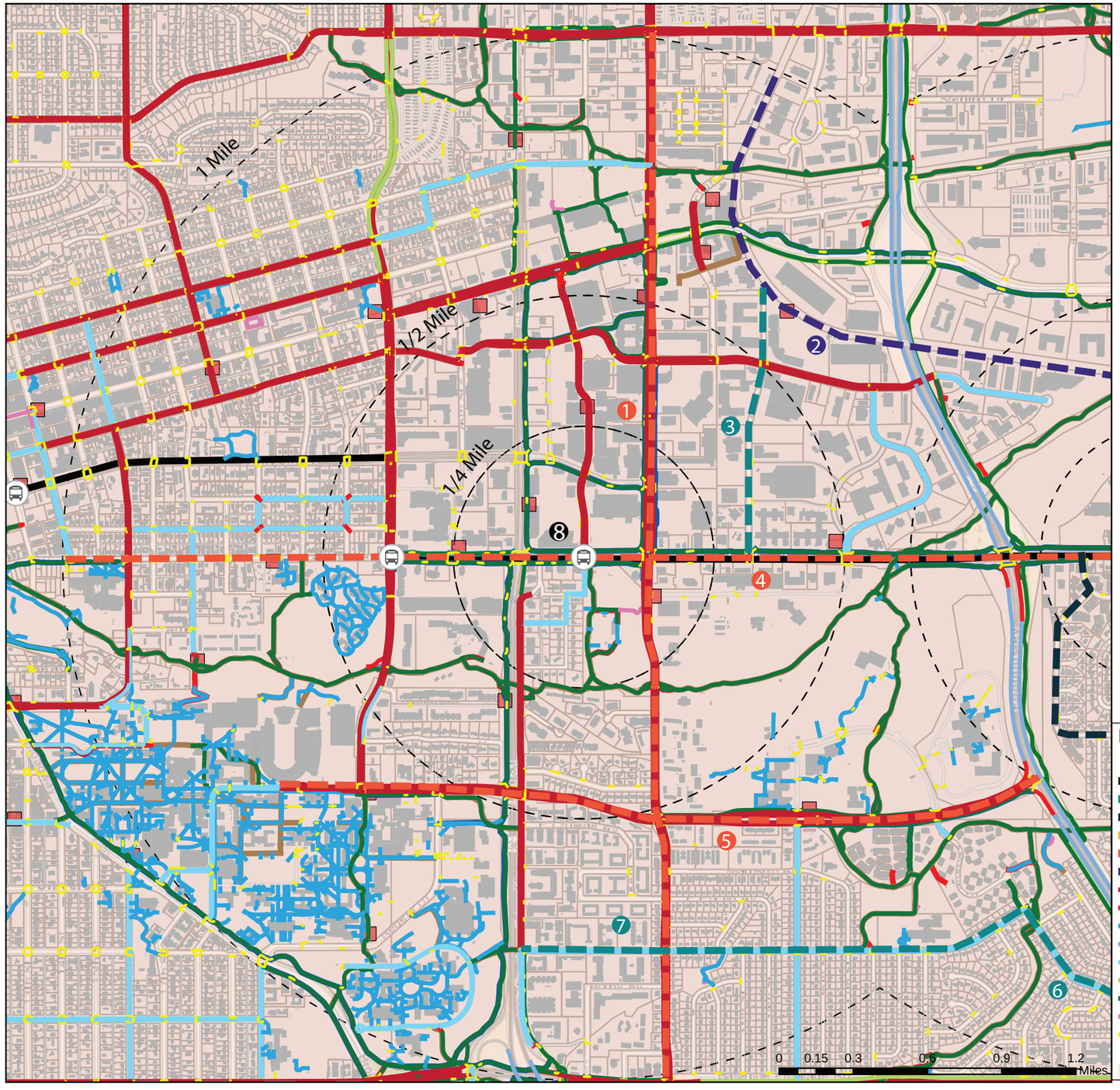
N

State Highway 7 BRT Station Area Design

City of Lafayette · Pinyon · Otak · Fox Tuttle Hernandez Transportation Group

29th Street Station

April 2019



Recommendations

1. **Proposed Protected Bike Lane on 30th Street**
   Provide a protected bike lane on 30th Street as part of the Boulder low-stress bikeway network.
2. **Proposed Rail with Trail along Railroad Alignment**
   Provide a trail along the existing rail line north of the State Highway 7 corridor. Coordination with adjacent landowners will be needed in some areas.
3. **Proposed Bike Lane on 33rd Street**
   Create a bike lane on 33rd Street to connect the Rail-with-Trail to State Highway 7
4. **Proposed Protected Bike Lane and Sidepath along Araphoe Avenue**
   Provide a protected bike lane and sidepath along Araphoe Avenue as identified in East Arapahoe Corridor Plan.
5. **Proposed Protected Bike Lane on Colorado Avenue**
   Provide a protected bike lane on Colorado Avenue as part of the Boulder low-stress bikeway network.
6. **Proposed Bike Lane on Mohawk Drive**
   Provide the appropriate bike lane based on speeds and volume of the roadway to connect neighborhood users to Aurora Avenue and neighborhood trails.
7. **Proposed Bike Lane on Aurora Avenue**
   Provide the appropriate bike lane based on speeds and volume of the roadway to connect neighborhood users to 30th Street
8. **Secure Bicycle Parking at Station**
   Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.
9. **Sidewalk Gap Identification and Remediation**
   Utilize existing GIS data for Boulder to identify gaps in sidewalks and remediate those gaps. Start by using the arterial routes to the station, followed by collector routes.
10. **Employer/ Neighborhood Transit Benefit**
    Work with existing employers and neighborhoods to provide incentives for transit passes, bicycle share and other methods to reduce vehicle miles traveled.
11. **Circulator/ A/V / Shared Mobility**
