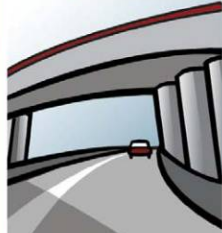


US 6/Wadsworth



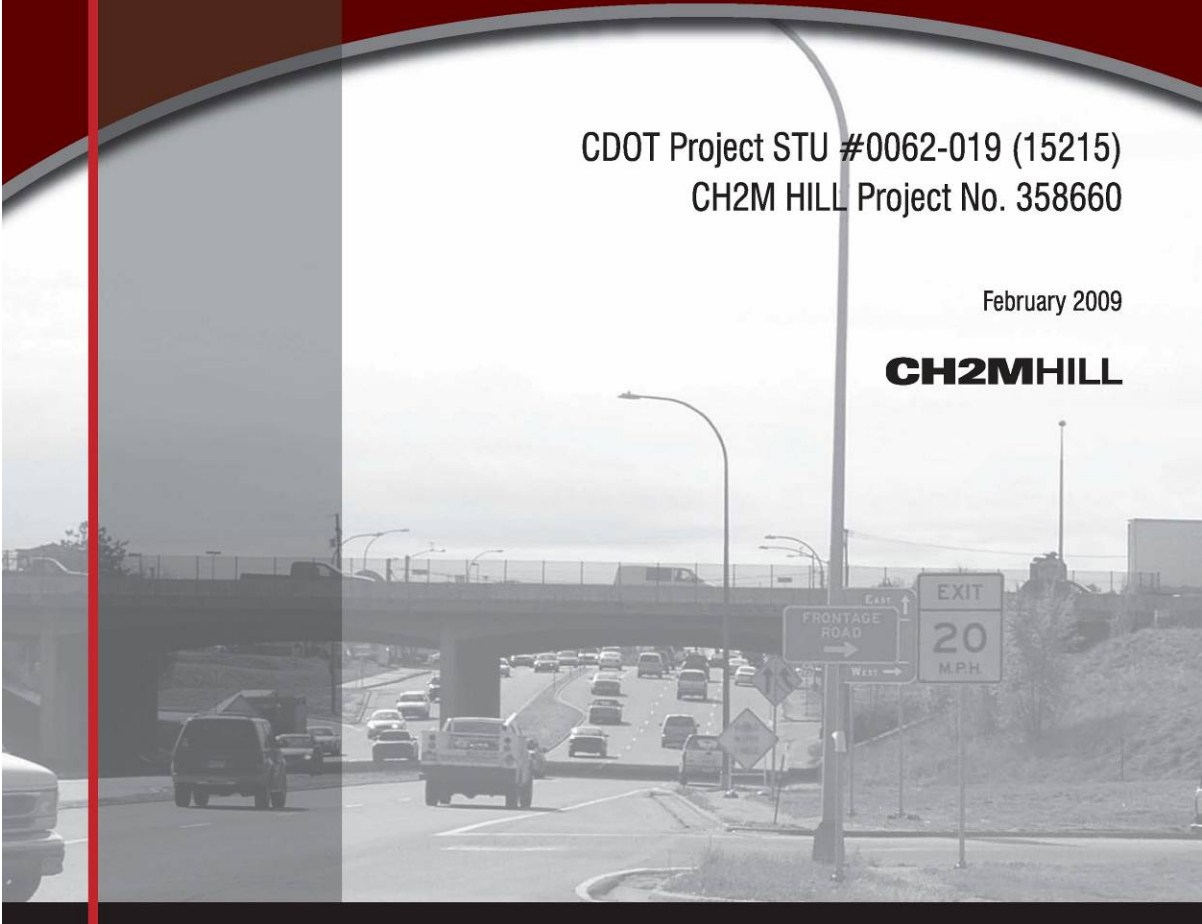
**Environmental
Assessment**

DRAFT Traffic Study Report

CDOT Project STU #0062-019 (15215)
CH2M HILL Project No. 358660

February 2009

CH2MHILL





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Acronyms and Abbreviations

AADT	annual average daily traffic
ADT	average daily traffic
CDOT	Colorado Department of Transportation
DRCOG	Denver Regional Council of Governments
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FW	freeway
HCM	<i>Highway Capacity Manual</i>
ITS	Intelligence Transportation Systems
LOS	level of service
LOSS	level of service of safety
LRT	light rail transit
MP	milepost
mph	miles per hour
NCHRP	National Cooperative Highway Research Program
NR-A	non-rural regional highway
RIRO	right-in/right-out
ROW	right-of-way
RTD	Regional Transportation District
RTP	Regional Transportation Plan
SLFS	System Level Feasibility Study
SPF	safety performance function



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SPUI	single-point urban interchange
TDM	Travel Demand Management
TMU	transit mixed-use
TSM	Transportation Systems Management
TWSC	two-way stop control
V/C	volume-to-capacity ratio
vpd	vehicles per day

Executive Summary

Purpose

The Colorado Department of Transportation (CDOT) proposes to reconstruct the interchange of US 6 and Wadsworth Boulevard and widen Wadsworth Blvd. between 4th and 14th Avenues in Lakewood, Colorado. A vicinity map is shown in Exhibit ES-1. The purpose of the US 6 and Wadsworth Blvd. project is to:

- Improve traffic flow and safety for motorists, pedestrians, and bicyclists
- Accommodate high traffic volumes
- Correct design deficiencies that contribute to safety concerns and operational inefficiencies
- Increase infrastructure capacity to meet current and future traffic volumes
- Increase multi-modal travel options and connections at the US 6 and Wadsworth Blvd. interchange and along Wadsworth Blvd. between 4th Avenue and 14th Avenue

Constructed in the early 1960s and later expanded in 1970, the existing design and configuration of the interchange and roadway within the project limits have not kept pace with traffic and multi-modal travel demands. CDOT, the Federal Highway Administration (FHWA) City of Lakewood, area residents, businesses, and commuters have prioritized making improvements to correct the transportation problems in the project area through previous planning efforts. CDOT's goal is to identify a Build Alternative that meets transportation needs, is compatible with local and regional plans, minimizes environmental harm, and can be implemented within cost constraints.

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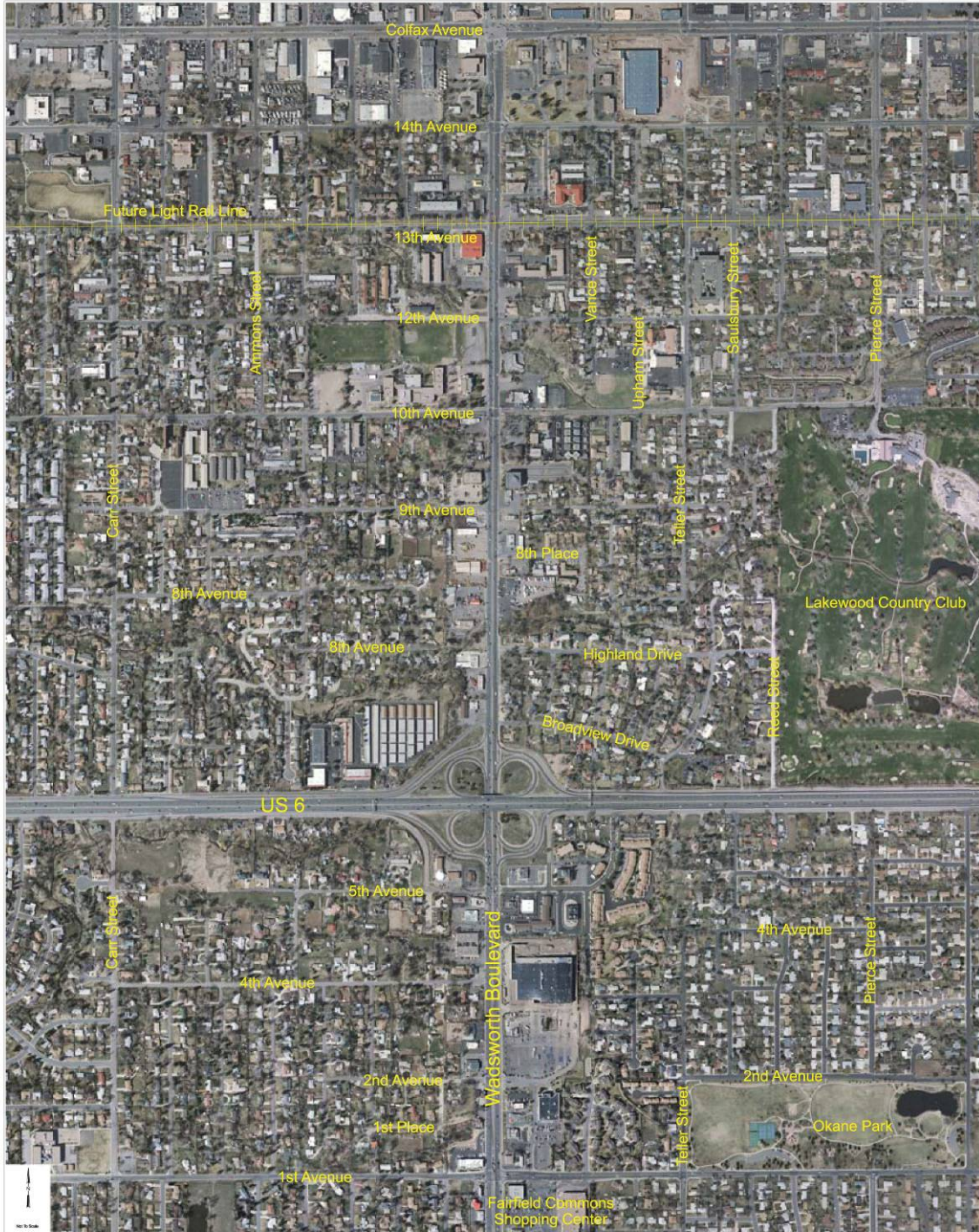


EXHIBIT ES-1
Vicinity Map



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Existing Conditions

US 6 is a primary east-west six-lane freeway that traverses through Denver, Lakewood, and Golden. Located in central Lakewood, the US 6 and Wadsworth Blvd. interchange is a full cloverleaf configuration with low ramp speeds as a result of tight curves both on the directional ramps and on the loop ramps. Intersections are spaced closely to the interchange both north and south of US 6. The Carr/Garrison Street slip ramps to the west are in close proximity to the Wadsworth Blvd. interchange.

The Wadsworth Blvd. corridor is a major regional arterial with signalized, stop control, and driveway accesses. Within the project area south of US 6, Wadsworth Blvd. has six through-lanes, while north of US 6 there are four through-lanes. North of US 6, access is uncontrolled with numerous intersection crossings and driveways. The median is striped to provide two side-by-side, continuous left-turn lanes, one in each direction, serving major intersections and driveway accesses. Study Area land use generally consists of typical urban commercial, industrial, and residential uses.

Traffic Operations

US 6 carries approximately 122,000 vehicles daily. Average daily traffic (ADT) south of US 6 on Wadsworth Blvd. is approximately 65,700 vehicles, while north of US 6 the ADT is about 50,800 vehicles. Evaluation of traffic operations was completed using industry-accepted standards. Morning and evening peak-hour conditions for mainline, weave, merge/diverge, and urban street operations were evaluated with Highway Capacity Software. Synchro™ software was used to determine intersection level of service (LOS).

The highest level (LOS A) describes free-flow conditions in which vehicles experience minimal delay. The lowest level (LOS F) describes stop-and-go conditions in which long delays are experienced by most vehicles in the traffic stream. LOSs A, B, and C are considered "Good"; LOS D "Fair"; and LOSs E and F "Poor." For purposes of this study, poor LOSs E and F were considered unacceptable. Shown in Exhibit ES-2 is a complete summary of the existing peak-hour-traffic turning movements and LOS.

The following critical issues and problem areas, related to the existing traffic operations, were considered during alternative development.

US 6 Mainline and Interchanges

- The US 6 and Wadsworth interchange is a full cloverleaf configuration with low speeds and tight curves on both the directional and the loop ramps.
- Three of the four weave segments on US 6 and Wadsworth Blvd. operate at unacceptable LOSs during peak hours.



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- The eastbound merge and westbound diverge segments on US 6 at Wadsworth Blvd. also operate at unacceptable LOSs and contribute to mainline congestion near the interchange.
- Vehicles do not have adequate distance to accelerate/decelerate when entering/exiting US 6 at Wadsworth Blvd.
- The westbound US 6 on-ramp from the Wadsworth weave with the US 6 slip ramp to Carr/Garrison Street operates at an unacceptable LOS.
- The proximity of the Carr/Garrison Street slip ramps to the Wadsworth Blvd. interchange does not allow adequate acceleration and deceleration at either location.

Wadsworth Boulevard Corridor

- The Wadsworth Blvd. corridor is an urban arterial with signalized, stop control, and numerous driveway accesses.
- The 5th Avenue and Broadview Drive intersections are close to the US 6 interchange; therefore, vehicles attempting to cross multiple lanes of traffic create turbulence in the traffic stream in both directions on Wadsworth Blvd.
- North of US 6, the median is striped to provide two side-by-side, continuous left-turn lanes, one in each direction, serving major intersections and driveway accesses. The uncertainty of where drivers enter the median left-turn lane(s) contributes to mainline congestion and adds to the difficulty for vehicles on the side streets to enter or cross Wadsworth Blvd. In addition, sight distance between opposing vehicles in the turn lanes is a problem due to the vehicles blocking the view of traffic in the through-lanes.
- As a major regional arterial, signal priority is given to northbound and southbound vehicles. The cross-street approaches at most signalized and unsignalized intersections operate at poor LOSs.
- Due to the heavy through-traffic on Wadsworth Blvd., vehicles both from the side streets and from the driveways are forced to wait long periods and pull into short gaps in traffic.
- The four through-lane cross section north of US 6 does not accommodate current traffic demands, with a LOS of E.

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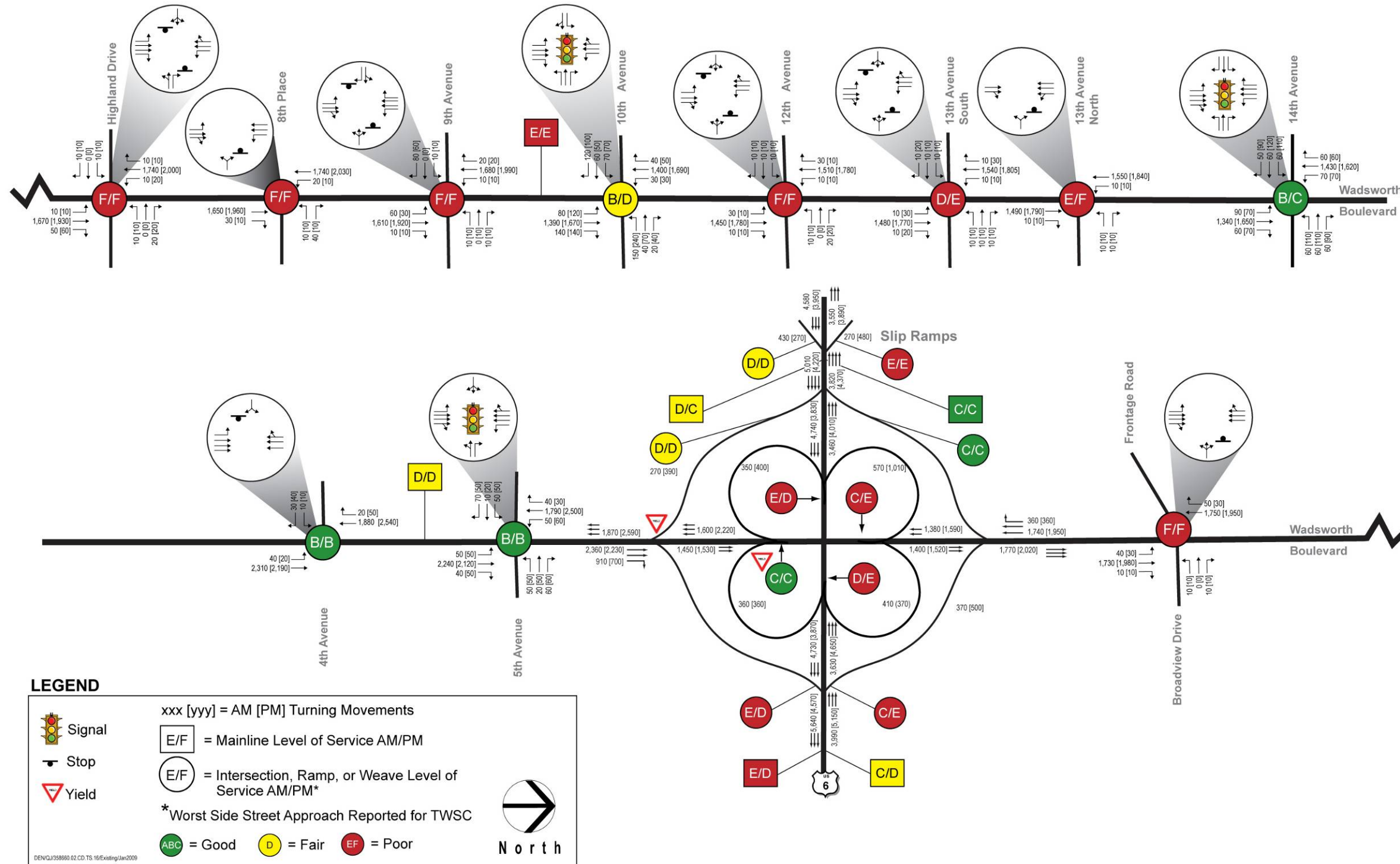


EXHIBIT ES-2
Existing Traffic Conditions – Wadsworth Boulevard and US 6 Interchange



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Access

According to the CDOT Access Category Assignment Schedule, US 6 is a freeway (FW) and Wadsworth Blvd. is a non-rural regional highway (NR-A). As a freeway, access to US 6 in the Study Area is limited to interchange ramps and slip ramps to frontage roads. In the Study Area, access to Wadsworth Blvd. is provided with a full cloverleaf interchange. To the west, access to Carr and Garrison Streets is provided via short, one-lane directional ramps that intersect frontage roads on either side of US 6.

Access to Wadsworth Blvd. is currently provided in a variety of ways. Exclusive left- and right-turn lanes are provided at high-volume movements, although a number of right turns occur from shared through-lanes. South of US 6, a raised median aids in controlling access to Wadsworth Blvd. Some accesses have been consolidated, while others have been modified to right-in/right-out (RIRO) only. North of US 6, access is uncontrolled, with numerous intersection crossings and driveways. The median is striped to provide two side-by-side, continuous left-turn lanes serving major intersections and driveway accesses. The following critical issues and problem areas, related to the current access configuration and median treatment, were considered during alternative development:

- A sight distance problem results when there are opposing left-turning vehicles at or near the same location.
- The uncertainty of where drivers will enter the median lane(s) contributes to mainline congestion and adds to the difficulty of entering or crossing Wadsworth Blvd. from the side streets.
- The numerous driveway accesses contribute to mainline turbulence.
- Due to the heavy through-traffic on Wadsworth Blvd., vehicles both from the side streets and from the driveways are forced to wait long periods and to pull into gaps that are inadequate.

Safety

Within the Study Area, the US 6 currently performs at a LOS of Safety II, which is a “Better than Expected Safety Performance” in relationship to the total accident history for both total and severe (injury plus fatal) crashes for urban six-lane freeways. Wadsworth Blvd. in the Study Area has higher total and property damage only accident rates than the corresponding average statewide rates for Federal Aid Primary Urban Highways; however, the injury and fatality rates are below the statewide rates. The Study Area accidents occur at relatively low speeds due to the congested conditions and do not result in a significant number of severe accidents. Considered during the alternative development, the most common accident types are:

- Rear end (related to congestion and multiple access points)

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- Hit fixed objects (related to severe ramp curvature)
- Sideswipe same direction (related to weaving and lane changing maneuvers)
- Overturning (related to severe ramp curvature)
- Approach turn and broadside (related to multiple access points and traffic control)
- Head on and sideswipe opposite direction (related to painted median and multiple access points)

Bicycles and Pedestrians

Pedestrian facilities in the Study Area are mostly absent and, where they do exist, much of the pathways do not meet local or CDOT standards. Sidewalk is mostly continuous along the east side of Wadsworth Blvd. but much of it is narrow, undetached from the street, or has impedances within the pedestrian travel way. Along the west side of Wadsworth, the majority of the corridor is lacking sidewalk to the point that pedestrian mobility is mostly limited to dirt pathways behind the curb. Through the US6 interchange area, sidewalk is only located along the east side of Wadsworth Blvd.

The Wadsworth Blvd. corridor is not conducive to bicycle travel due to the high volumes of vehicle traffic, lack of a continuous multi-use path, and safety issues associated with the existing cloverleaf interchange at US 6. The interchange presents an especially difficult mobility and safety problem for pedestrians and bicyclists due to the free-flow movements of these ramps and the high volume of vehicles entering/exiting US 6. The sidewalk/path along the east side of Wadsworth crosses four free-flow ramps in locations where motorists are not expecting to encounter multi-modal activity. The high volumes of traffic entering these ramps offer a limited amount of gaps for pedestrians and bicycles to cross the ramps, especially during peak traffic periods. The following critical issues and problem areas, related to bicycle and pedestrian travel were considered during alternative development:

- Approximately 50 percent of the eastside sidewalk is missing or in substandard condition and 85 percent of the west side sidewalk is missing or substandard.
- The Wadsworth Blvd. corridor is not currently a highly active pedestrian or bicycle corridor. However, the missing and substandard sidewalks may be discouraging bicycle and pedestrian use. The future light rail station and ancillary development at 13th Avenue and Wadsworth Blvd. are expected to increase pedestrian and bicycle activity.
- Even with current low user demand, Wadsworth Blvd. is an important corridor for bicyclists and pedestrians because of the barrier effect created by US 6. Wadsworth is the only crossing of US 6 for a 2.5-mile stretch from Sheridan Boulevard to Garrison Street.
- The existing cloverleaf interchange is not conducive to pedestrian and bicycle movements through the interchange. The high-volume, free-flowing ramps do not offer



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many gaps in traffic flow, and vehicle visibility for bicyclists crossing the ramps is difficult.

Multimodal

The Regional Transportation District (RTD) operates and maintains transit service and infrastructure in the Study Area. Existing transit service is comprised of local, limited, and express bus routes. The planned West Corridor light rail project is a 12.1-mile light rail transit (LRT) corridor that will link Denver Union Station in downtown Denver and the Jefferson County Government Center in Golden. The City of Lakewood plans a transit-oriented development surrounding the 13th Avenue and Wadsworth Blvd. station. The following critical issues, problem areas, and opportunities, related to existing, planned, and potential future transit service were considered during alternative development:

- Buses regularly stop in the outside through-traffic lane-causing a temporary reduction in roadway capacity. These bus blockages occur at a number of stops serving local and limited bus lines.
- With the introduction of LRT, a station at 13th Avenue and Wadsworth Blvd., and the surrounding planned redevelopment, it is anticipated that transit and non-motorized travel will increase.
- Once light rail is implemented, bus frequency on Wadsworth Blvd. will increase four-fold from four buses per hour today to 16 buses hourly in the future.
- The City desires to link its City Center and Belmar development to the south with the LRT station to the north via fixed guideway transit such as a trolley.

Alternatives Considered

The alternatives development and evaluation process included two levels of screening and evaluation for a range of design concepts for the interchange and Wadsworth Blvd. Concepts for the interchange and Wadsworth Blvd. were developed and subjected to a Level 1 “fatal flaw” screening. Those concepts carried forward for further evaluation were refined and compared to each other in a Level 2 evaluation. The results of the Level 2 evaluation identified one combined alternative that will be evaluated in the Environmental Assessment (EA).

The Build Alternative for Wadsworth Blvd. was identified as a result of the Level 1 screening because it was the only concept that met the project purpose and need. The Wadsworth Blvd. Build Alternative would feature 11- and 12-foot travel lanes, a raised median of varying width, and a detached multi-use sidewalk in most locations north of US 6.



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The Build Alternative for the US 6 and Wadsworth Blvd. interchange was identified after completion of the Level 2 Evaluation. Of the eight alternatives considered in Level 1 and of the remaining four evaluated in Level 2, the Tight Diamond with Loop Alternative best met the project purpose and need. Detailed traffic operational analyses were performed for the four interchange alternatives that passed the Level 1 screening. These analyses were used to evaluate mobility criteria as part of the Level 2 evaluation for the following alternatives:

- Tight Diamond
- Tight Diamond with Loop
- Single Point Urban Interchange (SPUI)
- Partial Cloverleaf

Forecast 2035 traffic conditions were determined using the Denver Regional Council of Governments (DRCOG) regional travel demand model, "Compass." This regional model is a robust database of land use characteristics, expected future roadway network improvements, planned transit expansion, and travel behavior used to forecast future regional traffic volumes. The demand model was used to assess and compare alternatives, determine future corridor capacity needs, and develop appropriate expected future turning movements at intersections.

In 2035, significant travel demand on US 6 causes the mainline to operate at LOS F at most locations. Due to the mainline congestion, the ramps also operate at LOS F. Each of the four alternatives eliminates the critical weaving sections on both US 6 and Wadsworth Blvd., which should greatly improve overall system traffic operations. The acceleration and deceleration lengths were increased at each ramp location, providing for more adequate maneuvering distance for vehicles entering and exiting US 6. For each of the four alternatives, the traffic signals introduced on Wadsworth Blvd. operate at acceptable (D or better) LOSs.

A complete summary of the peak-hour traffic turning movements and LOS for the No Build Alternative and the alternatives considered for the interchange is shown in Exhibits ES-3 and ES-4.

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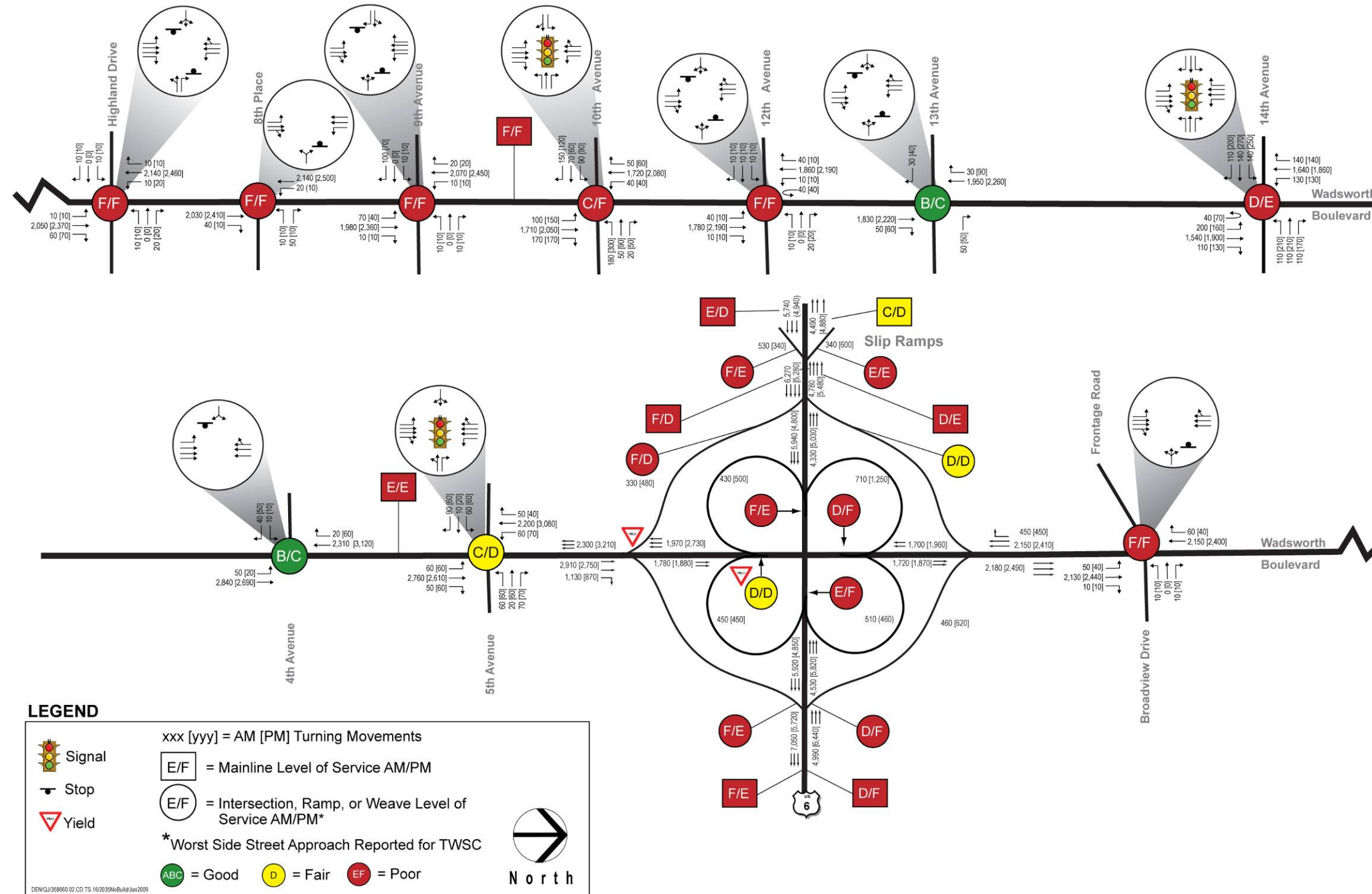


EXHIBIT ES-3
2035 No Build Traffic Conditions – Wadsworth Boulevard and US 6 Interchange

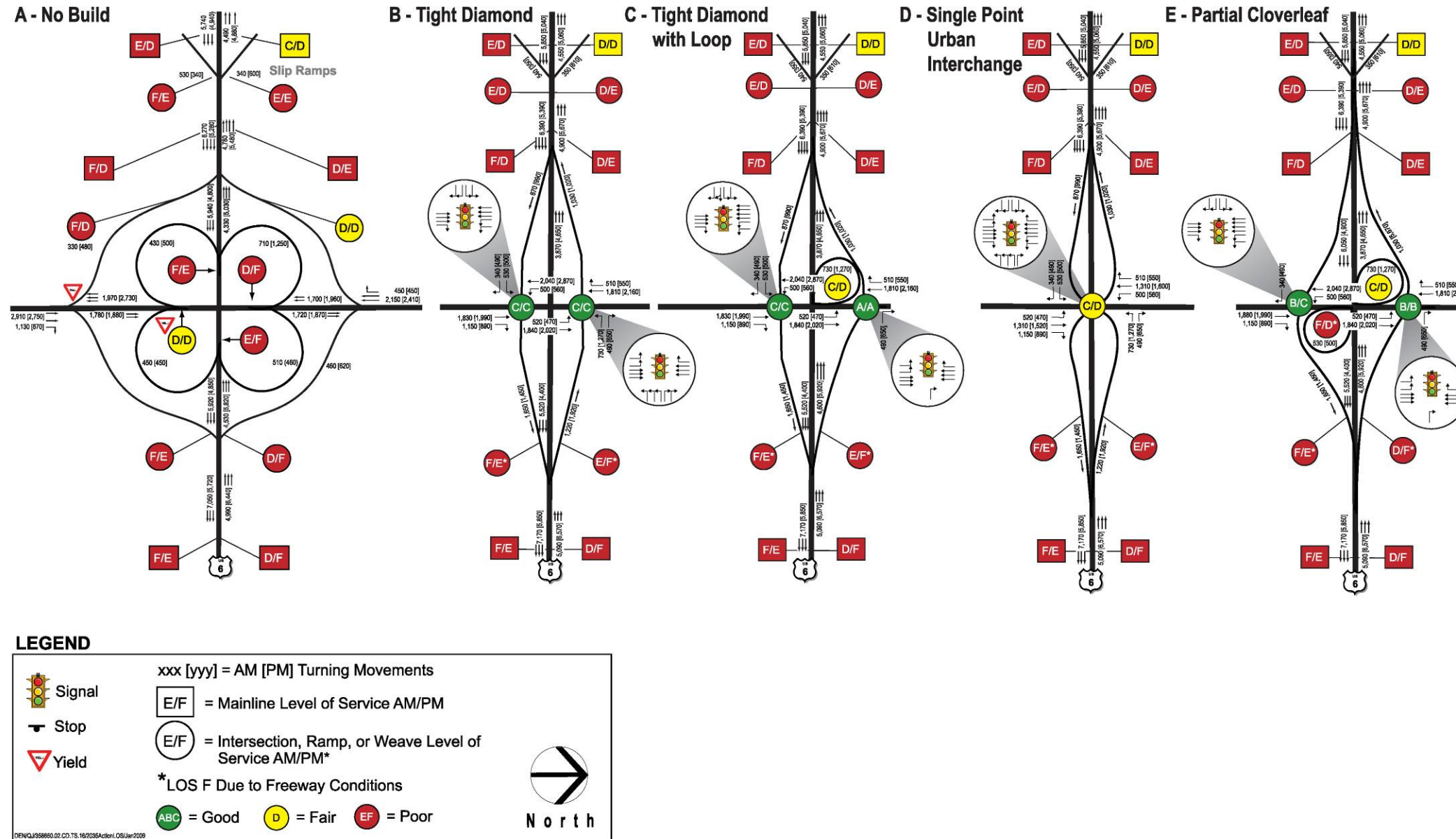


EXHIBIT ES-4
2035 Alternatives Considered Traffic Conditions – US 6 and Wadsworth Boulevard Interchange



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Servicing left-turning traffic movements through the interchange is critical in maintaining acceptable LOS. Those alternatives that provided free-flowing loop ramps such as the partial cloverleaf and tight diamond with loop alternatives were thought to better accommodate left-turning traffic at the interchange, particularly for the critical westbound-to-southbound PM peak traffic. Therefore, volume-to-capacity (V/C) ratios for left-turning movements were compared for each of the alternatives. As shown in Exhibit ES-5, the partial cloverleaf had the lowest average left-turn movement V/C ratio followed by the tight diamond with loop. In the PM peak, the tight diamond alternative had two of the four left-turn movement V/C ratios above 1.0, and the SPUI alternative had two left-turn movements above 0.9.

