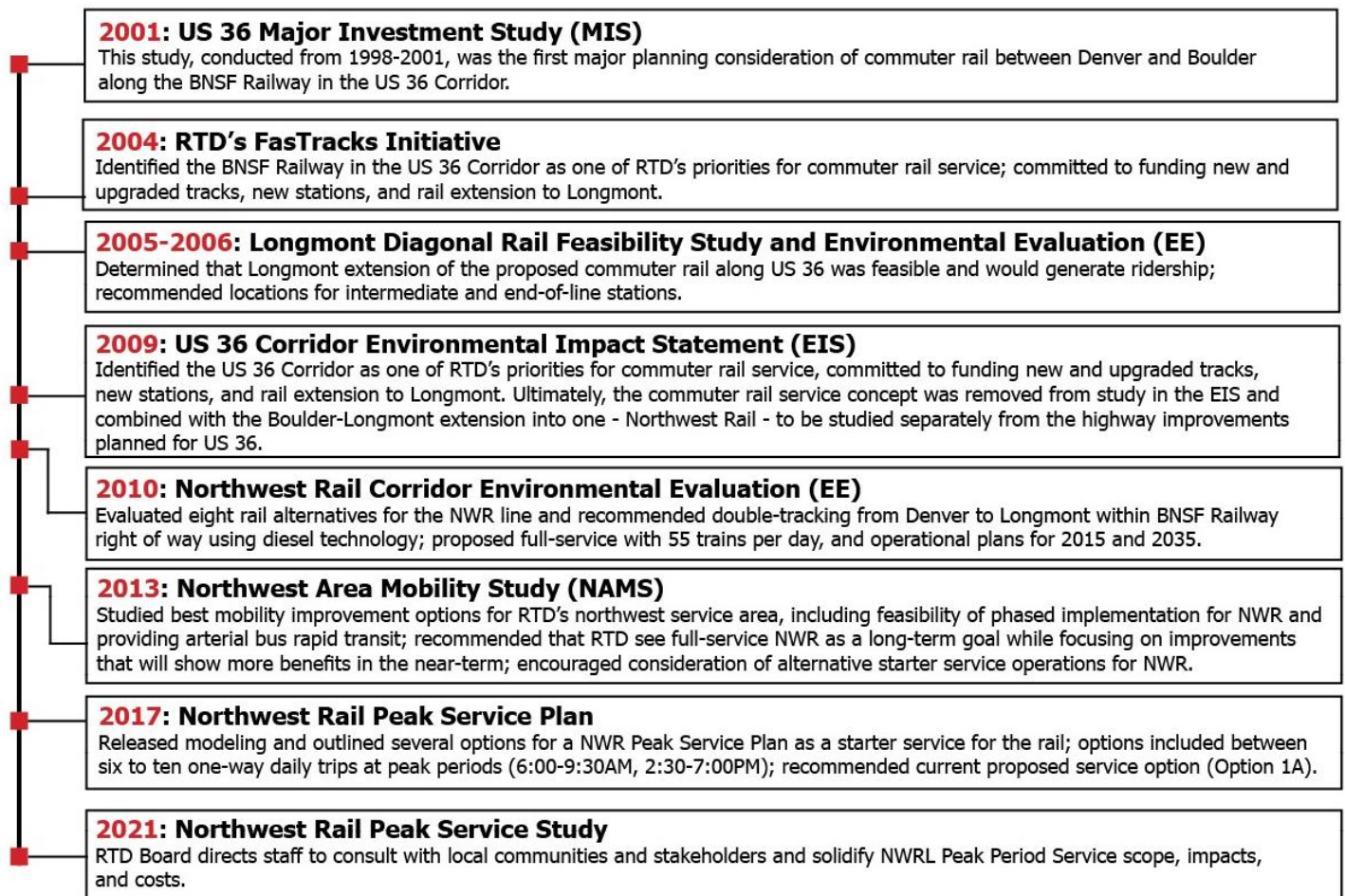


**To:** HDR and RTD  
**From:** Peak Consulting Group  
**Date:** September 19, 2022; Updated November 4, 2022  
**Re:** **Past Planning and Alternatives Methodology**

### Introduction and Purpose

The RTD Board directed staff to conduct the Northwest Rail Peak Service Study (Study) to analyze various factors for implementing Northwest Rail. As summarized in Figure 1, planning studies for the Northwest Rail Corridor have been conducted over the past two decades, and RTD has continued efforts to enable Northwest Rail development.