    Implement a circulator bus or shared mobility to connect users to the many destinations in the area. Explore the usage of autonomous vehicle like the EasyMile for use in the 29th Street Mall.

Legend

- Station
- BRT Alignment
- Proposed Bike Lane
- Proposed Neighborhood Greenway
- Proposed Multi-Use Trail
- Proposed Protected Bike Lane
- Proposed Rail with Trail
- Existing On-Street/ Contra Flow Bike Lane
- Existing Connector
- Existing Pedestrian Path
- Existing Bikable Shoulder
- Existing Designated Bike Route
- Existing Protected Bike Lane
- Existing Multi-Use Path
- Existing Plaza Path
- Existing Crossing
- Existing B-Cycle Stations
- Boulder City Limits

State Highway 7 BRT Station Area Design

Pinyon Otak FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

Recommendations

1. **Proposed Bike Lane on 48th Street**
Provide a bike lane to connect existing trail network to the station at 48th street.

2. **Proposed Rail with Trail along Railroad Alignment**
Provide a trail along the existing rail line north of the State Highway 7 corridor. Coordination with adjacent landowners will be needed in some areas.

3. **Proposed Protected Bike Lane along State Highway 7**
Provide a protected bike lane along State Highway 7 as identified in East Arapahoe Corridor Plan.

4. **Proposed Neighborhood Greenway on 48th Street**
Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations

5. **Proposed Neighborhood Greenway on Eisenhower Drive**
Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations

6. **Proposed Neighborhood Greenway on Pennsylvania Avenue**
Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations

7. **Proposed Neighborhood Greenway on McIntire Street**
Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations

8. **Proposed Neighborhood Greenway on Harrison Avenue**
Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations

9. **Proposed Bike Lane on Mohawk Drive**
Provide bike lane on Mohawk Drive to connect neighborhood to low-stress bikeway on 30th.

10. **Proposed Bike Lane on Aurora Avenue**
Provide bike lane on Aurora Avenue to connect neighborhood to low-stress bikeway on 30th.