EXHIBIT ES-5
2035 Interchange Left-Turn V/C Ratios (AM/PM)

Alternative	Eastbound	Westbound	Northbound	Southbound
No Build	Does not eliminate critical weave sections			
Tight Diamond	0.82 (0.77)	0.70 (1.01)	0.85 (1.02)	0.84 (0.84)
Tight Diamond with Loop	0.74 (0.67)	0.49 (0.85)	0.79 (0.78)	0.80 (0.83)
SPUI	0.80 (0.56)	0.76 (0.98)	0.75 (0.73)	0.80 (0.95)
Partial Cloverleaf	0.35 (0.33)	0.49 (0.85)	0.79 (0.77)	0.78 (0.81)

Conclusion

The 2035 No Build traffic scenario has approximately 25 percent more traffic than existing conditions, and the Build Alternative has about 10 percent latent demand on Wadsworth Blvd. north of US 6. This equates to approximately 1 percent annual growth, which is typical for an urban area. The existing and forecast daily traffic volumes are shown in Exhibit ES-6.

EXHIBIT ES-6
Existing, No Build, and Build Forecast Daily Traffic Volumes

Location	2007 ADT	2035 No Build	2035 Build
Wadsworth Blvd. south of 10th Avenue	50,800	62,600	68,700
Wadsworth Blvd. south of 5th Avenue	65,700	80,900	82,500
US 6 east of Wadsworth Blvd.	123,000	153,900	156,900
US 6 west of Wadsworth Blvd.	122,300	153,000	156,000

The existing configuration of the US 6 and Wadsworth Blvd interchange and the Wadsworth Blvd. corridor cannot accommodate this expected future travel demand. Without improvement, traffic LOSs will continue to deteriorate, with many locations operating at LOS F. As shown in Exhibit ES-7, in the Build Alternative, the reconstruction of the interchange, additional capacity on Wadsworth Blvd., and planned access control along the corridor improves LOS over No Build conditions for all but the intersection of 12th Avenue, which remains unsignalized.

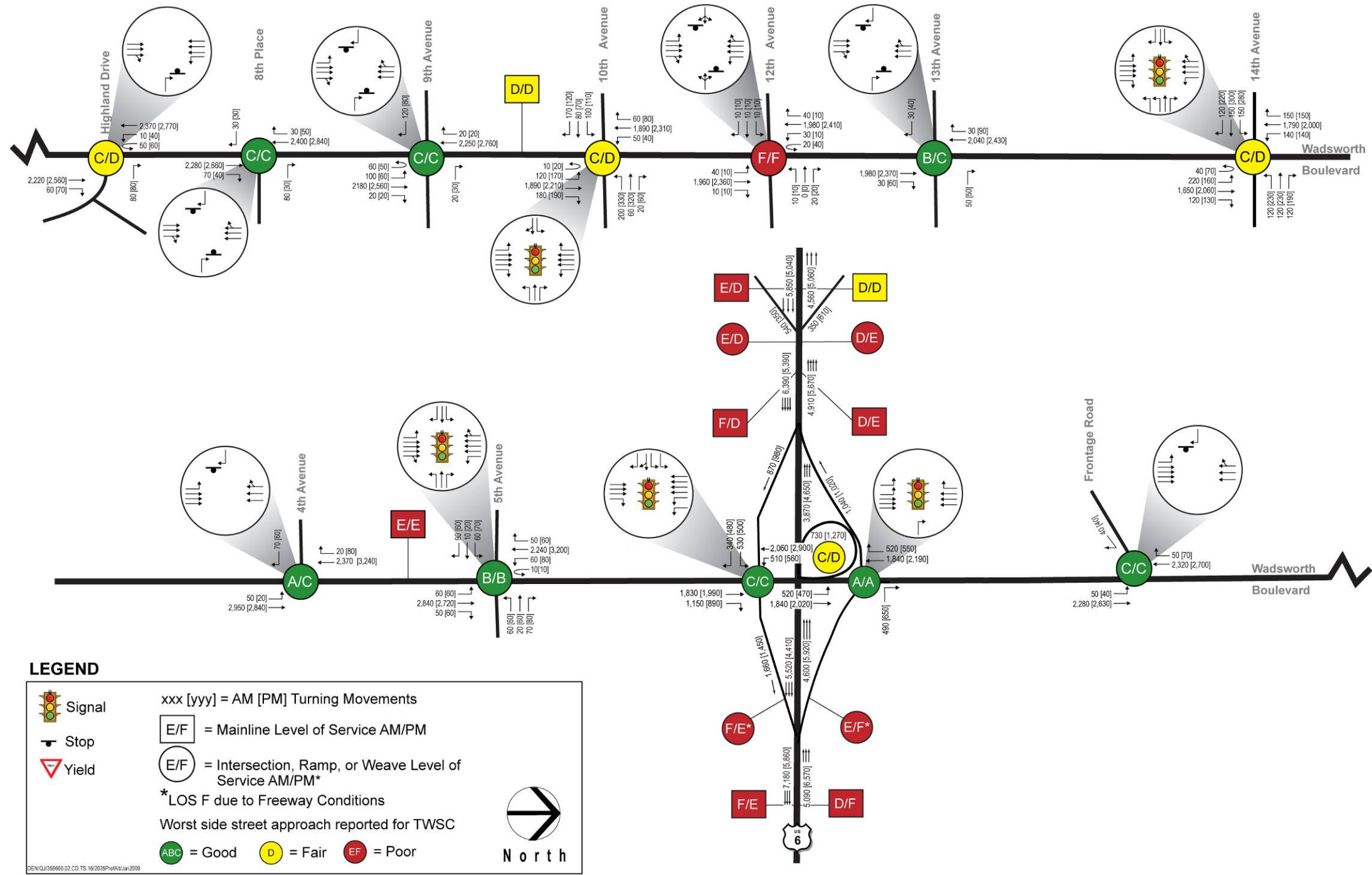


EXHIBIT ES-7
2035 Build Alternative Traffic Conditions – Wadsworth Boulevard and US 6 Interchange



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The Build Alternative, Tight Diamond with Loop interchange and six-lane section with raised medians and detached sidewalks on Wadsworth Blvd., meets the project purpose and need by:

- Reconfiguring the outdated interchange design
- Increasing corridor capacity on Wadsworth Blvd.
- Reducing conflicts by consolidating accesses
- Providing significant improvements to bicycle and pedestrian facilities
- Considering existing, planned, and potential future multimodal options

The low speeds and tight curves of the existing cloverleaf design are eliminated, and all of the critical weave sections are removed. Inadequate ramp acceleration and deceleration lengths were increased to meet current design standards, which greatly improves the level of driver comfort and will likely reduce side-swipe crashes. Improvements at the interchange and along Wadsworth Blvd. have a positive impact on the adjacent transportation system by slightly reducing daily traffic volume on parallel corridors.

Increased capacity on Wadsworth Blvd. will create a consistent six-lane arterial cross section and consolidated accesses will help to improve overall traffic operations and safety. By focusing turning movements at major intersections, vehicles will no longer have to pull into gaps that are inadequate. Ramp and local street traffic are separated with the realignment of the frontage road near Highland Drive. Traffic destined for locations east of the Study Area, via the north frontage road, no longer must travel through the Green Acres neighborhood on local streets.

The Build Alternative also offers several improvements that will facilitate multimodal travel throughout the project Study Area. These improvements will enhance both safety and mobility for non-motorized traffic by providing continuous pathways, along both sides of Wadsworth Blvd., of sufficient width that are buffered from the motorized travel way. In addition, the Build Alternative has been designed to not preclude future potential transit options on Wadsworth Blvd. The US 6 and Wadsworth Blvd. interchange and Wadsworth Blvd. corridor Build Alternative are shown in Exhibits ES-8 and ES-9.

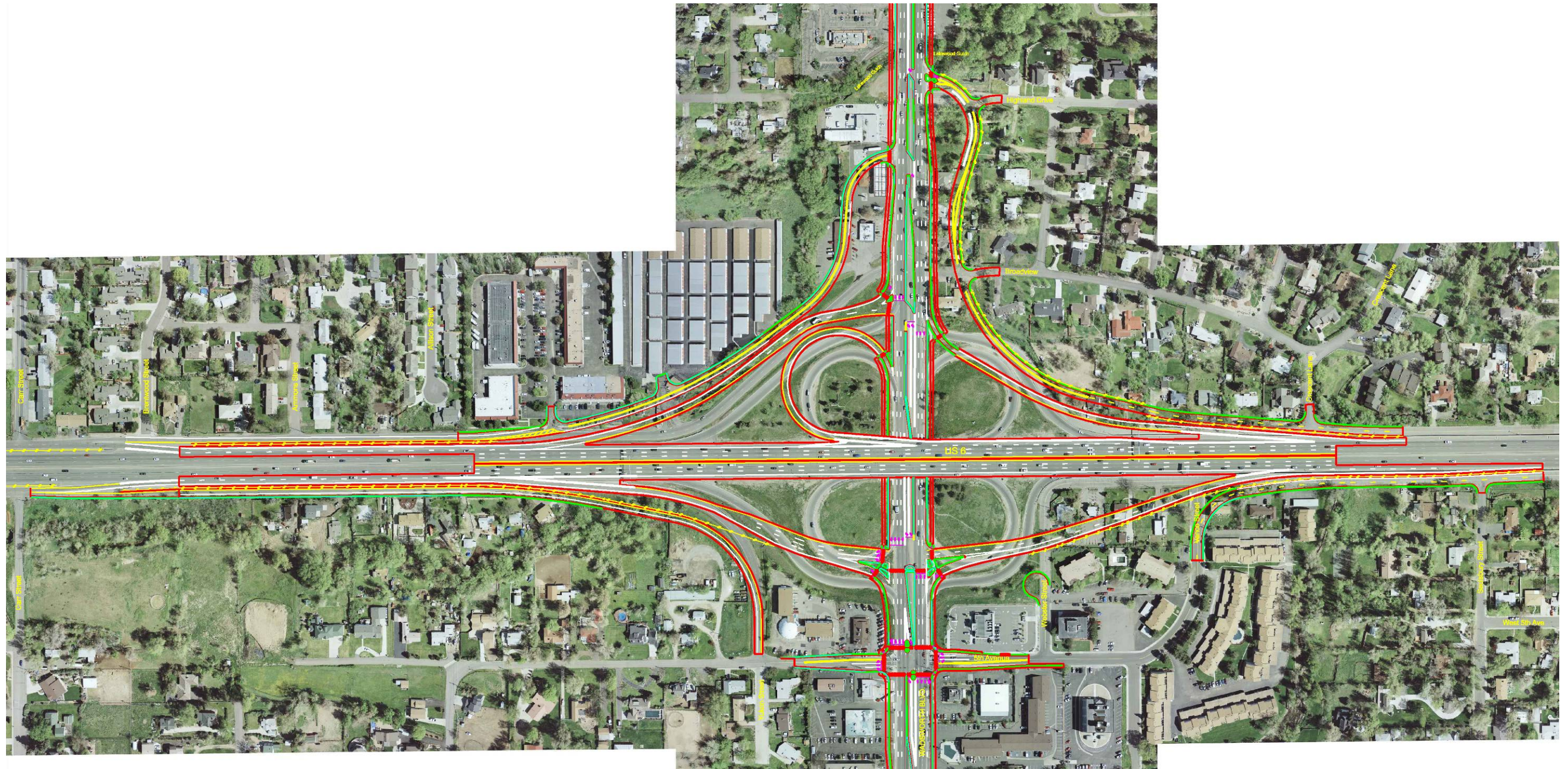


EXHIBIT ES-8
Build Alternative – US 6 and Wadsworth Boulevard Interchange

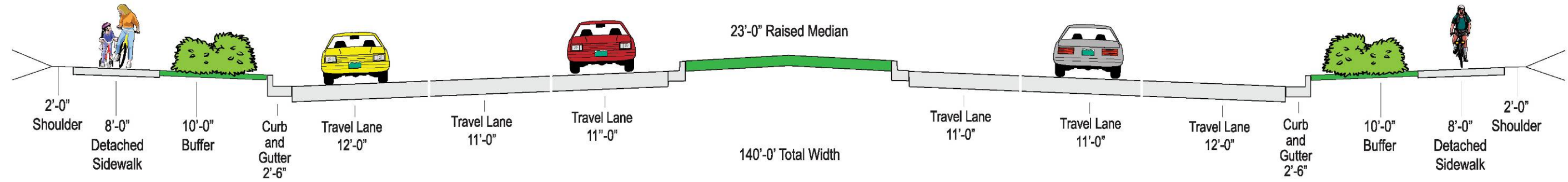


EXHIBIT ES-9
Build Alternative –Wadsworth Boulevard



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Next Steps

This *Traffic Study Report* has been prepared in accordance with the CDOT 1601 Procedural Directive guidance for purposes of evaluating existing and expected future traffic conditions for the No Action Alternative, the alternatives considered, and the Build Alternative, and to provide input for the System Level Feasibility Study (SLFS). The purpose of the SLFS is to evaluate the effects of the interchange modification on the State highway system and surrounding transportation system, and determine if the proposed modification is in the public interest.

The next steps include completion of the EA document, collecting public and agency input, signing a decision document, and submitting the SLFS to the Chief Engineer for review by the Transportation Commission. The EA will be released for public review in the spring of 2009.

Completion of the SLFS, approval of the Type 2-1601, and signing of the Finding of No Significant Impact (FONSI) is largely dependant on CDOT, FHWA, Lakewood, and other funding partners identifying funding for the project. As more information regarding revenue forecasts, Senate Bill 1 dollars, and Federal Stimulus packages becomes available, it will be integrated into the SLFS.

1.0 Introduction

The Colorado Department of Transportation (CDOT) proposes to reconstruct the interchange of US 6 and Wadsworth Boulevard and widen Wadsworth Blvd. between 4th and 14th Avenues in Lakewood, Colorado. A vicinity map is shown in Exhibit 1. The purpose of the US 6 and Wadsworth Blvd. project is to:

- Improve traffic flow and safety for motorists, pedestrians, and bicyclists
- Accommodate high traffic volumes
- Correct design deficiencies that contribute to safety concerns and operational inefficiencies
- Increase infrastructure capacity to meet current and future traffic volumes
- Increase multi-modal travel options and connections at the US 6 and Wadsworth Blvd. interchange and along Wadsworth Blvd. between 4th Avenue and 14th Avenue.

Constructed in the early 1960s and later expanded in 1970, the existing design and configuration of the interchange and roadway within the project limits have not kept pace with traffic and multi-modal travel demands. CDOT, the Federal Highway Administration (FHWA), City of Lakewood (Lakewood), area residents, businesses, and commuters have prioritized making improvements to correct the transportation problems in the project area through previous planning efforts. CDOT's goal is to identify a Build Alternative that meets transportation needs, is compatible with local and regional plans, minimizes environmental harm, and can be implemented within cost constraints.

This *Traffic Study Report* has been prepared in accordance with the CDOT 1601 Procedural Directive guidance for purposes of evaluating existing and expected future traffic conditions for the No Build Alternative, the alternatives considered, and the Build Alternative, as well as to provide input for the *System Level Feasibility Study* (SLFS).

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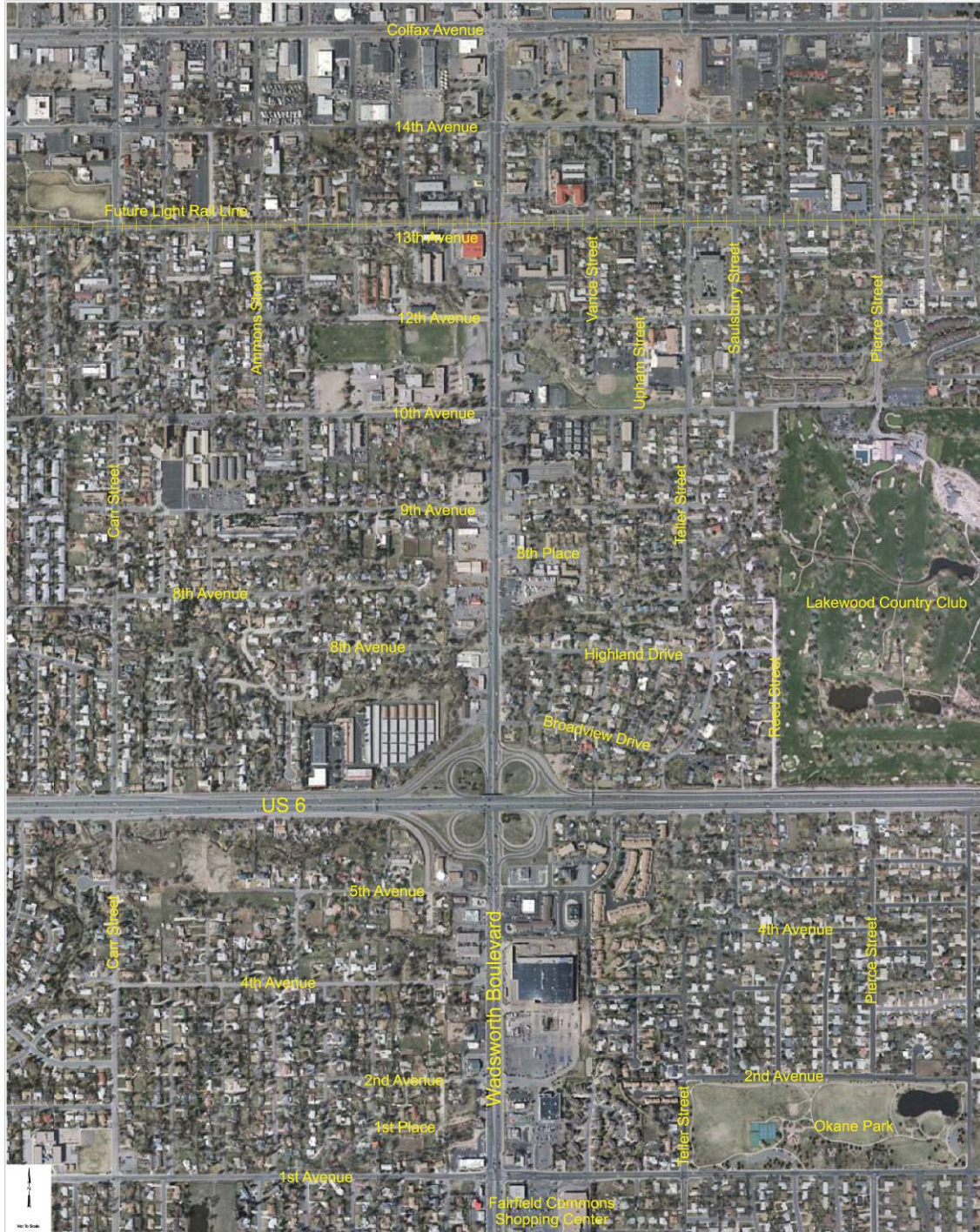


EXHIBIT 1
Vicinity Map

2.0 Existing Conditions

2.1 Transportation System

2.1.1 Roadway Network

US 6 is a primary east-west six-lane freeway in the Denver metropolitan area, which traverses through Denver, Lakewood, and Golden. Located in central Lakewood, the US 6 and Wadsworth Blvd. interchange is a full-cloverleaf configuration with low ramp speeds as a result of tight curves both on the directional ramps and on the loop ramps. Intersections are spaced closely to the interchange both north and south of US 6. The Carr/Garrison Street slip ramps to the west are in close proximity to the Wadsworth Blvd. interchange.

The Wadsworth Blvd. corridor is a major urban arterial with signalized, stop control, and driveway accesses. It is a primary north-south travel route in the western Denver metropolitan area, traversing through Boulder, Arvada, Westminster, Lakewood, and Littleton. Within the project area south of US 6, Wadsworth Blvd. has six through-lanes, while north of US 6 there are four through-lanes. Exclusive left- and right-turn lanes are provided for high-volume movement locations, but a number of right turns also occur from shared through-lanes. South of US 6, a raised median helps control access to Wadsworth Blvd. Some accesses have been consolidated and others have been changed to right-in/right-out (RIRO). North of US 6, access is uncontrolled with numerous intersection crossings and driveways. The median is striped to provide two side-by-side, continuous left-turn lanes, one in each direction, serving major intersections and driveway accesses. Buses regularly stop in the outside through traffic lane causing a temporary reduction in roadway capacity. These bus blockages occur at a number of stops serving the local and limited bus lines.

2.1.2 Adjacent Land Use

Study Area land use generally consists of urban commercial, industrial, and residential uses. Wadsworth Blvd. is a defined urban corridor with commercial and industrial uses fronting the roadway. The areas surrounding Wadsworth Blvd. and US 6 consist of large areas of residential development of various densities. Small pockets of agricultural uses are also found in the area.

2.1.3 Transit Network

The Denver Regional Transportation District (RTD) operates and maintains transit service and infrastructure in the Study Area. As shown in Exhibit 2, existing transit service in the Study Area is comprised of local, limited, and express bus routes. The local 76 is the primary bus route along Wadsworth Blvd. in the Study Area and maintains 15-minute headways in the peak hours (four buses per hour). Route 17 traverses a short segment of Wadsworth Blvd. on the southern end of the Study Area on its way to Lakewood Commons south of Alameda Avenue. Numerous bus routes use US 6 destined for downtown Denver. Route 9

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crosses Wadsworth Blvd. along 10th Avenue and Route 16 uses Colfax Avenue north of the Study Area.

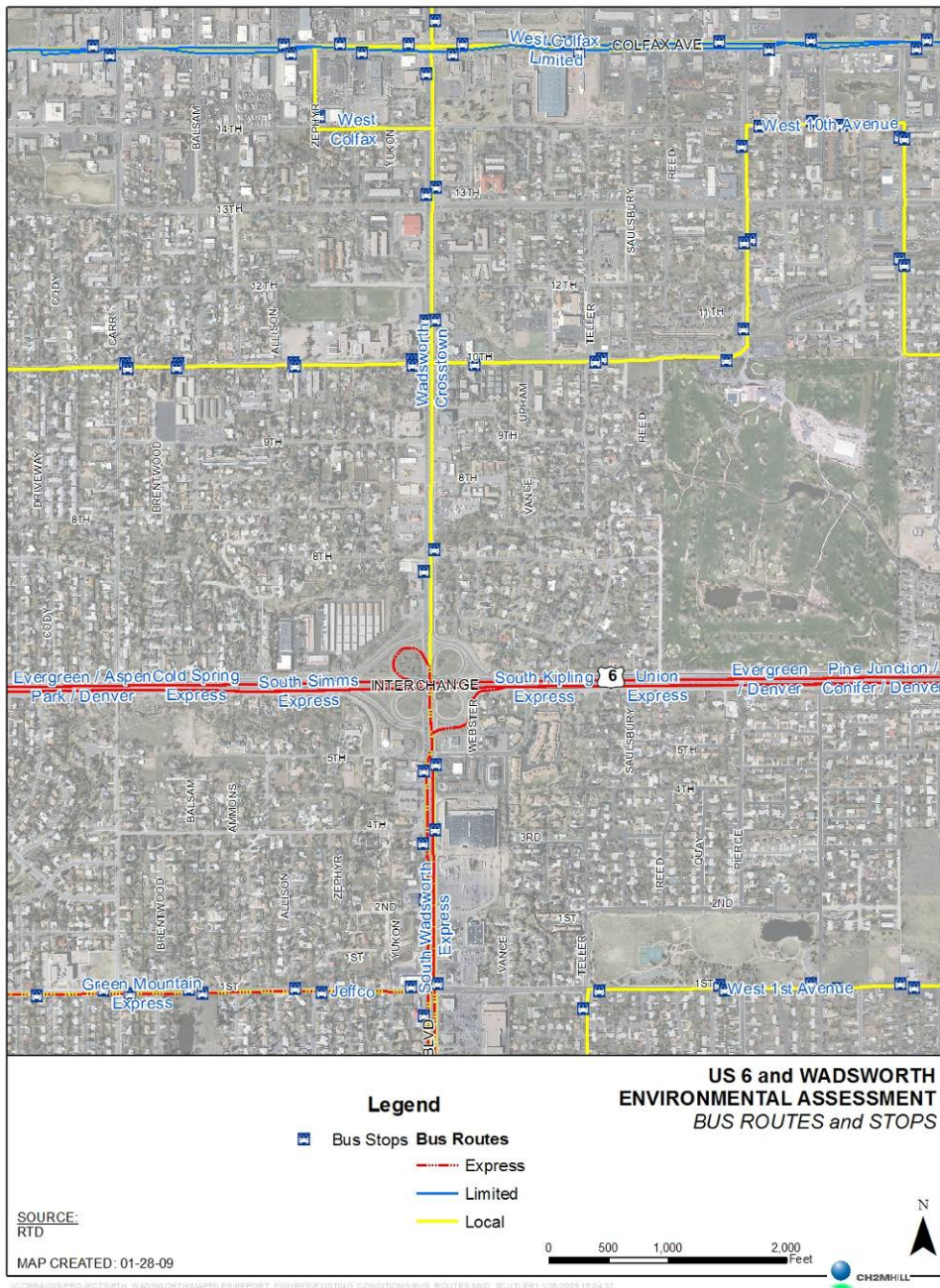


EXHIBIT 2
 Existing Transit Network

2.1.4 Bicycle and Pedestrian Network

Existing bicycle and pedestrian conditions are covered under subsequent headings.

2.2 Existing Traffic Issues

The following bullet lists highlight the critical issues and problem areas identified from the evaluation of existing traffic conditions for the US 6 and Wadsworth Blvd. interchange and along the Wadsworth Blvd. corridor.

2.2.1 US 6 Mainline and Interchanges

- The US 6 and Wadsworth interchange is a full cloverleaf configuration with low speeds and tight curves on both the directional and the loop ramps.
- Three of the four weave segments on US 6 and Wadsworth Blvd. operate at unacceptable levels of service (LOSs) during peak hours.
- The eastbound merge and westbound diverge segments on US 6 at Wadsworth Blvd. also operate at unacceptable LOSs and contribute to mainline congestion near the interchange.
- Vehicles do not have adequate distance to accelerate/decelerate when entering/exiting US 6 at Wadsworth Blvd.
- The westbound US 6 on-ramp from the Wadsworth weave with the US 6 slip ramp to Carr/Garrison Street operates at an unacceptable LOS.
- The proximity of the Carr/Garrison Street slip ramps to the Wadsworth Blvd. interchange does not allow adequate acceleration and deceleration at either location.

2.2.2 Wadsworth Boulevard Corridor

- The Wadsworth Blvd. corridor is an urban arterial with signalized, stop controlled, and numerous driveway accesses.
- The 5th Avenue and Broadview Drive intersections are close to the US 6 interchange; therefore, vehicles attempting to cross multiple lanes of traffic create turbulence in the traffic stream in both directions on Wadsworth Blvd.
- North of US 6, the median is striped to provide two side-by-side, continuous left-turn lanes, one in each direction, serving major intersections and driveway accesses. The uncertainty of where drivers enter the median left-turn lane(s) contributes to mainline congestion and adds to the difficulty for vehicles on the side streets to enter or cross Wadsworth Blvd. In addition, sight distance between opposing vehicles in the turn lanes is a problem due to the vehicles blocking the view of traffic in the through-lanes.

- As a major regional arterial, signal priority is given to northbound and southbound vehicles. The cross-street approaches at most signalized and unsignalized intersections operate at poor LOSs.
- Due to the heavy through-traffic on Wadsworth Blvd., vehicles both from the side streets and from the driveways are forced to wait long periods of time and pull into short gaps in traffic.
- The four through-lane cross section north of US 6 does not accommodate current traffic demands, with a LOS of E.

2.3 Existing Traffic Operations

2.3.1 Traffic Data Collection

Current traffic counts for the corridor and surrounding roadway network were collected the first week in May 2007 to include school traffic. Available traffic data were compiled from various state and municipal sources including CDOT automated traffic recorder locations, which provided a historical reference for comparison to data collected. A traffic count program was undertaken to facilitate LOS evaluation on Wadsworth Blvd., at major arterial intersections, and at the US 6 interchange ramp intersections.

Daily vehicle classification counts were collected at three locations along Wadsworth Blvd. Turning-movement counts were collected at the 12 Study Area intersections on two consecutive weekdays for both AM and PM peak hours. Daily tube and radar counts were completed at the US 6 ramps to evaluate the weave and ramp operations. Daily traffic counts were also collected at the Carr/Garrison Street slip ramps due to their proximity to the Wadsworth Blvd. interchange.

To assist in the evaluation of potential neighborhood traffic impacts, 12 48-hour speed/volume counts were conducted on neighborhood streets. Carr Street north of 7th Avenue is the only location that appears to have vehicles traveling consistently above the posted speed limit. The data collected were used to evaluate the potential impacts of cut-through-traffic on neighborhood streets as interchange alternatives were developed. A summary of the vehicle classification and speed counts is shown in Exhibit 3. US 6 carries approximately 122,000 vehicles daily. Average daily traffic (ADT) south of US 6 on Wadsworth Blvd. is approximately 65,700 vehicles, while north of US 6 the ADT is about 50,800 vehicles.

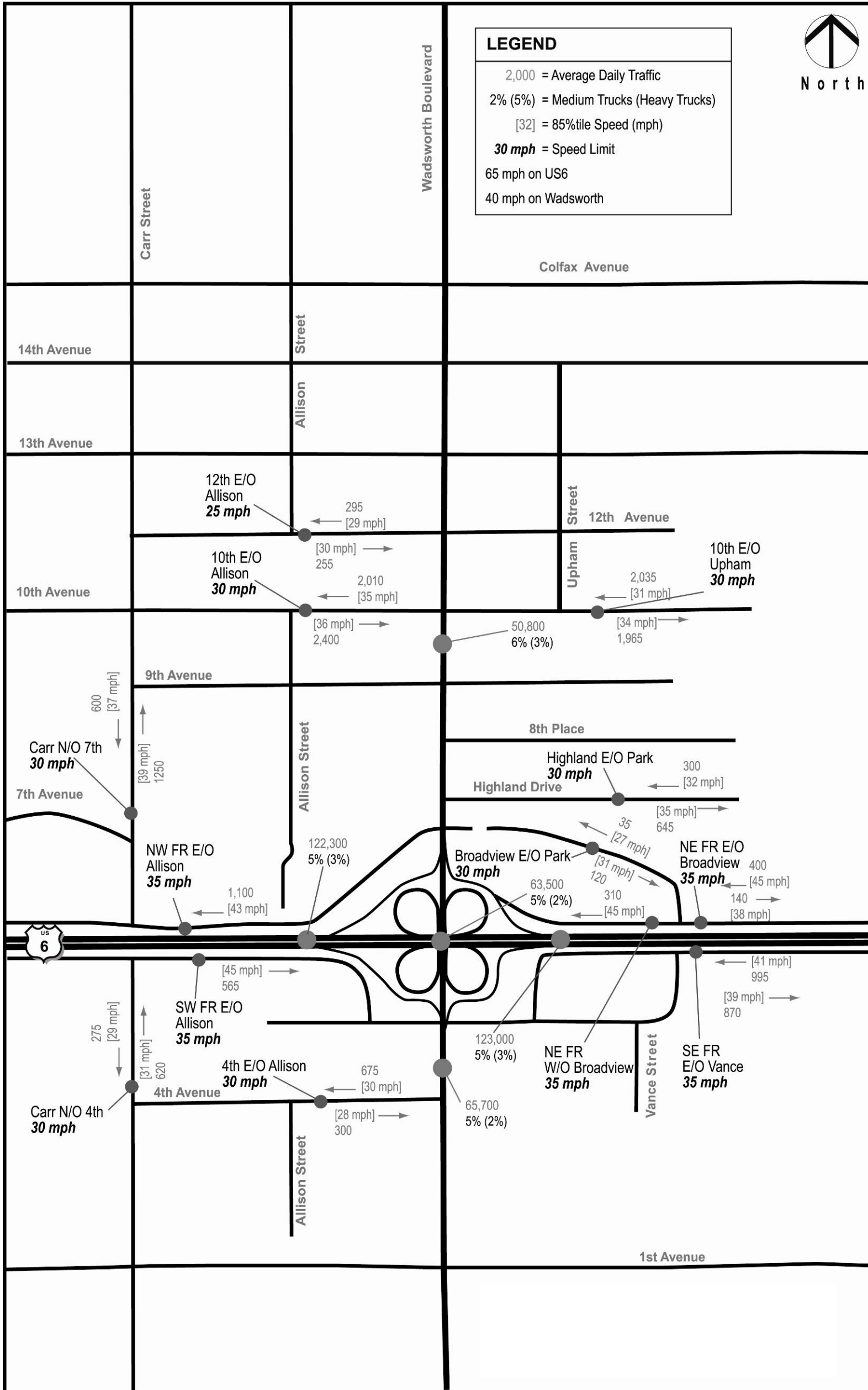


EXHIBIT 3
Existing Speed and Classification Traffic Counts

2.3.2 Traffic Analysis

Evaluation of existing traffic operations was completed using current industry accepted standards. Morning and evening peak-hour conditions for mainline, weave, merge/diverge, and urban street operations were evaluated with Highway Capacity Software. Synchro™ software was used to determine intersection LOS.