**Figure 1.** Timeline of Northwest Rail Corridor Past Planning Studies



This memorandum provides background for the Study's peak service rail concept and preferred design option, including its service and operational characteristics. This memorandum details past planning studies of the FasTracks Northwest Rail Corridor that have led to the need for the current Study.

## **I. Alignment**

The Northwest Rail Corridor was originally studied in a *US 36 Major Investment Study* (MIS) (2001), which recommended a set of multimodal transportation improvements along the US 36 Corridor, including extension of lanes, implementation of Bus Rapid Transit (BRT) service with on-line stations, widened portions of US 36, a bikeway along US 36, upgrades to existing rail track, and construction of a new rail track along railroad right of way to support commuter rail. Subsequent planning by RTD and communities resulted in a recommendation to extend the commuter rail line to the City of Longmont along BNSF right of way.

In November 2004, voters in the Denver area voted to approve RTD's *FasTracks Plan* (2004) through a sales tax increase. This initiative was proposed as a twelve-year comprehensive plan to construct and operate new rail lines and improve elements of BRT, bus service, and Park-n-Rides, increasing transportation options and connectivity throughout the rapidly growing Denver metro region. In addition to these direct transportation and mobility improvements, the initiative pursued goals to provide broad-reaching benefits to economic growth and environmental quality. As proposed in 2004, FasTracks identified nine conceptual corridors including 119 miles of rail and 18 miles of BRT construction. One such corridor was the US 36 Corridor, now known as the Northwest Rail Corridor.

The FasTracks initiative committed to fund the recommendations from the US 36 MIS, including upgrades to existing tracks, construction of a new adjacent track for commuter rail to Boulder, extension of the commuter rail line to Longmont in a single-track configuration, and the addition of seven new rail stations.

The feasibility of extending the rail alignment beyond the Denver-Boulder US 36 Corridor was evaluated in two studies, the *Longmont Diagonal Rail Feasibility Study* (2005), and the *Longmont Diagonal Rail Final Environmental Evaluation* (2006), both of which found the proposed Longmont extension from Boulder feasible and recommended locations for an intermediate station in Gunbarrel and an end-of-line station in downtown Longmont. In 2006, RTD combined the commuter rail portions of the US 36 Corridor and the Boulder-Longmont Corridor into one – Northwest Rail – to be studied and implemented separately from the highway improvements planned for US 36.

RTD issued a *Northwest Rail Corridor Final Environmental Evaluation* (NWR EE) in 2010, which evaluated eight alternatives for the commuter rail service, including single and double track options, options within and outside of BNSF Railway right of way, and a no-action option. Extensive analysis, including examination of capital costs, ridership, travel time, environmental impacts, and public and agency support ultimately led the project team to a single preferred design option: A double-track rail from Union Station in downtown Denver to downtown Longmont on existing BNSF Railway right of way. This was found to be the most viable option for commuter rail in RTD's northwest service area, as other options had characteristics that failed to meet the project's stated purpose and needs of

providing consistent and reliable travel times or providing an affordable transit investment. Since the release of the NWR EE in 2010, the proposed alignment of the NWR line has remained consistent and supported by regional stakeholders.

In 2016, RTD completed the construction of the first segment of the NWR line and the Westminster Station at 71<sup>st</sup> Avenue as part of its FasTracks *Eagle P3* Project. This 6.2-mile segment currently operates as RTD's B Line from Union Station to Westminster Station. RTD has since added two station stops between Denver and Westminster, at Pecos Junction and 41<sup>st</sup> Avenue and Fox Street in Denver, as part of RTD's Gold Line service.