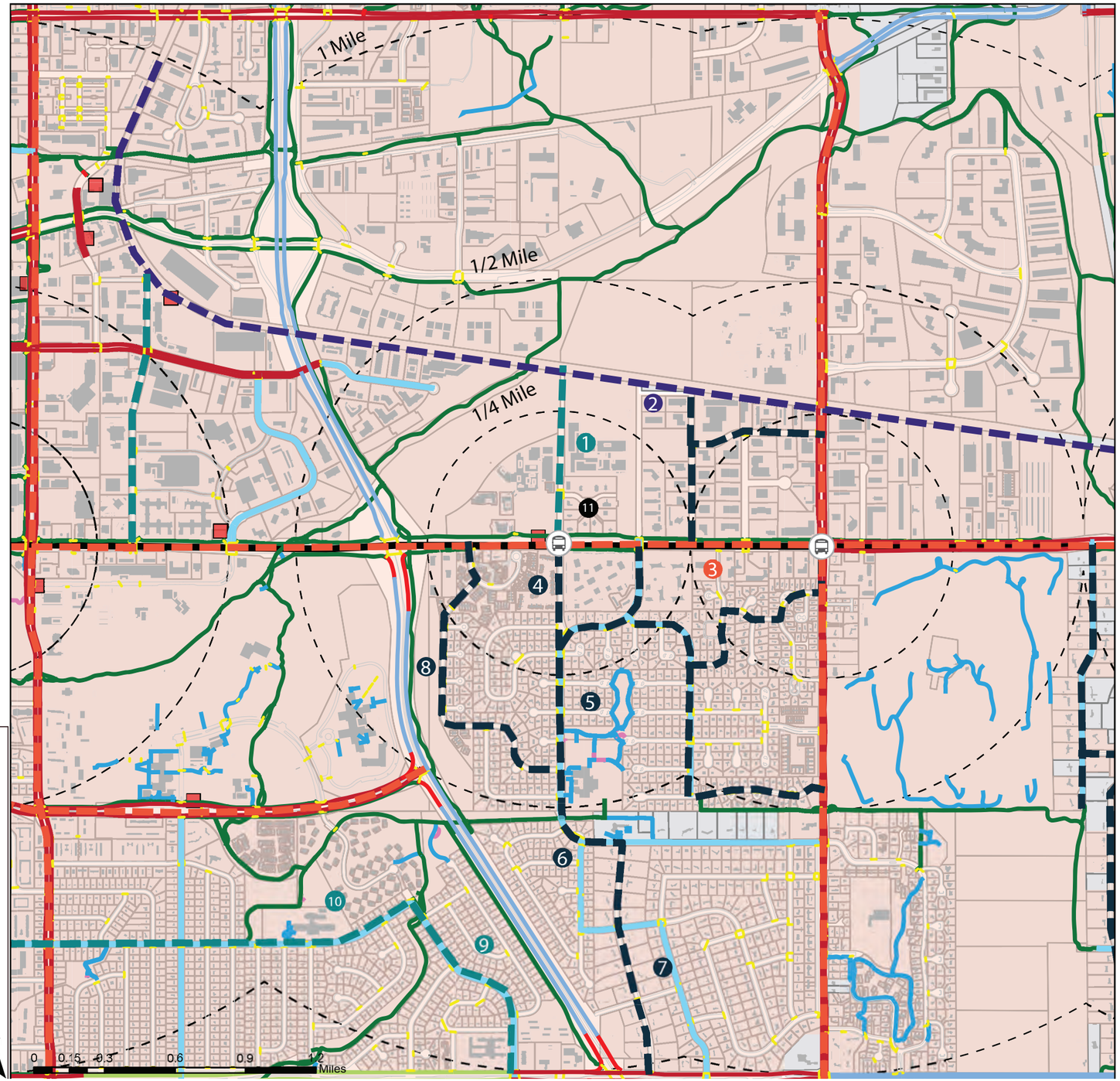
11. **Secure Bicycle Parking at Station**
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

12. **Sidewalk Gap Identification and Remediation**
Utilize existing GIS data for Boulder to identify gaps in sidewalks and remediate those gaps. Start by using the arterial routes to the station, followed by collector routes.

