Centennial

SMOKY HILL ROAD
TRANSPORTATION CORRIDOR STUDY

April
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Prepared for:
City of Centennial

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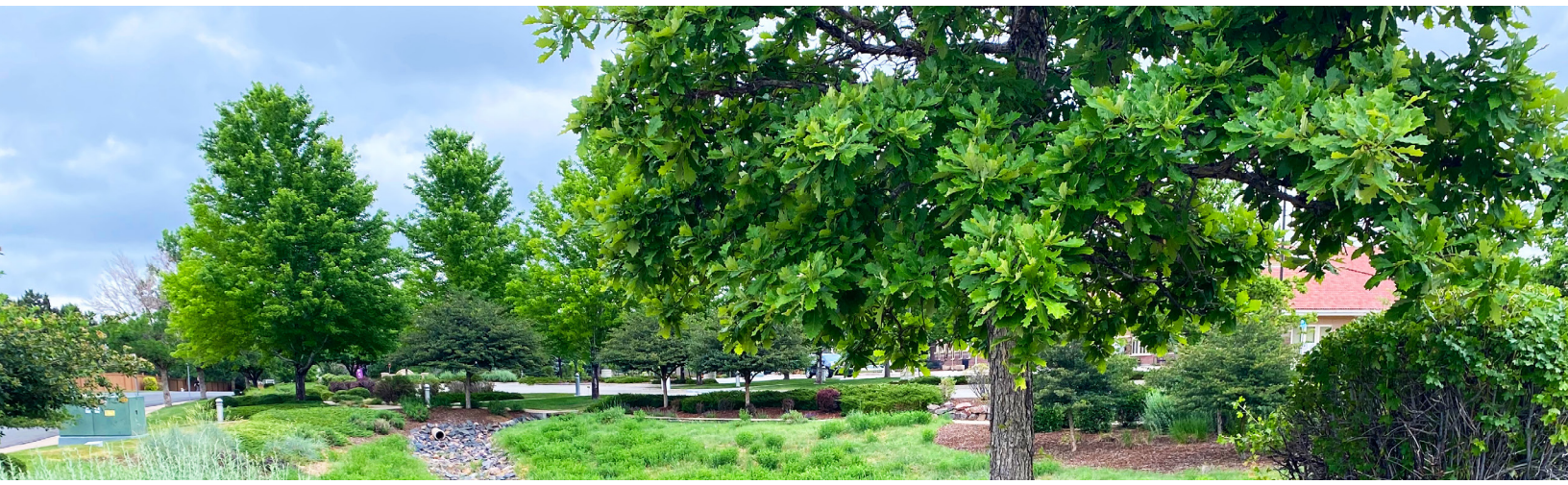

1 INTRODUCTION

1.1 - Study Background

Smoky Hill Road is a critical arterial corridor serving the eastern portion of the City of Centennial. The Smoky Hill Road Transportation Corridor Study examined how drivers, pedestrians, cyclists, and transit users can safely, efficiently, and comfortably travel on the corridor.

Previous planning efforts such as the Centennial (2013) Transportation Master Plan identified transportation improvements for drivers, cyclists, pedestrians, and transit services on the Smoky Hill Road corridor. The purpose of the Smoky Hill Road Transportation Corridor Study was to conduct a comprehensive review of these potential improvements.

Key goals of the Smoky Hill Road Transportation Corridor Study included:

- **Identifying future improvements, multimodal connections, and opportunities**
- **Reflecting community character through design**
- **Embracing citizen participation**

This report provides an overview of the Smoky Hill Road corridor in the study area and identifies a proposed approach for transportation improvements.

1.2 - Study Area

The Focus Area for the study includes the section of Smoky Hill Road within the City of Centennial between the intersections with Buckley Road and Liverpool Street/Picadilly Street. The study also provided considerations for the Adjacent Section of Smoky Hill Road further to the east between Liverpool Street/Picadilly Street and Versailles Parkway/Ponderosa Trail, which is partially located outside of the City of Centennial in unincorporated Arapahoe County and the City of Aurora. The study area is shown in **Figure 1.1.**

Tower Road Intersection

Figure 1.1: Study Area

2 EXISTING CONDITIONS

2.1 - Corridor Land Use

Smoky Hill Road is a diagonal arterial corridor connecting Quincy Avenue, in close proximity to Parker Road (to the west of the study area), and E-470 (to the east of the study area). Land use immediately adjacent to the corridor is a mixture of residential, commercial, institutional, open space/parks, and industrial uses (**Figure 2.1**, Page 4). The areas immediately adjacent to the corridor are generally surrounded by residential land use.

2.2 - Corridor Zoning

Zoning along Smoky Hill Road within the City of Centennial is shown in **Figure 2.2** (Page 5). Zoning generally consists of a series of commercial areas close to the corridor surrounded by neighborhood conservation areas. There are also several areas zoned for education where schools are located, a planned unit development in the northeast quadrant of the Danube Street intersection, and a business park in the southwest quadrant of the Liverpool Street/Picadilly Street intersection.

Sidewalk and Guardrail East of Orchard Road

Figure 2.1: Smoky Hill Road Land Use

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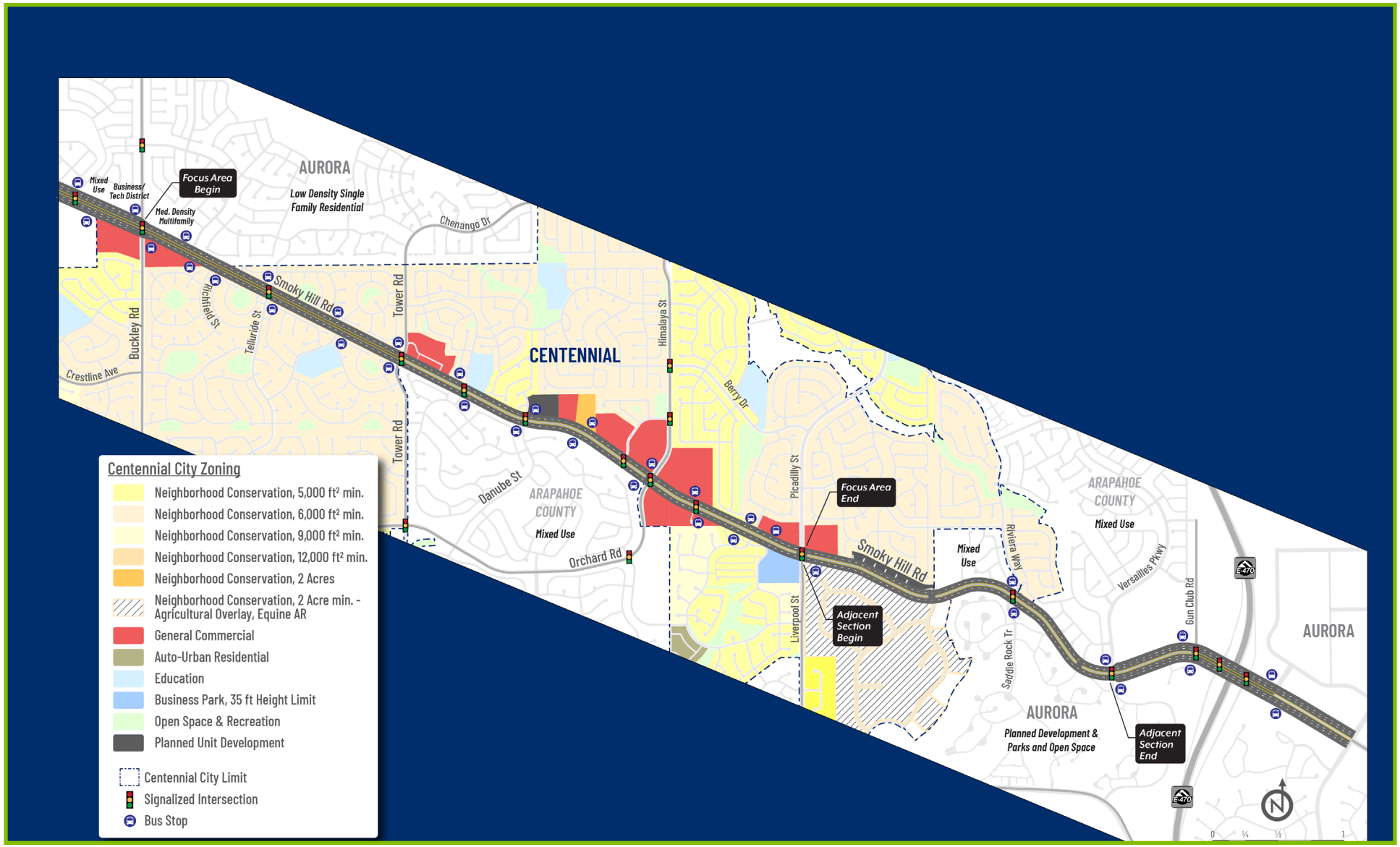
Figure 2.2: Smoky Hill Road Corridor Zoning



2.3 Corridor Mobility and Transportation

2.3.1 - Vehicle Network

Smoky Hill Road within the city limits of Centennial is generally a four-lane major arterial roadway between Buckley Road and Versailles Parkway. To the west of Buckley Road and to the east near E-470, Smoky Hill Road transitions to a six-lane major arterial. There are nine signalized intersections between the Buckley Road and Liverpool Street/Picadilly Street intersections. Auxiliary left and right turn lanes are provided at many of the intersections. The posted speed limit is 40 mph between Buckley Road and Liverpool Street/Picadilly Street and increases to 45 mph to the east of Liverpool Street/Picadilly Street. Other arterials intersecting with Smoky Hill Road in the project area include Buckley Road, Orchard Road/Himalaya Street, and Liverpool Street/Picadilly Street.

Figure 2.3 shows aspects of the mobility and transportation network in the study area including signalized intersections, transit facilities, and existing bike routes.

2.3.2 - Transit Network

RTD Bus Route 135 runs along Smoky Hill Road and generally provides hourly service between the Southlands Mall to the east of the study area and the Nine Mile Light Rail Station to the west of the study area.

Additionally, a RTD park-n-ride is located in the study area on the northwest corner of the Picadilly Street intersection. The park-n-ride provides 58 vehicle parking spaces as well as bike racks. Users of the park-n-ride are able to ride the RTD Bus Route 135 as well as RTD Bus Route 139. Route 139 provides hourly service and travels between the Smoky Hill/Picadilly park-n-ride and the Nine Mile light rail station via a route using Picadilly Street and Quincy Avenue.

RTD Bus Routes 169 and 169L cross Smoky Hill Road on Buckley Road and provide service between the Arapahoe Crossing Shopping Center (to the south) and the 40th Avenue and Airport Boulevard Station further to the north.

2.3.3 - Bike Network

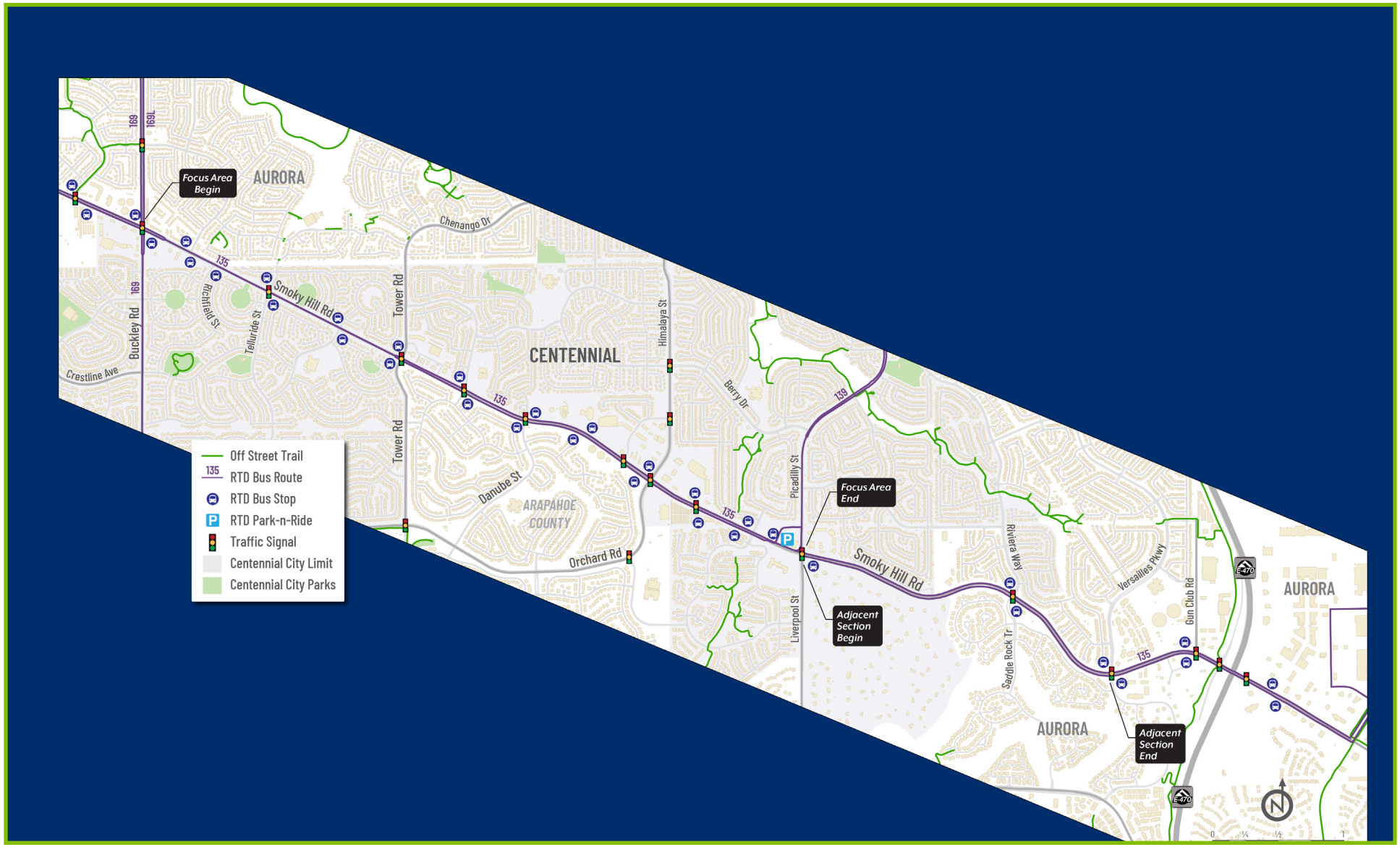
Existing bike infrastructure is limited along the corridor. There are some wider sidewalk segments along Smoky Hill Road that act as shared pedestrian and cyclist side paths, but these are not continuous along the corridor.

Based on the City of Centennial (2016) Trails Inventory, there are several multi-use trails located near the Smoky Hill Road corridor (**Figure 2.3**). The Piney Creek Trail is a regional trail located south of the Smoky Hill Road corridor. North of the corridor is the West Toll Gate Creek Trail, which is designated as a local trail. A local trail is also provided via a side path along Liverpool Street to the south of Smoky Hill Road, connecting with the Piney Creek Trail. Additional local connector trails are located immediately north and south of Smoky Hill Road near the Kirk Street intersection, connecting with the Piney Creek and West Toll Gate Creek trails.

Other nearby bike facilities include bike lanes on Picadilly Street 500 feet north of Smoky Hill Road and on Wagon Trail Parkway 800 feet north of Smoky Hill Road.

Smoky Hill Road Park-n-Ride

Figure 2.3: Mobility and Transportation in the Project Area



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2.3.4 - Pedestrian Network

Smoky Hill Road provides sidewalks along both sides of the roadway throughout the study area. Sidewalk widths vary between four and 15 feet, and are a mixture of attached and detached sidewalks. Pedestrians are generally limited to crossing Smoky Hill Road at signalized intersections where pedestrian crossings are provided. Signalized intersection spacing along Smoky Hill Road is approximately every half mile or less. Pedestrians are also able to travel on the multi-use trail network discussed in Section 2.3.3.

2.3.5 - Micromobility

Micromobility vehicles are an emerging transportation mode that have become more popular in recent years, providing an efficient way for road users to complete short trips in cities and suburban areas. Micromobility may include electric bikes (E-bikes), scooters, skateboards, or other emerging vehicle types - many with some form of power assistance. These vehicles may be privately owned or be available for use through shared services. Based on the traffic data collected and anecdotal observations in the Smoky Hill Road area, micromobility use in the project area is currently low and no existing shared micromobility services were identified.

2.3.6 - Intelligent Transportation Systems

The traffic signals on Smoky Hill Road between Telluride Street and Liverpool Street/Picadilly Street are operated by the City of Centennial and the Buckley Road intersection is operated by the City of Aurora. These traffic signals and others adjacent to the study area are shown in **Figure 2.3**. The City of Centennial's traffic signal system operates with fiber communications and a centrally controlled traffic signal system. The signals in the project area are currently operated with time-based traffic signal coordination plans developed based on historical traffic patterns in the corridor. The City of Centennial's Traffic Management Center (TMC) is used for live monitoring and management of traffic operations including the Smoky Hill Road area.

The City's Traffic Engineering Services (TES) provides a wide range of transportation operations, infrastructure maintenance and improvements including pavement markings, traffic signals, and traffic signs. TES staff also support Intelligent Transportation Systems (ITS) hardware and software. ITS is the usage of sensor, computer, electronics and communication technologies and management strategies in a cohesive way. The goal is to improve transportation-related safety and mobility issues and to enhance operational efficiency. ITS devices and applications can include many different things, from advanced traffic signal controllers to weather stations, pan-tilt-zoom cameras for monitoring traffic conditions, real-time adaptive traffic signal operations, and more. These are often joined by a communications network and in that case can be linked to Traffic Management Centers (TMCs) where ITS professionals can monitor or operate the system using real-time information and traffic management plans. ITS is a key part of Smart City/Smart Community efforts, which take data from these and many other sources beyond transportation to manage City assets and resources more efficiently, resulting ideally in an improved quality of life for constituents as well as a stronger and more connected community. The City's Traffic Management Center (TMC) is used for live monitoring and management of traffic operations. Centennial is currently in the process of installing additional necessary components and connections to enable deployment of adaptive traffic signal operations on the Smoky Hill corridor. This new adaptive signal system and sensors will enable the timing of signals to be adjusted in real time by the system as traffic patterns and volumes change throughout the day. Since modifications to signal timing are based on traffic conditions across the corridor, changes or modifications may or may not be noticeable to drivers on the corridor. Ideally any ongoing adjustments are seamless and invisible to the user they are benefiting. The City will be working to develop and evolve metrics for the adaptive traffic signal timing corridors as additional corridors are deployed. Travel time may be part of those metrics but that metric alone does not capture the potential full benefits of the added flexibility in operations that adaptive operations can provide when compared to time-based operations. The City's Transportation Master Plan (TMP) identifies a vision and goals that can support additional future ITS projects as needed.

2.4 Corridor Segments

2.4.1 - Segment 1 – Buckley Road to Tower Road

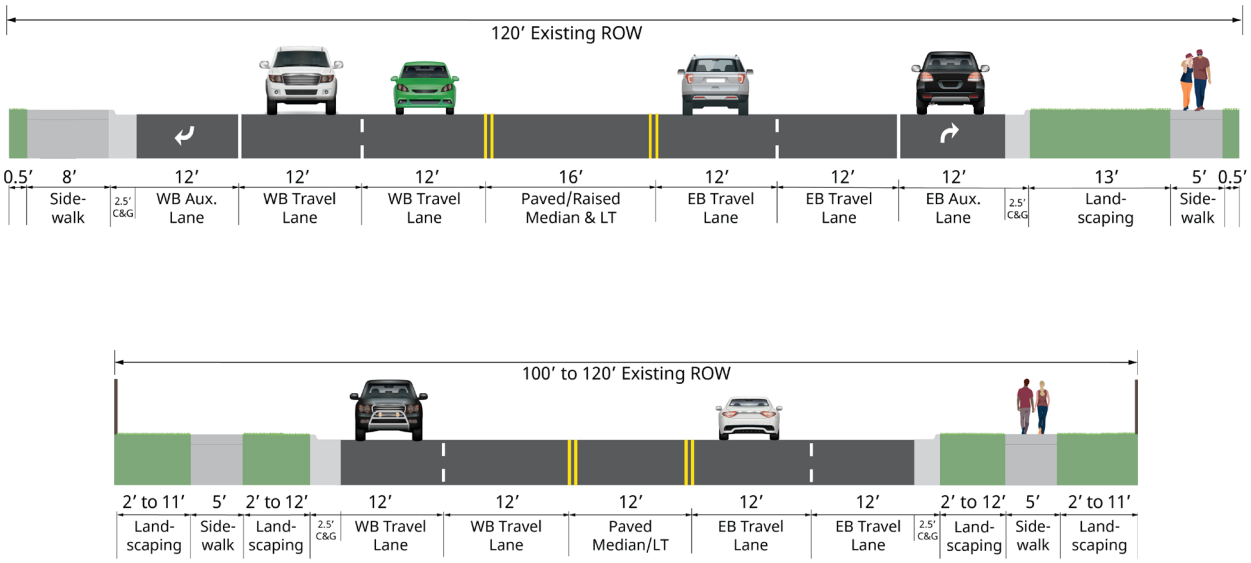
Typical sections provide a general picture of the roadway elements along a given stretch of the corridor. These roadway elements include travel lanes, sidewalks, curb and gutter (C&G), landscaping and medians. Sidewalks and landscaping typically have variable widths that may change along differing sections of the corridor. This results in a variable total width of the typical section.

To develop typical sections, the study area was sub-divided into four corridor segments and typical sections were developed for each segment. The typical section presented in the report are shown at the same scale.

Roadway Elements

- **100–120 feet of right-of-way**
- **Signalized intersections at Buckley Road, Telluride Street, and Tower Road**
- **Four through lanes with single auxiliary left and right turn lanes at intersections**
  - Except at Buckley Road which has three through lanes westbound with a shared through and right turn lane

Figure 2.4: Buckley Road to Tower Road – Existing Typical Sections



Traffic Elements

- **46,900 vehicles per day between Buckley Road and Telluride Street**
- **40 mph posted speed limit**

Multimodal Elements

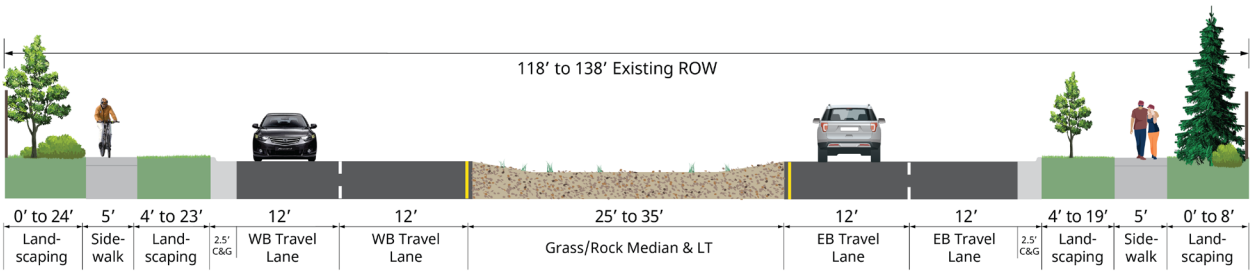
- **RTD Bus Routes 135 along Smoky Hill Road and 169/169L along Buckley Road**
- **Sidewalks along both sides of Smoky Hill Road**
- **Pedestrian crossings approximately every half a mile at signalized intersections (Buckley Road, Telluride Street, and Tower Road)**
- **Existing bike lanes on Wagontrail Parkway 800 feet north of Smoky Hill Road**

2.4.2 - Segment 2 – Tower Road to Orchard Road/Himalaya Street

Roadway Elements

- 118–138 feet of right-of-way
- Signalized intersections at Tower Road, Biscay Circle, Danube Street, Gibraltar Way, and Orchard Road/Himalaya Street
- Four through lanes with single auxiliary left and right turn lanes at intersections
- Wide center median

Figure 2.5: Tower Road to Orchard Road/Himalaya Street – Existing Typical Section



Traffic Elements

- 30,700 vehicles per day between the Danube Street and Orchard Road/Himalaya Street intersections
- 40 mph posted speed limit

Multimodal Elements

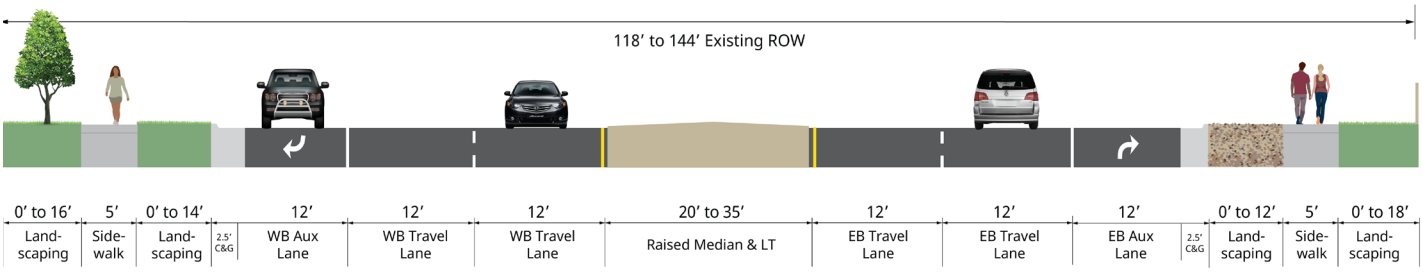
- RTD Bus Route 135 along Smoky Hill Road
- Sidewalks along both sides of Smoky Hill Road
- Pedestrian crossings approximately every half a mile or less at signalized intersections (Tower Road, Biscay Circle, Danube Street, Gibraltar Way, and Orchard Road/Himalaya Street)
- Existing bike lanes on Wagontrail Parkway 800 feet north of Smoky Hill Road

2.4.3 - Segment 3 – Orchard Road/Himalaya Street to Liverpool Street/Picadilly Street

Roadway Elements

- 118–138 feet of right-of-way
- Signalized intersections at Orchard Road/Himalaya Street, 20250 East/Safeway Entrance, and Liverpool Street/Picadilly Street
- Four through lanes with single auxiliary right turn lanes at intersections, dual left turn lanes westbound at Orchard Road/Himalaya Street and eastbound at Liverpool Street/Picadilly Street, single left turn lanes at 20250 East/Safeway Entrance and unsignalized intersections (Kirk Street and RTD Park-n-Ride/Sprouts entrance)
- Center median
- Vertical and horizontal curvature

Figure 2.6: Orchard Road/Himalaya Street to Liverpool Street/Picadilly Street – Existing Typical Section



Traffic Elements

- 35,800 vehicles per day west of Liverpool Street/Picadilly Street
- 40 mph posted speed limit

Multimodal Elements

- RTD Bus Routes 135 along Smoky Hill Road and Route 139 along Picadilly Street
- Park-n-Ride at northwest corner of Liverpool Street/Picadilly Street
- Sidewalks along both sides of Smoky Hill Road
- Pedestrian crossings approximately every half mile or less at signalized intersections (Orchard Road/Himalaya Street, 20250 East/Safeway Entrance, and Liverpool Street/Picadilly Street)
- Existing bike lanes on Picadilly Street 500 feet north of Smoky Hill Road. Side path along Liverpool Street to the south of Smoky Hill Road.
- Connector trails near Kirk Street providing access to the Piney Creek Trail (to the south) and West Toll Gate Creek Trails (to the north).

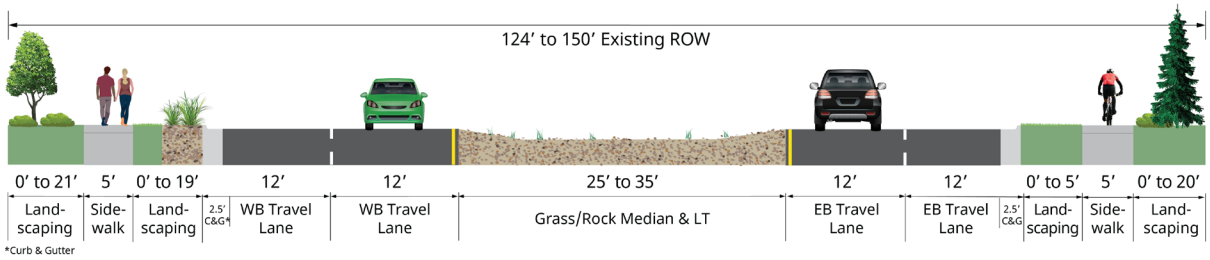
East of Tower Road

2.4.4 - Segment 4 – Liverpool Street/Picadilly Street to Versailles Parkway/Ponderosa Trail

Roadway Elements

- 124–150 feet of right-of-way
- Signalized intersections at Liverpool Street/Picadilly Street, Riviera Way/Saddle Rock Trail, and Versailles Parkway/Ponderosa Trail.
- Four through lanes with single auxiliary right and left turn lanes at the majority of intersections
    - Dual left turn lanes westbound at Liverpool Street/Picadilly Street
- Wide center median
- Horizontal curvature

Figure 2.7: Liverpool Street/Picadilly Street to Versailles Parkway/Ponderosa Trail – Existing Typical Cross Sections



Traffic Elements

- 34,400 vehicles per day west of Versailles Parkway/Ponderosa Trail
- 45 mph posted speed limit

Multimodal Elements

- RTD Bus Route 135 along Smoky Hill Road.
- Sidewalks along both sides of Smoky Hill Road.
- Pedestrian crossings approximately every 0.9 miles or less at signalized intersections (Liverpool Street/Picadilly Street, Riviera Way/Saddle Rock Trail, and Versailles Parkway/Ponderosa Trail)
- Existing bike lanes on Picadilly Street 500 feet north of Smoky Hill Road. Side path along Liverpool Street to the south of Smoky Hill Road.

2.5 Traffic Operations

Based on previous traffic counts and data received from the Denver Regional Council of Governments (DRCOG), traffic volumes for Year 2020 were identified and after applying growth factors, forecasted traffic volumes for Year 2050 were developed. Further details on the method used for developing the traffic volumes and the Synchro output from the traffic analysis is included in the Background Conditions Report provided in **Appendix A.** To assess existing operations in the study area, level of service (LOS) was determined at each of the signalized intersections and individual traffic movements. LOS is a measure of operational performance given an A–F scale, with A representing the best operating conditions.

Volume-to-capacity ratios (VCRs) were also determined for signalized intersection movements. VCRs compare the traffic volume arriving with the maximum traffic volume that can travel through an intersection for the specific operational and roadway conditions at a location. At signalized intersections, a VCR of 0.95 or greater indicates a traffic movement that is nearing or exceeding capacity, which will contribute to adverse intersection performance.

2.5.1 - 2020 Traffic Conditions

Peak hour and average daily traffic volumes for 2020 are shown in **Figure 2.8** (Page 14). As shown, in 2020 average daily traffic ranges from 30,700 in the center of the study area near the Orchard Road/Himalaya Street intersection to 46,900 on the western end between Buckley Road and Telluride Street.

Intersection LOS based on the 2020 traffic volumes is shown in **Figure 2.9** (Page 15). As shown, the Buckley Road intersection operates at LOS D during both the AM and PM Peak periods and the Liverpool Street/Picadilly Street intersection operates at LOS D during the PM Peak period. All of the remaining intersections in the project area operate at LOS C or better.

VCRs based on the 2020 traffic volumes are shown in **Figure 2.10** (Page 16). At signalized intersections, VCRs of 0.95 or greater indicate a threshold where current demand may contribute to operational issues. At the Buckley Road intersection, the southbound through and eastbound left turn exceed or are at the 0.95 threshold. At the remaining intersections, all movements had VCRs of less than 0.95. Several of the other intersections (e.g., Telluride St, Tower Rd, Orchard Rd/Himalaya St, and Liverpool St/Picadilly St) have VCRs in the 0.6 to 0.8 range.

Smoky Hill Road,East of Buckley Road

Figure 2.8: 2020 Traffic Volumes

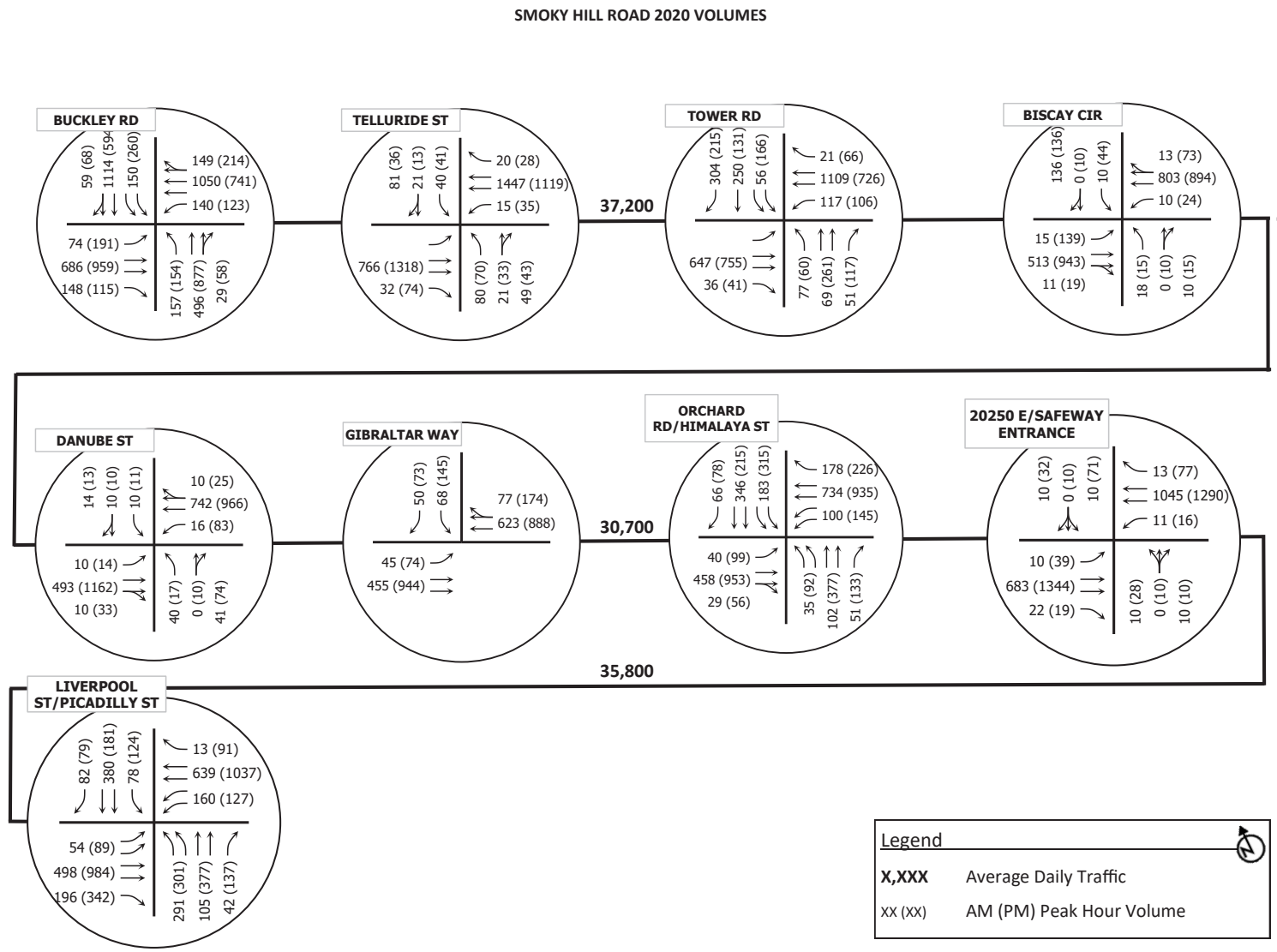


Figure 2.9: 2020 Level of Service

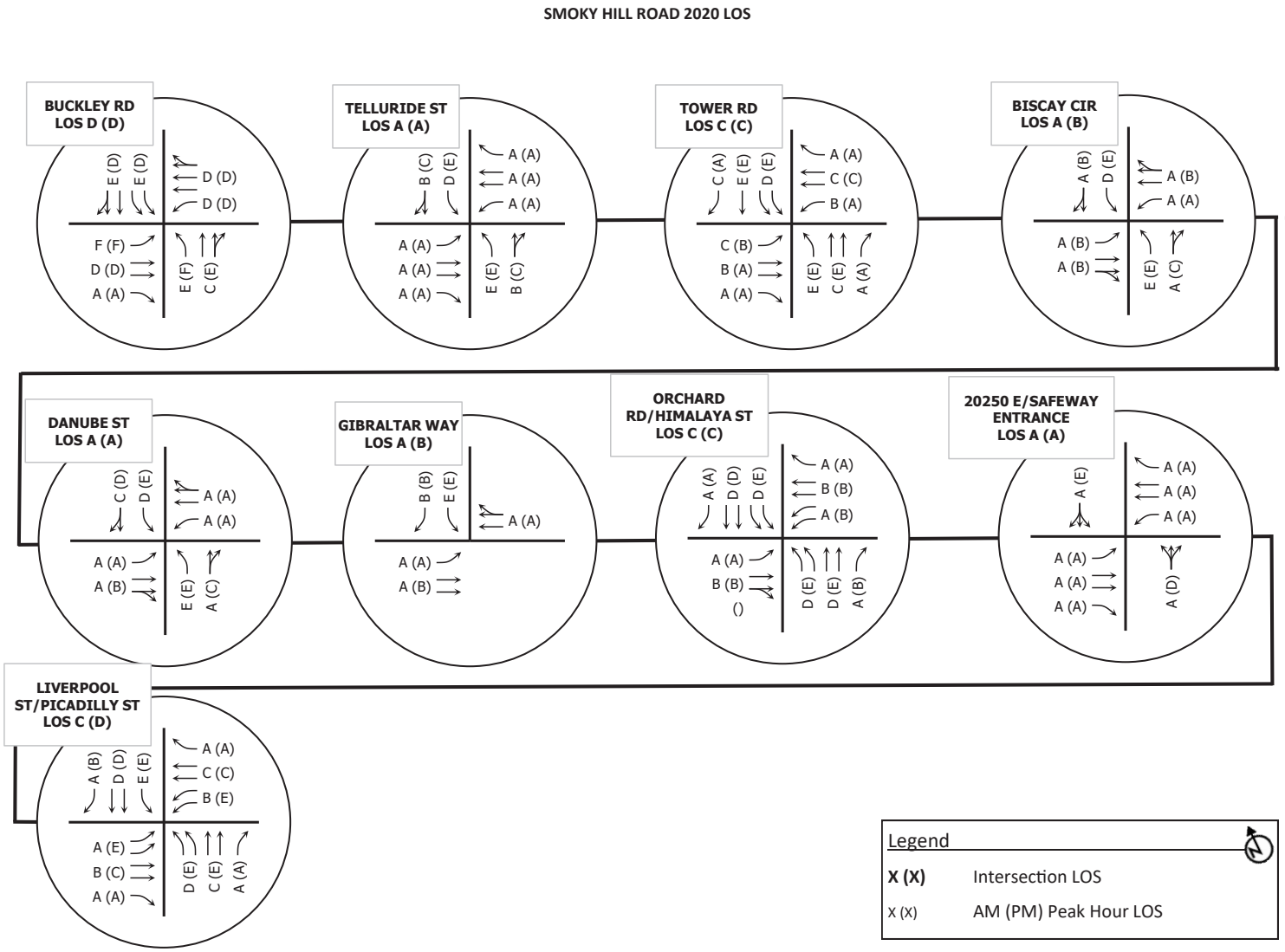
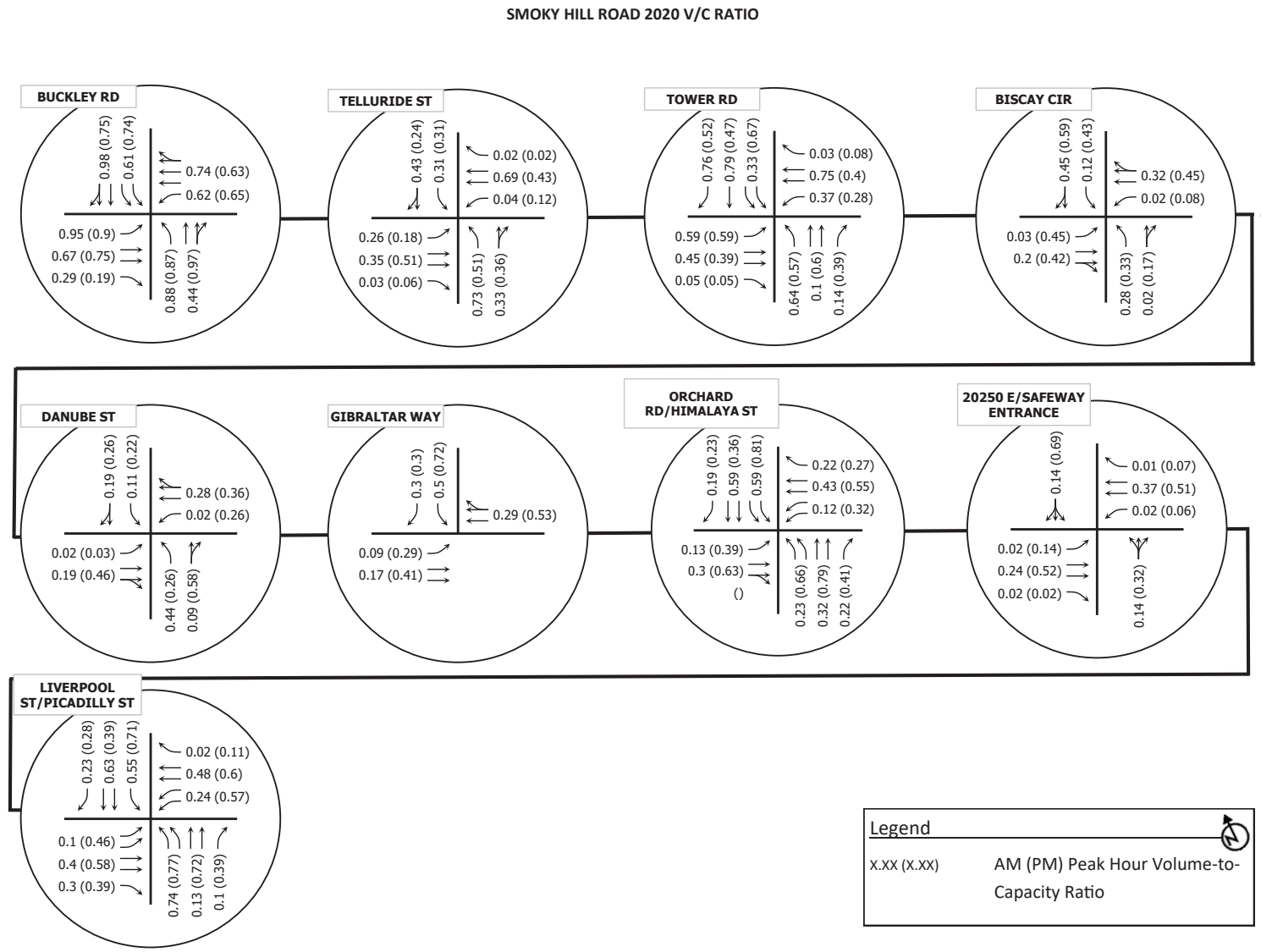


Figure 2.10: 2020 Volume to Capacity Ratios



2.5.2 - 2050 Traffic Conditions

Forecasted 2050 traffic volumes were developed in the project area based on data received from the DRCOG Travel Demand Model (**Figure 2.11**, Page 18). As shown, average daily traffic volumes are forecasted to exceed 50,000 vehicles per day on the eastern and western edges of the project area and will reach 44,800 vehicles per day near the Orchard Road/Himalaya Street intersection.

The LOS based on the 2050 volumes is shown in **Figure 2.12** (Page 19). At the Buckley Road and Orchard Road/Himalaya Street intersections, traffic conditions are forecasted to degrade to LOS F during the PM peak period. The Buckley Road intersection will also operate at LOS E during the AM peak period. Additionally, the Tower Road intersection will degrade to LOS D during the AM peak period and the Liverpool Street/Picadilly Street intersection during the AM and PM peak periods. At the remaining intersections, several movements will also degrade to LOS E or LOS F.

VCRs based on the 2050 forecasts are shown in **Figure 2.13** (Page 20). During the PM peak period, several movements have a VCR exceeding 0.95 at the Buckley Road and Orchard Road/Himalaya Street intersections. The northbound left turn at the Liverpool Street/Picadilly Street intersection has a high VCR during the PM peak (1.08) with several other movements approaching 0.95. During the AM peak period, the Buckley Road intersection has movements with a VCR exceeding 0.95. At the remaining intersections, lower VCR values were identified based on the 2050 forecasts during the AM peak period.

The outcomes of the analysis suggest that operational issues will likely occur with LOS F and VCR exceeding 0.95 at several intersections based on the existing roadway geometry and additional treatments may need to be considered to improve operations.

It should be noted that analysis of future year conditions was based on the City of Centennial's existing traffic control. As noted in **Section 2.3.6**, the City of Centennial has plans to implement adaptive traffic signal operations. This change, as well as other future mitigations may improve traffic performance to better than those otherwise projected for 2050 conditions.

Park View

Figure 2.11: 2050 Traffic Volumes

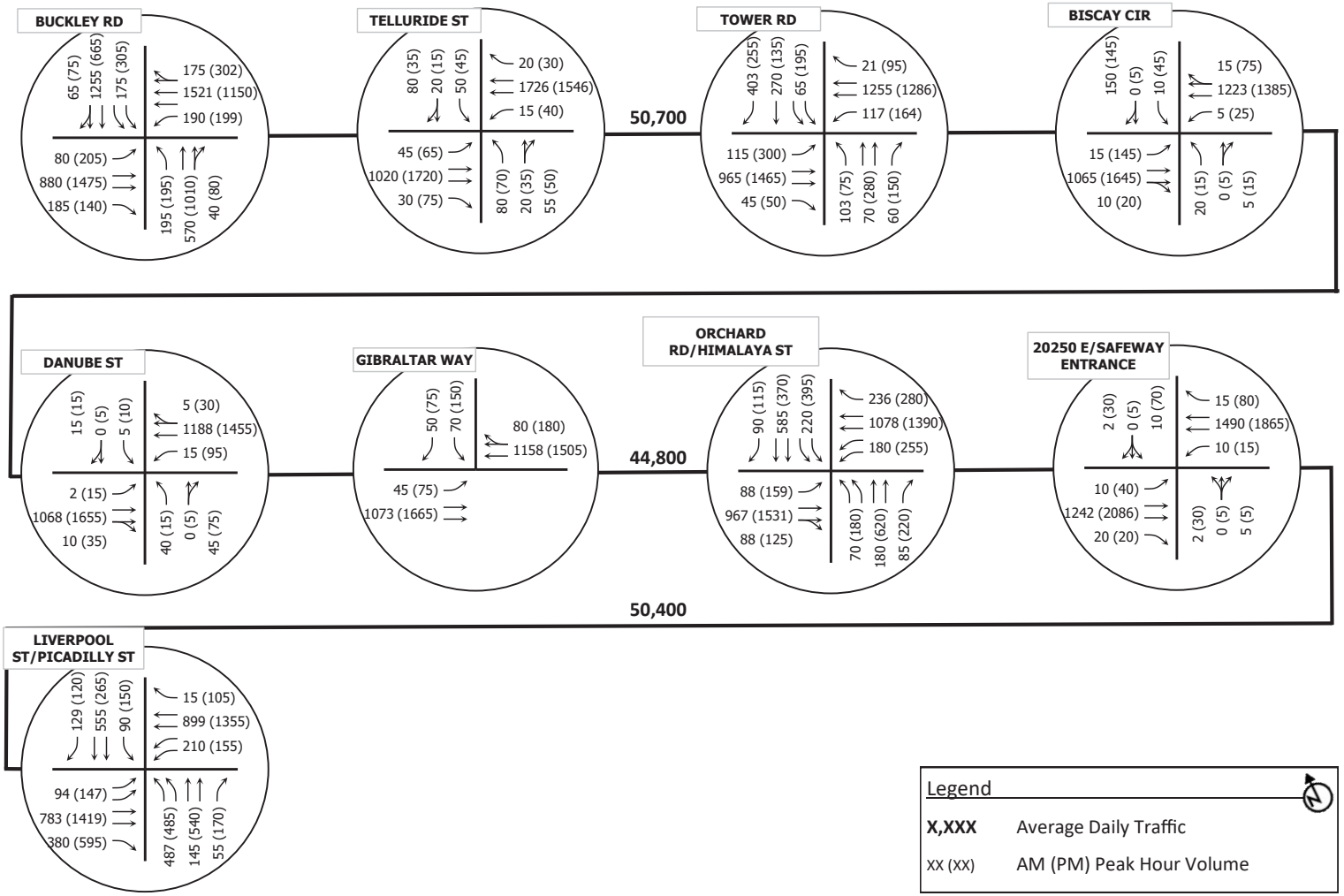


Figure 2.12: 2050 Level of Service

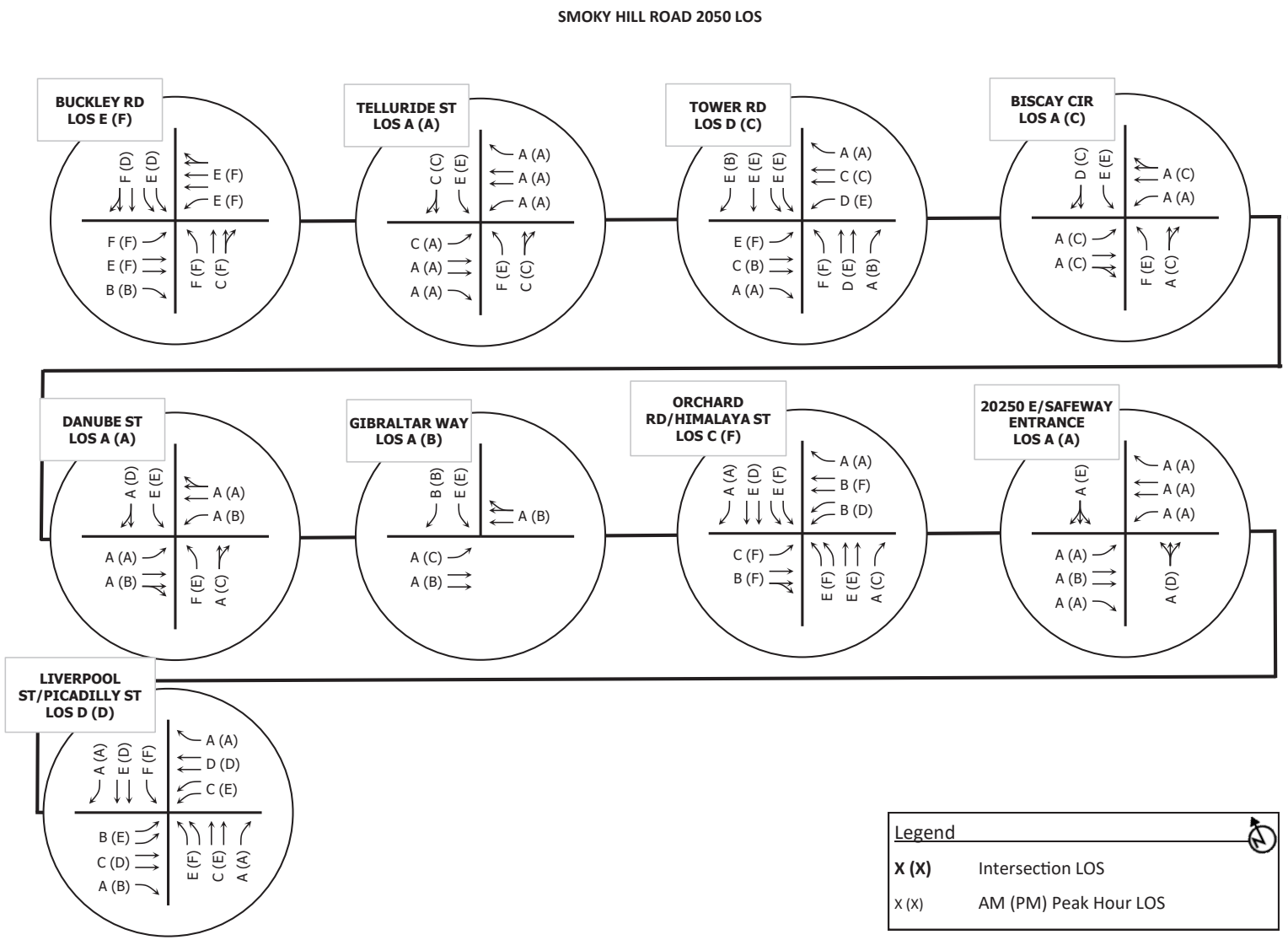
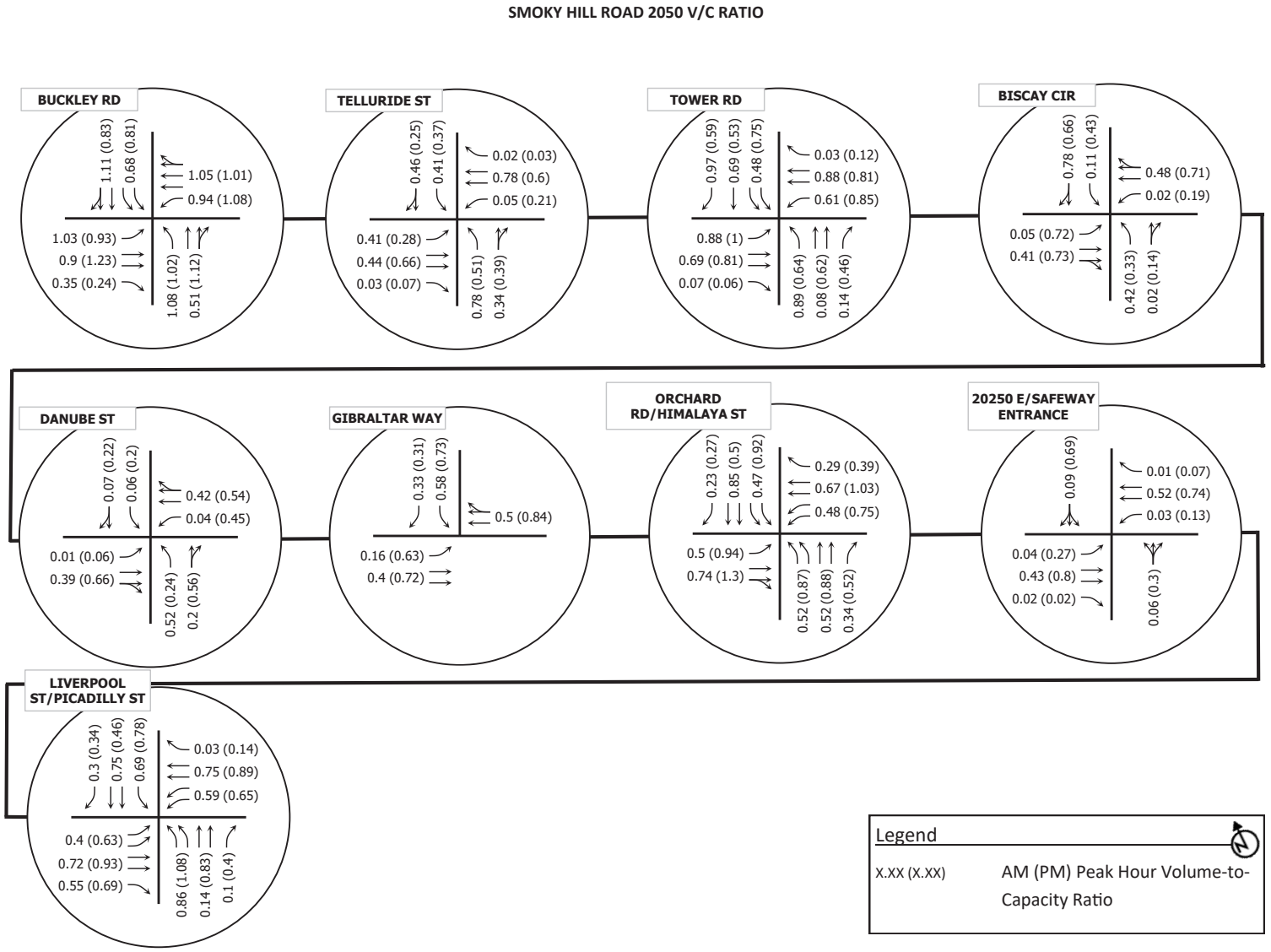


Figure 2.13: 2050 Volume to Capacity Ratios



As part of the turning movement count data obtained in the study area, pedestrian and bike counts were also obtained. Based on the data, intersections with higher pedestrian activity (29 to 49 pedestrians across the three periods) included Buckley Road, Orchard Road/Himalaya Street, and Liverpool Street/Picadilly Street. Cyclist activity was lower than pedestrian activity. Intersections with higher cyclist activity, with more than ten cyclists recorded across the peak periods, included Danube Street, Orchard Road/Himalaya Street, and Liverpool Street/Picadilly Street.