The highest level (LOS A) describes free-flow conditions in which vehicles experience minimal delay. The lowest level (LOS F) describes stop-and-go conditions in which long delays are experienced by most vehicles in the traffic stream. LOSs A, B, and C are considered “Good”; LOS D “Fair”; and LOSs E and F “Poor.” For purposes of this study, poor LOSs “E and F” were considered unacceptable. Refer to Appendix B for *Highway Capacity Manual* (HCM) LOS descriptions.

Mainline, Weaves, Merges, and Diverges

Highway capacity software was utilized to determine the US 6 mainline LOS. An initial base free-flow speed of 70 miles per hour (mph) was assumed. In accordance with HCM procedures, the base free-flow speed was adjusted downward to reflect the geometric and operational characteristics of mainline US 6. A summary of the mainline LOS by direction at six locations is shown in Exhibit 4.

Highway capacity software was used to determine the US 6 and Wadsworth Blvd. weave LOS. An initial base mainline free-flow speed of 70 mph was assumed for US 6 and 45 mph was assumed for Wadsworth Blvd. In accordance with HCM procedures, base free-flow speeds were adjusted to reflect local geometric and operational considerations. A summary of the weave LOS by direction at the four weave locations is shown in Exhibit 5.

Highway capacity software was used to determine the merge and diverge LOS at US 6 ramps. An initial base mainline free-flow speed of 70 mph was assumed for US 6, and, due to the tight ramp curvature, 30 mph was assumed for ramps. In accordance with HCM procedures, base free-flow speeds were adjusted to reflect local geometric and operational considerations. A summary of the merge and diverge LOS is shown in Exhibit 6.

EXHIBIT 4
Existing LOS for Basic Freeway Segments on US 6 (AM/PM)

Location	Westbound LOS	Eastbound LOS
East of Wadsworth	C/D	E/D
West of Wadsworth	C/C	D/C
West of Carr	C/C	D/C



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EXHIBIT 5
Existing LOS for Weave Areas at the US 6 Interchange (AM/PM)

Location	Weave Type ¹	LOS
Westbound US 6	A	D/E
Eastbound US 6	A	E/D
Northbound Wadsworth	A	C/C
Southbound Wadsworth	B	C/E

¹ Type A weaves require both merging and diverging vehicles to make one lane change; Type B only requires one or the other to make a lane change.

EXHIBIT 6
Existing LOS for Merge and Diverge Areas at US 6 Interchanges (AM/PM)

Location	Type	LOS
WB US 6 to NB WW	Diverge	C/E
SB WW to WB US 6	Merge	C/C
WB US 6 to Carr/Garrison Slip Ramp	Diverge	E/E
Carr/Garrison Slip Ramp to EB US 6	Merge	D/D
EB US 6 to SB WW	Diverge	D/D
NB WW to EB US 6	Merge	E/D

Wadsworth Boulevard and Intersections

Highway capacity software was used to determine the urban street LOS along Wadsworth Blvd. A planning-level analysis was performed both north and south of US 6 assuming a base free-flow speed of 45 mph. In accordance with HCM procedures, the base free-flow speed was adjusted to reflect the geometric and operational characteristics of mainline Wadsworth Blvd. South of US 6, Wadsworth Blvd. has six through-lanes, while north of US 6 four through-lanes are present. A summary of the urban street LOS is shown in Exhibit 7.

Synchro software was used to determine LOS at the 11 Study Area intersections. For two-way stop control (TWSC) locations, the worst cross-street approach LOS is reported. Intersection geometries were verified from current aerial photography and field observations. Intersection traffic signal timing, provided by the City of Lakewood, offered the best individual intersection operation and optimized corridor timing. These optimal



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traffic signal timing plans were used in the analysis. A summary of the intersection LOS is shown in Exhibit 8.

EXHIBIT 7

Existing LOS for Wadsworth Boulevard (AM/PM)

Location	Northbound LOS	Southbound LOS
South of 5th Avenue	D/D	D/D
South of 10th Avenue	E/E	E/E

EXHIBIT 8

Existing LOS for Intersections along Wadsworth Boulevard (AM/PM)

Location	Control	LOS ¹
4th Avenue	Two-way Stop	B/B
5th Avenue	Signal	B/B
Broadview Drive/Frontage Road	Two-way Stop	F/F
Highland Drive	Two-way Stop	F/F
8th Place	Two-way Stop	F/F
9th Avenue	Two-way Stop	F/F
10th Avenue	Signal	B/D
12th Avenue	Two-way Stop	F/F
13th Avenue (south)	Two-way Stop	D/E
13th Avenue (north)	Two-way Stop	E/F
14th Avenue	Signal	B/C

¹ Worst cross-street approach LOS reported at TWSC intersections.

A complete summary of the peak-hour-traffic turning movements and LOS is shown in Exhibit 9.

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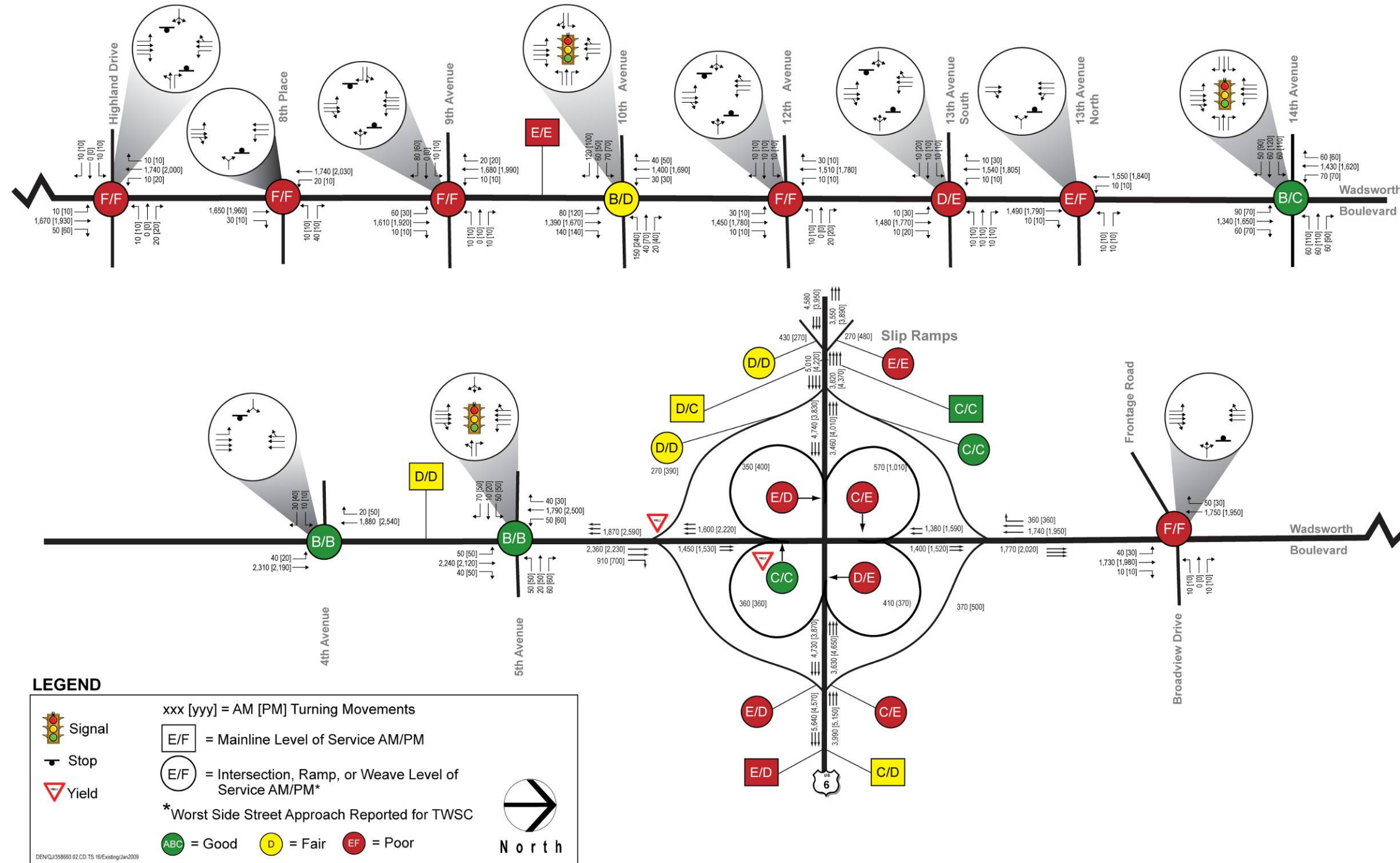


EXHIBIT 9
Existing Traffic Conditions – Wadsworth Boulevard and US 6 Interchange



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Adjacent Interchanges

To fulfill the requirement of the CDOT 1601 process, traffic operational analyses were performed for the adjacent interchanges of Sheridan Boulevard east of Wadsworth Blvd. and the Kipling Street/Garrison Street interchange complex west of Wadsworth Blvd. Supplemental traffic data were collected in January 2008.

Kipling Street is approximately 1.5 miles west of Wadsworth Blvd. It is a four-lane divided arterial south of US 6 and a four-lane undivided arterial north of US 6. Its interchange with US 6 is a modified cloverleaf design that provides all movements between Kipling Street and US 6.

Garrison Street is approximately 1 mile west of Wadsworth Blvd. It is a two-lane collector facility. It is connected to the Kipling Street interchange via auxiliary lanes. The Garrison Street ramps to/from US 6 work together with one-way frontage roads to provide the access between the two facilities.

Sheridan Boulevard is approximately 1.5 miles east of Wadsworth Blvd. It is a four-lane undivided arterial. Its interchange with US 6 is a diamond configuration. It is connected to the Wadsworth Blvd. interchange via one-way frontage roads. Exhibit 10 shows the existing ADT volumes for these facilities.

EXHIBIT 10
Existing Average Daily Traffic Volumes at Adjacent Interchanges

Location	Average Daily Traffic Volume
Kipling Street north of US 6	41,200
Kipling Street south of US 6	44,300
Garrison Street north of US 6	15,000
Garrison Street south of US 6	15,200
Sheridan Boulevard north of US 6	44,700
Sheridan Boulevard south of US 6	47,800

Exhibits 11 and 12 show the volumes and resulting LOSs for the various components of the facilities. All of the signalized intersections operate acceptably during the peak hours. The weave section on southbound Kipling Street operates very poorly at LOS F during the evening peak hour. The weaving section length between the two loop ramps is too short to accommodate the significant volume of traffic entering and exiting Kipling Street at this location. In the morning peak hour, the predominant movement is eastbound toward downtown Denver. The effect of this can be seen at the Wadsworth Blvd. and Sheridan Boulevard interchanges, where the LOSs on the mainline and at merge/diverge points are lower as compared to the Kipling Street interchange.

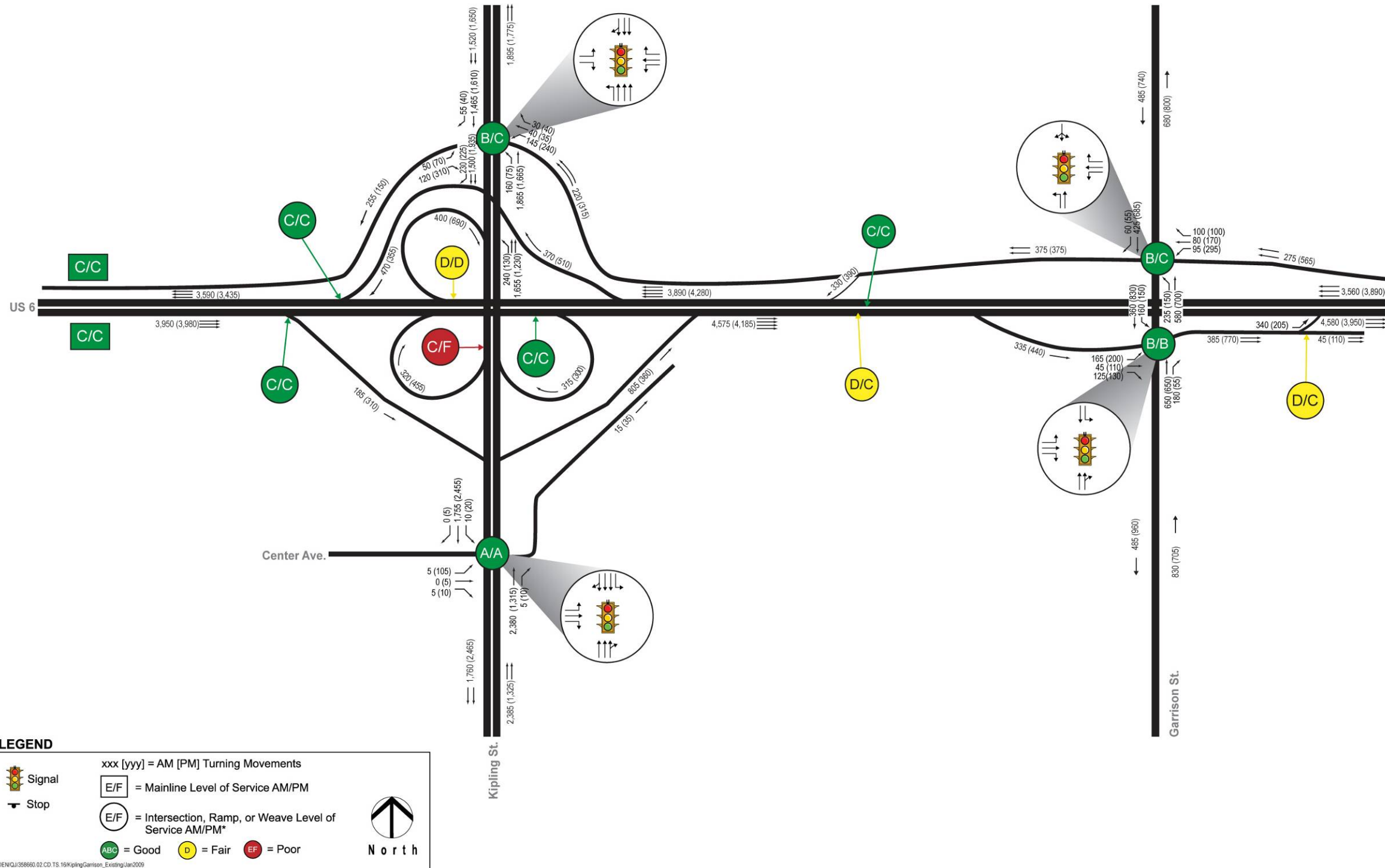
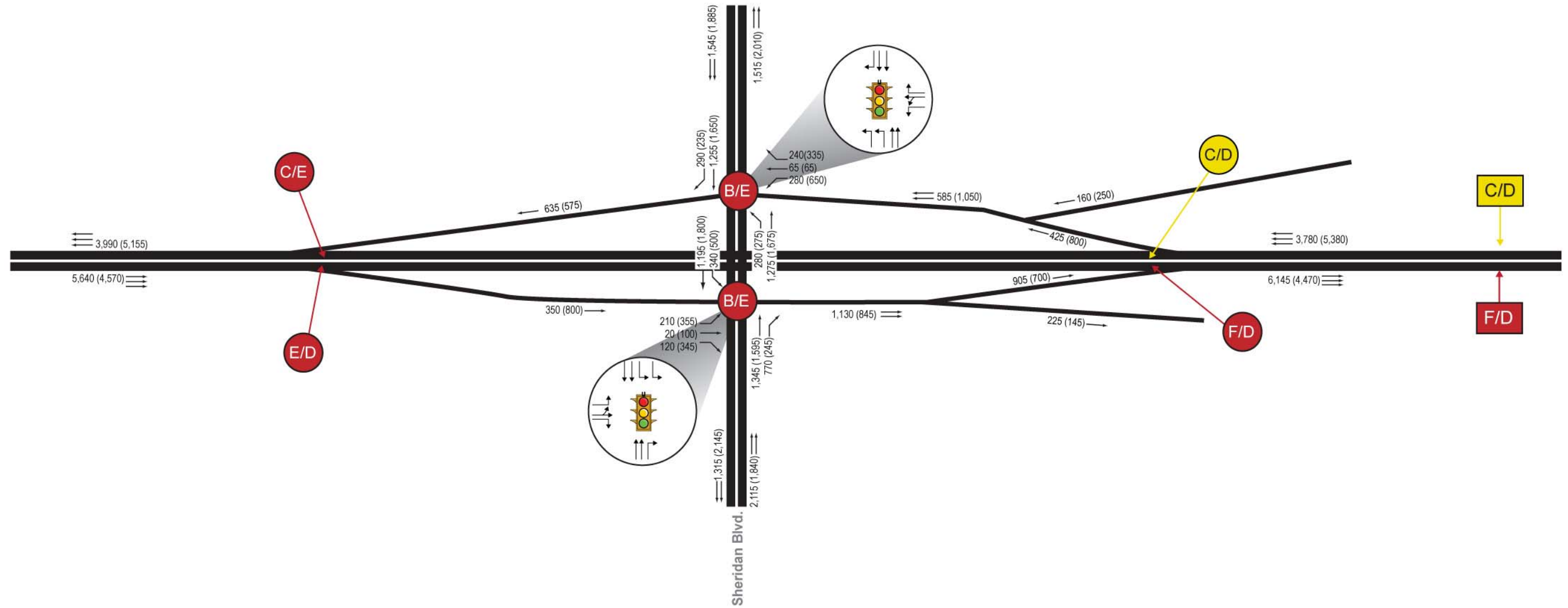


EXHIBIT 11
Existing Traffic Conditions – Kipling and Garrison Street Interchanges



LEGEND

Signal Stop

xxx [yyy] = AM [PM] Turning Movements

= Mainline Level of Service AM/PM

= Intersection, Ramp, or Weave Level of Service AM/PM*

= Good = Fair = Poor

North

DEN/QJ/358660.02.CD.TS.16/Sheridan_Existing/Jan2009

EXHIBIT 12
Existing Traffic Conditions – Sheridan Street Interchange

2.4 Access and Median Treatment Conditions

According to the CDOT Access Category Assignment Schedule, US 6 is a freeway (FW) and Wadsworth Blvd. is a non-rural regional highway (NR-A). NR-A facilities provide for intra- and inter-regional and city travel with movement of through-traffic given priority over direct access. CDOT defines the desired spacing of full-movement intersections for NR-A facilities similar to Wadsworth Blvd. as 0.50 miles.

As a freeway, access to US 6 in the Study Area is limited to interchange ramps and slip ramps to frontage roads. In the Study Area, access to Wadsworth Blvd. is provided with a full cloverleaf interchange. To the west, access to Carr and Garrison Streets is provided via short, one-lane directional ramps that intersect frontage roads on either side of US 6.

Access to Wadsworth Blvd. is currently provided in a variety of ways. Exclusive left- and right-turn lanes are provided at high-volume movements, although a number of right turns occur from shared through-lanes. South of US 6, a raised median helps control access to Wadsworth Blvd. Some accesses have been consolidated and others have been changed to RIRO. North of US 6, the median is striped to provide two side-by-side, continuous left-turn lanes serving major intersections and driveway accesses.

2.4.1 Access and Median Treatment Issues

The following bullet list highlights the critical issues and problem areas identified from the evaluation of existing access and median treatment conditions.

- A sight distance problem results when there are opposing left-turning vehicles at or near the same location.
- The uncertainty of where drivers will enter the median lane(s) contributes to mainline congestion and adds to the difficulty of entering or crossing Wadsworth Blvd. from the side streets.
- The numerous driveway accesses contribute to mainline turbulence.
- Due to the heavy through-traffic on Wadsworth Blvd., vehicles both from the side streets and from the driveways are forced to wait long periods of time and to pull into gaps that are inadequate.

2.5 Traffic Safety Conditions

The following is CDOT's Statement of Philosophy regarding crashes and their efforts to reduce them:

The efficient and responsible investment of resources in addressing safety problems is a difficult task. Since crashes occur on all highways in use, it is inappropriate to say

of any highway that it is safe. However, it is correct to say that highways can be built to be safer or less safe. Road safety is a matter of degree. When making decisions effecting road safety, it is critical to understand that expenditure of limited available funds on improvements in places where it prevents few injuries and saves few lives can mean that injuries will occur and lives will be lost by not spending them in places where more accidents could have been prevented. It is CDOT's objective to maximize accident reduction within the limitations of available budgets by making road safety improvements at locations where it does the most good or prevents the most accidents.

With this philosophy in mind, CDOT's Safety Engineering and Analysis Group performs safety assessments for highways around the state. Several recent assessments have included all or a portion of the Study Area limits within their area of analysis. The City of Lakewood Traffic Engineering Division has also prepared traffic safety reports that include the Study Area limits. Each of the traffic safety assessment reports were reviewed to determine the identified accident issues and recommended mitigation measures. A summary of each report, as it relates to the Study Area limits, is provided in Section 3.5.3.

CDOT's Safety Engineering and Analysis Group also prepared a summary of the accident history and level of service of safety (LOSS) for the US 6 mainline specifically for the EA effort. The results of this study are summarized in Section 3.5.4. Furthermore, additional accident data were obtained from CDOT and reviewed for individual segments of Wadsworth Blvd. within the study limits. The results of this review are summarized in Section 3.5.5. These three efforts (previous reports, LOSS analysis, and data analysis) form the basis of this existing conditions safety analysis.

2.5.1 Traffic Safety Issues

The following bullet list highlights the critical issues and problem areas identified from the evaluation of existing traffic safety conditions for the US 6 and Wadsworth Blvd. EA.

- From the statewide perspective looking at the entire project length, neither the accident frequency nor the severity is excessive for either of these facilities as compared to similar facilities across the state. Analyzing the accident data over short segments of Wadsworth Blvd. does suggest that there is a need to reduce the frequency of accidents at specific locations in this Study Area. The US 6/Wadsworth Blvd. interchange has the highest number of accidents of all the intersections analyzed in the CDOT report covering Wadsworth Blvd. from Florida Avenue to Broadview Drive. Likewise, the 10th Avenue intersection is highlighted as a problem intersection in the report covering Wadsworth Blvd. from Broadview Drive to 58th Avenue. Therefore, this particular Study Area from north of 2nd Avenue to 13th Avenue on Wadsworth Blvd. has several intersections identified as having a high accident frequency.
- As defined by the City of Lakewood traffic safety statistics, the interchange area was the most critical location in the City in 2001 and 2003 for frequency and the second-most

critical location for severity. It was also included on the critical intersection list in 2004 and 2005. The 13th Avenue intersection with Wadsworth Blvd. also appeared on Lakewood's 2003 and 2001 critical intersection list.

- Report summaries reviewed as part of this study suggest congestion along US 6 and Wadsworth Blvd. is an issue that is contributing to rear-end accidents, which are the most common accident type in the Study Area. This type of accident is occurring at relatively low speeds due to the congestion and is not resulting in a significant number of severe (injury and fatal) accidents.
- Wadsworth Blvd. in the interchange area experiences sideswipe same-direction accidents, which typically occur during lane-changing maneuvers. The cloverleaf interchange configuration provokes lane changing and weaving between merging and diverging vehicles. The need to change lanes is further exacerbated by the location of intersections immediately adjacent to the interchange area on the north and the south. Vehicles must change lanes to enter left-turn lanes at these intersections. An exiting vehicle has to weave across three lanes from the exit ramps to these left-turn lanes over a short distance.
- The second-highest type of accident on US 6 was hit fixed object. These result when drivers veer out of the travel lanes and strike the barriers and guardrails. Although nothing can prevent errant driving, the presence of these devices reduces the opportunity for run-off road accidents.
- The cloverleaf interchange configuration has ramps with significant curvature that require a much lower speed to negotiate than the prevailing speeds on either US 6 or Wadsworth Blvd. The overturning and hit-fixed-object accidents on the ramps can be attributed to failure to properly negotiate the curves. Exiting drivers may not adjust their speed quickly enough to slow down to the appropriate curve speeds. Furthermore, the lower speeds on the entrance ramps require quick acceleration over a short distance to merge at the prevailing speeds.

2.5.2 Traffic Safety Methodology

This section explains the evaluation process and presents the ratings for the existing safety conditions.

US 6 Mainline

Evaluation Criteria

Safety performance functions (SPFs) for urban six-lane freeways are provided in both of the US 6 reports reviewed as part of this study. These SPFs estimate the expected accident frequency for a particular ADT volume on an annual accident-per-mile basis for various facility types. It does not account for accidents that occur on the ramps.

For this existing conditions analysis, a particular segment's accident experience is evaluated based on the plotted position of its accident experience and ADT in relation to this statewide mean. If the annual accidents per mile plot within 25 percent on either side of the expected mean for that particular ADT, the segment receives a fair rating. An accident experience that plots below this threshold receives a good rating, while one that plots above this threshold results in a poor rating.

Evaluation Rating

The *Abbreviated Safety Assessment Report SH 6 MP 275.65 – MP 282.33* (April 2002) is based on accidents that occurred during the period 1996 through 2000. The mean on this SPF graph is 53 accidents per mile per year at an ADT of 120,000 vehicles. The accident experience for the segment between Garrison Street and Sheridan Boulevard plots at 42 accidents per mile per year for an ADT of 120,000. This is within the 25 percent threshold and, therefore, this segment receives a fair rating for this period.

The *Safety Assessment Report SH 6 Resurfacing Project MP 280.84 – MP 283.86* (April 30, 2003) is based on accidents that occurred during the period 1997 through 2001. The mean on this SPF graph is 54 accidents per mile per year at an ADT of 120,000 vehicles. The accident experience for the segment between Wadsworth Blvd. and Sheridan Boulevard plots at 39 accidents per mile per year for an ADT of 120,000. This is within the 25 percent threshold and, therefore, this segment receives a good rating for this period.

The portion of US 6 within the Study Area receives a fair rating for safety in accordance with the April 2002 report. However, the 42 accidents per mile per year is very close to the threshold for receiving a good rating. This analysis uses the older report because it covers the entire US 6 Study Area, whereas the April 2003 report does not include the portion of US 6 to the west of Wadsworth Blvd.

Wadsworth Boulevard

Evaluation Criteria

Wadsworth Blvd. is categorized as a Federal Aid Primary Urban Highway. For comparison to statewide average accident rates, it is categorized as a Federal Aid Urban Highway. This category includes state highways that have at-grade intersections and access driveways. Average statewide accident rates rather than SPFs provide the evaluation measure for this facility type. The 2003 average statewide accident rates for this type of facility are as follows:

- Total – 3.60 accidents per million vehicle miles traveled
- Property Damage Only – 2.63 accidents per million vehicle miles traveled
- Injury – 0.95 accidents per million vehicle miles traveled
- Fatal – 1.19 accidents per 100 million vehicle miles traveled

If a segment's accident rate falls within 25 percent of the statewide average rate, it receives a fair rating. A rate below this threshold receives a good rating, while one above this threshold results in a poor rating.

Evaluation Rating

Both of the two Wadsworth Blvd. reports reviewed as part of this study present one accident rate for the entire length of their respective Study Areas. These Study Areas encompass more of Wadsworth Blvd. than necessary for this existing conditions analysis. Therefore, this analysis divided the Study Area into segments and calculated accident rates for each.

Exhibit 13 shows the accident rates and corresponding evaluation rating by segment. The total, property damage only, and injury rates are in terms of accidents per 1 million vehicle miles traveled, while the fatal rates are in terms of accidents per 100 million vehicle miles traveled.

EXHIBIT 13
Wadsworth Boulevard 2001 – 2004 Accident Rates by Segment

Segment	Total	Property Damage Only	Injury	Fatal
	Rate/Rating	Rate/Rating	Rate/Rating	Rate/Rating
2nd Avenue to 5th Avenue	5.70/Poor	4.74/Poor	0.97/Good	0.00/Good
5th Avenue to Broadview Drive	10.91/Poor	9.42/Poor	1.49/Good	0.00/Good
Broadview Drive to 10th Avenue	4.81/Poor	3.65/Poor	1.11/Good	5.28/Poor
10th Avenue to 13th Avenue	6.40/Poor	5.33/Poor	1.08/Good	0.00/Good
Overall	6.51/Poor	5.34/Poor	1.15/Good	2.13/Poor

Source: CH2M HILL, 2007

The individual segments, as well as the Study Area overall, have a poor rating for the total and property damage only rates. The injury ratings are all good, indicating that the rates for each segment are more than 25 percent lower than the average for similar facilities statewide. The Broadview Drive to 10th Avenue segment receives a poor fatal rating, which also contributes to the overall poor total rating.

The individual segments between 2nd Avenue and Broadview Drive have accident rates that are greater than for the total length of Wadsworth Blvd. between Florida Avenue and Broadview Drive as reported in the CDOT *Safety Assessment Report SH 121 Resurfacing Project MP 10.10 – MP 12.53* (April 2001). According to this report, the interchange area has the most accidents of all the intersections in the segment between it and Florida Avenue. The vehicle miles traveled is in the denominator of the rate calculation. Therefore, the lower overall rate for the portion of Wadsworth Blvd. between Broadview Drive and Florida Avenue reflects the interchange accidents being spread over a greater distance and number of vehicle miles traveled. Hence, the shorter segment lengths have the effect of reducing the vehicle miles traveled, yielding a higher accident rate.

The poor ratings in the northern two segments for the total and property damage only rates reflect the conclusions shown in the *Safety Assessment Report SH 121 Resurfacing Project MP 12.54 – MP 18.00* (July 2003). The rate for the injury accidents within our Study Area is lower, indicating that segments further north in this Study Area had more injury accidents. The higher-than-average fatal rate for the segment between Broadview Drive and 10th Avenue also reflects the conclusions for the entire Study Area in the report.

2.5.3 Summary of Traffic Safety Reports

The review included the following reports previously produced by the CDOT Safety Engineering and Analysis Group:

- *Safety Assessment Report SH 121 Resurfacing Project MP 10.10 – MP 12.53* (April, 2001)
- *Abbreviated Safety Assessment Report SH 6 MP 275.65 – MP 282.33* (April 2002)
- *Safety Assessment Report SH 6 Resurfacing Project MP 280.84 – MP 283.86* (April 30, 2003)
- *Safety Assessment Report SH 121 Resurfacing Project MP 12.54 – MP 18.00*

The review also included the following reports previously produced by the Lakewood Traffic Engineering Division:

- *2003 Traffic Safety Report*
- *2005 Traffic Safety Report*

All of the reports include parts of the facilities that are outside of this Study Area. Included in Appendix C are individual report summaries that include a brief discussion of the entire report followed by a detailed discussion of the portions dealing with the Study Area.

General Conclusions from the Reports

The following presents conclusions drawn from the report review.

- **Magnitude of the Accident Problem:** From the statewide perspective provided in the CDOT analyses, US 6 experiences accident and severity frequencies that are within the expected deviation of the statewide average for similar facilities. Additionally, the accident and severity rates are below the statewide averages for similar facilities for both US 6 and the portion of Wadsworth Blvd. that is between the northern limit of the interchange and Florida Avenue. The interchange does not exhibit any unusual accident characteristics compared to similar facilities statewide. However, from the citywide perspective provided by Lakewood, the interchange accident rate is above the citywide average for similar facilities. It had the highest frequency of accidents and the second-highest severity index in the City in 2003.
- **Most Common Accident Types:** Based on review of available CDOT and City of Lakewood accident statistics, the top three accident types in the Study Area are rear end, hit fixed object, and sideswipe same direction. Both conclude that congestion is the cause

of the rear-end accidents. Capacity improvements to reduce congestion and signal progression to improve flow may help to mitigate the rear-end accidents. Lakewood concludes the significant sideswipe-same-direction (lane changing/merging) and rear-end accidents on Wadsworth Blvd. in the interchange area are due to the interchange configuration and congestion.