13. **Employer/ Neighborhood Transit Benefit**
Work with existing employers and neighborhoods to provide incentives for transit passes, bicycle share and other methods to reduce vehicle miles traveled.

48th Street Station

April 2019

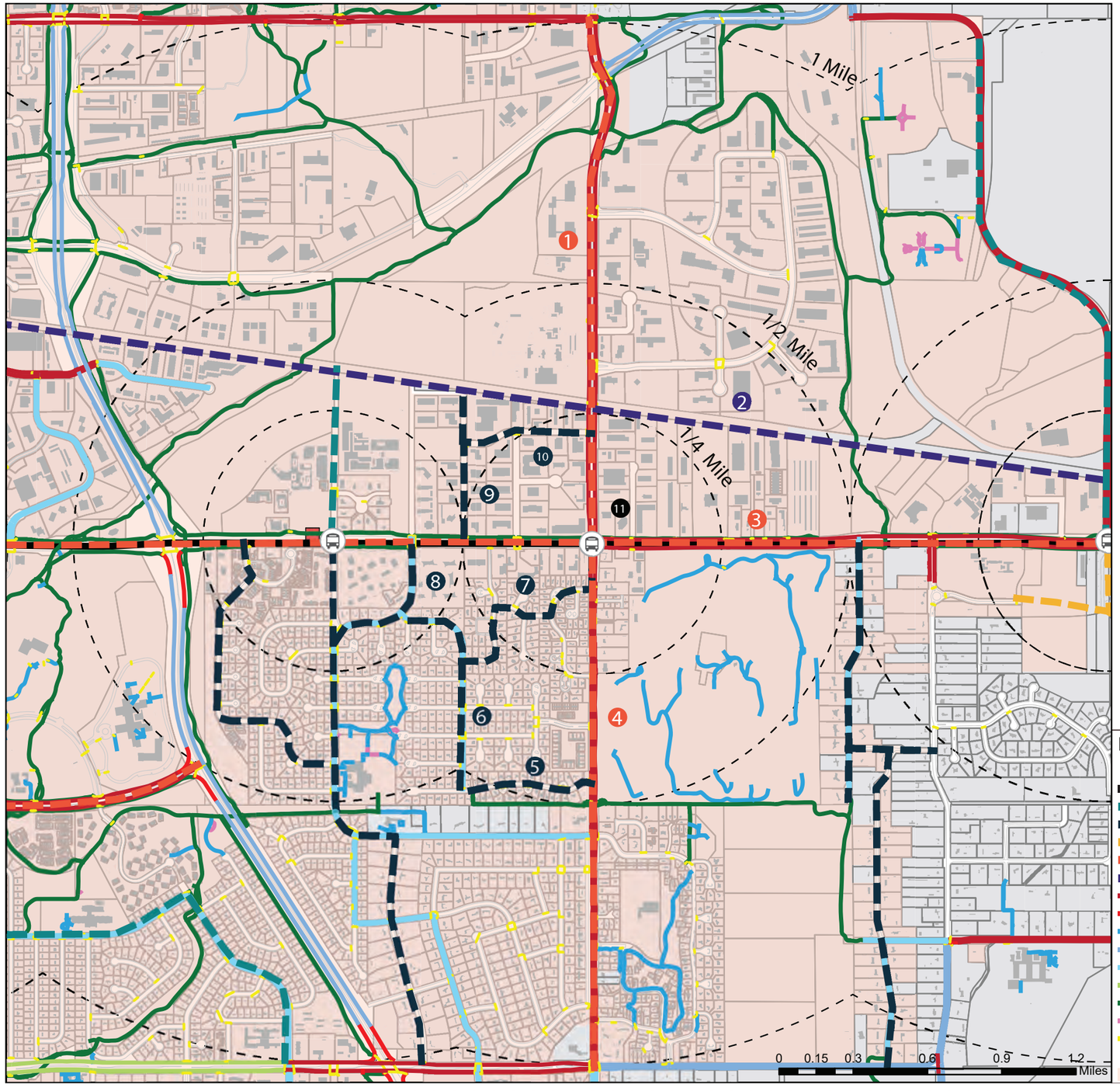


State Highway 7 BRT Station Area Design

Pinyon Otak FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

55th Street Station

April 2019



Recommendations

1. **Proposed Protected Bike Lane on 55th Street**
   Provide a protected bike lane along 55th Street as part of the Boulder Low-Stress Bikeway Network.
2. **Proposed Rail with Trail along Railroad Alignment**
   Provide a trail along the existing rail line north of the State Highway 7 corridor. Coordination with adjacent landowners will be needed in some areas.
3. **Proposed Protected Bike Lane along State Highway 7**
   Provide a protected bike lane along State Highway 7 as identified in East Arapahoe Corridor Plan.
4. **Proposed Protected Bike Lane on 55th Street**
   Provide a protected bike lane along 55th Street as part of the Boulder Low-Stress Bikeway Network.
5. **Proposed Neighborhood Greenway on Centennial Trail**
   Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations
6. **Proposed Neighborhood Greenway on Marritt Drive**
   Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations.
7. **Proposed Neighborhood Greenway on Patton Drive/ Gandhi Drive/ Lodge Lane**
   Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations
8. **Proposed Neighborhood Greenway on Eisenhower Drive**
   Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations
9. **Proposed Neighborhood Greenway on Range Street**
   Develop a neighborhood greenway on Range Street to connect 55th and State Highway 7 in a low-stress solution.
10. **Proposed Neighborhood Greenway on Western Avenue**