2.6 Crash History

The City of Centennial provided Muller with crash history within the study area between January 1, 2014, and January 31, 2021 (7 years and 1 month). The crash history was examined between the Buckley Road intersection and the Picadilly Street intersection to locate clusters and identify crash patterns. Four hundred ninety-three (493) crashes were reported along this section of Smoky Hill Road during the study period; 40 crashes resulted in 48 injuries and there were no fatalities. **Table 2.1** summarizes the crash totals for this segment of Smoky Hill Road over the study period. As shown, a reduction in total crashes occurred between years 2014 to 2016 and 2017 to 2019. There were fewer crashes recorded in 2020 than in previous years potentially due to COVID-19 impacts on traffic.

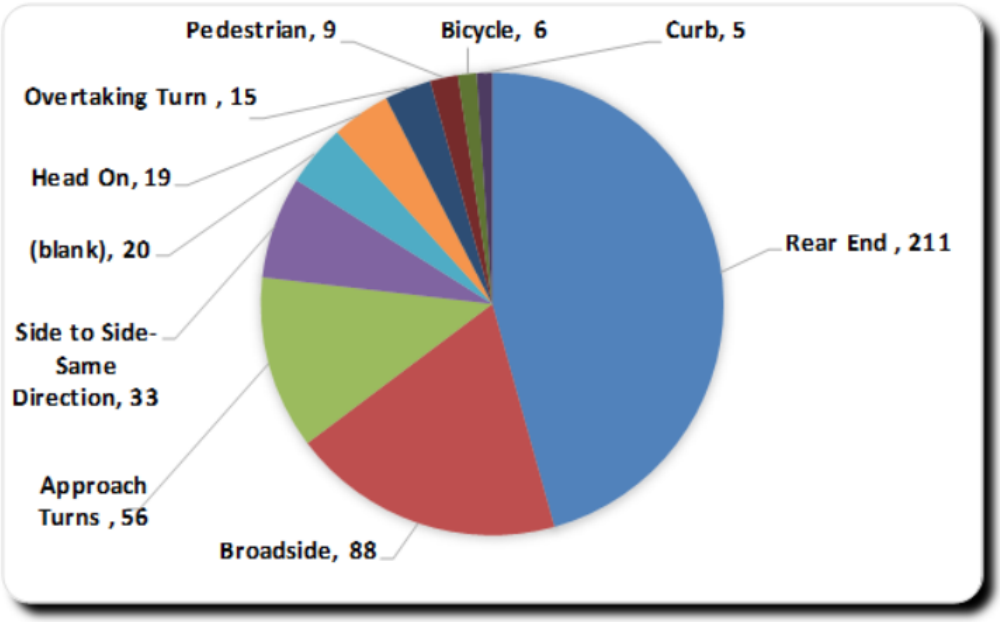
Table 2.1: Smoky Hill Road Crash History by Year

Year	Crashes			Persons Injured
	PDO[1]	Injury	Total	
1/1/2014 to 12/31/2014	81	4	85	5
1/1/2015 to 12/31/2015	98	3	101	3
1/1/2016 to 12/31/2016	89	10	99	13
1/1/2017 to 12/31/2017	54	6	60	6
1/1/2018 to 12/31/2018	50	7	57	8
1/1/2019 to 12/31/2019	57	6	63	9
1/1/2020 to 12/31/2020	22	3	25	3
1/1/2021 to 1/31/2021	3	1	3	1
Total	**453**	**40**	**493**	**48**
Average/Year	**64**	**6**	**70**	**7**

[1] Property Damage Only

Figure 2.14 displays the crash distribution by type for the study segment. Rear end crashes were the most common crash type observed, accounting for 43% of the total crashes, followed by broadside type crashes at 18%, and approach turn crashes at 11%.

Figure 2.14: Smoky Hill Road Crash Distribution by Type



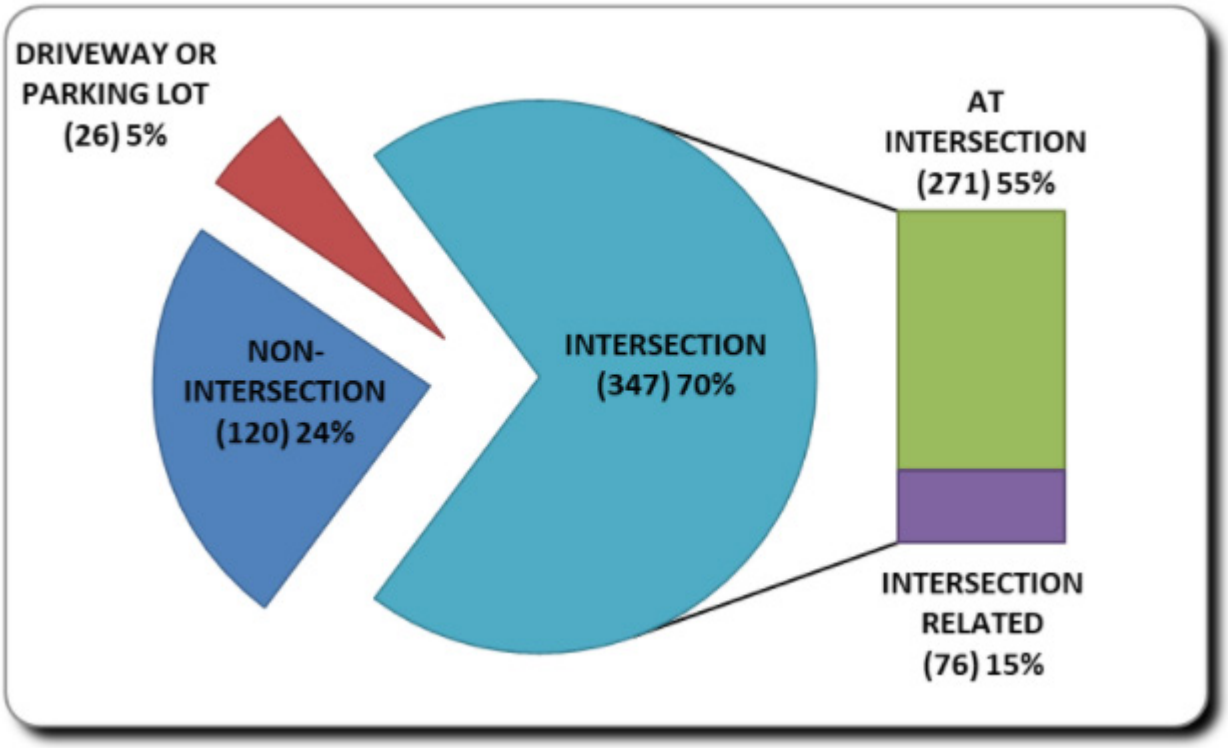
Other Crashes <1%	
Other Non-Collision	4
Sign	4
Parked Motor Vehicle	3
Rear to Rear	3
Side to Side-Opposite Direction	3
Fence	2
Rear to Side	2
Tree	2
Culvert or Headwall	1
Delineator Post	1
Large Rocks or Boulder	1
Other Fixed Object	1
Overturning	1
Traffic Signal Pole	1
Vehicle Debris or Cargo	1
Wall or Building	1

Note: Crashes shown as "(blank)" crash type were not identified in the crash data.

2.6.1 - Crash Locations

The majority of the crashes along the Smoky Hill Road corridor occurred in the vicinity of intersections (347 of 493, 70%), followed by non-intersection locations (120 of 493, 24%), and driveway accesses or parking lots (26 of 493, 5%). This breakdown is shown in **Figure 2.15**. The magnitude of safety problems at intersections was assessed using Safety Performance Functions, and specific patterns were determined using direct diagnostic analysis techniques. The complete listing for the study corridor of Smoky Hill Road are provided in the Background Conditions Report (**Appendix A**).

Figure 2.15: Intersection Crashes



2.6.2 - Intersection Crash Analysis

Crashes that can be attributed to intersections (located at intersections or that are intersection related) accounted for 70% of the total crashes (347 of 493). **Table 2.1** lists the intersection, number of legs, signalization, crash frequency, and Level of Safety Service (LOSS) at intersections in the study area. LOSS was determined using Safety Performance Function analysis. This method is further discussed in the Background Conditions Report (**Appendix A**). As shown, the Orchard Road/Himalaya Street intersection had the most total crashes and had a LOSS III, which indicates less than expected safety performance. The remaining intersections were rated as LOSS I for total crashes indicating low potential for crash reduction. All intersections were also identified as LOSS I for severe crashes.

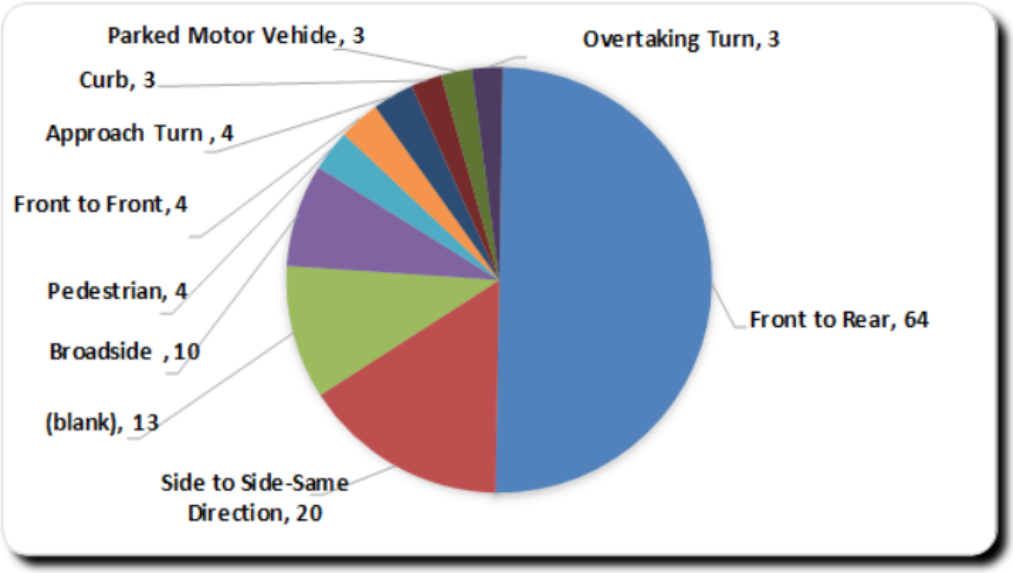
Table 2.2: Intersection Crashes by Location

Description	Legs	Signal	Number of Crashes				LOSS Total	LOSS Severe
			PDO	Injury	Fatal	Total		
Buckley Rd	4	Yes	10	1	0	11	I	I
Pagosa St	4	No	2	0	0	2	I	I
Wagontrail Pkwy	4	No	2	0	0	2	I	I
Richfield St	3	No	0	0	0	0	I	I
Telluride St	4	Yes	13	6	0	19	I	I
Waco St	4	No	6	0	0	6	I	I
Tower Rd	4	Yes	43	5	0	48	I	I
Biscay Cir	4	Yes	20	2	0	22	I	I
Danube St	4	Yes	13	2	0	15	I	I
Gibraltar Way	3	Yes	5	0	0	5	I	I
Orchard Rd/Himalaya St	4	Yes	112	5	0	117	III	I
20250 E Intersection	4	Yes	17	0	0	17	I	I
Jericho St/Kirk St	4	No	2	0	0	2	I	I
Liverpool St/Picadilly St	4	Yes	73	5	0	78	I	I
Picadilly St	4	No	3	0	0	3	I	I
Total			321	26	0	347		
Average/Year			45	4	0	49		

2.6.3 - Non-Intersection Segment Crash Analysis

There were 146 non-intersection crashes during the study period on Smoky Hill Road along a non-intersection segment, driveway access, or parking lot. Rear end type crashes were predominant (44%), followed by sideswipe (same direction) type crashes (14%), and broadside crashes (9%). **Figure 2.16** shows the crash distribution, by type, for the study segment.

Figure 2.16: Non-Intersection Crash Distribution by Type



Other Crashes <2%	
Fence	2
Other Non-Collision	2
Rear to Rear	2
Rear to Side	2
Sign	2
Tree	2
Culvert or Headwall	1
Delineator Post	1
Large Rocks or Boulder	1
Other Fixed Object	1
Overturning	1
Wall or Building	1

Non-intersection crashes were analyzed in segments in order to identify patterns and clusters throughout the corridor. Non-intersection crash analysis segments were broken down into the four main segments listed above in Section 3.4 of this report. **Table 2.3** shows the breakdown of crashes by analysis segment.

Table 2.3: Crashes by Analysis Segment

Segment	Length (miles)	Number of Crashes			
		PDO	Injury	Fatal	Total
Buckley Rd to Tower Rd	1.10	29	4	0	3
Tower Rd to Orchard Rd/ Himalaya St	1.06	43	6	0	49
Orchard Rd/ Himalaya St to Liverpool St/Picadilly St	0.64	52	2	0	54
Liverpool St/Picadilly St to Versailles Pkwy/Ponderosa Trail	1.34	8	2	0	10
Total		132	14	0	146
Average/Year		18.6	2.0	0	20.6

As shown, crashes were most concentrated in the segment between the Orchard Road/Himalaya Street and Liverpool Street/ Picadilly Street intersections, which was the shortest segment but had the greatest total number of crashes. Injury crashes were most prevalent in the segment between Tower Road and the Orchard Road/Himalaya Street intersection.

2.7 Environmental Resources

The Smoky Hill Road corridor is located within the High Plains ecosystem, more specifically designated as South Central Semi-Arid Prairies in the Great Plains. The western portion of the corridor crosses over a catchment for Cherry Creek Lake.

In order to identify environmental resources, a Study Area 50 feet from the edge of the pavement was developed. The Study Area represents the area where potential improvements and projects are likely to occur.

In order to better understand the corridor, the following environmental resources were identified within the Study Area:

- **Biological resources**
- **Parks, trails, and recreation areas**
- **Potentially sensitive noise receptors**
- **Hazardous materials sites**

2.7.1 - Biological Resources

Within the Study Area, there were no water crossings or wetlands identified. Additionally, there were no threatened or endangered species. Noxious weeds and migratory birds will be considered on a project-by-project basis and incorporated into the Final Design Construction Notes.

2.7.2 - Parks, Trails, and Recreation Areas

There are seven parks, trails, and golf courses located with the Study Area (**Figure 2.17**). Big Sandy Park and Big Rock Park are adjacent to Smoky Hill Road while Bellewood Park and Arrowhead Park are located within the neighborhood communities. There are two trails that cross the corridor and one that runs parallel to Smoky Hill Road. Pheasant Run Green Belt Trail and a neighborhood connection trail between Piccadilly Street and Saddle Rock Trail are adjacent to the corridor. High Plains Trails crosses the corridor near E-470. One Land and Water Conservation Fund (LWCF) property has been identified along the corridor, west of the East Smoky Hill Road and South Tower Road intersection at 'Smoky Hill Park Six'.

2.7.3 - Potentially Sensitive Noise Receptors

There are several noise sensitive receptors including those associated with neighborhoods adjacent to Smoky Hill Road. A receptor is a location of a noise-sensitive area that has been identified for specific land uses. These residential noise receptors are highlighted in yellow in **Figure 2.18** (Page 27). Additionally, 13 other potential noise receptors have been identified along the corridor which include parks, schools, and churches.

2.7.4 - Hazardous Materials Sites

Nine leaking storage tanks, six spills, one release, one hazardous waste management site, and one clandestine drug laboratory have been identified (**Figure 2.19**, Page 28) along and adjacent to the corridor.

Figure 2.17: Parks, Trails, and Recreation Areas

Figure 2.18: Potential Noise Receptors

Figure 2.19: Hazardous Materials Locations

3 OUTREACH AND ENGAGEMENT

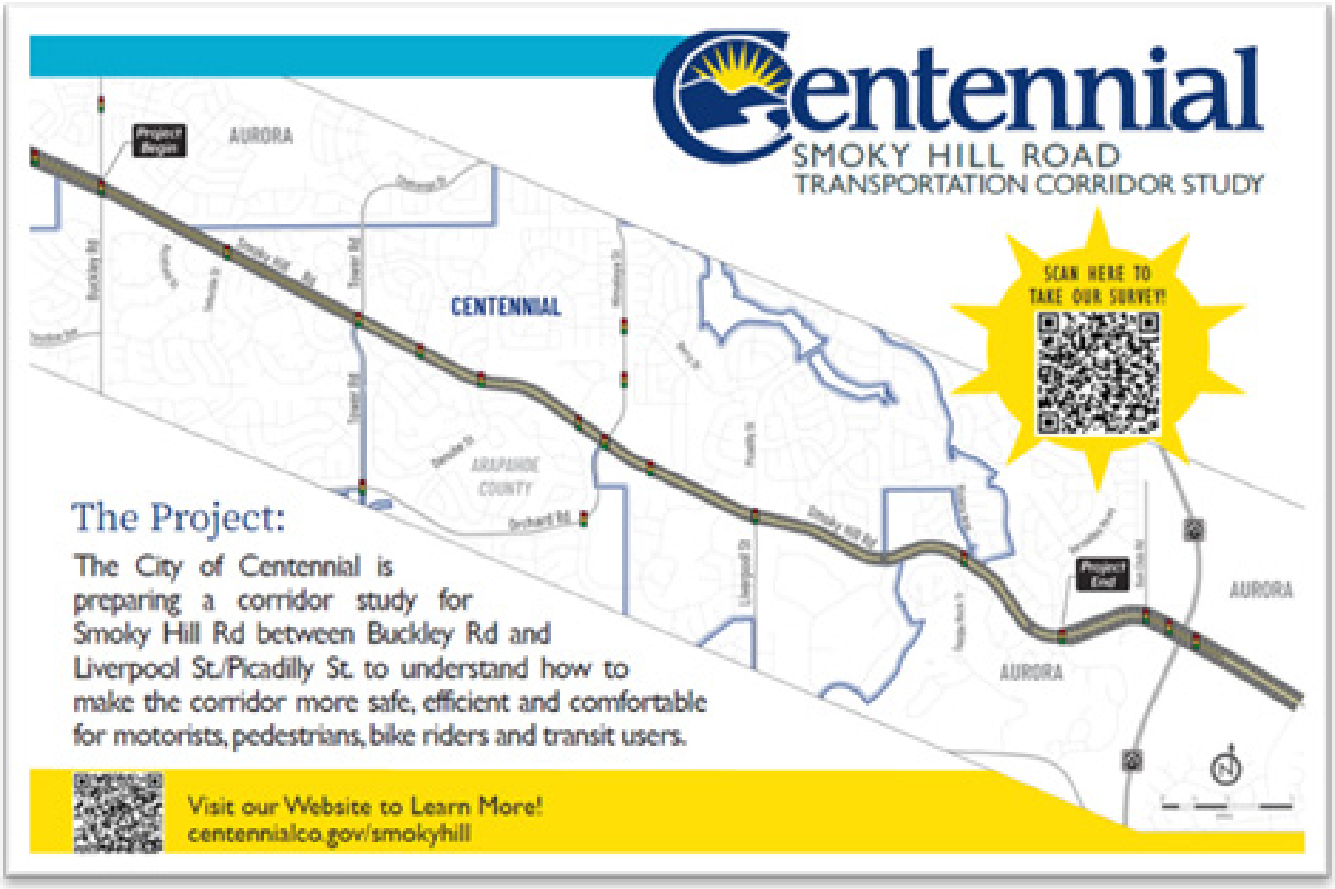
In order to understand how drivers, pedestrians, cyclists, and transit users currently travel along the corridor, the project team used various communication and outreach efforts with residents and corridor users near the project area. The data gathered was used to inform latter stages of the project to develop safe, efficient, and comfortable improvements.

Early in the study, the project team identified key stakeholders to consult and keep informed throughout the study process. Twenty-seven postcards were sent to stakeholders along the corridor with project information, the virtual survey, and information on how to get involved (**Figure 3.2**). The postcards were also distributed during the Centennial Summer Social event (**Section 3.1**). A comprehensive list of the stakeholders can be found in **Appendix C**.

In conjunction with the City of Centennial, the project team initiated several events to solicit public engagement along the corridor. There were a variety of opportunities for the public to receive information on the study, including the project website, E-newsletters, mailings, and an in-person pop-up event. The project website (Centennialco.gov/smokyhill) served as an information hub and engagement platform for the general public (**Figure 3.1**), providing access to project documents, reports, and updates. Three E-newsletter updates were sent to the City of Centennial's District 3 and 4 email databases. On average, 30.3% of newsletter recipients opened the newsletters.

Figure 3.1: Project Website

Figure 3.2: Project Postcard



3.1 Public Input Opportunities

There were two key opportunities to gather public input which included an in-person event and survey. On July 29, 2021, four members of the Project Team attended the Centennial Summer Social event to present information to the public on the project. As part of this presentation booth, the staff distributed postcards (**Figure 3.2**) which included QR codes to the project website and survey. The online survey gathered comments from the website, Summer Social Event, and postcard mailings. The survey included four multiple choice survey questions and two open-ended response questions. The questions aimed to understand the typical corridor use, the typical mode of travel along the corridor, and any concerns they may have about their experience using the corridor. 28 responses were received between July 29, 2021, and August 23, 2021. The survey found that improving road safety and reducing congestion were the two highest ranked potential improvements (**Figure 3.3**). A summary of participant responses to all questions can be found in **Appendix C.**

Figure 3.3: Project Potential Improvements

The results of the survey as well as discussions with members of the public and corridor stakeholders, were distributed to the project team. The public's concerns about congestion and speed reduction, and their desires for widening the road and improving road safety were incorporated into the evaluation of alternatives.

The Final Report will be posted on the City's website to allow residents to provide additional input if they have any questions in the future.

Kirk St Intersection

4 ALTERNATIVES DEVELOPMENT AND ANALYSIS

Corridor improvement goals were considered when developing the evaluation criteria and alternatives. These include improving connectivity, improving safety, and expanding mobility options. In order to develop and analyze alternatives, the same corridor segments presented in Section 2.4 were used. Due to differences in corridor characteristics, the segments were further sub-divided into Segments 1A and 1B and a series of sub-segments.

Minimizing right-of-way impacts is also a corridor priority. Wagontrail Parkway to Tower Road (Segment 1B) and the Sub-Segment from Orchard Road/Himalaya Street to 20250 East are the locations with the most constrained right-of way. These areas would provide significant design challenges or property impacts if the improvements were to extend past existing right-of-way.

4.1 Evaluation Criteria

The evaluation criteria were focused on several categories including:

- **Consistency with local plans**
- **Complexity of application/improvement**
- **Impact on vehicular traffic**
- **Right-of-way impacts**
- **Safety improvements**
- **Improving transit connectivity**
- **Improving pedestrian and cyclist continuity and reducing barriers**
- **Minimizing visual, noise and hazardous material impacts**

Each criterion was assigned a performance measure for use in evaluating alternatives. A numeric rating system was developed to score each alternative relative to a given performance measure. Further information on the evaluation criteria and alternative assessment is provided in **Appendix B**.

4.2 Corridor Alternatives

4.2.1 - Alternatives Development

Brainstorming Meeting

The applicable standard roadway typical section for the roadway classification of this corridor is the Typical Six-Lane Principal Arterial Street Cross-Section (Standard Detail SD-23) from the City of Centennial (2018) Roadway Design & Construction Standards. This full typical section requires 144 feet of right-of-way, which is wider than the available right-of-way within the corridor. Knowing that minimizing impacts to right-of-way while still providing a six-lane section was a key concern for the City of Centennial, a meeting was held to discuss allowable modifications to the standard typical section elements prior to developing alternatives for the corridor. During this meeting, the City of Centennial provided guidance on their preferences for typical section modifications which would allow for certain elements to be narrowed to reduce the overall footprint of the improvements. This allowed the study team to develop alternatives using typical sections that deviated from standard while remaining consistent with the City of Centennial's priorities. Allowable modifications to the typical section, in order of preference, are shown in **Table 4.1**.

Table 4.1: Allowable Typical Section Element Modification

Order of Preference	Typical Section Element	Standard Width (feet)	Allowable Width (feet)	Notes
1	Landscaped Buffer	9	4 min	-
2	Landscaped Buffer	9	0	-
3	Sidewalk (north side)	10	6	-
4	Median	6	5	Where left turn is present
5	Inside Left Turn Lane	12	10	-
6	Travel Lanes	12	11	-
7	Striped Median	-	-	Would decrease footprint by 3 feet (no median curb and gutter)

Lane Widths

Although the standard lane width for a six-lane principal arterial street is 12 feet, the segment between Wagontrail Parkway and Tower Road is so constrained that a six-lane section would not fit within right-of-way using the a 12-foot lane width without having to acquire additional right-of-way, even with narrowing other elements. For this reason, the City of Centennial chose to proceed with 11-foot travel lanes throughout the corridor for consistency and to further help minimize impacts to adjacent properties.

Auxiliary Right Turn Treatments

A key consideration for the improvements was considering whether widening could be completed within the existing corridor right-of-way. As part of this process, modifications to auxiliary right turn treatments for the eastbound and westbound right turn movements on Smoky Hill Road were considered. At signalized intersections, where exclusive right turn lanes are currently installed, the potential for converting these to shared through and right turn lanes was considered.

A target 2050 volume of 150 vehicles per hour (vph) was applied as a threshold to convert shared through and right turn lanes to dedicated right turn lanes to mitigate operational deficiencies at intersections. Conversely, right turn volumes were analyzed to see if existing dedicated right turn lanes could be modified to shared through and right turn lanes to support the third through lane in each direction. The right turn treatments were then included in the alternative development. This included changes converting dedicated right turns to shared through and right turn lanes at some locations where turning volumes were lower and converting to dedicated right turns at higher volume locations. Further details of the analysis are provided in **Appendix E.**

Auxiliary Left Turn Treatments

Some intersections along Smoky Hill Road have single left turn lanes with a striped buffer that provided opportunities for implementing dual left turns without the need for additional widening. Dual left turn lanes were included in the improvements for Buckley Road (northbound left), Orchard Road/Himalaya Street (eastbound left), and Liverpool Street/Picadilly Street (southbound left).

Additionally, dual left turn lanes were added to the alternative for the eastbound and westbound left turns at Buckley Road. The City of Aurora currently has a project that will construct this improvement that is in the design stage.

Alternatives

A No Build alternative was included for all segments.

A **Minimal Section** was developed based on the narrowing needed of the typical section to have minimal right-of-way impacts. The narrowing varied between segments based on the allowable typical section element modification (**Table 4.1**). For additional details, see **Figure 5.1** through **Figure 5.4**.

A **Modified Standard Section** was developed by adding width to the Minimal Section by the order of the allowable typical section element modification (**Table 4.1**) to be more consistent with the City of Centennial's standard. This modification varied between Segment based on the constraints or areas where the City of Centennial may consider right-of-way impacts acceptable, such as where there is an existing sidewalk outside of right-of-way. The Modified Standard Section was evaluated and concluded to be unreasonable in Segment 1B and the Sub Segment between Orchard Road/Himalaya Street and 20250 East due to tight right-of-way constraints.

4.2.2 Alternatives Evaluation

The alternatives were evaluated against the Evaluation Criteria. Each alternative was scored as –1, 0, or 1. The total score for each alternative was then used to select a recommended alternative. For some of the sub-segments, the Modified Standard Section Alternative was not developed or evaluated because of existing constraints. These constrains made any width additions beyond the Minimal Section not reasonable and were not considered based on the results from the Brainstorming Meeting.

Consistency with Local Plans

The alternatives were evaluated based on the accommodation of planned improvements from local plans within the corridor. The Centennial (2013) Master Plan had previously identified widening Smoky Hill Road to six lanes and provisioning a multi-use path along the corridor.

In general, the No Build Alternative would have no impact on the local plans (SCORE -1). The Minimal Section and Modified Standard Section Alternatives included the widening to six lanes and multi-use path improvements identified in the Master Plan (SCORE 1). The one exception was on the Wagontrail Parkway to Tower Road segment where the Minimal Section and Modified Standard Section would widen Smoky Hill Road to six lanes but would not provide a 10-foot multi-use path (SCORE 0).

Complexity of Application/Improvement

Each alternative was evaluated relative to physical, structural, or natural challenges that could increase the complexity to implement the improvement.

Table 4.2: Complexity of Application/Improvement Evaluation

Segment	Sub-Segment	Not Complicated (1), Somewhat Complicated (0), Very Complicated (-1)		
		No Build	Minimal Section	Modified Standard Section
1A	Buckley Rd to Pagosa St	1	-1	0
	Pagosa St to Wagontrail Pkwy	1	0	0
1B	Wagontrail Pkwy to Tower Rd	1	-1	Not evaluated
2	Tower Rd to Gibraltar Wy	1	-1	-1
	Gibraltar Wy to Orchard Rd/Himalaya St	1	-1	-1
3	Orchard Rd/Himalaya St to 20250 East	1	-1	Not evaluated
	20250 East to Kirk St	1	0	0
	Kirk St to Liverpool St/Picadilly St	1	0	0

Vehicular Traffic

Each alternative's traffic impact was assessed based on a qualitative rating of traffic operational performance parameters including level of service, volume/capacity ratio and arterial travel time impact. Based on the traffic analysis, the No Build Alternative will lead to deteriorating traffic operations while the Minimal Section and Modified Standard Section will improve traffic conditions. The Scoring was the same for each sub-segment: No Build (SCORE -1), Minimal Section and Modified Standard Section (SCORE 1).

Right-of-Way

Each alternative was assessed to consider its impact on potential right-of-way and acquisition requirements. As shown in **Table 4.2**, right-of-way impacts were identified in several sub-segments of the Minimal Section and Modified Standard Section alternatives.

Table 4.3: Right-of-Way Evaluation

Segment	Sub-Segment	No Impact (1), Some Impact (0), More Impact (-1)		
		No Build	Minimal Section	Modified Standard Section
1A	Buckley Rd to Pagosa St	1	-1	-1
	Pagosa St to Wagontrail Pkwy	1	0	0
1B	Wagontrail Pkwy to Tower Rd	1	0	Not evaluated
2	Tower Rd to Gibraltar Wy	1	-1	-1
	Gibraltar Wy to Orchard Rd/Himalaya St	1	-1	-1
3	Orchard Rd/Himalaya St to 20250 East	1	-1	Not evaluated
	20250 East to Kirk St	1	0	-1
	Kirk St to Liverpool St/Picadilly St	1	-1	-1

Safety

Each alternative was assessed to consider its impact on safety. The No Build Alternative is expected to experience an increase in road crashes due to deteriorating operational performance. Bottleneck intersections such as Buckley Road, Orchard Road/ Himalaya Street and Liverpool Street/Picadilly Street are also expected to have an increased number of crashes under the No Build Alternative. The evaluation scoring given for the No Build Alternative was the same for all sub-segments (SCORE -1). Depending on the sub-segment, the Minimal Section or Modified Standard Section was rated as no change (SCORE 0) or an improvement in safety (SCORE 1) based on the impact on operational performance.

Transit

Each alternative was assessed to consider whether it improved connectivity to transit stops. The Minimal Section and Modified Standard Section Alternatives will allow for more curb-side drop-off and pick-up of passengers in the outer through lane, which is expected to contribute to more efficient transit operations. For the No Build Alternative, as traffic volumes are forecasted to increase on Smoky Hill Road in the future and operational conditions degrade, this is expected to lead to increased bus travel time between transit stops. The Scoring was the same for each sub-segment: No Build (SCORE -1), Minimal Section and Modified Standard Section (SCORE 1).

Pedestrian/Bike

The impact of each alternative on pedestrians and cyclists was evaluated to consider improved continuity or a reduction in barriers for pedestrian and cyclist movement. The No Build Alternative would result in no change to this criterion (SCORE 0). The Minimal Section and Modified Standard Section would provide a multi-use path along Smoky Hill Road (SCORE 1). The one exception was on the Wagontrail Parkway to Tower Road sub-segment where it was not possible to provide a 10-foot path (All Alternatives SCORE 0).

Environmental Resources Assessment

Each alternative was assessed based on the potential impact to visual, noise, and hazardous materials within the study area (**Table 4.3**, **Table 4.5**, and **Table 4.6**). The Minimal Section alternative was identified as having the greatest potential impact to visual and noise resources since this alternative removes existing trees and opportunities for landscaped areas.

Table 4.4: Visual Impact Evaluation

Segment	Sub-Segment	No Impact (1), Some Impact (0), More Impact (-1)		
		No Build	Minimal Section	Modified Standard Section
1A	Buckley Rd to Pagosa St	1	-1	-1
	Pagosa St to Wagontrail Pkwy	1	-1	0
1B	Wagontrail Pkwy to Tower Rd	0	-1	Not evaluated
2	Tower Rd to Gibraltar Wy	1	0	-1
	Gibraltar Wy to Orchard Rd/Himalaya St	1	0	-1
3	Orchard Rd/Himalaya St to 20250 East	1	0	Not evaluated
	20250 East to Kirk St	0	1	-1
	Kirk St to Liverpool St/Picadilly St	0	-1	-1

Table 4.5: Noise Impact Evaluation

Segment	Sub-Segment	No Impact (1), Some Impact (0), More Impact (-1)		
		No Build	Minimal Section	Modified Standard Section
1A	Buckley Rd to Pagosa St	1	-1	-1
	Pagosa St to Wagontrail Pkwy	1	-1	-1
1B	Wagontrail Pkwy to Tower Rd	0	-1	Not evaluated
2	Tower Rd to Gibraltar Wy	1	0	1
	Gibraltar Wy to Orchard Rd/Himalaya St	1	0	-1
3	Orchard Rd/Himalaya St to 20250 East	0	1	Not evaluated
	20250 East to Kirk St	0	1	0
	Kirk St to Liverpool St/Picadilly St	0	-1	0

Table 4.6: Hazardous Material Impact Evaluation

Segment	Sub-Segment	No Impact (1), Some Impact (0), More Impact (-1)		
		No Build	Minimal Section	Modified Standard Section
1A	Buckley Rd to Pagosa St	1	0	0
	Pagosa St to Wagontrail Pkwy	1	1	1
1B	Wagontrail Pkwy to Tower Rd	1	1	Not evaluated
2	Tower Rd to Gibraltar Wy	1	-1	-1
	Gibraltar Wy to Orchard Rd/Himalaya St	1	0	0
3	Orchard Rd/Himalaya St to 20250 East	1	1	Not evaluated
	20250 East to Kirk St	1	1	1
	Kirk St to Liverpool St/Picadilly St	1	-1	1

4.2.3 - Transit Considerations

The alternatives evaluation also considered potential transit improvements. The Centennial Transportation Master Plan has previously identified transit signal priority and a potential mobility hub in the Smoky Hill Road/E-470 area (east of the project area). Additional transit improvements were evaluated to consider if additional bus priority in the form of full-time or peak period bus lanes were merited. However, based on the assessment of current and forecasted future use on the corridor, operating the widened lanes as general-purpose lanes scored higher than full-time or peak period bus lanes.

4.3 Alternative Assessment Outcomes

Total evaluation scores were determined for each alternative and sub-segment (**Table 4.7**). As shown, the Modified Standard Section received the highest scoring (or was tied with the highest) in all sub-segments, with the exception of the Wagontrail Parkway to Orchard Road/Himalaya Street and Orchard Road/Himalaya Street to 20250 East Smoky Hill Road sub-segments. Due to constraints in these areas, the Modified Standard Section was not feasible and the Minimal Section had the highest scoring. The highest scoring alternatives (highlighted) were the basis for developing the Recommended Roadway Improvements.

Table 4.7: Alternative Scoring

Segment	Sub-Segment	Alternative		
		No Build	Minimal Section	Modified Standard Section
1A	Buckley Rd to Pagosa St	0	1	1
	Pagosa St to Wagontrail Pkwy	0	3	3
1B	Wagontrail Pkwy to Tower Rd	1	2	Not evaluated
2	Tower Rd to Gibraltar Wy	1	2	4
	Gibraltar Wy to Orchard Rd/Himalaya St	1	3	4
3	Orchard Rd/Himalaya St to 20250 East	0	6	Not evaluated
	20250 East to Kirk St	0	2	4
	Kirk St to Liverpool St/Picadilly St	0	4	6

5 Recommended Alternative

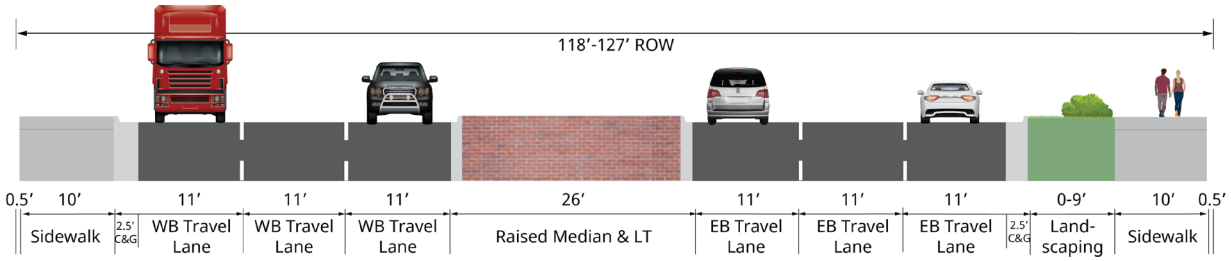
5.1 - Recommended Roadway Improvements

The Modified Standard Section Alternative was the recommended alternative for all segments of the project, except for Wagontrail Parkway to Tower Road and Orchard Road/Himalaya Street to 20250 East, where the Minimal Section Alternative was recommended. Details of the improvements in each segment are discussed below. Conceptual layouts of the recommended alternatives are shown in **Appendix D**.

Segment 1A –Buckley Road to Wagontrail Parkway

A typical section for the recommended alternative for Segment 1A is shown in **Figure 5.1**. A six-lane typical section with dual left turn lanes at Buckley Road will be provided with multi-use paths on each side of the roadway.

Figure 5.1: Buckley Road to Wagontrail Parkway Typical Section



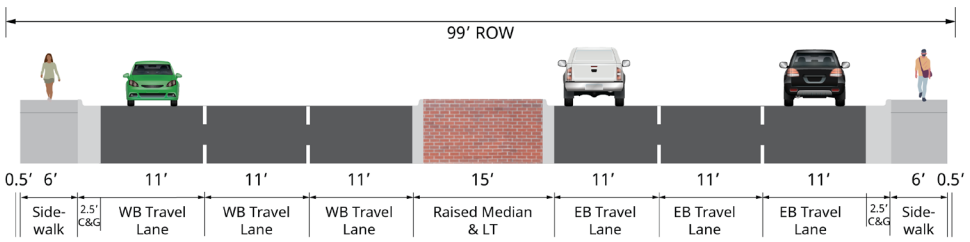
Recommended Alternative Characteristics	
• Widening at Buckley Road will mitigate overcapacity and poor intersection operational performance by 2050. • Sidewalks will be widened to 10-foot wide multi-use paths on both sides of the roadway. • RTD buses will not be required to merge in and out of outer through lane to access bus stops. • Raised median.	• Substantial right-of-way impacts will be required to construct an auxiliary right turn deceleration lane on the westbound approach to Buckley Road. • Dedicated auxiliary right turn lanes at unsignalized intersections will be converted to shared through and right turn lanes. • Decreased space available for landscaping.

Buckley Road Intersection

Segment 1B – Wagontrail Parkway to Tower Road

Figure 5.2 shows a typical section of the recommended roadway concept between Wagontrail Parkway and Tower Road.

Figure 5.2: Wagontrail Parkway. to Tower Road. Typical Section

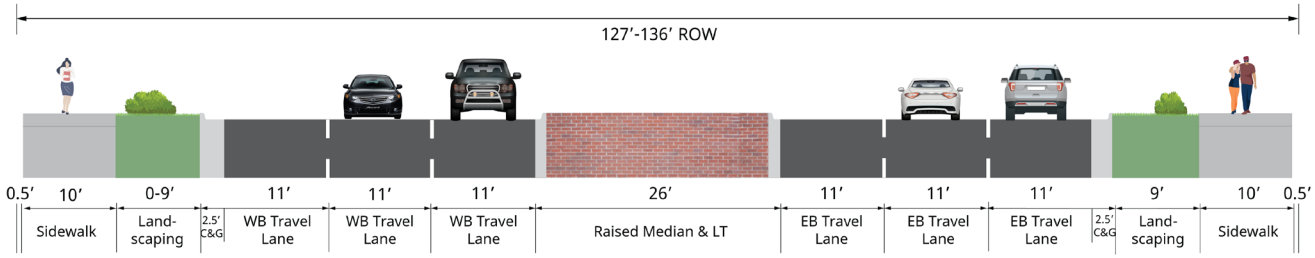


Recommended Alternative Characteristics	
• Widening at the Tower Road intersection will provide improved operational performance to several turn movements approaching capacity by 2050. • RTD buses will not be required to merge in and out of outer through lane to access bus stops. • Widening will be accomplished with minimal impact on adjacent right-of-way. • Raised median.	• Sidewalks will remain at a six-foot width on both sides of this segment. • Dedicated auxiliary right turn lanes will be converted to shared through and right turn lanes. • Sidewalks adjacent to roadway. • Less space available for landscaping.

Segment 2 – Tower Road to Orchard Road/Himalaya Street

A typical section for the recommended alternative between Tower Road and Orchard Rd/Himalaya Street is shown in **Figure 5.3.**

Figure 5.3: Tower Road to Orchard Road/Himalaya Street Typical Section



Recommended Alternative Characteristics	
• Intersection operations will improve (LOS F to LOS D in PM peak period in 2050). • Sidewalks will be widened to 10-foot wide multi-use paths on both sides of the roadway. • RTD buses will not be required to merge in and out of outer through lane to access bus stops. • Dedicated westbound right turn to be added at Gibraltar Way. • Raised median.	• Dedicated auxiliary right turn lanes at unsignalized intersections will be converted to shared through and right turn lanes. • Decreased space available for landscaping.

Segment 3 – Orchard Road/Himalaya Street to Liverpool Street/Picadilly Street

Figure 5.4 shows a typical section for the recommended alternative on the segment between the Orchard Road/Himalaya Street and 20250 East intersections. **Figure 5.5** shows a typical section for the recommended alternative on the segment between the 20250 East and Liverpool Street/Picadilly Street.

Figure 5.4: Orchard Road/Himalaya Street to 20250 East Typical Section

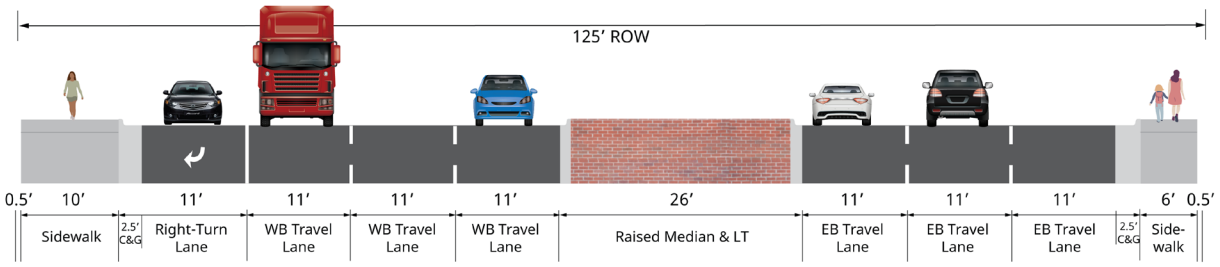
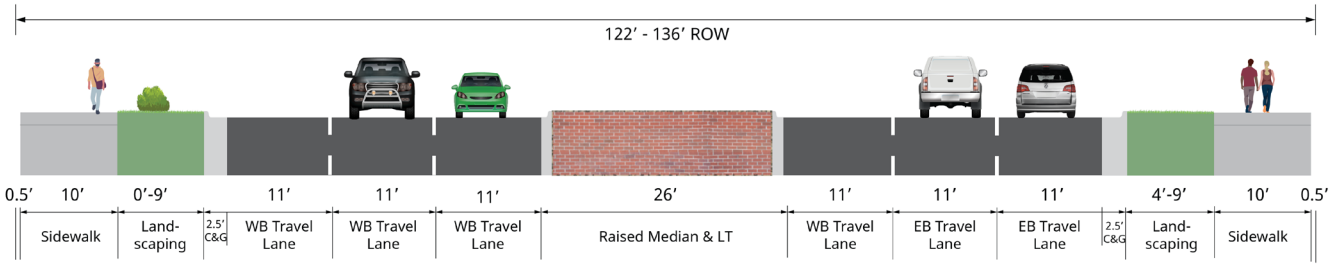


Figure 5.5: 20250 East to Liverpool Street/Picadilly Street Typical Section



Recommended Alternative Characteristics	
• Intersection operations at the Liverpool Street/Picadilly Street intersection will improve (from LOS D to LOS C in PM peak period in 2050). • Sidewalks will be widened to 10-foot wide multi-use paths on the north side of the roadway. • RTD buses will not be required to merge in and out of outer through lane to access bus stops. • Raised median.	• Substantial impact on right-of-way in the Orchard Road/ Himalaya Street to 20250 East and the Kirk Street to Liverpool Street/Picadilly Street sub segments. • Six-foot sidewalk width will remain on south side of roadway between Orchard Road/Himalaya Street and 20250 East. • Dedicated auxiliary right turn lanes at unsignalized intersections will be converted to shared through and right turn lanes. • Decreased space available for landscaping.

5.2 Project List

The Alternative Assessment (**Appendix B**) resulted in a recommended alternative for each segment of the corridor which was then further refined to a list of potential projects. These projects include adding a right turn lane, a multi-use path, and the alternative improvements identified for a segment. The complete project list is shown in Table 5.1.

While there is limited opportunity for phased construction within the segments, there are a few opportunities to break out smaller, less costly improvements. The traffic analysis identified intersection improvements at each major intersection. While adding left turns would require substantial reconstruction, there were two locations identified that could experience improved traffic operations by constructing a right turn lane ahead of full improvements – Pagosa Street to Buckley Road and Orchard Road/Himalaya Street to 20250 East.

The recommended improvements for each sub-segment (**Appendix B**) were designed to minimize anticipated effects to the rest of the corridor. Intersection modifications, including signal upgrades, accessibility, and pedestrian connectivity improvements, are also identified within each segment. It is possible that some of the signal improvements to improve accessibility/connectivity could be completed independently of corridor wide improvements. When using a phased implementation strategy, infrastructure improvements such as pole locations should be located to accommodate the ultimate buildout of the intersection. Advancing these improvements can offer immediate benefits of accessibility and connectivity for pedestrians as well as a benefit to traffic operations.

Table 5.1: Project List

Project	Description
(West of) Buckley Rd to (West of) Wagontrail Pkwy*	Intersection improvements at Buckley, additional through lane, raised median
Westbound Right Turn Lane from Pagosa St to Buckley Rd	Add westbound right turn lane
(West of) Wagontrail Pkwy to (East of) Tower Rd	Intersection improvements at Wagontrail, additional through lane, raised median
(East of) Tower Rd to (West of) Gibraltar Wy	Intersection improvements at Tower, additional through lane, raised median
(West of) Gibraltar Wy to (West of) Orchard Road/Himalaya Street	Intersection improvements at Gibraltar, additional through lane, raised median
(West of) Orchard Road/Himalaya Street to (West of) 20250 East**	Intersection improvements at Orchard Road/Himalaya Street, additional through lane, raised median
Westbound Right Turn Lane from Orchard Road/Himalaya Street to 20250 East	Add westbound right turn lane
(West of) 20250 East to Liverpool Street/Picadilly Street	Intersection improvements at 20250 East, additional through lane, raised median

5.3 Improvement Prioritization

The list of projects includes a series of improvements identified for the different segments of Smoky Hill Road that was primarily focused on roadway and path widening. The projects do not require simultaneous implementation but may be phased with improvements of higher importance being prioritized sooner. Based on the assessment of needs in project segments and other factors, the improvement prioritization shown in **Table 5.2** was developed. Key considerations included tying in improvements with the existing six-lane section of Smoky Hill Road to the west of the project area and reducing bottleneck conditions at the most congested intersections.