- **Ramp Issues:** CDOT concludes the westbound directional exit ramp experienced several overturn and run-off-road accidents due to severe curvature. Region 6 made some improvements that have helped to alert drivers to the need to slow down. Lakewood concludes that the curves on the directional eastbound entrance ramp contribute to fixed-object accidents and the short acceleration length contributes to rear-end accidents.
- **CDOT Mainline Recommendations:** Any alternative should incorporate median barrier and guardrail/retaining wall to prevent run-off-road accidents in which a vehicle leaves the travel way from becoming severe accidents. Likewise, there should be no curb that can induce overturning accidents. A continuous length of delineation is recommended along the median barriers to enhance visibility and provide positive guidance to drivers.

2.5.4 US 6 Safety Assessment

The CDOT Safety and Analysis Group tabulated the US 6 crashes in the Study Area for the most recent years of available data (2000-2004) and then used these data in the LOSS analysis of the US 6 mainline for both total crashes and severe (injury plus fatal) crashes. Exhibit 14 summarizes the accident history for US 6 from Kipling Street (MP 279.31) to Sheridan Boulevard (MP 282.33).

EXHIBIT 14
US 6 Accident Summary 2001 – 2004

Year	AADT	Crash History			
		PDO	Injury	Fatal	Total
2000	116,906	132	45	1	178
2001	116,910	83	35	0	118
2002	116,870	79	27	0	106
2003	116,894	92	16	0	108
2004	116,895	105	32	0	137
Average	116,895	98	31	0	129

Source: CDOT Safety and Analysis Group, 2008.

LOSS Analysis

CDOT has refined the assessment of the magnitude of safety problems on highway segments through the use of SPFs. An SPF reflects the complex relationship between traffic

exposure measured in annual ADT (AADT), and accident counts for a unit of road section measured in accidents per mile per year. The SPF models provide an estimate of the normal or expected accident frequency and severity for a range of AADT among similar facilities. Two kinds of SPFs were calibrated. The first one addresses the total number of accidents and the second one considers only accidents involving an injury or fatality (severe accident). These functions allow CDOT to assess the magnitude of the safety problem from the standpoints of both frequency and severity.

All dataset preparation was performed using the CDOT accident databases. Accident history for each facility was prepared using the most recent 10 years of available accident data. The AADT for each roadway segment for each of the 10 years was entered into the same dataset. Exhibit 15 illustrates how the dataset was prepared for urban freeways.

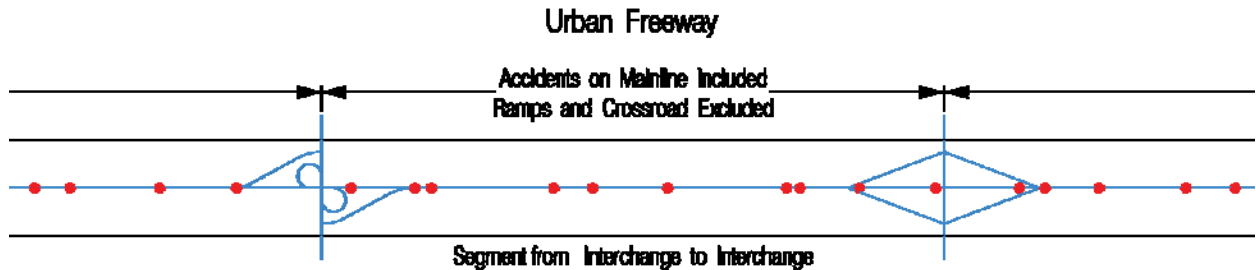


EXHIBIT 15
Diagram of Accidents Included in the US 6 Dataset

Development of the SPF lends itself well to the conceptual formulation of the LOSS. The concept of LOS uses qualitative measures that characterize safety of a roadway segment in reference to its expected performance and severity. If the level of safety predicted by the SPF represents a normal or expected number of accidents at a specific level of AADT, then the degree of deviation from the norm can be stratified to represent specific levels of safety as follows:

- LOSS I - Indicates a low potential for accident reduction
- LOSS II - Indicates a better than expected safety performance
- LOSS III - Indicates a less than expected safety performance
- LOSS IV - Indicates a high potential for accident reduction

Gradual change in the degree of deviation of the LOSS boundary line from the fitted model mean reflects the observed increase of variability in accidents/mile as AADT increases. LOSS reflects how the roadway segment is performing in regard to its expected accident frequency and severity at a specific level of AADT. It only provides an accident frequency and severity comparison with the expected norm. However, it does not provide any information related to the nature of the safety problem itself. If a safety problem is present, LOSS will only describe its magnitude from the frequency and severity standpoint. The nature of the problem is determined through diagnostic analysis using the direct diagnostics and pattern recognition techniques.

Exhibit 16 depicts the SPF calibrated specifically for Urban Six-Lane Freeways. The SPF Total and SPF Severe analyses describe the magnitude of the safety problem from the standpoints of both frequency and severity. These two existing segments are performing about the same (below the mean), which suggests a “Better than Expected Safety Performance” (LOSS II) in relationship to the total accident history for Urban Six-Lane Freeways.

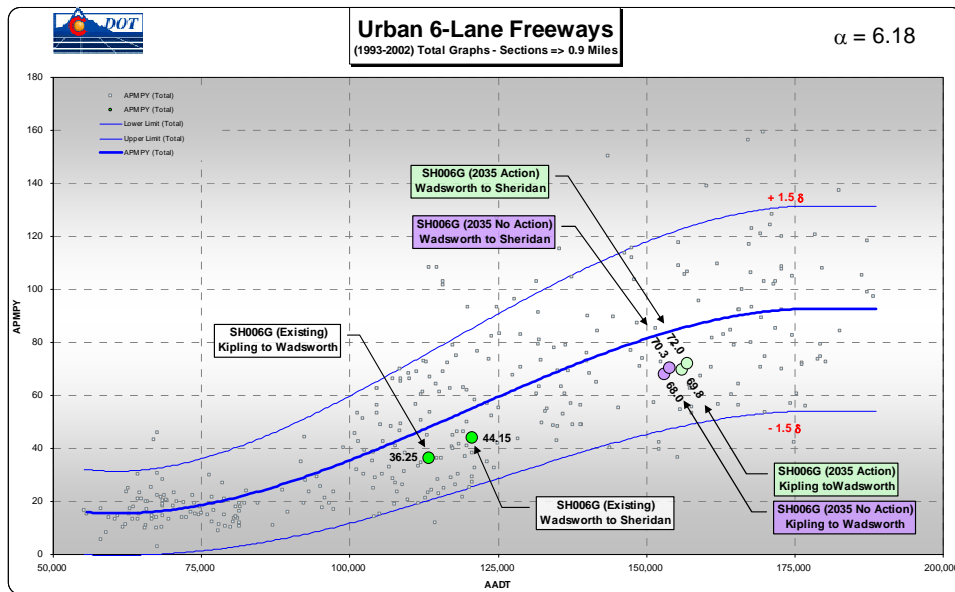


EXHIBIT 16
Safety Performance Function Graph for Total Accidents on US 6

Exhibit 17 depicts the SPF graph calibrated specifically for injury and fatal (severe) accidents only. These existing segments are also in the LOSS II category suggesting a “Better than Expected Safety Performance” for the more severe accidents. Exhibit 17 also shows that accident severity is performing slightly better than the total accident frequency, suggesting that there is a lower number of injury crashes in relationship to the total crash frequency.

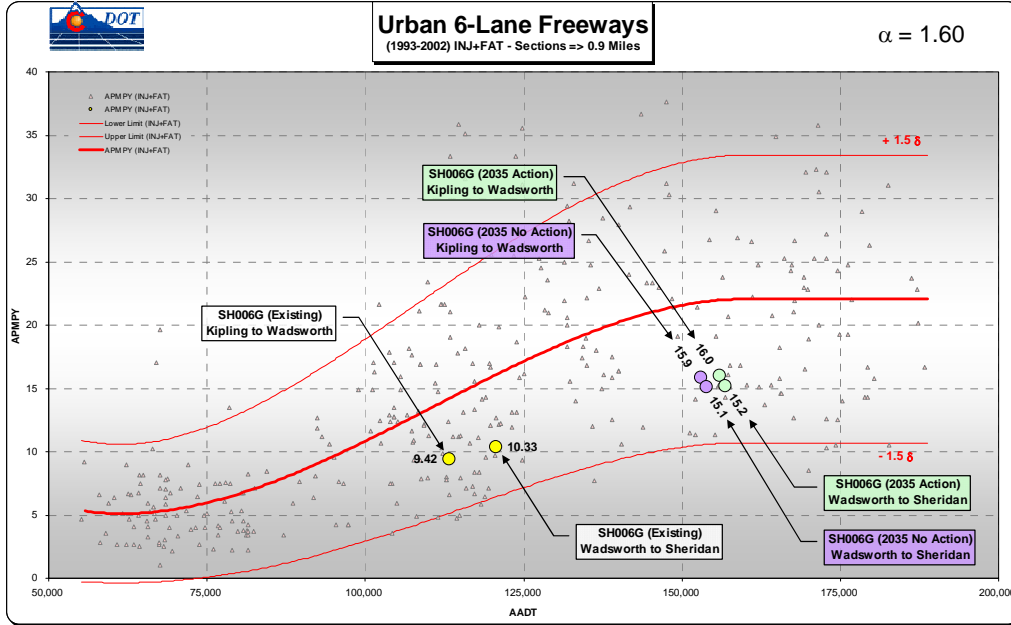


EXHIBIT 17
Safety Performance Function Graph for Severe Accidents on US 6

Exhibits 18 and 19 show the specific sideswipe-same-direction and rear-end crash types for US 6 at various MPs along the study corridor. These cumulative accident-type graphs show distinct concentration points of US 6 accidents around the Wadsworth Blvd. interchange.

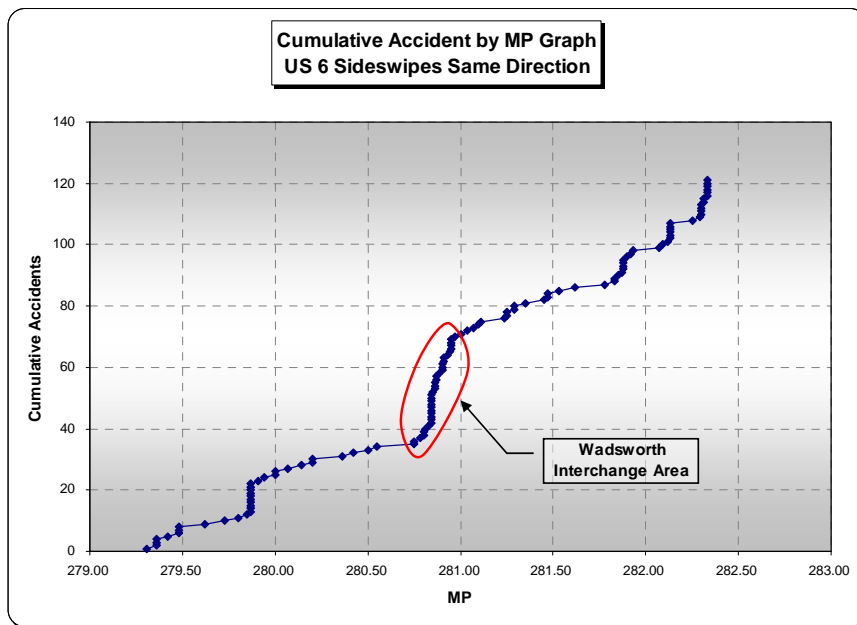


EXHIBIT 18
Sideswipe Same Direction Accident Graph for US 6

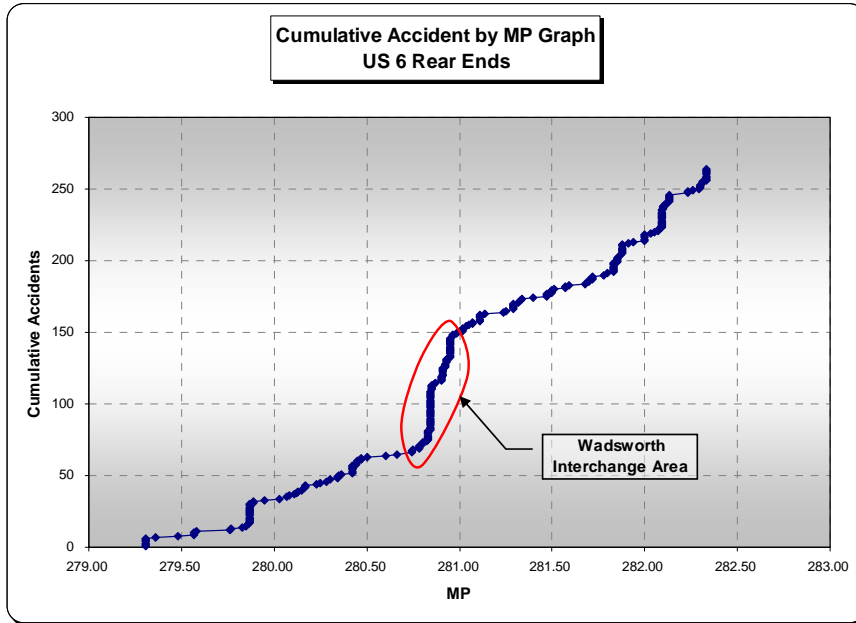


EXHIBIT 19
Rear end Accident Graph for US 6

2.5.5 Wadsworth Boulevard Safety Assessment

Based on data from the previously described Summary of Existing Traffic Safety Reports, the two Wadsworth Blvd. reports each present one accident rate for the entire length of the respective Study Area. The existing conditions analysis requires segmentation of the Study Area along Wadsworth Blvd. in order to determine spot-specific issues. Therefore, this analysis divided the Wadsworth Blvd. Study Area into segments and assessed accident patterns and calculated accident rates for each. CDOT provided accident and ADT data for the years 2001-2004 for this analysis.

2nd Avenue to 5th Avenue

This segment includes the 5th Avenue intersection, but does not include the 2nd Avenue intersection. Over the 4-year period, this segment experienced a total of 118 accidents. Of this total, 83 percent were property damage only and the remaining 17 percent involved injuries. A significant majority of the accidents occurred during the day with fair conditions when there was no inclement weather and the pavement was dry. The following lists the accident types and the percent of the total accidents each represents:

- Rear End 51%
- Sideswipe Same Direction 18%

- Broadside 13%
- Approach Turn 7%
- Hit Fixed Object 5%
- Overtaking Turn 3%
- Head On 2%
- Pedestrian 0.5%
- Bicycle 0.5%

This segment is typical of all of the segments in that the rear-end collisions were the most common accident type. Rear-end accidents are frequently related to congestion. Broadside and approach-turn accidents usually occur in an intersection environment.

5th Avenue to Broadview Drive

This segment encompasses the interchange. Over the 4-year period, this segment experienced a total of 205 accidents. Of this total, 86 percent were property damage only and the remaining 14 percent involved injuries. A significant majority of the accidents occurred during the day with fair conditions when there was no inclement weather and the pavement was dry. This segment had the highest percentage of accidents that occurred in the dark with lighting. The following lists the accident types and the percent of the total accidents each represents:

- Rear End 56%
- Sideswipe Same Direction 23%
- Broadside 8%
- Hit Fixed Object 6%
- Approach Turn 3%
- Overturning 2%
- Other Non-Collision 1%
- Overtaking Turn 0.5%
- Bicycle 0.5%

This segment has the highest percentage of sideswipe-same-direction accidents. These accidents typically occur during lane-changing maneuvers. The cloverleaf interchange configuration requires weaving maneuvers between the entering and exiting vehicles, increasing the potential for sideswipe-same-direction-type-accidents. The intersections immediately north and south of this interchange also increase the weaving as exiting vehicles attempt to weave across several lanes to enter the left-turn lanes to Broadview and 5th Avenues. The approach-turn accidents occurred at the Broadview Drive intersection. None occurred within the interchange due to the nature of the cloverleaf interchange. All but one of the broadside accidents appear to have occurred at the merge point of the eastbound directional exit to southbound Wadsworth Blvd., suggesting some drivers may not have properly negotiated the curve or there may be a sight distance issue.

Broadview Drive to 10th Avenue

This segment includes the 10th Avenue intersection. Over the 4-year period, this segment experienced a total of 183 accidents. Of this total, 76 percent were property damage only, 23 percent involved injuries, and 1 percent involved fatalities. A significant majority of the accidents occurred during the day with fair conditions when there was no inclement weather and the pavement was dry. The following lists the accident types and the percent of the total accidents each represents:

- Rear End 43%
- Approach Turn 20%
- Broadside 18%
- Sideswipe Same Direction 8%
- Hit Fixed Object 6%
- Head On 2%
- Overturning 1.5%
- Pedestrian 1%
- Bicycle 0.5%

This segment has the highest percentage of approach-turn and broadside accidents. All but two of the approach-turn accidents involved northbound and southbound vehicles turning off of Wadsworth Blvd. to 10th Avenue. A significant majority of the broadside accidents involved eastbound and westbound vehicles on 10th Avenue colliding with a northbound or southbound vehicle on Wadsworth Blvd. One of the fatal accidents was an approach turn at a driveway access north of the Highland Drive intersection. This driver was under the influence of illegal drugs. In the other fatal accident, the driver ran off the road to the right and hit a tree at the Highland Drive intersection.

10th Avenue to 13th Avenue

This segment division occurs here because there is a significant drop in ADT north of 10th Avenue. Over the 4-year period, this segment experienced a total of 107 accidents. Of this total, 83 percent were property damage only, while the remaining 17 percent involved injuries. A significant majority of the accidents occurred during the day with fair conditions when there was no inclement weather and the pavement was dry. The following lists the accident types and the percent of the total accidents each represents:

- Rear End 67%
- Broadside 12%
- Approach Turn 11%
- Sideswipe Same Direction 7%
- Sideswipe Opposite Direction 1%
- Hit Fixed Object 1%
- Other Non-Collision 1%

This is the only segment that experienced a sideswipe-opposite-direction accident. The accident occurred when a northbound vehicle on Wadsworth Blvd. was attempting to turn left at 13th Avenue. The other accident types are typical of those experienced by the other segments.

2.6 Bicycle and Pedestrian Conditions

This section describes the condition of the existing pedestrian and bicycle facilities within the US 6 and Wadsworth Blvd. EA Study Area. The inventory of existing conditions was compiled from aerial photography and field inventories. US 6 is a grade-separated facility where bicycles and pedestrians are prohibited; therefore, it was not included in the analysis, with the exception of pedestrian facilities in the Wadsworth interchange area. Results of this analysis suggest that the existing facilities along Wadsworth Blvd. are largely inadequate for both pedestrian and bicycle travel modes.

2.6.1 Bicycle and Pedestrian Issues

The following bullet list highlights the critical issues and problem areas identified from the evaluation of existing bicycle and pedestrian conditions for the US 6 and Wadsworth Blvd. EA.

- The existing pedestrian sidewalk system is lacking in continuity and conformance with CDOT standards. Approximately 50 percent of the eastside sidewalk is missing or in substandard condition, and 85 percent of the west side sidewalk is missing or substandard.
- The Wadsworth corridor is not currently a highly active pedestrian or bicycle corridor. However, the missing and substandard sidewalks may be discouraging bicycle and pedestrian use. The future light rail station and ancillary development at 13th Avenue and Wadsworth are expected to increase pedestrian and bicycle activity along Wadsworth Blvd.
- Even with current low user demand, Wadsworth Blvd. is an important corridor for bicyclists and pedestrians because of the barrier effect created by US 6. Wadsworth is the only crossing of US 6 for a 2.5-mile stretch from Sheridan Boulevard to Garrison Street.
- The existing cloverleaf interchange is not conducive to pedestrian and bicycle movements through the interchange. The high-volume, free-flowing ramps do not offer many gaps in traffic flow, and vehicle visibility for bicyclists crossing the ramps is difficult.
- Crash data from 2003 through 2005 do not indicate a hazardous pattern or trend in crashes.

2.6.2 Pedestrian Facilities – Wadsworth Sidewalk Conditions

The sidewalks along Wadsworth are characterized by a mixture of detached and attached walks, missing links, and various obstructions along the corridor. A detailed inventory was conducted to measure the amount of missing and substandard sidewalk. Exhibit 20 provides a summary of the sidewalk that is missing or is in substandard condition for each side of Wadsworth. Exhibit 21 provides the same data, but summarized by street segment.

EXHIBIT 20
Missing or Substandard Sidewalk on Each Side of Wadsworth

Location	% Missing Sidewalk	% Missing or Non Standard Sidewalk
East sidewalk	20%	52%
West sidewalk	71%	85%
Combined	45%	68%

EXHIBIT 21
Missing or Substandard Sidewalk by Segment of Wadsworth

Location	% Missing Sidewalk	% Missing or Non Standard Sidewalk
3rd Avenue to 5th Avenue	17%	61%
5th Avenue to 10th Avenue	50%	65%
10th Avenue to 14th Avenue	52%	83%

The majority of sidewalk along Wadsworth Blvd. is either non-existent or substandard. The east side of Wadsworth has more sidewalk continuity than the west side, but it is still missing long segments of sidewalk, especially north of US 6. The west side of Wadsworth Blvd. has very little sidewalk that currently exists or meets standards. In fact, only 15 percent of the west side of Wadsworth Blvd. has sidewalk that meets CDOT standards.

In addition to the discontinuity of sidewalk, there are numerous sidewalk deficiencies along Wadsworth Blvd. Where the sidewalk is attached, it is often no more than 5 feet in width with no a suitable barrier to protect pedestrians from adjacent vehicles. The following photographs provide a sample of several of the sidewalk deficiencies that exist.

Sidewalk crossing at high-volume on-ramp
(NB Wadsworth to EB US 6)



Narrow attached sidewalk under US 6 bridge (east side
of Wadsworth)



Light Pole obstructing pedestrian traveled way (East side
Wadsworth from 6th to 8th Avenue)



Missing curb ramp on northeast corner of 8th Place and
Wadsworth



Turn island without curb ramps in pedestrian path
(940 Wadsworth Parking Lot Access)



Non-ADA curb ramp at southeast corner of
10th Avenue/Wadsworth Boulevard





2.6.3 Pedestrian Facilities – Wadsworth Crossings

The Study Area currently has just two controlled pedestrian crossings of Wadsworth Blvd. These are located at the signalized intersections of 5th Avenue and 10th Avenue. Both intersections experience a low to moderate amount of pedestrian activity. Pedestrian crosswalks and pedestrian signals are provided on all four corners of each intersection. The following provides a summary of pedestrian facility conditions at 5th Avenue and 10th Avenue:

5th Avenue and Wadsworth Boulevard

Pedestrian Signals

At the time of this existing conditions evaluation only standard man/hand pedestrian signal indications existed for each crosswalk. This traffic signal was recently reconstructed. The pedestrian signal equipment was replaced including the addition of countdown timer signals and intersection lighting on each corner.



DRAFT Traffic Study Report

Pedestrian Signal Actuation

Push buttons are provided on each corner. Pedestrian signals for crosswalks parallel to Wadsworth Blvd. (crossing 5th Avenue) are set to “rest-in-walk” mode.

Lighting

No lighting exists.

Crosswalk Pavement Markings:

- North leg: Fair condition
- South leg: Fair condition
- East leg: Fair condition
- West leg: Fair condition

Pedestrian Signing

No special signs exist.

10th Avenue and Wadsworth Boulevard

Pedestrian Signals

Standard Man/Hand pedestrian signal indications along with countdown timers are provided for each crosswalk.

Pedestrian Signal Actuation

Push buttons are provided on each corner. Pedestrian signals for crosswalks parallel to Wadsworth Blvd. (crossing 10th Avenue) are set to “rest-in-walk” mode.

Lighting

Lighting exists on all four corners.

Crosswalk Pavement Markings:

- North leg: Fair condition
- South leg: Poor condition
- East leg: Poor condition
- West leg: Fair condition

Pedestrian Signing

No special signs exist.

2.6.4 Pedestrian Activity

Pedestrian activity information along the Wadsworth Blvd. corridor was collected as part of the traffic data collection, and general field observations confirm that this corridor does not have a high volume of pedestrians. Pockets of pedestrian activity tend to be centered at the signalized intersections of 5th Avenue and 10th Avenue. A higher-than-expected number of mid-block crossings occur near 4th Avenue. This is likely due to the presence of the Wal-Mart store east of Wadsworth Blvd. and residential land uses to the west. Although Wadsworth Blvd. is not a heavily used pedestrian corridor, it still provides the only north-

south pedestrian crossing of US 6 along a 2.5-mile stretch from Sheridan Boulevard to Garrison Street. Additionally, pedestrian activity along Wadsworth Blvd. is expected to increase once the West Corridor light rail station at 13th Avenue and Wadsworth Blvd. opens in 2012, but no quantitative estimates of future pedestrian activity have been made to date.

2.6.5 Pedestrian Crashes

Pedestrian crash data from Lakewood were analyzed for a 3-year period from January 1, 2003, through December 31, 2005. As indicated by Exhibit 22, there were a total of four pedestrian crashes (including one injury crash) from 2003 through 2005. The crashes appear to be random and the data do not indicate any identifiable crash patterns or trends.

EXHIBIT 22
Pedestrian Crash Data (2003 – 2005)

Year	Number	Injuries	Fatalities	Location
2003	2	1	0	Property damage only at 8th Place; injury at 13th Avenue
2004	0	0	0	N/A
2005	2	0	0	Property damage only at US 6 and 10th Avenue

2.6.6 Bicycle Facilities

Exhibit 23 shows the existing and proposed bicycle facilities in the vicinity of the Study Area. The *Lakewood Bicycle System Master Plan*, adopted by City Council in 2005, identifies Wadsworth Blvd. as a bike route with detached multi-use paths. Although Wadsworth Blvd. is not a primary bicycle corridor, it is the only north-south roadway between Sheridan Boulevard and Garrison Street where bicyclists are able to cross US 6.

There are also two bicycle routes that cross Wadsworth Blvd. in the Study Area: 10th Avenue and the 13th Avenue (D-10) bike route. Tenth Avenue is identified as a commuter bicycling route with on-street bike lanes. Bike lanes along 10th Avenue currently exist west of Wadsworth Blvd. but not to the east.

The 13th Avenue bike route is a primary commuter and recreational route that will eventually connect northwest Lakewood with downtown Denver. The route currently exists as an on-street facility along 13th Avenue but it will be mostly converted to a multi-use path with a grade separation at Wadsworth and Sheridan Boulevards as part of the West Corridor light rail project.

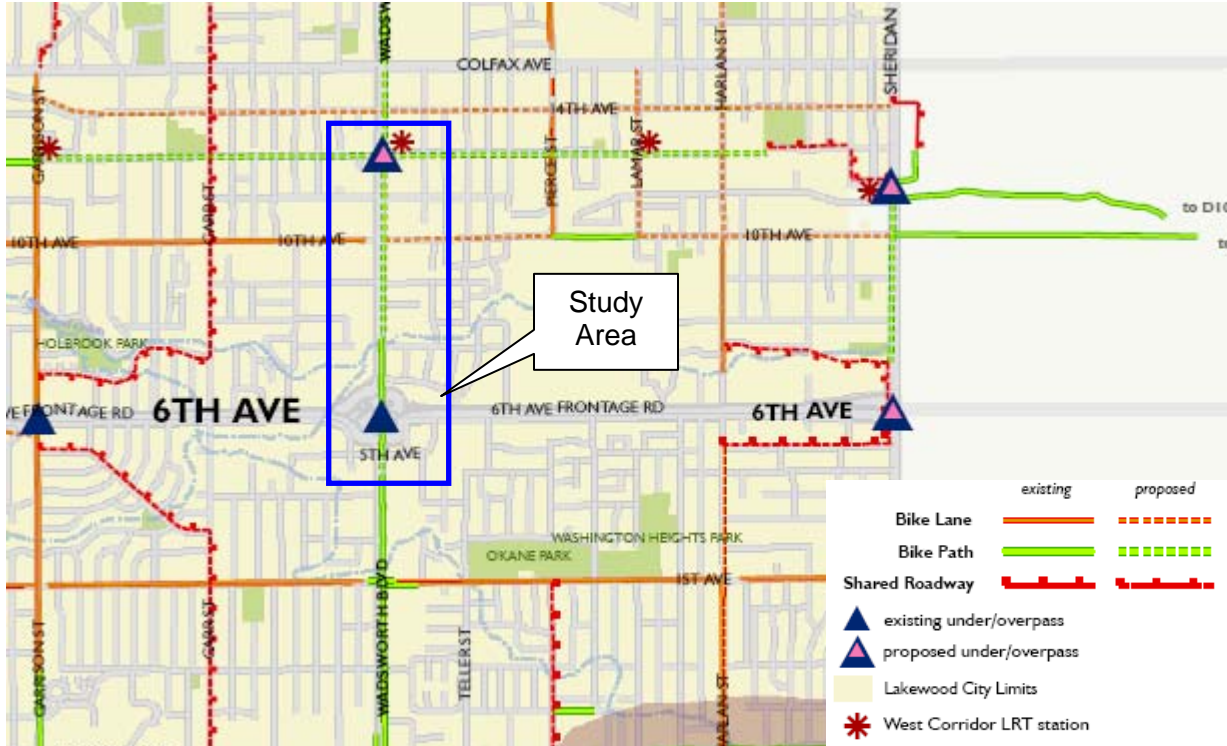


EXHIBIT 23
Lakewood Bicycle Master Plan in Vicinity of the Study Area

The Colorado Bicycling Map (published by CDOT in 2004) identifies US 6 as a state highway where bicyclists are prohibited. This is also conveyed through “bicycles prohibited” signs posted at the on-ramps to US 6. The Colorado Bike Map identifies Wadsworth Blvd. as a high-volume state highway with shoulder widths of less than 4 feet. Bicycles are not prohibited from using Wadsworth Blvd.; however, the map information conveys that Wadsworth Blvd. is not a bicycle-friendly state highway.

2.6.7 Bicycle Facility Deficiencies

One of the primary deficiencies of the existing sidewalk/path along Wadsworth Blvd. is the crossing of the cloverleaf interchange at US 6. The sidewalk path system crosses four free-flowing ramps in locations where drivers are not expecting to encounter bicycle and pedestrian activity. Furthermore, northbound bicyclists do not have a good view of approaching traffic when they are crossing the northbound-to-eastbound on-ramp and the northbound-to-westbound on-ramp at US 6. Bicyclists must look over their left shoulder to see traffic approaching from behind.

Another issue with the existing multi-use path along Wadsworth Blvd. is the crossing of driveways and side streets. Because most of the west side of Wadsworth Blvd. does not

have an existing path, southbound bicyclists are forced to either ride in the street where there is no shoulder, or use the path along the east side of the street. Using the path on the east side becomes a safety issue when bicyclists encounter vehicles exiting driveways or side streets. Motorists turning right onto Wadsworth Blvd. normally look to their left and may not see a bicycle approaching from their right (north).

At locations where a sidewalk/path does exist, numerous deficiencies exist that make the path unfriendly and/or unsafe to bicycle travel. These include obstacles in the travel way (light poles, benches, newspaper stands, etc.), insufficient clear zone, missing curb ramps, debris in the travel way, and inadequate width to accommodate both bicyclists and pedestrians.

2.6.8 Bicycle Activity

Bicycle activity along Wadsworth Blvd. is generally low as most riders use Garrison Street 1 mile to the west for north-south travel. Garrison Street has a lower posted speed, less traffic, and more continuous shoulders all of which are more conducive to bicycle travel. Bicycle activity is expected to increase once the West Corridor light rail station at 13th and Wadsworth Blvd. opens in 2012, but no quantitative estimates of future bicycle activity have been made to date.

2.6.9 Bicycle Crashes

Bicycle crash data from Lakewood were analyzed for a 3-year period from January 1, 2003, through December 31, 2005. As indicated by Exhibit 24, there were a total of five bicycle crashes (including four injury crashes) from 2003 through 2005. Two of the five crashes occurred at 10th Avenue and both involved eastbound bicycles. The 2003 crash was a broadside crash involving a southbound left-turning vehicle. The crash in 2005 was a rear-end crash involving an eastbound vehicle away from the intersection. In both crashes, the motor vehicle was at fault. Given the differing characteristics of these crashes, it does not appear they are indicative of an accident pattern; however, when more recent crash data become available, the data should be evaluated to determine if there is a correctable pattern of crashes.