    Develop a neighborhood greenway on Western Avenue to connect 55th, Rail-with-Trail and State Highway 7 in a low-stress solution.
11. **Secure Bicycle Parking at Station**
    Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.
12. **Sidewalk Gap Identification and Remediation**
    Utilize existing GIS data for Boulder to identify gaps in sidewalks and remediate those gaps. Start by using the arterial routes to the station, followed by collector routes.
13. **Employer/ Neighborhood Transit Benefit**
    Work with existing employers and neighborhoods to provide incentives for transit passes, bicycle share and other methods to reduce vehicle miles traveled.
14. **Circulator/ A/V / Shared Mobility**
    Implement a circulator bus or shared mobility to connect users to the many destinations in the area. Explore the usage of autonomous vehicle like the EasyMile for use in the 29th Street Mall.

State Highway 7 BRT Station Area Design
Pinyon Otak FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

Recommendations

1. **Proposed Bike Lane on 63rd Street**
Evaluate existing bike lane on 63rd Street for the appropriate bicycle lane treatment based on vehicle volumes and speed.

2. **Proposed Rail with Trail Along Railroad Alignment**
Provide a trail along the existing rail line north of the State Highway 7 corridor. Coordination with adjacent landowners will be needed in some areas.

3. **Proposed Protected Bike Lane along State Highway 7**
Provide a protected bike lane along State Highway 7 as identified in East Arapahoe Corridor Plan.

4. **Proposed Multi-Use Trail Connection along 63rd Street**
Provide a multi-use trial south of State Highway 7 along 63rd Street.

5. **Proposed Multi-Use Trail Connection to Neighborhoods**
Provide a trail to connect to 63rd Street, Oreg Street and Ravenwood Road.