Table 5.2: Improvement Prioritization

Segment Improvements	Key Considerations
West of Buckley Rd to West of Wagontrail Pkwy	• Intersection improvements at Buckley, additional through lane, raised median. Westbound right turn lane at Buckley Road is listed as a separate project but is also a higher priority. • Operational performance improvement needs are greater on segment. • Will tie in with six-lane segment to west of Buckley Road. • Buckley Road intersection improvements may require coordination with City of Aurora.
(West of) Orchard Road/Himalaya Street to (West of) 20250 East	• Intersection improvements at Orchard Road/Himalaya Street, additional through lane, raised median • Westbound right turn lane at Orchard Road/Himalaya Street listed as a separate project. • Will provide bottleneck reduction benefits if constructed earlier. • Higher operational improvement need at Orchard Road/Himalaya Street intersection than other segments.
(West of) 20250 East to Liverpool Street/ Picadilly Street	• Will provide bottleneck reduction benefits if constructed earlier. • Higher operational improvement needed at Liverpool Street/Picadilly Street intersection than other segments. • Tie in with six-lane segment between Orchard Road/Himalaya Street and 20250 East.
(West of) Wagontrail Pkwy to (East of) Tower Rd	• Tie in with segment west of Buckley Road to West of Wagontrail Parkway to extend to extend continuous six-lane segment.
(East of) Tower Rd to (West of) Gibraltar Wy	• Highest construction costs. • Last segment provides continuous six-lane section between Buckley Road and Liverpool Street/Picadilly Street.

Note: Improvements shown in order of descending priority.

5.4 Planning Level Cost Estimates

Based on the improvements identified, a set of planning level cost estimates was developed. The cost estimates include the cost of both design and construction of the recommended alternative as stand-alone projects. Right-of-way costs were approximated based on an estimated cost per square foot provided by the City of Centennial and were not based on an appraised right-of-way valuation. As a result, the right-of-way costs were listed separate from the design and construction costs. A summary of the planning level costs for the list of projects identified is shown in **Table 5.3.**

Table 5.3: Summary of Planning Level Costs by Project

Improvement	Description	Cost[3]	ROW Cost[3,4]
(West of) Buckley Rd to (West of) Wagontrail Pkwy[1]	Intersection improvements at Buckley, additional through lane, raised median	$5,690,000	$400,000
Westbound Right-Turn Lane from Pagosa St to Buckley Rd	Add westbound right turn lane	$760,000	$175,000
(West of) Wagontrail Pkwy to (East of) Tower Rd	Intersection improvements at Wagontrail, additional through lane, raised median	$10,640,000	$95,000
(East of) Tower Rd to (West of) Gibraltar Wy	Intersection improvements at Tower, additional through lane, raised median	$18,550,000	$1,255,000
(West of) Gibraltar Wy to (West of) Orchard Road/ Himalaya Street	Intersection improvements at Gibraltar, additional through lane, raised median	$3,000,000	$260,000
(West of) Orchard Road/ Himalaya Street to (West of) 20250 East[2]	Intersection improvements at Orchard Road/Himalaya Street, additional through lane, raised median	$4,640,000	$290,000
Westbound Right-Turn Lane from Orchard Road/Himalaya Street to 20250 East	Add Westbound right turn lane	$1,250,000	$260,000
(West of) 20250 East to Liverpool St/Picadilly St	Intersection improvements at 20250 East, additional through lane, raised median	$7,800,000	$440,000

Notes: [1] This project includes a westbound right turn lane from Pagosa to Buckley.

[2] This project includes westbound right turn lane from 20250 East to Orchard Road/Himalaya Street.

[3] Costs are shown in 2021 dollars. Includes probable construction cost, design costs, and surveying and right-of-way plan costs.

[4] Right-of-way costs are approximated based on estimated cost per square foot provided by Centennial and are not based on appraised valuation.

5.5 Future Considerations

5.5.1 - Intelligent Transportation Systems

In addition to the alternatives identified, there are also plans to implement Intelligent Transportation Systems (ITS) improvements on Smoky Hill Road. Centennial Transportation Master Plan identifies a vision and goals that can support additional future ITS projects as needed. ITS projects that have been identified for future deployment on Smoky Hill Road include adaptive traffic signal timing and transit signal priority.

Adaptive Traffic Signal Timing

The City of Centennial is currently in the process of installing additional components and connections to deploy adaptive traffic signal operations on the Smoky Hill Road corridor. The new adaptive signal system and sensors will enable the timing of signals to be adjusted in real time by the system as traffic patterns and volumes change throughout the day. The system may also be able to identify improved timing plans if differing patterns or volumes are observed from one day or season to the next.

Transit Signal Priority

The City of Centennial and the Regional Transportation District (RTD) have identified Smoky Hill Road as a potential corridor to implement transit signal priority (TSP). TSP permits minor changes to traffic signal timings when buses are detected at an intersection. This may permit a bus to receive a green signal earlier if it is a waiting at a signalized intersection or for the traffic signal to extend a green by a few seconds if that would prevent a bus from stopping. RTD is also planning to implement forms of "conditional priority" whereby TSP could only be provided under specific circumstances, such as when there are a certain number of bus passengers. TSP implementation would be expected to provide improved transit services on Smoky Hill Road.

5.5.2 - Pedestrian and Cyclist Connectivity

A key challenge for the recommended alternative identified was to provide a multi-use path along Smoky Hill Road on the segment between Wagontrail Parkway and Tower Road. Not including a full-width path here forms a barrier to continuous bike and pedestrian connectivity along the corridor. The City of Centennial may consider investigating alternatives to providing bike connectivity on a route parallel to Smoky Hill Road. For example, opposite from the Richfield Street and Smoky Hill Road intersection is a power line that connects with Tower Road. This may provide an opportunity to develop a parallel bike facility to Smoky Hill Road that may merit future consideration.

5.5.3 - ADA Improvements

Implementing the recommended alternative will provide opportunities to improve the corridor to meet Americans with Disabilities Act (ADA) standards and Public Right of Way Accessibility Guidelines (PROWAG). This includes reconstructing pedestrian ramps, modifying driveway curb cuts, and removing obstructions from existing sidewalks. These aspects can be addressed as part of phased improvements, or a corridor-wide ADA improvement program can be implemented separately. Ultimately, if sidewalks are widened to multi-use, ADA improvements should be implemented in conjunction with these improvements.

5.5.4 - Environmental

The Smoky Hill Road Corridor Transportation Study is intended to provide a framework for the implementation of the recommended alternative as funding becomes available. As projects are identified, the level and amount of environmental documentation will be determined early during the scoping or design stage. Local, state, and federal requirements may be applicable to projects to address water quality, stormwater, utilities, tree removal/replacement, and right-of-way. Any projects funded by federal-aid dollars would be subject to National Environmental Policy Act (NEPA) documentation and potentially Colorado Department of Transportation (CDOT) Local Agency coordination prior to construction. It is important to identify environmental requirements early to adequately assess project timelines and incorporate ample time for CDOT and federal agency review and approval, if applicable.

REFERENCES

City of Centennial 2016, Intelligent Transportation System Master Plan Concept of Operations Report, Prepared by CH2M Hill.

City of Centennial 2017, Centennial Trails and Recreation Plan, City of Centennial.

City of Centennial 2018, Roadway Design & Construction Standards, Standard SD-23, p. 107, City of Centennial.

City of Centennial 2019, 2019 Traffic Signal Warrant Analysis, City of Centennial.

FHU 2013, Centennial Transportation Master Plan, Felsburg Holt & Ullevig, Prepared for the City of Centennial.

FHU 2017, Arapahoe County Bicycle/Pedestrian Master Plan, Felsburg Holt & Ullevig, Prepared for the City of Centennial.

Institute of Transportation Engineers 2021, Micromobility Facility Design Guide, Publication No. IR-149-E, ITE, Washington, DC.

APPENDIX A

SMOKY HILL ROAD TRANSPORTATION CORRIDOR STUDY

Background Conditions Report

July 2021

Prepared for:

City of Centennial
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Muller Project Number: 21-010.01

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Appendices

1 INTRODUCTION

1.1 Introduction

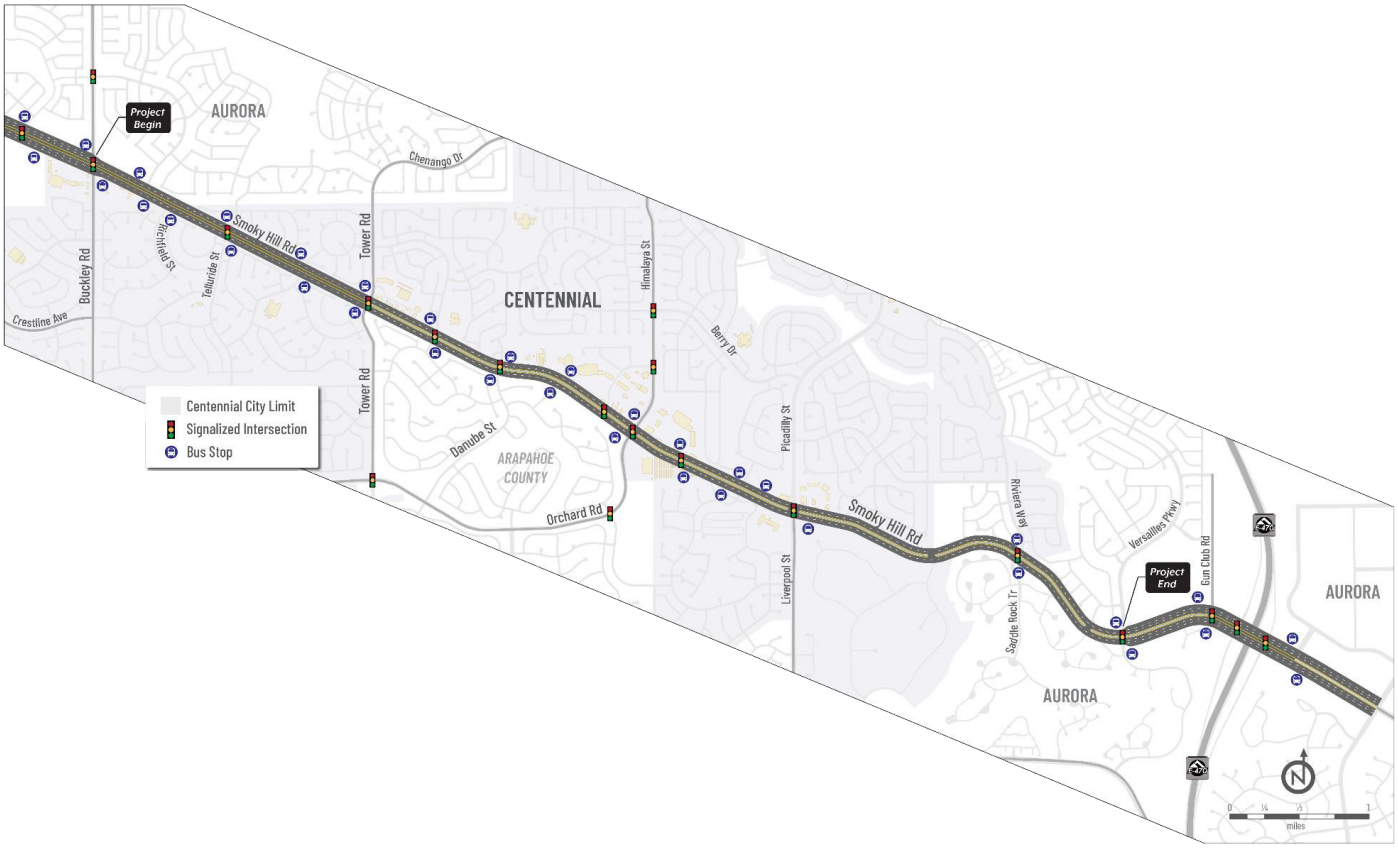
Smoky Hill Road is a critical corridor serving the eastern portion of the City of Centennial. The Smoky Hill Road Corridor Transportation Study is considering how drivers, pedestrians, cyclists and transit users can safely, efficiently, and comfortably travel on the corridor.

This report documents the review of existing conditions and the background review of plans and studies relevant to the project. This will be used to inform latter stages of the project and to consider potential improvements.

1.2 Study Area

The study area includes Smoky Hill Road between the intersections with Buckley Road and Liverpool Street/Picadilly Street, which is located in the City of Centennial. The study is also providing considerations for the section of Smoky Hill Road further to the east between Liverpool Street/Picadilly Street and Versailles Parkway/Ponderosa Trail, which is located outside of the City of Centennial in Arapahoe County and the City of Aurora. The study area is shown in **Figure 1.1**. This study is being led by the City of Centennial in coordination with Arapahoe County and the City of Aurora.

Figure 1.1: Study Area



2 BACKGROUND – PREVIOUS PLANS REVIEW

2.1 Centennial Transportation Master Plan

The *Centennial Transportation Master Plan* (FHU, 2013) provided a comprehensive review of the transportation network in the City of Centennial, established a transportation vision, and prioritized future transportation needs in the City.

Within the study area, roadway needs identified in the Master Plan included widening Smoky Hill Road from a four-lane to a six-lane arterial between Buckley Road and E-470 as a short-term priority.

The plan also identified considering installing a traffic signal at the Kirk Street and Smoky Hill Road intersection as a short-term priority noting that residents reported difficulties making northbound left turn movements onto westbound Smoky Hill Rd. However, a signal warrant study (City of Centennial 2019) found the intersection did not meet any warrants identified for traffic signals in the *Manual on Uniform Traffic Control Devices* (FHWA 2009) and did not recommend signalizing the Kirk Street and Smoky Hill Road intersection. However, there may merit investigating other types of improvements to aid northbound left turning vehicles at the intersection.

For bike riders, the plan recommended developing a continuous shared side path along Smoky Hill Road between Buckley Road and Versailles Parkway with a minimum width of 10 feet.

For transit, recommendations included providing new bus service along Orchard Road that would connect with the existing park-n-ride facility at Smoky Hill Road and Picadilly Street.

It should also be noted that the City of Centennial has currently initiated a project to update the Centennial Master Plan developed in 2013, but no additional information was available at the time of this review.

2.2 Centennial Trails and Recreation Plan

The *Centennial Trails and Recreation Plan* (City of Centennial, 2017) details the existing trails and recreation system in the City and identifies plans for new components for the system. The trails and recreation system includes four separate Recreation Districts. The Smoky Hill Road corridor resides in the Smoky Hill Metro District. Implementation Action T2.2 identifies prioritizing the construction of on-street bike projects in Centennial in alignment with the *Arapahoe County Bicycle and Pedestrian Master Plan*. A side path along Smoky Hill Road was one of the projects identified under this action.

2.3 Arapahoe County Bicycle/Pedestrian Master Plan

The *Arapahoe County Bicycle/Pedestrian Master Plan* (FHU, 2017) was developed to establish a safe, connected regional trail network for Arapahoe County that will include a combination of off-road trails, on-street bike, and pedestrian facilities. The Master Plan identified improvements such as sidewalks, bike lanes, and shared streets, with a focus on major bike and pedestrian routes.

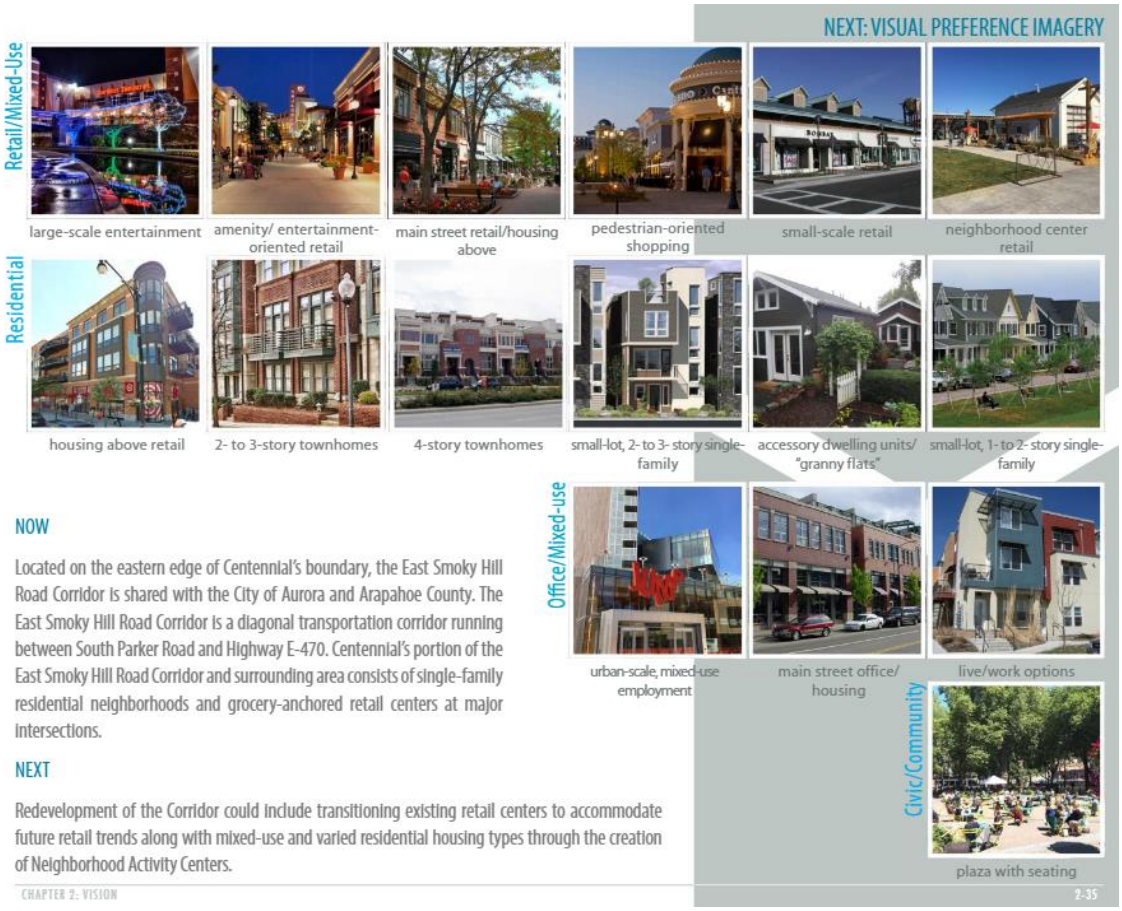
The plan identified that existing conditions, including traffic volume and speed, on Smoky Hill Road create a high level of stress for bike riders and recommended developing a continuous side path along the corridor within the study limits. The plan also identified routes that would provide connections between the Smoky Hill Road corridor and the multi-use trails north and south of the study area (i.e. West Toll Gate

Creek Trail and Piney Creek Trail). The connector routes included proposed crossings of Smoky Hill Road at Telluride Street, Tower Road, Biscay Street, Kirk Street and Liverpool Street/Picadilly Street.

2.4 Centennial NEXT 2040 Comprehensive Plan

The *Centennial NEXT 2040 Comprehensive Plan* (City of Centennial 2018) provided a long-range vision future land use in the City with some transportation goals. The Plan identified the East Smoky Hill Road Corridor as a Spotlight Area where opportunities for potential future land uses were considered. Potential land uses identified included transitioning existing retail centers to accommodate future retail trends, developing mixed use and varied residential housing types and Neighborhood Activity Centers. Details of the vision for the East Smoky Hill Road Spotlight Area from the plan are shown in **Figure 2.1**.

Figure 2.1: East Smoky Hill Road Spotlight Area



Source: City of Centennial (2018).

3 EXISTING CONDITIONS

3.1 Environmental Resources

The Smoky Hill corridor is located within the High Plains ecosystem, more specifically designated as South Central Semi-Arid Prairies in the Great Plains. The western portion of the corridor crosses over a catchment for Cherry Creek Lake.

In order to identify environmental resources, a Study Area 50 ft from the edge of the pavement was developed. The Study Area represents the area where potential improvements and projects are likely to occur.

In order to better understand the corridor, the following environmental resources were identified within the Study Area:

- Biological resources
- Parks, trails, and recreation areas
- Potentially sensitive noise receptors
- Identified hazardous materials sites

3.1.1 Biological Resources

Within the Study Area, there were no water crossings or wetlands identified. Additionally, there were no threatened or endangered species. Noxious weeds and migratory birds will be considered on a project-by-project basis and incorporated into the Final Design Construction Notes.

3.1.2 Parks, Trails, and Recreation Areas

There are seven parks, trails, and golf courses located with the Study Area (**Figure 3.2**). Big Sandy Park and Big Rock Park are adjacent to Smoky Hill Road while Bellewood Park and Arrowhead Park are located within the neighborhood communities. There are two trails that cross the corridor and one that runs parallel to Smoky Hill. Pheasant Run Green Belt Trail and a neighborhood connection trail between Piccadilly St. and Saddle Rock Trail are adjacent to the corridor. High Plains Trails crosses the corridor near E-470. One Land and Water Conservation Fund (LWCF) property has been identified along the corridor, west of the E Smoky Hill Rd and S Tower Rd intersection at 'Smoky Hill Park Six'.

3.1.3 Potentially Sensitive Noise Receptors

There are several noise sensitive receptors including those associated with neighborhoods adjacent to Smoky Hill Road. A receptor is a location of a noise-sensitive area that has been identified for specific land uses. These residential noise receptors are highlighted in yellow in **Figure 3.2** (Page 7). Additionally, 13 other potential noise receptors have been identified along the corridor which include parks, schools, and churches.

3.1.4 Hazardous Materials Sites

Nine leaking storage tanks, six spills, one release, one hazardous waste management site, and one clandestine drug laboratory have been identified (**Figure 3.3**, Page 8) along and adjacent to the corridor.

Figure 3.1 Parks, Trails, and Recreation Areas

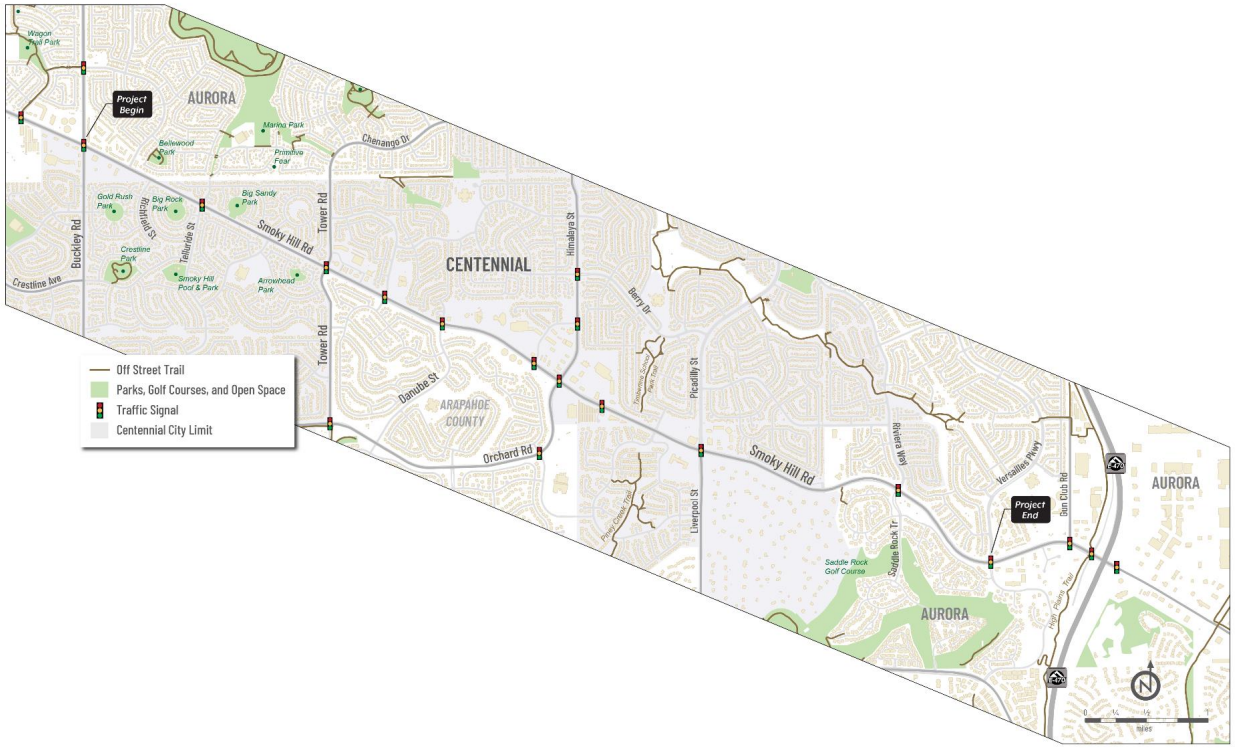


Figure 3.2: Potential Noise Receptors

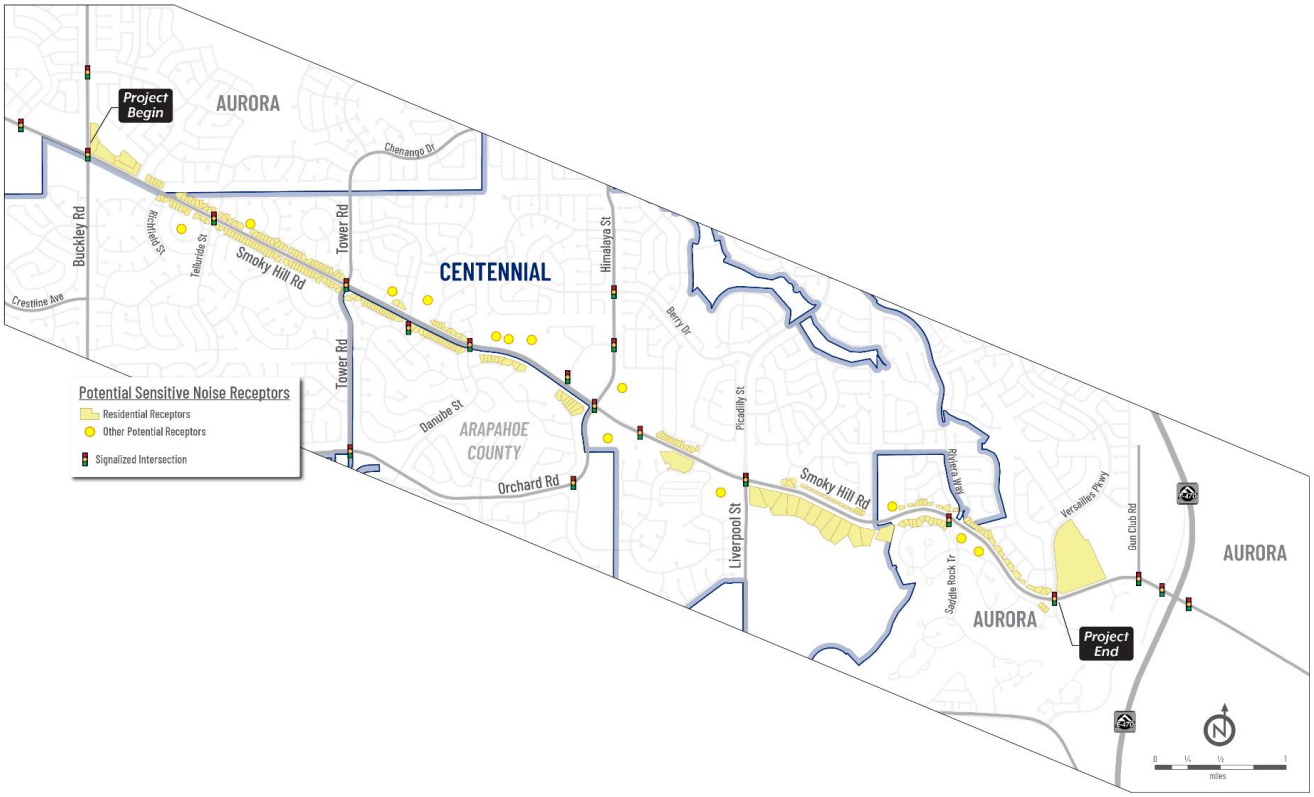
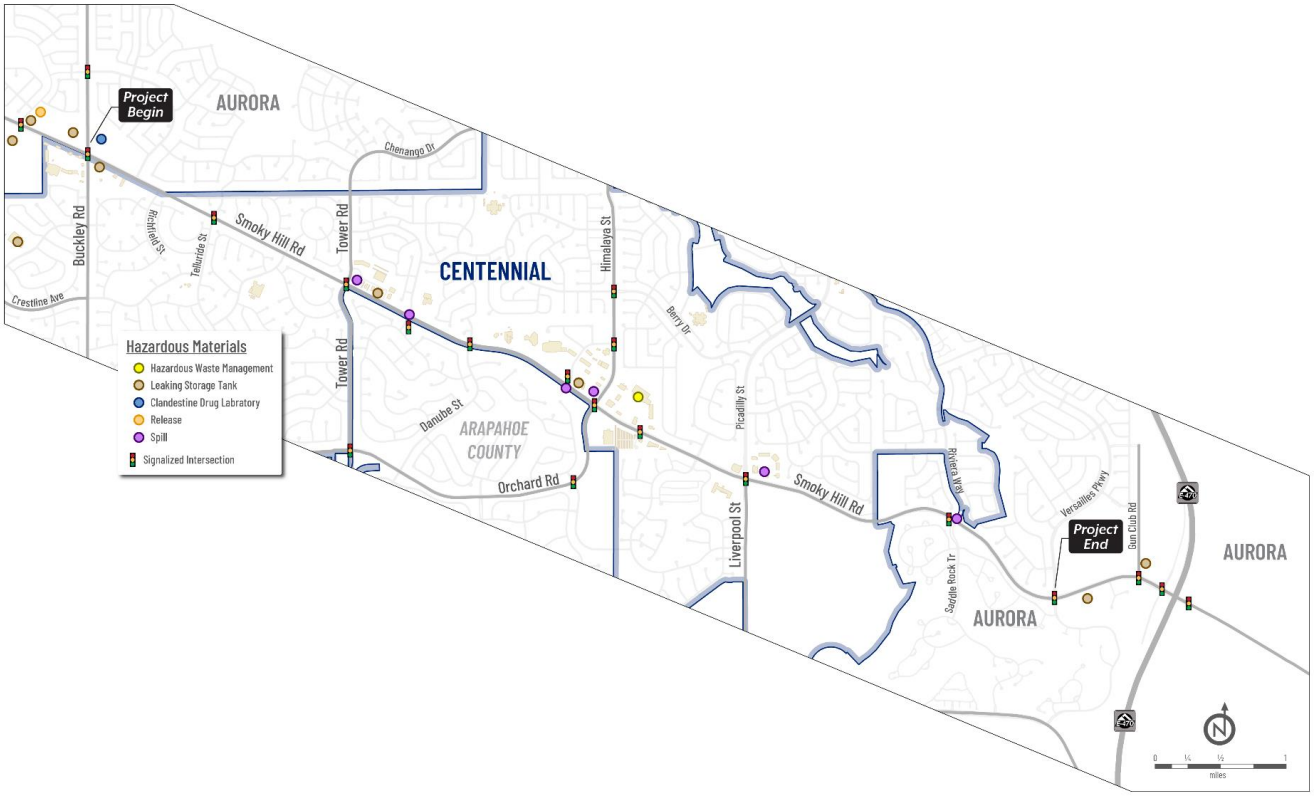


Figure 3.3: Hazardous Materials Locations



3.1.5 Next Steps

In addition to the resources listed above, visual resources will be used as performance measures in the alternatives matrix. Evaluation Criteria will be established for each performance measure to compare the potential impact to resources for each alternative. Visual impacts will consider likely impacts to landscaping and mature trees.

3.2 Corridor Land Use

Smoky Hill Road is a diagonal corridor connecting South Parker Road (to the west of the study area) and E-470 (to the east of the study area). Land use along the corridor immediately adjacent to the corridor is a mixture of residential, commercial, institutional, open space/parks, and industrial uses (**Figure 3.4**, Page 10). The areas immediately adjacent to the corridor are generally surrounded by residential land use.

3.3 Corridor Zoning

Zoning along Smoky Hill Road within the City of Centennial is shown in **Figure 3.5** (Page 11). Zoning generally consists of a series of commercial areas close to the corridor surrounded by neighborhood conservation areas. There are also several areas zoned education where schools are located, a planned unit development in the northeast quadrant of the Danube Street intersection, and a business park in the southwest quadrant of the Liverpool Street/Picadilly Street intersection.

Figure 3.4: Smoky Hill Road Land Use

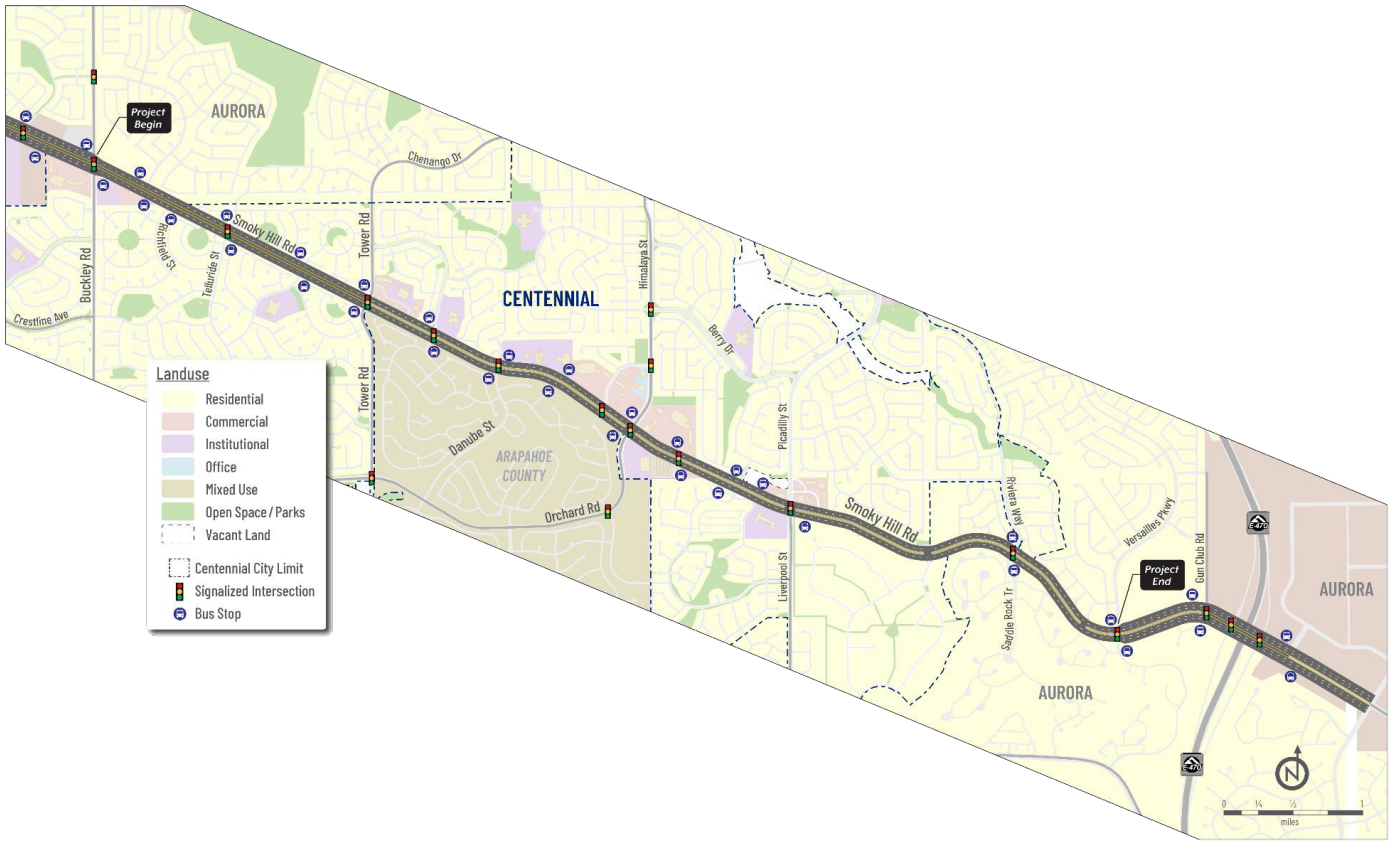
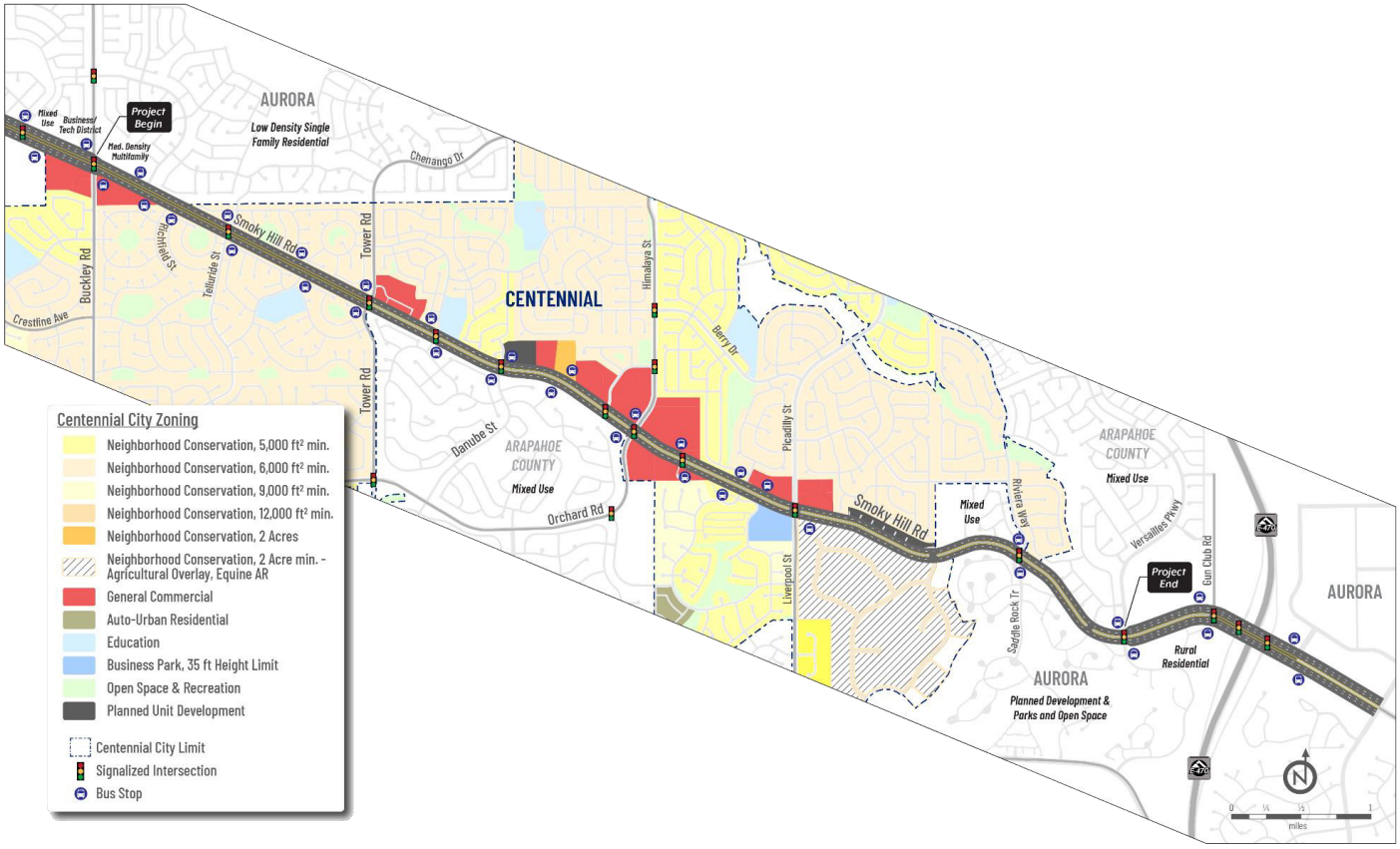


Figure 3.5: Smoky Hill Road Corridor Zoning



3.4 Corridor Mobility and Transportation

3.4.1 Vehicle Network

Smoky Hill Road within the city limits of Centennial is approximately 2.2 miles in length. Smoky Hill Road is generally a four-lane major arterial roadway between Buckley Road and Versailles Parkway. To the west of Buckley Road and near E-470, Smoky Hill Road transitions to a six-lane major arterial. There are nine signalized intersections between the Buckley Road and Liverpool Street/Picadilly Street intersections. Auxiliary left and right turn lanes are provided at many of the intersections. The posted speed limit is 40 mph. Other major arterials intersecting with Smoky Hill Road in the project area include Buckley Road, Orchard Road/Himalaya Street, and Liverpool Street/Picadilly Street.

Figure 3.6 (Page 13) shows aspects of the mobility and transportation network in the study area including signalized intersections, transit facilities, and existing bike routes.

3.4.2 Transit Network

RTD Bus Route 135 runs along Smoky Hill Road and generally provides hourly service between the Southlands Mall to the east of the study area and the Nine Mile Light Rail Station to the west of the study area.

Additionally, a RTD park-n-ride is located in the study area on the northwest corner of the Picadilly Street intersection. The park-n-ride provides 58 vehicle parking spaces as well as bike racks. Users of the park-n-ride are able to ride the RTD Route 135 buses as well as RTD Bus Route 139. Route 139 provides hourly service and travels between the Smoky Hill/Picadilly park-n-ride and the Nine Mile light rail station via a route using Picadilly Street and Quincy Avenue.

RTD Bus Routes 169 and 169L cross Smoky Hill Road on Buckley Road and provide service between the Arapahoe Crossing Shopping Center (to the south) and the 40th Avenue and Airport Boulevard Station further to the north.

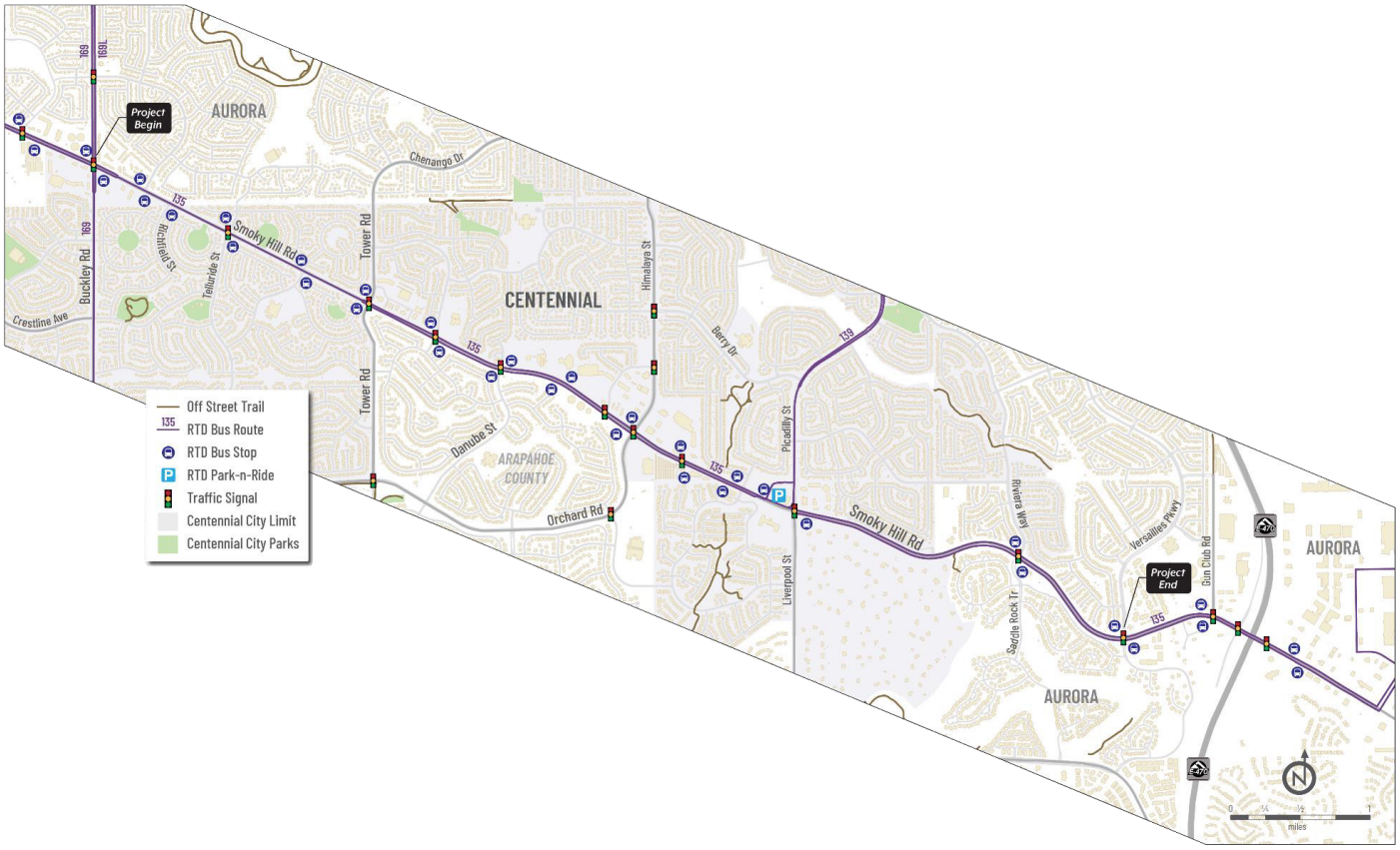
3.4.3 Bike Rider Network

Existing bike rider infrastructure is limited along the corridor. There are some wider sidewalk segments along Smoky Hill Road that act as shared pedestrian and bike rider side paths, but these are not continuous along the corridor.

Based on the City of Centennial (2016) Trails Inventory, there are several multi-use trails located near the Smoky Hill Road corridor. The Piney Creek Trail is a Regional Trail located south of Smoky Hill Road corridor. North of the corridor is the West Toll Gate Creek Trail, which is designated as a Local Trail. A Local Trail is also provided via a side path along Liverpool Street to the south of Smoky Hill Road connecting with the Piney Creek Trail. Local connector trails are also located immediately north and south of Smoky Hill Road near the Kirk Street intersection connecting with the Piney Creek and West Toll Gate Creek Trails.

Other nearby bike facilities include bike lanes on Picadilly Street 500 feet north of Smoky Hill Road and on Wagon Trail Parkway 800 feet north of Smoky Hill Road.

Figure 3.6: Mobility and Transportation in the Project Area



3.4.4 Pedestrian Network

Smoky Hill Road provides sidewalks along both sides of the roadway throughout the study area. Sidewalk widths vary between four and 15 feet and are a mixture of attached and detached sidewalks. Pedestrians are generally limited to crossing Smoky Hill Road at signalized intersections where pedestrian crossings are provided. Signalized intersection spacing along Smoky Hill Road is approximately every half mile or less. Pedestrians are also able to travel on the multi-use trail network discussed as part of the bike rider network (Section 3.4.3).

3.4.5 Traffic Technology

The traffic signals on Smoky Hill Road between Telluride Street and Liverpool Street/Picadilly Street are operated by the City of Centennial and the Buckley Road intersection is operated by the City of Aurora. The Centennial traffic signal system operates with Econolite ASC/3 controllers and fiber communications. The signals in the project area are currently operated with time-based traffic signal coordination plans developed based on historical traffic patterns in the corridor. However, Centennial has plans to develop an adaptive traffic control system in the future whereby timing changes will be modified in near real-time based on traffic detected in the corridor. Centennial and RTD also have plans to develop transit signal priority (TSP) to facilitate bus travel on Smoky Hill Road. TSP can be used to provide an early green signals when buses are waiting at a traffic signal or to extend a traffic signal for a few seconds for a bus.

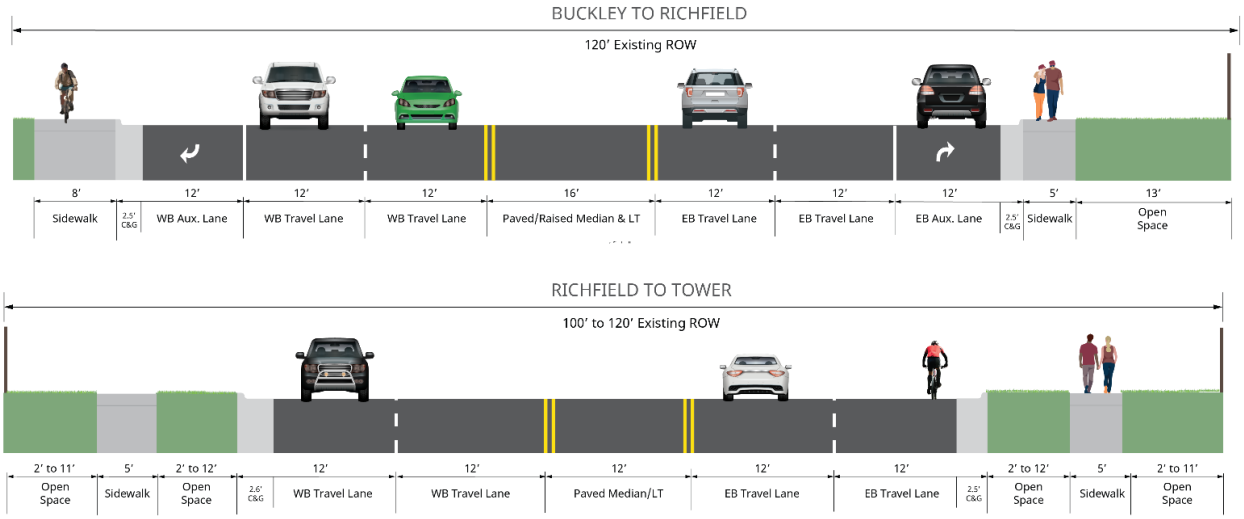
3.5 Corridor Segments

3.5.1 Segment 1 – Buckley Road to Tower Road

Roadway Elements

- 100–120 feet of right-of-way
- Signalized intersections at Buckley Road, Telluride Street, and Tower Road
- Four through lanes with single auxiliary left and right turn lanes at intersections
  - Except at Buckley Road which has three through lanes westbound with a shared through and right turn lane

Figure 3.7: Buckley Road to Tower Road Existing Typical Cross Sections



Traffic Elements

- 46,900 vehicles per day between Buckley Road and Telluride Street
- 40 mph posted speed limit

Multi-Modal Elements

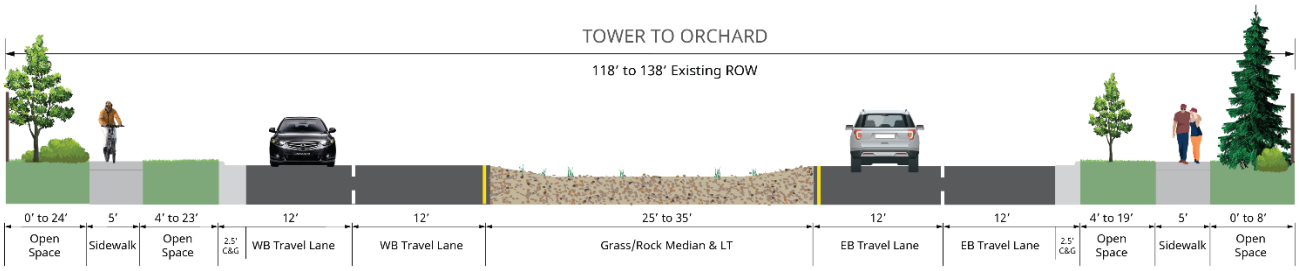
- RTD Bus Routes 135 along Smoky Hill Road and 169/169L along Buckley Road.
- Sidewalks along both sides of Smoky Hill Road.
- Pedestrian crossings approximately every half mile at signalized intersections (Buckley Road, Telluride Street, and Tower Road)
- Existing bike lanes on Wagontrail Parkway 800 feet north of Smoky Hill Road

3.5.2 Segment 2 – Tower Road to Orchard Road/Himalaya Street

Roadway Elements

- 118–138 feet of right-of-way
- Signalized intersections at Tower Road, Biscay Circle, Danube Street, Gibraltar Way, and Orchard Road/Himalaya Street.
- Four through lanes with single auxiliary left and right turn lanes at intersections
- Wide center median

Figure 3.8: Tower Road to Orchard Road/Himalaya Street Existing Typical Cross Sections



Traffic Elements

- 30,700 vehicles per between the Danube Street and Orchard Road/Himalaya Street intersections
- 40 mph posted speed limit

Multi-Modal Elements

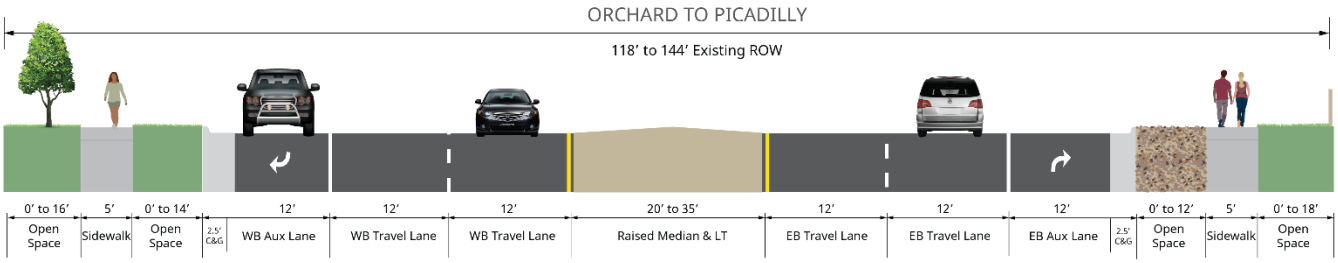
- RTD Bus Route 135 along Smoky Hill Road.
- Sidewalks along both sides of Smoky Hill Road.
- Pedestrian crossings approximately every half mile or less at signalized intersections (Tower Road, Biscay Circle, Danube Street, Gibraltar Way, and Orchard Road/Himalaya Street)
- Existing bike lanes on Wagontrail Parkway 800 feet north of Smoky Hill Road

3.5.3 Segment 3 – Orchard Road/Himalaya Street to Liverpool Street/Picadilly Street

Roadway Elements

- 118–138 feet of right-of-way
- Signalized intersections at Orchard Road/Himalaya Street, 20250 East/Safeway Entrance, and Liverpool Street/Picadilly Street
- Four through lanes with single auxiliary right turn lanes at intersections, dual left turn lanes westbound at Orchard Road/Himalaya Street and eastbound at Liverpool Street/Picadilly Street, single left turn lanes at 20250 East/Safeway Entrance and unsignalized intersections (Kirk Street and RTD park-n-ride/Sprouts entrance)
- Center median
- Vertical and horizontal curvature

Figure 3.9: Orchard Road/ to Picadilly Street – Existing Typical Cross Sections



Traffic Elements

- 35,800 vehicles per day west of Liverpool Street/Picadilly Street
- 40 mph posted speed limit

Multi-Modal Elements

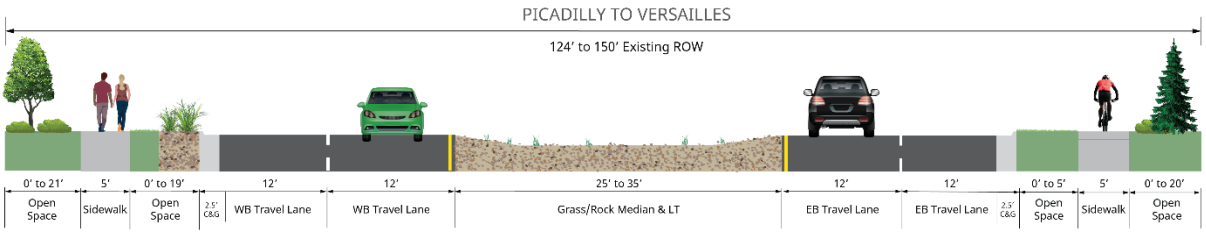
- RTD Bus Routes 135 along Smoky Hill Road and Route 139 along Picadilly Street.
- Park-n-Ride at northwest corner of Liverpool Street/Picadilly Street
- Sidewalks along both sides of Smoky Hill Road.
- Pedestrian crossings approximately every 0.4 miles or less at signalized intersections (Orchard Road/Himalaya Street, 20250 East/Safeway Entrance, and Liverpool Street/Picadilly Street)
- Existing bike lanes on Picadilly Street 500 feet north of Smoky Hill Road. Side path along Liverpool Street to the south of Smoky Hill Road.
- Connector trails near Kirk Street providing access to the Piney Creek Trail (to the south) and West Toll Gate Creek Trails (to the north).