EXHIBIT 24
 Bicycle Crash Data (2003 – 2005)

Year	Number	Injuries	Fatalities	Location
2003	3	2	0	Property damage only at 4th Avenue; injury at US 6 and at 10th Avenue
2004	0	0	0	N/A
2005	2	2	0	Property damage only at 10th Avenue; injury at 12th Avenue

2.7 Neighborhood Traffic Conditions

This section describes the existing condition of neighborhood traffic along the streets surrounding the US 6 and Wadsworth Blvd. interchange area. Depending on the alternative for the interchange and Wadsworth Blvd. corridor, there is the potential for neighborhood access and traffic patterns to be changed, particularly near the US 6 interchange and supporting frontage road system.

2.7.1 Neighborhood Traffic Issues

The following bullet list highlights the critical issues and problem areas identified from the evaluation of existing neighborhood traffic conditions for the US 6 and Wadsworth Blvd. EA.

- 4th Avenue, 12th Avenue, Broadview Drive, and Highland Drive are carrying daily traffic volumes well below Lakewood's design threshold of 2,500 vehicles per day (vpd) for local streets. With the exception of Highland Drive, the 85th percentile speed on these streets was at or below the existing speed limit.
- The data indicate a slight speeding problem along Highland Drive (34 mph 85th percentile speed versus 30-mph speed limit), but the speeds are not high enough to be considered a traffic hazard to the neighborhood.
- The frontage road does not carry a high volume of traffic (310 vpd); however, there is a history of neighborhood concern about traffic flow, and local residents may be concerned about any additional traffic that is routed on their streets from the frontage road.
- The 85th percentile speeds along the US 6 frontage roads are 5-10 mph higher than the posted speed limit of 35 mph (NE 6th FR, e/o Broadview = 43 mph; NE 6th FR, w/o Broadview = 45 mph; SE 6th FR, e/o Vance = 40 mph; SW 6th FR, e/o Allison = 45 mph; and NW 6th FR, e/o Allison = 43 mph) The higher speeds are primarily a result of long tangent sections and minimal side-street friction. Additionally, speeds on the west quadrant frontage roads are likely influenced by the higher speeds on the adjacent freeway because there is no visual separation between the two facilities.
- Several of the two-way streets (4th Avenue, Carr Street, Broadview Drive, and Highland Drive) have a large directional difference in ADT volume. This imbalance is primarily due to these streets serving traffic in the opposite direction of nearby one-way frontage roads.
- The traffic data indicate that 10th Avenue west of Wadsworth Blvd. and Carr Street north of US 6 both have 85th percentile speeds well above the 30-mph posted speed limit (36 mph and 38 mph, respectively). Although both streets are classified as minor collectors, they still pass through residential neighborhoods. 10th Avenue is adjacent to the Jefferson County Open School. Traffic speeds on 10th Avenue are partially mitigated by

the 20-mph school speed zone that is activated during school start and end times. Examination of speed data during school start and end times shows that the 85th percentile speeds are reduced from 36 mph to 30 mph.

- Field review of study area residential streets suggests that these streets do not have a speeding or traffic volume problem due to narrow pavement sections, curvilinear geometry, and street discontinuity, each of which helps mitigate speeding.

2.7.2 Neighborhood Traffic Data

ADT and speed data were collected at 13 locations on neighborhood streets and on the US 6 frontage roads. These counts were selected based on prior knowledge of the street system and an understanding of which streets are susceptible to changes in traffic flow as a result of the project. The traffic counts measured traffic volume and 85th percentile speeds. The data were collected over a 2-day period during the second week of May 2007 (while school was still in session). Exhibit 25 provides a summary of the collected data and Exhibit 26 shows the neighborhood traffic-control devices.

EXHIBIT 25
Existing Neighborhood Traffic Volume and Speed Data

Location	Street Classification	ADT (vpd)	Speed Limit (mph)	85th%tile Speed (mph)
10th Avenue, e/o Upham	Minor Collector	4,000	30	32
10th Avenue., e/o Allison	Minor Collector	4,410	30	36
NE 6th FR, e/o Broadview	Minor Collector	540	35	43
NE 6th FR, w/o Broadview ¹	Minor Collector	310	35	45
SE 6th FR, e/o Vance	Minor Collector	1,865	35	40
SW 6th FR, e/o Allison ¹	Minor Collector	465	35	45
NW 6th FR, e/o Allison ¹	Minor Collector	1,100	35	43
Carr Street, n/o 4th	Minor Collector	895	30	30
Carr St., n/o 7th	Minor Collector	1,850	30	38
12th Avenue, e/o Allison	Local	550	25	29
Highland Drive, e/o Park	Local	945	30	34
Broadview, e/o Park	Local	155	30	30
4th Avenue, e/o Allison	Local	975	30	29

¹ Indicates one-way street

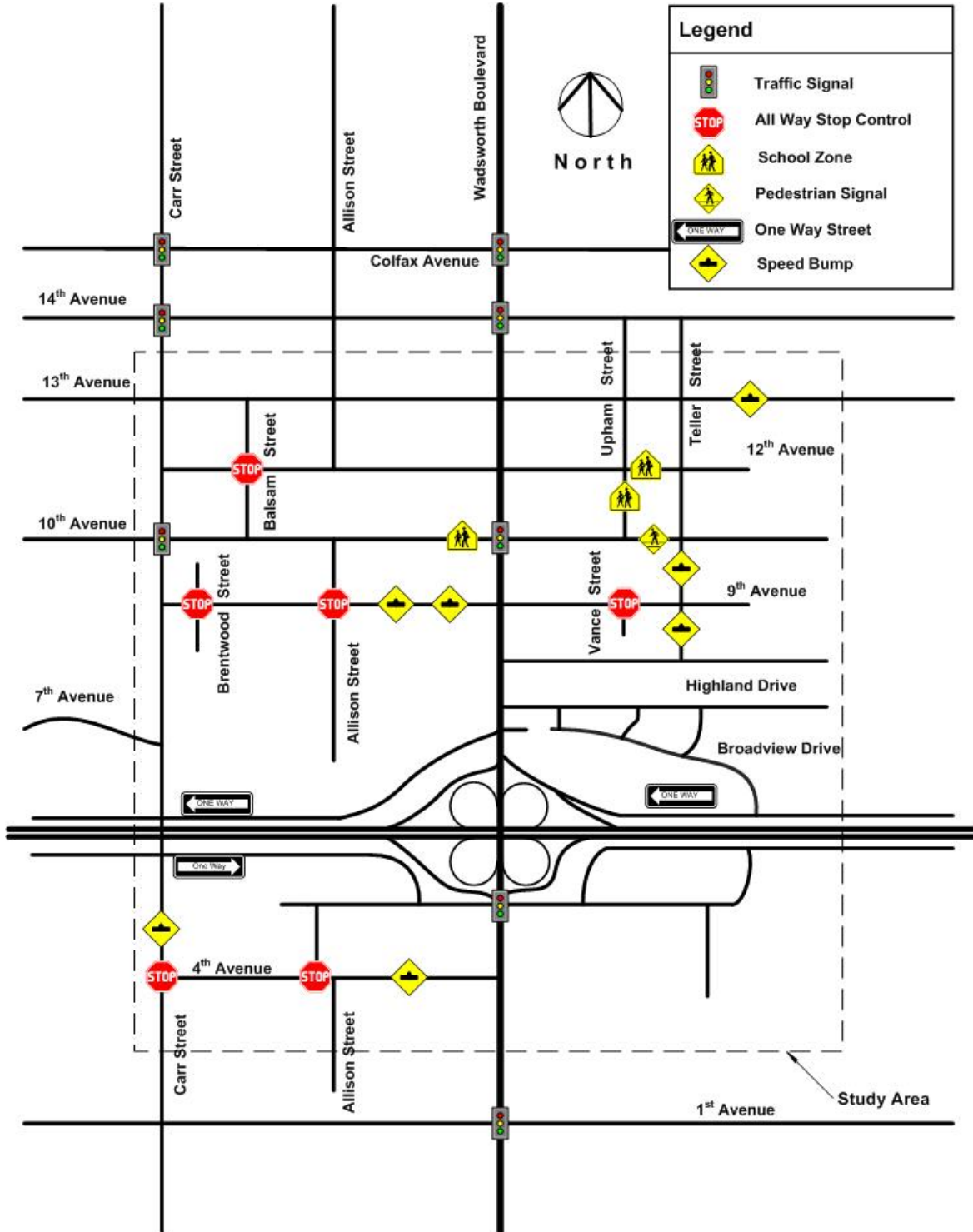


EXHIBIT 26
Existing Neighborhood Traffic Control Devices in Vicinity of the Study Area

3.0 Alternatives Considered

The alternatives development and evaluation process included two levels of screening and evaluation for a range of design concepts for the interchange and Wadsworth Blvd. General concepts for the interchange and Wadsworth Blvd. were developed and subjected to a Level 1 “fatal flaw” screening. Those concepts carried forward for further evaluation were refined and compared to each other in a Level 2 evaluation. The results of the Level 2 evaluation identified one combined alternative that will be evaluated in the EA.

This section provides a brief summary of the traffic input to the screening and evaluation criteria, and the alternatives considered. Additional information on the alternatives evaluation and selection process can be found in the *Alternatives Development and Screening Technical Memorandum* (CH2M HILL, 2008). Results from this traffic study were used to inform the decision-making process and to assist in the evaluation of mobility/traffic operations, safety/design, and local impact criteria. Through a series of stakeholder workshops and public open houses, key agencies and the public provided input into criteria development, alternative evaluation, and selection of the Build Alternative.

3.1 Level 1 Screening

Level 1 screening was intended to define a range of design concepts that could meet the project purpose and need and would not result in unacceptable environmental or community impacts. Level 1 screening criteria were developed to screen concepts in the following areas: safety and design; mobility and traffic operations; local impacts; environmental impacts; cost feasibility; and implementation. Consistent with the “fatal flaw” analysis, concepts were judged “yes” or “no” for meeting each criteria element. Questions such as, “Can this alternative accommodate safer bicycle and pedestrian travel through the interchange?” and “Can the alternative meet current and future traffic needs?” were used to eliminate infeasible alternatives. Those alternatives that passed the Level 1 screening were further evaluated and compared in Level 2.

3.1.1 US 6 and Wadsworth Boulevard Interchange

The US 6 and Wadsworth Blvd. interchange is a service interchange – an interchange between a controlled access facility (US 6) and an arterial (Wadsworth Blvd.) – in an urban environment. The interchange type and setting shaped the range of initial design concepts considered. Typical configurations for service interchanges in urban areas include diamonds and partial cloverleaves. These configurations accommodate high volumes of traffic within areas of constrained right-of-way (ROW). Interchange designs that had the potential to address the highest-volume movements from northbound Wadsworth Blvd. to eastbound US 6 in the morning peak hour, and from westbound US 6 to southbound Wadsworth Blvd. in the evening peak hour were considered.

Given the interchange type and the location of the highest-volume movements, the following general concepts, in addition to the No Build Alternative, were considered for the US 6 and Wadsworth Blvd. interchange:

1. **Traditional Diamond:** The Traditional Diamond was considered because of its widespread application in freeway-to-arterial interchanges. It is the most common type for local access freeway interchanges with one entrance and one exit in each direction; on- and off-ramps meet at two signalized intersections.
2. **Tight Diamond:** The Tight Diamond operates the same as a traditional diamond except that ramp intersections are spaced more closely. It was considered because of its suitability to urban areas with constrained ROW.
3. **Tight Diamond with Loop:** The Tight Diamond with Loop is similar to the Tight Diamond except that a loop ramp would be maintained in the northwest quadrant of the interchange. There would be no traffic signal at the intersection of the loop ramp with Wadsworth Blvd. The Tight Diamond with Loop was considered to accommodate the high-volume left-turn movement from westbound US 6 to southbound Wadsworth Blvd.
4. **Single-Point Urban Interchange (SPUI):** The SPUI is similar to a Diamond interchange, with one entrance and one exit in each direction. However, all four ramps meet at one central signalized intersection, rather than at two signalized intersections. Like the Tight Diamond, the SPUI was considered because of its suitability to urban areas with constrained ROW.
5. **Partial Cloverleaf:** The Partial Cloverleaf would maintain loop ramps in the northwest and southeast quadrants of the interchange. The loops would be enlarged to meet current design standards, and the other ramps would be extended to improve acceleration and deceleration lengths. The two loop ramps would provide greater capacity and would eliminate two left-turn signals and left-turn conflicts when compared with the Diamond or SPUI interchanges.
6. **Partial Cloverleaf with Directional Ramp:** The Partial Cloverleaf with Directional Ramp would maintain two loop ramps in the northeast and southwest quadrants and add an elevated ramp from westbound US 6 to northbound Wadsworth Blvd. The ramp would fly over US 6 and touch down near 4th Avenue on Wadsworth Blvd.
7. **Full Cloverleaf with Collector-Distributor Roads:** This interchange would enlarge the four loop ramps to meet current design standards and expand the frontage road system between ramps to eliminate weaving conflicts on mainline US 6. It is the highest capacity interchange and has the largest physical impact of the concepts considered.
8. **Diverging Diamond:** The Diverging Diamond is a rare interchange type that would remove left turns in the intersection by requiring Wadsworth Blvd. drivers to briefly cross into the opposite lane of traffic at two crossover intersections. The Diverging

Diamond was considered because it removes the need for left-turn signals at the interchange.

Each of these general concepts were measured by the Level 1 screening criteria to identify any fatal flaws. Concepts receiving a fatal flaw rating on any of the criteria elements (that is, one or more “no” responses) were eliminated from further consideration. All of the concepts met Mobility and Traffic Operations and Local Impacts criteria, but four of the concepts failed one or more of the Environmental Impacts, Cost Feasibility, or Implementation criteria.

The No Action Alternative does not meet evaluation criteria, but was retained for baseline comparison. In addition to the No Action Alternative, the four concepts retained for Level 2 evaluation included the Tight Diamond, Tight Diamond with Loop, SPUI, and Partial Cloverleaf.

3.1.2 Wadsworth Boulevard

The initial Wadsworth Blvd. design concepts were developed to balance the potential for ROW acquisition with the need to improve traffic capacity, traffic safety, and pedestrian and bicycle conditions. Concepts ranged from those that would require limited construction to those that would require increasing amounts of additional ROW adjacent to Wadsworth Blvd. The concepts varied the number of lanes and the presence of medians and sidewalks to compare the “minimum” to “maximum” footprints. Travel lanes address capacity; medians address access control; and sidewalks address pedestrian and bicycle facilities.

The following general concepts, in addition to the No Build Alternative, were considered for Wadsworth Blvd.:

1. Intelligent Transportation Systems (ITS)/Travel Demand Management (TDM)/Transportation Systems Management (TSM) Only (minimal physical improvements)
2. Intersection Improvements plus Median
3. Four-Lane plus Median plus Sidewalk
4. Five-Lane plus Median without Sidewalk
5. Five-Lane plus Median plus Sidewalk
6. Six-Lane plus Median without Sidewalk
7. Six-Lane without Median plus Sidewalk
8. Six-Lane plus Median plus Sidewalk
9. Six-Lane plus Two-Way Left-Turn plus Sidewalk

10. Six-Lane (four Travel Lanes plus two Dedicated Transit Lanes)

11. Eight-Lane (six Travel Lanes plus two Dedicated Transit Lanes)

Each of these general concepts was measured by the Level 1 screening criteria to identify any fatal flaws. Concepts with any fatal flaws were eliminated from further consideration. Only one concept passed the Level 1 screening and was carried forward for further evaluation: Six-Lane plus Median plus Sidewalk (Concept 8). Because additional lane capacity, access control, and improved pedestrian and bicycle facilities were critical elements of the purpose and need for this project, Concept 8 was the only one that met the purpose and need for Wadsworth Blvd. improvements and, therefore, was the only concept carried forward to Level 2 evaluation.

3.2 Level 2 Evaluation

The purpose of the Level 2 evaluation was to establish a means for estimating and comparing how well design concepts performed in meeting transportation needs in a cost-effective and least environmentally harmful manner. The Level 2 evaluation expanded the measures for each of the criteria from Level 1 screening and provided a method for comparing concepts to support the selection of the Build Alternative to be evaluated in the EA via a “good,” “fair,” and “poor” rating system. Because only one Wadsworth Blvd. concept passed the Level 1 screening, a Level 2 evaluation was conducted for that concept solely for the purpose of identifying mitigation opportunities relative to the evaluation criteria.

Four interchange concepts were carried forward from the Level 1 screening for additional evaluation, in addition to the No Build Alternative:

1. Tight Diamond
2. Tight Diamond with Loop
3. SPUI
4. Partial Cloverleaf

The design of each of the four concepts was refined to better understand the benefits and impacts of the concepts and to provide information for a quantitative assessment in the Level 2 evaluation. The four concepts were then measured to determine how well each concept met the Level 2 evaluation criteria for the project. The initial evaluation showed that none of the concepts clearly performed better than the others in all criteria categories; some performed better on some measures and worse on others. The decision process that led to selection of the Build Alternative is described in subsequent sections.

The features of each of the interchange concepts and their performance on key evaluation criteria are described below.

3.2.1 Tight Diamond

The Tight Diamond interchange concept would provide four standard ramps between Wadsworth Blvd. and US 6. Two traffic signals would be added on Wadsworth Blvd. to allow left turns at the ramps. Right turns at the entrance ramps would be free-flow movements.

The Tight Diamond concept would address the highest-volume left-turn movement from westbound US 6 to southbound Wadsworth Blvd. by providing three left-turn lanes on the westbound exit ramp. To address the limited vehicle storage area within the interchange, queuing of vehicles would be accommodated outside of the interchange. This would allow vehicles to wait for left turns outside of the ramp intersections on Wadsworth Blvd.

Most of the pedestrian and bicycle crossings at the interchange would occur at signalized intersections, except at two free-flow right-turn movements. Additionally, pedestrians and bicyclists could cross Wadsworth Blvd. at either or both intersections in the interchange.

The Tight Diamond interchange alternative is shown in Exhibit 27.

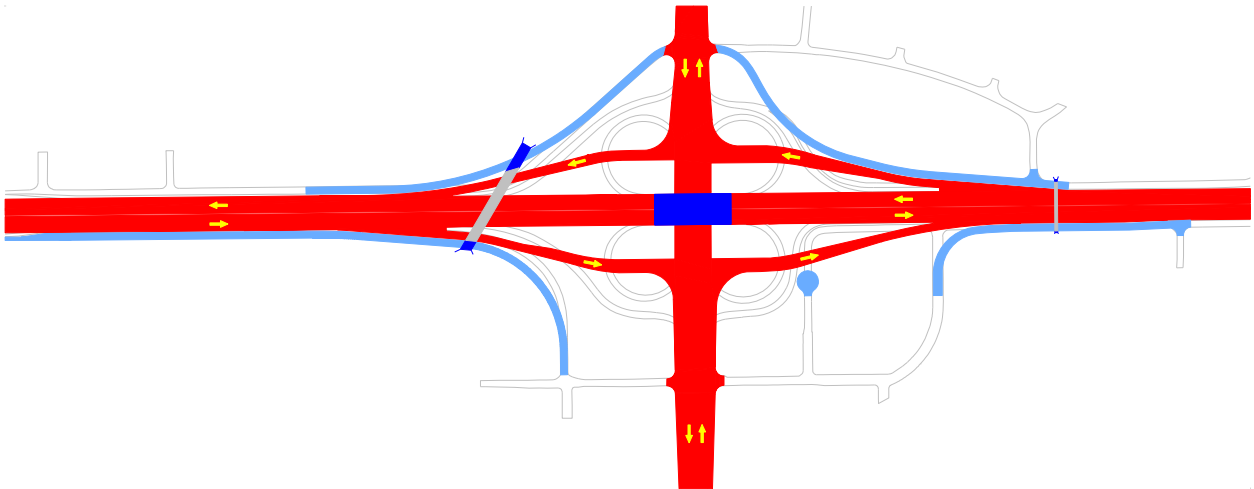


EXHIBIT 27
US 6 and Wadsworth Boulevard Interchange – Tight Diamond Alternative

3.2.2 Tight Diamond with Loop

The Tight Diamond with Loop concept would provide a loop ramp for the highest-volume left-turn movement from westbound US 6 to southbound Wadsworth Blvd. Traffic making this movement would exit US 6 onto a loop ramp, as it does today. Placing the highest-volume left-turn movement on a loop ramp would increase traffic capacity at other left-turn movements at the interchange, improving the operation of the entire interchange when compared to the Tight Diamond and SPUI concepts.

The eastbound ramps (on the south side of US 6) would be the same as those in the Tight Diamond, and would intersect Wadsworth Blvd. at a traffic signal. The westbound ramp intersection (on the north side of US 6) would be shifted farther north than in the Tight Diamond, to allow for the placement of the loop ramp. The westbound ramp intersection would require a signal for southbound Wadsworth Blvd. traffic only; northbound traffic at this location would not require a signal.

Pedestrians and bicycles crossing through the interchange would cross the terminal of the loop ramp and two free-flow right-turn movements without the benefit of traffic signals. Loop ramp crossings present a greater safety concern than right-turn movements because of the speed and sight lines of the vehicles on the loop ramp. Pedestrians and bicycles could cross Wadsworth Blvd. at the south ramp intersection, but not at the north ramp intersection.

The Tight Diamond with loop interchange alternative is shown in Exhibit 28.

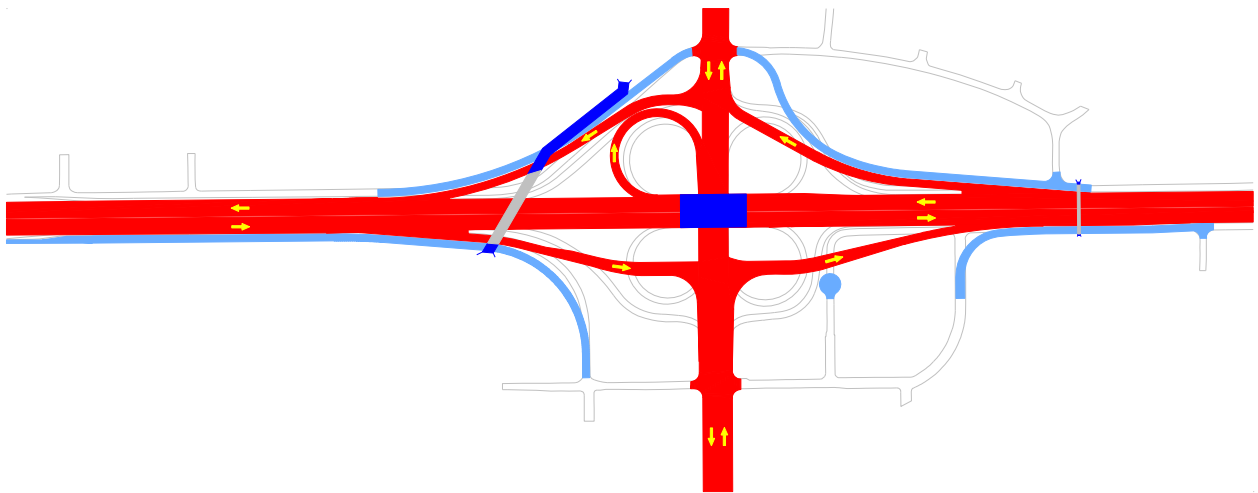


EXHIBIT 28

US 6 and Wadsworth Boulevard Interchange – Tight Diamond with Loop Alternative

3.2.3 Single-Point Urban Interchange

An SPUI would provide four standard ramps that converge to a single intersection. The left-turn movements at all four ramps would be controlled by a single traffic signal. SPUIs are often thought to operate more efficiently than Tight Diamond interchanges because there is only one traffic signal for vehicles to negotiate. However, the intersection is very large due to the geometry of the ramp movements.

The SPUI concept would address the highest-volume left-turn movement from westbound US 6 to southbound Wadsworth Blvd. by providing three left-turn lanes on the westbound exit ramp. Right turns at the ramps would be free-flow movements except in the southwest quadrant of the interchange. The right-turn movement in this quadrant would be signaled, allowing vehicles to travel across Wadsworth Blvd. to turn left onto 5th Avenue.

Most of the pedestrian and bicycle crossings at the interchange would occur at signalized intersections, except at free-flow right-turn movements. Pedestrians and bicyclists could not cross Wadsworth Blvd. at the interchange; they would travel south to the 5th Avenue intersection or north to the 10th Avenue intersection.

The SPUI alternative is shown in Exhibit 29.

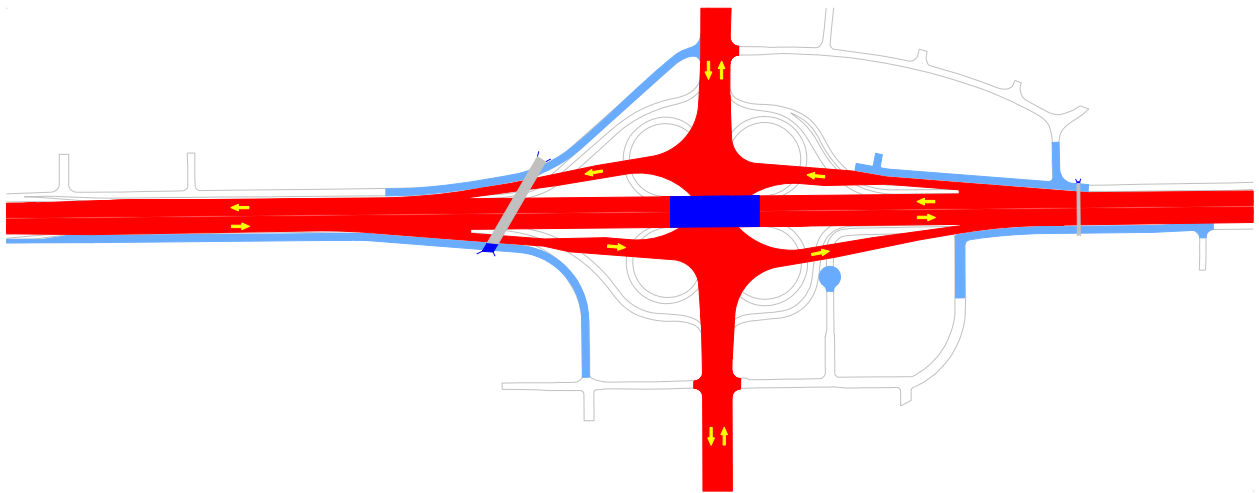


EXHIBIT 29
US 6 and Wadsworth Boulevard Interchange – Single-Point Urban Interchange Alternative

3.2.4 Partial Cloverleaf

The Partial Cloverleaf concept would provide loop ramps for two left-turn movements. The loop ramp in the northwest quadrant of the interchange would carry traffic at the highest-volume left-turn movement from westbound US 6 to southbound Wadsworth Blvd. The loop ramp in the southeast quadrant of the interchange would carry traffic from eastbound US 6 to northbound Wadsworth Blvd. Traffic making these movements would exit US 6 onto loop ramps, as it does today. Placing two left-turn movements onto loop ramps would increase traffic capacity at other left-turn movements at the interchange, improving the operation of the entire interchange when compared to the Tight Diamond and SPUI concepts.

The remaining ramps would be shifted farther away from US 6 to allow for placement of the loop ramps, increasing impacts to properties around the interchange. Two traffic signals would be added on Wadsworth Blvd., one at each ramp intersection.

Pedestrians and bicycles crossing through the interchange would cross the terminals of the two loop ramps and two free-flow right-turn movements without the benefit of traffic signals. Loop ramp crossings present a greater safety concern than right-turn movements, because of the speed and sight lines of the vehicles on the loop ramp. Pedestrians and bicyclists could not cross Wadsworth Blvd. at the interchange; they would travel south to the 5th Avenue intersection or north to the 10th Avenue intersection.

The partial cloverleaf interchange alternative is shown in Exhibit 30.

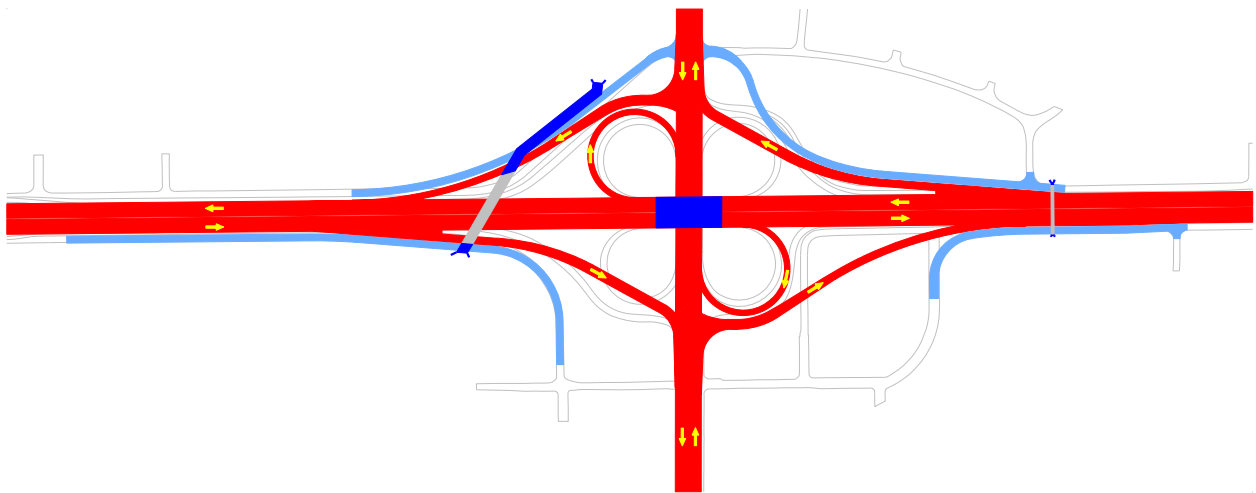


EXHIBIT 30
US 6 and Wadsworth Boulevard Interchange – Partial Cloverleaf Alternative

3.2.5 Wadsworth Boulevard

In addition to the No Build Alternative, a single Wadsworth Blvd. concept was carried forward from the Level 1 screening for additional evaluation: six travel lanes with a median and sidewalks. This concept was recommended as the Build Alternative for Wadsworth Blvd. and the Level 2 evaluation was only conducted to identify mitigation opportunities relative to the evaluation criteria.

3.3 Build Alternative Selection

US 6 Interchange

The Build Alternative for the project was identified separately for the US 6 and Wadsworth Blvd. interchange and for Wadsworth Blvd. north of Highland Drive. The Level 2 evaluation did not clearly identify a Build Alternative for the US 6 and Wadsworth Blvd. interchange, so an additional decision process was conducted. Based on a prioritization of distinguishing criteria which included interchange capacity, corridor travel time, and bicycle and pedestrian safety as three of the top four criteria, the Tight Diamond with Loop was selected as the Build Alternative for the interchange.

Charter team members agreed to the recommendation of the Tight Diamond with Loop as the Build Alternative. Two open houses held with the public presented the Level 2 evaluation results and the recommended Build Alternative. Comments received from the public indicated concurrence with the recommendation. The Build Alternative for the US 6 and Wadsworth Blvd. interchange is shown in Exhibit 31.

Wadsworth Boulevard

The Build Alternative for Wadsworth Blvd. was identified as a result of the Level 1 screening because it was the only concept that met the project purpose and need. The Wadsworth Blvd. Build Alternative would feature 11- and 12-foot travel lanes, a raised median of varying width, and a detached multi-use sidewalk in most locations north of US 6.

A raised median in varying width would provide access control and landscaping opportunities. The median would prevent left turns at mid-block locations and would channel left turns to intersections with cross streets. At most intersections, u-turns would be allowed. No additional traffic signals would be added on Wadsworth Blvd., except those required at the interchange. Traffic signals would remain at 5th, 10th, and 14th Avenues. Other intersections with cross streets would remain unsignalized. Cross-street access to Wadsworth Blvd. at Highland Drive, 8th Place, 9th Avenue, and 13th Avenue would be limited to further improve safety and traffic capacity in the corridor.

An 8-foot multi-use sidewalk would be provided on both sides of Wadsworth Blvd. to accommodate pedestrians and bicyclists. The multi-use sidewalk between US 6 and

14th Avenue would be detached in most locations. The detached walk would provide a higher level of comfort to pedestrians and bicyclists, moving them farther away from vehicular traffic, and would provide landscaping opportunities in the buffer between the road and sidewalk.

Included in Appendix A, the proposed *Access Control Plan* maintains the requirements for the freeway designation for US 6 and brings Wadsworth Blvd. more in line with the NR-A designation. An extensive public involvement campaign took place during the development of the plan including five open houses held with the public. CDOT mailed a project atlas showing estimated impacts to the 97 potentially affected property owners (represents approximately 130 parcels) and invited property owners to call or meet with project staff to discuss potential impacts to their properties. With the study intent of reducing access points to Wadsworth Blvd., many of these meetings focused on removing existing driveways and consolidating access for adjacent properties. The proposed access locations in the Build Alternative are the culmination of these numerous meetings with property owners, CDOT, and Lakewood.