6. **Proposed Neighborhood Greenway on Gapter Road**
Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations

7. **Proposed Neighborhood Greenway on McSorley Lane**
Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations

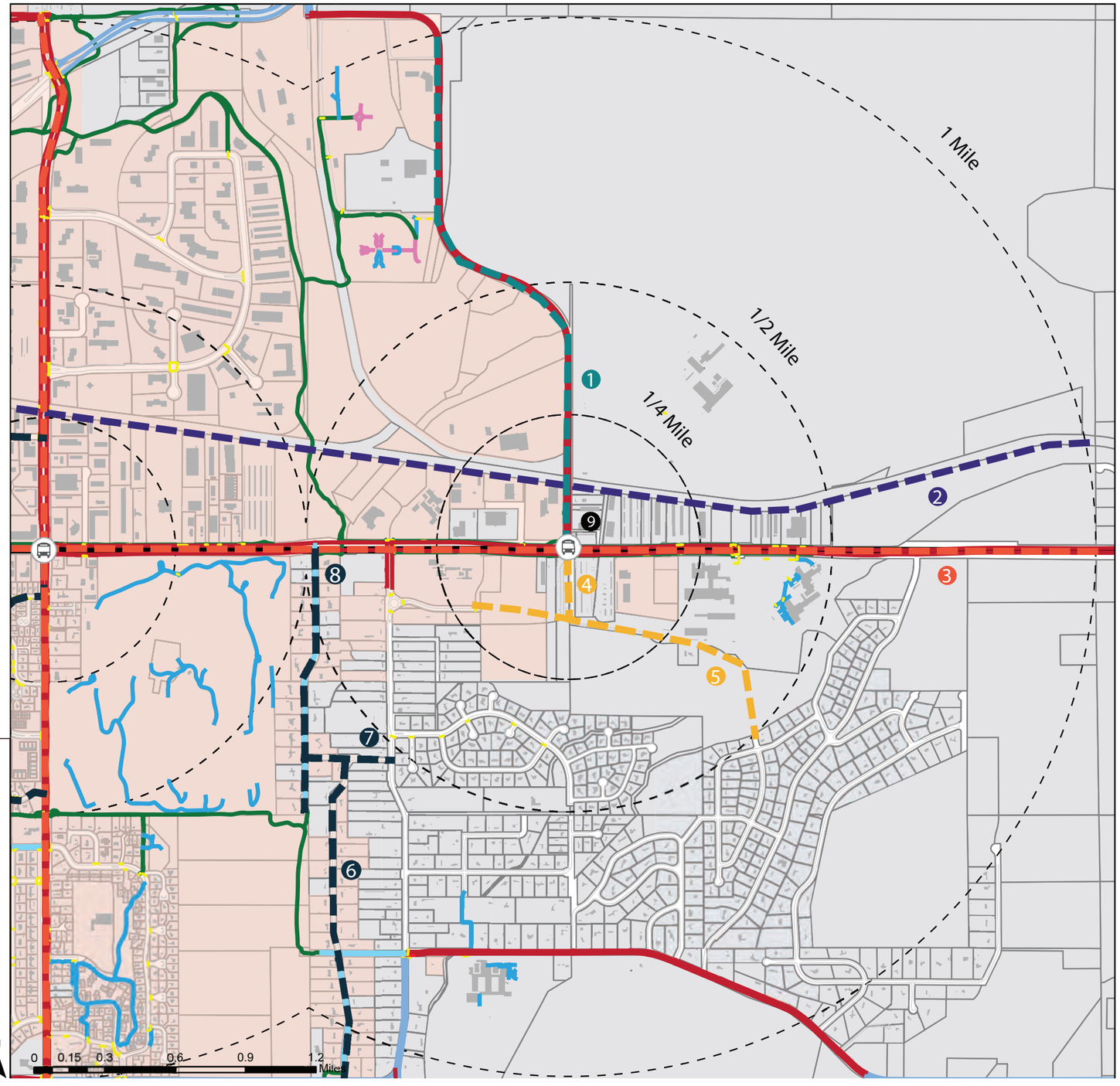
8. **Proposed Neighborhood Greenway on Old Tale Road**
Develop a neighborhood greenway network in neighborhood south of State Highway 7 to get users to stations

9. **Secure Bicycle Parking at Station**
Secure bike parking is critical to encourage bicycling to a station. Provide a secure bicycle parking shelter or lockers for long-term bicycle parking.

10. **Sidewalk Gap Identification and Remediation**
Utilize existing GIS data for Boulder to identify gaps in sidewalks and remediate those gaps. Start by using the arterial routes to the station, followed by collector routes.