3.5.4 Segment 4 – Liverpool Street/Picadilly Street to Versailles Parkway/Ponderosa Trail

Roadway Elements

- 124–150 feet of right-of-way
- Signalized intersections at Liverpool Street/Picadilly Street, Riviera Way/Saddle Rock Trail, and Versailles Parkway/Ponderosa Trail.
- Four through lanes with single auxiliary right and left turn lanes at intersections
  - Except at Liverpool Street/Picadilly Street where there are dual westbound left turn lanes.
- Wide center median
- Horizontal curvature

Figure 3.10: Picadilly Street to Versailles Parkway – Existing Typical Cross Sections



Traffic Elements

- 34,400 vehicles per day west of Versailles Parkway/Ponderosa Trail
- 40 mph posted speed limit

Multi-Modal Elements

- RTD Bus Routes 135 along Smoky Hill Road.
- Sidewalks along both sides of Smoky Hill Road.
- Pedestrian crossings approximately every 0.9 miles or less at signalized intersections (Liverpool Street/Picadilly Street, Riviera Way/Saddle Rock Trail, and Versailles Parkway/Ponderosa Trail)
- Existing bike lanes on Picadilly Street 500 feet north of Smoky Hill Road. Side path along Liverpool Street to the south of Smoky Hill Road.

3.6 Traffic Operations

Based on previous traffic counts and data received from the Denver Regional Council of Governments (DRCOG), traffic volumes for Year 2020 were identified and applying growth factors, forecasted traffic volumes for Year 2050 were developed. Further details on the method used for developing the traffic volumes is provided in **Appendix A**. Synchro output from the traffic analysis is provided in **Appendix C**.

3.6.1 2020 Traffic Conditions

2020 peak hour and average daily traffic volumes are shown in **Figure 3.11** (Page 20). As shown, in 2020 average daily traffic ranges from 30,700 in the center of the study area near the Orchard Road/Himalaya Street intersection to 46,900 between Buckley Road and Telluride Street.

Intersection Level of Service (LOS) based on the 2020 traffic volumes is shown in **Figure 3.12** (Page 21). As shown, the Buckley Road intersection operates with an LOS D during both the AM and PM Peak periods and the Liverpool Street/Picadilly Street intersection operates at LOS D during the PM Peak period. All of the remaining intersections in the project area operate at LOS C or better.

Volume-to-capacity ratios (VCRs) based on the 2020 traffic volumes are shown in **Figure 3.13** (Page 22). At signalized intersections, VCRs of 0.95 or greater indicate a threshold where current demand may contribute to operational issues. At the Buckley Road intersection, the southbound through and eastbound left turn exceed or are at the 0.95 threshold. At the remaining intersections, all movements had VCRs of less than 0.95. Several of the other intersections (e.g. Telluride St, Tower Rd, Orchard Rd/Himalaya St, and Liverpool St/Picadilly St) have VCRs in the 0.6 to 0.8 range.

Figure 3.11: 2020 Traffic Volumes

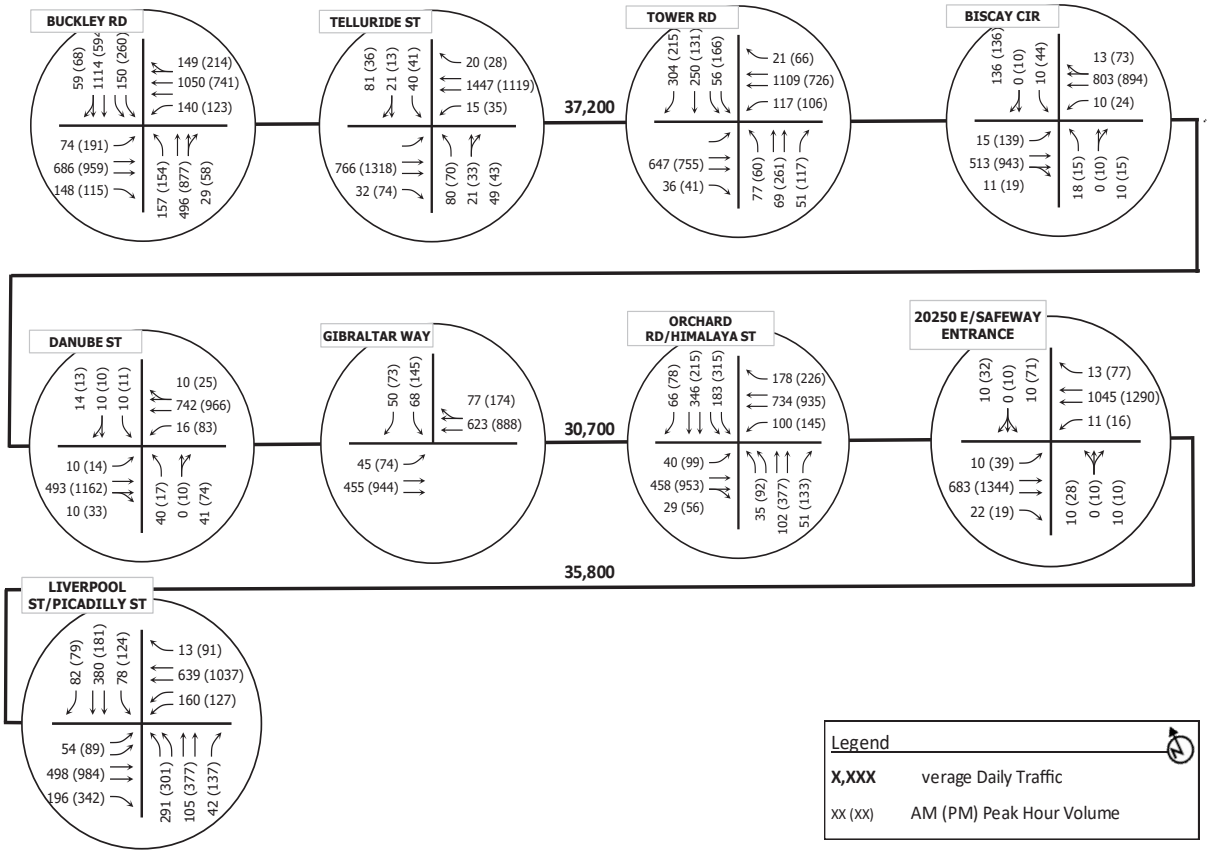


Figure 3.12: 2020 Level of Service

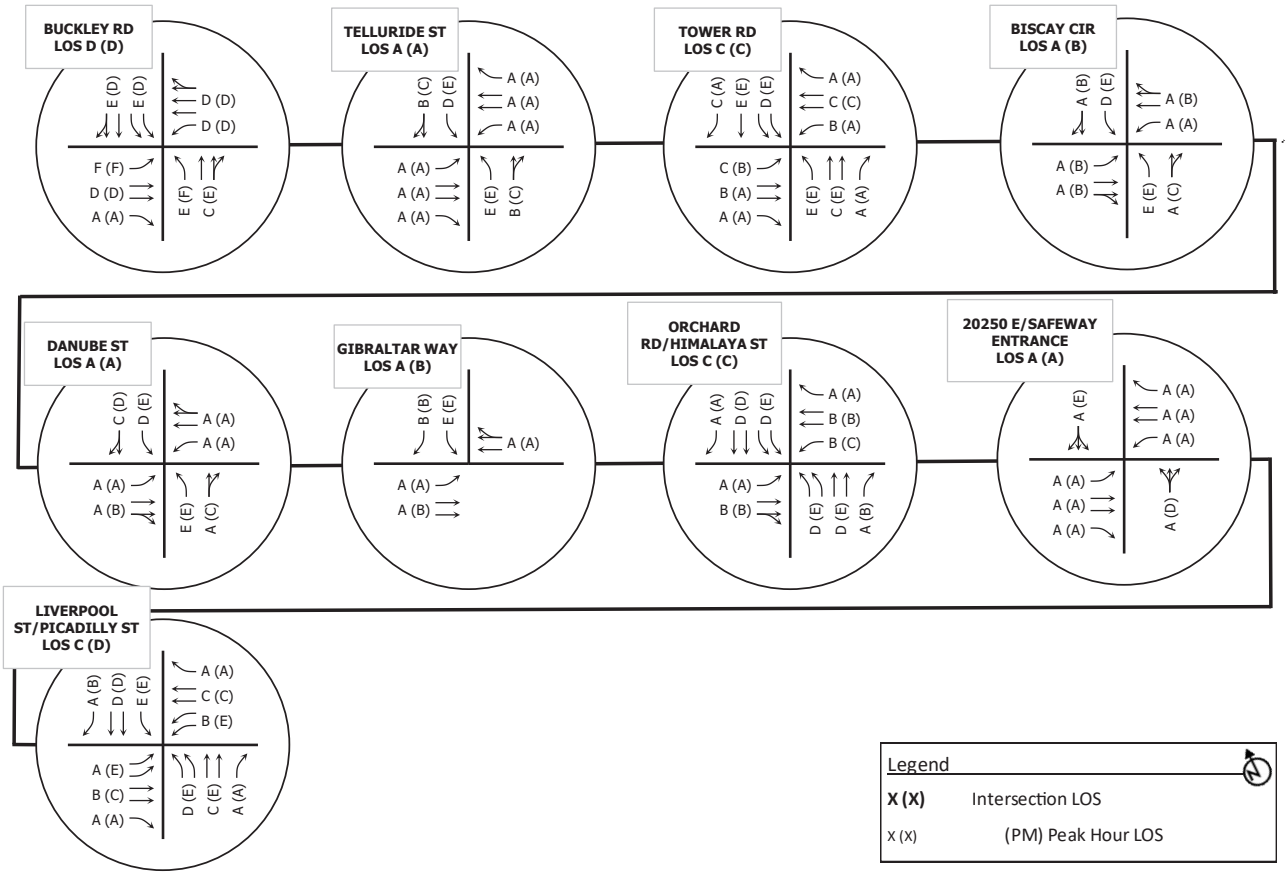
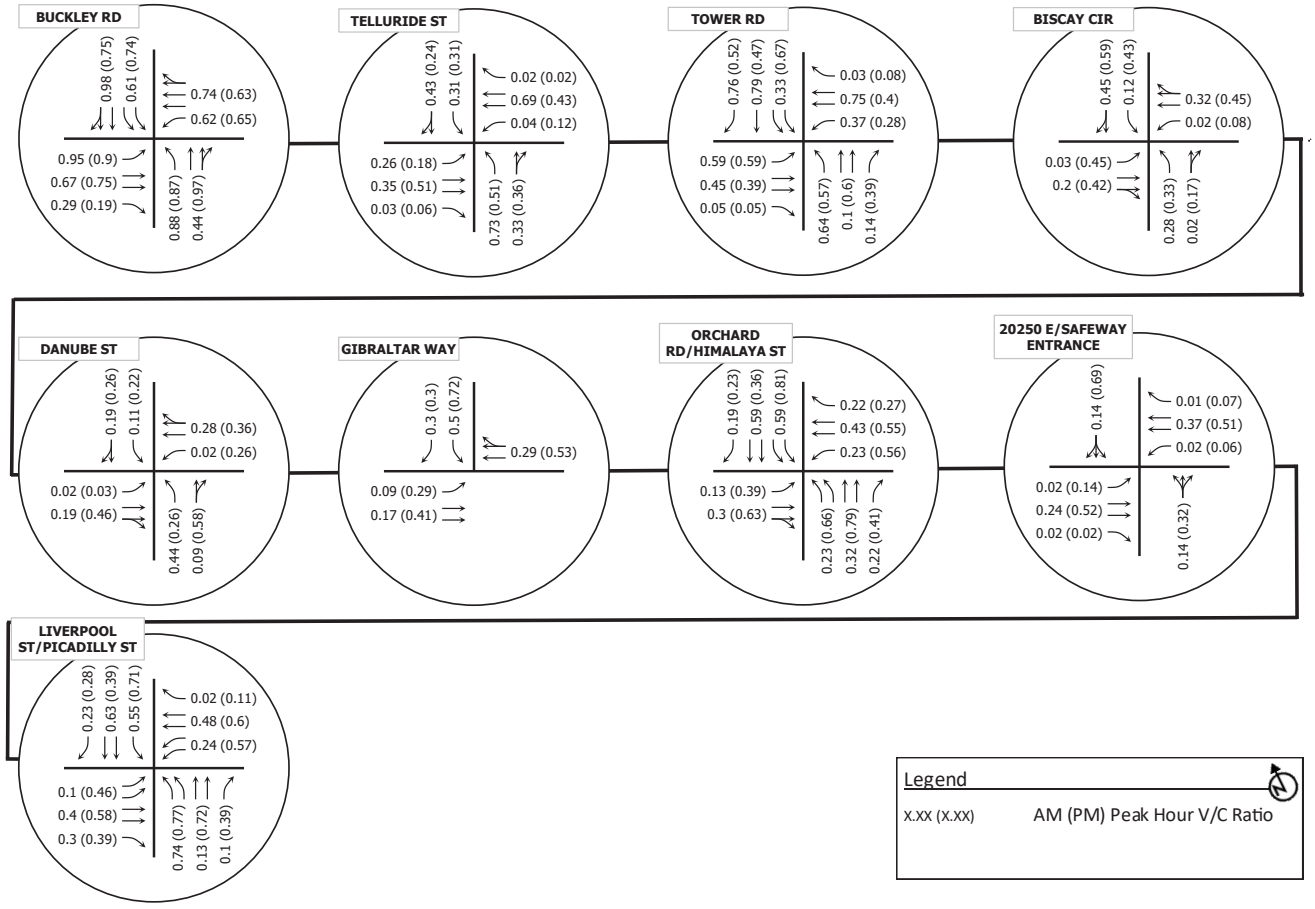


Figure 3.13: 2020 Volume to Capacity Ratios



3.6.2 2050 Traffic Conditions

Forecasted 2050 traffic volumes were developed in the project area based on data received from the DRCOG Travel Demand Model (**Figure 3.14**, Page 24). As shown, average daily traffic volumes are forecasted to exceed 50,000 vehicles per day on the eastern and western edges of the project area and will reach 44,800 vehicles per day near the Orchard Road/Himalaya Street intersection.

The LOS based on the 2050 volumes is shown in **Figure 3.15** (Page 25). At the Buckley Road and Orchard Road/Himalaya Street intersections, traffic conditions are forecasted to degrade to LOS F during the PM peak period. The Buckley Road intersection will also operate at LOS E during the AM peak period. Additionally, the Tower Road intersection will degrade to LOS D during the AM peak period and the Liverpool Street/Picadilly Street intersection during the AM and PM peak periods. At the remaining intersections, several movements will also degrade to LOS E or LOS F.

VCRs based on the 2050 forecasts are shown in **Figure 3.16** (Page 26). During the PM peak period, several movements have a VCR exceeding 0.95 at the Buckley Road and Orchard Road/Himalaya Street intersections. The northbound left turn at the Liverpool Street/Picadilly Street intersection has a high VCR during the PM peak (1.08) with several other movements approaching 0.95. During the AM peak period, the Buckley Road intersection had movements with a VCR exceeding 0.95. At the remaining intersections, lower VCR values were identified based on the 2050 forecasts during the AM peak period.

The outcomes of the analysis suggest that operational issues will likely occur with LOS F and VCR exceeding 0.95 at several intersections based on the existing roadway geometry and additional treatments may need to be considered to improve operations.

Figure 3.14: 2050 Traffic Volumes

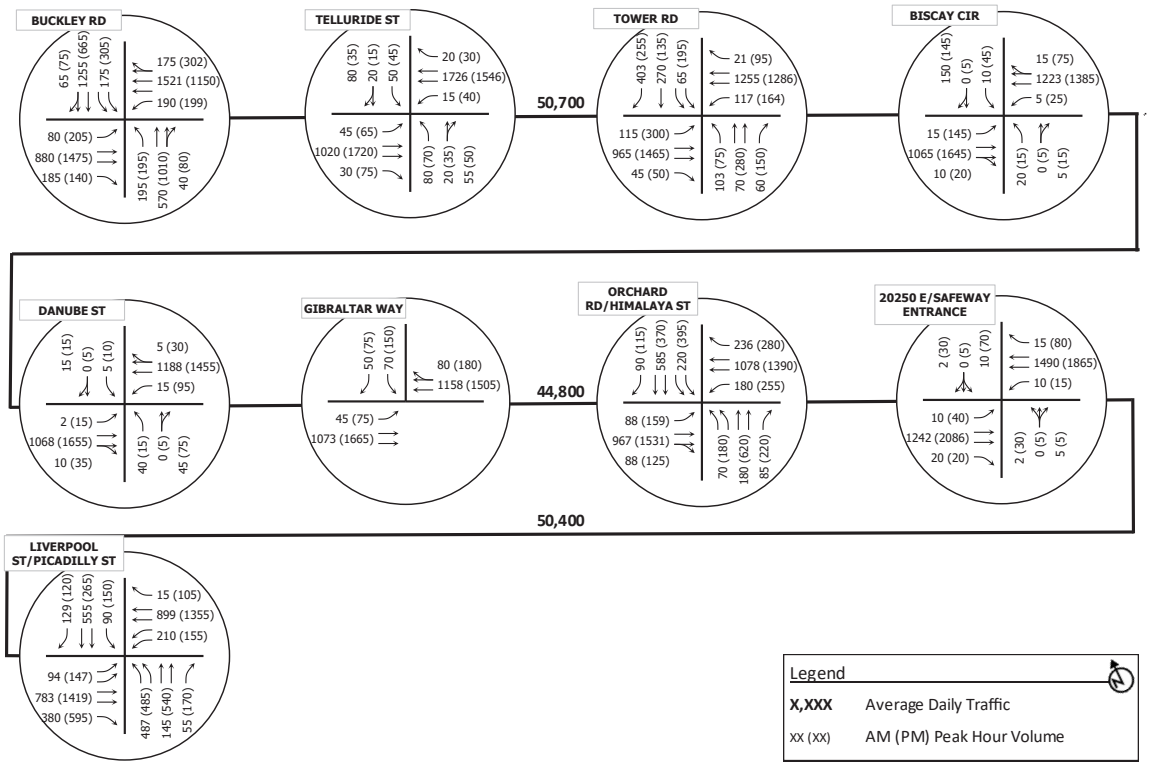


Figure 3.15: 2050 Level of Service

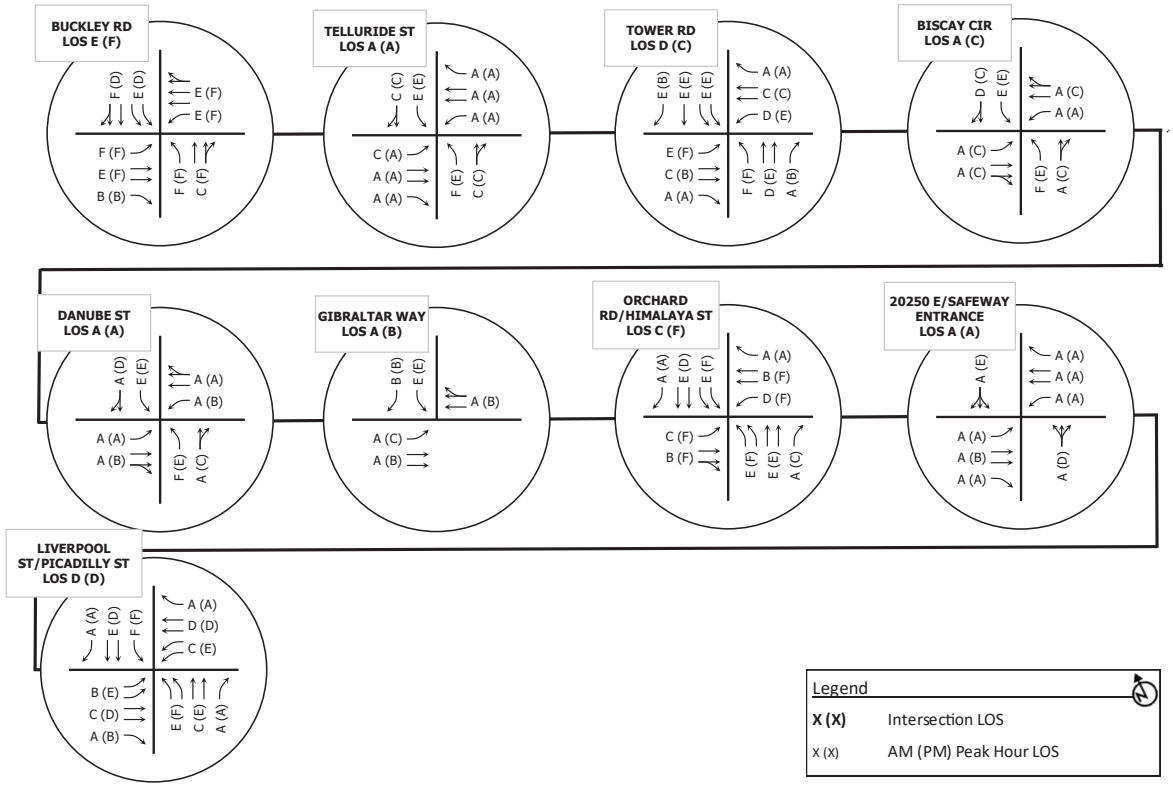
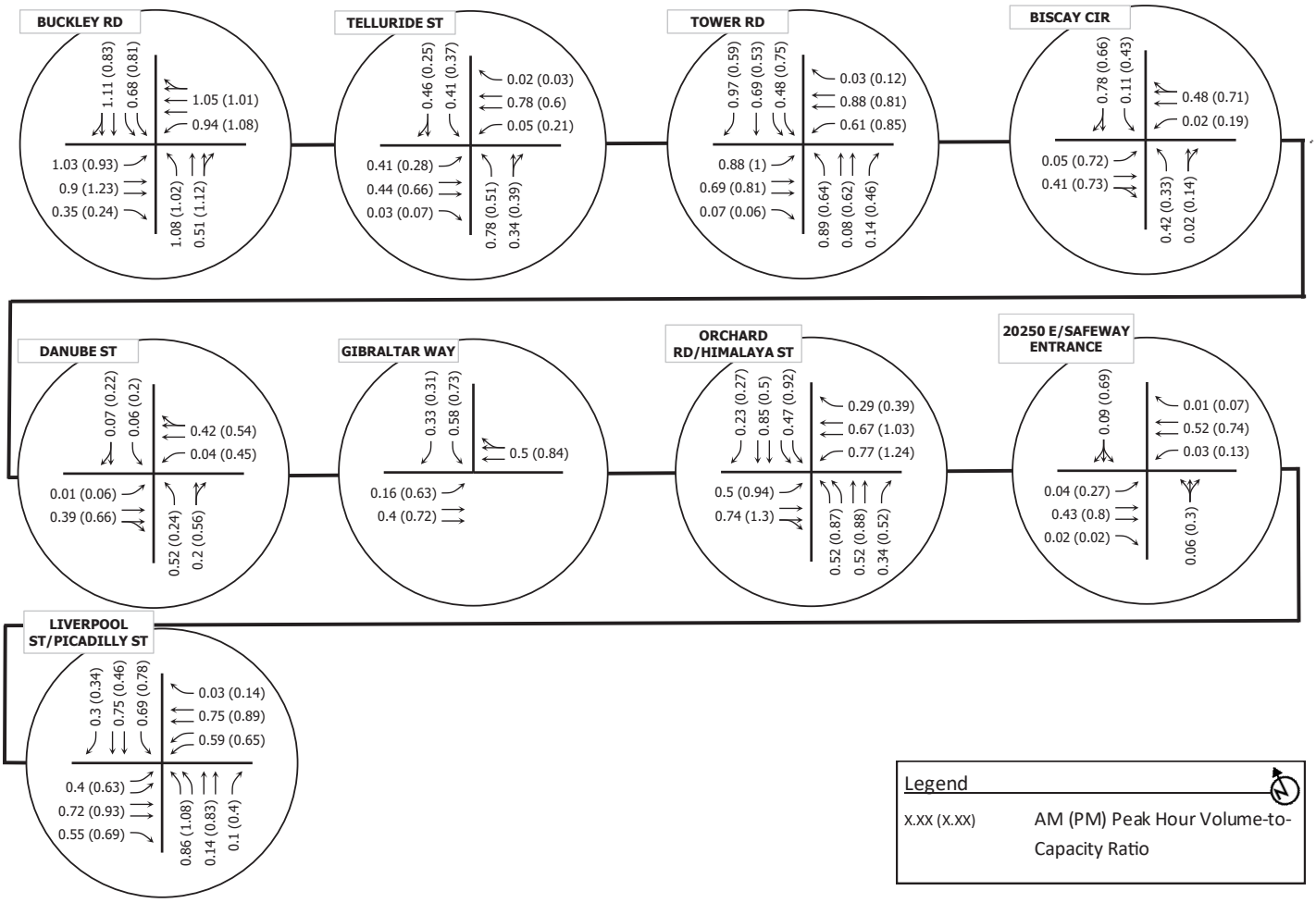


Figure 3.16: 2050 Volume to Capacity Ratios



3.6.3 Pedestrian and Bike Ride Activity

As part of the turning movement count data obtained in the study area, pedestrian and bike rider counts were also obtained. A summary of the pedestrian and bike rider counts is shown in **Appendix B**. Based on the data, intersections with higher pedestrian activity (29 to 49 pedestrians across the three periods) included Buckley Road, Orchard Road/Himalaya Street, and Liverpool Street/Picadilly Street. Bike rider activity was lower than pedestrian activity. Intersections with higher bike rider activity with more than ten bike riders recorded across the peak periods included Danube Street, Orchard Road/Himalaya Street, and Liverpool Street/Picadilly Street.

3.7 Crash History

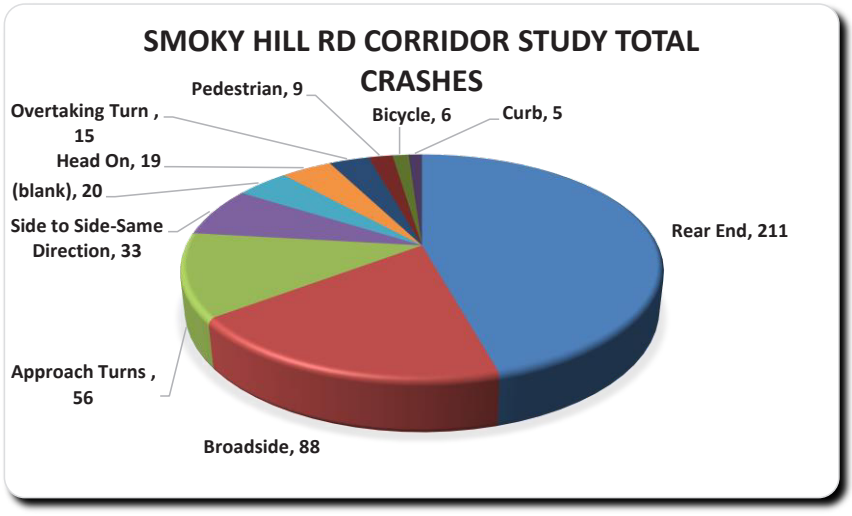
The City of Centennial provided Muller with of road crash history within the study area between January 1, 2014 and January 31, 2021 (7 years and 1 month). The crash history was examined between the Buckley Road intersection and the Picadilly Street intersection to locate clusters and identify crash patterns. Four hundred ninety-three (493) crashes were reported along this section of Smoky Hill Road during the study period; 40 crashes resulted in 48 injuries and no fatalities. **Table 3.1** summarizes the crash totals for this segment of Smoky Hill Road over the study period. As shown, a reduction in total crashes occurred between years 2014 to 2016 and 2017 to 2019. There were fewer crashes recorded in 2020 than in previous years potentially due to COVID-19 impacts on traffic.

Table 3.1: Smoky Hill Road Crash History by Year

Year	Crashes			Persons
	PDO	Injury	Total	Injured
1/1/2014 to 12/31/2014	81	4	85	5
1/1/2015 to 12/31/2015	98	3	101	3
1/1/2016 to 12/31/2016	89	10	99	13
1/1/2017 to 12/31/2017	54	6	60	6
1/1/2018 to 12/31/2018	50	7	57	8
1/1/2019 to 12/31/2019	57	6	63	9
1/1/2020 to 12/31/2020	22	3	25	3
1/1/2021 to 1/31/2021	3	1	3	1
Total	**453**	**40**	**493**	**48**
Average/Yr	**64**	**6**	**70**	**7**

Figure 3.17 displays the crash distribution, by type, for the study segment. *Rear end* crashes were the common crash type observed, accounting for 43% of the total crashes; followed by *broadside* type crashes at 18%, and *approach turn* crashes at 11%.

Figure 3.17: Smoky Hill Road Crash Distribution by Type



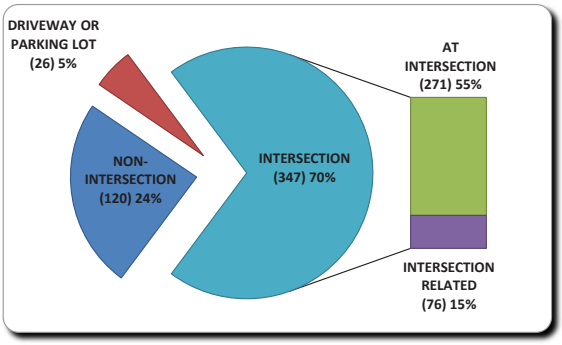
Other Crashes <1%	
Other Non-Collision	4
Sign	4
Parked Motor Vehicle	3
Rear to Rear	3
Side to Side-Opposite Direction	3
Fence	2
Rear to Side	2
Tree	2
Culvert or Headwall	1
Delineator Post	1
Large Rocks or Boulder	1
Other Fixed Object	1
Overturning	1
Traffic Signal Pole	1
Vehicle Debris or Cargo	1
Wall or Building	1

Note: Crashes shown as "(blank)" crash type were not identified in the crash data.

3.7.1 Crash Locations

The majority of the crashes along the Smoky Hill Road corridor occurred in the vicinity of intersections (347 of 493, 70%), followed by non-intersection locations (120 of 493, 24%), and driveway accesses or parking lots (26 of 493, 5%). This breakdown is shown in **Figure 3.18**. The magnitude of safety problems at intersections was assessed using Safety Performance Functions, and specific patterns were determined using direct diagnostic analysis techniques.

Figure 3.18: Intersection Crashes



3.7.2 Intersection Crash Analysis

Crashes that can be attributed to intersections (located at intersections or that are intersection related) accounted for 70% of the total crashes (347 of 493). **Table 3.2** lists the intersection, number of legs, signalization, crash frequency, and and Level of Safety Service (LOSS) at intersections in the study area. LOSS was determined using Safety Performance Function analysis. This method is further discussed in **Appendix D**. As shown, the Orchard Road/Himalaya Street intersection had the most total crashes and had a LOSS III, which indicates less than expected safety performance. The remaining intersections were rated as LOS I for total crashes indicating low potential for crash reduction. All intersections were also identified as LOSS I for severe crashes.

Table 3.2: Intersection Crashes by Location

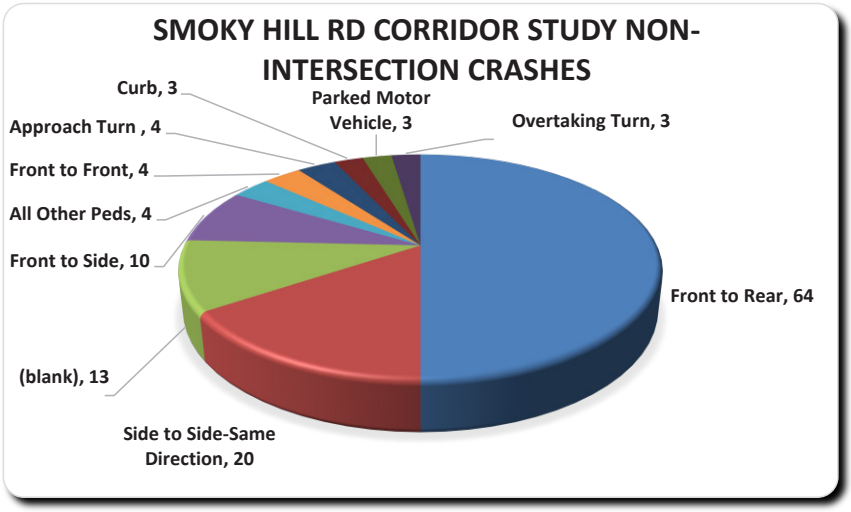
Description	Legs	Signal	Number of Crashes				LOSS Total	LOSS Severe
			PDO	Injury	Fatal	Total		
Buckley Rd	4	Yes	10	1	0	11	I	I
Pagosa St	4	No	2	0	0	2	I	I
Wagontrail Pkwy	4	No	2	0	0	2	I	I
Richfield St	3	No	0	0	0	0	I	I
Telluride St	4	Yes	13	6	0	19	I	I
Waco St	4	No	6	0	0	6	I	I
Tower Rd	4	Yes	43	5	0	48	I	I
Biscay Cir	4	Yes	20	2	0	22	I	I
Danube St	4	Yes	13	2	0	15	I	I
Gibraltar Way	3	Yes	5	0	0	5	I	I
Orchard Rd/Himalaya St	4	Yes	112	5	0	117	III	I
20250 E Intersection	4	Yes	17	0	0	17	I	I
Jericho St/Kirk St	4	No	2	0	0	2	I	I
Liverpool St/Picadilly St	4	Yes	73	5	0	78	I	I
Picadilly St	4	No	3	0	0	3	I	I
		Total	**321**	**26**	**0**	**347**		

Avg/Year	45	4	0	49		

3.7.3 Non-Intersection Segment Crash Analysis

There were 146 non-intersection crashes during the study period on Smoky Hill Road taking place along a non-intersection segment, driveway access, or parking lot. *Rear end* type crashes were predominant (44%), followed by *sideswipe (same direction)* type crashes (14%), and *broadside* crashes (9%). **Figure 3.19** shows the crash distribution, by type, for the study segment.

Figure 3.19: Non-Intersection Crash Distribution by Type



Other Crashes <2%	
Fence	2
Other Non-Collision	2
Rear to Rear	2
Rear to Side	2
Sign	2
Tree	2
Culvert or Headwall	1
Delineator Post	1
Large Rocks or Boulder	1
Other Fixed Object	1
Overturning	1
Wall or Building	1

Non-intersection crashes were analyzed in segments in order to identify patterns and clusters throughout the corridor. Non-intersection crash analysis segments were broken down into the four main segments listed above in Section 3.4 of this report. **Table 3.3** shows the breakdown of crashes by analysis segment.

Table 3.3: Crashes by Analysis Segment

Segment	Length (miles)	Number of Crashes			
		PDO	Injury	Fatal	Total
Buckley Rd to Tower Rd	1.10	29	4	0	33
Tower Rd to Orchard Road/Himalaya St	1.06	43	6	0	49
Orchard Road/ Himalaya St to Liverpool St/Picadilly St	0.64	52	2	0	54
Liverpool St/Picadilly St to Versailles Pkwy/Ponderosa Trail	1.34	8	2	0	10
Total		**132**	**14**	**0**	**146**
Avg/Year		**18.6**	**2.0**	**0**	**20.6**

As shown, crashes were most concentrated in the segment between the Orchard Road/Himalaya Street and Liverpool Street/Picadilly Street intersections, which was the shortest segment but had the greatest total number of crashes. Injury crashes were most prevalent in the segment between Tower Road and the Orchard Road/Himalaya Street intersection.

4 OUTREACH AND ENGAGEMENT

To better understand corridor issues and concerns, the project team initiated several activities to solicit public engagement along the corridor. In conjunction with the City of Centennial, opportunities to collect input were provided through the project website, mailings, and one-one-one stakeholder meetings. Since there are several projects occurring within corridor, a logo was created to help the public clearly identify this transportation study.

4.1 Website

The project website (https://www.centennialco.gov/Government/City-Projects-and-Initiatives) serves as a hub of information and provides a platform for engagement opportunities for the general public. Information shared on the project website can be viewed in **Appendix E**. As the study continues, project documents and reports will be provided as well as updates on the project schedule and status.

4.2 Stakeholders

The project team has identified the following list of stakeholders for the corridor:

- City of Aurora
- Arapahoe County
- RTD: Smoky Hill & Piccadilly Park-n-ride
- Smoky Hill High School
- CenCON
- Smoky Hill HOA
- Shenandoah ON Smoky Hill HOA
- Trails West Elementary
- Montessori School of Aurora
- Merryhill Preschool
- Smoky Hill Library
- Melvin Schoolhouse Museum & Library
- Bellewood Park
- Big Sandy Park
- Arrowhead Park
- Saddle Rock Golf Course
- High Plains Trail
- The Barn
- Smoky Hill Baptist Church
- Smoky Hill United Methodist Church
- Smoky Hill Vineyard Church
- Edge Church
- Lord of the Hills Lutheran Church
- Smoky Hill Village Shopping Mall
- Hope Starts Here Food Bank
- Smoky Hill Town Center Shopping Mall
- Aurora Animal Hospital
- Rocky Mountain Urgent Care & Family Medicine
- Peakview Assisted Living
- Bridges at Smoky Hill Shopping Mall
- Smoky Hill Metropolitan District
- Corridor Users

4.3 One-on-One Meetings

Stakeholders one-on-one meetings were conducted in July with several of the stakeholders to better understand their goals for the corridor, use of the corridor, and any issues they encounter in their day activities. Results of these meetings are being incorporated into the development of alternatives as the study moves forward.

4.4 Postcards

Project postcard were sent to additional stakeholders along the corridor to make them aware of the study and provide the website where they can provide additional comments about the corridor. Any comments received will be tracked and if needed, responded to, by a member of the project team.

4.5 Next Steps

The virtual public meeting for this project will be held in August to share existing conditions in the corridor, explain proposed alternatives, and gather initial input from stakeholders and corridor users.

A summary of future project engagement and outreach activities will be documented and included as part of the Smoky Hill Road Transportation Corridor Study.

REFERENCES

City of Centennial 2016, "City of Centennial Trails Inventory", City of Centennial, viewed April 27, 2021, www.centennialco.gov/files/sharedassets/public/documents/community-development/trails-inventory-map.pdf.

City of Centennial 2017, *Centennial Trails and Recreation Plan*, City of Centennial.

City of Centennial 2018, *Centennial NEXT 2040 Comprehensive Plan*, City of Centennial.

City of Centennial 2019, *2019 Traffic Signal Warrant Analysis*, City of Centennial.

FHU 2013, *Centennial Transportation Plan*, Felsburg Holt & Ullevig, Prepared for the City of Centennial.

FHU 2017, *Arapahoe County Bicycle/Pedestrian Master Plan*, Felsburg Holt & Ullevig, Prepared for the City of Centennial.

FHWA 2009, *Manual On Uniform Traffic Control Devices*, 2009 Edition, Section 4C.01, p. 436, Federal Highway Administration, Washington, DC.

APPENDIX A: 2020 AND 2050 TRAFFIC VOLUME DEVELOPMENT

In accordance with the tasks identified in the project scope, the project team obtained traffic data to support the analysis required for the project. This included:

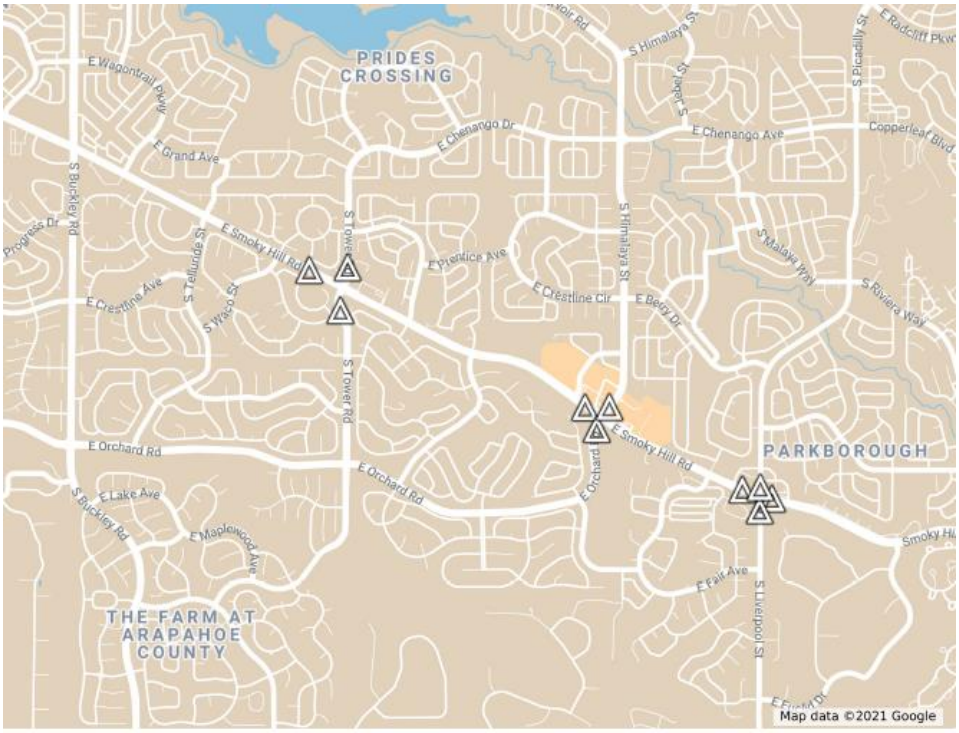
- Access to Streetlight Data in the project area.
- DRCOG travel demand model data for the 2020, 2045 and 2050 regional models.
- Turning movement counts at four locations in the project area completed in March.
- Synchro files and supporting data from the retiming project previously conducted on Smoky Hill Road in 2018.
- Crash data and signal warrant analysis studies previously conducted by the City of Centennial in the project area.

StreetLight Data Review

As part of the project, Streetlight Data was used to analyze historic changes in traffic volume and the impacts of the COVID-19 pandemic on traffic levels. Streetlight Data obtains data from a variety of sources including crowd-sourced information (fleet vehicles, cell phones, etc.) and existing traffic data sources from over 11,000 sources in the US and applies a machine-learning algorithm to predict changes over time and in adjacent areas.

A key purpose of the Streetlight Data analysis was to determine how traffic volumes have changed in the project area in recent years to consider how the Synchro files and supporting traffic data obtained in 2018 could be modified to serve as the base year for the current project. Bi-directional traffic data was obtained from Streetlight Data at the ten locations as shown in **Figure 1**. The Streetlight Data Zones included four locations on Smoky Hill Road and six locations on crossing arterials (Tower Road, Orchard Road/Himalaya Street, and Liverpool Street/Picadilly Street).

Figure A.1: Streetlight Data Zones



The Streetlight data was used to compare traffic volumes between the years of 2016 and 2016. Comparisons of average traffic volumes during these time periods are shown in **Figure** and **Figure** for the AM and PM Peak periods on Smoky Hill Road. **Figure** shows the total traffic volumes for all ten of the Streetlight Data zones.

For the comparisons, traffic data from the months of March, April, September, and October were chosen. The one exception was in 2020 where data was only taken from the Fall months due to COVID-19 impacts in the Spring. Streetlight Data from 2021 is starting to become available. However, it is more challenging to compare with the other years as data is currently only available for January and February. As more data becomes available later this Spring, it may be possible to further compare 2021 data as part of the analysis.

The data generally showed that the highest volumes occurred in the years 2018 or 2019. Lower traffic volumes were recorded in the Fall of 2020 particularly during the AM peak hour. PM peak hour volumes were only slightly less than in previous years.

The key finding from the data analysis is that the data collected by the DRCOG retiming project in 2018 was collected during a higher volume period when compared to other years. Based on this, it is recommended that the 2018 data be used as the base year for the analysis for the project.

Figure A.2: Smoky Hill Road AM Peak Hour Average Volumes (2016–2020)

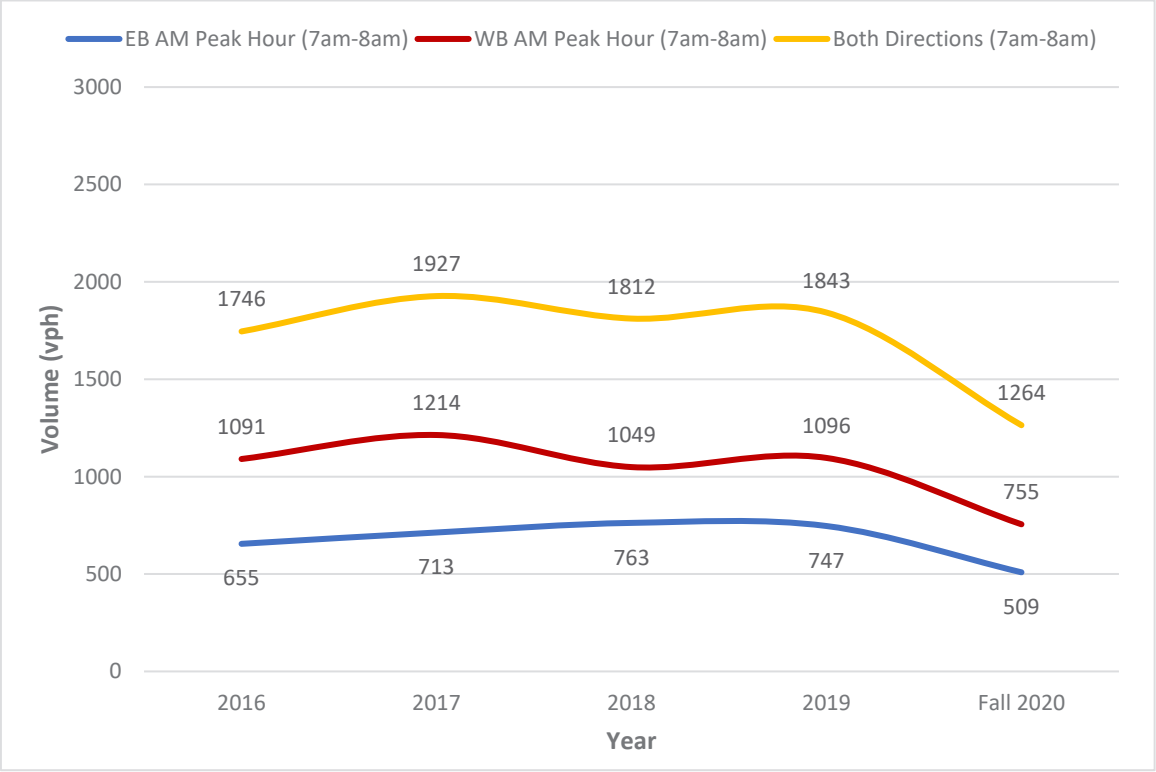


Figure A.3: Smoky Hill Road PM Peak Hour Average Volumes (2016–2020)

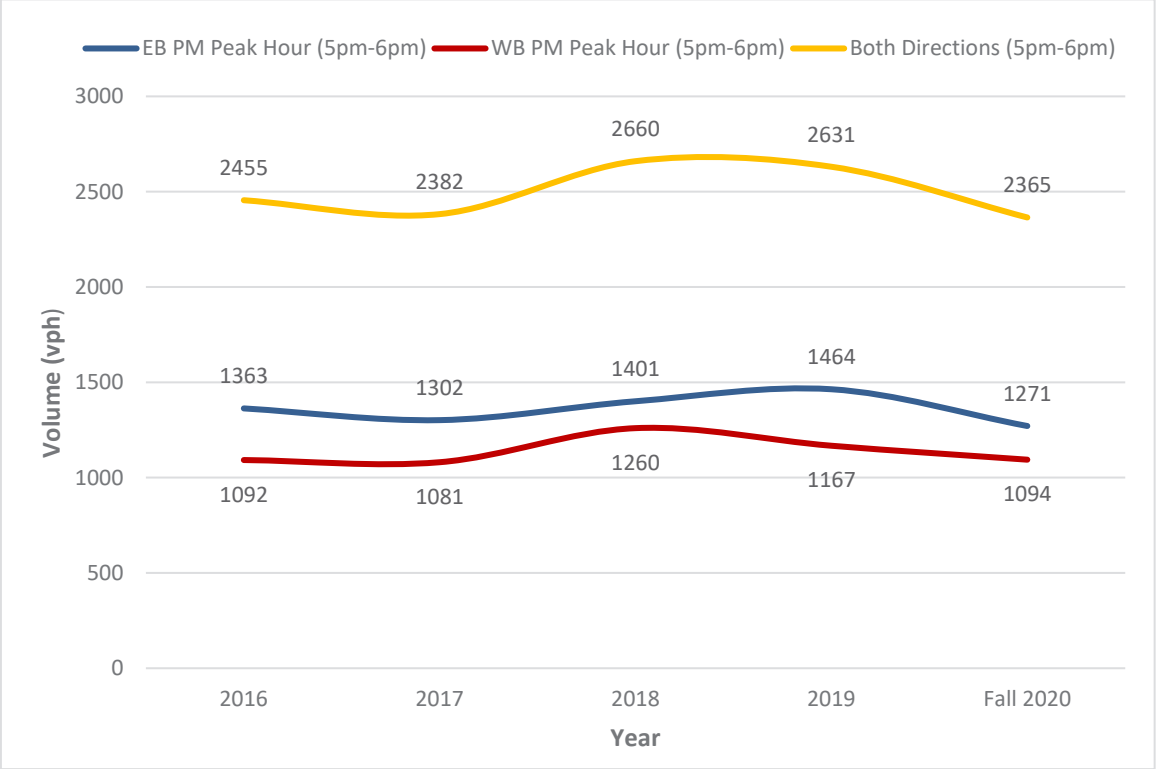
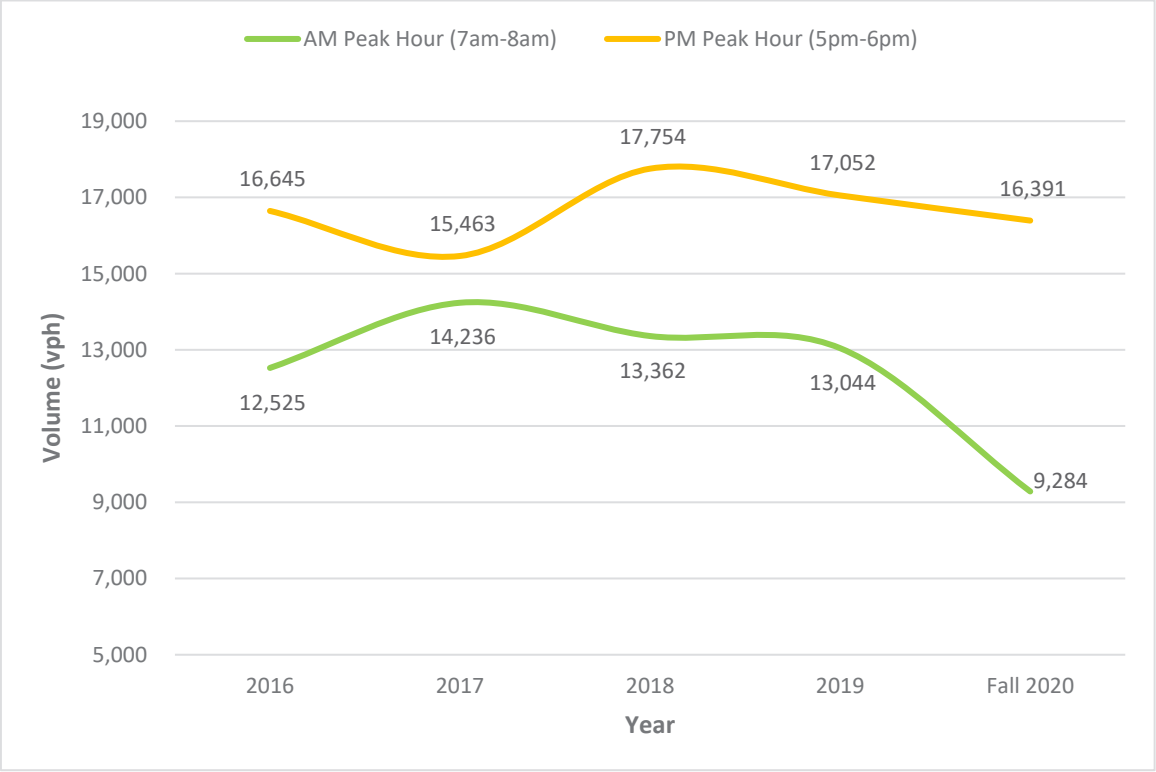


Figure A.4: Ten Streetlight Zones Total Volumes (2016–2020)



DRCOG Travel Demand Modeling

DRCOG provided the project team with traffic forecasts from DRCOG's FOCUS travel demand model (version 2.3) for the years of 2020, 2045 and 2050.

