287 Bus Rapid Transit Feasibility Study

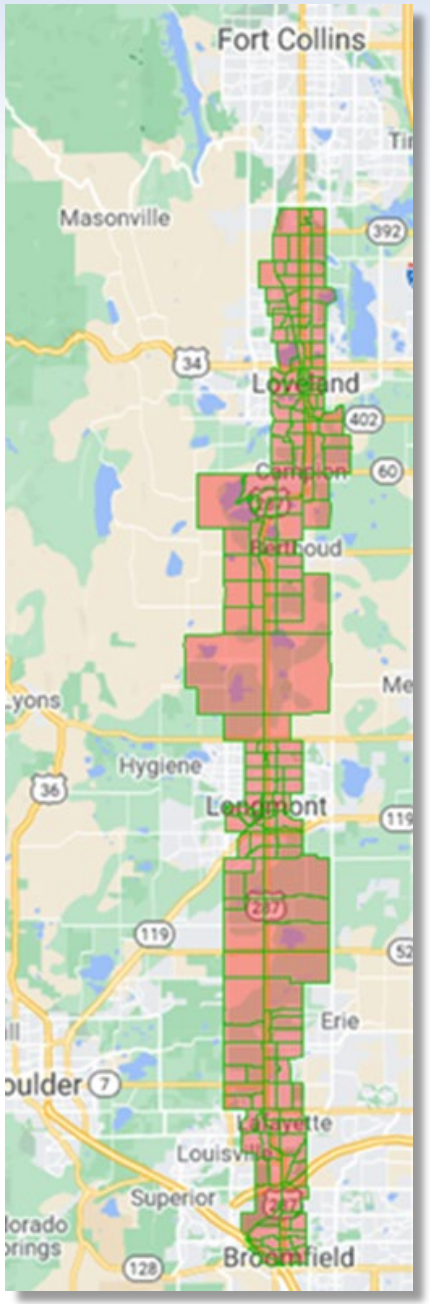
Boulder County Website | Summer & Fall 2022

Boulder County · Longmont · Lafayette · Broomfield · RTD · Fort Collins · Commuting Solutions · Federal Transit Administration · Colorado Department of Transportation

GUIDED BY PARTNERS

- Funded by Boulder County and City – County of Broomfield

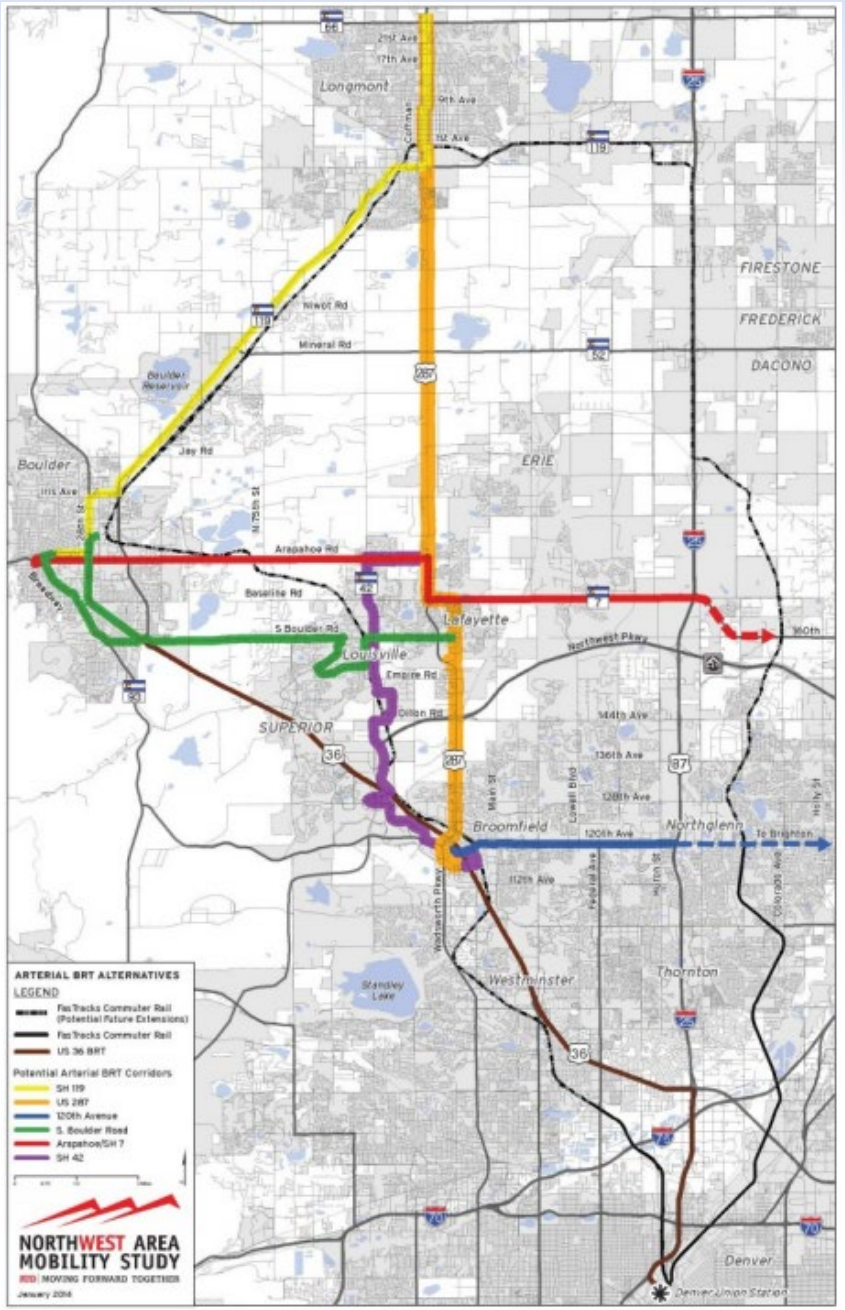
WHY US-287 BRT FEASIBILITY STUDY?



NORTHWEST AREA MOBILITY STUDY (NAMS)

US 287 BRT Feasibility

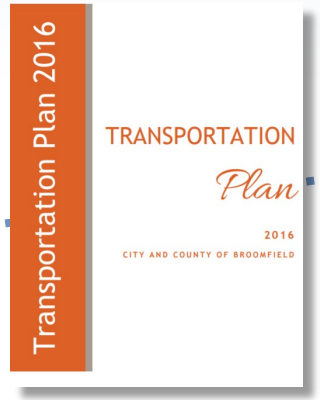
- **Network** of Mobility
- **Complimentary** Routes and Modes
- Everywhere-to-everywhere



