

Chapter 1.0: Purpose and Need

1.1 Background

State Highway 7 (SH 7), between Cherryvale Road in the City of Boulder through the 75th Street intersection in Boulder County (approximately 2.2 miles), is a principal east-west arterial roadway serving as a commuter and intra-regional facility (see **Figure 1-1** and **Figure 1-2**). This important arterial roadway serves the communities of Lafayette, Louisville, Erie and Boulder as well as other communities to the east. Previous studies have identified congestion, safety and multi-modal deficiencies along this segment of SH 7.

The Federal Highway Administration (FHWA) and Colorado Department of Transportation (CDOT) are considering improvements to this approximate two-mile section of State Highway (SH) 7. To comply with the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) is being conducted to evaluate the reasonable alternatives that address the purpose and need for the project and assesses the impacts of implementing the preferred alternative. FHWA is the lead federal agency for the EA and CDOT is the applicant.

1.2 Study Area Description

The SH 7 EA focuses on the transportation needs along the corridor. The study area is predominantly in unincorporated Boulder County with the very west end being within the incorporated boundaries of the City of Boulder. A separate CDOT project addressing capacity and safety improvements at the SH 7 and 75th Street intersection was recently completed in 2006.

The west end of the study area is predominantly characterized by urban residential, commercial and light industrial uses. The middle segment is characterized by open space and undeveloped land. Finally, the east end is characterized by rural residential and commercial uses at the 75th Street intersection. The highway provides direct public access at intersections with Cherryvale Road, 62nd Street, 63rd Street, the Boulder Valley School Access Road, Westview Drive, Valtec Lane and 75th Street. Direct access to abutting land serving residential, commercial, industrial and public use is prevalent in the study area. In addition to SH 7, South Boulder Road, Baseline Road and Valmont Road provide east-west travel options serving the eastern communities of Boulder County and the City of Boulder.