## II. Stations

Previous planning studies have considered a wide range of locations for stations to support the 41-mile NWR line. RTD's 2004 *FasTracks Plan* built off recommendations from the 2001 US 36 MIS to propose seven total stations along the corridor, including Union Station. The US 36 EIS then used modeling projections, community plans, discussions with local jurisdictions, public input, and assessment of impacts to appropriately evaluate candidate station locations and develop conceptual design plans. In the 2010 NWR EE, the preferred alternative included eleven stations between Denver and Longmont, located at:

- South Westminster - 71<sup>st</sup> Avenue
- **Westminster - 88<sup>th</sup> Avenue**
- Walnut Creek
- **Broomfield - 116<sup>th</sup> Avenue**
- Flatiron
- Downtown Louisville
- **East Boulder**
- Boulder Transit Village
- Gunbarrel
- **Twin Peaks**
- Downtown Longmont

Four of the eleven stations (indicated in bold) were identified as candidate station locations during the public and agency involvement component of the 2009 US 36 EIS prior to the decision to study BRT and commuter rail separately. These stations were not included in the FasTracks funding commitments but were included in the evaluation in case funding sources outside of FasTracks became available.

2035 station boarding projections from the EE identified Westminster/71<sup>st</sup> Avenue, Westminster/88<sup>th</sup> Avenue, Boulder Transit Village, and Downtown Longmont as the stations forecasted to generate the highest average weekday ridership activity in the Corridor. When ridership from special events was considered, the analysis suggested that the Broomfield - 116<sup>th</sup> Station had potential to generate substantial special event ridership due to its proximity to the 1st Bank Events Center (the largest event space in the Corridor). Conceptual site layouts for each of the stations carried forward were provided

in the EE document.

In 2013, RTD conducted the *Northwest Area Mobility Study* (NAMS), a collaborative effort with the Colorado Department of Transportation (CDOT), the Denver Regional Council of Governments (DRCOG), northwest area cities and counties, and the public to develop a prioritized list of mobility improvements for RTD's NWR service area. The study evaluated transit options in the northwest area, including the feasibility of extending RTD's North Metro Rail Line to Longmont, adding new and confirming existing plans for BRT lines, as well as service, operational, construction, and phasing options for a full-service NWR with nine stations along the Corridor.

Recently, RTD has recommended six stations between Westminster and Downtown Longmont to support its *Peak Service Plan* (2017). This brings the total proposed stations for the NWR Peak Service Plan to ten stations: Four stations already in service at Union Station, 41<sup>st</sup> & Fox, Pecos Junction, and Westminster; Downtown Westminster; Broomfield - 116<sup>th</sup> (partially constructed and in operation with BRT); Flatiron (partially constructed and in operation with BRT and Park-n-Ride services); Downtown Louisville; Boulder Junction at Depot Square (partially constructed and in service with local routes); and Downtown Longmont. All stations would include bus drop-off lanes, multimodal connections, and parking areas for Park-n-Rides that serve NWR, bus service, and BRT. In June 2021, RTD confirmed these station locations with local jurisdictions.

### **III. Operations**

A conceptual operating plan for the NWR service was first established in the 2010 NWR EE, which envisioned opening day service in 2015 with 30-minute peak-period service and 60-minute off-peak period service between Denver and Longmont. By 2035, the service would run in 15-minute intervals between Denver and Boulder and 30-minute intervals between Boulder and Longmont during peak morning and evening commuting periods and 30-minute intervals at most other times. The peak periods were identified as weekday mornings from 6:00 AM-9:30 AM and weekday evenings from 2:30 PM-7:00 PM.