In the documentation provided with the data[1], DRCOG noted that the share of the population working from home had been increased from 12 percent to 20 percent in model years after 2023 to account for changing behaviors. The increase was based on an extensive literature and research review of expectations for the future. Also, the 2020 model run was based on travel conditions prior to the COVID-19 pandemic.

Table summarizes the All Day Link Volumes from the 2020, 2045 and 2050 models and **Table** shows the forecasted traffic growth factors based on the models. Growth rates of between 1.25 and 1.50 were identified on Smoky Hill Road with greater growth forecasted for the middle section of the project area between Tower Road and Liverpool Street. The cross streets generally had growth rates similar to those on Smoky Hill Road. The one exception was on northbound Orchard Road (growth factors of 1.67–1.72). However, northbound Orchard Road had a relatively low 2020 volume (1,800 vpd). The results also showed slightly higher growth in 2050 when compared with 2045. To extend the relevancy of the traffic analysis further into the future. It is recommended that the 2050 growth factors be used to assess future

[1] DRCOG 2021, *DRCOG Releases Focus 2.3*, Technical Memorandum, January 22, 2021, Denver Regional Council of Governments, Denver, CO.

growth in the corridor. It should be noted that in addition to the growth factors, additional steps will be taken to balance the traffic volumes to align forecasts between each link and their respective growth factors.

Table A.1: All Day Assigned Volumes from DRCOG Travel Demand Models

	All Day Assigned Volumes (Vpd)								
	Eastbound			Westbound			Both Directions		
Smoky Hill Rd Link	2020	2045	2050	2020	2045	2050	2020	2045	2050
Endpoint- Buckley	22,700	28,300	28,700	21,900	27,300	27,800	44,600	55,600	56,500
Buckley-Telluride	23,900	30,100	30,400	23,000	29,400	29,800	46,900	59,500	60,200
Telluride-Tower	19,000	25,200	25,600	18,200	24,600	25,100	37,200	49,800	50,700
Tower-Danube	18,100	24,900	25,300	18,100	24,200	24,700	36,200	49,100	50,000
Danube-Orchard	15,700	22,200	22,700	15,000	21,500	22,100	30,700	43,700	44,800
Orchard-20250	19,100	25,600	26,400	18,500	25,200	25,900	37,600	50,800	52,300
20250-Liverpool	18,200	24,700	25,400	17,600	24,300	25,000	35,800	49,000	50,400
Liverpool-Riviera	16,200	20,400	20,800	15,800	20,200	20,500	32,000	40,600	41,300
Riviera-Versailles	17,400	21,900	22,400	17,000	21,700	22,100	34,400	43,600	44,500
Versailles-Endpoint	13,500	17,200	17,600	13,200	17,200	17,600	26,700	34,400	35,200

	All Day Assigned Volumes (Vpd)								
	Northbound			Southbound			Both Directions		
Cross Street Link	2020	2045	2050	2020	2045	2050	2020	2045	2050
Buckley	13,400	15,400	15,800	15,200	16,700	17,100	28,600	32,100	32,900
Tower	2,200	2,500	2,500	3,000	3,400	3,400	5,200	5,900	5,900
Orchard/Himalaya	1,800	3,000	3,100	6,800	9,500	9,900	8,600	12,500	13,000
Liverpool/Picadilly	9,800	13,900	14,500	7,200	10,100	10,100	17,000	24,000	24,600

Table A.2: Calculated Growth Factors from DRCOG Travel Demand Models

	EB Growth Factor		WB Growth Factor		EB/WB Growth Factor	
Smoky Hill Rd Link	2020-2045	2020-2050	2020-2045	2020-2050	2020-2045	2020-2050
Endpoint- Buckley	1.25	1.26	1.25	1.27	1.25	1.27
Buckley-Telluride	1.26	1.27	1.28	1.30	1.27	1.28
Telluride-Tower	1.33	1.35	1.35	1.38	1.34	1.36
Tower-Danube	1.38	1.40	1.34	1.36	1.36	1.38
Danube-Orchard	1.41	1.45	1.43	1.47	1.42	1.46
Orchard-20250	1.34	1.38	1.36	1.40	1.35	1.39
20250-Liverpool	1.36	1.40	1.38	1.42	1.37	1.41
Liverpool-Riviera	1.26	1.28	1.28	1.30	1.27	1.29
Riviera-Versailles	1.26	1.29	1.28	1.30	1.27	1.29
Versailles-Endpoint	1.27	1.30	1.30	1.33	1.29	1.32

	NB Growth Factor		SB Growth Factor		NB/SB Growth Factor	
Cross Street Link	2020-2045	2020-2050	2020-2045	2020-2050	2020-2045	2020-2050
Buckley	1.15	1.18	1.10	1.13	1.12	1.15
Tower	1.14	1.14	1.13	1.13	1.13	1.13
Orchard/Himalaya	1.67	1.72	1.40	1.46	1.45	1.51
Liverpool/Picadilly	1.42	1.48	1.40	1.40	1.41	1.45

APPENDIX B: PEDESTRIAN AND BIKE RIDER COUNTS

Figure B.1: Pedestrian and Bike Rider Counts

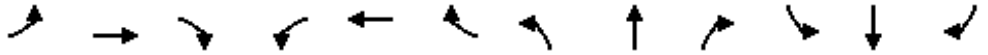
	Intersection	Pedestrians Crossing					Bike Riders Crossing				
		EB	WB	NB	SB	All Dir.	EB	WB	NB	SB	All Dir.
AM Peak Hour	Buckley Rd	3	6	2	0	11	0	0	0	0	0
	Telluride St	2	2	0	5	9	0	1	0	1	2
	Tower Rd	0	2	1	1	4	0	0	1	0	1
	Biscay Cir.	1	3	0	0	4	0	0	0	0	0
	Danube St.	0	3	0	0	3	0	2	0	0	2
	Gibraltar Wy.	0	2	0	0	2	0	2	0	0	2
	Orchard Rd/Himalaya St	5	4	1	1	11	3	2	1	0	6
	20250 Smoky Hill Rd	1	3	0	0	4	1	0	0	0	1
	Liverpool St/Picadilly St	2	2	2	6	12	1	1	2	5	9
Mid-Day Peak Hour	Buckley Rd	2	0	3	1	6	0	0	1	0	1
	Telluride St	1	2	1	1	5	0	1	0	1	2
	Tower Rd	0	2	1	1	4	0	0	0	0	0
	Biscay Cir.	1	3	0	0	4	0	2	0	1	3
	Danube St.	1	1	2	0	4	1	1	1	0	3
	Gibraltar Wy.	0	2	0	0	2	0	2	0	0	2
	Orchard Rd/Himalaya St	0	2	1	0	3	0	2	1	0	3
	20250 Smoky Hill Rd	0	1	1	0	2	0	1	1	0	2
	Liverpool St/Picadilly St	2	1	1	8	12	0	1	0	1	2
PM Peak Hour	Buckley Rd	14	1	2	15	32	0	1	0	0	1
	Telluride St	1	0	0	2	3	0	0	0	0	0
	Tower Rd	4	3	4	3	14	0	0	0	0	0
	Biscay Cir.	1	1	3	0	5	0	0	0	0	0
	Danube St.	2	5	0	0	7	1	5	0	0	6
	Gibraltar Wy.	0	1	0	1	2	0	0	0	0	0
	Orchard Rd/Himalaya St	1	5	6	3	15	0	3	0	0	3
	20250 Smoky Hill Rd	0	0	0	0	0	0	0	0	0	0
	Liverpool St/Picadilly St	2	3	5	0	10	0	0	0	0	0
AM, Mid-Day and PM Period Total	Buckley Rd	19	7	7	16	49	0	1	1	0	2
	Telluride St	4	4	1	8	17	0	2	0	2	4
	Tower Rd	4	7	6	5	22	0	0	1	0	1
	Biscay Cir.	3	7	3	0	13	0	2	0	1	3
	Danube St.	3	9	2	0	14	2	8	1	0	11
	Gibraltar Wy.	0	5	0	1	6	0	4	0	0	4
	Orchard Rd/Himalaya St	6	11	8	4	29	3	7	2	0	12
	20250 Smoky Hill Rd	1	4	1	0	6	1	1	1	0	3
	Liverpool St/Picadilly St	6	6	8	14	34	1	2	2	6	11

Note: Based on peak hour turning movement counts conducted between July and September 2018.

APPENDIX C: TRAFFIC ANALYSIS SYNCHRO OUTPUT

Lanes, Volumes, Timings
15: 06/17/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	130		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	1863	3539	0	1863	3539	0	1863	1863	0	1863	1863	0
Flt Permitted												
Satd. Flow (perm)	1863	3539	0	1863	3539	0	1863	1863	0	1863	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		540			832			204			217	
Travel Time (s)		9.2			14.2			4.6			4.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt			pm+pt			Perm			Perm		



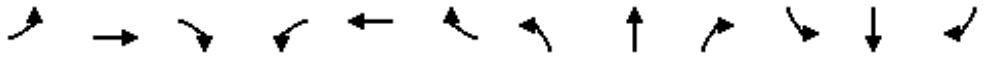
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	8.0	20.0		8.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	8.0	20.0		8.0	20.0		20.0	20.0		20.0	20.0	
Total Split (%)	16.7%	41.7%		16.7%	41.7%		41.7%	41.7%		41.7%	41.7%	
Maximum Green (s)	4.0	16.0		4.0	16.0		16.0	16.0		16.0	16.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)												
Actuated g/C Ratio												
v/c Ratio												
Control Delay												
Queue Delay												
Total Delay												
LOS												
Approach Delay												
Approach LOS												
Queue Length 50th (ft)												
Queue Length 95th (ft)												
Internal Link Dist (ft)		460			752			124			137	
Turn Bay Length (ft)												
Base Capacity (vph)												
Starvation Cap Reductn												
Spillback Cap Reductn												
Storage Cap Reductn												
Reduced v/c Ratio												

Intersection Summary	
Area Type:	Other
Cycle Length: 48	
Actuated Cycle Length: 48	
Offset: 28 (58%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.00	

Intersection Signal Delay: 0.0	Intersection LOS: A
Intersection Capacity Utilization 0.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 15:

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	498	196	160	639	13	291	105	42	78	380	82
Future Volume (vph)	54	498	196	160	639	13	291	105	42	78	380	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	345		0	250		310	275		310	285		105
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00			1.00		
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.299			0.339			0.950			0.950		
Satd. Flow (perm)	1078	3539	1556	1222	3539	1556	3422	3539	1583	1762	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			228			114			114			114
Link Speed (mph)		40			40			40			35	
Link Distance (ft)		1063			1494			537			674	
Travel Time (s)		18.1			25.5			9.2			13.1	
Confl. Peds. (#/hr)	5		5	5		5	6			5		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	63	579	228	186	743	15	338	122	49	91	442	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	579	228	186	743	15	338	122	49	91	442	95
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36	36	36	36	36
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Size(ft)	40	5	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2			4			8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8

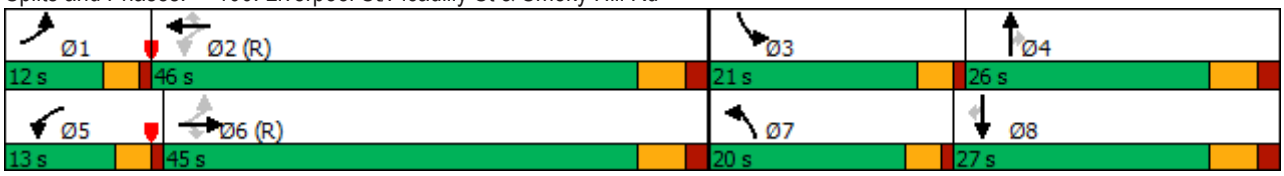


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	3.0	25.0	25.0	3.0	25.0	25.0	3.0	5.0	5.0	3.0	5.0	5.0
Minimum Split (s)	7.0	34.0	34.0	7.0	37.0	37.0	7.0	39.0	39.0	7.0	39.0	39.0
Total Split (s)	12.0	45.0	45.0	13.0	46.0	46.0	20.0	26.0	26.0	21.0	27.0	27.0
Total Split (%)	11.4%	42.9%	42.9%	12.4%	43.8%	43.8%	19.0%	24.8%	24.8%	20.0%	25.7%	25.7%
Maximum Green (s)	8.0	39.0	39.0	9.0	40.0	40.0	16.0	20.0	20.0	17.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		23.0	23.0		26.0	26.0		28.0	28.0		28.0	28.0
Pedestrian Calls (#/hr)		5	5		5	5		5	5		6	6
Act Effct Green (s)	50.0	42.5	42.5	54.4	46.2	46.2	14.1	27.1	27.1	9.9	21.0	21.0
Actuated g/C Ratio	0.48	0.40	0.40	0.52	0.44	0.44	0.13	0.26	0.26	0.09	0.20	0.20
v/c Ratio	0.10	0.40	0.30	0.24	0.48	0.02	0.74	0.13	0.10	0.55	0.63	0.23
Control Delay	7.6	17.3	4.3	13.3	23.2	0.1	53.6	31.9	0.4	56.9	42.9	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	17.3	4.3	13.3	23.2	0.1	53.6	31.9	0.4	56.9	42.9	6.1
LOS	A	B	A	B	C	A	D	C	A	E	D	A
Approach Delay		13.2			20.9			43.3			39.4	
Approach LOS		B			C			D			D	
Queue Length 50th (ft)	8	172	0	30	189	0	113	33	0	59	144	0
Queue Length 95th (ft)	6	111	29	47	240	0	151	57	0	102	187	27
Internal Link Dist (ft)		983			1414			457			594	
Turn Bay Length (ft)	345			250		310	275		310	285		105
Base Capacity (vph)	718	1433	766	833	1555	748	523	913	493	286	707	407
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.40	0.30	0.22	0.48	0.02	0.65	0.13	0.10	0.32	0.63	0.23

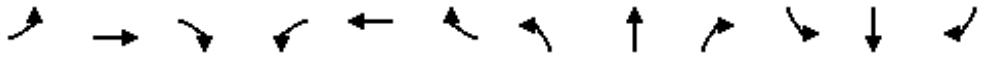
Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 105			
Offset: 8 (8%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 26.4		Intersection LOS: C	
Intersection Capacity Utilization 64.6%		ICU Level of Service C	
Analysis Period (min) 15			

Description: Centennial

Splits and Phases: 100: Liverpool St/Picadilly St & Smoky Hill Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	766	32	15	1447	20	80	21	49	40	21	81
Future Volume (vph)	43	766	32	15	1447	20	80	21	49	40	21	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		245	210		230	0		0	0		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97	1.00		0.97	1.00				0.99	
Frt			0.850			0.850		0.895			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1667	0	1770	1619	0
Flt Permitted	0.084			0.298			0.590			0.703		
Satd. Flow (perm)	156	3539	1536	554	3539	1536	1095	1667	0	1310	1619	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			73		58			96	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		348			2613			684			552	
Travel Time (s)		5.9			44.5			15.5			15.1	
Confl. Peds. (#/hr)	5		5	5		5	5					5
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	51	912	38	18	1723	24	95	25	58	48	25	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	912	38	18	1723	24	95	83	0	48	121	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36		36	36	
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4		-4	-4	
Detector 1 Size(ft)	40	5	20	40	5	20	40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	31.0	31.0	10.0	31.0	31.0	37.0	37.0		37.0	37.0	
Total Split (s)	12.0	68.0	68.0	12.0	68.0	68.0	25.0	25.0		25.0	25.0	
Total Split (%)	11.4%	64.8%	64.8%	11.4%	64.8%	64.8%	23.8%	23.8%		23.8%	23.8%	
Maximum Green (s)	7.0	63.0	63.0	7.0	63.0	63.0	20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		21.0	21.0		21.0	21.0	27.0	27.0		27.0	27.0	
Pedestrian Calls (#/hr)		5	5		5	5	0	0		5	5	
Act Effct Green (s)	80.6	78.4	78.4	78.2	74.2	74.2	12.6	12.6		12.6	12.6	
Actuated g/C Ratio	0.77	0.75	0.75	0.74	0.71	0.71	0.12	0.12		0.12	0.12	
v/c Ratio	0.26	0.35	0.03	0.04	0.69	0.02	0.73	0.33		0.31	0.43	
Control Delay	6.7	6.3	0.5	1.9	4.9	0.0	72.4	19.3		45.0	17.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.7	6.3	0.5	1.9	4.9	0.0	72.4	19.3		45.0	17.1	
LOS	A	A	A	A	A	A	E	B		D	B	
Approach Delay		6.1			4.8			47.6			25.0	
Approach LOS		A			A			D			C	
Queue Length 50th (ft)	6	73	0	1	83	0	63	15		30	15	
Queue Length 95th (ft)	18	175	2	m2	107	m0	102	50		57	55	
Internal Link Dist (ft)		268			2533			604			472	
Turn Bay Length (ft)	245		245	210		230						
Base Capacity (vph)	228	2641	1165	502	2499	1106	208	364		249	386	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.22	0.35	0.03	0.04	0.69	0.02	0.46	0.23		0.19	0.31	

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 105			
Offset: 100 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 59.9%		ICU Level of Service B	
Analysis Period (min) 15			

Description: Centennial

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Telluride St & Smoky Hill Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	59	75	144	48	185	25	475	78	45	555	10
Future Volume (vph)	24	59	75	144	48	185	25	475	78	45	555	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	125		0	95		0	165		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.916			0.881			0.979			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1706	0	1770	1641	0	1770	3465	0	1770	3529	0
Flt Permitted	0.277			0.535			0.376			0.365		
Satd. Flow (perm)	516	1706	0	997	1641	0	700	3465	0	680	3529	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			159			24			2	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		906			666			2512			3589	
Travel Time (s)		20.6			15.1			42.8			61.2	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	29	71	90	173	58	223	30	572	94	54	669	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	161	0	173	281	0	30	666	0	54	681	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	0		1	0	
Detector Template												
Leading Detector (ft)	36	36		36	36		36	0		36	0	
Trailing Detector (ft)	-4	-4		-4	-4		-4	0		-4	0	
Detector 1 Position(ft)	-4	-4		-4	-4		-4	0		-4	0	
Detector 1 Size(ft)	40	40		40	40		40	5		40	5	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		3.0	25.0		3.0	25.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	32.0	32.0		32.0	32.0		7.0	31.0		7.0	31.0	
Total Split (s)	38.0	38.0		38.0	38.0		12.0	70.0		12.0	70.0	
Total Split (%)	31.7%	31.7%		31.7%	31.7%		10.0%	58.3%		10.0%	58.3%	
Maximum Green (s)	33.0	33.0		33.0	33.0		8.0	64.0		8.0	64.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		4.0	6.0		4.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Flash Dont Walk (s)	22.0	22.0		22.0	22.0			20.0			15.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	24.1	24.1		24.1	24.1		83.2	76.1		84.9	78.5	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.69	0.63		0.71	0.65	
v/c Ratio	0.28	0.42		0.86	0.62		0.06	0.30		0.10	0.29	
Control Delay	44.8	29.6		81.7	23.3		6.5	11.5		6.6	11.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	44.8	29.6		81.7	23.3		6.5	11.5		6.6	11.0	
LOS	D	C		F	C		A	B		A	B	
Approach Delay		32.0			45.6			11.3			10.7	
Approach LOS		C			D			B			B	
Queue Length 50th (ft)	19	73		130	84		6	115		11	121	
Queue Length 95th (ft)	42	112		180	135		17	167		27	173	
Internal Link Dist (ft)		826			586			2432			3509	
Turn Bay Length (ft)	125			125			95			165		
Base Capacity (vph)	141	506		274	566		564	2206		556	2309	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.21	0.32		0.63	0.50		0.05	0.30		0.10	0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 11 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 20.4		Intersection LOS: C	
Intersection Capacity Utilization 58.9%		ICU Level of Service B	
Analysis Period (min) 15			
Description: Centennial			

Splits and Phases: 105: Himalaya St & Crestline Cir

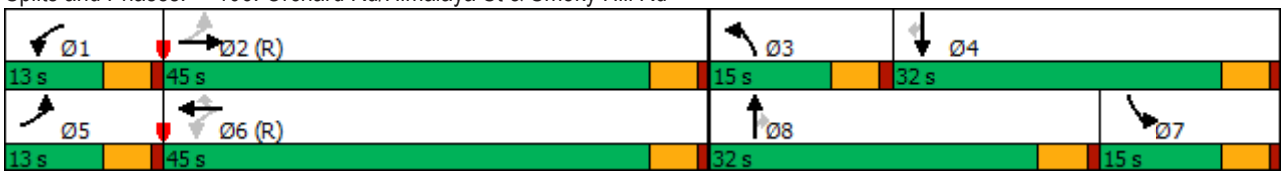
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	458	29	100	734	178	35	102	51	183	346	66
Future Volume (vph)	40	458	29	100	734	178	35	102	51	183	346	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	310		360	155		155	250		225
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00		0.98	1.00		0.98	0.99		0.98
Frt		0.991				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3504	0	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.267			0.388			0.950			0.950		
Satd. Flow (perm)	497	3504	0	1398	3539	1557	3418	3539	1557	3411	3539	1557
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				209			125			125
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		743			778			876			380	
Travel Time (s)		12.7			13.3			14.9			6.5	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	47	539	34	118	864	209	41	120	60	215	407	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	573	0	118	864	209	41	120	60	215	407	78
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0	1	1	1	0	1	1	0
Detector Template						Right						
Leading Detector (ft)	36	0		36	0	20	36	36	0	36	36	0
Trailing Detector (ft)	-4	0		-4	0	0	-4	-4	0	-4	-4	0
Detector 1 Position(ft)	-4	0		-4	0	0	-4	-4	0	-4	-4	0
Detector 1 Size(ft)	40	40		40	40	20	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6			8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	40.0		10.0	40.0	40.0	10.0	40.0	40.0	10.0	40.0	40.0
Total Split (s)	13.0	45.0		13.0	45.0	45.0	15.0	32.0	32.0	15.0	32.0	32.0
Total Split (%)	12.4%	42.9%		12.4%	42.9%	42.9%	14.3%	30.5%	30.5%	14.3%	30.5%	30.5%
Maximum Green (s)	8.0	40.0		8.0	40.0	40.0	10.0	27.0	27.0	10.0	27.0	27.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.5
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		30.0			30.0	30.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		5			5	5		5	5		5	5
Act Effct Green (s)	62.8	57.2		64.0	59.4	59.4	5.6	11.0	11.0	11.1	20.5	20.5
Actuated g/C Ratio	0.60	0.54		0.61	0.57	0.57	0.05	0.10	0.10	0.11	0.20	0.20
v/c Ratio	0.13	0.30		0.12	0.43	0.22	0.23	0.32	0.22	0.59	0.59	0.19
Control Delay	6.2	9.5		9.7	15.1	4.0	50.4	43.7	1.8	51.6	41.7	2.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	9.5		9.7	15.1	4.0	50.4	43.7	1.8	51.6	41.7	2.4
LOS	A	A		A	B	A	D	D	A	D	D	A
Approach Delay		9.2			12.6			33.6			40.3	
Approach LOS		A			B			C			D	
Queue Length 50th (ft)	2	43		13	110	14	13	41	0	70	139	0
Queue Length 95th (ft)	22	247		21	286	32	29	53	0	105	150	7
Internal Link Dist (ft)		663			698			796			300	
Turn Bay Length (ft)	250			310		360	155		155	250		225
Base Capacity (vph)	405	1912		1030	2000	971	326	910	493	386	932	502
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.30		0.11	0.43	0.22	0.13	0.13	0.12	0.56	0.44	0.16

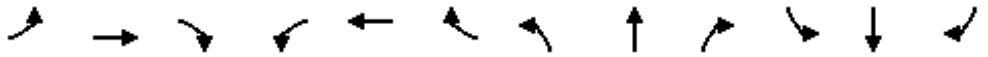
Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 105			
Offset: 67 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 20.6		Intersection LOS: C	
Intersection Capacity Utilization 63.0%		ICU Level of Service B	
Analysis Period (min) 15			

Description: Centennial

Splits and Phases: 106: Orchard Rd/Himalaya St & Smoky Hill Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	647	36	117	1109	21	77	69	51	56	250	304
Future Volume (vph)	96	647	36	117	1109	21	77	69	51	56	250	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		245	165		590	185		245	130		0
Storage Lanes	1		1	1		1	1		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00
Ped Bike Factor						0.98	1.00		0.98	0.99		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	3433	1863	1583
Flt Permitted	0.093			0.276			0.950			0.950		
Satd. Flow (perm)	173	3539	1583	514	3539	1556	1763	3539	1557	3410	1863	1556
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			125			125			125			201
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		371			1420			827			379	
Travel Time (s)		6.3			24.2			16.1			8.6	
Confl. Peds. (#/hr)	5					5	5		5	5		5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	113	761	42	138	1305	25	91	81	60	66	294	358
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	761	42	138	1305	25	91	81	60	66	294	358
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36	36	36	36	36
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Size(ft)	40	5	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4



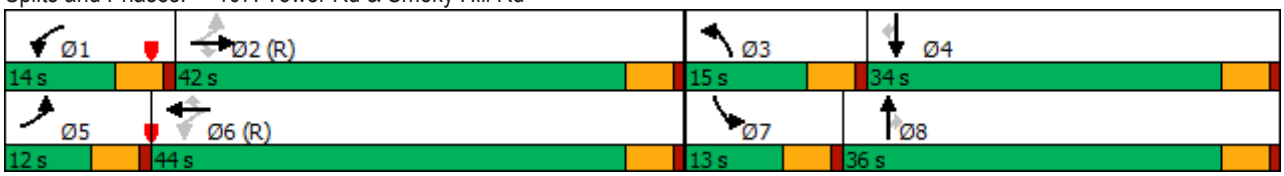
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	33.0	33.0	10.0	36.0	36.0	10.0	40.0	40.0	10.0	35.0	35.0
Total Split (s)	12.0	42.0	42.0	14.0	44.0	44.0	15.0	36.0	36.0	13.0	34.0	34.0
Total Split (%)	11.4%	40.0%	40.0%	13.3%	41.9%	41.9%	14.3%	34.3%	34.3%	12.4%	32.4%	32.4%
Maximum Green (s)	7.0	37.0	37.0	9.0	39.0	39.0	10.0	31.0	31.0	8.0	29.0	29.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.5
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		23.0	23.0		26.0	26.0		30.0	30.0		25.0	25.0
Pedestrian Calls (#/hr)		0	0		5	5		5	5		5	5
Act Effct Green (s)	56.6	50.2	50.2	58.8	51.3	51.3	8.5	23.1	23.1	6.2	20.9	20.9
Actuated g/C Ratio	0.54	0.48	0.48	0.56	0.49	0.49	0.08	0.22	0.22	0.06	0.20	0.20
v/c Ratio	0.59	0.45	0.05	0.37	0.75	0.03	0.64	0.10	0.14	0.33	0.79	0.76
Control Delay	30.8	18.2	1.4	10.9	21.9	0.0	66.8	30.6	0.6	51.4	55.2	27.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	18.2	1.4	10.9	21.9	0.0	66.8	30.6	0.6	51.4	55.2	27.3
LOS	C	B	A	B	C	A	E	C	A	D	E	C
Approach Delay		19.0			20.5			37.0			41.0	
Approach LOS		B			C			D			D	
Queue Length 50th (ft)	36	193	0	28	397	0	60	22	0	22	190	100
Queue Length 95th (ft)	#65	270	9	46	#554	0	106	36	0	41	240	166
Internal Link Dist (ft)		291			1340			747			299	
Turn Bay Length (ft)	200		245	165		590	185		245	130		
Base Capacity (vph)	200	1692	822	403	1729	824	168	1045	547	261	514	575
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.45	0.05	0.34	0.75	0.03	0.54	0.08	0.11	0.25	0.57	0.62

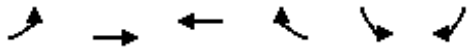
Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 105			
Offset: 58 (55%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 25.7		Intersection LOS: C	
Intersection Capacity Utilization 71.9%		ICU Level of Service C	
Analysis Period (min) 15			

Description: Centennial

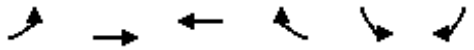
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 107: Tower Rd & Smoky Hill Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	45	455	623	77	68	50
Future Volume (vph)	45	455	623	77	68	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	75	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00			
Frt			0.983			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3466	0	1770	1583
Flt Permitted	0.322				0.950	
Satd. Flow (perm)	598	3539	3466	0	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			22			56
Link Speed (mph)		40	40		30	
Link Distance (ft)		694	743		699	
Travel Time (s)		11.8	12.7		15.9	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	50	506	692	86	76	56
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	506	778	0	76	56
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	0	0		1	1
Detector Template						
Leading Detector (ft)	36	0	0		36	36
Trailing Detector (ft)	-4	0	0		-4	-4
Detector 1 Position(ft)	-4	0	0		-4	-4
Detector 1 Size(ft)	40	40	40		40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Detector Phase	5	2	6		4	4

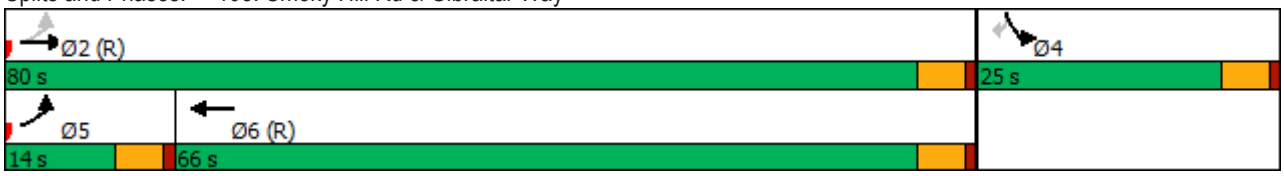


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0		5.0	5.0
Minimum Split (s)	10.0	25.0	25.0		35.0	35.0
Total Split (s)	14.0	80.0	66.0		25.0	25.0
Total Split (%)	13.3%	76.2%	62.9%		23.8%	23.8%
Maximum Green (s)	9.0	75.0	61.0		20.0	20.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Recall Mode	None	C-Max	C-Max		None	None
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		15.0	15.0		25.0	25.0
Pedestrian Calls (#/hr)		0	5		0	0
Act Effct Green (s)	88.0	89.0	80.7		9.0	9.0
Actuated g/C Ratio	0.84	0.85	0.77		0.09	0.09
v/c Ratio	0.09	0.17	0.29		0.50	0.30
Control Delay	2.6	3.8	0.6		56.6	16.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	2.6	3.8	0.6		56.6	16.0
LOS	A	A	A		E	B
Approach Delay		3.7	0.6		39.4	
Approach LOS		A	A		D	
Queue Length 50th (ft)	9	90	3		50	0
Queue Length 95th (ft)	4	21	10		94	37
Internal Link Dist (ft)		614	663		619	
Turn Bay Length (ft)	200				75	
Base Capacity (vph)	601	3001	2670		337	346
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.08	0.17	0.29		0.23	0.16

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 105			
Offset: 52 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 5.2		Intersection LOS: A	
Intersection Capacity Utilization 40.6%		ICU Level of Service A	
Analysis Period (min) 15			

Description: Centennial

Splits and Phases: 108: Smoky Hill Rd & Gibraltar Way



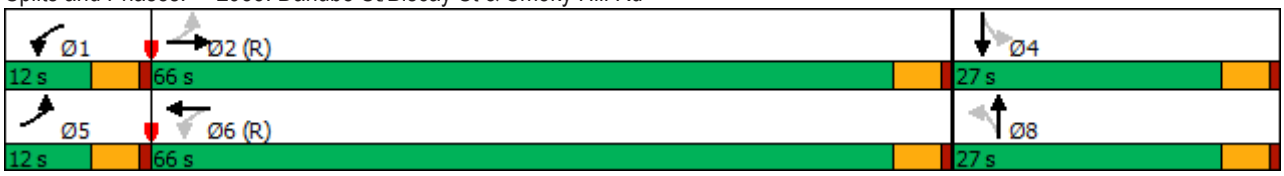
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	493	10	16	742	10	40	0	41	10	10	14
Future Volume (vph)	10	493	10	16	742	10	40	0	41	10	10	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	275		0	170		0	120		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt		0.997			0.998			0.850			0.913	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3529	0	1770	3531	0	1770	1583	0	1770	1701	0
Flt Permitted	0.335			0.440			0.740			0.728		
Satd. Flow (perm)	622	3529	0	820	3531	0	1378	1583	0	1356	1701	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			2			404			15	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		1349			1462			497			409	
Travel Time (s)		23.0			24.9			11.3			11.2	
Confl. Peds. (#/hr)	5					5						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	11	542	11	18	815	11	44	0	45	11	11	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	553	0	18	826	0	44	45	0	11	26	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0		36	0		36	36		36	36	
Trailing Detector (ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Size(ft)	40	40		40	40		40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	25.0		10.0	25.0		36.0	36.0		36.0	36.0	
Total Split (s)	12.0	66.0		12.0	66.0		27.0	27.0		27.0	27.0	
Total Split (%)	11.4%	62.9%		11.4%	62.9%		25.7%	25.7%		25.7%	25.7%	
Maximum Green (s)	7.0	61.0		7.0	61.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0		1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		15.0			15.0		26.0	26.0		26.0	26.0	
Pedestrian Calls (#/hr)		0			5		0	0		0	0	
Act Effct Green (s)	87.3	86.3		88.3	88.3		7.7	7.7		7.7	7.7	
Actuated g/C Ratio	0.83	0.82		0.84	0.84		0.07	0.07		0.07	0.07	
v/c Ratio	0.02	0.19		0.02	0.28		0.44	0.09		0.11	0.19	
Control Delay	0.2	0.4		0.8	0.9		59.3	0.4		46.3	30.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	0.2	0.4		0.8	0.9		59.3	0.4		46.3	30.0	
LOS	A	A		A	A		E	A		D	C	
Approach Delay		0.4			0.9			29.5			34.8	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)	0	1		0	7		29	0		7	7	
Queue Length 95th (ft)	1	5		2	28		64	0		25	33	
Internal Link Dist (ft)		1269			1382			417			329	
Turn Bay Length (ft)	250			275			170			120		
Base Capacity (vph)	598	2901		756	2970		288	651		284	368	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.19		0.02	0.28		0.15	0.07		0.04	0.07	

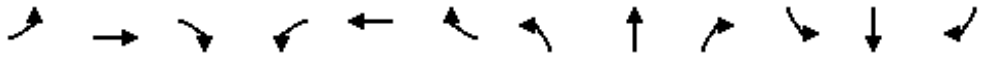
Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 105			
Offset: 4 (4%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 3.2		Intersection LOS: A	
Intersection Capacity Utilization 38.1%		ICU Level of Service A	
Analysis Period (min) 15			

Description: Centennial

Splits and Phases: 2933: Danube St/Biscay St & Smoky Hill Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	683	22	11	1045	13	10	0	10	10	0	10
Future Volume (vph)	10	683	22	11	1045	13	10	0	10	10	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		220	380		235	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.97	1.00		0.97						
Frt			0.850			0.850		0.932			0.932	
Flt Protected	0.950			0.950				0.976			0.976	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1694	0	0	1694	0
Flt Permitted	0.226			0.358								
Satd. Flow (perm)	420	3539	1529	664	3539	1529	0	1736	0	0	1736	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			73		73			73	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		328			1216			454			326	
Travel Time (s)		5.6			20.7			10.3			7.4	
Confl. Peds. (#/hr)	5		5	5		5						
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	776	25	13	1188	15	11	0	11	11	0	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	776	25	13	1188	15	0	22	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	36	0	0	36	0	0	20	36		20	36	
Trailing Detector (ft)	-4	0	0	-4	0	0	0	-4		0	-4	
Detector 1 Position(ft)	-4	0	0	-4	0	0	0	-4		0	-4	
Detector 1 Size(ft)	40	40	40	40	40	40	20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	



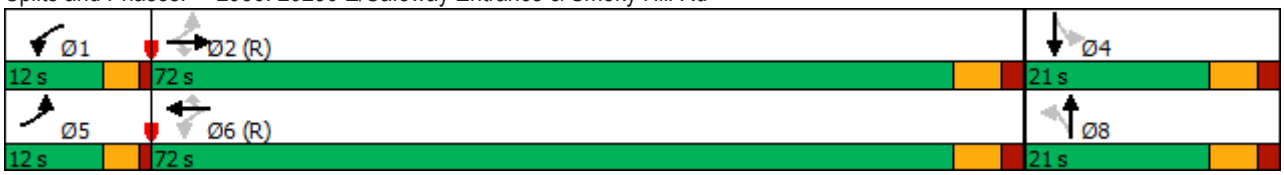
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	3.0	18.0	18.0	3.0	18.0	18.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	20.0	24.0	24.0	7.0	24.0	24.0	40.0	40.0		40.0	40.0	
Total Split (s)	12.0	72.0	72.0	12.0	72.0	72.0	21.0	21.0		21.0	21.0	
Total Split (%)	11.4%	68.6%	68.6%	11.4%	68.6%	68.6%	20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	8.0	66.0	66.0	8.0	66.0	66.0	15.0	15.0		15.0	15.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		6.0			6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		13.0	13.0		13.0	13.0	29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)		5	5		5	5	0	0		0	0	
Act Effct Green (s)	95.8	96.4	96.4	95.8	96.4	96.4		5.0			5.0	
Actuated g/C Ratio	0.91	0.92	0.92	0.91	0.92	0.92		0.05			0.05	
v/c Ratio	0.02	0.24	0.02	0.02	0.37	0.01		0.14			0.14	
Control Delay	0.7	0.8	0.0	0.2	0.6	0.0		2.0			2.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	0.7	0.8	0.0	0.2	0.6	0.0		2.0			2.0	
LOS	A	A	A	A	A	A		A			A	
Approach Delay		0.7			0.6			2.0			2.0	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	0	0	0	0	2	0		0			0	
Queue Length 95th (ft)	m0	9	m0	m0	21	m0		0			0	
Internal Link Dist (ft)		248			1136			374			246	
Turn Bay Length (ft)	220		220	380		235						
Base Capacity (vph)	488	3250	1410	693	3250	1410		310			310	
Starvation Cap Reductn	0	0	0	0	0	0		0			0	
Spillback Cap Reductn	0	0	0	0	0	0		0			0	
Storage Cap Reductn	0	0	0	0	0	0		0			0	
Reduced v/c Ratio	0.02	0.24	0.02	0.02	0.37	0.01		0.07			0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 105			
Offset: 47 (45%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 0.7		Intersection LOS: A	
Intersection Capacity Utilization 43.1%		ICU Level of Service A	
Analysis Period (min) 15			

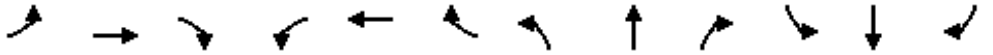
Description: Centennial

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2936: 20250 E/Safeway Entrance & Smoky Hill Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	513	11	10	803	13	18	0	10	10	0	136
Future Volume (vph)	15	513	11	10	803	13	18	0	10	10	0	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	130		0	85		0	95		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		0.99	1.00							
Frt		0.997			0.998			0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3526	0	1770	3530	0	1770	1583	0	1770	1583	0
Flt Permitted	0.294			0.430			0.597			0.750		
Satd. Flow (perm)	546	3526	0	797	3530	0	1112	1583	0	1397	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			3			403			254	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		1420			1349			312			596	
Travel Time (s)		24.2			23.0			7.1			16.3	
Confl. Peds. (#/hr)	5		5	5		5						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	17	576	12	11	902	15	20	0	11	11	0	153
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	588	0	11	917	0	20	11	0	11	153	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0		36	0		36	36		36	36	
Trailing Detector (ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Size(ft)	40	40		40	40		40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	25.0		10.0	25.0		35.0	35.0		35.0	35.0	
Total Split (s)	12.0	72.0		12.0	72.0		21.0	21.0		21.0	21.0	
Total Split (%)	11.4%	68.6%		11.4%	68.6%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	7.0	67.0		7.0	67.0		16.0	16.0		16.0	16.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0		1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		15.0			15.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)		5			5		0	0		0	0	
Act Effct Green (s)	87.3	86.3		86.3	84.3		6.7	6.7		6.7	6.7	
Actuated g/C Ratio	0.83	0.82		0.82	0.80		0.06	0.06		0.06	0.06	
v/c Ratio	0.03	0.20		0.02	0.32		0.28	0.02		0.12	0.45	
Control Delay	1.4	1.9		1.0	3.4		55.9	0.1		48.0	4.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	1.4	1.9		1.0	3.4		55.9	0.1		48.0	4.3	
LOS	A	A		A	A		E	A		D	A	
Approach Delay		1.9			3.4			36.1			7.2	
Approach LOS		A			A			D			A	
Queue Length 50th (ft)	1	19		1	13		13	0		7	0	
Queue Length 95th (ft)	m2	46		3	59		37	0		24	0	
Internal Link Dist (ft)		1340			1269			232			516	
Turn Bay Length (ft)	260			130			85			95		
Base Capacity (vph)	537	2897		725	2833		169	582		212	456	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.03	0.20		0.02	0.32		0.12	0.02		0.05	0.34	

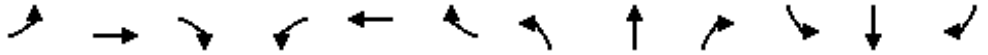
Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 105			
Offset: 44 (42%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 3.8		Intersection LOS: A	
Intersection Capacity Utilization 45.9%		ICU Level of Service A	
Analysis Period (min) 15			

Description: Centennial

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3118: Biscay Cir & Smoky Hill Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	686	148	140	1050	149	157	496	29	150	1114	59
Future Volume (vph)	74	686	148	140	1050	149	157	496	29	150	1114	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	155		725	350		0	195		0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.97	0.95	0.95
Ped Bike Factor	1.00		0.98	1.00	1.00			1.00		1.00		
Frt			0.850		0.981			0.992			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	4977	0	1770	3507	0	3433	3511	0
Flt Permitted	0.950			0.170			0.075			0.950		
Satd. Flow (perm)	1768	3539	1552	316	4977	0	140	3507	0	3419	3511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			162		21			5			4	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1800			2494			1189			1206	
Travel Time (s)		30.7			42.5			20.3			20.6	
Confl. Peds. (#/hr)	5		6	6		5			5	5		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	84	780	168	159	1193	169	178	564	33	170	1266	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	780	168	159	1362	0	178	597	0	170	1333	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1		1	1		1	1	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	30	20	20	30		20	30		20	30	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	30	20	20	30		20	30		20	30	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Prot	NA	Perm	D.P+P	NA		D.P+P	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	2			4					
Detector Phase	5	2	2	1	6		3	8		7	4	



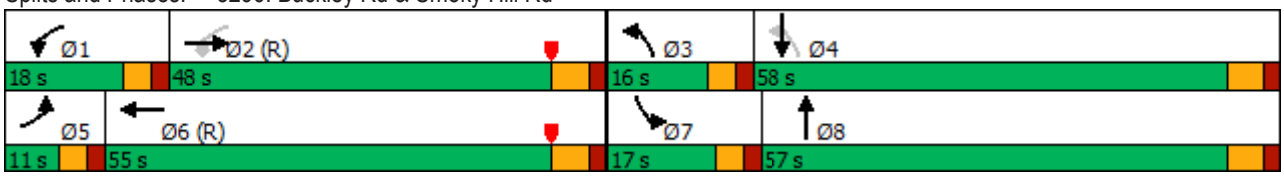
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	6.0	11.0	11.0	6.0	11.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.0	39.0	39.0	11.0	39.0		11.0	43.0		11.0	43.0	
Total Split (s)	11.0	48.0	48.0	18.0	55.0		16.0	57.0		17.0	58.0	
Total Split (%)	7.9%	34.3%	34.3%	12.9%	39.3%		11.4%	40.7%		12.1%	41.4%	
Maximum Green (s)	6.0	42.0	42.0	13.0	49.0		11.0	51.0		12.0	52.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-2.0	2.0	-1.0	-2.0		-1.0	-2.0		-1.0	-2.0	
Total Lost Time (s)	4.0	4.0	8.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.0	3.0	1.5	3.0		1.5	2.0		1.5	2.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	
Walk Time (s)		6.0	6.0		6.0			6.0			6.0	
Flash Dont Walk (s)		27.0	27.0		27.0			31.0			31.0	
Pedestrian Calls (#/hr)		5	5		6			0			0	
Act Effct Green (s)	7.0	46.3	42.3	58.3	51.3		65.7	54.4		11.3	54.0	
Actuated g/C Ratio	0.05	0.33	0.30	0.42	0.37		0.47	0.39		0.08	0.39	
v/c Ratio	0.95	0.67	0.29	0.62	0.74		0.88	0.44		0.61	0.98	
Control Delay	149.0	44.1	7.4	35.1	41.0		72.3	32.7		71.8	63.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	149.0	44.1	7.4	35.1	41.0		72.3	32.7		71.8	63.0	
LOS	F	D	A	D	D		E	C		E	E	
Approach Delay		46.6			40.4			41.8			64.0	
Approach LOS		D			D			D			E	
Queue Length 50th (ft)	78	324	4	87	389		109	207		78	626	
Queue Length 95th (ft)	#183	392	56	134	433		#234	259		114	#758	
Internal Link Dist (ft)		1720			2414			1109			1126	
Turn Bay Length (ft)	225			155			350			195		
Base Capacity (vph)	88	1169	581	280	1835		205	1366		318	1356	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.95	0.67	0.29	0.57	0.74		0.87	0.44		0.53	0.98	

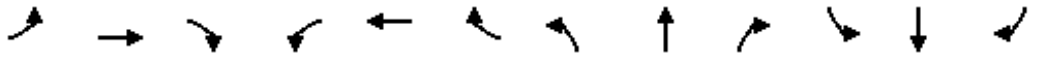
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 94 (67%), Referenced to phase 2:EBWB and 6:WBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 49.3		Intersection LOS: D	
Intersection Capacity Utilization 90.0%		ICU Level of Service E	
Analysis Period (min) 15			

Description: Aurora

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3296: Buckley Rd & Smoky Hill Rd



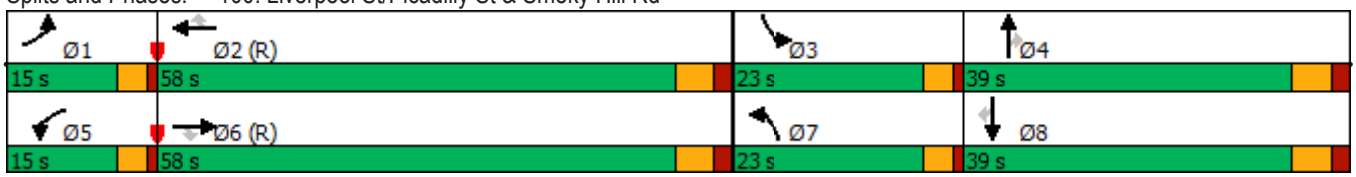


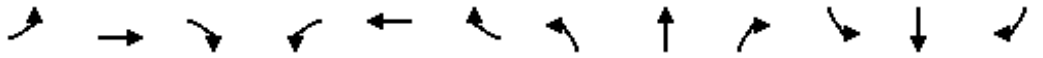
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	984	342	127	1037	91	301	377	137	124	181	79
Future Volume (vph)	89	984	342	127	1037	91	301	377	137	124	181	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	345		0	250		310	275		310	285		105
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	1.00			1.00					
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1553	3427	3539	1583	3417	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			315			97			147			89
Link Speed (mph)		40			40			40			35	
Link Distance (ft)		1063			616			537			674	
Travel Time (s)		18.1			10.5			9.2			13.1	
Confl. Peds. (#/hr)			5	5			5					
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	96	1058	368	137	1115	98	324	405	147	133	195	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	1058	368	137	1115	98	324	405	147	133	195	85
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36	36	36	36	36
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Size(ft)	40	5	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	3.0	25.0	25.0	3.0	25.0	25.0	3.0	5.0	5.0	3.0	5.0	5.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	7.0	34.0	34.0	7.0	37.0	37.0	7.0	39.0	39.0	7.0	39.0	39.0
Total Split (s)	15.0	58.0	58.0	15.0	58.0	58.0	23.0	39.0	39.0	23.0	39.0	39.0
Total Split (%)	11.1%	43.0%	43.0%	11.1%	43.0%	43.0%	17.0%	28.9%	28.9%	17.0%	28.9%	28.9%
Maximum Green (s)	11.0	52.0	52.0	11.0	52.0	52.0	19.0	33.0	33.0	19.0	33.0	33.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		23.0	23.0		26.0	26.0		28.0	28.0		28.0	28.0
Pedestrian Calls (#/hr)		5	5		0	0		0	0		5	5
Act Effct Green (s)	8.3	69.6	69.6	9.5	70.8	70.8	16.6	21.6	21.6	14.3	19.3	19.3
Actuated g/C Ratio	0.06	0.52	0.52	0.07	0.52	0.52	0.12	0.16	0.16	0.11	0.14	0.14
v/c Ratio	0.46	0.58	0.39	0.57	0.60	0.11	0.77	0.72	0.39	0.71	0.39	0.28
Control Delay	67.1	29.7	10.2	70.0	26.3	4.9	69.9	60.5	9.6	78.2	53.1	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.1	29.7	10.2	70.0	26.3	4.9	69.9	60.5	9.6	78.2	53.1	10.1
LOS	E	C	B	E	C	A	E	E	A	E	D	B
Approach Delay		27.3			29.1			55.5			52.3	
Approach LOS		C			C			E			D	
Queue Length 50th (ft)	38	440	73	60	338	0	143	182	0	114	84	0
Queue Length 95th (ft)	66	567	267	95	548	37	193	213	55	180	107	40
Internal Link Dist (ft)		983			536			457			594	
Turn Bay Length (ft)	345			250		310	275		310	285		105
Base Capacity (vph)	279	1825	953	279	1857	876	483	865	498	249	865	454
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.58	0.39	0.49	0.60	0.11	0.67	0.47	0.30	0.53	0.23	0.19