Figure 1-1
Project Location

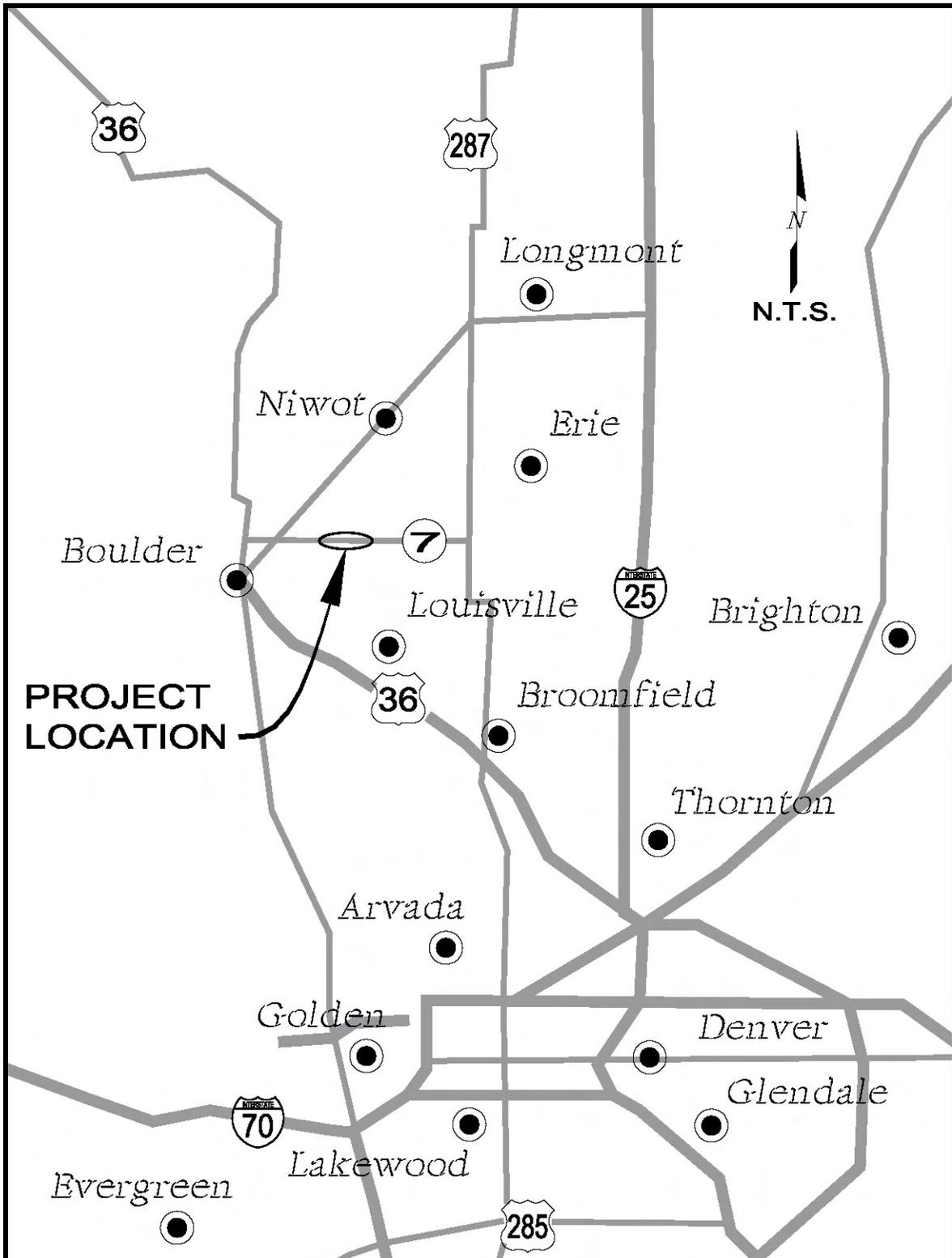
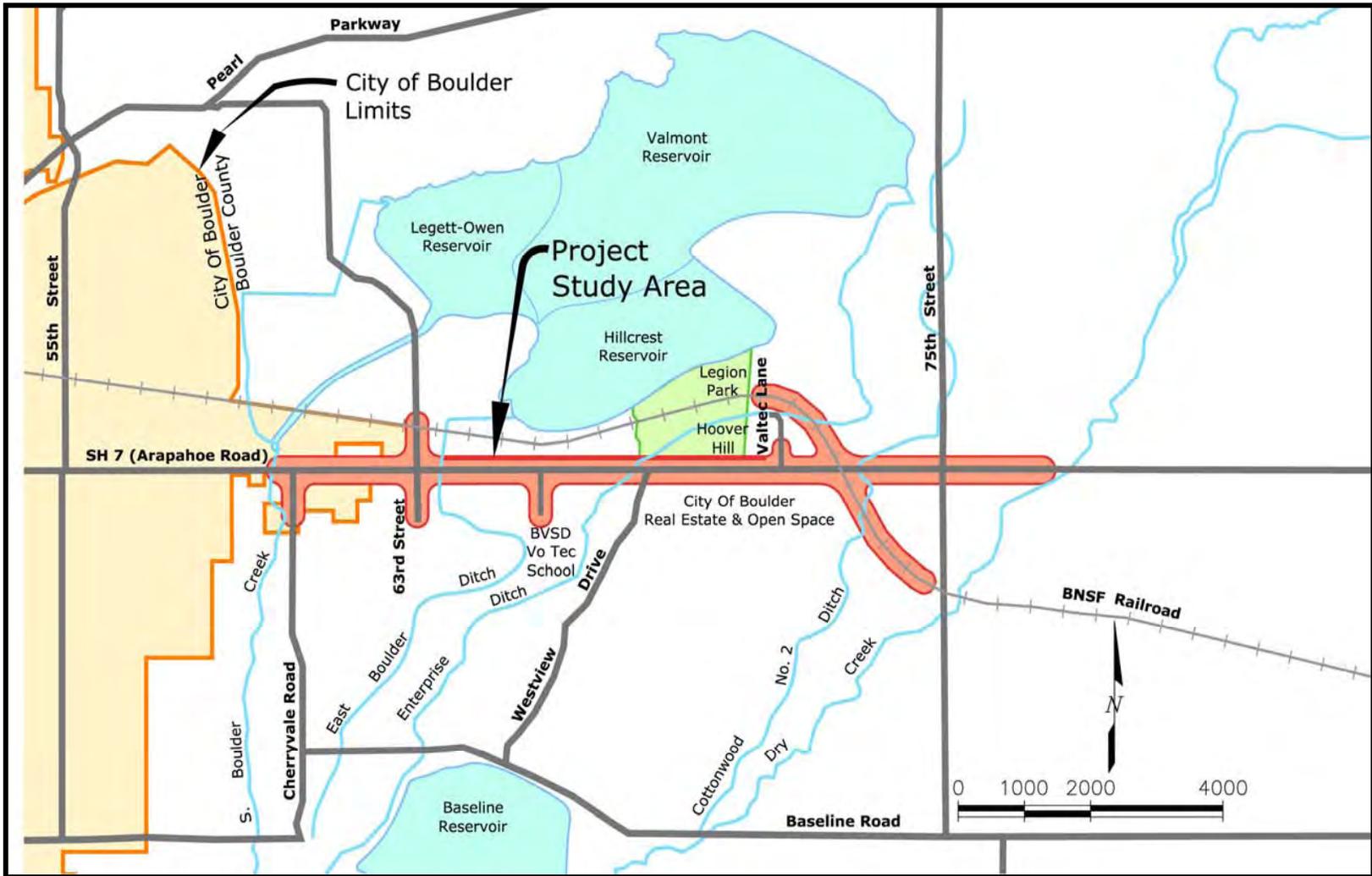