The 2013 NAMS also assumed the rail would begin opening day service with both peak and off-peak service plans. Operational assumptions from this study were 55 one-way trips during the week at the same 30-minute peak period and 60-minute off-peak period intervals identified in the EE, and 36 one-way trips on the weekends, no more than hourly. As part of the NAMS process, BNSF provided cost estimates for this service plan, as well as a less frequent operating service that would run nine one-way trips in both the morning and afternoon peaks. The NAMS report identified several issues with the full-service operation plan, including BNSF cost estimates that were higher than anticipated by RTD, insufficient FasTrack funds, low ridership projections, BNSF's infrastructure conditions, and other challenges within the Corridor. Given the difficulties and timing of implementing full-service operations, the report recommended that RTD consider the completion of NWR as a long-term goal, while emphasizing near-term improvements, such as bus and arterial BRT expansion, with mobility benefits that would be seen sooner for northwest area stakeholders.

From 2013-2016, RTD considered options for feasibly advancing the project in the near-term by

implementing a partial level of NWR service. RTD's *Peak Service Plan*, proposed in 2017, would provide three one-way trips from Downtown Longmont to Union Station on weekday mornings, and three one-way trips from Union Station to Downtown Longmont on weekday evenings. RTD determined that it would be feasible to implement NWR Peak Service and allow for future full-service build-out of NWR, while capitalizing on the potential to align RTD strategically with the agency's stated goals to partner with other entities such as the Front Range Passenger Rail District, Amtrak, and CDOT.

### Implementation/Phasing

Since the EE, RTD explored alternative implementation strategies to phase NWR implementation and address funding constraints. The 2013 NAMS Report first considered phased implementation by constructing the rail line and stations in five distinct segments. Phase 1, from Union Station to Westminster Station, was completed in 2016 as the first section of RTD's B Line during the *Eagle P3* Project. The remaining four phases would include construction of rail segments between proposed stations as well as the stations themselves.

While segmented implementation is not being considered for peak service, the peak period rail concept would be developed to not preclude expanded service in the future as ridership and demand warrant. If higher levels of service are proposed in the future, RTD will draw on examples of rail services around the country that have shown success with phased build out approaches, such as Sound Transit's "Sounder" commuter rail between Tacoma and Seattle; the combined service of Amtrak's Pacific Surfliner, the LAMTA Metrolink, and the SANDAG Coaster commuter rail in Southern California; the regionwide Metra commuter rail system in Chicago; and Colorado's own Winter Park Express ski train. RTD also plans to monitor the progression of Colorado's Front Range Passenger Rail project, with goals to collaborate with the service as either part of base peak period or expanded service.

### Technology

The existing 6.2-mile Phase 1 segment of the NWR line is operated with electric multiple unit (EMU) technology. While the NWR EE evaluated the feasibility of electrification for the remaining phases of the NWR Line, it was found that there would be numerous issues with an extension of EMU technology, including highly increased costs and longer construction times required for implementing electric rail in BNSF's right of way. In addition, because BNSF Railway operates double-stack and possible triple-stack container trains on this line, overhead electrical lines are not permitted where the tracks would be shared. Therefore, in 2010, RTD proposed that the remaining 35.3 miles of rail operate using diesel multiple unit (DMU) technology. The potential partnership with Front Range Passenger Rail likely reinforces that DMU technology is more feasible for the longer-distance routes, especially shared freight corridor routes. While DMU remains the strong candidate, RTD will consider a range of technologies, including hydrogen and battery electric.

## Maintenance

The NWR service would require a new rail maintenance facility (RMF) for storage, service, and maintenance of the new trainsets. RTD recently constructed the FasTracks Commuter Rail Maintenance Facility near the junction of I-70 and I-25, but this facility was designed to serve EMU operating cars and would require expansion or modification to accommodate a DMU fleet. The current site is also fully built out. While the Commuter Rail Maintenance Facility could potentially provide daytime storage or maintenance, the preferred design option from the 2017 Peak Service Plan would ultimately require NWR trains to be stored overnight at a new DMU RMF, where they can be serviced and stored between evening and morning peak periods. Prior to recent service refinements, the 2013 NAMS Report recommended an RMF to be located near the Broomfield - 116<sup>th</sup> Station between US 36 and BNSF tracks on a parcel of land which the City of Westminster offered to donate to RTD for this purpose. RTD is now considering various RMF locations for maintenance and train storage in Longmont.