TRANSPORTATION SYSTEMS PLANNING

August 2014

February 2014

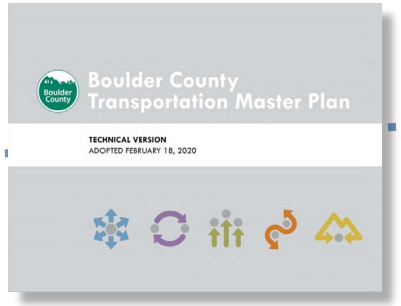


July 2016

April 2017

October 2019

October 2019

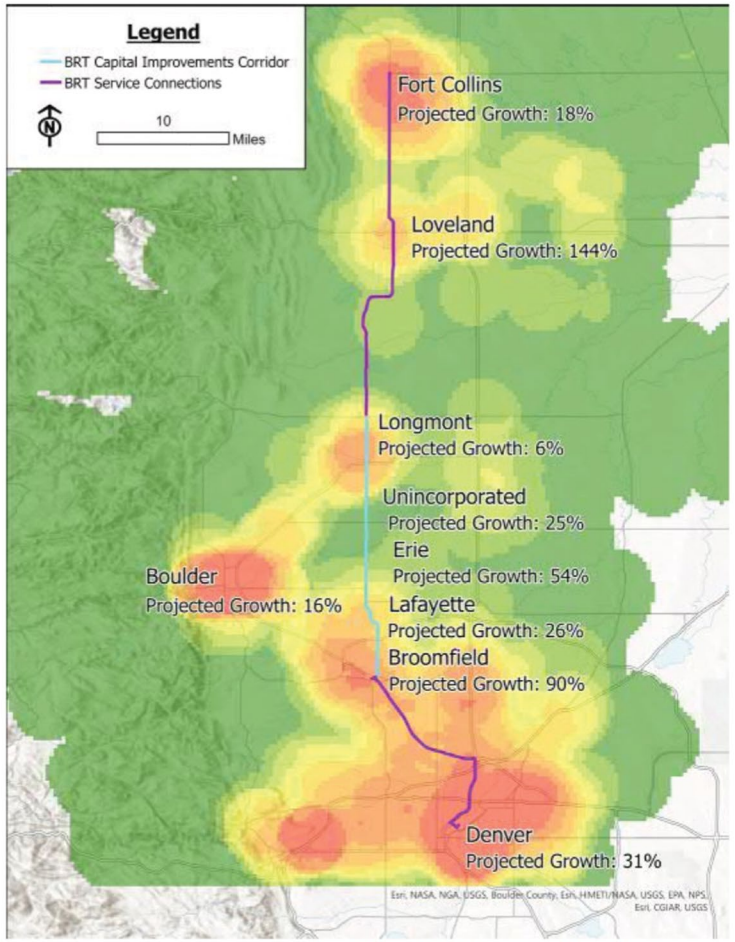


February 2020

September 2022

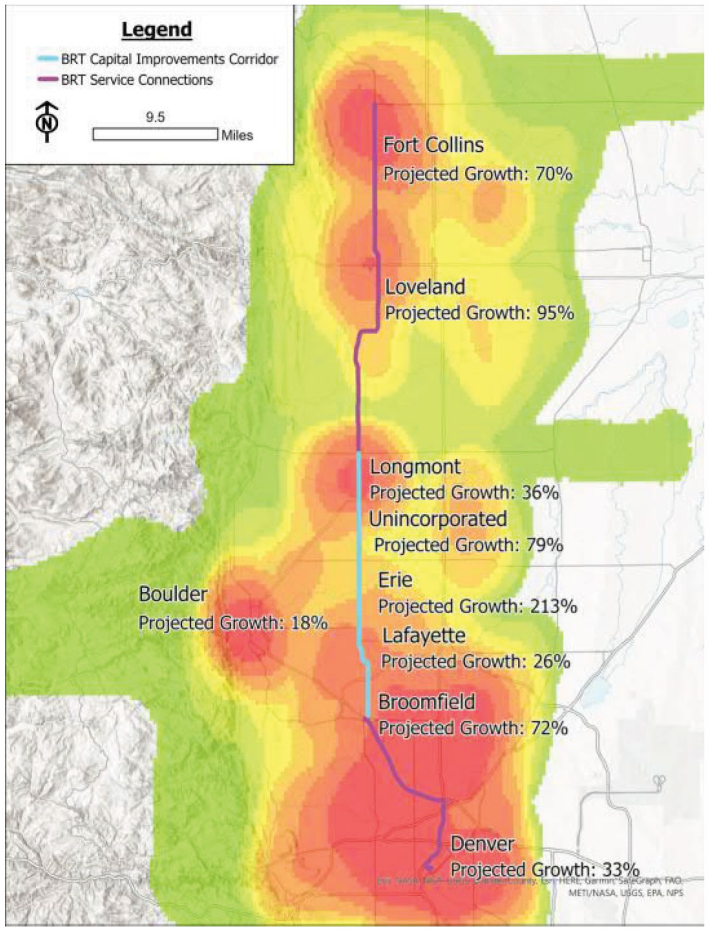
WHY REGIONAL BUS RAPID TRANSIT ON US-287?

Figure 23: Concentrations of Jobs within Region



Projected growth rates are based on the 2015 and 2045 Statewide Model Traffic Analysis Zone land use data

Figure 14: Regional Population Density



Projected growth rates are based on the 2015 and 2045 Statewide Model Traffic Analysis Zone land use data

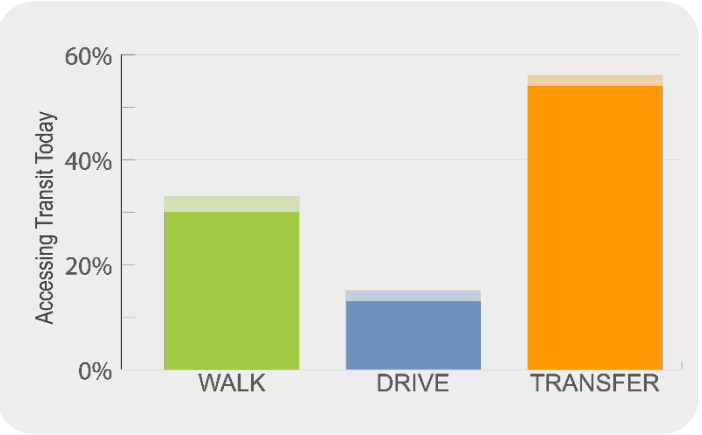
Quick Facts about Population within the Study Area

147,897
people in study area
(Longmont to Broomfield)

59,399
households in study area
(Longmont to Broomfield)

Projected regional growth:
47%

Projected study area growth:
75%



PHASE I:

BRT FEASIBILITY

287 Bus Rapid Transit Feasibility Study

Boulder County | Longmont | Lafayette | Broomfield | RTD | Fort Collins | Commuting Solutions | Federal Transit Administration | Colorado Department of Transportation

OBJECTIVES

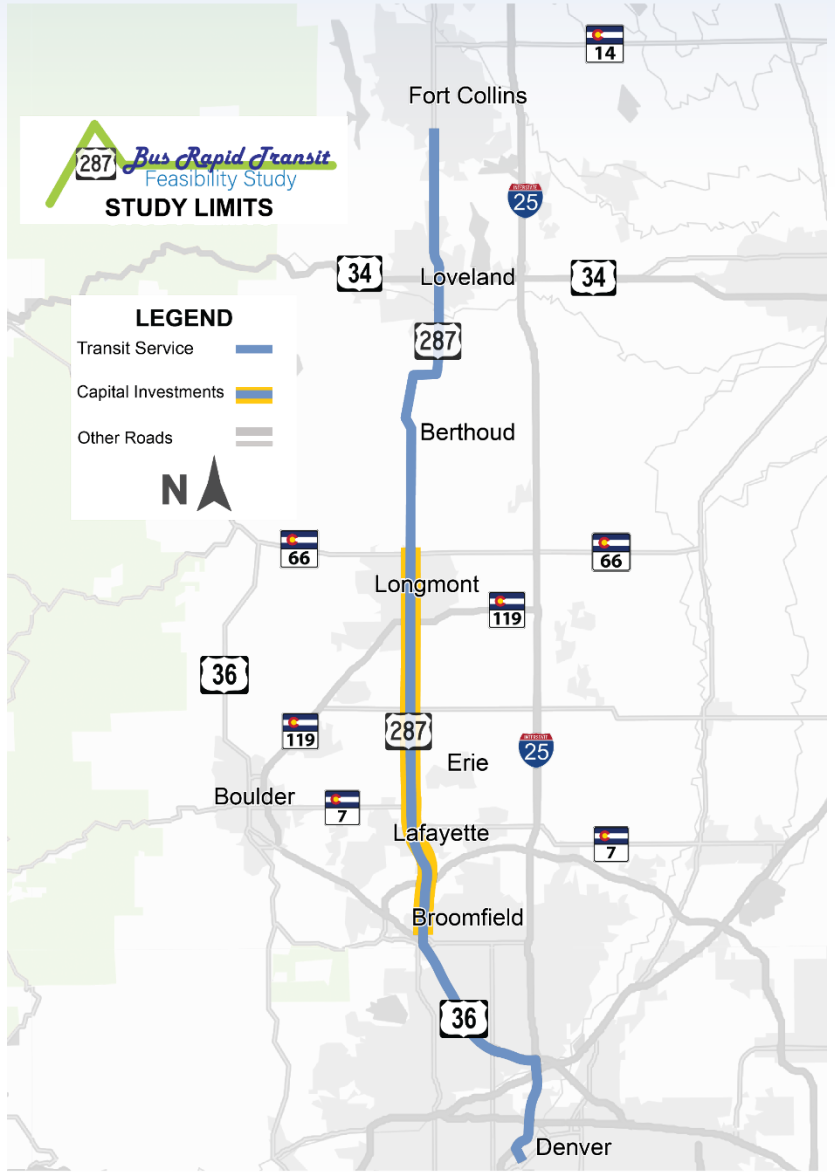
- Understand North-South Mobility Needs
- Recommend Transit Services
- Recommend Capital Investments

Capital Investments:

- ✓ Longmont
- ✓ Erie
- ✓ Lafayette
- ✓ Broomfield
- ✓ Boulder County

One Seat Ride:

- ✓ Fort Collins
- ✓ Denver Union Station

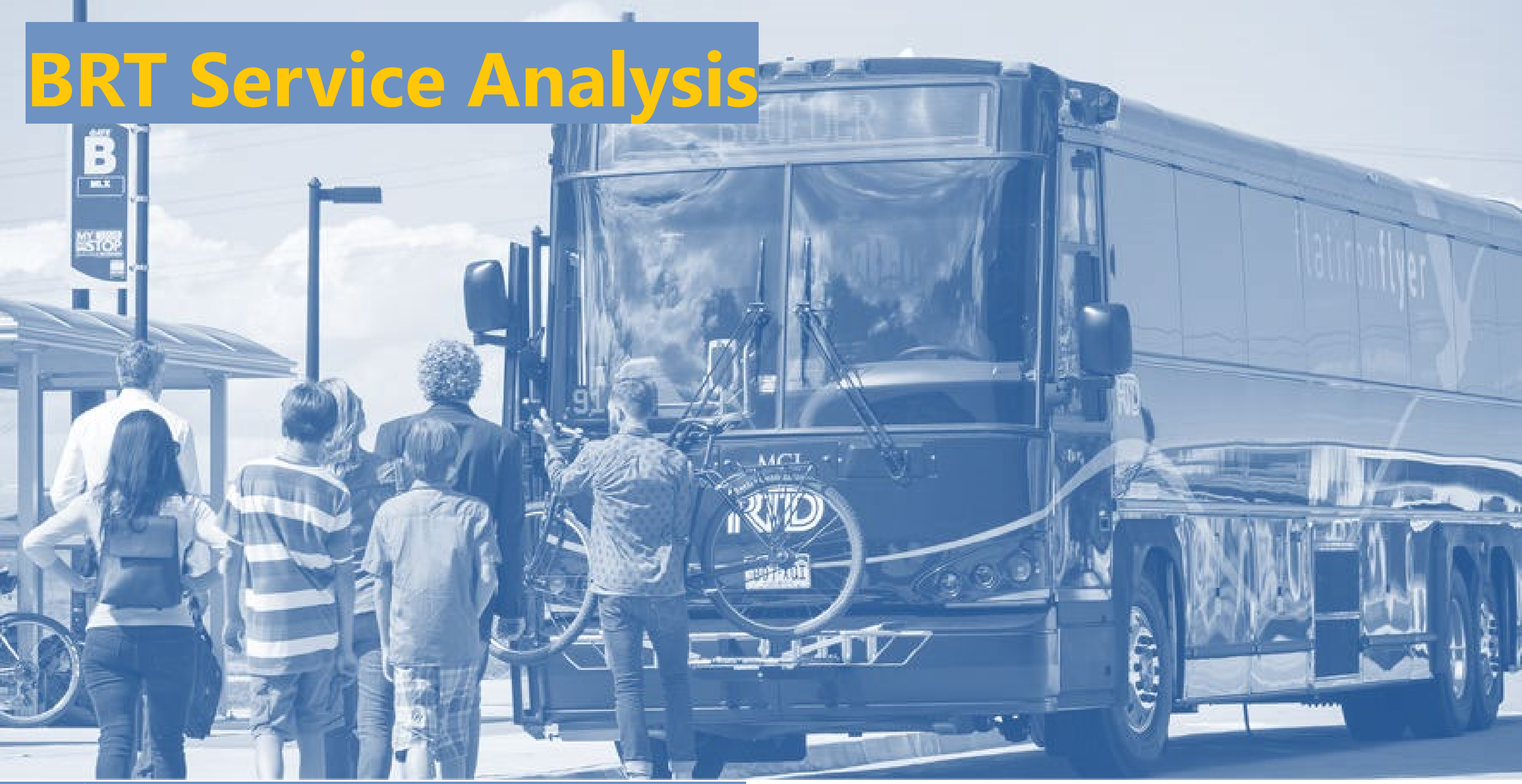


MULTIPLE PERSPECTIVES

- Public Input
  - Bilingual Zoom Webinars
  - Community Conversations
- Technical Staff
  - Stakeholder Working Group
  - Individual Conversations
- Elected Officials
  - Coalition
  - Updates

COMMUNITY INPUT

BRT Service Analysis



287 Bus Rapid Transit Feasibility Study

Boulder County · Longmont · City of Lafayette · City and County of Broomfield · RTD · City of Fort Collins · Commuting Solutions · Federal Transit Administration · Colorado Department of Transportation

STATIONS AREA TOOLKIT

boco.org/287planning

TRANSIT APERTURE / TRANSIT SIGNAL PRIORITY

Application

- Useful on BRT routes that often use larger transit vehicles to increase headways and reduce costs on high-capacity routes.
- Most applicable to intersections that have significant queuing or transit route delay due to congest on.
- Corridors that have long signal cycles or long distances between signals are good candidates for these techniques.

Benefits

- Helps to reduce transit vehicle delay.

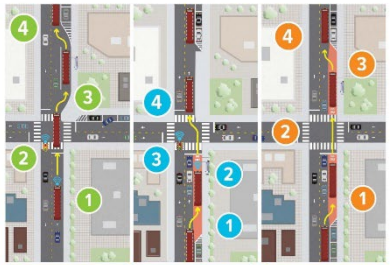
Transit Signal Priority

Transit Signal Priority (TSP) is an operational system installed at signalized roadway intersections to time local traffic signals. The purpose of a TSP system is to reduce regional bus travel times, increase schedule reliability, and reduce bus operating costs. Once

fully implemented, a "SP system can either extend signal green times by a few seconds or bring a green phase sooner every time a bus approaches an equipped intersection. Buses utilizing TSP will emit a unique frequency to intersection traffic signals, triggering a change in the signal phasing and allowing more time for the bus to pass through the intersection. TSP is typically coupled with Automatic Vehicle Location (AVL) so priority requests are only made when the bus is behind schedule. Combined with a queue jump lane, TSP and a bus only lane enable buses to by-pass waiting traffic to get out in front by getting an early green signal.

Transit Only Aperture

This treatment prohibits or redirects general traffic away from a transit route that continues through an intersection. An exclusive lane at the far side of the intersection is dedicated for transit and/or bicycle use only. Transit-only apertures reduce friction between buses and general traffic, allowing for more efficient travel through congested and/or strategically located intersections.



Transit Signal Priority	Queue Jump	Bypass Lane
1. Bus approaches intersection and communicates with upcoming signal. 2. Green light extends, bus proceeds through intersection. 3. Signal resumes normal timing once bus clears intersection. Bus dwells at station. 4. Bus merges back into travel lane when appropriate.	1. Bus enters queue jump lane. 2. Bus dwells in right turn lane at station. 3. Bus communicates with priority signal. A few seconds before green bus travels through intersection ahead of vehicles alleviating the right turn lane. 4. Bus merges back into travel lane.	1. Bus enters bypass lane (shared right turn lane). 2. Bus travels through intersection. 3. Bus dwells safely at station. 4. Bus merges back into travel lane.

BIKE PARKING

Supplying bike parking at transit stations can expand transit sheds and increase multi-modal access by providing a safe and convenient location to store bikes. This can increase transit ridership by providing an alternative from driving for people to utilize transit, who do not live within walking distance. The Association of Pedestrian & Bicycle Professionals offers resources and guidance on how to provide easily used and secure bicycle parking.

Key Features

- Bike parking type at stations can vary significantly and can offer bike storage that caters to the needs of different riders. For example, stations can offer short-term parking like "inverted U" bicycle racks, or bike-n-ride shelters, which offer more secure, longer-term bike storage.

Application

- Short term parking should be located near the station or use being served.
- If space allows, long-term bicycle parking can offer enhanced security and protection from weather.
- Ensure a clear zone is reserved around bicycle parking so as not to impede transit vehicles or pedestrian circulation.
- Bicycle parking should be located in well-lit and highly visible locations.
- The Boulder County Multimodal Transportation Standards document offers specific guidance on the placement and type of bicycle racks. Other local standards and requirements about bicycle facility placement should be taken into consideration.

Benefits

- Improves multi-modal connectivity at stations.
- Offers convenient, secure bicycle storage to encourage bicycling and bridge first and last mile gaps.

STATIONS & STOPS

ROUTE / SYSTEM MAPS

Route and system maps should be located prominently at stations and be convenient to locate and view.

Providing route information that is clear, understandable, and accurate makes it easier for passengers to understand their travel options. Signage for Route and System Maps should be:

- Easy to read and understand.
- Provide useful information.
- Be reasonable to maintain.
- Be unique to the corridor, but also integrated with other existing and future BRT corridors in the region.

$ $ $ $

WAYFINDING / SIGNAGE

Wayfinding assists in helping patrons locate bus stops as well as other nearby destinations or transit connection locations.

Signage that communicates valuable information can enhance the transit stop as a gateway to its surrounding neighborhood or destinations.

Station ID, or a unique stop number clearly identified on stop signage helps for orientation, integration with mobile apps, and security at stations.

Consistent appearance of route signage and information makes it easier to find bus stops, especially where stops for opposing travel directions are not located immediately nearby each other. Stop identification signage with route information also helps integrate with mobile apps and finding real-time transit information.

$ $ $ $

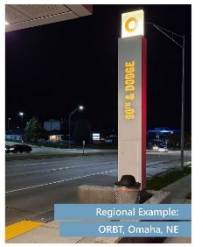
BRANDING

Consistent branding helps with forging a strong identity and reinforces transit rider confidence in navigating transit systems.

Branding features encompasses design strategies such as consistent use of color, materials, logo placement, appearance of maps at stations, unique street clocks, distinctive shelter design, amongst many other possible branding distinctions. Branding should be consistent and predictable. Regional or transit agency brand should be consistent, but some distinctions to highlight different services can be emphasized at transit stops if desired.

CLOCKS

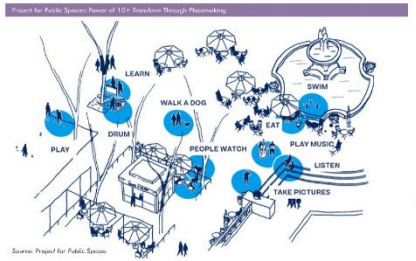
Providing clocks at stations can be useful for patrons without cell phones to know when the next bus will arrive. Clock placement and design can also serve as another station branding element.