Figure 1-2
Study Area



A Burlington Northern Santa Fe (BNSF) railroad line crosses SH 7 with an overpass in the study area (see **Figure 1-2**). The existing railroad bridge structure only allows for a restricted roadway section, consisting of two travel lanes and minimal (two- to three-foot) shoulders. Modifications to the BNSF alignment are evaluated in this EA because changes to SH 7 precipitate impacts to the railroad crossing. Improvements to the safety and capacity of the BNSF railway are not included in this study.

1.3 Project History and Status

CDOT, Boulder County, the City of Boulder and other local jurisdictions have identified SH 7 as an important commuter and intra-regional arterial roadway. Population and employment growth in the City of Boulder and suburban areas east in Boulder County have brought increases in traffic along the SH 7 study corridor. The following studies and project work identify the need for improvements to the transportation system along the SH 7 study area:

- ***DRCOG 2030 Metro Vision Regional Transportation Plan*** - The DRCOG 2030 Metro Vision Regional Transportation Plan addresses the challenges and guides the development of a multimodal transportation system and is an element of the overall Metro Vision 2030 Plan. The 2030 Metro Vision Regional Transportation Plan reflects a transportation system that closely interacts with the growth, development and environmental elements of the Metro Vision Plan.

The Regional Transportation Plan includes corridor visions for clearly identified transportation corridors. SH 7, between Cherryvale Road and 75th Street is identified as a Suburban Transition Road in the Regional Transportation Plan.

The transportation vision for Suburban Transition Roads is to serve as multimodal arterials facilitating longer and medium distance regional trips. Future improvements will primarily increase mobility as well as maintain system quality and improve safety. Most of these roads are serviced by bus transit routes. Access control and property setbacks will be implemented in currently rural areas to protect against expensive right-of-way takings needed for widening in the future.

The goals and objectives for Suburban Transition Roads are:

- Increase travel reliability and improve mobility for private and commercial vehicles
- Support urban development within the Denver regions Urban Growth Boundary/ Area
- Serve the proposed Urban Centers in the corridor

- Improve management of the existing facilities and travel demand
- Provide alternative modes of transportation to travelers
- Reduce motor vehicle crash rates
- Eliminate design deficiencies
- Maintain or improve pavement to optimal conditions
- Maintain statewide transportation connections

Improvements to the SH 7 project area should be consistent with this vision statement and these goals and objectives for Suburban Transition Roads.