63rd Street Station

April 2019



State Highway 7 BRT Station Area Design

Pinyon Otak FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

Planning for Transit Supportive Land Uses along Bus Rapid Transit Corridors

Activity Units vs. Dwelling Units

An important consideration in forecasting transit supportive densities along high capacity transit corridors, including bus rapid transit (BRT), relates to assessing and calculating *all* ridership-generating land uses. Several resources related to transit oriented development (TOD) planning evaluate density in terms of dwelling units per acre (du/acre) in proximity to transit stations and transit corridors. However, employment and commercial land uses can also be important generators for ridership. For example, a hospital or community college can generate high demand for transit ridership, as can shopping centers, special event venues, high tech centers, corporate campuses, agency headquarters, and other types of uses. As such, many regional planning entities, including the Puget Sound Regional Council (PSRC) describe transit supportive land uses in terms of "activity units" or the number of people (population) and/or jobs in proximity to the station or within the corridor. Some jurisdictions also add "students" from higher education into the mix of activity units (residents, employees, and students—each one is one activity unit). In PSRC's *VISION 2040* plan, residential densities exceeding 15 to 20 homes per acre, as well as employment areas with densities of 50 jobs per acre and higher, are preferred targets for the higher frequency and high-volume service provided by high-capacity transit. New regional growth centers are expected to plan for land use that accommodates at least ***45 activity units (number of people/population + jobs) per gross acre***.

A guidance paper prepared by PSRC notes that increasing densities of all types of land uses around transit stations around stops increases ridership. While the scale and mix of uses may vary, all types of station areas can play a role in boosting demand for transit trips to and from nearby land uses. Strategies include planning for more compact (and as such, more dense) residential and commercial development, neighborhoods with a variety of housing choices, including housing that is affordable at a range of incomes, regional and sub-regional employment centers, major institutions, and mixed-use districts. In addition the guidance paper highlights the following important best practices for planning.

- ***Establish Transit-Supportive Density Goals based on Locally Relevant Data and Policies.*** There is no one-size-fits-all threshold for what constitutes a "transit-supportive density." Existing PSRC guidance on density around transit is consistent with minimum thresholds cited in the literature and is an appropriate starting point for further collaboration among regional, transit, and local agencies to tailor density goals for a full range of places in the region. Tailored density goals should consider transit mode type and level of service, cost- effectiveness goals for transit, and station area type and market demand.

Otak

- ***Maximize Land Use Potential within Transit Walksheds.*** Research shows that riders will typically walk up to ½ mile to access high-capacity transit and ¼ mile or more to access bus transit. Planned land use and zoning designations should allow transit-supportive densities across as much of the corresponding transit walkshed as possible and investments in connectivity should be made to expand station area walksheds where feasible.

- ***Promote Employment Growth at Station Areas in Transit Corridors.*** Connecting workers to employment centers in the region is a foundation for the regional transit system. Land use strategies and place-based economic development that concentrates employment within walking distance of key transit nodes, in tandem with residential development along the transit corridor, is most effective in generating ridership demand.

- ***Plan for and Encourage Mixed Uses and Transit-Supportive Design.*** In locations with dense land uses, local jurisdictions should also promote a pedestrian-friendly public realm, mixed uses at both the station area and corridor scales, and regulations to discourage uses and building types and designs that are incompatible with transit-oriented development. These approaches complement land use density in maximizing transit ridership.

- ***Incentivize Alternatives to Automobile Travel in Station Areas.*** Policies and requirements that support efforts to build ridership through transit-oriented development, rather than driving and parking, should be implemented. In higher density corridors, tools such as multimodal concurrency and innovative parking management can be more compatible with supporting transit ridership."