$ $ $ $

$ $ $ $ - $ $ $ $

PLACEMAKING



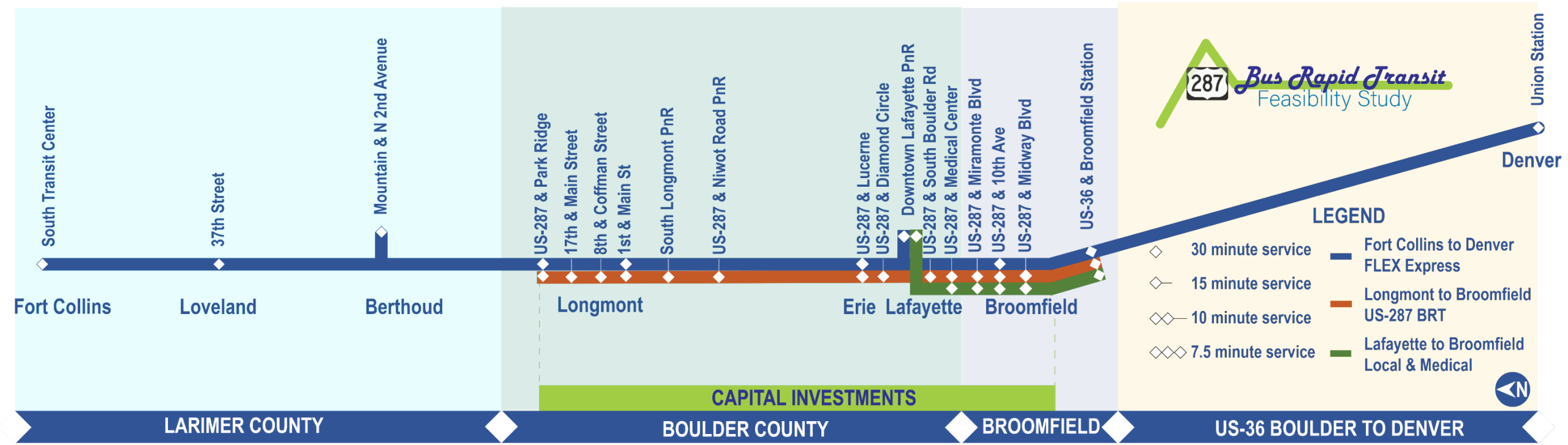
The Power of 10+ is a concept which posits that places thrive when people have multiple reasons to be there (10+). Some of these reasons may include food, music, places to play, places to sit, culture/history, etc. The tool offers a framework for how to engage residents and other stakeholders to create destinations.

The Power of 10+ concept may be used within Boulder County to make BRT stations and the spaces around them lively, active community spaces which serve as more than just transit stops. This concept is to create 10 different things for people to do, as a reward for being at the station and to provide a place where people waiting for the bus can enjoy. Larger stations should strive to have 10 or more things to do, medium stations may have 4 to 6, and smaller stations may have 2 to 3 elements.

The following are ways to develop mixed-use hubs surrounding the BRT stations:

- Create active public spaces—plazas should be designed to incorporate elements like public art, unique paving treatments, decorative landscaping, amongst other design techniques to enliven the public space.
- Extend pedestrian-centric streetscape such as wide sidewalks with tree grates. Trees offer shade and help reduce traffic noise.
- Ensure that land uses surrounding stations are connected to station areas and vice-versa. Safe, welcoming, and facilitated connections help integrate stations into the surrounding context.
- Provide shared parking options, like share, and other micro-mobility options to provide first and last mile connections.
- Utilize consistent landscaping, materials, colors, streetscaping, signage, and other elements surrounding BRT stations to establish continuity and provide patrons and pedestrians with visual cues that they are near a station.
- Where applicable, consider incorporating educational or historic signage that can inform patrons waiting for the bus about the surrounding area.
- When feasible, plan proactively so that stations have the physical infrastructure in place to be able to accommodate future opportunities. For example, the appropriate electrical connection could allow a coffee vending cart to locate near a station.

SERVICE PATTERNS, STATIONS AND CAPITAL INVESTMENT



CAPITAL INVESTMENT SCENARIOS

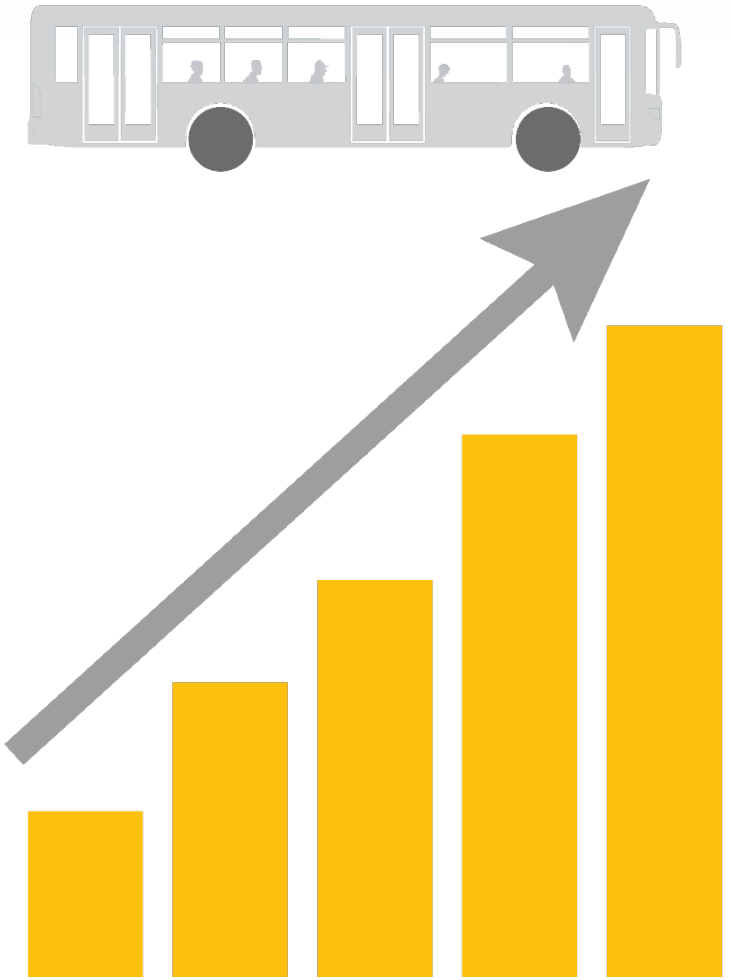
Baseline:

No change to physical or service elements.

CAPITAL INVESTMENT SCENARIOS

Baseline:

No change to physical or service elements.



1. **Operational Improvements Only:**
   No capital investments. Station optimization and additional service

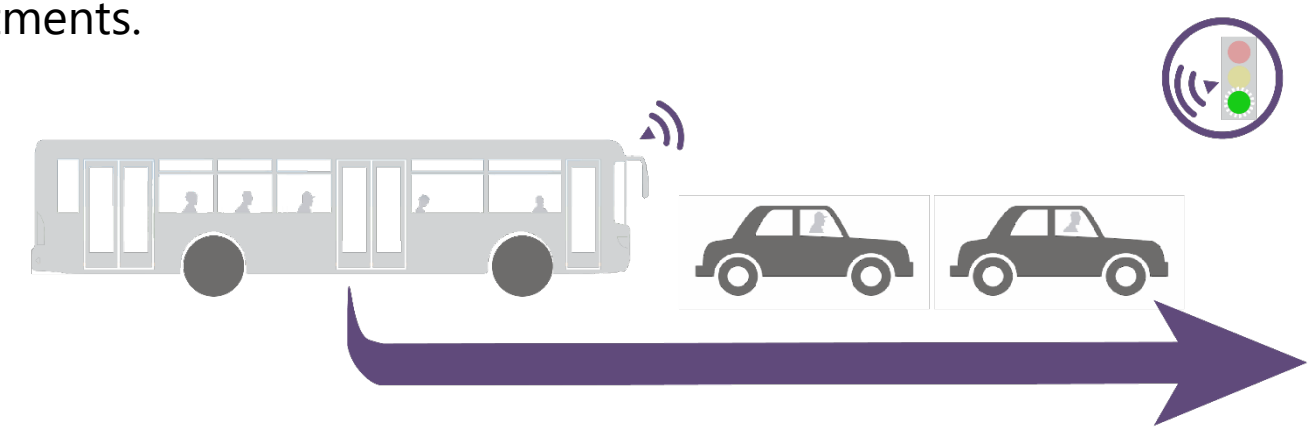
CAPITAL INVESTMENT SCENARIOS

Baseline:

No change to physical or service elements.

1. **Operational Improvements Only:**
   No capital investments. Station optimization and additional service

2. **Mixed Flow BRT + Intersection Improvements:**
   Substantial changes to stations and intersection treatments.



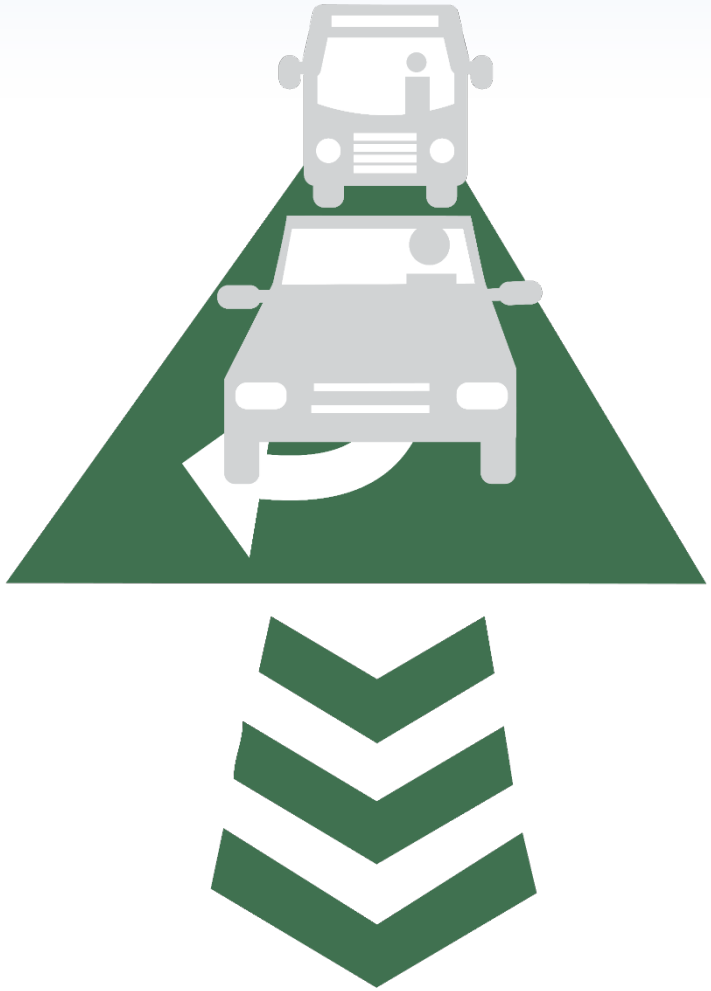
CAPITAL INVESTMENT SCENARIOS*

Baseline:
No change to physical or service elements.