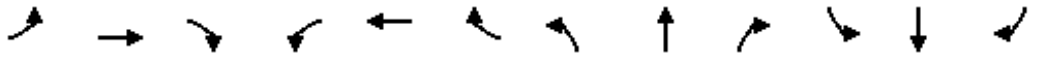
Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 55 (41%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 36.3		Intersection LOS: D	
Intersection Capacity Utilization 66.0%		ICU Level of Service C	
Analysis Period (min) 15			
Description: Centennial			

Splits and Phases: 100: Liverpool St/Picadilly St & Smoky Hill Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	1318	74	35	1119	28	70	33	43	41	13	36
Future Volume (vph)	64	1318	74	35	1119	28	70	33	43	41	13	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		245	210		230	0		0	0		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97				0.99				0.99	
Frt			0.850			0.850		0.915			0.889	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1704	0	1770	1634	0
Flt Permitted	0.215			0.167			0.724			0.683		
Satd. Flow (perm)	400	3539	1532	311	3539	1583	1341	1704	0	1272	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			57		44			37	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		348			2613			684			552	
Travel Time (s)		5.9			44.5			15.5			15.1	
Confl. Peds. (#/hr)			5	5			5					5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	66	1359	76	36	1154	29	72	34	44	42	13	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	1359	76	36	1154	29	72	78	0	42	50	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36		36	36	
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4		-4	-4	
Detector 1 Size(ft)	40	5	20	40	5	20	40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0		5.0	5.0	

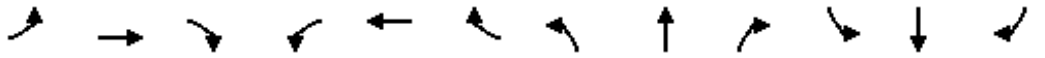


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	31.0	31.0	10.0	31.0	31.0	37.0	37.0		37.0	37.0	
Total Split (s)	15.0	83.0	83.0	15.0	83.0	83.0	37.0	37.0		37.0	37.0	
Total Split (%)	11.1%	61.5%	61.5%	11.1%	61.5%	61.5%	27.4%	27.4%		27.4%	27.4%	
Maximum Green (s)	10.0	78.0	78.0	10.0	78.0	78.0	32.0	32.0		32.0	32.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		21.0	21.0		21.0	21.0	27.0	27.0		27.0	27.0	
Pedestrian Calls (#/hr)		5	5		0	0	5	5		0	0	
Act Effct Green (s)	107.0	102.5	102.5	106.4	102.2	102.2	14.3	14.3		14.3	14.3	
Actuated g/C Ratio	0.79	0.76	0.76	0.79	0.76	0.76	0.11	0.11		0.11	0.11	
v/c Ratio	0.18	0.51	0.06	0.12	0.43	0.02	0.51	0.36		0.31	0.24	
Control Delay	3.8	5.3	1.5	2.1	5.0	0.1	66.4	29.2		57.7	22.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	3.8	5.3	1.5	2.1	5.0	0.1	66.4	29.2		57.7	22.7	
LOS	A	A	A	A	A	A	E	C		E	C	
Approach Delay		5.0			4.8			47.1			38.7	
Approach LOS		A			A			D			D	
Queue Length 50th (ft)	8	114	1	1	315	0	62	28		36	11	
Queue Length 95th (ft)	m16	m188	m4	6	70	0	97	67		63	43	
Internal Link Dist (ft)		268			2533			604			472	
Turn Bay Length (ft)	245		245	210		230						
Base Capacity (vph)	429	2687	1180	362	2679	1212	317	437		301	415	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.15	0.51	0.06	0.10	0.43	0.02	0.23	0.18		0.14	0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 79 (59%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 8.1		Intersection LOS: A	
Intersection Capacity Utilization 64.8%		ICU Level of Service C	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Telluride St & Smoky Hill Rd

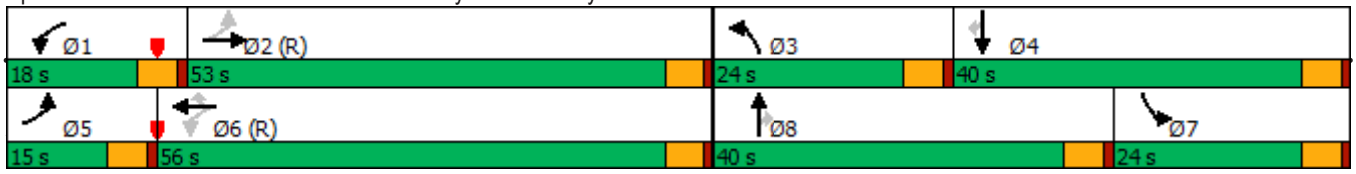


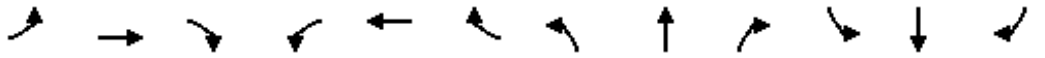
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	953	56	145	935	226	92	377	133	315	215	78
Future Volume (vph)	99	953	56	145	935	226	92	377	133	315	215	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	310		360	155		155	250		225
Storage Lanes	1		0	2		1	1		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98						
Frt		0.992				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3511	0	3433	3539	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.188			0.167			0.950			0.950		
Satd. Flow (perm)	350	3511	0	603	3539	1555	1770	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				248			146			97
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		743			778			859			380	
Travel Time (s)		12.7			13.3			14.6			6.5	
Confl. Peds. (#/hr)	5					5						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	109	1047	62	159	1027	248	101	414	146	346	236	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	1109	0	159	1027	248	101	414	146	346	236	86
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0	1	1	1	0	1	1	0
Detector Template						Right						
Leading Detector (ft)	36	0		36	0	20	36	36	0	36	36	0
Trailing Detector (ft)	-4	0		-4	0	0	-4	-4	0	-4	-4	0
Detector 1 Position(ft)	-4	0		-4	0	0	-4	-4	0	-4	-4	0
Detector 1 Size(ft)	40	40		40	40	20	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6			8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	40.0		10.0	40.0	40.0	10.0	40.0	40.0	10.0	40.0	40.0
Total Split (s)	15.0	53.0		18.0	56.0	56.0	24.0	40.0	40.0	24.0	40.0	40.0
Total Split (%)	11.1%	39.3%		13.3%	41.5%	41.5%	17.8%	29.6%	29.6%	17.8%	29.6%	29.6%
Maximum Green (s)	10.0	48.0		13.0	51.0	51.0	19.0	35.0	35.0	19.0	35.0	35.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.5
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		30.0			30.0	30.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0			5	5		0	0		0	0
Act Effct Green (s)	79.0	71.5		77.7	70.8	70.8	11.7	19.9	19.9	16.8	25.0	25.0
Actuated g/C Ratio	0.59	0.53		0.58	0.52	0.52	0.09	0.15	0.15	0.12	0.19	0.19
v/c Ratio	0.39	0.60		0.32	0.55	0.27	0.66	0.79	0.41	0.81	0.36	0.23
Control Delay	9.6	12.9		11.4	15.7	2.5	79.5	67.0	10.8	72.9	49.2	8.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.6	12.9		11.4	15.7	2.5	79.5	67.0	10.8	72.9	49.2	8.0
LOS	A	B		B	B	A	E	E	B	E	D	A
Approach Delay		12.6			13.0			56.5			56.2	
Approach LOS		B			B			E			E	
Queue Length 50th (ft)	23	197		19	132	16	87	186	0	153	95	0
Queue Length 95th (ft)	44	230		30	166	29	144	235	59	206	134	38
Internal Link Dist (ft)		663			698			779			300	
Turn Bay Length (ft)	250			310		360	155		155	250		225
Base Capacity (vph)	316	1861		642	1856	933	249	917	518	483	917	482
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.60		0.25	0.55	0.27	0.41	0.45	0.28	0.72	0.26	0.18

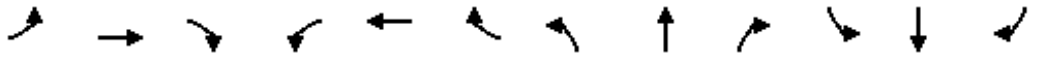
Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 115 (85%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 27.3		Intersection LOS: C	
Intersection Capacity Utilization 70.7%		ICU Level of Service C	
Analysis Period (min) 15			
Description: Centennial			

Splits and Phases: 106: Orchard Rd/Himalaya St & Smoky Hill Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	755	41	106	726	66	60	261	117	166	131	215
Future Volume (vph)	250	755	41	106	726	66	60	261	117	166	131	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		245	165		590	185		245	130		0
Storage Lanes	1		1	1		1	1		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00
Ped Bike Factor	1.00					0.98	0.99		0.98	0.99		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	3433	1863	1583
Flt Permitted	0.273			0.309			0.950			0.950		
Satd. Flow (perm)	508	3539	1583	576	3539	1554	1760	3539	1555	3411	1863	1554
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97			137			137			231
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		371			1420			827			379	
Travel Time (s)		6.3			24.2			16.1			8.6	
Confl. Peds. (#/hr)	5					5	5		5	5		5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	269	812	44	114	781	71	65	281	126	178	141	231
Shared Lane Traffic (%)												
Lane Group Flow (vph)	269	812	44	114	781	71	65	281	126	178	141	231
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36	36	36	36	36
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Size(ft)	40	5	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0

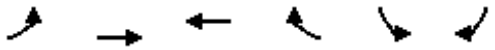


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	33.0	33.0	10.0	36.0	36.0	10.0	40.0	40.0	10.0	35.0	35.0
Total Split (s)	25.0	61.0	61.0	17.0	53.0	53.0	17.0	40.0	40.0	17.0	40.0	40.0
Total Split (%)	18.5%	45.2%	45.2%	12.6%	39.3%	39.3%	12.6%	29.6%	29.6%	12.6%	29.6%	29.6%
Maximum Green (s)	20.0	56.0	56.0	12.0	48.0	48.0	12.0	35.0	35.0	12.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.5
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		23.0	23.0		26.0	26.0		30.0	30.0		25.0	25.0
Pedestrian Calls (#/hr)		0	0		5	5		5	5		5	5
Act Effct Green (s)	90.6	79.2	79.2	81.7	74.3	74.3	8.8	18.0	18.0	10.4	21.6	21.6
Actuated g/C Ratio	0.67	0.59	0.59	0.61	0.55	0.55	0.07	0.13	0.13	0.08	0.16	0.16
v/c Ratio	0.59	0.39	0.05	0.28	0.40	0.08	0.57	0.60	0.39	0.67	0.47	0.52
Control Delay	16.2	8.8	1.0	8.8	21.1	4.0	79.4	59.2	8.9	73.2	56.2	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	8.8	1.0	8.8	21.1	4.0	79.4	59.2	8.9	73.2	56.2	9.7
LOS	B	A	A	A	C	A	E	E	A	E	E	A
Approach Delay		10.3			18.4			48.6			42.2	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	60	114	1	29	268	8	56	127	0	79	119	0
Queue Length 95th (ft)	156	167	m7	40	433	34	105	146	42	118	161	65
Internal Link Dist (ft)		291			1340			747			299	
Turn Bay Length (ft)	200		245	165		590	185		245	130		
Base Capacity (vph)	531	2075	968	474	1946	916	157	917	504	305	483	574
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.39	0.05	0.24	0.40	0.08	0.41	0.31	0.25	0.58	0.29	0.40

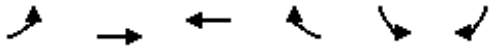
Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 20 (15%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 24.2		Intersection LOS: C	
Intersection Capacity Utilization 71.7%		ICU Level of Service C	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 107: Tower Rd & Smoky Hill Rd



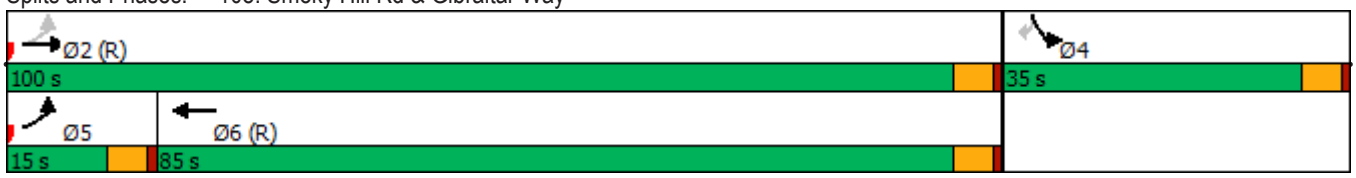
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	74	944	888	174	145	73
Future Volume (vph)	74	944	888	174	145	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	75	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			0.99			0.98
Frt			0.975			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3430	0	1770	1583
Flt Permitted	0.166				0.950	
Satd. Flow (perm)	309	3539	3430	0	1770	1554
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			30			88
Link Speed (mph)		40	40		30	
Link Distance (ft)		694	743		699	
Travel Time (s)		11.8	12.7		15.9	
Confl. Peds. (#/hr)	5			5		5
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	89	1137	1070	210	175	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	89	1137	1280	0	175	88
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	0	0		1	1
Detector Template						
Leading Detector (ft)	36	0	0		36	36
Trailing Detector (ft)	-4	0	0		-4	-4
Detector 1 Position(ft)	-4	0	0		-4	-4
Detector 1 Size(ft)	40	40	40		40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0		5.0	5.0

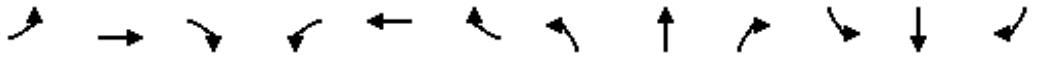


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Split (s)	10.0	25.0	25.0		35.0	35.0
Total Split (s)	15.0	100.0	85.0		35.0	35.0
Total Split (%)	11.1%	74.1%	63.0%		25.9%	25.9%
Maximum Green (s)	10.0	95.0	80.0		30.0	30.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	1.5	2.0	2.0		1.5	1.5
Recall Mode	None	C-Max	C-Max		None	None
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		15.0	15.0		25.0	25.0
Pedestrian Calls (#/hr)		0	5		5	5
Act Effct Green (s)	106.4	106.4	95.6		18.6	18.6
Actuated g/C Ratio	0.79	0.79	0.71		0.14	0.14
v/c Ratio	0.29	0.41	0.53		0.72	0.30
Control Delay	10.0	11.3	3.0		71.2	11.5
Queue Delay	0.0	0.0	0.2		0.0	0.0
Total Delay	10.0	11.3	3.2		71.2	11.5
LOS	A	B	A		E	B
Approach Delay		11.2	3.2		51.2	
Approach LOS		B	A		D	
Queue Length 50th (ft)	22	235	14		151	0
Queue Length 95th (ft)	83	410	32		189	36
Internal Link Dist (ft)		614	663		619	
Turn Bay Length (ft)	200				75	
Base Capacity (vph)	351	2790	2436		393	413
Starvation Cap Reductn	0	0	417		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.25	0.41	0.63		0.45	0.21

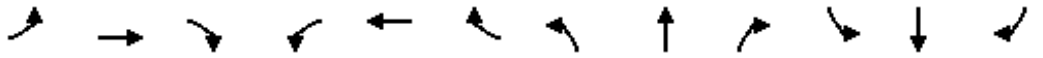
Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 107 (79%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 11.3		Intersection LOS: B	
Intersection Capacity Utilization 57.5%		ICU Level of Service B	
Analysis Period (min) 15			
Description: Centennial			

Splits and Phases: 108: Smoky Hill Rd & Gibraltar Way





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	1162	33	83	966	25	17	10	74	11	10	13
Future Volume (vph)	14	1162	33	83	966	25	17	10	74	11	10	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	275		0	170		0	120		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00							
Frt		0.996			0.996			0.868			0.916	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3521	0	1770	3522	0	1770	1617	0	1770	1706	0
Flt Permitted	0.259			0.184			0.741			0.597		
Satd. Flow (perm)	482	3521	0	343	3522	0	1380	1617	0	1112	1706	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			3			80			14	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		1349			1462			497			409	
Travel Time (s)		23.0			24.9			11.3			11.2	
Confl. Peds. (#/hr)	5		5	5		5						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	1263	36	90	1050	27	18	11	80	12	11	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	1299	0	90	1077	0	18	91	0	12	25	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0		36	0		36	36		36	36	
Trailing Detector (ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Size(ft)	40	40		40	40		40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0		5.0	5.0	

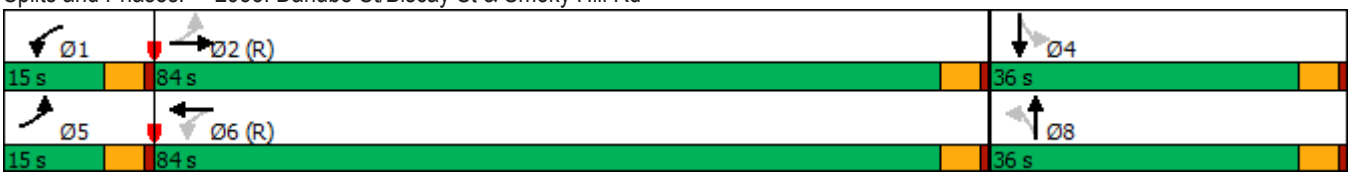


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	25.0		10.0	25.0		36.0	36.0		36.0	36.0	
Total Split (s)	15.0	84.0		15.0	84.0		36.0	36.0		36.0	36.0	
Total Split (%)	11.1%	62.2%		11.1%	62.2%		26.7%	26.7%		26.7%	26.7%	
Maximum Green (s)	10.0	79.0		10.0	79.0		31.0	31.0		31.0	31.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0		1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		15.0			15.0		26.0	26.0		26.0	26.0	
Pedestrian Calls (#/hr)		5			5		0	0		0	0	
Act Effct Green (s)	113.0	108.0		116.5	114.3		6.7	6.7		6.7	6.7	
Actuated g/C Ratio	0.84	0.80		0.86	0.85		0.05	0.05		0.05	0.05	
v/c Ratio	0.03	0.46		0.26	0.36		0.26	0.58		0.22	0.26	
Control Delay	2.9	10.1		1.7	0.5		70.0	31.3		69.5	42.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	2.9	10.1		1.7	0.5		70.0	31.3		69.5	42.4	
LOS	A	B		A	A		E	C		E	D	
Approach Delay		10.0			0.6			37.7			51.2	
Approach LOS		B			A			D			D	
Queue Length 50th (ft)	1	144		1	4		16	10		10	10	
Queue Length 95th (ft)	m8	601		2	11		42	65		32	39	
Internal Link Dist (ft)		1269			1382			417			329	
Turn Bay Length (ft)	250			275			170			120		
Base Capacity (vph)	516	2817		406	2982		316	432		255	402	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.03	0.46		0.22	0.36		0.06	0.21		0.05	0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 40 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 7.6		Intersection LOS: A	
Intersection Capacity Utilization 57.9%		ICU Level of Service B	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2933: Danube St/Biscay St & Smoky Hill Rd



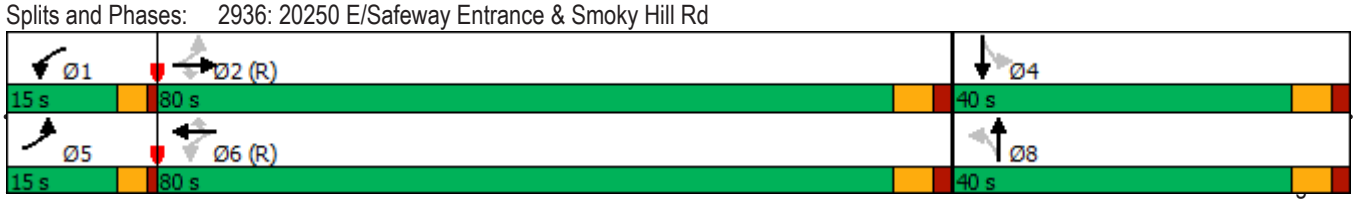
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	1344	19	16	1290	77	28	10	10	71	10	32
Future Volume (vph)	39	1344	19	16	1290	77	28	10	10	71	10	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		220	380		235	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.971			0.962	
Flt Protected	0.950			0.950				0.972			0.970	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1758	0	0	1738	0
Flt Permitted	0.162			0.161				0.757			0.817	
Satd. Flow (perm)	302	3539	1583	300	3539	1583	0	1369	0	0	1464	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			57			70		10			14	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		328			1216			454			326	
Travel Time (s)		5.6			20.7			10.3			7.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	1415	20	17	1358	81	29	11	11	75	11	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	1415	20	17	1358	81	0	51	0	0	120	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	36	0	0	36	0	0	20	36		20	36	
Trailing Detector (ft)	-4	0	0	-4	0	0	0	-4		0	-4	
Detector 1 Position(ft)	-4	0	0	-4	0	0	0	-4		0	-4	
Detector 1 Size(ft)	40	40	40	40	40	40	20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	18.0	18.0	3.0	18.0	18.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	7.0	24.0	24.0	7.0	24.0	24.0	40.0	40.0		40.0	40.0	
Total Split (s)	15.0	80.0	80.0	15.0	80.0	80.0	40.0	40.0		40.0	40.0	

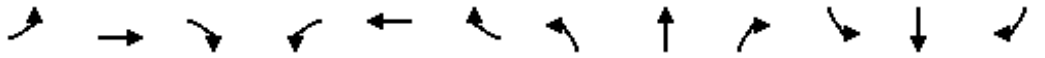
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	11.1%	59.3%	59.3%	11.1%	59.3%	59.3%	29.6%	29.6%		29.6%	29.6%	
Maximum Green (s)	11.0	74.0	74.0	11.0	74.0	74.0	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		6.0			6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		13.0	13.0		13.0	13.0	29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	108.8	104.5	104.5	106.6	100.7	100.7		14.8			14.8	
Actuated g/C Ratio	0.81	0.77	0.77	0.79	0.75	0.75		0.11			0.11	
v/c Ratio	0.14	0.52	0.02	0.06	0.51	0.07		0.32			0.69	
Control Delay	1.5	2.4	0.1	0.6	4.3	0.4		49.1			70.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	1.5	2.4	0.1	0.6	4.3	0.4		49.1			70.6	
LOS	A	A	A	A	A	A		D			E	
Approach Delay		2.3			4.1			49.1			70.6	
Approach LOS		A			A			D			E	
Queue Length 50th (ft)	1	16	0	0	361	4		34			91	
Queue Length 95th (ft)	m3	177	m0	m0	10	m0		73			152	
Internal Link Dist (ft)		248			1136			374			246	
Turn Bay Length (ft)	220		220	380		235						
Base Capacity (vph)	366	2739	1238	364	2638	1198		352			379	
Starvation Cap Reductn	0	0	0	0	0	0		0			0	
Spillback Cap Reductn	0	0	0	0	0	0		0			0	
Storage Cap Reductn	0	0	0	0	0	0		0			0	
Reduced v/c Ratio	0.11	0.52	0.02	0.05	0.51	0.07		0.14			0.32	

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 109 (81%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 6.5		Intersection LOS: A	
Intersection Capacity Utilization 55.1%		ICU Level of Service B	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2936: 20250 E/Safeway Entrance & Smoky Hill Rd



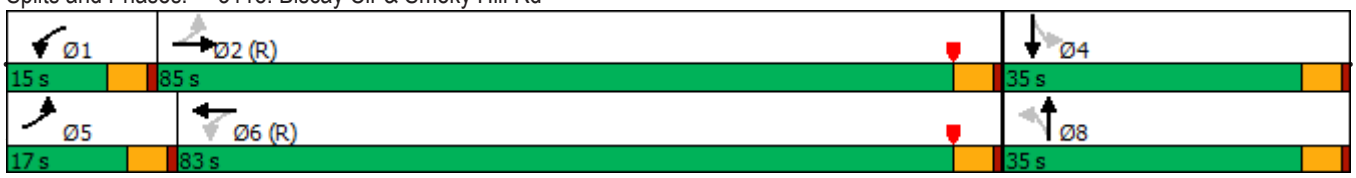


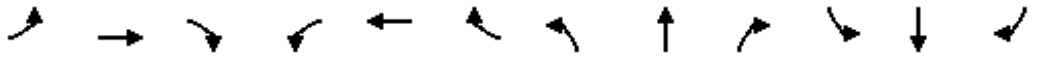
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	943	19	24	894	73	15	10	15	44	10	136
Future Volume (vph)	139	943	19	24	894	73	15	10	15	44	10	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	130		0	85		0	95		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00			0.99		0.99		
Frt		0.997			0.989			0.910			0.860	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3526	0	1770	3491	0	1770	1676	0	1770	1602	0
Flt Permitted	0.201			0.224			0.317			0.738		
Satd. Flow (perm)	374	3526	0	417	3491	0	590	1676	0	1366	1602	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			11			18			166	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		1420			1349			312			596	
Travel Time (s)		24.2			23.0			7.1			16.3	
Confl. Peds. (#/hr)	5		5	5		5			5	5		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	170	1150	23	29	1090	89	18	12	18	54	12	166
Shared Lane Traffic (%)												
Lane Group Flow (vph)	170	1173	0	29	1179	0	18	30	0	54	178	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0		36	0		36	36		36	36	
Trailing Detector (ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Size(ft)	40	40		40	40		40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	25.0		10.0	25.0		35.0	35.0		35.0	35.0	
Total Split (s)	17.0	85.0		15.0	83.0		35.0	35.0		35.0	35.0	
Total Split (%)	12.6%	63.0%		11.1%	61.5%		25.9%	25.9%		25.9%	25.9%	
Maximum Green (s)	12.0	80.0		10.0	78.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0		1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		15.0			15.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)		5			5		5	5		0	0	
Act Effct Green (s)	111.0	106.3		105.7	100.5		12.6	12.6		12.6	12.6	
Actuated g/C Ratio	0.82	0.79		0.78	0.74		0.09	0.09		0.09	0.09	
v/c Ratio	0.45	0.42		0.08	0.45		0.33	0.17		0.43	0.59	
Control Delay	11.5	14.1		8.0	18.8		68.1	29.6		64.4	17.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.5	14.1		8.0	18.8		68.1	29.6		64.4	17.3	
LOS	B	B		A	B		E	C		E	B	
Approach Delay		13.8			18.6			44.0			28.2	
Approach LOS		B			B			D			C	
Queue Length 50th (ft)	31	261		6	314		15	10		47	10	
Queue Length 95th (ft)	132	503		30	542		33	32		70	53	
Internal Link Dist (ft)		1340			1269			232			516	
Turn Bay Length (ft)	260			130			85			95		
Base Capacity (vph)	435	2775		441	2602		131	386		303	485	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.39	0.42		0.07	0.45		0.14	0.08		0.18	0.37	

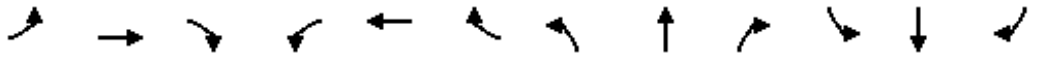
Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 47 (35%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 17.5		Intersection LOS: B	
Intersection Capacity Utilization 61.7%		ICU Level of Service B	
Analysis Period (min) 15			
Description: Centennial			

Splits and Phases: 3118: Biscay Cir & Smoky Hill Rd





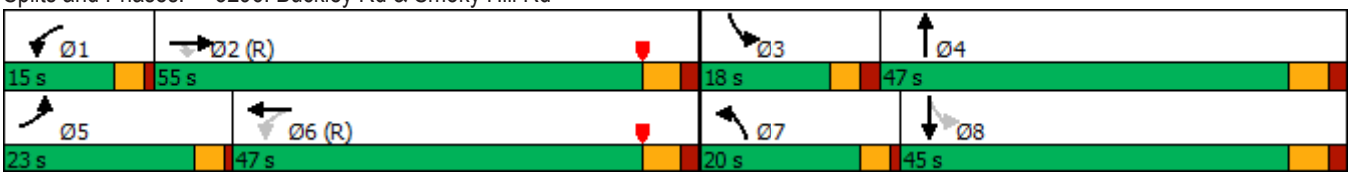
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	959	115	123	741	214	154	877	58	260	594	68
Future Volume (vph)	191	959	115	123	741	214	154	877	58	260	594	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	155		725	350		0	195		0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.97	0.95	0.95
Ped Bike Factor	1.00		0.98	1.00	1.00		1.00	1.00		1.00	1.00	
Frt			0.850		0.966			0.991			0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	4893	0	1770	3503	0	3433	3480	0
Flt Permitted	0.950			0.140			0.950			0.106		
Satd. Flow (perm)	1767	3539	1551	260	4893	0	1766	3503	0	382	3480	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105		56			5			9	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1800			2494			1189			1206	
Travel Time (s)		30.7			42.5			20.3			20.6	
Confl. Peds. (#/hr)	5		7	7		5	5		6	6		5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	210	1054	126	135	814	235	169	964	64	286	653	75
Shared Lane Traffic (%)												
Lane Group Flow (vph)	210	1054	126	135	1049	0	169	1028	0	286	728	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1		1	1		1	1	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	30	20	20	30		20	30		20	30	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	30	20	20	30		20	30		20	30	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Prot	NA	Perm	pm+pt	NA		Prot	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6						8		
Detector Phase	5	2	2	1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0		3.0	5.0	

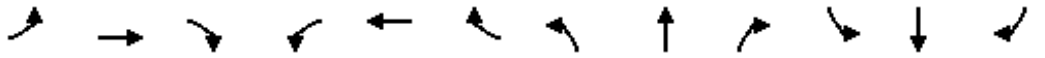


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	7.0	39.0	39.0	7.0	39.0		7.0	42.0		8.0	43.0	
Total Split (s)	23.0	55.0	55.0	15.0	47.0		20.0	47.0		18.0	45.0	
Total Split (%)	17.0%	40.7%	40.7%	11.1%	34.8%		14.8%	34.8%		13.3%	33.3%	
Maximum Green (s)	19.0	49.0	49.0	11.0	41.0		16.0	41.0		13.0	39.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.0	3.0	1.5	3.0		1.5	2.0		1.5	2.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None		None	None	
Walk Time (s)		6.0	6.0		6.0			6.0			6.0	
Flash Dont Walk (s)		27.0	27.0		27.0			30.0			31.0	
Pedestrian Calls (#/hr)		7	7		5			6			5	
Act Effct Green (s)	17.9	53.3	53.3	55.7	44.6		14.9	40.6		49.6	37.7	
Actuated g/C Ratio	0.13	0.39	0.39	0.41	0.33		0.11	0.30		0.37	0.28	
v/c Ratio	0.90	0.75	0.19	0.65	0.63		0.87	0.97		0.74	0.75	
Control Delay	94.8	40.2	8.2	46.7	52.2		96.4	68.2		39.1	49.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	94.8	40.2	8.2	46.7	52.2		96.4	68.2		39.1	49.1	
LOS	F	D	A	D	D		F	E		D	D	
Approach Delay		45.6			51.6			72.2			46.3	
Approach LOS		D			D			E			D	
Queue Length 50th (ft)	182	419	11	89	298		147	465		79	305	
Queue Length 95th (ft)	#319	528	56	164	394		#266	#609		119	372	
Internal Link Dist (ft)		1720			2414			1109			1126	
Turn Bay Length (ft)	225			155			350			195		
Base Capacity (vph)	249	1397	676	233	1653		209	1067		440	1011	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.84	0.75	0.19	0.58	0.63		0.81	0.96		0.65	0.72	

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 108 (80%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 53.9		Intersection LOS: D	
Intersection Capacity Utilization 89.8%		ICU Level of Service E	
Analysis Period (min) 15			
Description: Aurora			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3296: Buckley Rd & Smoky Hill Rd



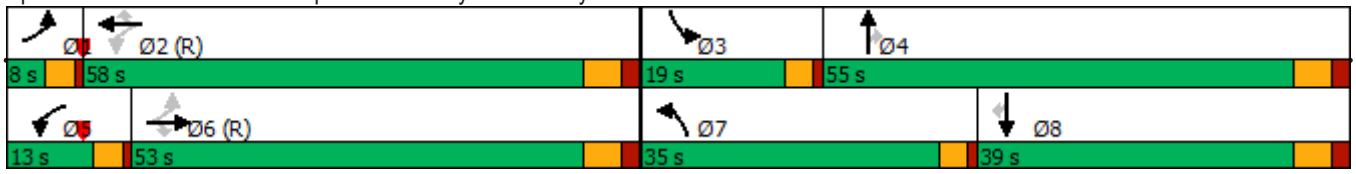


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	783	380	210	899	15	487	145	55	90	555	129
Future Volume (vph)	94	783	380	210	899	15	487	145	55	90	555	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	345		0	250		310	275		310	285		105
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00		0.98			0.98	1.00			0.99		
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.128			0.137			0.950			0.950		
Satd. Flow (perm)	462	3539	1553	495	3539	1554	3422	3539	1583	1761	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			393			117			117			148
Link Speed (mph)		40			40			40			35	
Link Distance (ft)		1063			1494			537			674	
Travel Time (s)		18.1			25.5			9.2			13.1	
Confl. Peds. (#/hr)	5		5	5		5	6			5		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	109	910	442	244	1045	17	566	169	64	105	645	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	910	442	244	1045	17	566	169	64	105	645	150
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36	36	36	36	36
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Size(ft)	40	5	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2			4			8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	3.0	25.0	25.0	3.0	25.0	25.0	3.0	5.0	5.0	3.0	5.0	5.0

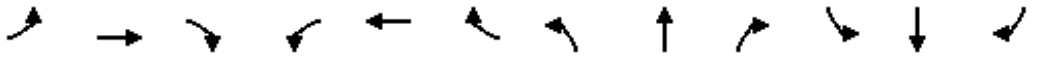
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	7.0	34.0	34.0	7.0	37.0	37.0	7.0	39.0	39.0	7.0	39.0	39.0
Total Split (s)	8.0	53.0	53.0	13.0	58.0	58.0	35.0	55.0	55.0	19.0	39.0	39.0
Total Split (%)	5.7%	37.9%	37.9%	9.3%	41.4%	41.4%	25.0%	39.3%	39.3%	13.6%	27.9%	27.9%
Maximum Green (s)	4.0	47.0	47.0	9.0	52.0	52.0	31.0	49.0	49.0	15.0	33.0	33.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		23.0	23.0		26.0	26.0		28.0	28.0		28.0	28.0
Pedestrian Calls (#/hr)		5	5		5	5		5	5		6	6
Act Effct Green (s)	56.2	50.2	50.2	64.8	54.9	54.9	26.9	49.0	49.0	12.1	34.2	34.2
Actuated g/C Ratio	0.40	0.36	0.36	0.46	0.39	0.39	0.19	0.35	0.35	0.09	0.24	0.24
v/c Ratio	0.40	0.72	0.55	0.59	0.75	0.03	0.86	0.14	0.10	0.69	0.75	0.30
Control Delay	15.4	29.0	7.2	28.5	41.4	0.1	68.1	31.5	0.3	84.0	55.2	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	29.0	7.2	28.5	41.4	0.1	68.1	31.5	0.3	84.0	55.2	8.3
LOS	B	C	A	C	D	A	E	C	A	F	E	A
Approach Delay		21.4			38.5			54.9			50.8	
Approach LOS		C			D			D			D	
Queue Length 50th (ft)	14	402	103	65	432	0	258	55	0	94	287	1
Queue Length 95th (ft)	20	325	49	91	498	0	299	79	0	148	343	51
Internal Link Dist (ft)		983			1414			457			594	
Turn Bay Length (ft)	345			250		310	275		310	285		105
Base Capacity (vph)	270	1268	808	418	1387	680	760	1238	630	189	865	498
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.72	0.55	0.58	0.75	0.03	0.74	0.14	0.10	0.56	0.75	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 72 (51%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 38.3		Intersection LOS: D	
Intersection Capacity Utilization 75.2%		ICU Level of Service D	
Analysis Period (min) 15			
Description: Centennial			

Splits and Phases: 100: Liverpool St/Picadilly St & Smoky Hill Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	1020	30	15	1726	20	80	20	55	50	20	80
Future Volume (vph)	45	1020	30	15	1726	20	80	20	55	50	20	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		245	210		230	0		0	0		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97	1.00		0.97	0.99				0.99	
Frt			0.850			0.850		0.890			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1658	0	1770	1615	0
Flt Permitted	0.050			0.205			0.536			0.643		
Satd. Flow (perm)	93	3539	1531	381	3539	1531	993	1658	0	1198	1615	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			55		65			70	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		348			2613			684			552	
Travel Time (s)		5.9			44.5			15.5			15.1	
Confl. Peds. (#/hr)	5		5	5		5	5					5
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	54	1214	36	18	2055	24	95	24	65	60	24	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	1214	36	18	2055	24	95	89	0	60	119	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36		36	36	
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4		-4	-4	
Detector 1 Size(ft)	40	5	20	40	5	20	40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0		5.0	5.0	

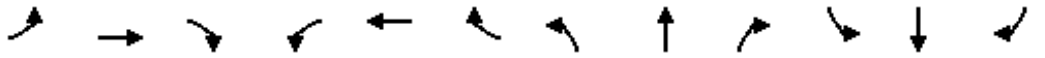


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	31.0	31.0	10.0	31.0	31.0	37.0	37.0		37.0	37.0	
Total Split (s)	10.0	93.0	93.0	10.0	93.0	93.0	37.0	37.0		37.0	37.0	
Total Split (%)	7.1%	66.4%	66.4%	7.1%	66.4%	66.4%	26.4%	26.4%		26.4%	26.4%	
Maximum Green (s)	5.0	88.0	88.0	5.0	88.0	88.0	32.0	32.0		32.0	32.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		21.0	21.0		21.0	21.0	27.0	27.0		27.0	27.0	
Pedestrian Calls (#/hr)		5	5		5	5	0	0		5	5	
Act Effct Green (s)	110.7	108.7	108.7	108.7	104.7	104.7	17.3	17.3		17.3	17.3	
Actuated g/C Ratio	0.79	0.78	0.78	0.78	0.75	0.75	0.12	0.12		0.12	0.12	
v/c Ratio	0.41	0.44	0.03	0.05	0.78	0.02	0.78	0.34		0.41	0.46	
Control Delay	34.6	1.0	0.0	2.7	7.8	0.0	94.8	20.9		61.6	28.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	34.6	1.0	0.0	2.7	7.8	0.0	94.8	20.9		61.6	28.7	
LOS	C	A	A	A	A	A	F	C		E	C	
Approach Delay		2.4			7.7			59.1			39.7	
Approach LOS		A			A			E			D	
Queue Length 50th (ft)	12	14	0	1	210	0	86	20		52	42	
Queue Length 95th (ft)	m22	25	m0	m3	346	m0	123	56		82	81	
Internal Link Dist (ft)		268			2533			604			472	
Turn Bay Length (ft)	245		245	210		230						
Base Capacity (vph)	133	2747	1200	345	2646	1158	226	429		273	423	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.41	0.44	0.03	0.05	0.78	0.02	0.42	0.21		0.22	0.28	

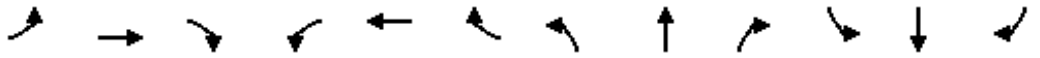
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 109 (78%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 9.9		Intersection LOS: A	
Intersection Capacity Utilization 68.1%		ICU Level of Service C	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Telluride St & Smoky Hill Rd



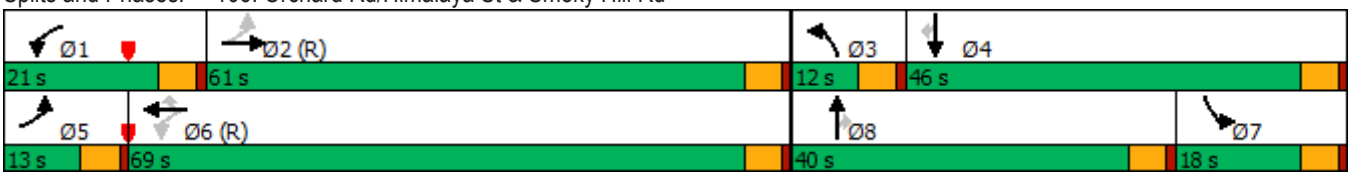
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	967	88	180	1078	236	70	180	85	220	585	90
Future Volume (vph)	88	967	88	180	1078	236	70	180	85	220	585	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	310		360	155		155	250		225
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00	1.00				0.98	1.00		0.98	0.99		0.98
Frt		0.987				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3488	0	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.123			0.120			0.950			0.950		
Satd. Flow (perm)	229	3488	0	434	3539	1555	3420	3539	1555	3407	3539	1555
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				278			132			132
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		743			778			876			380	
Travel Time (s)		12.7			13.3			14.9			6.5	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	104	1138	104	212	1268	278	82	212	100	259	688	106
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	1242	0	212	1268	278	82	212	100	259	688	106
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0	1	1	1	0	1	1	0
Detector Template						Right						
Leading Detector (ft)	36	0		36	0	20	36	36	0	36	36	0
Trailing Detector (ft)	-4	0		-4	0	0	-4	-4	0	-4	-4	0
Detector 1 Position(ft)	-4	0		-4	0	0	-4	-4	0	-4	-4	0
Detector 1 Size(ft)	40	40		40	40	20	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6			8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0

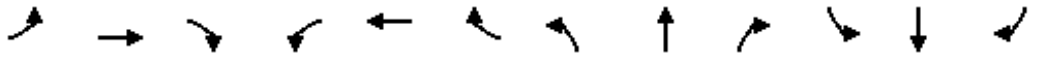


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	40.0		10.0	40.0	40.0	10.0	40.0	40.0	10.0	40.0	40.0
Total Split (s)	13.0	61.0		21.0	69.0	69.0	12.0	40.0	40.0	18.0	46.0	46.0
Total Split (%)	9.3%	43.6%		15.0%	49.3%	49.3%	8.6%	28.6%	28.6%	12.9%	32.9%	32.9%
Maximum Green (s)	8.0	56.0		16.0	64.0	64.0	7.0	35.0	35.0	13.0	41.0	41.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.5
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		30.0			30.0	30.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		5			5	5		5	5		5	5
Act Effct Green (s)	79.9	73.0		82.9	74.5	74.5	6.5	16.2	16.2	22.4	32.1	32.1
Actuated g/C Ratio	0.57	0.52		0.59	0.53	0.53	0.05	0.12	0.12	0.16	0.23	0.23
v/c Ratio	0.50	0.68		0.48	0.67	0.29	0.52	0.52	0.34	0.47	0.85	0.23
Control Delay	25.4	15.7		10.5	10.5	1.3	76.9	61.2	5.7	57.0	61.8	4.0
Queue Delay	0.0	0.1		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	15.8		10.5	10.5	1.3	76.9	61.2	5.7	57.0	61.8	4.0
LOS	C	B		B	B	A	E	E	A	E	E	A
Approach Delay		16.6			9.1			50.4			54.8	
Approach LOS		B			A			D			D	
Queue Length 50th (ft)	26	188		6	243	7	38	100	0	108	320	0
Queue Length 95th (ft)	70	264		19	483	26	63	111	17	#170	335	20
Internal Link Dist (ft)		663			698			796			300	
Turn Bay Length (ft)	250			310		360	155		155	250		225
Base Capacity (vph)	220	1821		610	1882	957	171	884	487	548	1036	548
Starvation Cap Reductn	0	88		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.72		0.35	0.67	0.29	0.48	0.24	0.21	0.47	0.66	0.19

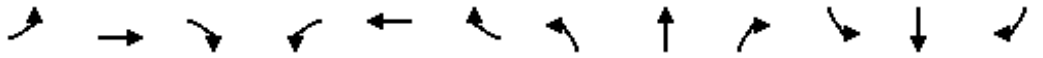
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 6 (4%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 25.4		Intersection LOS: C	
Intersection Capacity Utilization 73.7%		ICU Level of Service D	
Analysis Period (min) 15			
Description: Centennial			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 106: Orchard Rd/Himalaya St & Smoky Hill Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	965	45	117	1255	21	103	70	60	65	270	403
Future Volume (vph)	115	965	45	117	1255	21	103	70	60	65	270	403
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		245	165		590	185		245	130		0
Storage Lanes	1		1	1		1	1		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00
Ped Bike Factor						0.98	1.00		0.98	0.99		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	3433	1863	1583
Flt Permitted	0.061			0.126			0.950			0.950		
Satd. Flow (perm)	114	3539	1583	235	3539	1554	1762	3539	1555	3402	1863	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94			94			139
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		371			1420			827			379	
Travel Time (s)		6.3			24.2			16.1			8.6	
Confl. Peds. (#/hr)	5					5	5		5	5		5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	135	1135	53	138	1476	25	121	82	71	76	318	474
Shared Lane Traffic (%)												
Lane Group Flow (vph)	135	1135	53	138	1476	25	121	82	71	76	318	474
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36	36	36	36	36
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Size(ft)	40	5	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0

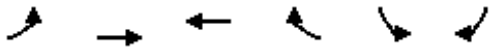


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	33.0	33.0	10.0	36.0	36.0	10.0	40.0	40.0	10.0	35.0	35.0
Total Split (s)	13.0	66.0	66.0	17.0	70.0	70.0	16.0	45.0	45.0	12.0	41.0	41.0
Total Split (%)	9.3%	47.1%	47.1%	12.1%	50.0%	50.0%	11.4%	32.1%	32.1%	8.6%	29.3%	29.3%
Maximum Green (s)	8.0	61.0	61.0	12.0	65.0	65.0	11.0	40.0	40.0	7.0	36.0	36.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.5
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		23.0	23.0		26.0	26.0		30.0	30.0		25.0	25.0
Pedestrian Calls (#/hr)		0	0		5	5		5	5		5	5
Act Effct Green (s)	73.5	65.5	65.5	75.9	66.7	66.7	10.7	38.9	38.9	6.4	34.6	34.6
Actuated g/C Ratio	0.52	0.47	0.47	0.54	0.48	0.48	0.08	0.28	0.28	0.05	0.25	0.25
v/c Ratio	0.88	0.69	0.07	0.61	0.88	0.03	0.89	0.08	0.14	0.48	0.69	0.97
Control Delay	65.7	35.6	6.4	37.2	33.1	0.6	116.1	37.1	3.9	75.4	56.3	70.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.7	35.6	6.4	37.2	33.1	0.6	116.1	37.1	3.9	75.4	56.3	70.9
LOS	E	D	A	D	C	A	F	D	A	E	E	E
Approach Delay		37.5			32.9			63.4			65.9	
Approach LOS		D			C			E			E	
Queue Length 50th (ft)	71	535	9	56	294	0	111	28	0	35	261	320
Queue Length 95th (ft)	#178	572	33	131	494	m1	#211	47	17	59	343	#481
Internal Link Dist (ft)		291			1340			747			299	
Turn Bay Length (ft)	200		245	165		590	185		245	130		
Base Capacity (vph)	154	1655	790	263	1686	789	139	1015	513	171	479	502
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.69	0.07	0.52	0.88	0.03	0.87	0.08	0.14	0.44	0.66	0.94

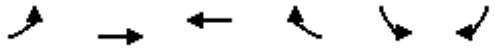
Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 69 (49%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 43.4 Intersection LOS: D
Intersection Capacity Utilization 79.3% ICU Level of Service D
Analysis Period (min) 15
Description: Centennial
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 107: Tower Rd & Smoky Hill Rd



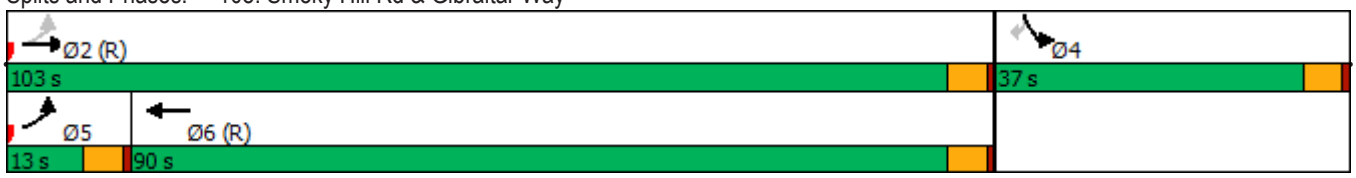
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	45	1073	1158	80	70	50
Future Volume (vph)	45	1073	1158	80	70	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	75	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			1.00			
Frt			0.990			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3495	0	1770	1583
Flt Permitted	0.162				0.950	
Satd. Flow (perm)	302	3539	3495	0	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			9			56
Link Speed (mph)		40	40		30	
Link Distance (ft)		694	743		699	
Travel Time (s)		11.8	12.7		15.9	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	50	1192	1287	89	78	56
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	1192	1376	0	78	56
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	0	0		1	1
Detector Template						
Leading Detector (ft)	36	0	0		36	36
Trailing Detector (ft)	-4	0	0		-4	-4
Detector 1 Position(ft)	-4	0	0		-4	-4
Detector 1 Size(ft)	40	40	40		40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0		5.0	5.0



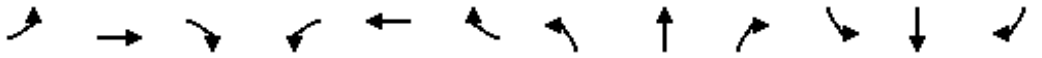
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Split (s)	10.0	25.0	25.0		35.0	35.0
Total Split (s)	13.0	103.0	90.0		37.0	37.0
Total Split (%)	9.3%	73.6%	64.3%		26.4%	26.4%
Maximum Green (s)	8.0	98.0	85.0		32.0	32.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Recall Mode	None	C-Max	C-Max		None	None
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		15.0	15.0		25.0	25.0
Pedestrian Calls (#/hr)		0	5		0	0
Act Effct Green (s)	119.3	119.3	111.0		10.7	10.7
Actuated g/C Ratio	0.85	0.85	0.79		0.08	0.08
v/c Ratio	0.16	0.40	0.50		0.58	0.33
Control Delay	2.0	1.2	0.9		78.4	19.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	2.0	1.2	0.9		78.4	19.2
LOS	A	A	A		E	B
Approach Delay		1.2	0.9		53.7	
Approach LOS		A	A		D	
Queue Length 50th (ft)	1	6	8		70	0
Queue Length 95th (ft)	11	79	23		123	43
Internal Link Dist (ft)		614	663		619	
Turn Bay Length (ft)	200				75	
Base Capacity (vph)	341	3015	2771		404	405
Starvation Cap Reductn	0	0	180		0	0
Spillback Cap Reductn	0	56	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.15	0.40	0.53		0.19	0.14

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 135 (96%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 3.6		Intersection LOS: A	
Intersection Capacity Utilization 49.9%		ICU Level of Service A	
Analysis Period (min) 15			
Description: Centennial			

Splits and Phases: 108: Smoky Hill Rd & Gibraltar Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	1068	10	15	1188	5	40	0	45	5	0	15
Future Volume (vph)	2	1068	10	15	1188	5	40	0	45	5	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	275		0	170		0	120		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					1.00							
Frt		0.999			0.999			0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3536	0	1770	3535	0	1770	1583	0	1770	1583	0
Flt Permitted	0.194			0.220			0.747			0.725		
Satd. Flow (perm)	361	3536	0	410	3535	0	1391	1583	0	1350	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1						160			139	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		1349			1462			497			409	
Travel Time (s)		23.0			24.9			11.3			11.2	
Confl. Peds. (#/hr)	5					5						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	2	1174	11	16	1305	5	44	0	49	5	0	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	1185	0	16	1310	0	44	49	0	5	16	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0		36	0		36	36		36	36	
Trailing Detector (ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Size(ft)	40	40		40	40		40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0		5.0	5.0	