- **The RTTF Final Report to the Consortiums of Cities (June 1998)** - In 1996 the Boulder County Consortium of Cities created a Regional Transportation Task Force (RTTF) and began a study of major regional county transportation corridors. The RTTF studied six transportation corridors, of which SH 7, between Cherryvale Road and US 287 in Lafayette, was one. The *RTTF Final Report to the Consortiums of Cities* indicated that a consensus was reached regarding improvements to the SH 7 corridor, including additional turn lanes at major intersections; shoulder widening to improve safety, capacity and bicycle accommodations; extension of the existing four-lane sections through the 63rd Street intersection; improved bus service, with mini park-n-Rides, bus priority at signalized intersections and improved bus stops.
- **US 36 MIS (June 2001)** - The Regional Transportation District (RTD) initiated the US 36 Major Investment Study (MIS) in February 1998 to identify potential solutions to long-term transportation needs in the US 36 study corridor between Denver and Boulder. The Locally Preferred Alternative of the MIS included a new regional rail service utilizing two rail lines along the BNSF railroad alignment, which crosses the SH 7 project.
- **US 36 Corridor Draft EIS (August 2007)** - The purpose of the US 36 Corridor DEIS is to identify local and regional transportation improvements in the US 36 corridor between Denver and Boulder.
- **Northwest Rail EA (Ongoing)** - This EA includes an evaluation of passenger rail alternatives along the BNSF alignment and commuter rail park-n-Ride stations in the vicinity of the SH 7 project.
- **SH 7 - Cherryvale Road to North 75th Street Improvement Assessment Study (March 2002)** - CDOT initiated a study in April 2001 to gather data, evaluate and document needs for transportation improvements and outline improvement recommendations to address the capacity, safety and level of service concerns on

SH 7 between Cherryvale Road and 75th Street in Boulder County. The study assessed existing conditions, evaluated constraints along the corridor, identified needs and obtained public input. The study also identified and screened alternatives and presented recommended improvements for the corridor.

- **SH 7 and 75th Street Intersection Improvements (2006)** - Following the recommendations of the SH 7 – Cherryvale Road to North 75th Street Improvement Assessment Study, CDOT undertook the design of improvements to the SH 7 and 75th Street intersection. The design incorporated two travel lanes in each direction along SH 7 through the intersection, along with turn lanes on all four legs, bicycle lanes, transit queue jump lanes, improved drainage and access control, traffic signalization and lighting. These improvements to the SH 7 and 75th Street intersection are considered as completed in the evaluation of the No-Action Alternative for the EA. The intersection improvements were cleared as a Categorical Exclusion under NEPA. Construction was completed in the fall of 2006.
- **East Arapahoe Transportation Network Plan (Ongoing)** - The City of Boulder developed a network plan for Arapahoe Road (SH 7) in 2004 that defines transportation improvements for all modes of travel. The plan identifies proposed multi-use paths and sidewalks, on-street bike lanes and transit improvements for SH 7 east of Cherryvale Road.

In addition to the planning that has been completed, CDOT funding is identified for the reconstruction of SH 7 in the 2005-2010 Colorado State Transportation Improvement Program (STIP). The project is also identified in the Denver Regional Council of Government's 2005-2010 Transportation Improvement Program (TIP).

1.4 Overview of Purpose and Need

The primary purpose and need for improvements to SH 7 (Cherryvale Road to 75th Street) are to reduce congestion, enhance safety and improve mobility for multiple modes of transportation, summarized as follows:

- **To Reduce Congestion** - Population and employment growth in the City of Boulder, Boulder County and the surrounding communities has increased traffic along SH 7 to a level that is overloading the existing transportation system. There is currently a two hour peak traffic period during the morning and another two-hour peak traffic period in the evening. In addition, the two-lane roadway segment between 63rd Street and 75th Street currently operates at near capacity conditions, with traffic growth anticipated to continue to grow in the future.

- **To Enhance Roadway Deficiencies and Safety-** The existing roadway does not meet current design standards with regard to roadway grades, stopping sight distance, roadway shoulder widths, roadside clear zone, roadway drainage, warranted auxiliary lanes and access control. On the west end (at Cherryvale Road) and the east end (at 75th Street) of the study limits, SH 7 is a 4-lane facility, requiring traffic to transition through sub-standard lane drops to the existing 2-lane facility within the study limits. These roadway deficiencies result in unsafe roadway and operating conditions.
- **To Improve Mobility for Multiple Modes of Transportation -** The City of Boulder, Boulder County, CDOT and RTD have identified that SH 7 provides improved opportunities for multiple modes of transportation. The “JUMP” bus service currently serves SH 7 commuters utilizing general-purpose traffic lanes, but bus stops in the project area are not served by sidewalks or standard bus stop facilities. Pedestrians along SH 7 use makeshift dirt roadside trails or substandard roadway shoulders due to the lack of sidewalks. Also, the lack of bicycle trails, bicycle lanes, or standard shoulder widths do not provide adequate bicycle facilities consistent with the SH 7 vision identified in the Boulder County Bikeway Plan.