1. **Operational Improvements Only:**
   No capital investments. Station optimization and additional service

2. **Mixed Flow BRT + Intersection Improvements:**
   Substantial changes to stations and intersection treatments.

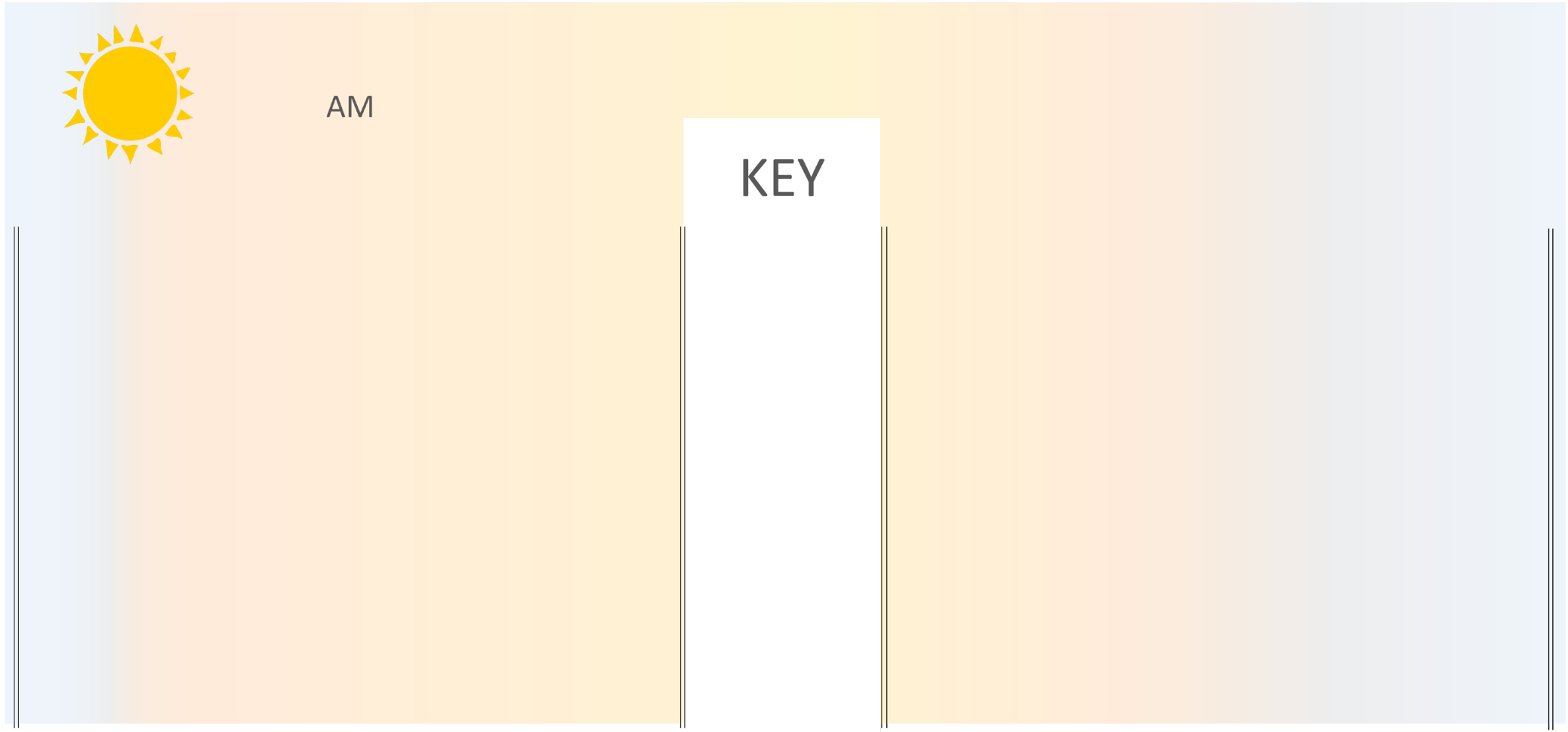
3. **Mixed Flow BRT + Intersection Improvements + BAT Lanes**:
   Scenario 2 and "Bus and Turning" lanes at targeted locations