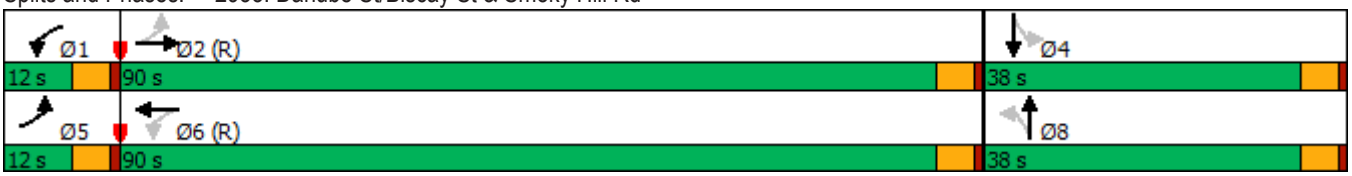


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	25.0		10.0	25.0		36.0	36.0		36.0	36.0	
Total Split (s)	12.0	90.0		12.0	90.0		38.0	38.0		38.0	38.0	
Total Split (%)	8.6%	64.3%		8.6%	64.3%		27.1%	27.1%		27.1%	27.1%	
Maximum Green (s)	7.0	85.0		7.0	85.0		33.0	33.0		33.0	33.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0		1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		15.0			15.0		26.0	26.0		26.0	26.0	
Pedestrian Calls (#/hr)		0			5		0	0		0	0	
Act Effct Green (s)	121.4	120.4		122.4	122.4		8.6	8.6		8.6	8.6	
Actuated g/C Ratio	0.87	0.86		0.87	0.87		0.06	0.06		0.06	0.06	
v/c Ratio	0.01	0.39		0.04	0.42		0.52	0.20		0.06	0.07	
Control Delay	1.0	1.4		0.5	1.5		83.2	1.8		61.0	0.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	1.0	1.4		0.5	1.5		83.2	1.8		61.0	0.6	
LOS	A	A		A	A		F	A		E	A	
Approach Delay		1.4			1.5			40.3			15.0	
Approach LOS		A			A			D			B	
Queue Length 50th (ft)	0	12		1	6		40	0		4	0	
Queue Length 95th (ft)	m0	75		m0	38		80	0		19	0	
Internal Link Dist (ft)		1269			1382			417			329	
Turn Bay Length (ft)	250			275			170			120		
Base Capacity (vph)	385	3039		427	3089		327	495		318	479	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.39		0.04	0.42		0.13	0.10		0.02	0.03	

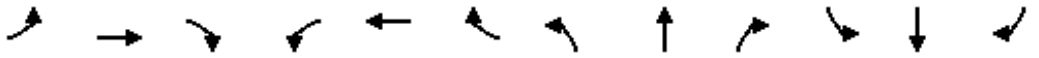
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 87 (62%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 3.0		Intersection LOS: A	
Intersection Capacity Utilization 50.2%		ICU Level of Service A	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2933: Danube St/Biscay St & Smoky Hill Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1242	20	10	1490	15	2	0	5	10	0	2
Future Volume (vph)	10	1242	20	10	1490	15	2	0	5	10	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		220	380		235	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.96			0.96						
Frt			0.850			0.850		0.899			0.979	
Flt Protected	0.950			0.950				0.988			0.959	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1655	0	0	1749	0
Flt Permitted	0.126			0.179								
Satd. Flow (perm)	235	3539	1521	333	3539	1521	0	1675	0	0	1824	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			86		86			86	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		328			1216			454			326	
Travel Time (s)		5.6			20.7			10.3			7.4	
Confl. Peds. (#/hr)	5		5	5		5						
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	1411	23	11	1693	17	2	0	6	11	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1411	23	11	1693	17	0	8	0	0	13	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	36	0	0	36	0	0	20	36		20	36	
Trailing Detector (ft)	-4	0	0	-4	0	0	0	-4		0	-4	
Detector 1 Position(ft)	-4	0	0	-4	0	0	0	-4		0	-4	
Detector 1 Size(ft)	40	40	40	40	40	40	20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	18.0	18.0	3.0	18.0	18.0	5.0	5.0		5.0	5.0	

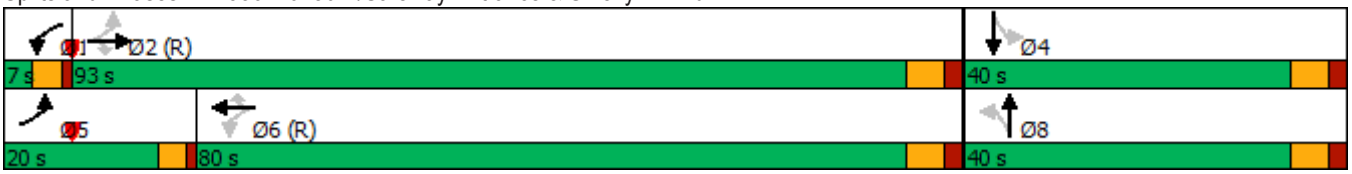


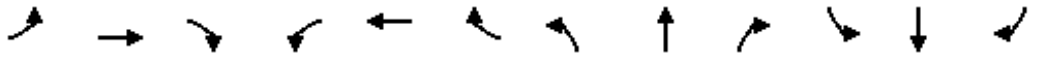
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	20.0	24.0	24.0	7.0	24.0	24.0	40.0	40.0		40.0	40.0	
Total Split (s)	20.0	93.0	93.0	7.0	80.0	80.0	40.0	40.0		40.0	40.0	
Total Split (%)	14.3%	66.4%	66.4%	5.0%	57.1%	57.1%	28.6%	28.6%		28.6%	28.6%	
Maximum Green (s)	16.0	87.0	87.0	3.0	74.0	74.0	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		6.0			6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		13.0	13.0		13.0	13.0	29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)		5	5		5	5	0	0		0	0	
Act Effct Green (s)	130.7	130.4	130.4	129.3	129.7	129.7		5.0			5.0	
Actuated g/C Ratio	0.93	0.93	0.93	0.92	0.93	0.93		0.04			0.04	
v/c Ratio	0.04	0.43	0.02	0.03	0.52	0.01		0.06			0.09	
Control Delay	0.3	0.6	0.0	0.2	1.2	0.0		0.7			1.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	0.3	0.6	0.0	0.2	1.2	0.0		0.7			1.2	
LOS	A	A	A	A	A	A		A			A	
Approach Delay		0.5			1.2			0.7			1.2	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	0	0	0	0	1	0		0			0	
Queue Length 95th (ft)	m0	22	m0	m0	9	m0		0			0	
Internal Link Dist (ft)		248			1136			374			246	
Turn Bay Length (ft)	220		220	380		235						
Base Capacity (vph)	396	3296	1420	338	3278	1415		471			508	
Starvation Cap Reductn	0	0	0	0	0	0		0			0	
Spillback Cap Reductn	0	0	0	0	0	0		0			0	
Storage Cap Reductn	0	0	0	0	0	0		0			0	
Reduced v/c Ratio	0.03	0.43	0.02	0.03	0.52	0.01		0.02			0.03	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 0.9		Intersection LOS: A	
Intersection Capacity Utilization 55.4%		ICU Level of Service B	
Analysis Period (min) 15			
Description: Centennial			

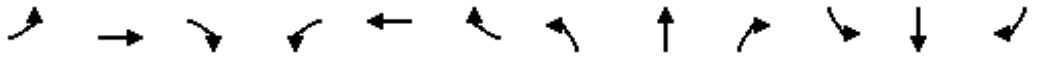
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2936: 20250 E/Safeway Entrance & Smoky Hill Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1065	10	5	1223	15	20	0	5	10	0	150
Future Volume (vph)	15	1065	10	5	1223	15	20	0	5	10	0	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	130		0	85		0	95		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00							
Frt		0.999			0.998			0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3534	0	1770	3531	0	1770	1583	0	1770	1583	0
Flt Permitted	0.169			0.216			0.388			0.754		
Satd. Flow (perm)	315	3534	0	402	3531	0	723	1583	0	1405	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			2			135			110	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		1420			1349			312			596	
Travel Time (s)		24.2			23.0			7.1			16.3	
Confl. Peds. (#/hr)	5		5	5		5						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	17	1197	11	6	1374	17	22	0	6	11	0	169
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	1208	0	6	1391	0	22	6	0	11	169	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0		36	0		36	36		36	36	
Trailing Detector (ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Size(ft)	40	40		40	40		40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0		5.0	5.0	

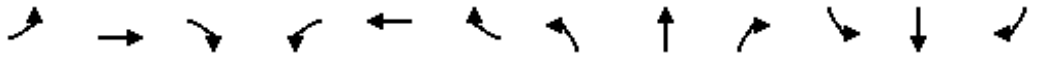


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	25.0		10.0	25.0		35.0	35.0		35.0	35.0	
Total Split (s)	10.0	91.0		10.0	91.0		39.0	39.0		39.0	39.0	
Total Split (%)	7.1%	65.0%		7.1%	65.0%		27.9%	27.9%		27.9%	27.9%	
Maximum Green (s)	5.0	86.0		5.0	86.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0		1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		15.0			15.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)		5			5		0	0		0	0	
Act Effct Green (s)	118.7	117.7		117.7	115.7		10.3	10.3		10.3	10.3	
Actuated g/C Ratio	0.85	0.84		0.84	0.83		0.07	0.07		0.07	0.07	
v/c Ratio	0.05	0.41		0.02	0.48		0.42	0.02		0.11	0.78	
Control Delay	0.3	0.5		0.8	2.1		82.3	0.2		59.2	46.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	0.3	0.5		0.8	2.1		82.3	0.2		59.2	46.2	
LOS	A	A		A	A		F	A		E	D	
Approach Delay		0.4			2.1			64.7			47.0	
Approach LOS		A			A			E			D	
Queue Length 50th (ft)	0	3		0	15		20	0		10	53	
Queue Length 95th (ft)	m0	8		m1	54		47	0		29	126	
Internal Link Dist (ft)		1340			1269			232			516	
Turn Bay Length (ft)	260			130			85			95		
Base Capacity (vph)	319	2970		386	2917		175	486		341	467	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.41		0.02	0.48		0.13	0.01		0.03	0.36	

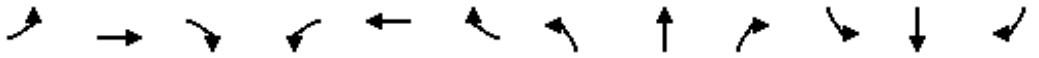
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 99 (71%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 4.9		Intersection LOS: A	
Intersection Capacity Utilization 59.2%		ICU Level of Service B	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3118: Biscay Cir & Smoky Hill Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	880	185	190	1521	175	195	570	40	175	1255	65
Future Volume (vph)	80	880	185	190	1521	175	195	570	40	175	1255	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	155		725	350		0	195		0
Storage Lanes	2		1	2		1	1		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	0.95	0.97	0.95	1.00
Ped Bike Factor	1.00		0.98		1.00			1.00		1.00		
Frt			0.850		0.985			0.990				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	5000	0	1770	3500	0	3433	3539	1583
Flt Permitted	0.950			0.086			0.075			0.950		
Satd. Flow (perm)	3431	3539	1552	311	5000	0	140	3500	0	3421	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			165		16			6				140
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1800			2494			1189			1206	
Travel Time (s)		30.7			42.5			20.3			20.6	
Confl. Peds. (#/hr)	5		6	6		5			5	5		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	91	1000	210	216	1728	199	222	648	45	199	1426	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	1000	210	216	1927	0	222	693	0	199	1426	74
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1		1	1		1	1	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	30	20	20	30		20	30		20	30	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	30	20	20	30		20	30		20	30	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Prot	NA	Perm	D.P+P	NA		D.P+P	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	2			4					4
Detector Phase	5	2	2	1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	6.0	11.0	11.0	6.0	11.0		6.0	6.0		6.0	6.0	6.0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	11.0	39.0	39.0	11.0	39.0		11.0	43.0		11.0	43.0	43.0
Total Split (s)	11.0	48.0	48.0	18.0	55.0		16.0	57.0		17.0	58.0	58.0
Total Split (%)	7.9%	34.3%	34.3%	12.9%	39.3%		11.4%	40.7%		12.1%	41.4%	41.4%
Maximum Green (s)	6.0	42.0	42.0	13.0	49.0		11.0	51.0		12.0	52.0	52.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-1.0	-2.0		-1.0	-2.0		-1.0	-2.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.0	3.0	1.5	3.0		1.5	2.0		1.5	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max		None	Max	Max
Walk Time (s)		6.0	6.0		6.0			6.0			6.0	6.0
Flash Dont Walk (s)		27.0	27.0		27.0			31.0			31.0	31.0
Pedestrian Calls (#/hr)		5	5		6			0			0	0
Act Effct Green (s)	7.0	47.7	47.7	58.0	51.0		66.0	54.0		12.0	54.0	52.0
Actuated g/C Ratio	0.05	0.34	0.34	0.41	0.36		0.47	0.39		0.09	0.39	0.37
v/c Ratio	0.53	0.83	0.33	0.60	1.05		1.08	0.51		0.68	1.04	0.11
Control Delay	76.6	49.8	10.3	25.0	70.9		121.9	34.4		74.2	78.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	76.6	49.8	10.3	25.0	70.9		121.9	34.4		74.2	78.6	0.3
LOS	E	D	B	C	E		F	C		E	E	A
Approach Delay		45.3			66.3			55.6			74.7	
Approach LOS		D			E			E			E	
Queue Length 50th (ft)	42	439	28	55	~704		~173	253		91	~739	0
Queue Length 95th (ft)	71	528	88	m71	#768		#330	306		131	#844	0
Internal Link Dist (ft)		1720			2414			1109			1126	
Turn Bay Length (ft)	225			155			350			195		
Base Capacity (vph)	171	1205	637	447	1831		205	1354		318	1365	675
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.83	0.33	0.48	1.05		1.08	0.51		0.63	1.04	0.11

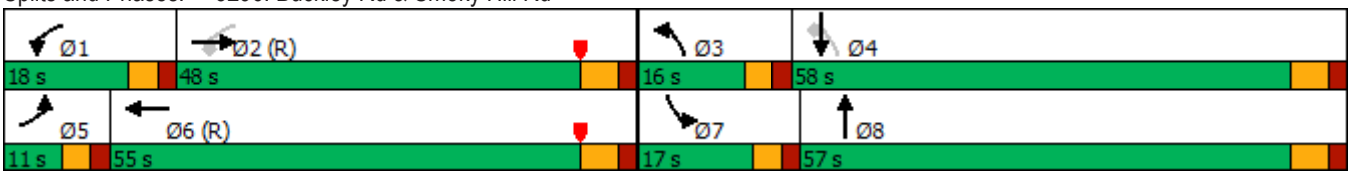
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 115 (82%), Referenced to phase 2:EBWB and 6:WBT, Start of Yellow			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 62.5		Intersection LOS: E	
Intersection Capacity Utilization 97.2%		ICU Level of Service F	
Analysis Period (min) 15			
Description: Aurora			

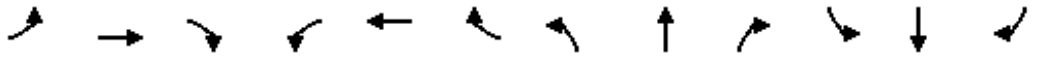
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

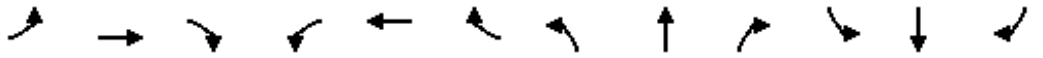
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3296: Buckley Rd & Smoky Hill Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	1419	595	155	1355	105	485	540	170	150	265	120
Future Volume (vph)	147	1419	595	155	1355	105	485	540	170	150	265	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	345		0	250		310	275		310	285		105
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	1.00			1.00					
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1553	3430	3539	1583	3419	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			380			89			183			129
Link Speed (mph)		40			40			40			35	
Link Distance (ft)		1063			616			537			674	
Travel Time (s)		18.1			10.5			9.2			13.1	
Confl. Peds. (#/hr)			5	5			5					
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	158	1526	640	167	1457	113	522	581	183	161	285	129
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	1526	640	167	1457	113	522	581	183	161	285	129
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36	36	36	36	36
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Size(ft)	40	5	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	3.0	25.0	25.0	3.0	25.0	25.0	3.0	5.0	5.0	3.0	5.0	5.0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	7.0	34.0	34.0	7.0	37.0	37.0	7.0	39.0	39.0	7.0	39.0	39.0
Total Split (s)	15.0	58.0	58.0	15.0	58.0	58.0	23.0	39.0	39.0	23.0	39.0	39.0
Total Split (%)	11.1%	43.0%	43.0%	11.1%	43.0%	43.0%	17.0%	28.9%	28.9%	17.0%	28.9%	28.9%
Maximum Green (s)	11.0	52.0	52.0	11.0	52.0	52.0	19.0	33.0	33.0	19.0	33.0	33.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		23.0	23.0		26.0	26.0		28.0	28.0		28.0	28.0
Pedestrian Calls (#/hr)		5	5		0	0		0	0		5	5
Act Effct Green (s)	9.9	62.4	62.4	10.1	62.6	62.6	19.0	26.7	26.7	15.8	23.5	23.5
Actuated g/C Ratio	0.07	0.46	0.46	0.07	0.46	0.46	0.14	0.20	0.20	0.12	0.17	0.17
v/c Ratio	0.63	0.93	0.69	0.65	0.89	0.14	1.08	0.83	0.40	0.78	0.46	0.34
Control Delay	72.8	41.6	17.7	73.0	42.1	8.0	118.0	62.6	8.4	81.9	51.2	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.8	41.6	17.7	73.0	42.1	8.0	118.0	62.6	8.4	81.9	51.2	9.2
LOS	E	D	B	E	D	A	F	E	A	F	D	A
Approach Delay		37.1			42.9			77.4			50.3	
Approach LOS		D			D			E			D	
Queue Length 50th (ft)	69	742	220	74	615	12	~262	260	0	138	118	0
Queue Length 95th (ft)	m87	#971	572	113	#882	53	#377	310	60	214	151	52
Internal Link Dist (ft)		983			536			457			594	
Turn Bay Length (ft)	345			250		310	275		310	285		105
Base Capacity (vph)	279	1636	922	279	1640	781	483	865	525	249	865	484
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.93	0.69	0.60	0.89	0.14	1.08	0.67	0.35	0.65	0.33	0.27

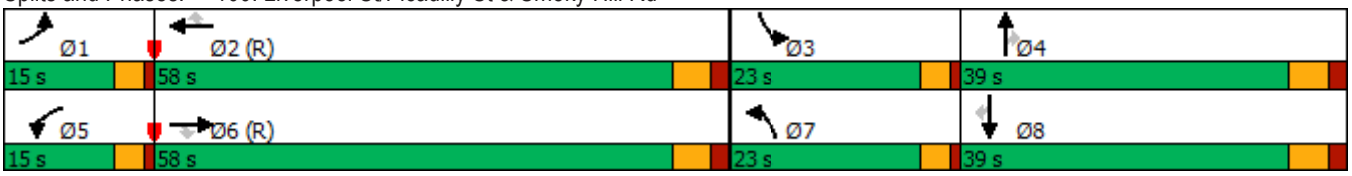
Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 89 (66%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 48.8		Intersection LOS: D	
Intersection Capacity Utilization 83.6%		ICU Level of Service E	
Analysis Period (min) 15			
Description: Centennial			

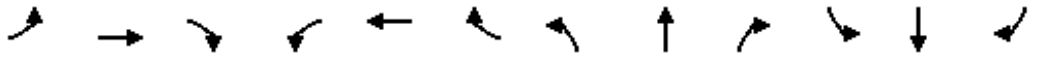
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

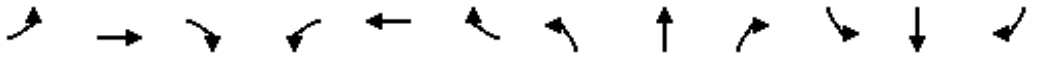
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 100: Liverpool St/Picadilly St & Smoky Hill Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	1720	75	40	1546	30	70	35	50	45	15	35
Future Volume (vph)	65	1720	75	40	1546	30	70	35	50	45	15	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		245	210		230	0		0	0		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97				0.99				0.99	
Frt			0.850			0.850		0.911			0.894	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1697	0	1770	1644	0
Flt Permitted	0.119			0.091			0.724			0.641		
Satd. Flow (perm)	222	3539	1532	170	3539	1583	1341	1697	0	1194	1644	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			57			57		50			36	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		348			2613			684			552	
Travel Time (s)		5.9			44.5			15.5			15.1	
Confl. Peds. (#/hr)			5	5			5					5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	1773	77	41	1594	31	72	36	52	46	15	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	1773	77	41	1594	31	72	88	0	46	51	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36		36	36	
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4		-4	-4	
Detector 1 Size(ft)	40	5	20	40	5	20	40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0		5.0	5.0	



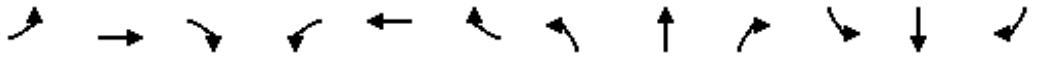
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	31.0	31.0	10.0	31.0	31.0	37.0	37.0		37.0	37.0	
Total Split (s)	15.0	83.0	83.0	15.0	83.0	83.0	37.0	37.0		37.0	37.0	
Total Split (%)	11.1%	61.5%	61.5%	11.1%	61.5%	61.5%	27.4%	27.4%		27.4%	27.4%	
Maximum Green (s)	10.0	78.0	78.0	10.0	78.0	78.0	32.0	32.0		32.0	32.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		21.0	21.0		21.0	21.0	27.0	27.0		27.0	27.0	
Pedestrian Calls (#/hr)		5	5		0	0	5	5		0	0	
Act Effct Green (s)	107.0	102.5	102.5	106.4	102.2	102.2	14.3	14.3		14.3	14.3	
Actuated g/C Ratio	0.79	0.76	0.76	0.79	0.76	0.76	0.11	0.11		0.11	0.11	
v/c Ratio	0.28	0.66	0.07	0.21	0.60	0.03	0.51	0.39		0.37	0.25	
Control Delay	5.6	8.7	1.3	3.5	3.0	0.0	66.4	29.5		60.2	23.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	5.6	8.7	1.3	3.5	3.0	0.0	66.4	29.5		60.2	23.6	
LOS	A	A	A	A	A	A	E	C		E	C	
Approach Delay		8.3			3.0			46.1			41.0	
Approach LOS		A			A			D			D	
Queue Length 50th (ft)	7	123	1	1	25	0	62	32		39	12	
Queue Length 95th (ft)	m9	m156	m2	m2	772	m0	97	72		69	46	
Internal Link Dist (ft)		268			2533			604			472	
Turn Bay Length (ft)	245		245	210		230						
Base Capacity (vph)	296	2686	1176	257	2678	1211	317	440		283	417	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.23	0.66	0.07	0.16	0.60	0.03	0.23	0.20		0.16	0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 113 (84%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 8.4		Intersection LOS: A	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Telluride St & Smoky Hill Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	1531	125	255	1390	280	180	620	220	395	370	115
Future Volume (vph)	159	1531	125	255	1390	280	180	620	220	395	370	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	310		360	155		155	250		225
Storage Lanes	1		0	2		1	1		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor						0.98						
Frt		0.989				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3500	0	3433	3539	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.071			0.071			0.950			0.950		
Satd. Flow (perm)	132	3500	0	257	3539	1555	1770	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				253			147			126
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		743			778			859			380	
Travel Time (s)		12.7			13.3			14.6			6.5	
Confl. Peds. (#/hr)	5					5						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	175	1682	137	280	1527	308	198	681	242	434	407	126
Shared Lane Traffic (%)												
Lane Group Flow (vph)	175	1819	0	280	1527	308	198	681	242	434	407	126
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0	1	1	1	0	1	1	0
Detector Template						Right						
Leading Detector (ft)	36	0		36	0	20	36	36	0	36	36	0
Trailing Detector (ft)	-4	0		-4	0	0	-4	-4	0	-4	-4	0
Detector 1 Position(ft)	-4	0		-4	0	0	-4	-4	0	-4	-4	0
Detector 1 Size(ft)	40	40		40	40	20	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6			8			4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	40.0		10.0	40.0	40.0	10.0	40.0	40.0	10.0	40.0	40.0
Total Split (s)	15.0	53.0		18.0	56.0	56.0	24.0	40.0	40.0	24.0	40.0	40.0
Total Split (%)	11.1%	39.3%		13.3%	41.5%	41.5%	17.8%	29.6%	29.6%	17.8%	29.6%	29.6%
Maximum Green (s)	10.0	48.0		13.0	51.0	51.0	19.0	35.0	35.0	19.0	35.0	35.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.5
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		30.0			30.0	30.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0			5	5		0	0		0	0
Act Effct Green (s)	66.3	56.3		67.2	56.7	56.7	17.3	29.7	29.7	18.6	30.9	30.9
Actuated g/C Ratio	0.49	0.42		0.50	0.42	0.42	0.13	0.22	0.22	0.14	0.23	0.23
v/c Ratio	0.94	1.24		0.75	1.03	0.39	0.87	0.88	0.52	0.92	0.50	0.27
Control Delay	85.0	140.8		54.5	60.0	5.8	91.5	63.7	21.5	82.9	47.3	7.9
Queue Delay	0.0	0.0		0.0	28.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.0	140.8		54.5	88.7	5.8	91.5	63.7	21.5	82.9	47.3	8.0
LOS	F	F		D	F	A	F	E	C	F	D	A
Approach Delay		135.9			72.1			59.5			58.2	
Approach LOS		F			E			E			E	
Queue Length 50th (ft)	113	~897		78	~772	31	170	305	70	195	166	0
Queue Length 95th (ft)	m#246	#1280		m132	#956	78	#294	362	150	#289	209	50
Internal Link Dist (ft)		663			698			779			300	
Turn Bay Length (ft)	250			310		360	155		155	250		225
Base Capacity (vph)	186	1463		438	1487	800	249	917	519	483	917	503
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	135	0	0	0	0	0	0	4
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	1.24		0.64	1.13	0.39	0.80	0.74	0.47	0.90	0.44	0.25

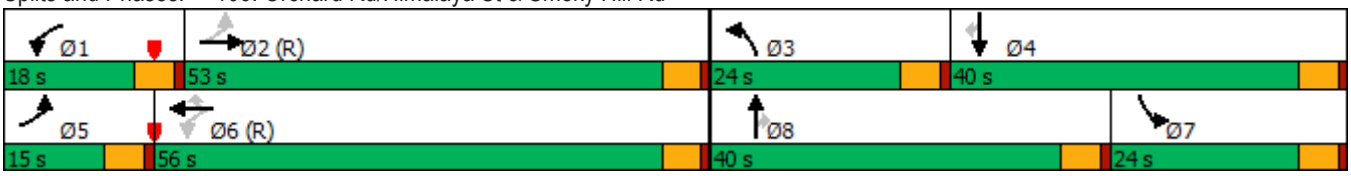
Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 14 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.24			
Intersection Signal Delay: 88.2		Intersection LOS: F	
Intersection Capacity Utilization 98.6%		ICU Level of Service F	
Analysis Period (min) 15			
Description: Centennial			

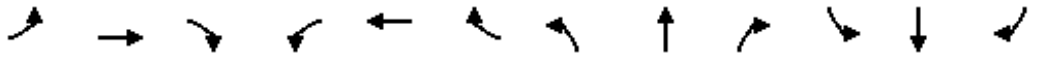
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

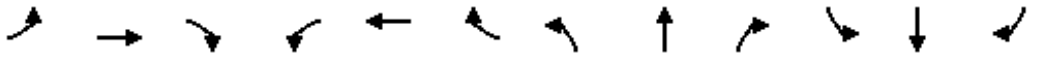
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 106: Orchard Rd/Himalaya St & Smoky Hill Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	1465	50	164	1286	95	75	280	150	195	135	255
Future Volume (vph)	300	1465	50	164	1286	95	75	280	150	195	135	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		245	165		590	185		245	130		0
Storage Lanes	1		1	1		1	1		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00
Ped Bike Factor						0.98	0.99		0.98	0.99		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	3433	1863	1583
Flt Permitted	0.064			0.068			0.950			0.950		
Satd. Flow (perm)	119	3539	1583	127	3539	1554	1760	3539	1555	3411	1863	1554
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97			137			161			274
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		371			1420			827			379	
Travel Time (s)		6.3			24.2			16.1			8.6	
Confl. Peds. (#/hr)	5					5	5		5	5		5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	323	1575	54	176	1383	102	81	301	161	210	145	274
Shared Lane Traffic (%)												
Lane Group Flow (vph)	323	1575	54	176	1383	102	81	301	161	210	145	274
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	36	0	0	36	0	0	36	36	36	36	36	36
Trailing Detector (ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Position(ft)	-4	0	0	-4	0	0	-4	-4	-4	-4	-4	-4
Detector 1 Size(ft)	40	5	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0

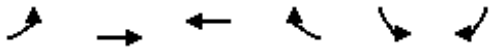


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	33.0	33.0	10.0	36.0	36.0	10.0	40.0	40.0	10.0	35.0	35.0
Total Split (s)	25.0	61.0	61.0	17.0	53.0	53.0	17.0	40.0	40.0	17.0	40.0	40.0
Total Split (%)	18.5%	45.2%	45.2%	12.6%	39.3%	39.3%	12.6%	29.6%	29.6%	12.6%	29.6%	29.6%
Maximum Green (s)	20.0	56.0	56.0	12.0	48.0	48.0	12.0	35.0	35.0	12.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.5
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		23.0	23.0		26.0	26.0		30.0	30.0		25.0	25.0
Pedestrian Calls (#/hr)		0	0		5	5		5	5		5	5
Act Effct Green (s)	90.4	74.3	74.3	76.5	65.4	65.4	9.6	18.6	18.6	11.0	20.0	20.0
Actuated g/C Ratio	0.67	0.55	0.55	0.57	0.48	0.48	0.07	0.14	0.14	0.08	0.15	0.15
v/c Ratio	1.00	0.81	0.06	0.85	0.81	0.12	0.64	0.62	0.46	0.75	0.53	0.59
Control Delay	96.1	16.2	1.1	67.3	31.9	3.0	83.1	59.4	10.6	77.3	58.7	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	96.1	16.2	1.1	67.3	31.9	3.0	83.1	59.4	10.6	77.3	58.7	10.5
LOS	F	B	A	E	C	A	F	E	B	E	E	B
Approach Delay		29.0			33.9			48.4			43.9	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	251	195	0	80	628	11	70	136	0	93	122	0
Queue Length 95th (ft)	#456	#965	m5	m#223	#888	m21	125	156	56	137	165	71
Internal Link Dist (ft)		291			1340			747			299	
Turn Bay Length (ft)	200		245	165		590	185		245	130		
Base Capacity (vph)	324	1947	914	218	1713	823	157	917	522	305	483	605
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.81	0.06	0.81	0.81	0.12	0.52	0.33	0.31	0.69	0.30	0.45

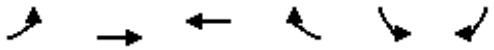
Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 54 (40%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 34.9		Intersection LOS: C	
Intersection Capacity Utilization 85.4%		ICU Level of Service E	
Analysis Period (min) 15			
Description: Centennial			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 107: Tower Rd & Smoky Hill Rd



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	1665	1505	180	150	75
Future Volume (vph)	75	1665	1505	180	150	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	75	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			1.00			0.98
Frt			0.984			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3469	0	1770	1583
Flt Permitted	0.041				0.950	
Satd. Flow (perm)	76	3539	3469	0	1770	1554
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			17			90
Link Speed (mph)		40	40		30	
Link Distance (ft)		694	743		699	
Travel Time (s)		11.8	12.7		15.9	
Confl. Peds. (#/hr)	5			5		5
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	90	2006	1813	217	181	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	90	2006	2030	0	181	90
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	0	0		1	1
Detector Template						
Leading Detector (ft)	36	0	0		36	36
Trailing Detector (ft)	-4	0	0		-4	-4
Detector 1 Position(ft)	-4	0	0		-4	-4
Detector 1 Size(ft)	40	40	40		40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0		5.0	5.0



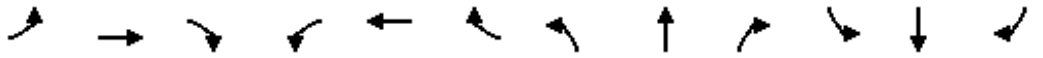
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Split (s)	10.0	25.0	25.0		35.0	35.0
Total Split (s)	15.0	100.0	85.0		35.0	35.0
Total Split (%)	11.1%	74.1%	63.0%		25.9%	25.9%
Maximum Green (s)	10.0	95.0	80.0		30.0	30.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	1.5	2.0	2.0		1.5	1.5
Recall Mode	None	C-Max	C-Max		None	None
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		15.0	15.0		25.0	25.0
Pedestrian Calls (#/hr)		0	5		5	5
Act Effct Green (s)	106.1	106.1	94.4		18.9	18.9
Actuated g/C Ratio	0.79	0.79	0.70		0.14	0.14
v/c Ratio	0.63	0.72	0.84		0.73	0.31
Control Delay	30.8	17.5	8.9		71.6	11.5
Queue Delay	0.0	0.0	4.5		0.0	0.0
Total Delay	30.8	17.5	13.5		71.6	11.5
LOS	C	B	B		E	B
Approach Delay		18.1	13.5		51.6	
Approach LOS		B	B		D	
Queue Length 50th (ft)	33	486	108		156	0
Queue Length 95th (ft)	m69	819	m874		195	37
Internal Link Dist (ft)		614	663		619	
Turn Bay Length (ft)	200				75	
Base Capacity (vph)	185	2780	2429		393	415
Starvation Cap Reductn	0	0	333		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.49	0.72	0.97		0.46	0.22

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 6 (4%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 74.9%		ICU Level of Service D	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 108: Smoky Hill Rd & Gibraltar Way

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	1655	35	95	1455	30	15	5	75	10	5	15
Future Volume (vph)	15	1655	35	95	1455	30	15	5	75	10	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	275		0	170		0	120		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00							
Frt		0.997			0.997			0.859			0.886	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3526	0	1770	3526	0	1770	1600	0	1770	1650	0
Flt Permitted	0.139			0.085			0.744			0.615		
Satd. Flow (perm)	259	3526	0	158	3526	0	1386	1600	0	1146	1650	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			3			82			16	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		1349			1462			497			409	
Travel Time (s)		23.0			24.9			11.3			11.2	
Confl. Peds. (#/hr)	5		5	5		5						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	1799	38	103	1582	33	16	5	82	11	5	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	1837	0	103	1615	0	16	87	0	11	21	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0		36	0		36	36		36	36	
Trailing Detector (ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Size(ft)	40	40		40	40		40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0		5.0	5.0	

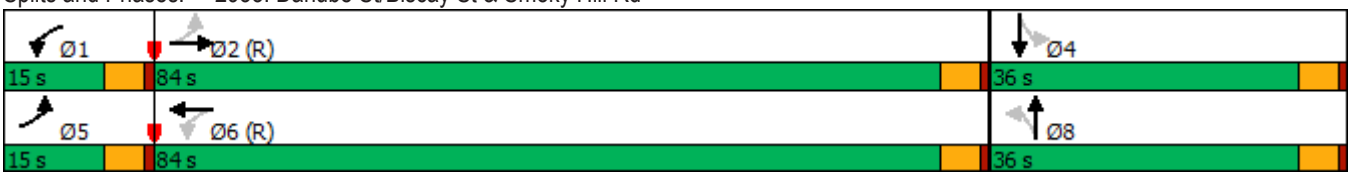


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	25.0		10.0	25.0		36.0	36.0		36.0	36.0	
Total Split (s)	15.0	84.0		15.0	84.0		36.0	36.0		36.0	36.0	
Total Split (%)	11.1%	62.2%		11.1%	62.2%		26.7%	26.7%		26.7%	26.7%	
Maximum Green (s)	10.0	79.0		10.0	79.0		31.0	31.0		31.0	31.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0		1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		15.0			15.0		26.0	26.0		26.0	26.0	
Pedestrian Calls (#/hr)		5			5		0	0		0	0	
Act Effct Green (s)	111.0	106.0		118.5	114.5		6.5	6.5		6.5	6.5	
Actuated g/C Ratio	0.82	0.79		0.88	0.85		0.05	0.05		0.05	0.05	
v/c Ratio	0.06	0.66		0.45	0.54		0.24	0.56		0.20	0.22	
Control Delay	2.8	14.8		17.0	0.5		69.7	28.4		69.2	35.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	2.8	14.8		17.0	0.5		69.7	28.4		69.2	35.5	
LOS	A	B		B	A		E	C		E	D	
Approach Delay		14.7			1.5			34.8			47.1	
Approach LOS		B			A			C			D	
Queue Length 50th (ft)	2	413		7	3		14	4		10	4	
Queue Length 95th (ft)	m3	971		m24	8		38	58		30	32	
Internal Link Dist (ft)		1269			1382			417			329	
Turn Bay Length (ft)	250			275			170			120		
Base Capacity (vph)	334	2768		258	2992		318	430		263	391	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.66		0.40	0.54		0.05	0.20		0.04	0.05	

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 74 (55%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 9.4		Intersection LOS: A	
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2933: Danube St/Biscay St & Smoky Hill Rd



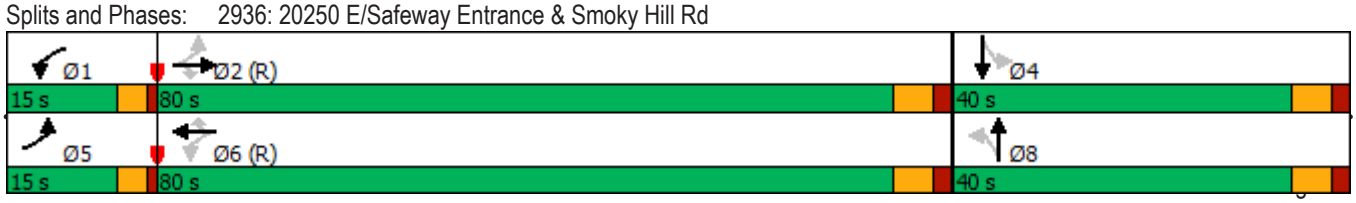
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	2086	20	15	1865	80	30	5	5	70	5	30
Future Volume (vph)	40	2086	20	15	1865	80	30	5	5	70	5	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		220	380		235	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.984			0.961	
Flt Protected	0.950			0.950				0.963			0.968	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1765	0	0	1733	0
Flt Permitted	0.063			0.043				0.721			0.796	
Satd. Flow (perm)	117	3539	1583	80	3539	1583	0	1322	0	0	1425	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			57			57		5			14	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		328			1216			454			326	
Travel Time (s)		5.6			20.7			10.3			7.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	2196	21	16	1963	84	32	5	5	74	5	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	2196	21	16	1963	84	0	42	0	0	111	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0	0	1	0	0	1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	36	0	0	36	0	0	20	36		20	36	
Trailing Detector (ft)	-4	0	0	-4	0	0	0	-4		0	-4	
Detector 1 Position(ft)	-4	0	0	-4	0	0	0	-4		0	-4	
Detector 1 Size(ft)	40	40	40	40	40	40	20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	18.0	18.0	3.0	18.0	18.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	7.0	24.0	24.0	7.0	24.0	24.0	40.0	40.0		40.0	40.0	
Total Split (s)	15.0	80.0	80.0	15.0	80.0	80.0	40.0	40.0		40.0	40.0	

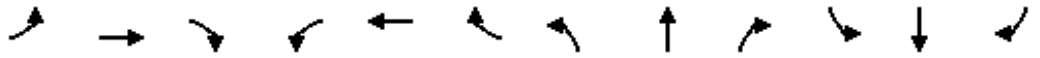
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	11.1%	59.3%	59.3%	11.1%	59.3%	59.3%	29.6%	29.6%		29.6%	29.6%	
Maximum Green (s)	11.0	74.0	74.0	11.0	74.0	74.0	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		6.0			6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		13.0	13.0		13.0	13.0	29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	109.6	105.3	105.3	107.4	101.5	101.5		14.0			14.0	
Actuated g/C Ratio	0.81	0.78	0.78	0.80	0.75	0.75		0.10			0.10	
v/c Ratio	0.27	0.80	0.02	0.13	0.74	0.07		0.30			0.69	
Control Delay	6.7	11.4	0.0	1.1	2.4	0.1		53.8			71.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	6.7	11.4	0.0	1.1	2.4	0.1		53.8			71.6	
LOS	A	B	A	A	A	A		D			E	
Approach Delay		11.2			2.3			53.8			71.6	
Approach LOS		B			A			D			E	
Queue Length 50th (ft)	2	167	0	0	13	0		30			83	
Queue Length 95th (ft)	m2	m254	m0	m0	m34	m0		66			142	
Internal Link Dist (ft)		248			1136			374			246	
Turn Bay Length (ft)	220		220	380		235						
Base Capacity (vph)	230	2760	1247	203	2659	1203		336			369	
Starvation Cap Reductn	0	0	0	0	0	0		0			0	
Spillback Cap Reductn	0	0	0	0	0	0		0			0	
Storage Cap Reductn	0	0	0	0	0	0		0			0	
Reduced v/c Ratio	0.18	0.80	0.02	0.08	0.74	0.07		0.13			0.30	

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 8 (6%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 9.0		Intersection LOS: A	
Intersection Capacity Utilization 74.1%		ICU Level of Service D	
Analysis Period (min) 15			
Description: Centennial			

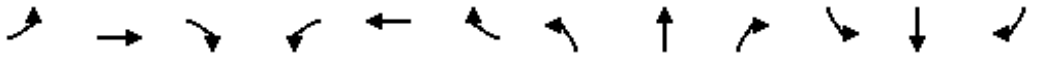
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2936: 20250 E/Safeway Entrance & Smoky Hill Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	1645	20	25	1385	75	15	5	15	45	5	145
Future Volume (vph)	145	1645	20	25	1385	75	15	5	15	45	5	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	130		0	85		0	95		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00			0.99		0.99		
Frt		0.998			0.992			0.887			0.855	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3531	0	1770	3504	0	1770	1629	0	1770	1593	0
Flt Permitted	0.077			0.067			0.315			0.742		
Satd. Flow (perm)	143	3531	0	125	3504	0	587	1629	0	1373	1593	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			7			18			142	
Link Speed (mph)		40			40			30			25	
Link Distance (ft)		1420			1349			312			596	
Travel Time (s)		24.2			23.0			7.1			16.3	
Confl. Peds. (#/hr)	5		5	5		5			5	5		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	177	2006	24	30	1689	91	18	6	18	55	6	177
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	2030	0	30	1780	0	18	24	0	55	183	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template												
Leading Detector (ft)	36	0		36	0		36	36		36	36	
Trailing Detector (ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Position(ft)	-4	0		-4	0		-4	-4		-4	-4	
Detector 1 Size(ft)	40	40		40	40		40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0		5.0	5.0	

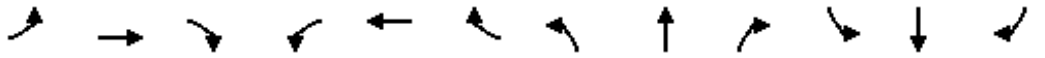


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.0	25.0		10.0	25.0		35.0	35.0		35.0	35.0	
Total Split (s)	17.0	85.0		15.0	83.0		35.0	35.0		35.0	35.0	
Total Split (%)	12.6%	63.0%		11.1%	61.5%		25.9%	25.9%		25.9%	25.9%	
Maximum Green (s)	12.0	80.0		10.0	78.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.0		1.5	2.0		1.5	1.5		1.5	1.5	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		15.0			15.0		25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)		5			5		5	5		0	0	
Act Effct Green (s)	112.3	106.2		102.0	96.8		12.7	12.7		12.7	12.7	
Actuated g/C Ratio	0.83	0.79		0.76	0.72		0.09	0.09		0.09	0.09	
v/c Ratio	0.72	0.73		0.19	0.71		0.33	0.14		0.43	0.66	
Control Delay	27.8	22.9		9.1	28.2		68.3	25.4		64.6	26.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.8	22.9		9.1	28.2		68.3	25.4		64.6	26.1	
LOS	C	C		A	C		E	C		E	C	
Approach Delay		23.3			27.9			43.8			35.0	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	56	685		3	790		15	5		48	35	
Queue Length 95th (ft)	m139	920		m20	838		33	25		72	76	
Internal Link Dist (ft)		1340			1269			232			516	
Turn Bay Length (ft)	260			130			85			95		
Base Capacity (vph)	263	2778		220	2515		130	376		305	464	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.67	0.73		0.14	0.71		0.14	0.06		0.18	0.39	

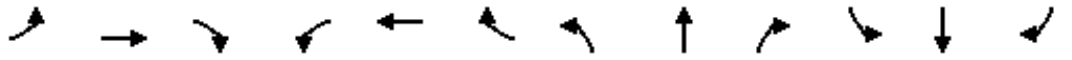
Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 81 (60%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 26.1		Intersection LOS: C	
Intersection Capacity Utilization 77.2%		ICU Level of Service D	
Analysis Period (min) 15			
Description: Centennial			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3118: Biscay Cir & Smoky Hill Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	1475	140	199	1150	302	195	1010	80	305	665	75
Future Volume (vph)	205	1475	140	199	1150	302	195	1010	80	305	665	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	155		725	350		0	195		0
Storage Lanes	2		1	2		1	1		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.91	1.00	0.95	0.95	0.97	0.91	0.91
Ped Bike Factor	1.00		0.98		1.00		1.00	1.00			1.00	0.98
Frt			0.850		0.969			0.989			0.998	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	4909	0	1770	3495	0	3433	3383	1441
Flt Permitted	0.950			0.083			0.950			0.106		
Satd. Flow (perm)	3429	3539	1551	300	4909	0	1766	3495	0	383	3383	1416
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97		50			6			1	129
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1800			2494			1189			1206	
Travel Time (s)		30.7			42.5			20.3			20.6	
Confl. Peds. (#/hr)	5		7	7		5	5		6	6		5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	225	1621	154	219	1264	332	214	1110	88	335	731	82
Shared Lane Traffic (%)												10%
Lane Group Flow (vph)	225	1621	154	219	1596	0	214	1198	0	335	739	74
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1		1	1		1	1	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	30	20	20	30		20	30		20	30	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	30	20	20	30		20	30		20	30	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Prot	NA	Perm	pm+pt	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2	6						8		8
Detector Phase	5	2	2	1	6		7	4		3	8	8
Switch Phase												
Minimum Initial (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0		3.0	5.0	5.0



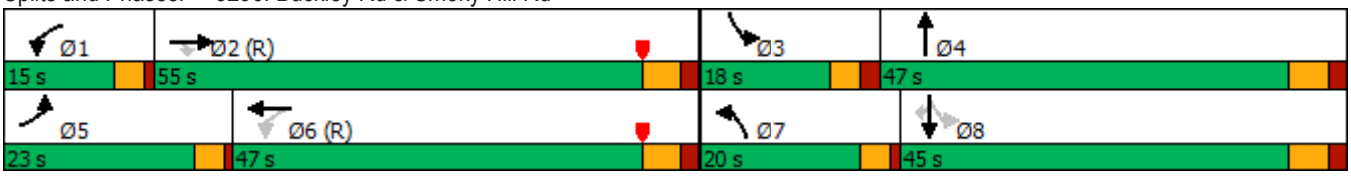
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	7.0	39.0	39.0	7.0	39.0		7.0	42.0		8.0	43.0	43.0
Total Split (s)	23.0	55.0	55.0	15.0	47.0		20.0	47.0		18.0	45.0	45.0
Total Split (%)	17.0%	40.7%	40.7%	11.1%	34.8%		14.8%	34.8%		13.3%	33.3%	33.3%
Maximum Green (s)	19.0	49.0	49.0	11.0	41.0		16.0	41.0		13.0	39.0	39.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.0	3.0	1.5	3.0		1.5	2.0		1.5	2.0	2.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None		None	None	None
Walk Time (s)		6.0	6.0		6.0			6.0			6.0	6.0
Flash Dont Walk (s)		27.0	27.0		27.0			30.0			31.0	31.0
Pedestrian Calls (#/hr)		7	7		5			6			5	5
Act Effct Green (s)	12.7	52.5	52.5	59.0	48.4		16.0	41.0		50.7	37.9	37.9
Actuated g/C Ratio	0.09	0.39	0.39	0.44	0.36		0.12	0.30		0.38	0.28	0.28
v/c Ratio	0.70	1.18	0.23	0.66	0.89		1.02	1.12		0.81	0.78	0.15
Control Delay	70.6	125.2	12.3	39.0	65.4		126.2	111.4		45.3	51.1	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	70.6	125.2	12.3	39.0	65.4		126.2	111.4		45.3	51.1	0.8
LOS	E	F	B	D	E		F	F		D	D	A
Approach Delay		110.3			62.2			113.7			46.2	
Approach LOS		F			E			F			D	
Queue Length 50th (ft)	100	~904	32	86	514		~199	~636		93	324	0
Queue Length 95th (ft)	140	#1077	84	105	#629		#362	#777		146	403	2
Internal Link Dist (ft)		1720			2414			1109			1126	
Turn Bay Length (ft)	225			155			350			195		
Base Capacity (vph)	483	1376	662	391	1792		209	1065		440	978	500
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.47	1.18	0.23	0.56	0.89		1.02	1.12		0.76	0.76	0.15

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 4 (3%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.18			
Intersection Signal Delay: 85.8		Intersection LOS: F	
Intersection Capacity Utilization 103.2%		ICU Level of Service G	
Analysis Period (min) 15			
Description: Aurora			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3296: Buckley Rd & Smoky Hill Rd



APPENDIX D: CRASH ANALYSIS

Safety Performance Function Analysis

The assessment of the magnitude of safety problems on highway segments has been refined using Safety Performance Functions (SPF). The SPF reflects the complex relationship between traffic exposure measured in Average Daily Traffic (ADT), and accident count for a unit of road section measured in crashes per mile per year. The SPF models provide an estimate of the normal or expected crash frequency and severity for a range of ADT among similar facilities. Two kinds of Safety Performance Functions were calibrated. The first one addresses the total number of crashes and the second one looks only at crashes involving an injury or fatality. This allows for the assessment of the magnitude of safety problems from the frequency and severity standpoint.

Development of the SPF lends itself well to the conceptual formulation of the Level of Service of Safety (LOSS). The concept of level of service uses qualitative measures that characterize safety of a roadway segment about its expected performance and severity. The concept of LOSS was developed by the Colorado Department of Transportation (CDOT) in 2000 and has been applied by CDOT in Colorado and other locations to assess safety performance. If the level of safety predicted by the SPF will represent a normal or expected number of crashes at a specific level of ADT, then the degree of deviation from the norm can be stratified to represent specific levels of safety.

LOSS levels determined by the analysis are:

- LOSS-I Indicates low potential for crash reduction.
- LOSS-II Indicates better than expected safety performance.
- LOSS-III Indicates less than expected safety performance.
- LOSS-IV Indicates high potential for crash 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 crashes/mile as ADT increases. LOSS reflects how the roadway segment or intersection is performing regarding its expected crash frequency and severity at a specific level of ADT. It only provides a crash frequency and severity comparison with the expected norm. It does not, however, provide any information related to the nature of the safety problem itself. If the 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 direct diagnostics and pattern recognition techniques.