## Ridership and Service Options

The 2004 FasTracks Plan conducted ridership projections for the entire FasTracks system, including Northwest Rail. The 2010 NWR EE subsequently conducted ridership projections based on operational assumptions of 15-minute train intervals for the Denver to Boulder segment and 30-minute intervals for the Boulder to Longmont segment in the morning and evening peak periods and 30-minute intervals at most other times. Ridership projections under these operations estimated average weekday rail ridership of 8,400 riders per day with the FasTracks-only stations and 12,100 with all stations in the year 2035. Stakeholders requested a sensitivity analysis and revised distribution of ridership projections during the 2013 NAMS. These projections forecast between 9,300 and 10,700 trips per day in 2035.

Both the 2010 EE and 2013 NAMS noted that operations would need to be optimized to minimize operational costs and maximize ridership. Due to this goal, the studies suggested that reducing train frequencies would be the most likely operational change to be considered as the project progressed. Projections from both studies represent residents of the northwest area would utilize the NWR service, but ridership levels may not justify the high cost of a full-service build out of NWR.

RTD's most recent operations plan, the 2017 *Peak Service Plan*, considered several rail service options that would operate only during morning and evening weekday peak periods when regional commuter travel is highest. Options included one-way only trips and bi-directional trips in mornings and evenings, as well as combined and separate operations options for the Boulder-Longmont segment of the NWR Line. Option 1A, the preferred option from the plan, would provide three trips from Downtown Longmont to Union Station on weekday mornings, and three trips from Union Station to Downtown Longmont on weekday evenings. In comparison to other options considered in this exercise, this service option would have the highest ridership, with a forecasted average of 4,100 riders per weekday in 2035. Travel forecasting and station boarding projections show that the majority of commuters in the northwest area travel east into Denver in the mornings and back home to cities such as Westminster, Broomfield, Louisville, Boulder, and Longmont in the evenings. As an initial

phase, this proposed service option has the greatest opportunity to replace trips that are frequently traveled by single-occupancy vehicles, fulfilling Study goals to maximize ridership and improve mobility through the corridor.

#### **IV. Additional Considerations and Next Steps**

In June 2021, RTD confirmed the alignment and supplementary station locations of NWR with local jurisdictions. However, development near the proposed station locations, including high-density residential and commercial development, will require reconsideration of the original (2010) conceptual design plans for the six stations that are not yet built. Previous conceptual designs for station platforms, parking lots, bus lanes, and multimodal features at each of the stations will need to be re-configured in most situations to accommodate this recent development.

Other items to consider moving forward will be decisions about potential locations for a RMF in Longmont, which is necessary to serve the rail, as well as the feasibility of daytime train storage near Union Station between the service's operating hours.

In 2021, RTD signed a Memorandum of Understanding with CDOT to cooperate and coordinate on the development of Colorado's Front Range Passenger Rail Project. As that project continues to evolve, RTD will need to coordinate with the Front Range Passenger Rail District, of which RTD is a non-voting member, about cooperability between the two regional passenger rail services.

The Study will also inform the RTD Board of Directors considerations regarding the needs and roles of the NWR service as part of its regional transit system. Stakeholder engagement and consensus building are planned at each step of the Peak Service Study to ensure that RTD's vision for overall transit investment moves forward consistently with the desires and expectations of stakeholders and residents in the northwest area.

#### **V. Conclusions**

Studies and decision-making regarding Northwest Rail over the past two decades have informed RTD and led to the current Peak Service Study to add detail and assess updated operating plans, preliminary design, capital and operating costs, impact analysis, ridership forecasts, and other factors in the Study according to the service and operations of the Peak Service Plan Option 1A, as outlined above. This memorandum, summarizing relevant Project history, provides background and context for the peak service concept being carried forward in this Study, fulfilling Milestone 1 of RTD's Incremental Decision-Making Process.