1.5 Traffic Characteristics

Weekday daily traffic volumes on SH 7 range from near 19,300 vehicles per day (vpd) at the east end of the project near 75th Street, to 25,000 vpd at the west end near Cherryvale Road.

The intersection of 75th Street was improved in 2005-2006 to add through and turn lanes in the intersection area. SH 7 narrows back to one lane each direction outside of the intersection area. The 75th Street intersection improvement has allowed AM peak hour traffic to increase about 10% on SH 7 when comparing 2007 counts to 2004 counts. PM peak traffic on SH 7 did not increase between 2004 and 2007, but that may be due to a 2006-2007 construction project further west on SH 7.

The 2007 intersection LOS was calculated at project intersections based on 2007 traffic counts. (Six levels of service are defined from A to F, with LOS A representing the best operating conditions and LOS F the worst. LOS E is generally considered to correspond to maximum capacity (see **Figure 1-3**).

**Figure 1-3
Level of Service Definitions**

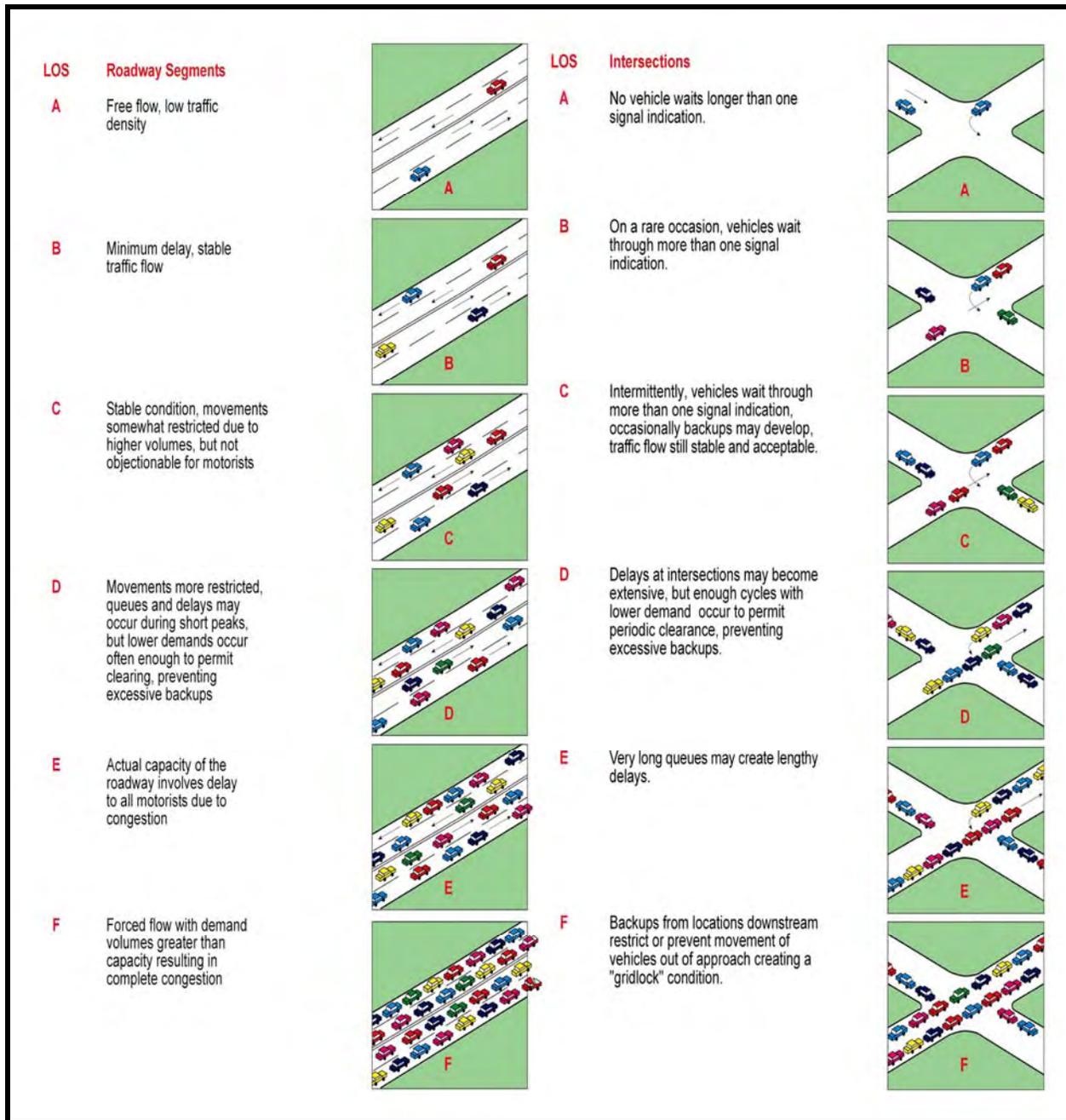


Table 1-1 shows the 2007 LOS at the signalized intersections.

The existing signalized LOS is generally good because the side-street traffic is relatively low, allowing SH 7 through traffic to have between 70 percent and 80 percent of the signal time.

In addition to intersection LOS, an operating LOS for the roadway in between the signals was also calculated. The existing LOS for the AM and PM peak hour for the two-lane corridor segment (from 63rd Street to 75th Street) is classified as LOS E, with travelers experiencing reduced travel speeds and significant friction from turning vehicles at access points and slow accelerating vehicles.

Based on planning conducted by Boulder County, population and employment growth in Boulder County is expected to increase 51 percent and 63 percent, respectively, between 1990 and 2020. Population and employment on the eastern extent of the SH 7 corridor, in the communities of Erie, Lafayette and Louisville, is expected to increase 113 percent and 50 percent, respectively. Many people living in the communities to the east commute along SH 7 to the Boulder area for employment.

Due to the projected increase in population and employment discussed above, traffic volumes are projected to increase on SH 7 in the future. The 2030 daily traffic is forecasted to increase about 20% to about 23,000 vpd.