Charter team members agreed to the recommendation of a six-lane section with raised median and detached sidewalks as the Build Alternative. Two open houses held with the public presented the Level 2 evaluation results and the recommended Build Alternative. Comments received from the public indicated concurrence with the recommendation. The Build Alternative for Wadsworth Blvd. is shown in Exhibit 32.

The next section, 5.0 Travel Demand, describes the process for determining future 2035 travel demands at the interchange and along the corridor. Detailed traffic operational analyses were performed for each of the four alternatives considered.

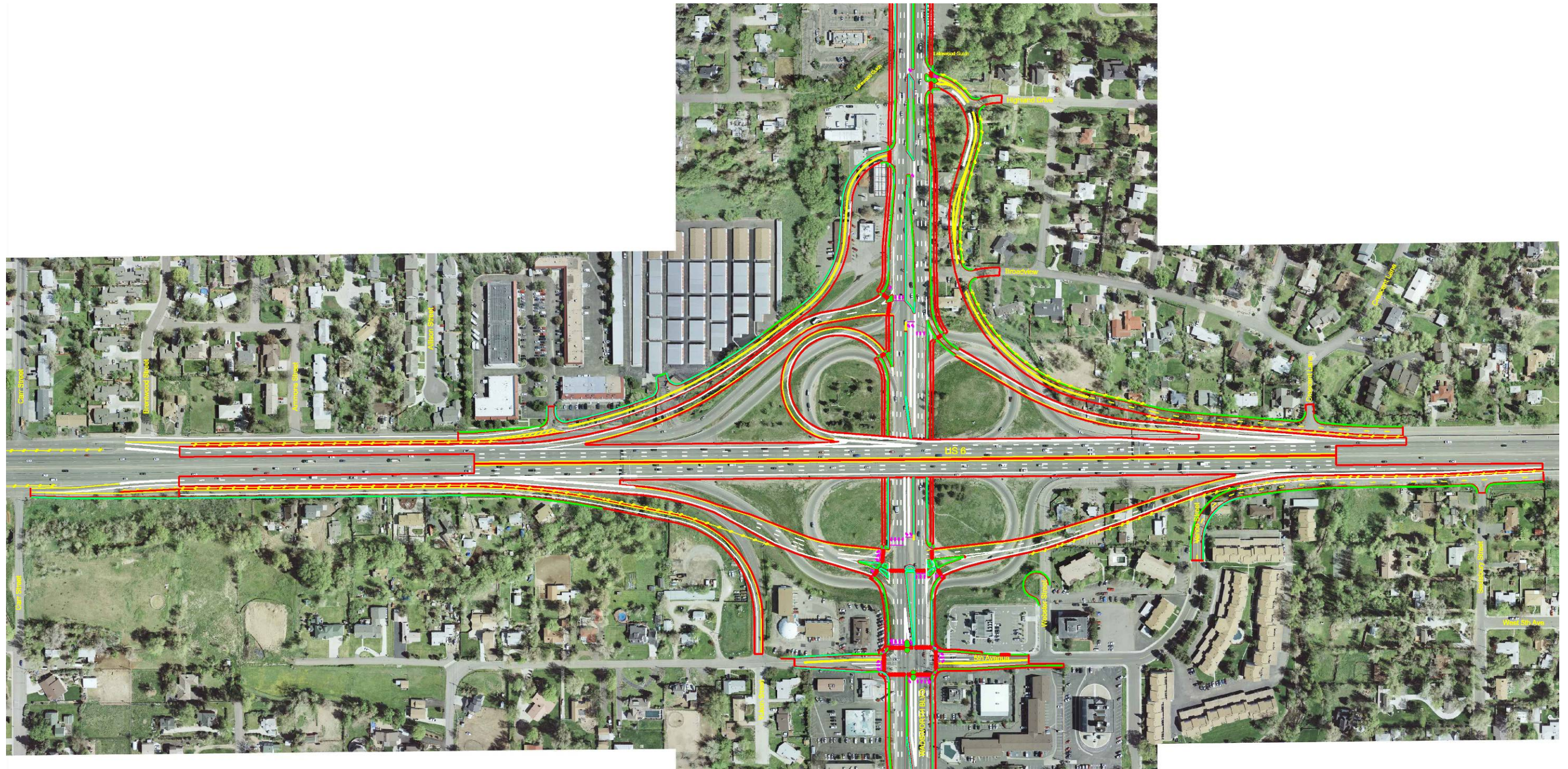


EXHIBIT 31
Build Alternative – US 6 and Wadsworth Boulevard Interchange

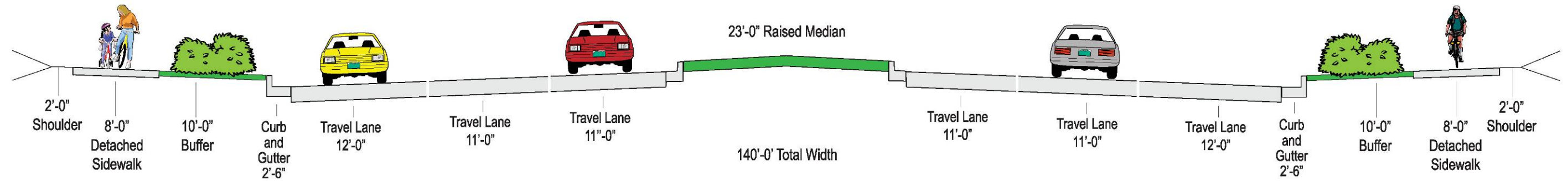


EXHIBIT 32
Build Alternative –Wadsworth Boulevard

4.0 Future Travel Demand

4.1 Travel Demand Forecasting

Forecast 2035 traffic conditions were determined using the Denver Regional Council of Governments (DRCOG) regional travel demand model, “Compass.” This regional model is a robust database of land use characteristics, expected future roadway network improvements, planned transit expansion, and travel behavior used to forecast future regional traffic volumes. The demand model was used to assess and compare alternatives, determine future corridor capacity needs, and develop appropriate expected future turning movements at intersections.

At the onset of the study, DRCOG was in the process of updating its travel model to year 2035. At that time, Lakewood provided DRCOG revised land use estimates at the Federal Center, which is expected to undergo significant redevelopment, and near the 13th Avenue LRT station on Wadsworth Blvd., which included socio-economic estimates reflective of the recent transit mixed-use (TMU) zoning changes enacted by the City. The DRCOG model contains all of the planned transit lines for the FasTracks program including the West Corridor light rail project that traverses the northern part of the Study Area. The US 6 and Wadsworth Blvd. interchange as well as the widening between 4th and 14th Avenues is included in the *Fiscally Constrained 2035 Regional Transportation Plan (RTP)*. Therefore, the project was removed from the network to appropriately model the No Build Alternative.

Nationally recognized National Cooperative Highway Research Program (NCHRP) 255 procedures were used to adjust future link volumes where appropriate. These procedures refine future modeled volumes based on the deviations of the base-year model from the count data using both a ratio and a difference method. Generally, the 2035 No Build Alternative traffic scenario has approximate 25 percent more traffic than existing conditions and the build alternatives have about 10 percent latent demand on Wadsworth Blvd. north of US 6. This growth equates to approximate 1 percent annual growth which is typical for an urban area. As expected, the growth near the planned 13th Avenue RTD LRT station is higher than the rest of the corridor. The existing and forecast daily traffic volumes are shown in Exhibit 33.

EXHIBIT 33
Existing and Forecast Daily Traffic Volumes

Location	2007 ADT	2035 No Build	2035 Build
Wadsworth Blvd. south of 10th Avenue	50,800	62,600	68,700
Wadsworth Blvd. south of 5th Avenue	65,700	80,900	82,500
US 6 east of Wadsworth Blvd.	123,000	153,900	156,900
US 6 west of Wadsworth Blvd.	122,300	153,000	156,000

In order to evaluate the overall benefits and potential impacts of the additional capacity on Wadsworth Blvd., a screenline analysis was performed from Kipling Street to Sheridan Boulevard. A screenline analysis looks at the travel shed as a whole rather than focusing on individual corridors. As shown in Exhibit 34, the five corridors included in the analysis carry the same amount of traffic regardless of the alternative. This indicates that the proposed capacity on Wadsworth Blvd. will meet the expected future demand and does not induce additional automobile traffic. Therefore, the proposed improvements to the interchange and increased corridor capacity on Wadsworth Blvd. serve the existing and expected demands and will likely slightly reduce congestion on parallel adjacent corridors, most notably Kipling Street and Sheridan Boulevard.

EXHIBIT 34

Existing and Forecast Daily Traffic Screenline – Street Network North of US 6 from Kipling Street to Sheridan Boulevard

Location	2007 ADT	2035 No Build	2035 Build
Kipling Street	41,200	55,300	53,500
Garrison Street	15,000	17,700	17,000
Carr Street	1,850	3,200	2,500
Wadsworth Blvd.	50,800	62,600	68,700
Sheridan Boulevard	44,700	54,200	51,600
Total	153,550	193,000	193,300

4.2 Future Traffic Operations – No Build Alternative

Evaluation of future No Build traffic operations was completed using the same methodology outlined for the existing conditions. Mainline, weave, merge/diverge, and urban street operations were evaluated with Highway Capacity Software. Synchro software was used to determine intersection LOS. The effects of the additional traffic volume can be seen as most of the LOSs decrease compared to the existing conditions.

Mainline, Weaves, Merges, and Diverges

A summary of the mainline LOS by direction at six locations is shown in Exhibit 35 followed by a summary of the weave LOS by direction at the four weave locations in Exhibit 36. A summary of the merge and diverge LOS is shown in Exhibit 37.



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EXHIBIT 35

2035 No Build Alternative LOS for Basic Freeway Segments on US 6 (AM/PM)

Location	Westbound LOS	Eastbound LOS
East of Wadsworth Blvd.	D/F	F/E
West of Wadsworth Blvd.	D/E	F/D
West of Carr Street	C/D	E/D

EXHIBIT 36

2035 No Build Alternative LOS for Weave Areas at the US 6 Interchange (AM/PM)

Location	Weave Type ¹	LOS
Westbound US 6	A	E/F
Eastbound US 6	A	F/E
Northbound Wadsworth Blvd.	A	D/D
Southbound Wadsworth Blvd.	B	D/F

¹ Type A weaves require both merging and diverging vehicles to make one lane change; Type B only requires one or the other to make a lane change.

EXHIBIT 37

2035 No Build Alternative LOS for Merge and Diverge Areas at US 6 Interchanges (AM/PM)

Location	Type	LOS
WB US 6 to NB WW	Diverge	D/F
SB WW to WB US 6	Merge	D/D
WB US 6 to Carr/Garrison Slip Ramp	Diverge	E/E
Carr/Garrison Slip Ramp to EB US 6	Merge	F/E
EB US 6 to SB WW	Diverge	F/D
NB WW to EB US 6	Merge	F/E

Wadsworth Boulevard and Intersections

A summary of the urban street LOS is shown in Exhibit 38 followed by a summary of the intersection LOS in Exhibit 39.



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EXHIBIT 38
2035 No Build Alternative LOS for Wadsworth Boulevard (AM/PM)

Location	Northbound LOS	Southbound LOS
South of 5th Avenue	E/E	E/E
South of 10th Avenue	F/F	F/F

EXHIBIT 39
2035 No Build LOS for Intersection Along Wadsworth Boulevard (AM/PM)

Location	Control	LOS ¹
4th Avenue	Two-way Stop	B/C
5th Avenue	Signal	C/D
Broadview Drive/Frontage Road	Two-way Stop	F/F
Highland Drive	Two-way Stop	F/F
8th Place	Two-way Stop	F/F
9th Avenue	Two-way Stop	F/F
10th Avenue	Signal	C/F
12th Avenue	Two-way Stop	F/F
13th Avenue ²	Two-way Stop	B/C
14th Avenue	Signal	D/E

¹ Worst cross-street approach LOS reported at TWSC intersections.

² Two existing 13th Avenue intersections to be consolidated and access limited to RIRO with the RTD West Corridor LRT project.

A complete summary of the No Build peak-hour-traffic turning movements and LOS is shown in Exhibit 40.

Adjacent Interchanges

Utilizing 2035 forecast data output from the DRCOG regional travel demand model, nationally accepted factoring methods described earlier, and adjustments to account for changes in local travel patterns, reasonable growth factors were applied to existing traffic volumes at adjacent interchanges. Growth factors ranged from 15 to 30 percent depending on the location, and their magnitude was consistent with corridor growth on Wadsworth Blvd. and historical expected growth trends of urban areas.

Once the volumes were established, new models were created for the operations analyses. No changes were made to the geometries or free-flow speeds used in the existing conditions analyses. Exhibits 41 and 42 show the projected volumes and operating conditions for the 2035 No Build scenario. The effects of additional traffic volume on the network can be seen as most of the LOSs drop compared to the existing conditions.

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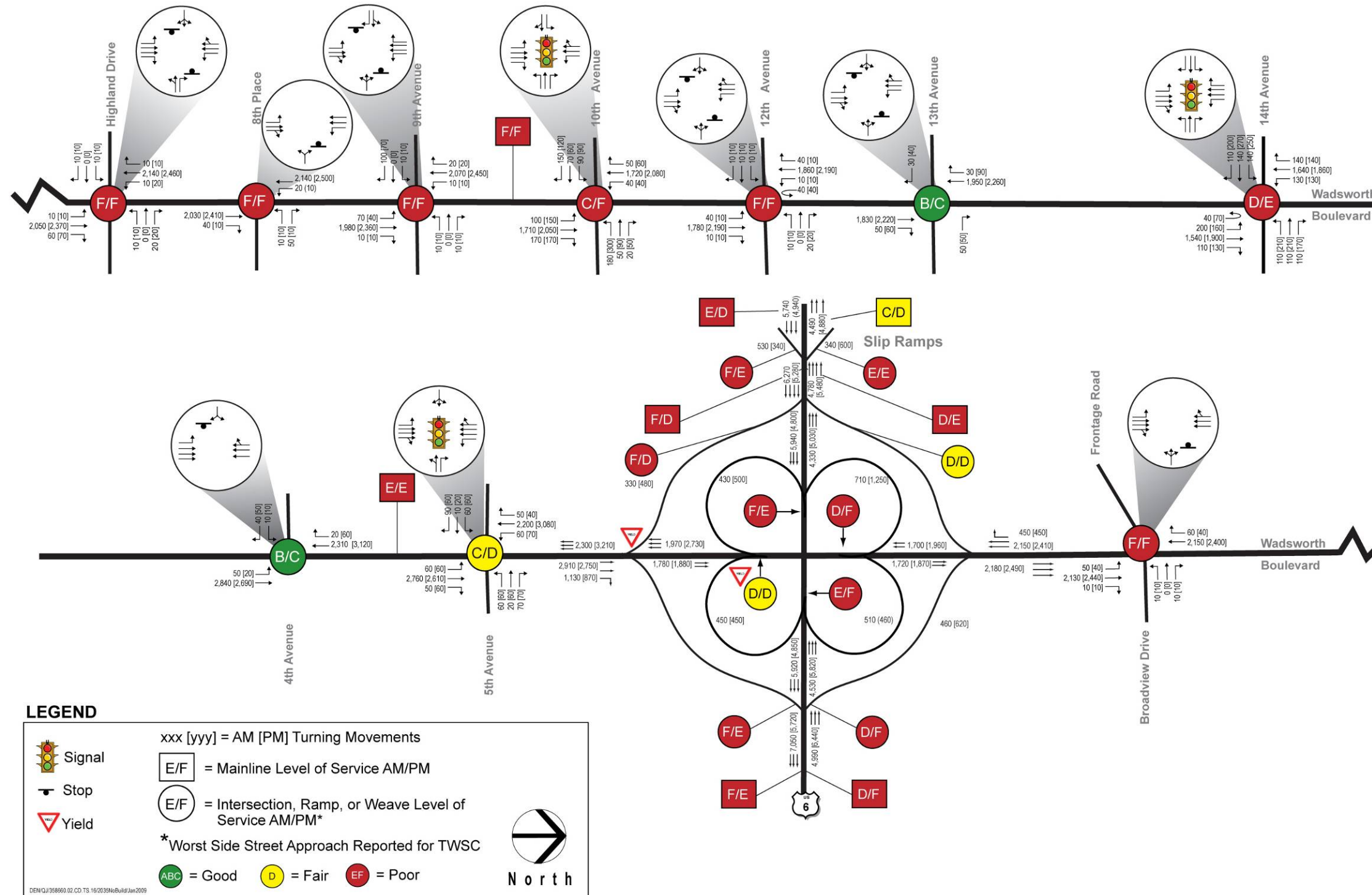


EXHIBIT 40
2035 No Build Traffic Conditions – Wadsworth Boulevard and US 6 Interchange

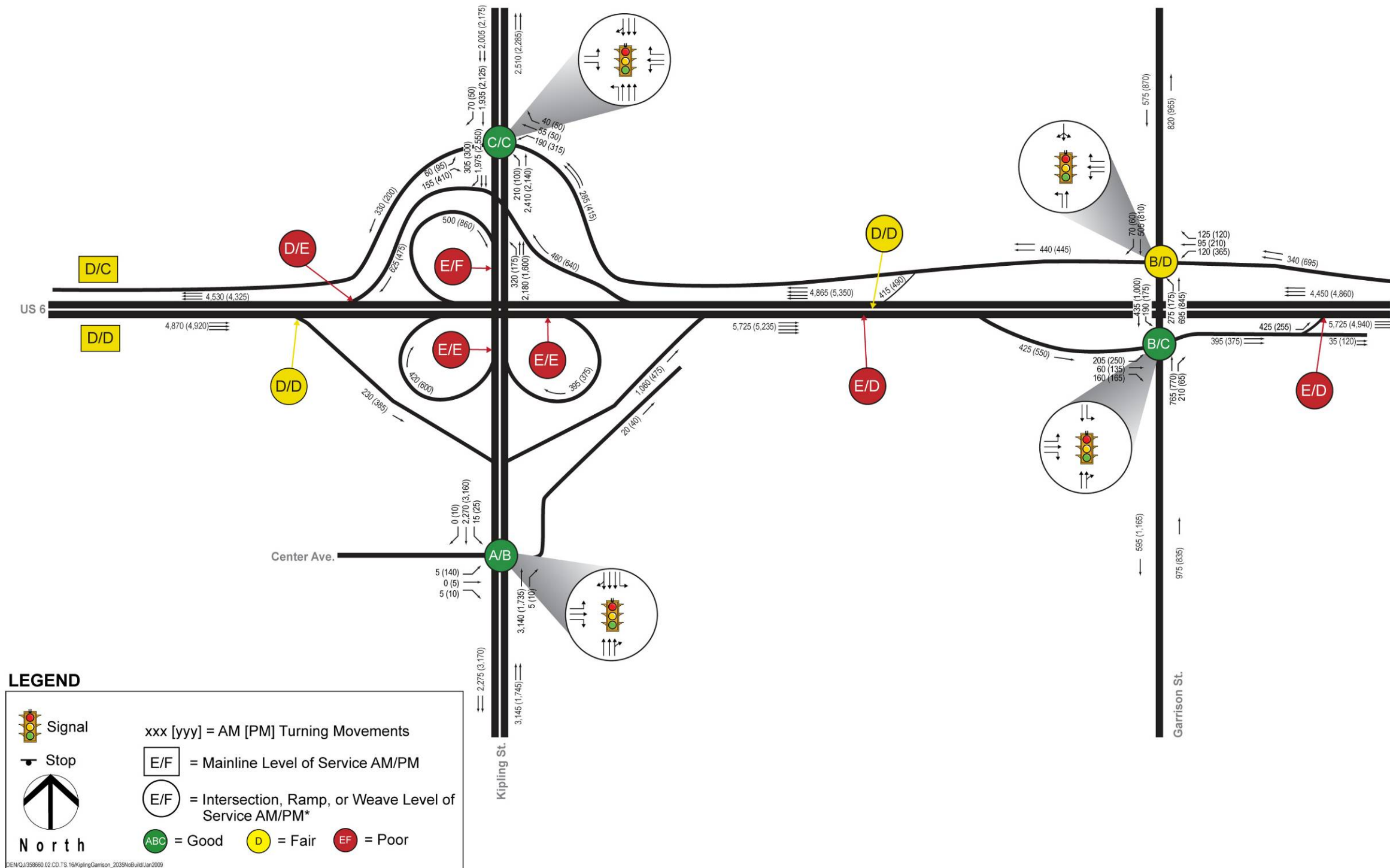
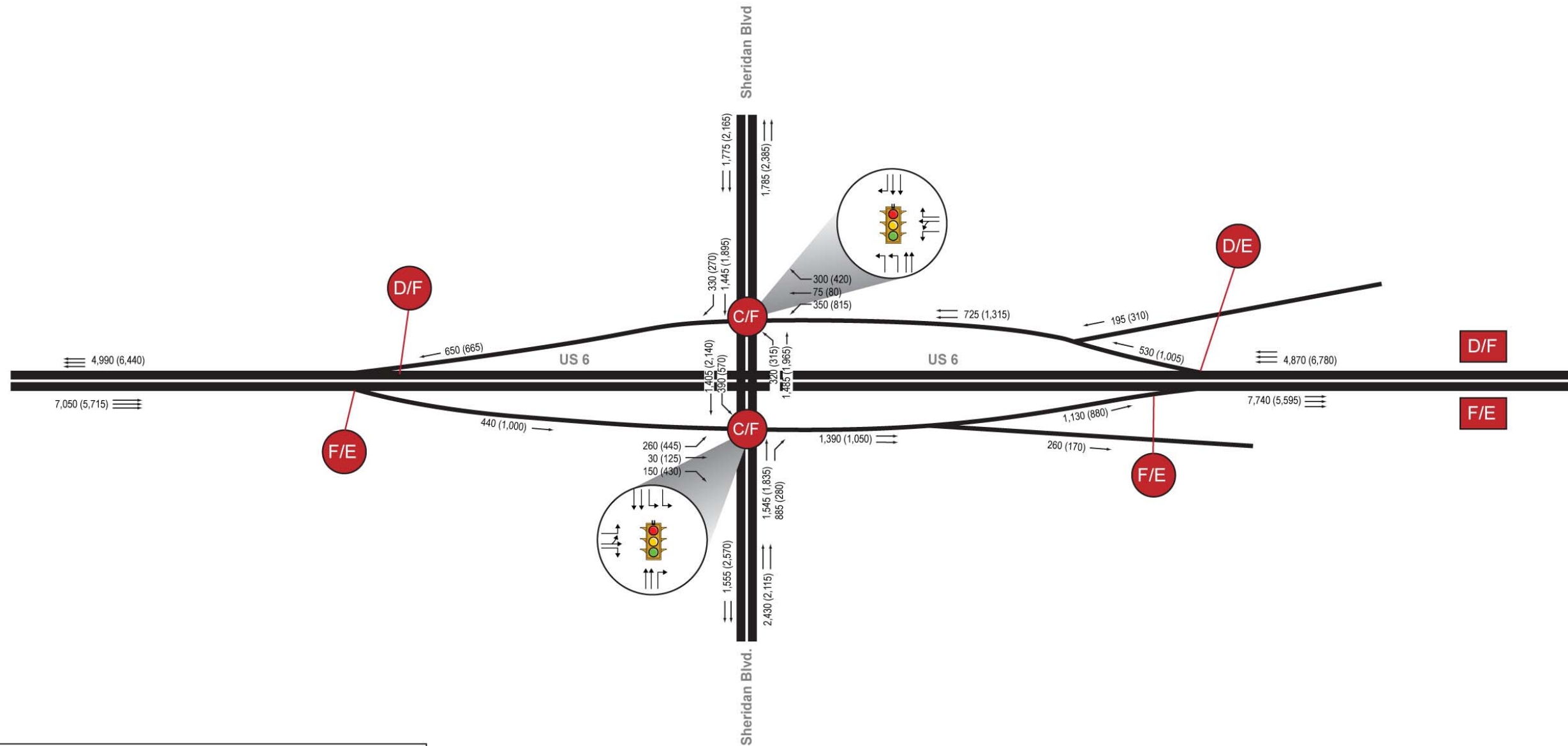


EXHIBIT 41
2035 No Build Traffic Conditions – Kipling and Garrison Street Interchanges



LEGEND

Signal
Stop

xxx [yyy] = AM [PM] Turning Movements

E/F = Mainline Level of Service AM/PM

E/F = Intersection, Ramp, or Weave Level of Service AM/PM*

ABC = Good D = Fair EF = Poor

North

DEN\Q\3588960.02.CD.TS 16/Sheridan_2035NoBuildJan2009

EXHIBIT 42
2035 No Build Traffic Conditions – Sheridan Street Interchange

4.3 Future Traffic Operations – Interchange Alternatives Considered

In order to further inform the alternative evaluation decision-making process, detailed traffic operational analyses were performed for the four interchange alternatives that passed the Level 1 screening. These analyses were used to evaluate mobility criteria as part of the Level 2 evaluation for the following alternatives:

- Tight Diamond
- Tight Diamond with Loop
- Single Point Urban Interchange
- Partial Cloverleaf

In 2035, significant travel demand on US 6 causes the mainline to operate at LOS F at most locations. At most of the US 6 interchanges, ramp meters are warranted, and could provide some congestion relief in the short term. However, for an ITS strategy like ramp metering to be effective it must be implemented on a corridor wide basis. Therefore, it was determined that given current funding constraints and the additional right-of-way needed it was unlikely that ramp metering along US 6 would be implemented in the 30 year planning horizon.

All of the alternatives eliminate the critical weaving sections on both US 6 and Wadsworth Blvd., which should greatly improve overall system traffic operations. Due to the significant mainline congestion, the ramps also operate at LOS F. However, the acceleration and deceleration lengths were increased at each ramp location, providing for more adequate maneuvering distance for vehicles entering and exiting US 6. For every alternative, the traffic signals introduced on Wadsworth Blvd. operate at acceptable (D or better) LOSs.

A complete summary of the peak-hour-traffic turning movements and LOS for the alternatives considered for the interchange is shown in Exhibit 43.

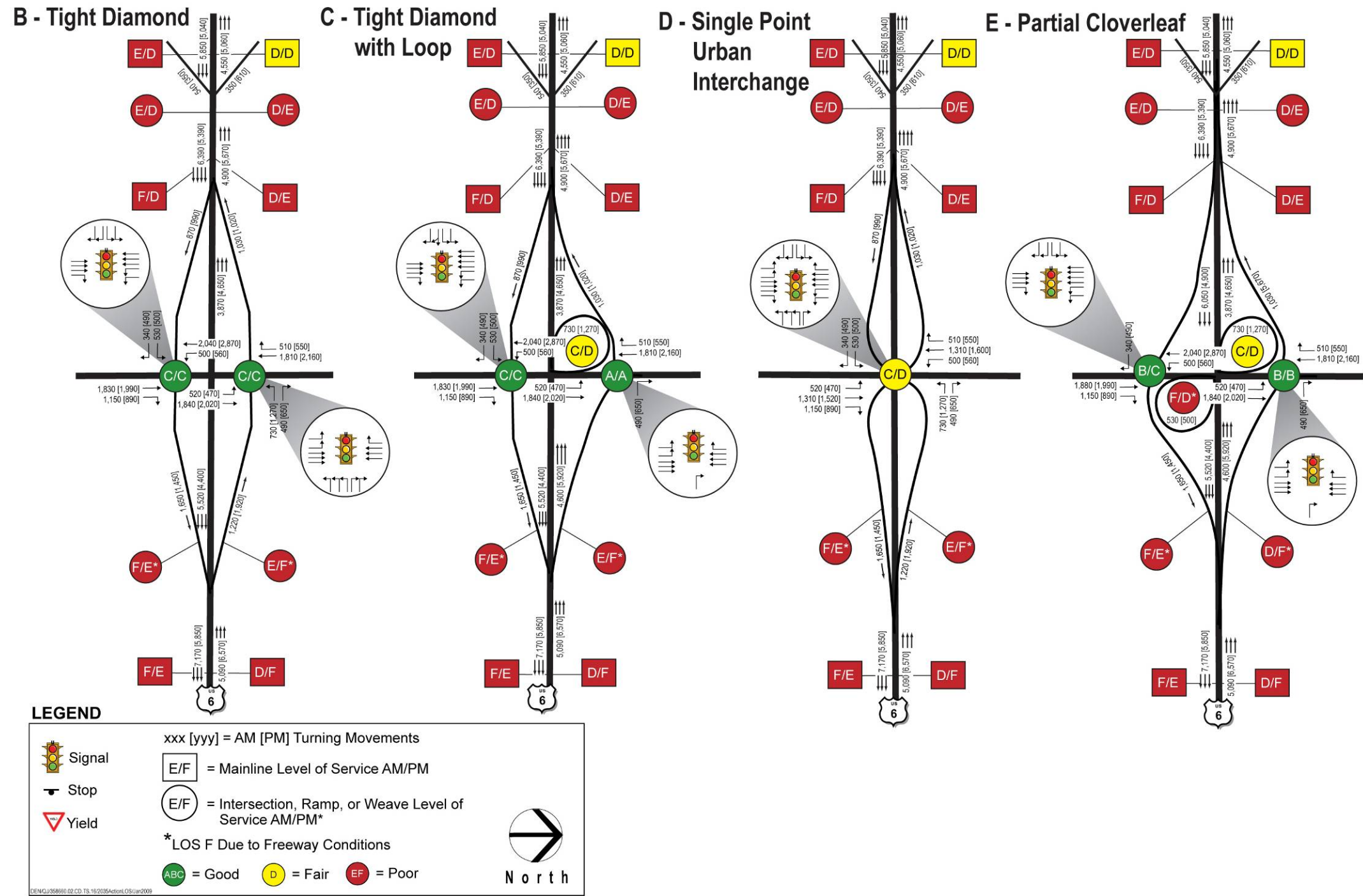


EXHIBIT 43
2035 Alternatives Considered Traffic Conditions – US 6 and Wadsworth Boulevard Interchange

Servicing left-turning traffic movements through the interchange is critical in maintaining acceptable LOS. Those alternatives that provided free flowing loop ramps such as the partial cloverleaf and tight diamond with loop alternatives were thought to better accommodate left-turning traffic at the interchange, particularly for the critical westbound-to-southbound PM peak traffic. Therefore, volume-to-capacity (V/C) ratios for left-turning movements were compared for each of the alternatives. As shown in Exhibit 44, the partial cloverleaf had the lowest average left-turn movement V/C ratio followed by the tight diamond with loop. In the PM peak, the tight diamond alternative had two of the four left-turn movement V/C ratios above 1.0, and the SPUI alternative had two left-turn movements above 0.9.

EXHIBIT 44

2035 Interchange Left Turn V/C Ratios (AM/PM)

Alternative	Eastbound	Westbound	Northbound	Southbound
No Build	Does not eliminate critical weave sections			
Tight Diamond	0.82 (0.77)	0.70 (1.01)	0.85 (1.02)	0.84 (0.84)
Tight Diamond with Loop	0.74 (0.67)	0.49 (0.85)	0.79 (0.78)	0.80 (0.83)
SPUI	0.80 (0.56)	0.76 (0.98)	0.75 (0.73)	0.80 (0.95)
Partial Cloverleaf	0.35 (0.33)	0.49 (0.85)	0.79 (0.77)	0.78 (0.81)

Wadsworth Boulevard

Traffic operations at corridor intersections were the same for each interchange alternative considered. See Section 5.4 for a summary and description of the Wadsworth Blvd. corridor level analysis of the Build Alternative.

Adjacent Interchanges

Traffic operations at the adjacent interchanges were the same for each alternative. See Section 5.4 for a summary and description of the system level analysis of the Build Alternative.

4.4 Future Traffic Operations – Build Alternative (Tight Diamond with Loop)

Evaluation of future Build Alternative traffic operations was completed using the same methodology outlined for the existing and No Build conditions. Mainline, weave, merge/diverge, and urban street operations were evaluated with Highway Capacity Software. Synchro software was used to determine intersection LOS. The reconstruction of the interchange, additional capacity on Wadsworth Blvd., and planned access control along the corridor improves LOS over No Build conditions for most of the components. The intersection at Wadsworth Blvd. and 12th Avenue is planned to remain unsignalized in the short term and, therefore, cross-street delay is expected to remain high with an LOS of F. As the TMU zoning near the RTD LRT station is implemented and the surrounding area redevelops, this intersection may be considered for a traffic signal. Because no capacity



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improvements are currently planned, congestion on US 6 causes LOSs on the mainline, weave sections, and ramps to remain poor. The tight diamond with loop interchange has excess capacity but the benefits of that capacity cannot be fully realized without improvements to US 6.