*modeled scenarios not an implementation plan

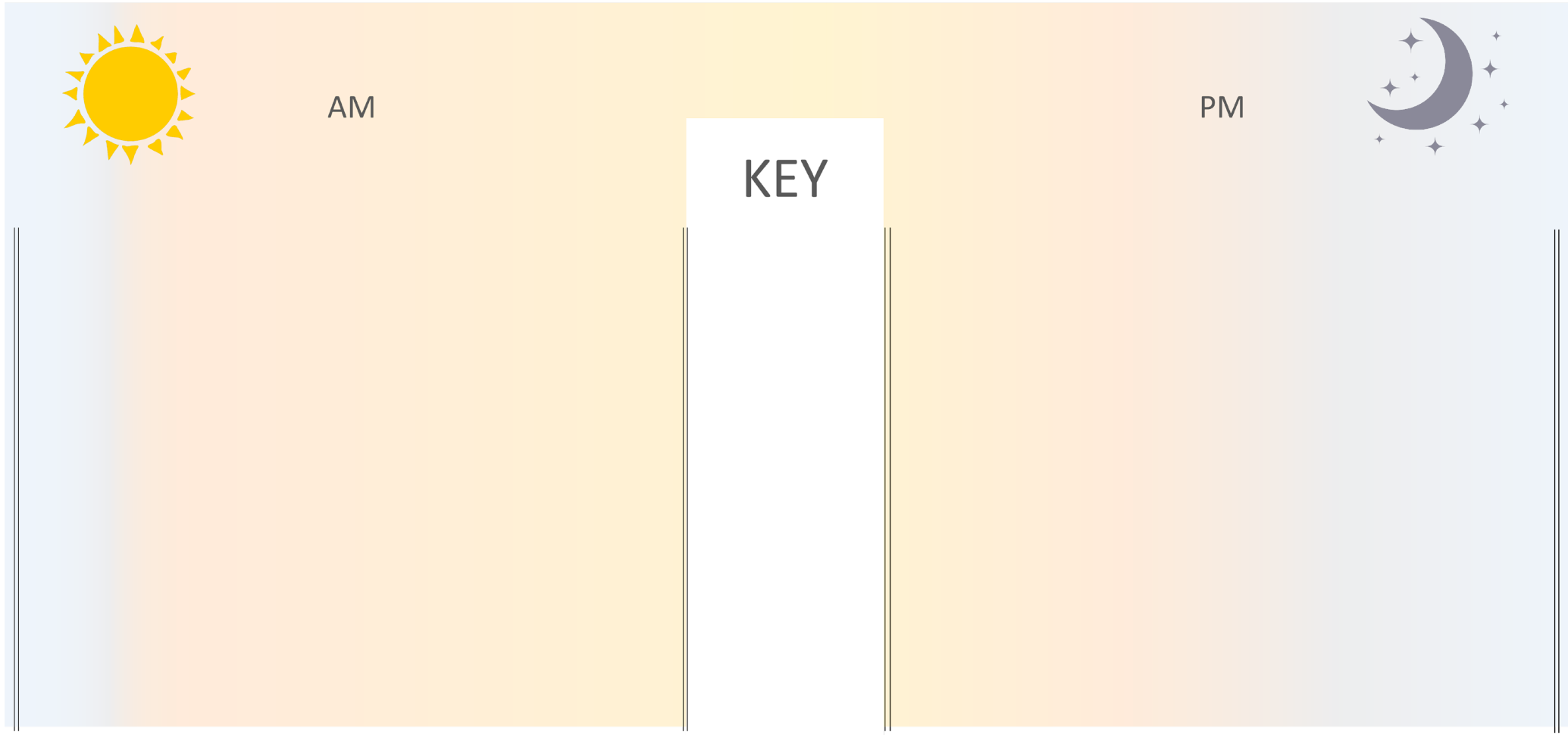
MODELED TRANSIT TRAVEL TIMES

Modeled Longmont to Broomfield Transit Travel Times



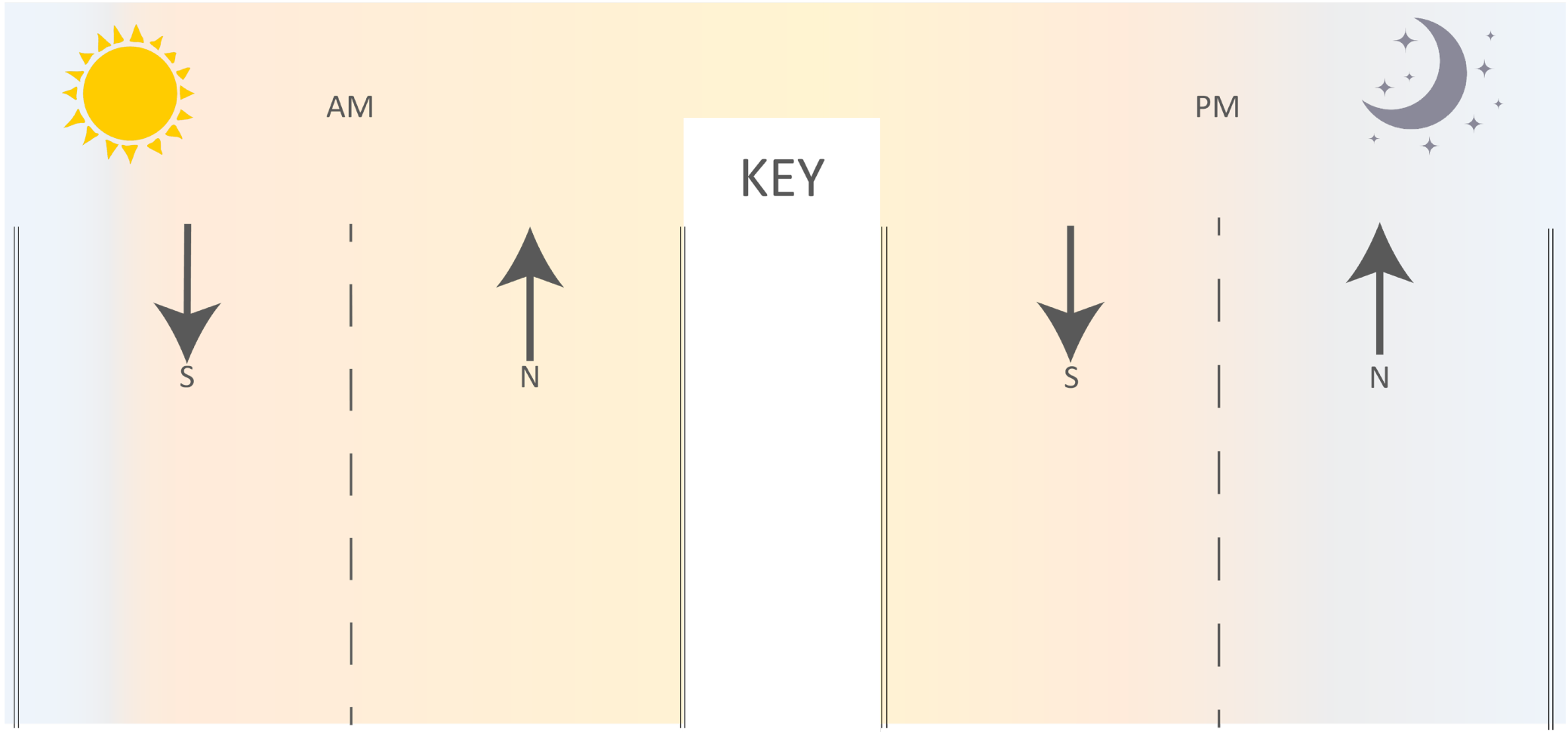
MODELED TRANSIT TRAVEL TIMES

Modeled Longmont to Broomfield Transit Travel Times



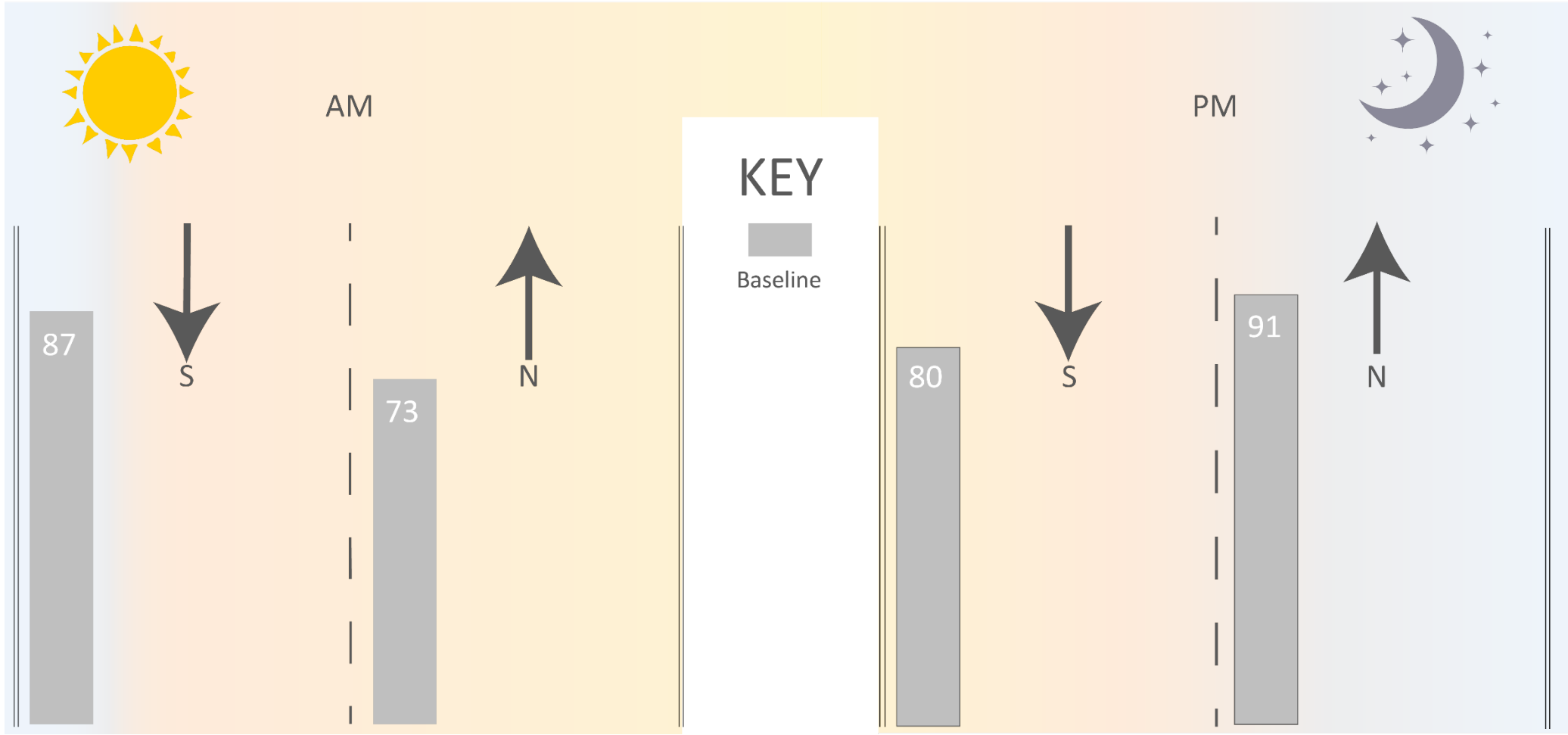
MODELED TRANSIT TRAVEL TIMES

Modeled Longmont to Broomfield Transit Travel Times



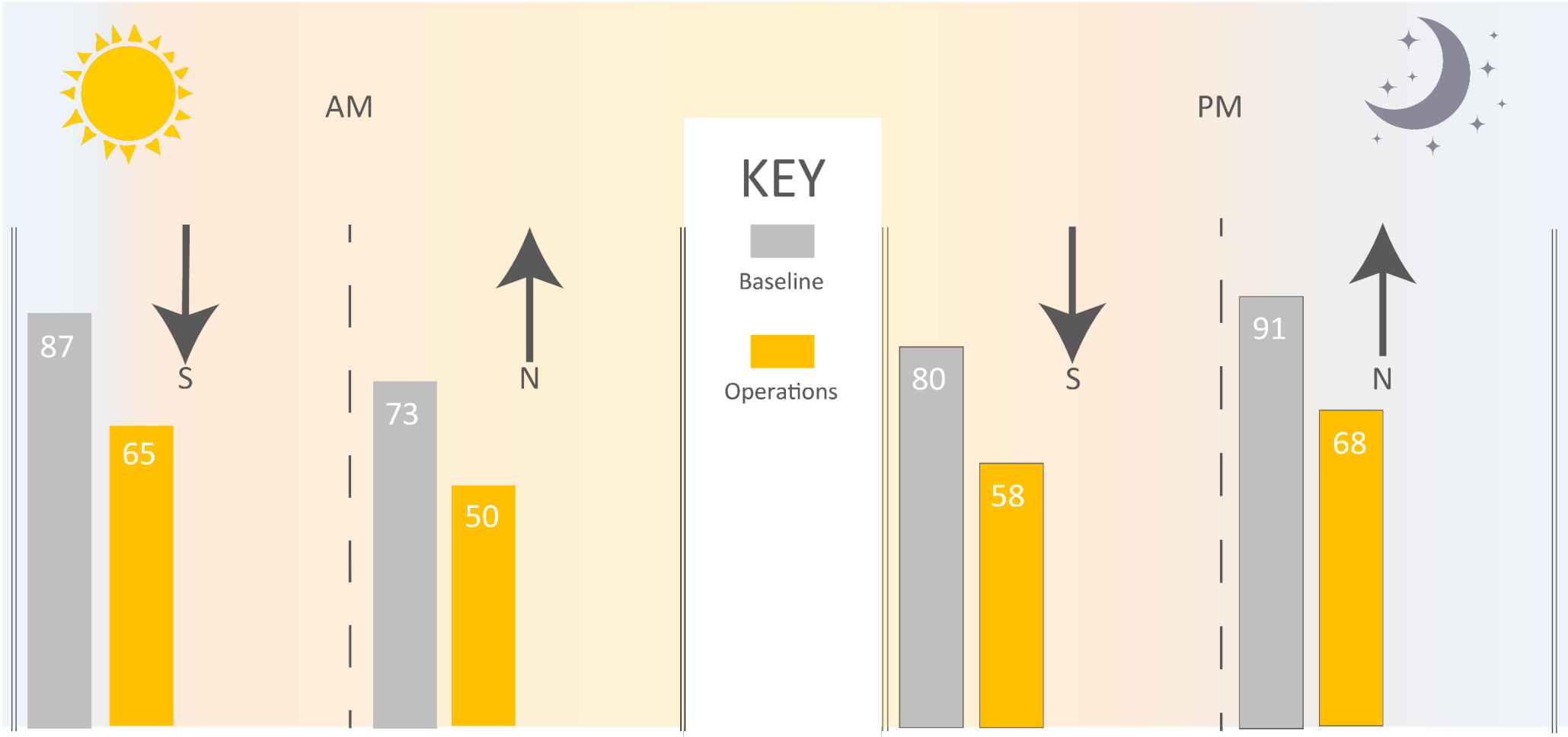
MODELED TRANSIT TRAVEL TIMES

Modeled Longmont to Broomfield Transit Travel Times



MODELED TRANSIT TRAVEL TIMES

Modeled Longmont to Broomfield Transit Travel Times



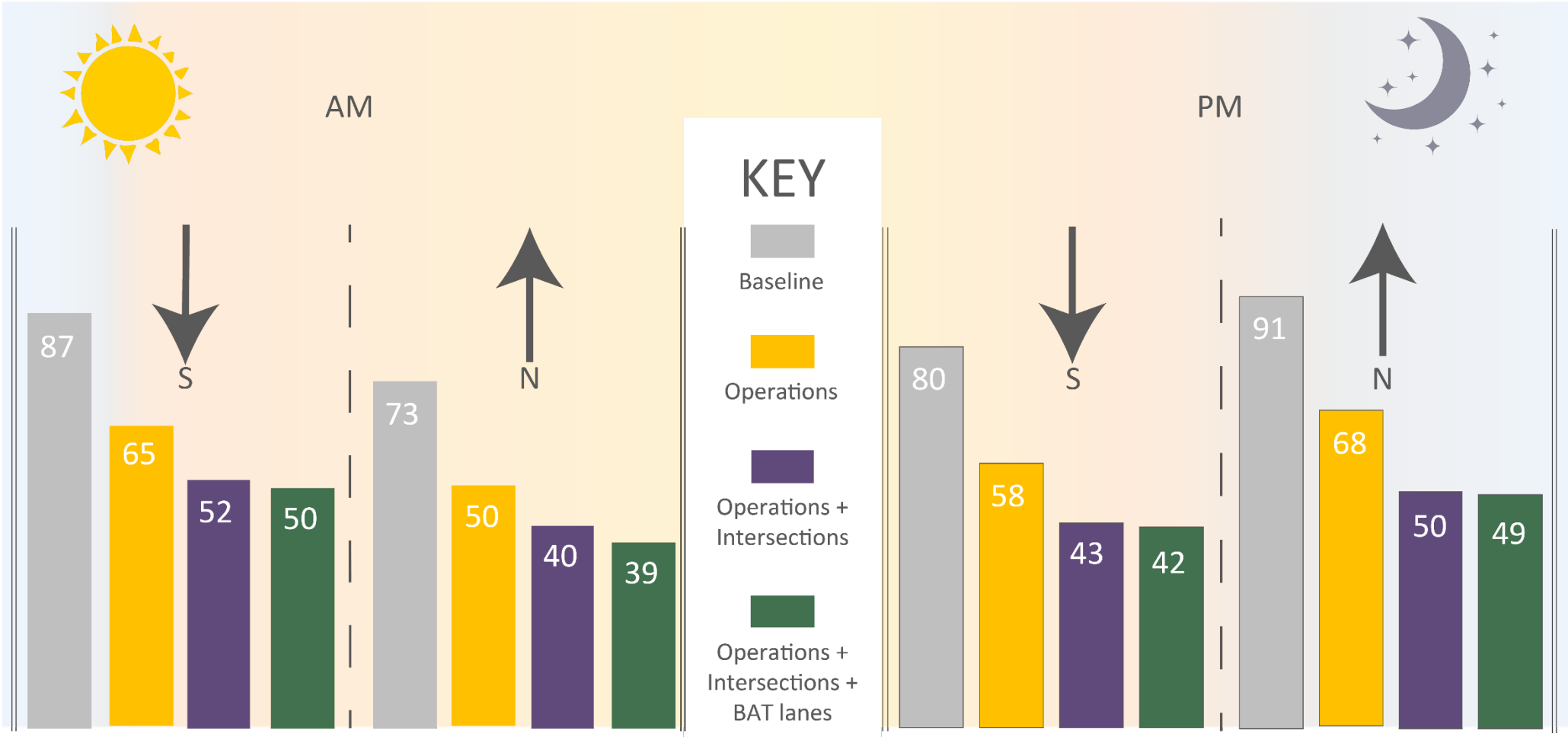
MODELED TRANSIT TRAVEL TIMES

Modeled Longmont to Broomfield Transit Travel Times

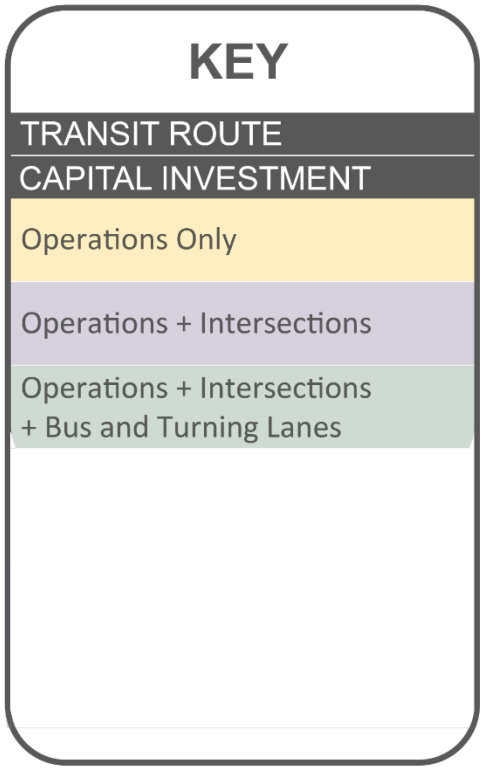
MODELED TRANSIT TRAVEL TIMES

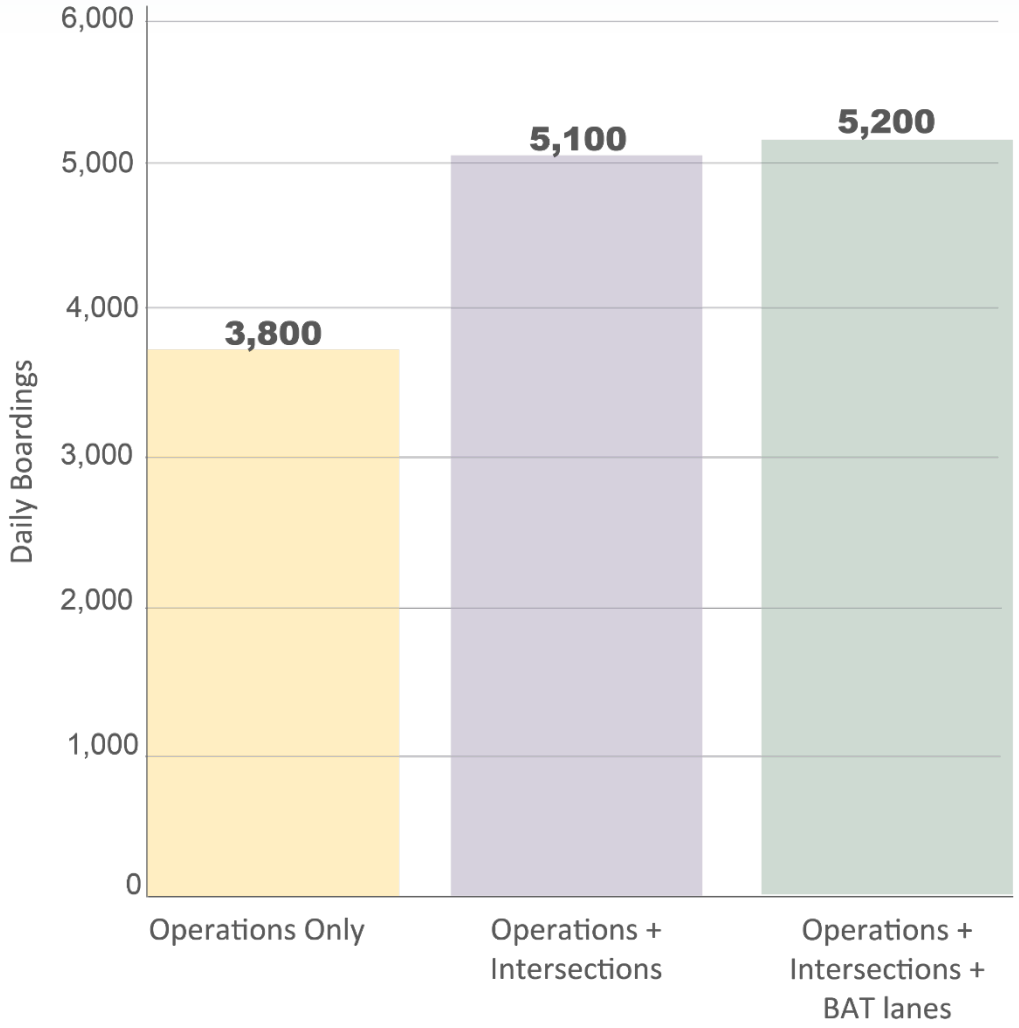
Peak **drive times:**
30 – 70 minutes

Modeled Longmont to Broomfield Transit Travel Times



PROJECTED US 287 BRT DAILY RIDERSHIP (2045)





*transit trips with origin or destination in Boulder County