Mixed Use Development vs. Synergies Between Station Area Land Uses in the Corridor

While development of compact, mixed use areas within ½ mile (ten minute walk) of high capacity transit stations is a general best practice for land use planning, it is also important to recognize that within a transit corridor, ridership synergies may occur between transit stops emphasizing a more focused type of land use, but land use types that may vary by stop. For example, a transit stop in a multi-family residential area may generate a high concentration of riders who take transit to their jobs at an employment centers and commercial centers located at other transit stops in the same corridor. Mixed use is still an important principal for TOD planning, but in analyzing TOD potential within corridors, it is also informative to consider how various types of land uses can support ridership patterns to and from stops in the corridor.

Otak

Average Minimum Density Based on Context and Level of Transit Service

Transit agencies and local jurisdictions are also trending toward planning for average minimum densities based on the level of transit service provided (headway frequency, duration, etc.) and the context of the service. For example, in its *Local Planning Handbook* the Metropolitan Council for the Minneapolis-Saint Paul metro area suggests average minimum densities (DU/acre) of higher levels along light rail transit, commuter rail, and dedicated bus rapid transit lines, compared to more highway-oriented bus rapid transit. The Metropolitan Council's study also recommends standards for average minimum densities (see table below.) It should be noted that the *average minimum* density is *not* the "target density" for planning.

Average Minimum Residential Density Requirements (dwelling units per acre)

Right-of-Way Type	Transit Type	Geography (Distance from Station)	Urban Center DU/Acre	Urban DU/Acre	Suburban DU/Acre	Suburban Edge / Emerging Suburban Edge DU/Acre
Fixed or Dedicated Transitway	Light Rail Transit, Commuter Rail, or Dedicated BRT	half-mile radius	50	25	20	15
Highway Transitway (MnPass / HOV)	Highway BRT	half-mile radius	25	12	10	8
Shared Rights-of-Way	Arterial BRT	quarter-mile radius	15	15	15	15
	Local Bus Routes on High Frequency Network	quarter-mile along route	10	10	10	10

Target Residential Densities (dwelling units per acre)

Right-of-Way Type	Transit Type	Geography (Distance from Station)	Urban Center DU/Acre	Urban DU/Acre	Suburban DU/Acre	Suburban Edge / Emerging Suburban Edge DU/Acre
Fixed or Dedicated Transitway	Light Rail Transit Commuter Rail Dedicated BRT	half-mile radius	75-150+	50-100+	40-75+	40-75+
Highway Transitway (MnPass / HOV)	Highway BRT	half-mile radius	40-75+	25-50+	20-40+	20-40+
Shared Rights-of-Way	Arterial BRT	quarter-mile radius	20-60+	20-60+	20-60+	20-60+
	Local Bus Routes on High Frequency Networks	quarter-mile along route	15-50+	15-60+	15-60+	15-60+

The target density should be higher in order to achieve the desirable average minimum throughout the entire corridor, as shown in the second table on the previous page. However, this chart only addresses the target density for residential use, and as noted earlier, it is also important to consider target activity unit density, for all types of land uses in the corridor.

The Metropolitan Council study goes on to indicate a guideline for land use planning in proximity to highway BRT: each half-mile station area should be planned to achieve a minimum of 7,000 residents, jobs, and/or students within the half-mile distance from the station. So for the 502.4 acre half-mile area surrounding a station, this would equate to a minimum average density of approx. 14 activity units per acre. The study by the Metropolitan Council also points out that the guideline of 7,000 does not apply to arterial BRT or local bus routes that may be part of the high frequency network.

By Mandi Roberts, AICP, PLA
Vice President and Principal, Otak, Inc.
August 26, 2019

References

Density & Activity Near Transit, Local Planning Handbook, Metropolitan Council, Saint Paul, MN, January 2018

Planning for Transit-Supportive Development: A Practitioner's Guide, Section 5: Local Planning and Transit Supportive Development, FTA Report No. 0057, Federal Transit Administration, Dr. Colette Santasieri, Director Strategic Initiatives, New Jersey Institute of Technology, June 2014

Transit-Supportive Densities and Land Uses, *A PSRC Guidance Paper*, Michael Hubner, Principal Planner, February 2015