Mainline, Weaves, Merges, and Diverges

A summary of the mainline LOS by direction at six locations is shown in Exhibit 45 followed by a summary of the weave LOS by direction at the two new weave locations in Exhibit 46. A summary of the merge and diverge LOS is shown in Exhibit 47.

EXHIBIT 45
2035 Build Alternative LOS for Basic Freeway Segments on US 6 (AM/PM)

Location	Westbound LOS	Eastbound LOS
East of Wadsworth Blvd.	D/F	F/E
West of Wadsworth Blvd.	D/E	F/D
West of Carr Street	D/D	E/D

EXHIBIT 46
2035 Build Alternative LOS for Weave Areas at the US 6 Interchange (AM/PM)

Location	Weave Type ¹	LOS
Westbound US 6	NA	Eliminated
Eastbound US 6	NA	Eliminated
Northbound Wadsworth Blvd.	NA	Eliminated
Southbound Wadsworth Blvd.	NA	Eliminated
Westbound US 6 between Wadsworth Blvd. and Garrison/Carr ²	A	D/E
Eastbound US 6 between Garrison/Carr and Wadsworth Blvd. ²	A	E/D

¹ Type A weaves require both merging and diverging vehicles to make one lane change; Type B only requires one or the other to make a lane change.

² The on- and off-ramps between Wadsworth Blvd. and the Garrison Street/Carr Street slip ramps were connected to form an auxiliary lane.



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EXHIBIT 47

2035 Build Alternative LOS for Merge and Diverge Areas at US 6 Interchanges (AM/PM)

Location	Type	LOS
WB US 6 to NB WW	Diverge	E/F
SB WW to WB US 6	NA	See weave analysis
WB US 6 to Carr/Garrison Slip Ramp	NA	See weave analysis
Carr/Garrison Slip Ramp to EB US 6	NA	See weave analysis
EB US 6 to SB WW	NA	See weave analysis
NB WW to EB US 6	Merge	F/E

Wadsworth Boulevard and Intersections

A summary of the urban street LOS is shown in Exhibit 48 and a summary of the intersection LOS is shown in Exhibit 49.

EXHIBIT 48

2035 Build Alternative LOS for Wadsworth Boulevard (AM/PM)

Location	Northbound LOS	Southbound LOS
South of 5th Avenue	E/E	E/E
South of 10th Avenue	D/D	D/D

EXHIBIT 49

2035 Build Alternative LOS for Intersections along Wadsworth Boulevard (AM/PM)

Location	Control	LOS ¹
4th Avenue	Two-way Stop	A/C
5th Avenue	Signal	B/B
Eastbound US 6 Ramps	Signal	C/C
Westbound US 6 Ramps	Signal	A/A
Broadview Drive/Frontage Road	Two-way Stop	C/C
Highland Drive	Two-way Stop	C/D
8th Place	Two-way Stop	C/C

EXHIBIT 49
2035 Build Alternative LOS for Intersections along Wadsworth Boulevard (AM/PM)

Location	Control	LOS ¹
9th Avenue	Two-way Stop	C/C
10th Avenue	Signal	C/D
12th Avenue	Two-way Stop	F/F
13th Avenue ²	Two-way Stop	B/C
14th Avenue	Signal	C/D

¹ Worst cross-street approach LOS reported at TWSC intersections.

² Two existing 13th Avenue intersections to be consolidated and access limited to RIRO with the RTD West Corridor LRT project.

A complete summary of the Build peak-hour-traffic turning movements and LOS is shown in Exhibit 50.

Adjacent Interchanges

Because each of the alternatives maintained the same level of access and the corridor capacity along Wadsworth Blvd. was the same for each alternative, the adjacent interchanges of Kipling Street, Garrison Street, and Sheridan Boulevard were expected to perform similarly regardless of which alternative was selected at the US 6 and Wadsworth Blvd. interchange. Slight traffic reductions on Kipling Street, Garrison Street, and Sheridan Boulevard were observed with the Build Alternative because the additional capacity on Wadsworth Blvd. provides some congestion relief in the overall travel shed. Variations in peak-hour traffic volumes do not change any component to an unacceptable LOS.

Exhibits 51 and 52 show the projected volumes and operating conditions for the 2035 Build scenario at adjacent interchanges. Little difference exists between the operating performance of the Build and No Build scenarios for Kipling Street and Sheridan Boulevard. There are a few locations in the Kipling/Garrison complex that experience a decrease in LOS by one letter designation. However, these locations were close to the threshold and, therefore, the decrease was caused by the minimal additional volume and not by a significant increase in density or delay.

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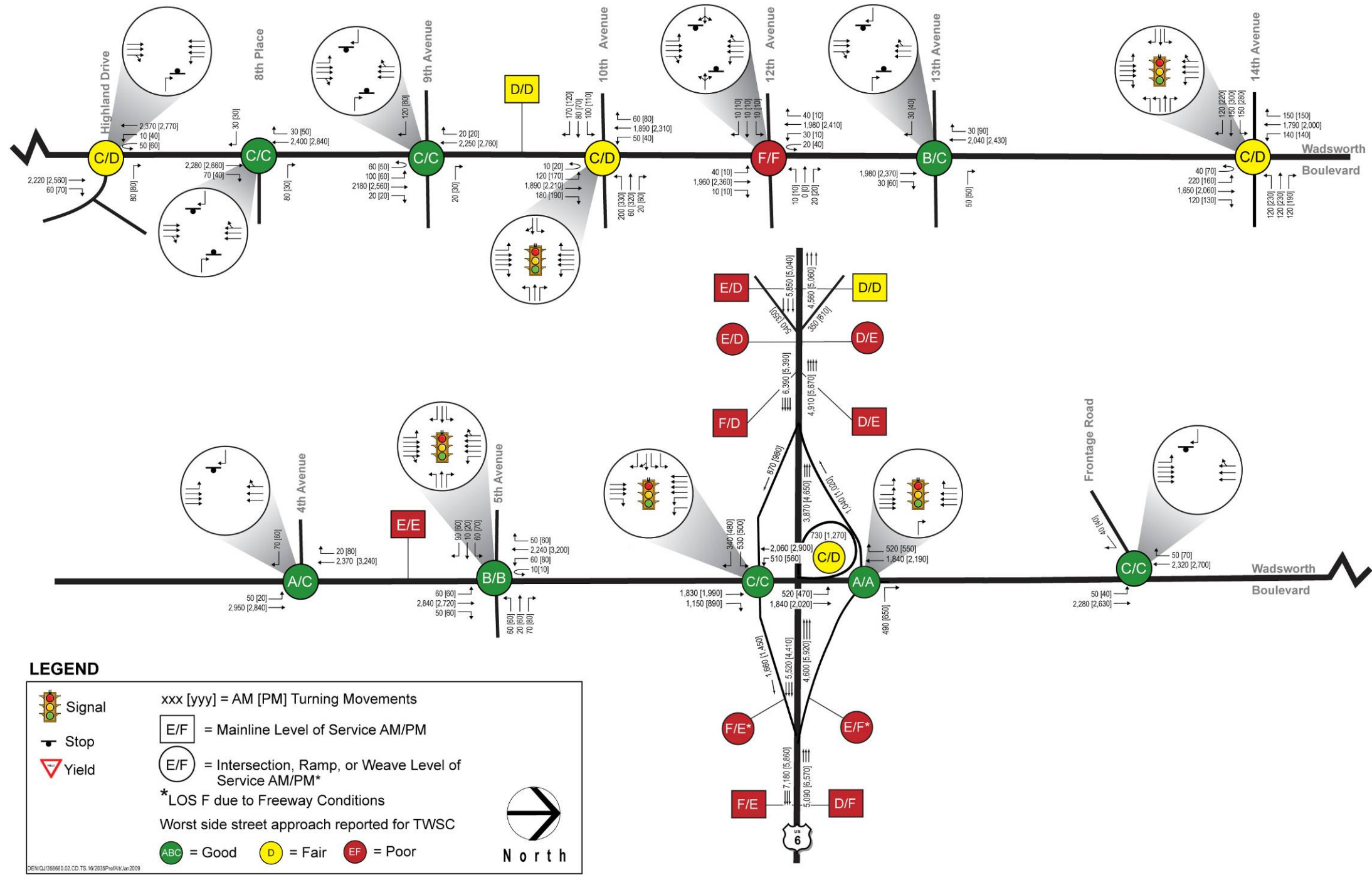


EXHIBIT 50
2035 Build Alternative Traffic Conditions – Wadsworth Boulevard and US 6 Interchange

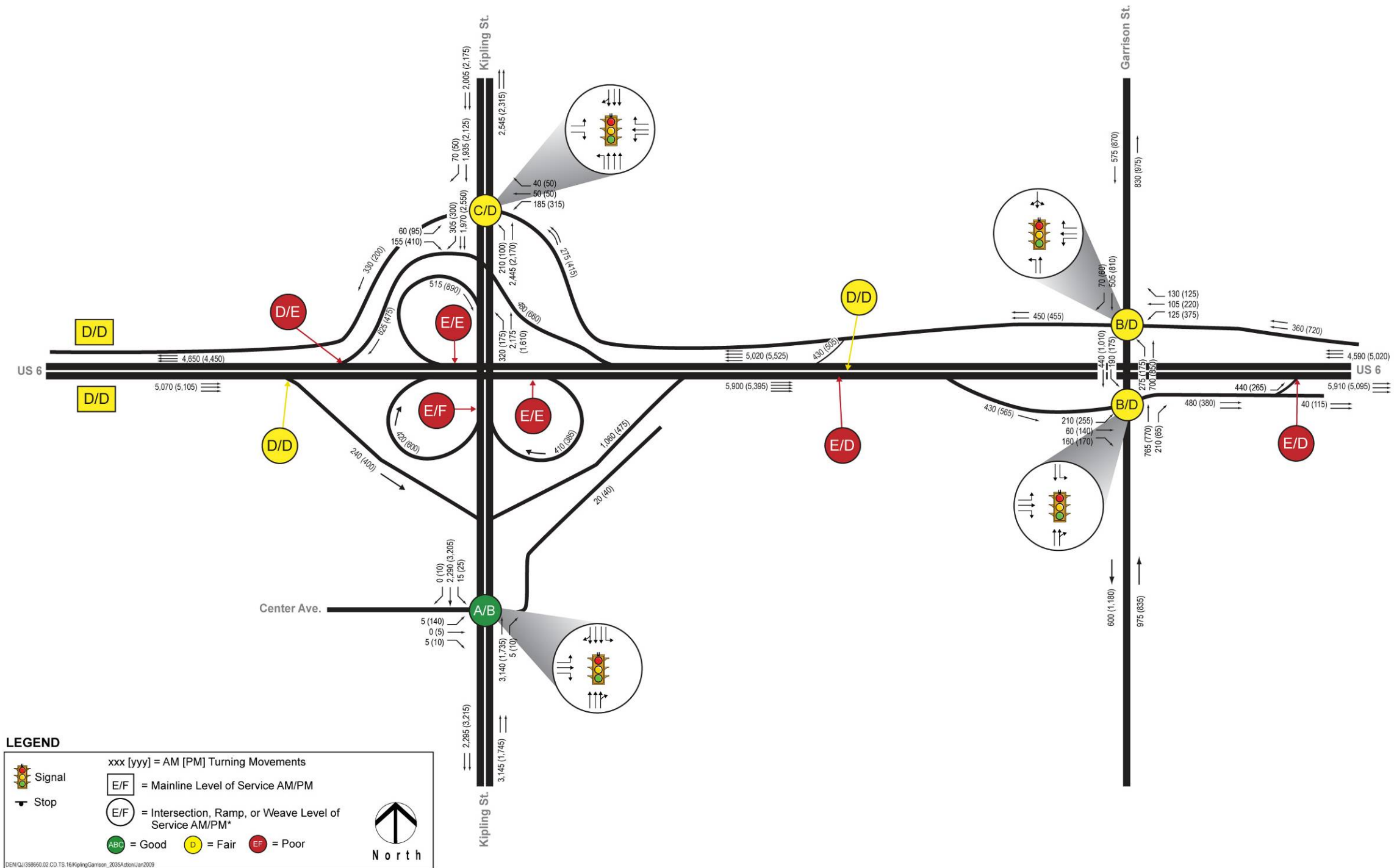
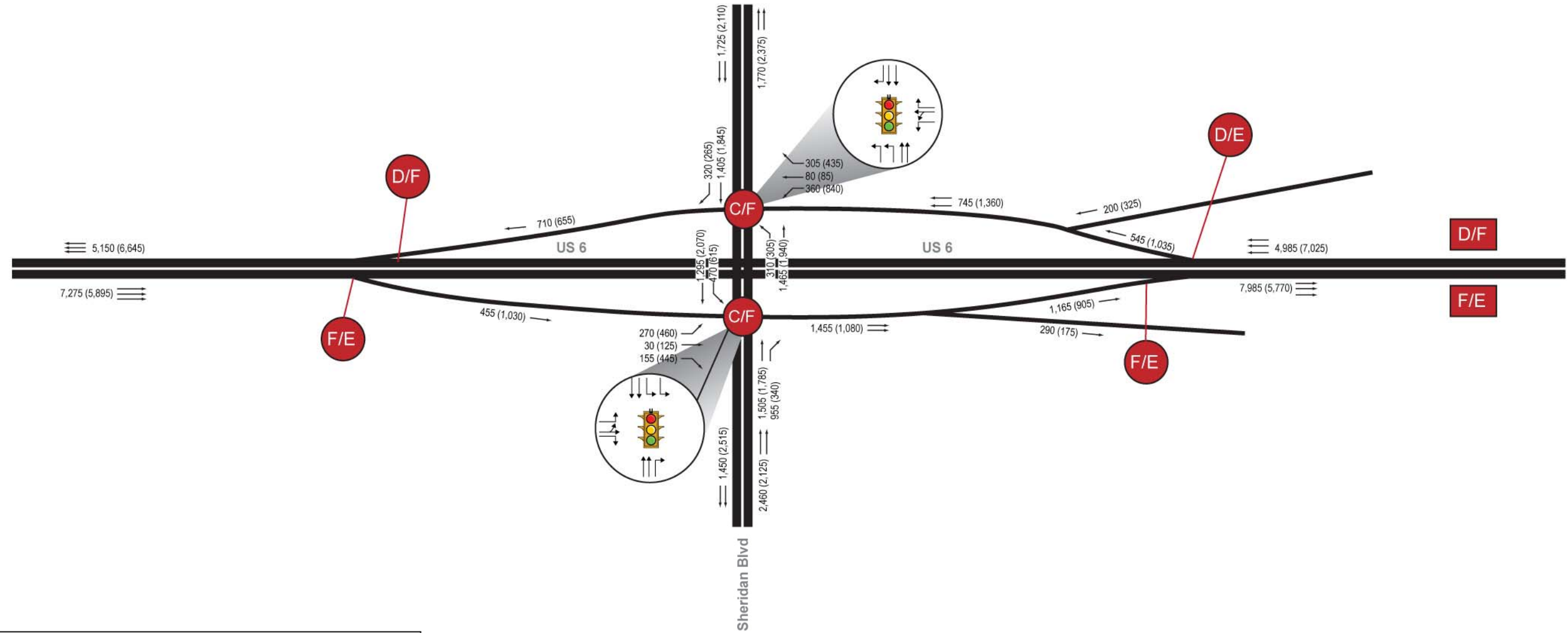


EXHIBIT 51
2035 Build Alternative Traffic Conditions – Kipling and Garrison Street Interchanges



LEGEND

Signal (Traffic Light Icon)
Stop (Trapezoid Icon)

xxx [yyy] = AM [PM] Turning Movements

E/F = Mainline Level of Service AM/PM

E/F = Intersection, Ramp, or Weave Level of Service AM/PM*

ABC = Good D = Fair EF = Poor

North (North Arrow Icon)

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EXHIBIT 52
2035 Build Alternative Traffic Conditions – Sheridan Street Interchange

4.5 Multimodal Considerations

The West Corridor light rail project is a 12.1-mile light rail transit (LRT) corridor between the Auraria Campus in downtown Denver and the Jefferson County Government Center in Golden, serving Denver, Lakewood, the Denver Federal Center, Golden, and Jefferson County. To supplement RTD's planned West Corridor LRT, Lakewood developed the *West Corridor Light Rail Station Plan* to incorporate the community's vision for future development around the light rail stations at Sheridan Boulevard, Wadsworth Blvd., Oak Street, and the Union Boulevard corridor near the Denver Federal Center station. The *Wadsworth Blvd. Station Area Plan* project area is located at 13th Avenue and Wadsworth Blvd., within the Study Area. This *Station Area Plan* calls for the implementation of a new TMU Zone District that incorporates mixed-use developments in the planned station areas with densities to support residents and employees who use LRT.

With the introduction of LRT, a station at 13th Avenue and Wadsworth Blvd., and the surrounding planned redevelopment, it is anticipated that transit and non-motorized travel will increase. According to the West Corridor EIS, the station at 13th Avenue is anticipated to have approximately 1,000 parking spaces and serve nearly 7,000 daily riders. It is expected that upwards of 70 percent of transit patrons will access light rail from bus transfers.

Once light rail is implemented, many of the regional routes destined for downtown Denver will likely be discontinued in favor of a local feeder bus system that facilitates transfers to and from the LRT. However, it is expected that bus frequency on Wadsworth Blvd. will increase nearly four-fold from four buses per hour today to 16 buses hourly in the future. Design elements incorporated into the Build Alternative for Wadsworth Blvd. will enhance access to transit and provide safer pedestrian and bicycle travel. In addition, the interchange Build Alternative has been designed to not preclude future potential transit options on Wadsworth Blvd. so that the City's desire to someday link its City Center and Belmar development to the south with the LRT station to the north via fixed guideway transit such as a trolley can be realized with minimal investment and reconstruction.

4.6 Future Traffic Operations – Summary

The completion of the future traffic analysis for the US 6 and Wadsworth Blvd. interchange and Wadsworth Blvd. corridor suggests that the existing interchange configuration and roadway system cannot accommodate the expected future travel demands. Without improvement, traffic LOSs will continue to deteriorate, with many locations operating at LOS F. The reconstruction of the interchange, additional capacity on Wadsworth Blvd., and planned access control along the corridor improves LOS over No Build conditions for all but the intersection of 12th Avenue, which remains unsignalized.

The following section provides a comparative summary of the existing, No Build, and Build Alternative traffic operations. As shown in previous exhibits, the good-fair-poor color rating system is continued in the summary tables. Because LOS D was determined as the threshold for acceptable LOS, a fair/yellow rating was given. LOSs below this threshold, E and F, were rated poor/red, and LOSs A, B, and C were considered good/green.

Generally, the 2035 No Build traffic scenario has approximately 25 percent more traffic than existing conditions, and the Build Alternative has about 10 percent latent demand on Wadsworth Blvd. north of US 6. This growth equates to approximate 1 percent annual growth, which is typical for an urban area. As expected, the growth near the planned 13th Avenue RTD LRT station is higher than the rest of the corridor. The existing and forecast daily traffic volumes are shown in Exhibit 53.

EXHIBIT 53
Existing, No Build, and Build Forecast Daily Traffic Volumes

Location	2007 ADT	2035 No Build	2035 Build
Wadsworth Blvd. south of 10th Avenue	50,800	62,600	68,700
Wadsworth Blvd. south of 5th Avenue	65,700	80,900	82,500
US 6 east of Wadsworth Blvd.	123,000	153,900	156,900
US 6 west of Wadsworth Blvd.	122,300	153,000	156,000

Mainline, Weaves, Merges, and Diverges

As shown in Exhibit 54, the LOS on US 6 remains poor both with and without improvements at the interchange and along Wadsworth Blvd. The Tight Diamond with Loop interchange has excess capacity but the benefits of that capacity cannot be fully realized without improvements to US 6.

In the Build Alternative, the critical weave sections that are largely responsible for the localized traffic congestion and sideswipe-same-direction crash types are eliminated. The on- and off-ramps between Wadsworth Blvd. and Garrison/Carr Street are extended to form an auxiliary lane. While these weave sections do operate below the LOS D threshold, they do operate better than if they remained as separate merge and diverge ramps, LOS E versus LOS F. The project leadership team did consider moving these ramps to the west to achieve better spacing, but concluded that potential relocation of the Garrison Street/Carr Street ramps should be included in future studies related to the Kipling Street and/or Garrison Street interchanges. Additionally, had the ramps been relocated or removed, it was determined that a detrimental change in local travel patterns could result. A summary of the weave LOS by direction is shown in Exhibit 55.

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The LOS F shown for the Build Alternative is due to the continued congestion on mainline US 6. As part of the proposed improvements, the acceleration and deceleration lengths were increased at each ramp location to provide more maneuvering distance for vehicles entering and exiting US 6. This additional distance should provide a better level of driver comfort and reduce the sideswipe-same-direction crashes. A summary of the merge and diverge LOS is shown in Exhibit 56.

EXHIBIT 54
Summary of LOS for Basic Freeway Segments on US 6 (AM/PM)

Location	Existing		No Build		Build	
	WB	EB	WB	EB	WB	EB
East of Wadsworth Blvd.	C/D	E/D	D/F	F/E	D/F	F/E
West of Wadsworth Blvd.	C/C	D/C	D/E	F/D	D/E	F/D
West of Carr Street	C/C	D/C	C/D	E/D	D/D	E/D

EXHIBIT 55
Summary of LOS for Weave Areas at the US 6 Interchange (AM/PM)

Location	Existing		No Build		Build	
	Weave Type ¹	LOS	Weave Type ¹	LOS	Weave Type ¹	LOS
Westbound US 6	A	D/E	A	E/F	NA	Eliminated
Eastbound US 6	A	E/D	A	F/E	NA	Eliminated
Northbound Wadsworth	A	C/C	A	D/D	NA	Eliminated
Southbound Wadsworth	B	C/E	B	D/F	NA	Eliminated
Westbound US 6 between Wadsworth and Garrison/Carr ²	NA	NA	NA	NA	A	D/E
Eastbound US 6 between Garrison/Carr and Wadsworth ²	NA	NA	NA	NA	A	E/D

¹ Type A weaves require both merging and diverging vehicles to make one lane change; Type B only requires one or the other to make a lane change.

² The on- and off-ramps between Wadsworth Blvd. and the Garrison Street/Carr Street slip ramps were connected to form an auxiliary lane.

EXHIBIT 56

Summary of LOS for Merge and Diverge Areas at US 6 Interchanges (AM/PM)

Location	Existing		No Build		Build	
	Type	LOS	Type	LOS	Type	LOS
WB US 6 to NB WW	Diverge	C/E	Diverge	D/F	Diverge	E/F
SB WW to WB US 6	Merge	C/C	Merge	D/D	NA	See weave analysis
WB US 6 to Carr/Garrison Slip Ramp	Diverge	E/E	Diverge	E/E	NA	See weave analysis
Carr/Garrison Slip Ramp to EB US 6	Merge	D/D	Merge	F/E	NA	See weave analysis
EB US 6 to SB WW	Diverge	D/D	Diverge	F/D	NA	See weave analysis
NB WW to EB US 6	Merge	E/D	Merge	F/E	Merge	F/E

Wadsworth Boulevard and Intersections

Wadsworth Blvd., south of 5th Avenue, is six lanes, and the Build Alternative cross section matches this configuration. The increase in expected future travel demand in this section barely exceeds the LOS D threshold. A summary of the urban street LOS is shown in Exhibit 57.

Under the Build Alternative, acceptable LOS is achieved at all but one Study Area intersection. The intersection at Wadsworth Blvd. and 12th Avenue is planned to remain unsignalized in the short term and, therefore, cross-street delay is expected to remain high with an LOS of F. As the TMU zoning is implemented and the area redevelops, this intersection may be considered for a traffic signal. The proposed access configurations significantly reduce the cross-street delay and focus turning movements at major intersections. At all locations, the Build Alternative design accommodates the expected 95 percentile queue lengths. A summary of the intersection LOS is shown in Exhibit 58.

EXHIBIT 57

Summary of LOS for Wadsworth Boulevard (AM/PM)

Location	Existing		No Build		Build	
	NB	SB	NB	SB	NB	SB
South of 5th Avenue	D/D	D/D	E/E	E/E	E/E	E/E
South of 10th Avenue	E/E	E/E	F/F	F/F	D/D	D/D

EXHIBIT 58
Summary of LOS for Intersections along Wadsworth Boulevard (AM/PM)

Location	Control	Existing	No Build	Build	
		LOS ¹	LOS ¹	LOS ¹	Change in Access
4th Avenue	Two-way Stop	B/B	B/C	A/C	¾-Movement northbound left in
5th Avenue	Signal	B/B	C/D	B/B	No Change – Full Movement
Eastbound US 6 Ramps	Signal	NA	NA	C/C	No Change – Full Movement
Westbound US 6 Ramps	Signal	NA	NA	A/A	No Change – Full Movement
Broadview Drive/ Frontage Road	Two-way Stop	F/F	F/F	C/C	RIRO
Highland Drive	Two-way Stop	F/F	F/F	C/D	¾-Movement southbound left in
8th Place	Two-way Stop	F/F	F/F	C/C	RIRO
9th Avenue	Two-way Stop	F/F	F/F	C/C	¾-Movement northbound left in
10th Avenue	Signal	B/D	C/F	C/D	No Change – Full Movement
12th Avenue	Two-way Stop	F/F	F/F	F/F ³	No Change – Full Movement
13th Avenue (south) ²	Two-way Stop	D/E	B/C	B/C	RIRO
13th Avenue (north) ²	Two-way Stop	E/F	NA	NA	NA
14th Avenue	Signal	B/C	D/E	C/D	No Change – Full Movement

¹ Worst cross-street approach LOS reported at TWSC intersections.

² Two existing 13th Avenue intersections to be consolidated and access limited to RIRO with the implementation of the RTD West Corridor LRT project.

³ Is planned to remain unsignalized in the short term and, therefore, cross-street delay is expected to remain high with an LOS of F. As the TMU zoning is implemented and the area redevelops, this intersection may be considered for a traffic signal.

5.0 Conclusion

5.1 Purpose

CDOT proposes to reconstruct the interchange of US 6 and Wadsworth Blvd. and widen Wadsworth Blvd. between 4th and 14th Avenues. The purpose of the US 6 and Wadsworth Blvd. project is to:

- Improve traffic flow and safety for motorists, pedestrians, and bicyclists
- Accommodate high traffic volumes
- Correct design deficiencies that contribute to safety concerns and operational inefficiencies
- Increase infrastructure capacity to meet current and future traffic volumes
- Increase multi-modal travel options and connections at the US 6 and Wadsworth Blvd. interchange and along Wadsworth Blvd. between 4th Avenue and 14th Avenue.

The existing design and configuration of the interchange and roadway within the project limits have not kept pace with traffic and multi-modal travel demands. CDOT, FHWA, Lakewood, area residents, businesses, and commuters have prioritized making US 6 and Wadsworth Blvd. improvements to correct the transportation problems in the project area through previous planning efforts. CDOT's goal is to identify a Build Alternative that meets transportation needs, is compatible with local and regional plans, minimizes environmental harm, and can be implemented within cost constraints.

5.2 Build Alternative (Tight Diamond with Loop)

The Build Alternative meets the project purpose and need by:

- Reconfiguring the outdated interchange design
- Increasing corridor capacity on Wadsworth Blvd.
- Reducing conflicts by consolidating accesses
- Providing significant improvements to bicycle and pedestrian facilities
- Considering existing, planned, and potential future multimodal options

The low speeds and tight curves of the existing cloverleaf design are eliminated, and all of the critical weave sections are removed. Inadequate ramp acceleration and deceleration lengths were increased to meet current design standards, which greatly improve the level of driver comfort and will likely reduce side-swipe crashes. Improvements at the interchange and along Wadsworth Blvd. have a positive impact on the adjacent transportation system by slightly reducing daily traffic volume on parallel corridors.



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Increased capacity on Wadsworth Blvd. will create a consistent six-lane arterial cross section and consolidated accesses will help to improve overall traffic operations. By focusing turning movements at major intersections, vehicles will no longer have to pull into gaps that are inadequate. Ramp and local street traffic are separated with the realignment of the frontage road near Highland Drive. Traffic destined for locations east of the Study Area, via the north frontage road, no longer must travel through the Green Acres neighborhood on local streets.

The Build Alternative also offers several improvements that will facilitate multimodal travel throughout the project Study Area. These improvements will enhance both safety and mobility for non-motorized traffic by providing continuous pathways, along both sides of Wadsworth Blvd., of sufficient width that are buffered from the motorized travel way. In addition, the Build Alternative has been designed to not preclude future potential transit options on Wadsworth Blvd.

5.3 Next Steps

This *Traffic Study Report* has been prepared in accordance with the CDOT 1601 Procedural Directive guidance for purposes of evaluating existing and expected future traffic conditions for the No Action Alternative, the alternatives considered, and the Build Alternative; and to provide input for the SLFS. The purpose of the SLFS is to evaluate the effects of the interchange modification on the State highway system and surrounding transportation system, and determine if the proposed modification is in the public interest.

The next steps include completion of the EA document, collecting public and agency input, signing a decision document, and submitting the SLFS to the Chief Engineer for review by the Transportation Commission. The EA will be released for public review in the Spring of 2009.

Completion of the SLFS, approval of the Type 2-1601, and signing of the FONSI is largely dependant on CDOT, FHWA, Lakewood, and other funding partners identifying funding for the project. As more information regarding revenue forecasts, Senate Bill 1 dollars, and Federal Stimulus packages becomes available, it will be integrated into the SLFS.



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APPENDIX A Access Control Plan

APPENDIX A

Access Control Plan

US 6 and Wadsworth Boulevard Access Control Plan

Introduction

This *Access Control Plan* (Plan) encompasses both US 6 and Wadsworth Blvd. (also known as SH 121). It describes the existing and proposed access design elements for each roadway. The Plan was developed in conjunction with CDOT and Lakewood in an attempt to achieve a balance between regional traffic flow and local access needs. Both agencies have agreed to the elements of the Plan. Several public meetings were held during the development of the Plan. Once the Plan receives approval from both agencies and is in effect, any future modification requests to it must also receive approval from both of these agencies.

Existing Access Locations

According to the CDOT Access Category Assignment Schedule, US 6 is a freeway (FW) and Wadsworth Blvd. is a non-rural regional highway (NR-A). Exhibit 1 shows the current access locations within the Study Area. As a freeway, access to US 6 in the Study Area is limited to interchange ramps and slip ramps to frontage roads. In the Study Area, access to Wadsworth Blvd. is provided with a full cloverleaf interchange. To the west, access to Carr and Garrison Streets is provided via short, one-lane directional ramps that intersect frontage roads on either side of US 6.

Access to Wadsworth Blvd. is currently provided in a variety of ways. Exclusive left- and right-turn lanes are provided at high-volume movements, although a number of right turns occur from shared through-lanes. South of US 6, a raised median aids in controlling access to Wadsworth Blvd. Some accesses have been consolidated, while others have been modified to RIRO only. North of US 6, access is uncontrolled, with numerous intersection crossings and driveways. The median is striped to provide two side-by-side, continuous left-turn lanes serving major intersections and driveway accesses.