PROJECTED US 287 BRT DAILY RIDERSHIP (2045)

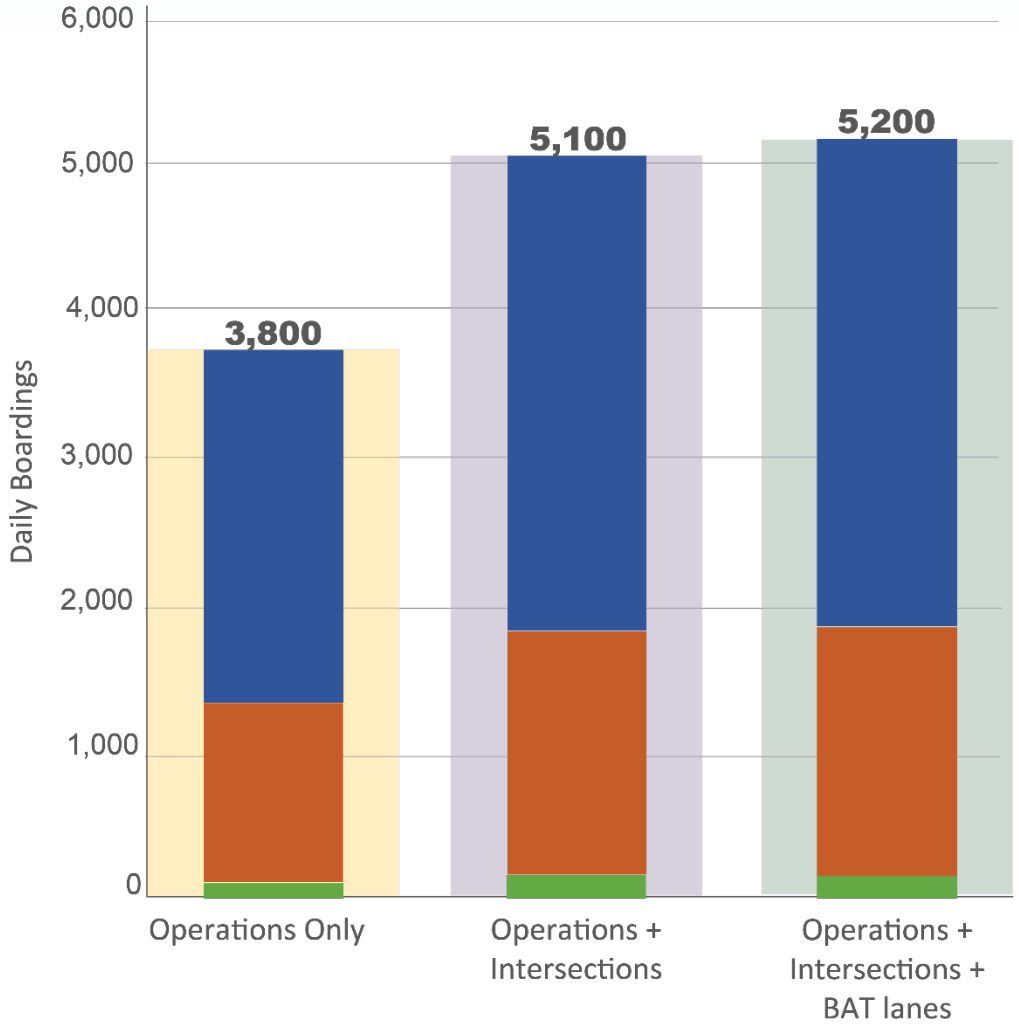
KEY

TRANSIT ROUTE

- Fort Collins to Denver
- Longmont to Broomfield
- Lafayette to Broomfield

CAPITAL INVESTMENT

- Operations Only
- Operations + Intersections
- Operations + Intersections + Bus and Turning Lanes



CAPITAL INVESTMENTS SCENARIOS

Scenario 1
Operational Improvements

- Increase Service
- Optimize Stops

Scenario 2
+ Stations & Intersections

- **$184M to $199M** (2021$)
- 27 Total Intersections
  - 12 High, 6 Medium, 9 Low

Scenario 3
+ BAT Lanes

- **$214M to $233M** (2021$)
- 27 Total Intersections
  - 12 High, 6 Medium, 9 Low
- BAT Lanes in Broomfield, Lafayette, and Longmont

CAPITAL INVESTMENTS SCENARIOS

Scenario 1
Operational Improvements

- Increase Service
- Optimize Stops

Scenario 2
+ Stations & Intersections

- **$184M to $199M** (2021$)
- 27 Total Intersections
  - 12 High, 6 Medium, 9 Low

Scenario 3
+ BAT Lanes

- **$214M to $233M** (2021$)
- 27 Total Intersections
  - 12 High, 6 Medium, 9 Low
- BAT Lanes in Broomfield, Lafayette, and Longmont