Table 1-2 shows traffic trends on SH 7 between 63rd and 75th Street dating back to 1988.

The No-Action Alternative will result in increasing congestion in the AM peak and PM peak periods in 2030. The 20% traffic growth will use up the remaining available peak hour capacity at the signalized intersections and result in two to three congested hours in each peak period. As traffic volumes increase, the two-lane segment of SH 7 is anticipated to experience increasing congestion and to approach LOS F during the peak hours.

**Table 1-1
2007 LOS at the Signalized Intersections**

SH 7 Intersection with:	AM Peak	PM Peak
Cherryvale	C	C
63 rd Street	C	C
Votec access	B	B

**Table 1-2
Traffic Trends on SH 7
between 63rd and 75th**

Year	Daily Traffic
1988	10,600*
1990	13,000*
1995	14,200*
2001	16,000
2004	18,500
2007	19,300

*The counts prior to 2001 are Average Annual Daily Traffic (AADT), while more recent counts are weekday traffic counts

1.6 Roadway Deficiencies and Accident History

The project is located in rolling terrain, with the middle section of the project dominated by a hill that is higher in elevation than the east and west ends of the project limits by approximately 120 feet. Approach grades are 7 percent on the west side of the hill and 6

percent on the east side of the hill. The approach grades can be difficult for drivers to maneuver during inclement weather. The posted speed in the vicinity of the hill is 50 mph, which correlates to a minimum stopping sight distance of 425 feet. The existing crest vertical curve has a stopping sight distance of 250 feet, which corresponds to a 35 mph design speed.

The existing paved roadway section is 28 to 30 feet in width (12-foot lanes with 2 to 3-foot paved shoulders), with additional 2- to 6-foot gravel shoulders. Roadside ditches are steep and are directly adjacent to the shoulder. This roadway section provides little room to pass an incapacitated vehicle or to easily maneuver past a turning vehicle and is leading to rear end accidents. Roadside clear zone is inadequate or nonexistent for vehicle recovery. Due to tight radii at intersections and lack of adequate shoulders many culvert end sections have been crushed due to their close proximity to the travel lanes.