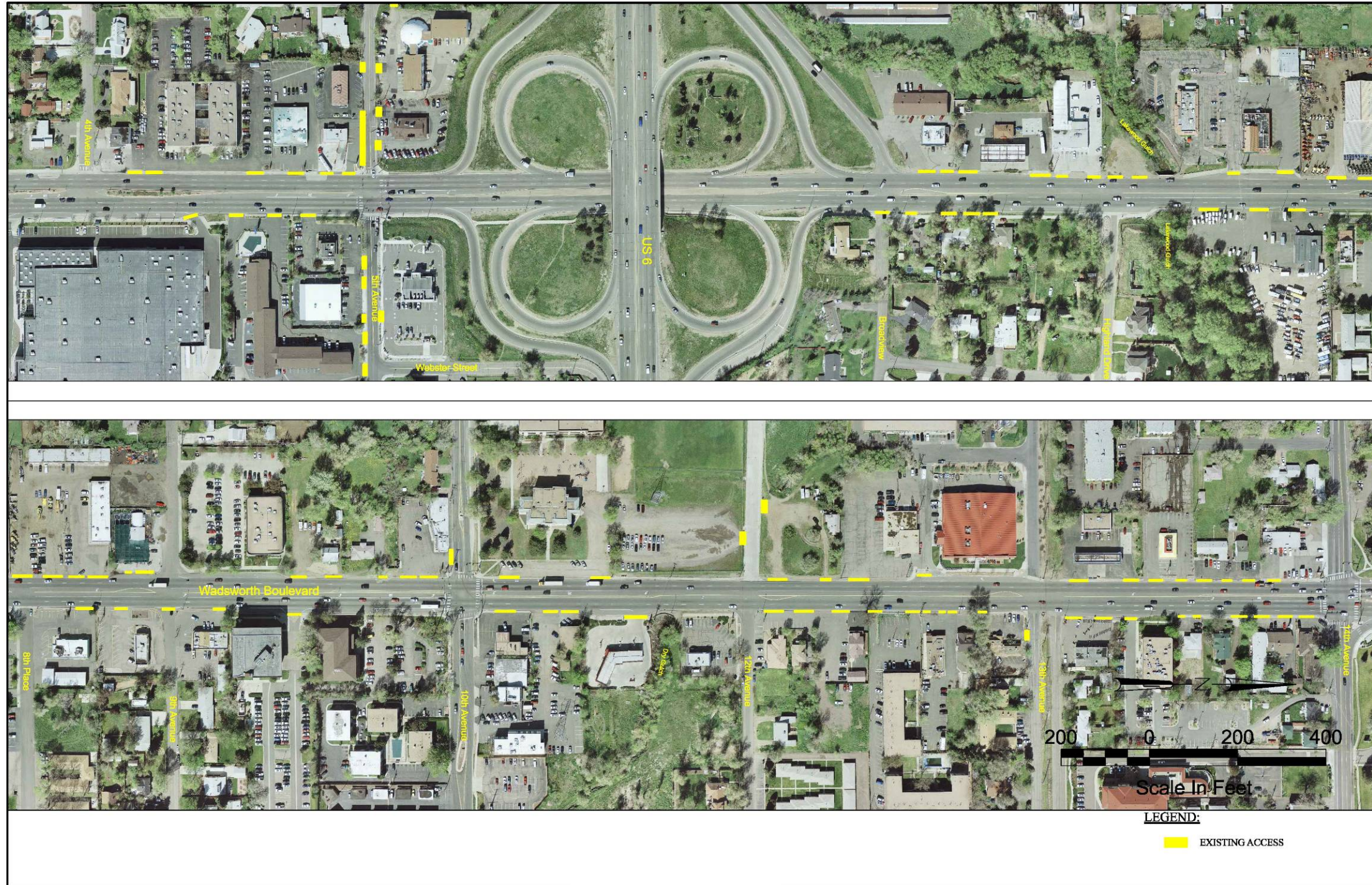


EXHIBIT A-1
Existing Access Locations

Proposed Access Control Plan

The proposed *Access Control Plan*, defined by the Build Alternative, maintains the requirements for the freeway designation for US 6 and brings Wadsworth Blvd. more in line with the NR-A requirements. Exhibit A-2 shows the proposed access locations within the Study Area. Like the existing conditions, the 0.50-mile signalized intersection spacing desirable for NR-A facilities is still not met. However, the traffic operations analysis indicates that both facilities will operate acceptably during peak hours with these proposed access points. The additional signals introduced on Wadsworth Blvd., at the ramp intersections, with the modified interchange configuration serve to condense access points into fewer locations in the interchange vicinity and improve safety.

The proposed Plan also provides bicycle and pedestrian access on both sides of Wadsworth Blvd. along the length of the project via an 8-foot trail. Crosswalk markings provide crossing guidance at all access points. Pedestrian signal indications provide additional guidance for crossing the streets at signalized intersections. Because it has a freeway classification, the proposed Plan does not provide pedestrian or bicycle facilities on US 6.

Build Alternative

The Build Alternative provides access to the US 6 freeway with a modified interchange configuration for Wadsworth Blvd. The modified interchange eliminates three of the four loop ramps and reduces the number of ramps accessing US 6. There is no change to the configuration of the Carr and Garrison Street directional ramps.

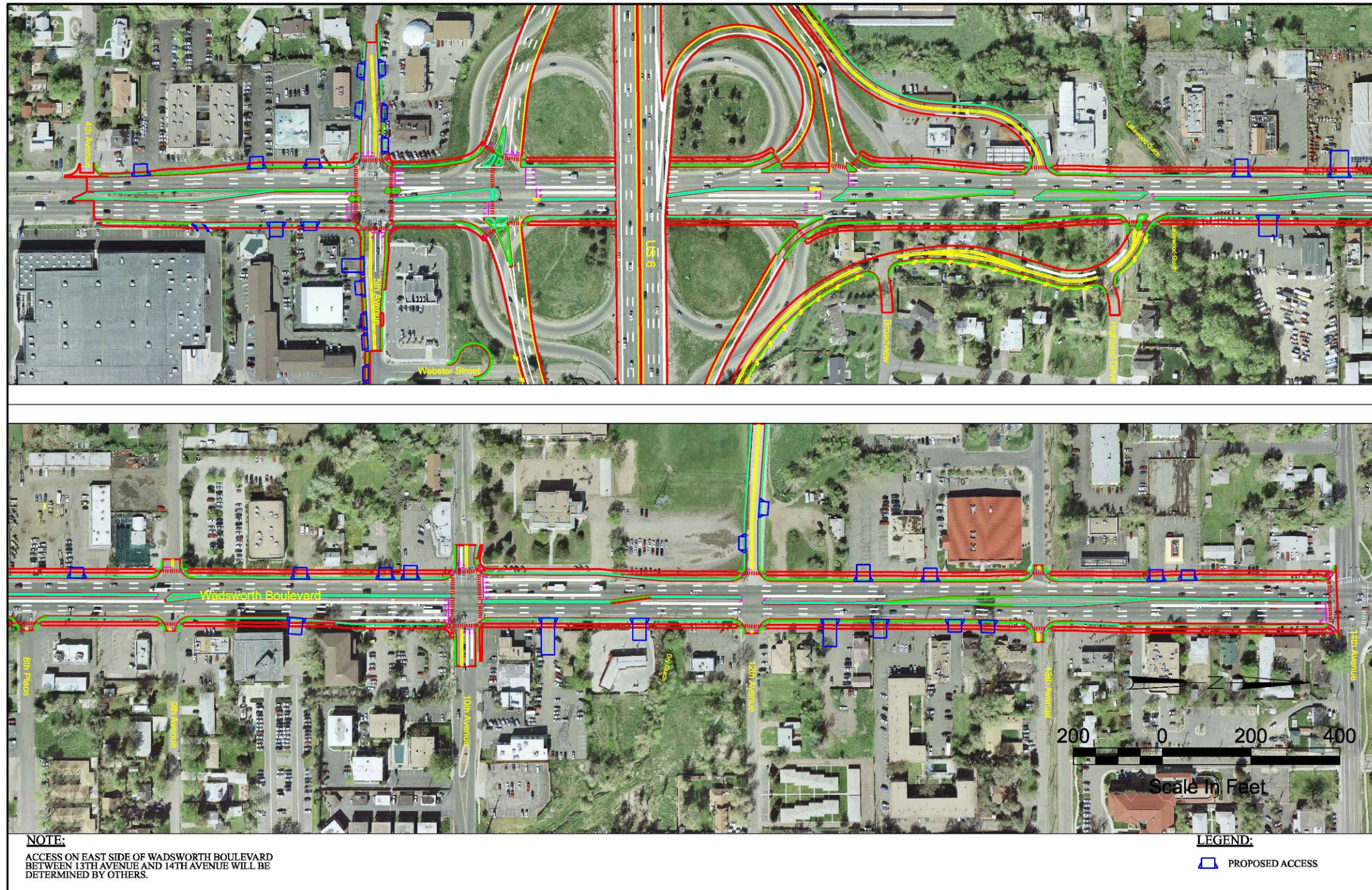


EXHIBIT A-2
Proposed Access Locations



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The Build Alternative proposes significant changes to the Wadsworth Blvd. access locations in order to reduce congestion, improve traffic flow, and bring this section of Wadsworth Blvd. more in line with its NR-A access category assignment. Continuation of the raised median north of 5th Avenue on Wadsworth Blvd. improves both operations and safety by eliminating several existing conflict points at driveways and unsignalized intersections. Exhibit A-3 summarizes the location and type of access for each proposed access point associated with Wadsworth Blvd.

EXHIBIT A-3 Wadsworth Boulevard Access Location Summary

Access Location	Proposed Traffic Control	Proposed Access Control
4th Avenue	Stop Sign	Three-quarter
Various Driveways between 4th & 5th Avenues	None	RIRO
5th Avenue	Signal	Full
Eastbound US 6 Ramps	Signal	Full
US 6 Loop Off-Ramp	None	Right-out
US 6 Directional Off-Ramp	None	Right-in
US 6 On-Ramp	Signal	Full
Northwest Frontage Road	Stop Sign	Three-quarter
Various Driveways between Northwest Frontage Rd & 9th Ave	None	RIRO
Northeast Frontage Road	Stop Sign	Three-quarter
Various Driveways between Northeast Frontage Rd & 8th Pl.	None	RIRO
8th Place	Stop Sign	RIRO
9th Avenue West Side	Stop Sign	Three-quarter
9th Avenue East Side	Stop Sign	RIRO
Various Driveways between 9th & 10th Avenues	None	RIRO
10th Avenue	Signal	Full
Various Driveways between 10th & 12th Avenues	None	RIRO
12th Avenue	Stop Sign	Full
Various Driveways between 12th & 13th Avenues	None	RIRO
13th Avenue West Side	Stop Sign	RIRO t
13th Avenue East Side	Stop Sign	RIRO
Various Driveways between 13th & 14th Avenues	None	RIRO
14th Avenue	Signal	Full

The following text describes the proposed access locations along Wadsworth Blvd. from south to north. According to the CDOT Access Code, none of the right-turn access locations requires acceleration and deceleration lanes because the Build Alternative provides three through-lanes per direction on Wadsworth Blvd. and the posted speed will not be greater than 40 mph.

4th Avenue. Extending the raised median to the south eliminates the left-out movement from 4th Avenue to northbound Wadsworth Blvd. and provides a three-quarter movement intersection. The three-quarter movement brings this access location into compliance with the Access Code requirements for non-full movement intersections on NR-A facilities.

On the west side of Wadsworth Blvd., six existing driveways between 4th Avenue and 5th Avenue will be consolidated into three. Two driveways immediately adjacent to the 5th Avenue intersection will be closed because the driveways serve a property that will be a ROW acquisition for this project. On the east side, four existing driveways will be reduced to two.

5th Avenue. The access remains as a full-movement signalized intersection.

Eastbound US 6 Ramps. This proposed signalized intersection is a full-movement access with free-flowing right turns for the eastbound US 6 ramps. The access is located approximately in the middle of the existing free-flowing ramps. The gore points for the ramps are moved slightly to the north, lengthening the distance to the 5th Avenue signalized intersection. The raised median is maintained to separate the northbound and southbound Wadsworth Blvd. traffic streams.

Westbound-to-Southbound Loop Off-Ramp. This loop ramp provides a free-flow movement for westbound US 6 to southbound Wadsworth Blvd. The access location for this ramp is moved slightly north as compared to the existing condition.

Westbound-to-Northbound Directional Off-Ramp. This directional ramp provides a free-flow movement for westbound US 6 to northbound Wadsworth Blvd. This ramp accesses Wadsworth Blvd. in approximately the same location as the existing ramp. This ramp carries only the westbound US 6 traffic and not the frontage road traffic like the existing condition.

Westbound US 6 On-Ramp. This proposed access is a signalized intersection with a yield-controlled right turn for the southbound Wadsworth Blvd. to westbound US 6 movement. The signal provides a protected left turn for the northbound Wadsworth Blvd. to westbound US 6 movement and subjects the southbound through-movement to signal control. The northbound through-movement on Wadsworth Blvd. is a free-flow movement that is not subject to signal control. The westbound-to-northbound directional ramp merges into Wadsworth Blvd. north of this intersection.

A raised median is introduced north of this intersection. This proposed intersection and median together serve to eliminate the existing unsignalized intersection with the frontage road on the west and existing Broadview Drive on the east. This existing intersection is not in compliance with the NR-A category requirements because there is no northbound right-turn deceleration lane to Broadview Drive.

Northwest Frontage Road. This proposed three-quarter movement intersection replaces the access eliminated by the proposed westbound US 6 on-ramp intersection. Unlike the current frontage road, it provides for eastbound travel and access to Wadsworth Blvd. southbound. The raised median prevents the left-out movement to northbound Wadsworth Blvd., thereby maintaining the Access Code requirement of a three-quarter movement intersection on this NR-A facility.

The proposed Plan for southbound Wadsworth Blvd. between this intersection and the westbound US 6 on-ramp intersection eliminates several existing driveways. Some of these are to properties that will be ROW acquisitions for this project. The rest will use this proposed frontage road to access Wadsworth Blvd. Fourteen driveways are also eliminated north of this intersection to 9th Avenue. The properties immediately adjacent to this frontage road and 9th Avenue will use these two side streets, respectively, to access Wadsworth Blvd. The access to the properties in between is consolidated into four driveways.

Northeast Frontage Road. This proposed three-quarter movement access location is slightly north of the existing Highland Drive access location and replaces the access eliminated by the westbound US 6 on-ramp intersection. The raised median prevents the left-out movement to southbound Wadsworth Blvd., which brings this access point in line with the Access Code requirement of three-quarter movement intersections on this NR-A facility. Unlike the current frontage road, it provides for eastbound travel and access from Wadsworth Blvd.

The proposed Plan for northbound Wadsworth Blvd. between this intersection and the westbound US 6 on-ramp intersection eliminates four existing driveways and the intersection with Broadview Drive. All four of the existing driveways access properties that will be ROW acquisitions for this project. This frontage road intersection replaces the existing Broadview Drive access to Wadsworth Blvd.

8th Place. The proposed raised median eliminates the left-turn movements and revises this access to a RIRO only, which brings it in line with NR-A requirements. The proposed Plan for northbound Wadsworth Blvd. between this intersection and the northeast frontage road intersection consolidates three existing driveways to the same property into one driveway.

9th Avenue. The proposed raised median eliminates left-turn movements for westbound 9th Avenue and eliminates the left-out movement to northbound Wadsworth Blvd. from eastbound 9th Avenue. Whereas the existing access was not in compliance with the Access Code requirements for an NR-A facility, the three-quarter movement for the west side and the RIRO for the east side provide an access that is in compliance with the Code requirements.

The proposed Plan for northbound Wadsworth Blvd. between 8th Place and 9th Avenue eliminates two existing driveways. These properties can access Wadsworth Blvd. at 8th Place and 9th Avenue.

10th Avenue. The access remains as a full-movement signalized intersection. The proposed raised median continues north to 12th Avenue. The proposed Plan for northbound and southbound Wadsworth Blvd. between 9th Avenue and 10th Avenue eliminates several existing driveways. The six driveways on the west side are consolidated to three. On the east side, the proposed Plan maintains one driveway and closes a second. This property can access Wadsworth Blvd. via 9th Avenue.

12th Avenue. The access remains as a full-movement unsignalized intersection. The proposed raised median continues north to 13th Avenue. The proposed Plan for northbound and southbound Wadsworth Blvd. between 10th Avenue and 12th Avenue eliminates several existing driveways. On the west side, one parcel extends between these two streets, so their access to Wadsworth Blvd. is relocated to 12th Avenue. On the east side, the Plan proposes to maintain one driveway and consolidate three driveways to the same parcel into one driveway.

13th Avenue. The proposed access extends the raised median through the intersections and converts the existing full-movement unsignalized intersection to RIRO only for both northbound and southbound Wadsworth Blvd. The proposed raised median continues north to 14th Avenue.

The proposed Plan for northbound and southbound Wadsworth Blvd. between 12th Avenue and 13th Avenue eliminates several existing driveways. On the west side, the Plan proposes to close two driveways to the same property, which has an access to 12th Avenue. For the parcel immediately north of this property, the Plan proposes to consolidate two driveways into one. The northernmost driveway along this segment remains. On the east side, nine driveways consolidate to four access points to Wadsworth Blvd.

14th Avenue. The access remains as a full-movement signalized intersection. The proposed Plan for northbound and southbound Wadsworth Blvd. between 13th Avenue and 14th Avenue eliminates several existing driveways. On the west side of Wadsworth Blvd., seven driveways are consolidated to two. For the northernmost parcel along this segment, the driveway to Wadsworth Blvd. is eliminated and the access concentrated at the 14th Avenue driveway. On the east side, RTD is redeveloping this block and will determine the access locations to Wadsworth Blvd.

Public Involvement

An extensive public involvement campaign took place during the development of this *Access Control Plan*. Five open houses were held with the public, two of which focused specifically on the Build Alternative. After these two open houses, CDOT mailed a project atlas showing estimated impacts to the 97 potentially affected property owners (represents approximately 130 parcels). CDOT invited property owners to call or meet with project staff to discuss potential impacts to their properties. With the study intent of reducing access points to Wadsworth Blvd., many of these meetings focused on removing existing driveways and consolidating access for adjacent properties. The proposed driveway access locations in the Build Alternative are the culmination of these numerous meetings with property owners, CDOT, and Lakewood.

Right-of-Way Report

To implement the Build Alternative, CDOT will need to acquire additional ROW within the project area. In determining the ROW requirements, CDOT has balanced a goal to minimize



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private property acquisitions with a desire to conservatively estimate ROW requirements for the purposes of the EA so that the EA identifies the maximum area that would likely be affected. Available upon request and prepared under a separate cover, the *Right-of-Way Report* summarizes the ROW requirements for the US 6 and Wadsworth project, compiles the ROW documentation produced during the design phase of the EA, supports the final ROW impact determination used in the study, and documents how the ROW cost estimate was developed. The appendices to this report include technical memorandums prepared during the ROW assessment process, meeting minutes from ROW meetings, detailed information packets for each of the affected parcels in the project area, and ROW cost estimates used during the alternatives screening and selection process.



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APPENDIX B

Highway Capacity Manual LOS Definitions

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Highway Capacity Manual LOS Definitions

LOS CRITERIA FOR BASIC FREEWAY SEGMENT

LOS	Density (passenger car/mi/ln)	Traffic Flow Characteristics
A	≤ 11	Free-flow operation, vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.
B	$> 11 - \leq 18$	Reasonably free flow, vehicles maneuver within the traffic stream is only slightly restricted.
C	$> 18 - \leq 26$	Freedom to maneuver within the traffic stream is noticeably restricted.
D	$> 26 - \leq 35$	Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort level.
E	$> 35 - \leq 45$	Vehicles are closely spaced, leaving little room to maneuver within the traffic stream at speed that still exceed 49 mph.
F	> 45	Breakdowns in vehicular flow.

Source: *Highway Capacity Manual* (HCM), 2000.

LOS CRITERIA FOR WEAVING AREA

LOS	Density (pc/mi/ln)	Traffic Flow Characteristics
A	≤ 10	Unrestricted operation, smooth weaving movements.
B	$> 10 - \leq 20$	Weaving maneuvers become noticeable to through-drivers.
C	$> 20 - \leq 28$	Both ramp and freeway vehicles begin to adjust their speeds to accomplish smooth transitions.
D	$> 28 - \leq 35$	Virtually all vehicles slow to accommodate weaving movements.
E	$> 35 - \leq 43$	Flow levels approach capacity, and small changes in demand or disruptions within the traffic stream can cause both ramp and freeway queues to form.
F	> 43	Demand exceeds capacity.

Source: *Highway Capacity Manual* (HCM), 2000.



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LOS CRITERIA FOR MERGING AND DIVERGING AREAS

LOS	Density (pc/mi/ln)	Traffic Flow Characteristics
A	≤ 10	Unrestricted operation, smooth merging and diverging.
B	$> 10 - \leq 20$	Merging and diverging maneuvers become noticeable to through-drivers.
C	$> 20 - \leq 28$	Both ramp and freeway vehicles begin to adjust their speeds to accomplish smooth transitions.
D	$> 28 - \leq 35$	Virtually all vehicles slow to accommodate merging and diverging.
E	> 35	Flow levels approach capacity, and small changes in demand or disruptions within the traffic stream can cause both ramp and freeway queues to form.
F		Demand exceeds capacity

Source: *Highway Capacity Manual (HCM)*, 2000.

HCM URBAN STREET LOS CLASSIFICATION

LOS	Description
A	The roadway primarily operates at free-flow operations at average travel speeds, usually about 90 percent of the free-flow speed for the given street class. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal.
B	The roadway reasonably operates at unimpeded operations at average travel speeds, usually about 70 percent of the free-flow speed for the given street class. The ability to maneuver within the traffic stream is only slightly restricted and control delay at signalized intersections are not significant.
C	The roadway operates at stable operations, however, the ability to maneuver and change lanes in midblock locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50 percent of the free-flow speed for the given street class.
D	The roadway boards on a range in which small increases in flow may cause substantial increases in delay and decreases in travel speeds. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors. Average travel speeds are about 40 percent of roadways free-flow speed.
E	The roadway is characterized by significant delays and average travel speeds 33 percent or less of the roadways free-flow speed. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.
F	The roadway is characterized by urban street flow at extremely low speeds, typically 25-33 percent of the roadways free-flow speed. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and extensive queuing.

Source: *Highway Capacity Manual (HCM)*, 2000.



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INTERSECTION LOS CRITERIA

LOS	Average Delay (seconds per vehicle)	Traffic Flow Characteristics
Signalized Intersections		
A	≤ 10	Most vehicles arrive during the green phase and do not stop at all.
B	$> 10 - \leq 20$	More vehicles stop, causing higher delay.
C	$> 20 - \leq 35$	Vehicle stopping is significant, but many still pass through the intersection without stopping.
D	$> 35 - \leq 55$	Many vehicles stop, and the influence of congestion becomes more noticeable.
E	$> 55 - \leq 80$	Very few vehicles pass through without stopping.
F	> 80	Considered unacceptable to most drivers. Intersection is not necessarily over capacity, even though arrivals exceed capacity of lane groups.
Unsignalized Intersections		
A	≤ 10	Little or no traffic delays
B	$> 10 - \leq 15$	Short traffic delays
C	$> 15 - \leq 25$	Average traffic delays
D	$> 25 - \leq 35$	Long traffic delays
E	$> 35 - \leq 50$	Very long traffic delays
F	> 50	Queuing on minor approaches and not enough gaps of suitable size to allow safe crossing of major streets. Signalization should be investigated at this point, but warrants must be satisfied before implementation.

Source: *Highway Capacity Manual* (HCM), 2000.



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APPENDIX C

Review of Traffic Safety Reports

APPENDIX C

Review of Traffic Safety Reports

Safety Assessment Report SH 121 Resurfacing Project MP 10.10 – MP 12.53 (April 2001)

This safety assessment reviewed Wadsworth Blvd. between Florida Avenue and the northern edge of the US 6 interchange. During the study period 1995 to 1999, the total average accident rate for this portion was below the statewide average for other Federal Aid Urban Highway facilities. Likewise, the property-damage-only rate was below the state average. The injury rate was slightly above and the fatal rate was equal to the statewide average. Most of the accidents were intersection and access related.

During the years 1995 through 1999, 120 accidents occurred in the US 6 interchange area. Of this total, 30 involved injuries and the remainder were property damage only. The southbound direction on Wadsworth Blvd. recorded the most accidents. The following lists the accident types for the interchange area:

- Rear End 52%
- Fixed Object 21%
- Sideswipe Same Direction 14%
- Overturning 9%
- Other 4%

Rear-end accidents were the predominant accident type and were typically related to congestion. Only four of these occurred on the ramps, while the rest occurred on Wadsworth Blvd. Similarly, only one of the sideswipes occurred on a ramp. The predominant accident type on the ramps was hitting a fixed object such as a guardrail, light/utility pole, curb, sign, median barrier, and embankment. The overturning-type accidents occurred equally on Wadsworth Blvd. and on the ramps.

Because the safety assessment was for a resurfacing project, the report recommended a mitigating measure within the scope of a resurfacing project. The recommendation was to examine the potential to improve the arterial progression between the signals on Wadsworth Blvd. in order to relieve congestion and reduce rear-end accidents.

Abbreviated Safety Assessment Report SH 6: MP 275.65 – MP 282.33 (April 2002)

This safety assessment reviewed US 6 between Colfax Avenue and Sheridan Boulevard. During the study period 1998 through 2000, the accident frequency for all of the segments was within the expected range and below the expected mean for Urban Six-Lane Freeways.

Further investigation for accident concentrations and patterns showed that there were statistically significant high frequencies of run-off-road-right accidents in the eastbound direction between Garrison Street and Wadsworth Blvd. (MP 280.05 – 280.65). The higher injury rates associated with these accidents are likely related to the presence of curbs, which



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cause overturning. This pattern and the close proximity of residences suggest the consideration of installing guardrail or concrete barrier as a countermeasure to reduce these types of accidents. The benefit–cost analysis shows placing guardrail or barrier in this location would be a cost-effective strategy.

Most of the accidents at the US 6/Wadsworth Blvd. interchange were rear-end and hit-fixed-object collisions, which is common for an urban interchange environment. The accident types and the order of their occurrence are the same as the previous report, indicating that accident patterns did not change over the 6-year period 1995 through 2000. The following lists the accident types reported for the interchange area:

- Rear End 44%
- Fixed Object 28%
- Sideswipe Same Direction 18%
- Overturning 5%
- Other 5%

The report recommended installing concrete barrier between mileposts (MPs) 280.05 and 280.65 in the eastbound direction to reduce the high severity run-off-road-type accidents at this location. A recent field review determined that there is now barrier in this location.

Safety Assessment Report SH 6 Resurfacing Project MP 280.84 – MP 283.86 (April 30, 2003)

This safety assessment reviewed US 6 between Wadsworth Blvd. and Federal Boulevard. During the study period 1997 through 2001, the accident frequency and severity for all of the segments was within the expected range for Urban Six-Lane Freeways. In addition, the average accident rate for total, property-damage-only, injury, and fatal accidents was below the statewide average for Federal Aid Primary Urban Highways.

Further investigation for accident concentrations and patterns on the mainline showed that there were statistically significant high frequencies of six types of accidents; however, the MP locations associated with these accidents were east of the Study Area. In general, rear-end accidents were the most common accident type along this stretch of US 6. They primarily occur during congested peak periods when inattentive drivers approach the area too fast or are following too closely as they approach the congested area. Most of the sideswipe same-direction accidents that happen during lane changing occur in the middle of the segments between interchanges.

Of the 101 interchange ramp accidents, 36 percent occurred on the east Wadsworth Blvd. ramps as opposed to 50 percent at the Sheridan Boulevard and 14 percent at the Federal Boulevard ramps. The following lists the accident types at the ramps for the three interchanges:

- Rear End 54%
- Fixed Object 23%



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- Overturning 12%
- Sideswipe Same Direction 7%
- Other 4%

The most common accident type was rear-end collisions. Periodic congestion and queuing at ramp intersections and merging locations caused many of these accidents. The overturning and fixed-object collisions on the ramps were attributed to drivers exiting US 6 at excess speed, causing them to lose control and run off the road.

The directional exit ramp from westbound US 6 to northbound Wadsworth Blvd. experienced several overturning and run-off-road-type accidents. The report noted that CDOT had recently improved the ramp by adding chevrons, advisory speed signs, and a flashing yellow beacon at the exit terminal, and these types of accidents have declined correspondingly. The report recommended installing an advisory exit speed sign within the deceleration lane limits for the westbound-to-northbound Wadsworth Blvd. directional exit ramp. A recent field review determined this sign has not yet been installed.

Safety Assessment Report SH 121 Resurfacing Project MP 12.54 – MP 18.00 (July 2003)

This safety assessment reviewed Wadsworth Blvd. between the northern edge of the US 6 interchange and 58th Avenue. During the study period 1999 through 2001, the total average accident rate for this portion was above the statewide average for other Federal Aid Urban Highway facilities. The report focuses on specific intersections that exhibited a higher concentration of accidents. One of these, 10th Avenue, is in the Study Area.

During the years 1999 through 2001, 39 accidents occurred at the 10th Avenue and Wadsworth Blvd. intersection. Of this total, four involved injuries and the remainder were property damage only. Only three of the accidents occurred on 10th Avenue. The following lists the accident types for the intersection:

- Rear End 43%
- Approach Turn 35%
- Broadside 8%
- Sideswipe Same Direction 8%
- Pedestrian 3%
- Bicycle 3%

All of the approach-turn accidents were northbound and southbound on Wadsworth Blvd. The report suggested changing the left-turn phasing to protected-only to reduce these types of accidents. All but one of the rear-end accidents were on Wadsworth Blvd. The report recommended examining and improving, if possible, the arterial progression between the signals on Wadsworth Blvd. in order to relieve congestion and reduce rear-end accidents. A recent field review indicates the northbound and southbound left-turn phases remain protected-permitted.

2003 Traffic Safety Report

This report summarizes Lakewood's evaluation of its intersection accidents for the year 2003. The US 6 and Wadsworth Blvd. interchange was on its 2003 critical intersection list, which indicates it had a higher accident rate than similar highway interchanges within Lakewood. It was also on the 2001 critical list. This interchange had the highest frequency of reported accidents and the second-highest severity index in Lakewood in both 2001 and 2003.

The following lists the trends or characteristics that occurred at least twice as frequently as citywide averages for other highway interchanges:

- Time of Day: midnight to 1 a.m., 2-3 a.m., 3-4 a.m.
- First Harmful: fixed object total and sideswipe same direction
- Driver Condition: alcohol and drugs involved
- Travel Direction: S-E
- Vehicle Movement: changing lanes, starting, passing, weaving, avoiding object
- Vehicle Type: non-school bus <1.5k, single-unit truck, bicycle

The analysis of this interchange yielded the following conclusions about the accidents:

- Sideswipe-same-direction accidents accounted for nearly 25 percent of intersection accidents as opposed to the 9 percent citywide average.
- Accidents involving lane-change maneuvers occurred three times more frequently than the citywide average; the majority of these were southbound vehicles.
- The directional eastbound entrance ramp to US 6 experienced a significant number of rear-end and fixed-object accidents.
- The number of accidents that occurred in early morning hours between 12 a.m. and 3 a.m. was more than 2.5 times the citywide average.
- The number of accidents where the at-fault driver was under the influence of drugs or alcohol occurred at twice the citywide average.
- The field review noted a significant number of vehicles exiting US 6 attempting to merge into the left lanes; the high frequency of sideswipe-same-direction-type accidents supports this observation.
- The field review noted that the directional eastbound entrance ramp to US 6 has two horizontal curves and a short acceleration distance that appear to contribute to rear-end and fixed-object accidents.

A review of the interchange collision diagram provides the following summary about the accidents at this interchange in 2003:

- No fatal accidents.
- Five injury accidents equated to 7 percent of the accidents, which was within two times the citywide average.
- The northbound approach experienced four rear-end accidents, two sideswipe-same-direction accidents, three right-turn hit-fixed-object, one double-left-turn collision, and two approach-turn accidents in which northbound-to-southbound vehicles struck southbound vehicles (these are likely at the Broadview Drive intersection) accidents.
- The southbound approach experienced 14 rear-end accidents, eight sideswipe-same-direction accidents, two collisions involving right turns into vehicles going straight, and one accident involving a right turn into a vehicle turning right.
- The westbound approach experienced six rear-end accidents, one sideswipe-same-direction accident, and seven hit-fixed-object accidents (this analysis assumes these occurred on the westbound entrance and exit ramps).
- The eastbound approach experienced nine rear-end accidents, four sideswipe-same-direction accidents, and four hit-fixed-object accidents (this analysis assumed these occurred on the eastbound entrance and exit ramps).

The report recommended a detailed study to determine an alternative interchange configuration to reduce accidents and congestion at this location.

The 13th Avenue and Wadsworth Blvd. intersection also made the 2003 critical intersection list as well as the 2001 list. In 2003, it had the 43rd highest frequency of crashes and the 47th highest severity index in the City. The following lists the trends or characteristics that occurred at least twice as frequently as citywide averages for other highway interchanges:

- Season: spring
- Month of Year: January, March, and April
- Time of Day: 11 a.m.-12 p.m., 4-5 p.m., 7-8 p.m., and 10-11 p.m.
- First Harmful: broadside, pedestrian, sideswipe same direction
- Roadway Condition: ice
- Driver Condition: alcohol and drugs involved
- Travel Direction: N-W, S-E, S-W
- Vehicle Movement: changing lanes, stopped, passing
- Vehicle Type: truck > 10k /bus > 15 passenger

The analysis of this intersection yielded the following conclusions about the accidents:

- The number of sideswipe same direction accidents occurred at 2.5 times the citywide average.



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- The proportion of accidents during the noon hour and the evening is over two times the citywide average.

A review of the intersection collision diagram provides the following summary about the accidents at this interchange in the year 2003:

- No fatal accidents
- Two injury accidents out of 16 total accidents equated to 13 percent of the accidents
- The northbound approach experienced three rear-end accidents, three sideswipe-same-direction accidents, two approach-turn accidents, and one hit- pedestrian accident
- The southbound approach experienced one rear-end accident, one sideswipe-same-direction accident, and three approach-turn accidents
- The westbound approach experienced one approach-turn accident and one broadside accident
- The eastbound approach experienced one rear-end accident

2005 Traffic Safety Report

This report summarized Lakewood's evaluation of intersection accidents for 2005. The report concludes that the US 6 and Wadsworth Blvd. interchange continues to appear on the critical intersection list.