$21.4 Million | $19.6 Million | $19.6 Million

NOTE: RTD currently spends $2.8 million annually on existing LD ($2.0M) and LX ($0.8M) services.

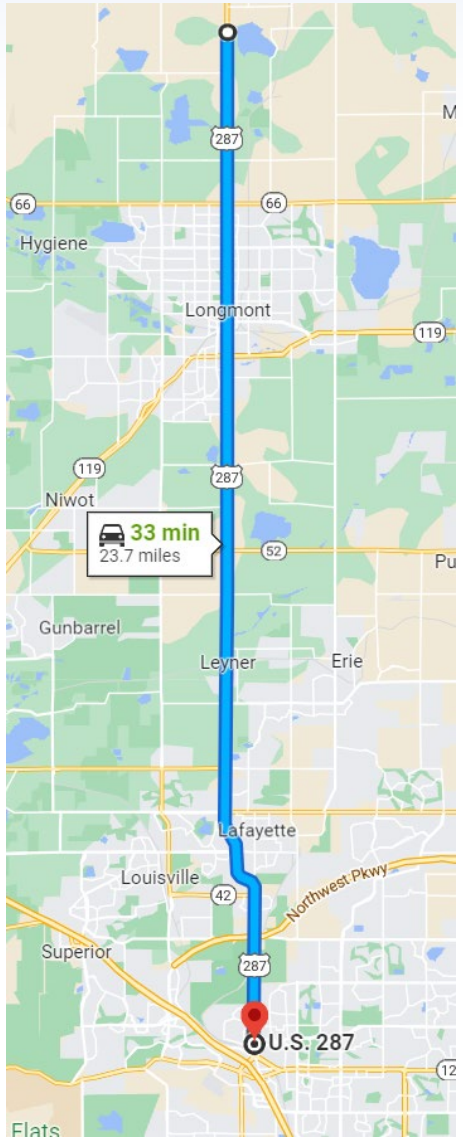
NEXT STEPS

IMPLEMENTATION

- Phased approach
- Opportunistic & concurrent projects
- Opportunities to meet multiple objectives
- Partnerships, planning & funding needed to advance corridor
- Ongoing corridor advocacy through US-287 Coalition

PHASE II – VISION ZERO SAFETY & MULTIMODAL MOBILITY

- US-287 from County Line to US-36
- Emphasis on **safety**, intersections and connections
  - **People** driving, taking-transit, bicycling, walking
  - Additional work for median design
- 287BRT (Phase I) recommendations will dovetail into Phase II
  - Win-win projects will surface
- Funding partners:
  - DRCOG, Longmont, Lafayette, Boulder County, Erie, Broomfield and CDOT
- Will follow federal planning processes



boco.org/287news

DISCUSSION +

QUESTIONS

Project manger: Jeff Butts, jbutts@bouldercounty.org
Project director: Kathleen Bracke, kbracke@bouldercounty.org