Along segments of the project, there is not enough slope across the lanes to allow for adequate drainage. Also, warranted right- and left-turn lanes are either nonexistent or substandard leading to rear-end type accidents. These include the right-turn lanes for eastbound traffic at the BVSD signal, Westview Drive and 75th Street. Substandard left-turn lanes are present at Cherryvale Road, 63rd Street, the BVSD signalized intersection, and 75th Street.

There is no access control along the project. Numerous accesses are in close proximity to intersections and other accesses, creating conflict areas.

CDOT completed a Safety Assessment Report for SH 7 from Cherryvale Road through the 75th Street intersection in May 2001. Accident data for the Safety Assessment was collected and compiled by CDOT for the period from March 1, 1996 to February 29, 2000. In addition, to supplement the information developed as part of the Safety Assessment report, CDOT collected and compiled accident data for the period from March 1, 2000 to December 31, 2002. This supplemental accident data was obtained to confirm that the conditions identified in the Safety Assessment report were still valid.

The Safety Assessment Report identified that there were 128 accidents along the corridor. Of those, 40 percent of the accidents resulted in injuries to 74 persons. The overall Weighted Hazard Index for the SH 7 project area was 1.76, slightly better than average when compared with other, similar highways statewide. Approximately 50 percent of the accidents occurred in the peak hour periods. Accidents associated with intersections and driveway accesses accounted for 87 percent of the accidents. A concentration of the accidents occurred at the intersection with 75th Street. Following are other observations made as part of the Safety Assessment Report with regard to the accident data:

- Five of the accidents on SH 7 at Cherryvale Road involved eastbound vehicles during wet pavement conditions.
- Ten rear-end accidents (nine were westbound), six involving injuries, occurred at or immediately east of the intersection of SH 7 with Westview Drive.
- Eight accidents, six being rear-ends, occurred at the SH 7 intersection with Valtec Lane.
- Sixteen accidents occurred at the business accesses just west of 75th Street. Six were broadsides, involving vehicles turning left out of the accesses onto SH 7, and two were approach turns, involving vehicles turning into the accesses.
- Thirteen accidents occurred at the 75th Street intersection, with 54 percent being broadsides.

The supplemental accident data supported the findings of the Safety Assessment Report with no noted changes in type or frequency of accidents.

1.7 Alternative Modes of Transportation

The City of Boulder/RTD provides the “JUMP” bus service every 10 minutes to the Boulder Valley School District (BVSD) Vocational and Technical Education Center (VoTec) with a bus that continues to the Lafayette park-n-Ride every 30 minutes. There are bus stops along SH 7 at 63rd Street, the BVSD signal, Valtec Lane and at 75th Street. In addition, there are bus stops within the BVSD Vocational School internal circulation routes. Ridership along the JUMP route is approximately 1,800 passengers per day.

Buses utilize the same lanes as general traffic. Congestion along the corridor creates a reduced level of service for transit operation. Transit stops are on gravel shoulders or dirt areas adjacent to the highway. Bus stop locations do not have bench facilities, shelters, sidewalk facilities, or pedestrian access to adjacent land uses.

Sidewalk facilities exist along the north side of SH 7 between Cherryvale Road and 63rd Street. There are no other sidewalks or pedestrian facilities along SH 7 in the study area. An existing bike lane along SH 7 ends just east of Cherryvale Road. Existing paved shoulders along the study area are generally two to three feet in width with an additional two- to six-foot gravel shoulder. Substandard clear zones characterize the roadway, providing little recovery area for bicyclists.

On the Boulder County Bikeway Plan, SH 7 is designated as a proposed on-road bike facility. The bikeway plan designates that on-road bike facilities shall be accommodated by a minimum four-foot shoulder. SH 7 intersects with 75th Street and 95th Street, which are also designated as major bike routes.

The programmed FasTracks commuter rail corridor, which will parallel and then cross SH 7 along the BNSF railroad right-of-way, is likely to attract patrons to the park-n-Ride in the study area.