APPENDIX E: WEBSITE CONTENT

Centennial
SMOKY HILL ROAD
TRANSPORTATION CORRIDOR STUDY

Welcome

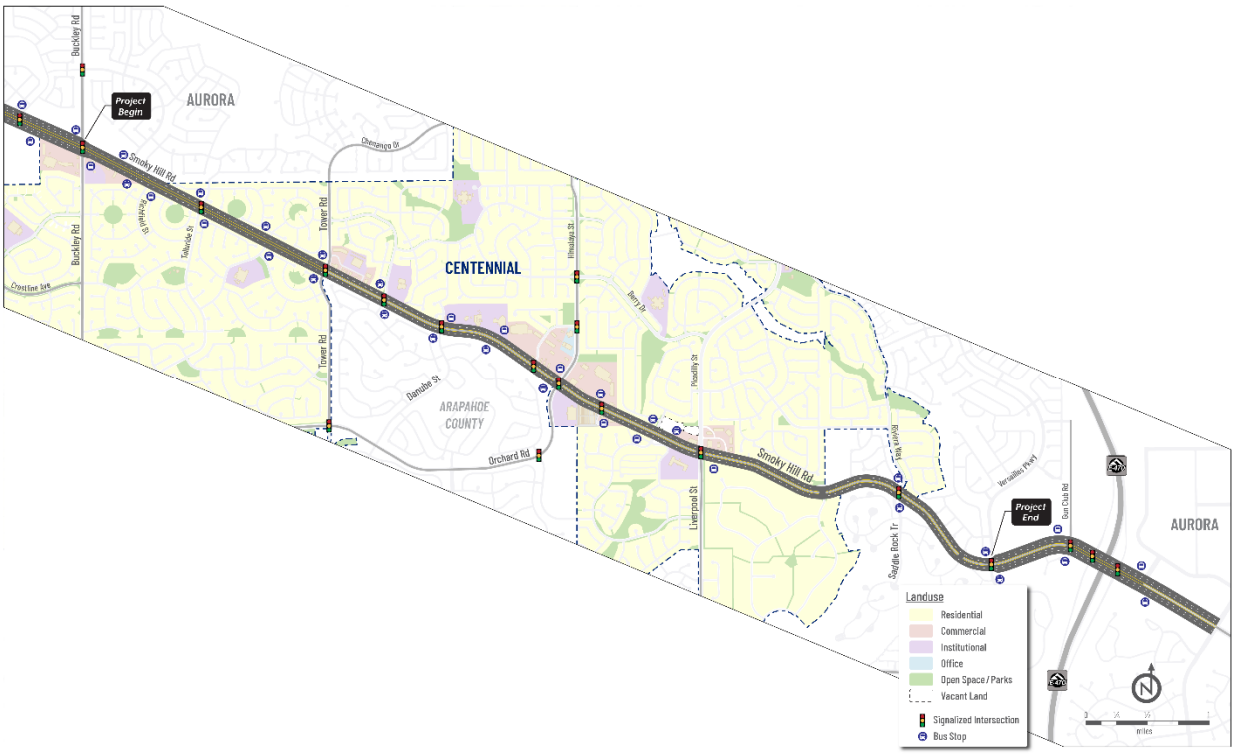
Welcome to the Smoky Hill Road Transportation Corridor Study. This site is intended to provide a place where interested members of the public can review study information, project documents, and schedule updates throughout the study. We also invite interested members to check back on this site regularly for on-going updates on our transportation study for the Smoky Hill Road Corridor. On this page you can find:

- Information on the purpose and goals of this project
- Previously created resources and studies related to the Smoky Hill Road Transportation Corridor
- Up-coming events and milestones for the overall study

Please note, this is a planning study and no projects are currently planned for the Smoky Hill Road Corridor.

Project Description

Smoky Hill Road is a four-lane roadway that experiences safety and operational problems for its travelers. This planning project focuses on a 2.8 mile stretch between Buckley Road and Versailles Parkway/Ponderosa Trail. This is a critical corridor which serves the eastern portion of Centennial and needs a clear vision for how motorists, transit users, bicyclist, and pedestrians can safely, efficiently and comfortably travel.



Share Your Thoughts

Click on the green 'Discussions' bar below to share comments and questions.

(BAR) Discussions

Community Meeting: Click Here to share comments and questions (Insert Link Here)

(BAR) Project Expectations

This project was developed as a City initiative to collect data to determine existing conditions within this segment of Smoky Hill Road, create a list of suggested improvements, analyze improvement costs, and develop an implementation plan.

As a part of the City's Comprehensive Plan, Centennial NEXT, the intended outcome of this study will be to improve the transportation system within

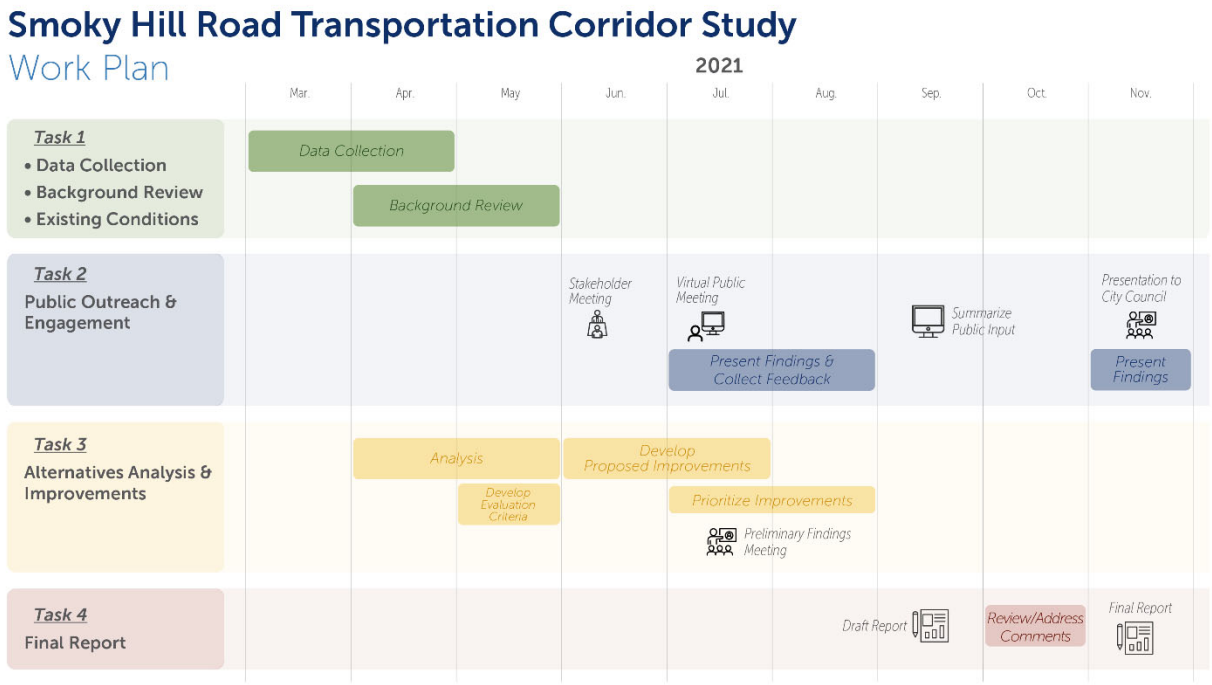
the corridor by providing expanded mobility options, greater connectivity and improved safety for all users. This study will identify and prioritize a list of potential projects along the corridor but is not intended to provide final design or construction documents. The overall goals of the project are:

- Identify future improvements, multimodal connections and opportunities
- Reflect community character through design
- Embrace citizen participation

Recommendations from this plan will be incorporated into the City of Centennial Transportation Master Plan.

(BAR) Schedule and Activities to Date

The first step in the project will be understanding the existing conditions along the corridor. This will include engaging stakeholders to understand the issues the experience in the corridor. We would like to hear what would make their use of this corridor more safe, efficient, and comfortable. Once we understand some of the issues, we will prepare alternatives and evaluation criteria to help us determine which improvements might work best to improve the every-day use of this corridor.



(BAR) Roles and Responsibilities

Rolando Melgoza | rmelgoza@Centennialco.gov | (303)325-8017.

Questions?

											Improve Connectivity				Improve Safety	Expand Mobility Options		Other			
		Goal Category									Consistency with Local Plans	Complexity of Application/Improvement	Vehicular Traffic	Right-of-Way	Safety	Transit	Pedestrian/Bike	Visual	Noise	Hazmat	
		Evaluation Criteria									Implements or accommodates planned improvements from local plans	Physical, structural, or natural challenges that make it complex to implement the application/improvement (qualitative).	LOS, VCR, and arterial travel time (quantitative)	Results in ROW impacts and acquisition requirements	Road crash reduction	Improves connectivity to transit stops	Improves continuity or reduces barriers for pedestrian and bike rider movement	Opportunity to add or remove medians and Landscaping	Potential proximity to number of sensitive noise receptors	Impact on hazardous materials sites	
		Performance Measure(s)									Fully Implements (1), Partially Implements (0), No Impact/Precludes (-1)	Not Complicated (1), Somewhat Complicated (0), Very Complicated (-1)	Quantitative including LOS, V/C ratio and arterial travel time Improves (1), Minimal Change (0), Worsens (-1)	No Impacts (1), Minimal Impacts (0), Substantial Impacts (-1)	Improves (1), No Change (0), Worsens (-1)	Improves (1), No Change (0), Worsens (-1)	Improves (1), No Change (0), Worsens (-1)	No Impacts (1), Some Impacts (0), Many Impacts (-1)	No Impacts (1), Some Impacts (0), Many Impacts (-1)	No Impacts (1), Some Impacts (0), Many Impacts (-1)	Total
Segment	Alternative	Sub-Segment	Through Lanes	Left Turn Lanes	Right Turn Lanes	Median	Landscaping	Sidewalk	ROW Impact	Comments											
Segment 1a: Buckley Road to Wagontrail Parkway	No Build/No Action										-1	1	-1	1	-1	-1	0	1	0	1	0
	Minimal Section	Buckley Rd to Pagosa St	11	10/11	11	5-26	N: 0 S: 6	N: 10 S: 10	N: 16 S: 0	RT from WB Smoky Hill to NB Buckley per traffic analysis	1	-1	1	-1	1	1	1	-1	-1	0	1
		Pagosa St to Wagontrail Pkwy	11	11	-	5-26	N: 0 S: 9	N: 10 S: 10	N: 5-6 S: 0		1	0	1	0	0	1	1	-1	-1	1	3
	Modified Standard Section	Pagosa St to Wagontrail Pkwy	11	11	-	5-26	N: 0 S: 9	N: 10 S: 10	N: 5-6 S: 1-3		1	0	1	0	0	1	1	-1	-1	1	3
Segment 1b: Wagontrail Parkway to Tower Road	No Build/No Action										-1	1	-1	1	-1	0	0	0	1	1	1
	Minimal Section		11	10	-	5-15	N: 0 S: 0	N: 6 S: 6	N: 0 S: 0	9' of landscaping to south (Wagontrail to Richfield)	0	-1	1	0	1	1	0	-1	0	1	2
	Modified Standard Section		-	-	-	-	-	-	-	No alternative provided because ROW impacts are not reasonable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Segment 2: Tower Road to Orchard Road/Himalaya Street	No Build/No Action										-1	1	-1	1	-1	-1	0	1	1	1	1
	Minimal Section	Tower Rd to Gibraltar Wy	11	11	-	5-26	N: 0-9 S: 0-9	N: 10 S: 10	N: 0-3 S: 0-4	Some existing sidewalks outside of ROW, preferable to use easements already in place and expand landscaping	1	-1	1	-1	1	1	1	0	0	-1	2
		Gibraltar Wy to Orchard Rd	11	10/11	11	5-26	N: 0 S: 1-4	N: 10 S: 10	N: 11-12 S: 0	RT lane through sub-segment per traffic analysis	1	-1	1	-1	1	0	1	0	1	0	3
	Modified Standard Section	Tower Rd to Gibraltar Wy	11	11	-	5-26	N: 9 S: 9	N: 10 S: 10	N: 0-12 S: 0-13	No impact to fencing, follows limits of existing sidewalks	1	-1	1	-1	1	1	1	1	1	-1	4
		Gibraltar Wy to Orchard Rd	11	10/11	11	5-26	N: 0 S: 9	N: 10 S: 10	N: 11-12 S: 5-8	RT lane through sub-segment per traffic analysis	1	-1	1	-1	1	1	1	0	1	0	4
Segment 3: Orchard Road/Himalaya Street to Liverpool Street/Picadilly Street	No Build/No Action										-1	1	-1	1	-1	-1	0	0	1	1	0
	Minimal Section	Orchard Rd to 20250 E	11	10/11	11	5-26	N: 0 S: 0	N: 10 S: 6	N: 5-13 S: 0	RT lane through sub-segment per traffic analysis. Sidewalk on south must be inside existing guardrail	1	-1	1	-1	1	1	1	1	1	1	6
		20250 E to Kirk St	11	11	-	15-26	N: 4 S: 4	N: 10 S: 10	N: 0 S: 0		0	0	1	0	0	1	1	-1	-1	1	2
		Kirk St to Liverpool St	11	10/11	11	15-26	N: 0-4 S: 0-4	N: 10 S: 10	N: 0-4 S: 0-11	No landscaping by Sprouts (NW corner of Liverpool intersection)	1	0	1	-1	1	1	1	-1	0	1	4
	Modified Standard Section	Orchard Rd to 20250 E	-	-	-	-	-	-	-	No alternative provided because ROW impacts are not reasonable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
		20250 E to Kirk St	11	11	-	15-26	N: 4 S: 4-9	N: 10 S: 10	N: 0 S: 4-9		1	0	1	0	0	1	1	0	-1	1	4
		Kirk St to Liverpool St	11	10/11	11	15-26	N: 0-9 S: 9	N: 10 S: 10	N: 4-5 S: 4-15	No landscaping by Sprouts (NW corner of Liverpool intersection)	1	0	1	-1	1	1	1	0	1	1	6
Transit Improvements (Segments 1 - 3)	No Build/No Action	Projectwide	Roadway design as shown above for No Build/No Action Alternative for Segments 1, 2, 3 and 4.								-1		-1		-1	-1	0	0	0	0	-4
	Widen to 6 Lanes, install additional general purpose lanes	Projectwide	Roadway design as shown above for Minimal Section Alternative for Segments 1, 2, 3 and 4.								1		1		1	1	1	-1	-1	-1	2
	Widen to 6 Lanes, install Peak Period Bus Lanes in additional lanes	Projectwide	Roadway design as shown above for Minimal Section Alternative for Segments 1, 2, 3 and 4.								-1		-1		0	1	1	-1	-1	-1	-3
	Widen to 6 Lanes, install Full Time Bus Lanes in additional lanes	Projectwide	Roadway design as shown above for Minimal Section Alternative for Segments 1, 2, 3 and 4.								-1		-1		0	1	1	-1	-1	-1	-3

APPENDIX C

Centennial
SMOKY HILL ROAD
TRANSPORTATION CORRIDOR STUDY

PUBLIC ENGAGEMENT REPORT

Smoky Hill Road Transportation Corridor Study

January 2022

Prepared for:

City of Centennial
7272 South Eagle Street
Centennial, CO 80112

Prepared by:

Muller Engineering Company
777 South Wadsworth Boulevard
Suite 4-100
Lakewood, Colorado 80226
303.988.4939

Muller Project Number: 20-010.01

MULLER
ENGINEERING COMPANY

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Appendices

1 BACKGROUND

The City of Centennial is preparing the Smoky Hill Road Corridor Transportation Study to understand how motorists, pedestrians, cyclists and transit users can safely, efficiently, and comfortably travel on the corridor. Smoky Hill Road is a arterial corridor serving the eastern portion of the City of Centennial. The study area includes Smoky Hill Road between the intersections with Buckley Road, which shares a boundary with the City of Aurora, and Liverpool Street/Picadilly Street, which is located in the City of Centennial. The Project Team is made up of City of Centennial Staff and consultants from Muller Engineering.

Project Goals:

- *Expand Multimodal Connectivity*
- *Greater Mobility*
- *Improve Safety*
- *Provide for Consistency in Format*
- *Minimize Impacts to Natural & Social Resources*

There have been several communications and outreach efforts with residents and corridor users near the Study area. These communications have been essential in determining the needs of the corridor, informing the public on potential roadway improvements, and gauging the public's opinions and concerns about the corridor. This data will be used to inform latter stages of the project and in consideration of potential improvements.

2 STAKEHOLDERS

The project team identified a list of stakeholders who would be consulted and informed throughout the process of the study. All of these stakeholders were sent postcards with informaiton on how to get involved with the virtual survey conducted. The following list summarizes the list of organizations that were considered stakeholders:

- City of Aurora
- Arapahoe County
- RTD: Smoky Hill & Picadilly Park-n-ride
- Smoky Hill High School
- Centennial Council of Neighborhoods
- Smoky Hill HOA
- Shenandoah ON Smoky Hill HOA
- Trails West Elementary
- Montessori School of Aurora
- Merryhill Preschool
- Smoky Hill Library
- Melvin Schoolhouse Museum & Library
- Saddle Rock Golf Course
- The Barn
- Smoky Hill Baptist Church
- Smoky Hill United Methodist Church
- Smoky Hill Vineyard Church
- Edge Church
- Lord of the Hills Lutheran Church
- Smoky Hill Village Shopping Mall
- Hope Starts Here Food Bank
- Smoky Hill Town Center Shopping Mall
- Aurora Animal Hospital
- Rocky Mountain Urgent Care & Family Medicine
- Peakview Assisted Living
- Bridges at Smoky Hill Shopping Mall
- Smoky Hill Metropolitan District
- Corridor Users

3 DISTRIBUTION OF PROJECT UPDATES

To better understand corridor issues and concerns, the Project Team initiated several events to solicit public engagement along the corridor. In conjunction with the City of Centennial, opportunities to collect input were provided through the project website, E-Newsletters, one-on-one meetings, and mailings. Since there are several projects occurring within corridor, a logo was created to help the public clearly identify this transportation study (Figure 1).

Centennial
SMOKY HILL ROAD
TRANSPORTATION CORRIDOR STUDY

Figure 1. Smoky Hill Road Transportation Corridor Study Logo

3.1 Website

The project website (Centennitalco.gov/smokyhill) (Figure 2) serves as a hub of information and provides a platform for engagement opportunities for the general public. Information shared on the project website can be viewed in Appendix A. As of December 9, 2021, there have been 201 unique page views for this project page. As the study continues, project documents and reports will be provided as well as updates on the project schedule and status.

Figure 2. Project Website

3.2 E-Newsletters

E-newsletter updates were sent to the City's District 3 & 4 email databases.

July 30th: The first E-Newsletter was distributed to the District 3 email list (of 1,864 recipients). This newsletter gave a brief overview of the purpose of the project, the project limits, and a link to the project website and survey. There was a 32% open rate on this newsletter.

August 13th: The second e-newsletter went to the District 4 email list (563 recipients), with a 29% open rate. This newsletter gave a brief overview of the purpose of the project, the project limits, and a link to the project website and survey.

October 21st: The final E-Newsletter was sent to the District 4 email list, now with 644 recipients. This newsletter had a 30% open rate. This newsletter updated the public that the survey had closed, and that a report of the survey's findings would be available near the end of the year.

3.3 Mailings

Project postcards (Figure 3) were sent to stakeholders along the corridor to inform them about the project, provide a link to the project website, and to encourage public participation and involvement. A total of 27 postcards were mailed. All comments received were tracked and, when needed, responded to by a member of the Project Team.

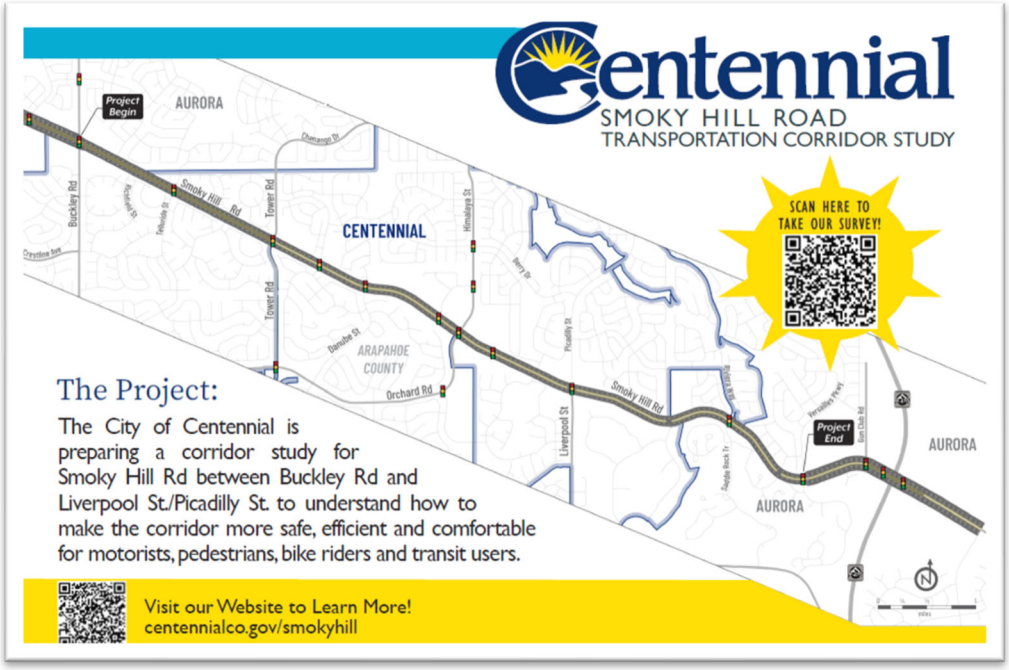


Figure 3. Project Postcard

4 PUBLIC INPUT OPPORTUNITIES

4.1 Summer Social Event

On July 29, 2021, four members of the Project Team attended the Centennial Summer Social event to present information to the public on the Project. As part of this presentation booth, the staff distributed postcards (Figure 2) which included QR codes to the project website and survey.

For more information on this event, please see Appendix B. Summer Social Event Summary**.**

4.2 Online Survey

An online survey was used to collect public comment for the website, postcard mailings, and the Summer Social Event. Having an online survey created more accessibility for the public to participate in the survey and engage the audience, without having to attend the in-person event at the Summer Social. Instead, the online survey allowed participants to provide input on their own time. It also allowed for participants who were not able to attend in person, or who preferred not to attend in person due to the COVID-19 pandemic, to still participate and provide input.

The online survey was composed of four multiple choice survey questions, and two open-ended response questions. The questions aimed to understand the typical corridor use, the typical mode of travel along the corridor, and any concerns they may have about their experience using the corridor.

The online survey was publicized through E-Newsletters, postcard mailings, the Summer Social event, the Project Website, and word of mouth. Between July 29, 2021 and August 23, 2021, there were 28 survey responses collected.

A quick summary of the responses received can be seen in the tables below:

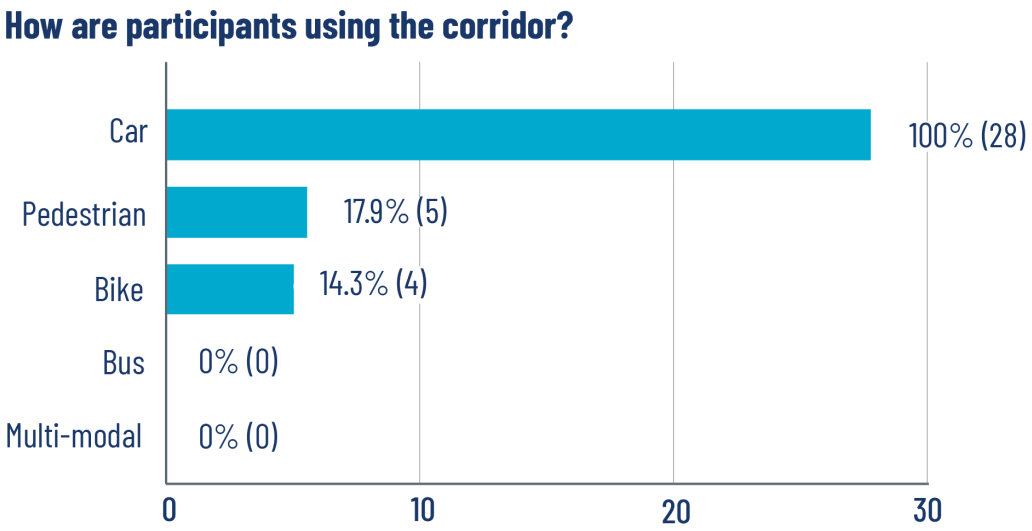


Figure 4. Preferred Transit Modes

Figure 4 shows that all of the survey participants use a car to travel along the corridor, however, almost 18% of the individuals also responded they walk along the corridor, and approximately 14% bike along the corridor.

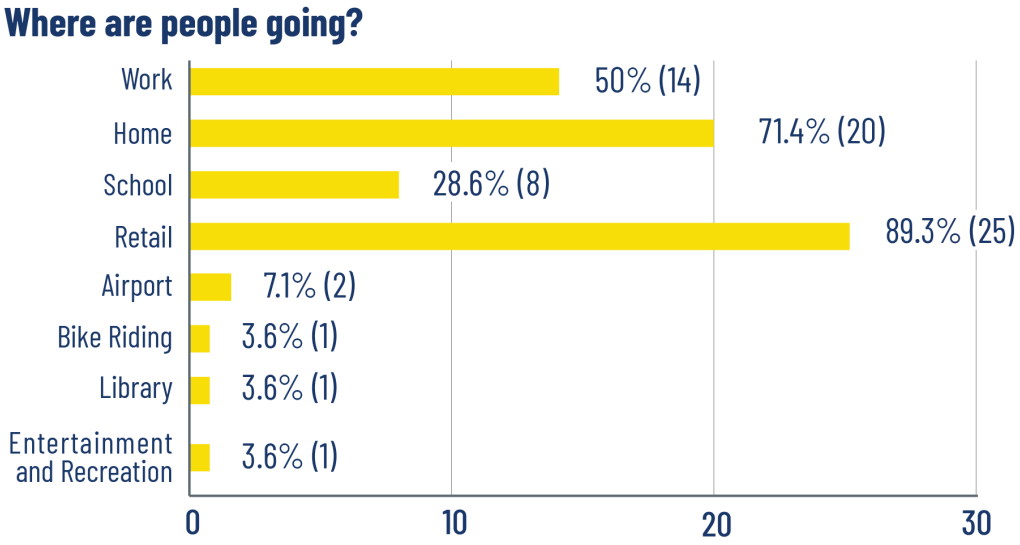


Figure 5. Destination of Corridor Users

Of the corridor users surveyed, a large majority are using Smoky Hill Road to access retail establishments (Figure 5). A slightly smaller group of surveyed corridor users are using Smoky Hill Road to commute to and from work or their homes.

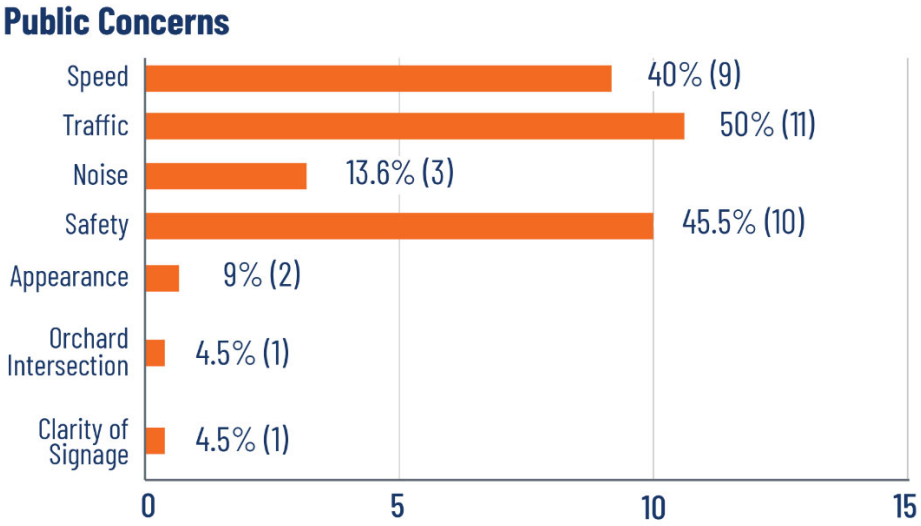


Figure 6. Largest Public Concerns

Figure 6 depicts the largest concerns of the public surveyed were congestion (often referred to by the public as “traffic”), safety, and speed. These results also lead into the following graphic (Figure 7), which shows that improving road safety and reducing congestion were the two highest ranked potential improvements in the survey.

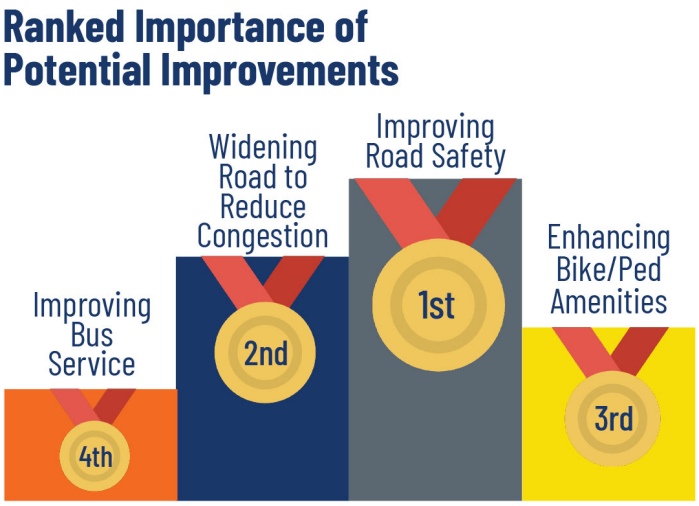


Figure 7. Importance of Potential Improvements

5 INCORPORATING INPUT COLLECTED

The results of the survey data, as well as discussions with members of the public and corridor stakeholders, have been distributed to the Project Team for review. This input will be incorporated into the Alternatives Analysis. The public's concerns about congestion and speed reduction, and their desires for widening the road and improving road safety will be incorporated into how the alternatives are evaluated.

Appendix A. Website Content

Centennial
SMOKY HILL ROAD
TRANSPORTATION CORRIDOR STUDY

Welcome

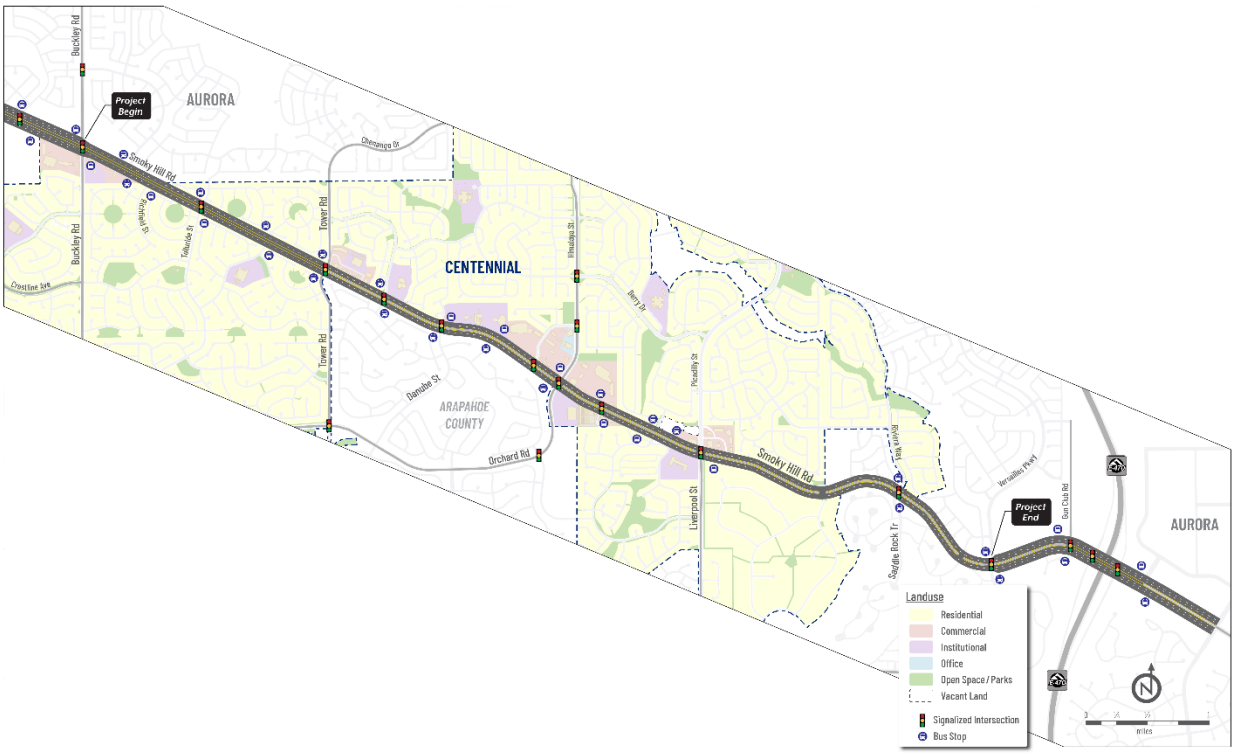
Welcome to the Smoky Hill Road Transportation Corridor Study. This site is intended to provide a place where interested members of the public can review study information, project documents, and schedule updates throughout the study. We also invite interested members to check back on this site regularly for on-going updates on our transportation study for the Smoky Hill Road Corridor. On this page you can find:

- Information on the purpose and goals of this project
- Previously created resources and studies related to the Smoky Hill Road Transportation Corridor
- Up-coming events and milestones for the overall study

Please note, this is a planning study and no projects are currently planned for the Smoky Hill Road Corridor.

Project Description

Smoky Hill Road is a four-lane roadway that experiences safety and operational problems for its travelers. This planning project focuses on a 2.8 mile stretch between Buckley Road and Versailles Parkway/Ponderosa Trail. This is a critical corridor which serves the eastern portion of Centennial and needs a clear vision for how motorists, transit users, bicyclist, and pedestrians can safely, efficiently and comfortably travel.



Share Your Thoughts

Click on the green 'Discussions' bar below to share comments and questions.

(BAR) Discussions

Community Meeting: Click Here to share comments and questions (Insert Link Here)

(BAR) Project Expectations

This project was developed as a City initiative to collect data to determine existing conditions within this segment of Smoky Hill Road, create a list of suggested improvements, analyze improvement costs, and develop an implementation plan.

As a part of the City's Comprehensive Plan, Centennial NEXT, the intended outcome of this study will be to improve the transportation system within

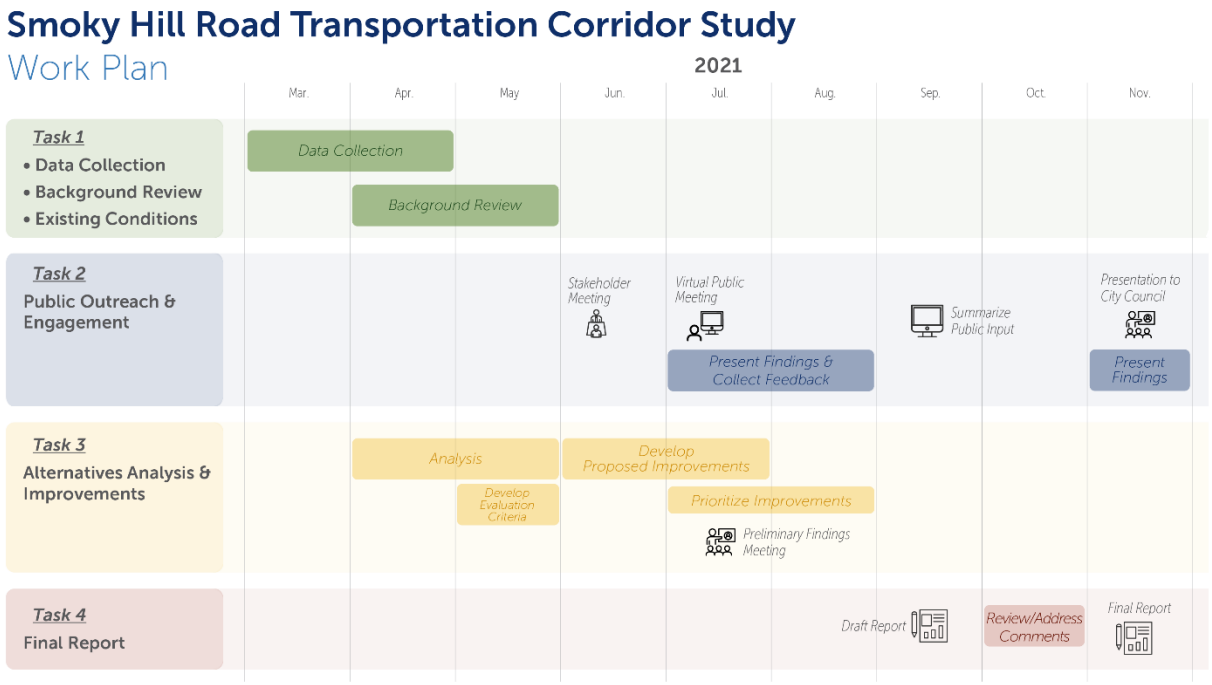
the corridor by providing expanded mobility options, greater connectivity and improved safety for all users. This study will identify and prioritize a list of potential projects along the corridor but is not intended to provide final design or construction documents. The overall goals of the project are:

- Identify future improvements, multimodal connections and opportunities
- Reflect community character through design
- Embrace citizen participation

Recommendations from this plan will be incorporated into the City of Centennial Transportation Master Plan.

(BAR) Schedule and Activities to Date

The first step in the project will be understanding the existing conditions along the corridor. This will include engaging stakeholders to understand the issues the experience in the corridor. We would like to hear what would make their use of this corridor more safe, efficient, and comfortable. Once we understand some of the issues, we will prepare alternatives and evaluation criteria to help us determine which improvements might work best to improve the every-day use of this corridor.



(BAR) Roles and Responsibilities

Rolando Melgoza | rmelgoza@Centennialco.gov | (303)325-8017.

Questions?

Right Hand Side Bar

Timeline

- March – May, 2021: Data Collection and Background Review
- June - August, 2021: Development and categorization of proposed improvements
- June, 2021: Stakeholder Meetings
- July, 2021: Virtual Public Meeting
- July – August, 2021: Present findings & Collect Input
- September – October, 2021: Summarize public Input and Draft Report
- October, 2021: Review Draft Report with City and Stakeholders
- November, 2021: Present Findings to City Council
- December: Submit Final Report

Appendix B. Summer Social Event Summary

PUBLIC INPUT EVENT SUMMARY

Project:	Smoky Hill Road Transportation Corridor Study
Client:	City of Centennial
PI Description:	Centennial Summer Social
Meeting Date:	July 29, 2021
Meeting Location:	Centennial Center Park
Muller Project #:	21-010.01
Notes Prepared By:	Addy Stearns
Notes Issue Date:	August 6, 2021

DISCUSSION

On July 29, 2021, four members of the Smoky Hill Road Transportation Corridor Study team attended the Centennial Summer Social event to present information to the public on the Project. The event featured singing and dancing performances by youths, live music, food trucks, face painting, and balloon animals, along with numerous other tents providing information on the Centennial Transportation Master Plan, the new HealthONE Centennial Hospital, and the Smoky Hill Road Transportation Corridor Study, among others. The Project team brought postcards with QR codes for the project website and survey, a map for people to mark where they live or areas of concern along the corridor, extra printouts of the QR codes for the table, a banner, and Centennial and Muller branded giveaways such as frisbees, Chapstick, and candy.

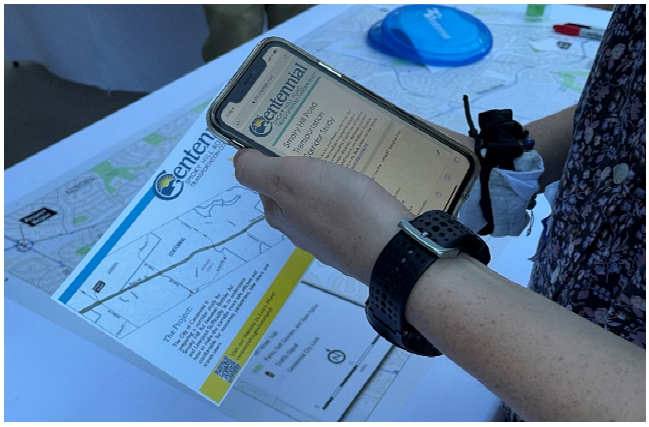


Figure 1: Project information table, postcard, and survey

Muller team members walked around the event to discuss the Project with the public and hand out the postcards directing them to the survey and website. Members of the public also came to the table to discuss the project and mark where they live on the map. As of August 6, 2021, 16 people responded to the survey. The following section outlines the talking points that the Project team focused on when discussing the project with the public.

Figure 2: Speaking with members of the public

PROJECT INFORMATION SHARED

The purpose of the corridor study is to provide a clear vision for how motorists, transit users, bicyclist, and pedestrians can safely, efficiently, and comfortably travel. As part of the City's Comprehensive Centennial NEXT Plan, the intended outcome is to improve the transportation system within the Smoky Hill corridor by providing expanded mobility options, greater connectivity, and improved safety for all users. This study aims to identify and prioritize a list of potential projects along the corridor. It is not intended to provide design or construction documents.

Project Goals:

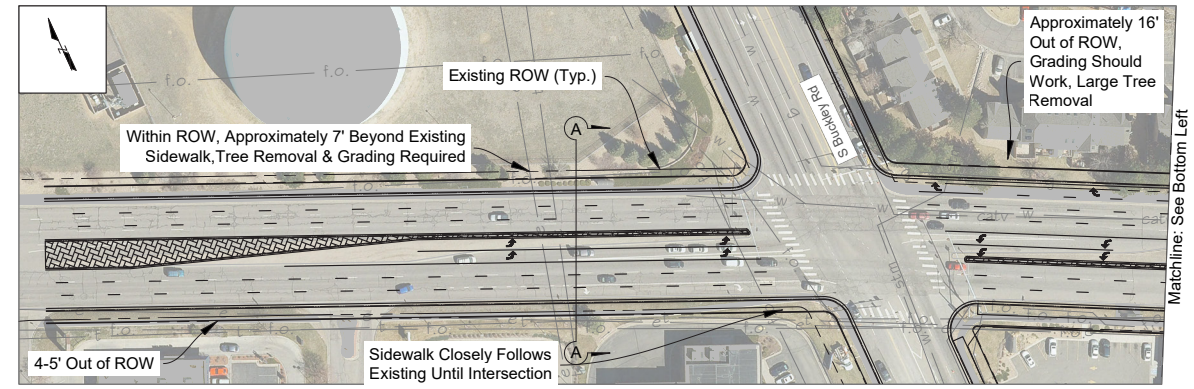
- Identify future improvements, multimodal connections, and opportunities
- Reflect community character through design
- Embrace citizen participation

Location: Smoky Hill Road is a four-lane roadway that experiences safety and operational issues for its travelers. This planning project focuses on a 2.8 mile stretch between Buckley Road and Versailles Parkway/Ponderosa Trail. This is a critical corridor which serves the eastern portion of Centennial.

Figure 3: A section of the map of Smoky Hill Road Transportation Corridor Study

Project to Date: The first step of the project was to gain an understanding of the existing conditions along the corridor. This included engaging stakeholders through the website and one-on-one meetings to understand the issues they experience in the corridor.

Project Timeline: After the Summer Social Event, the Project Team began to develop alternatives and evaluation criteria, which will allow them to determine which improvements will best improve the everyday use of the corridor. After gathering more public input and addressing comments on the prioritized improvements, a final report with findings will be presented to City Council in November. The recommendations from this plan will be incorporated into the City of Centennial Transportation Master Plan.



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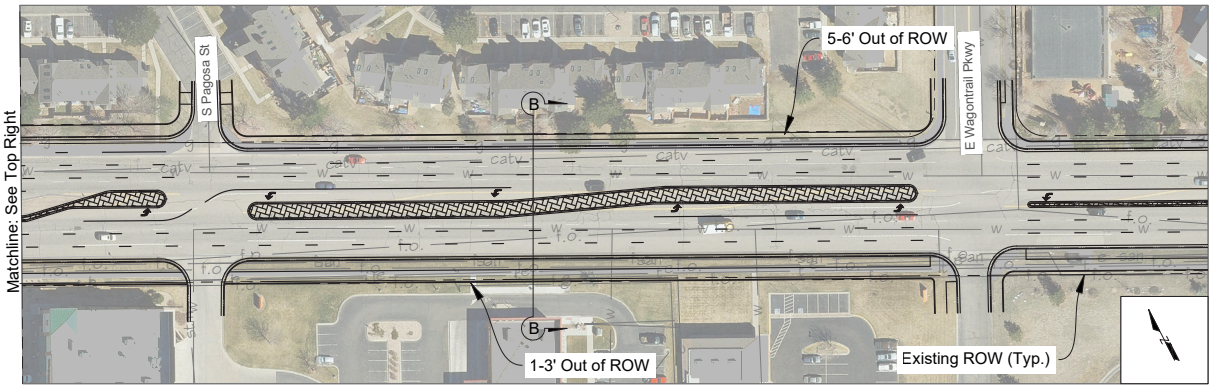

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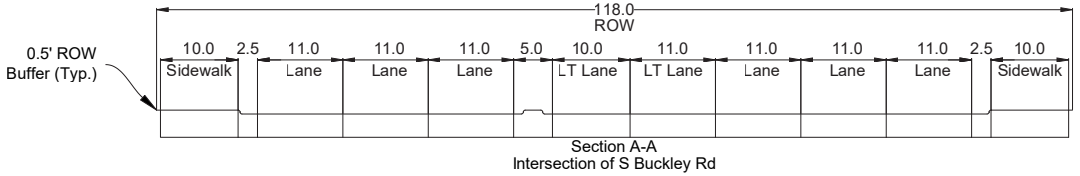
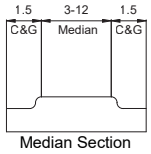
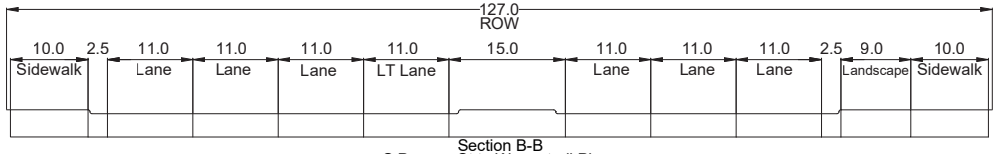


Section A-A
Intersection of S Buckley Rd



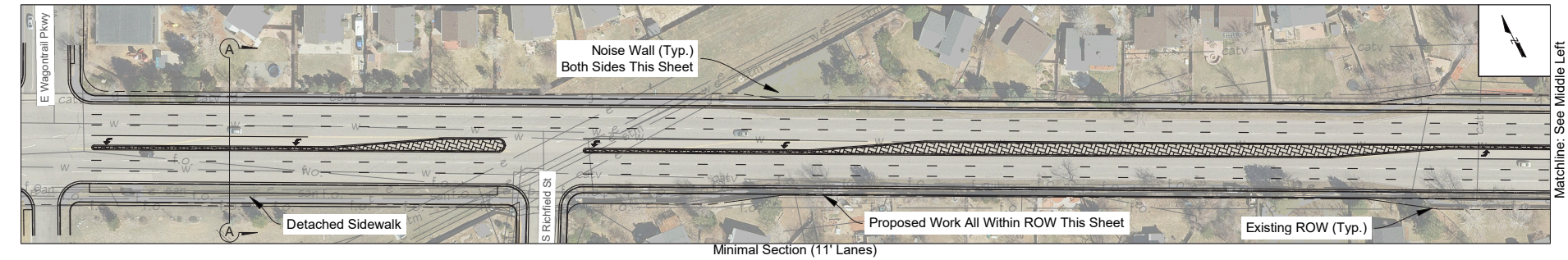
Median Section



Section B-B
S Pagosa St to Wagontrail Pkwy

Smoky Hill Corridor Study
Recommended Alternatives Conceptual Layouts
S Buckley Rd to Wagontrail Pkwy (Sheet 1)
Date: 03/08/2022

Centennial
SMOKY HILL ROAD
TRANSPORTATION CORRIDOR STUDY



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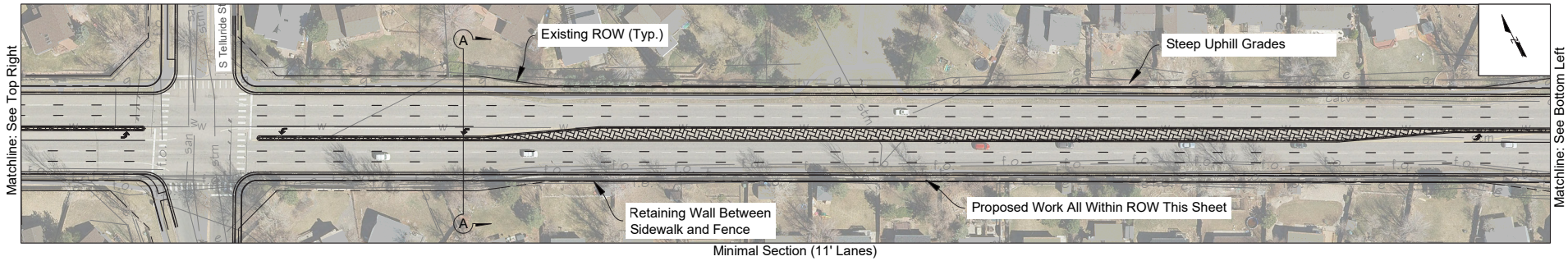

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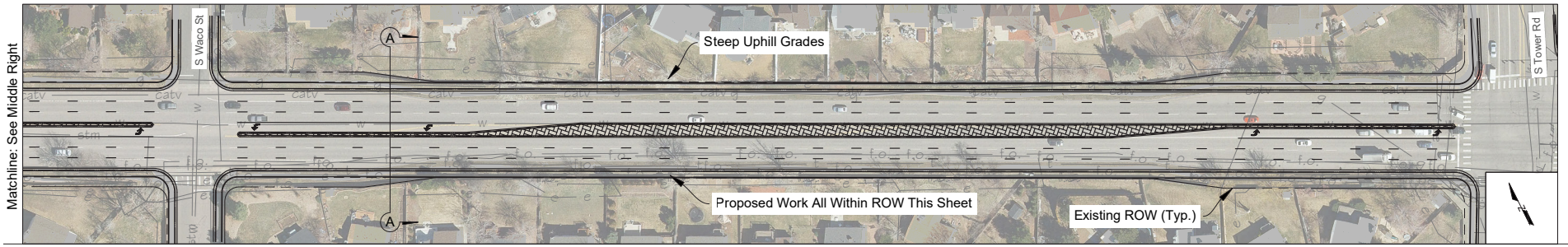

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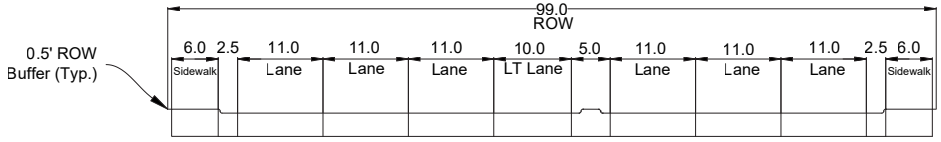
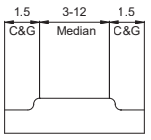


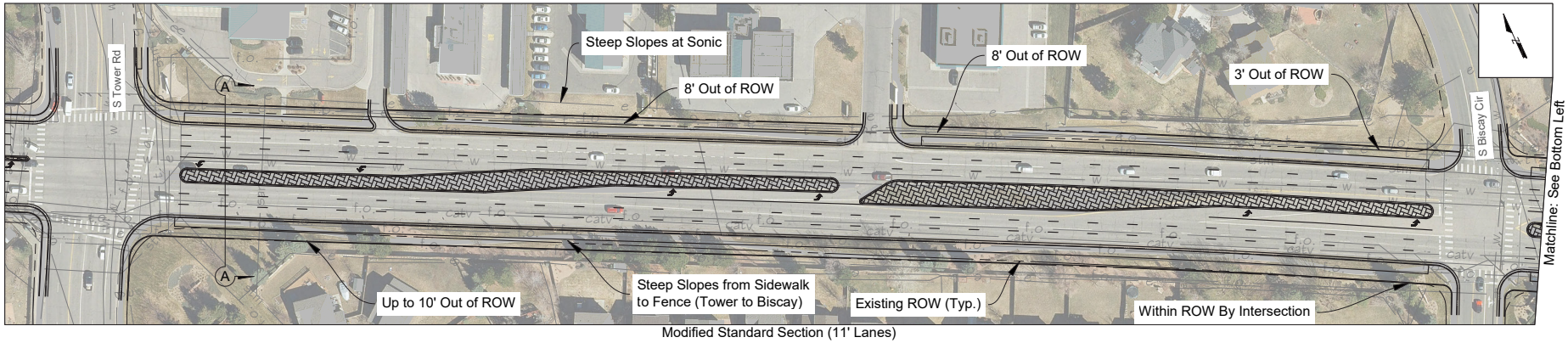
Section A-A
Wagontrail Pkwy to S Tower Rd



Median Section

0 100 200 Feet

Smoky Hill Corridor Study
Recommended Alternatives Conceptual Layouts
Wagontrail Pkwy to S Tower Rd (Sheet 2)
Date: 03/08/2022



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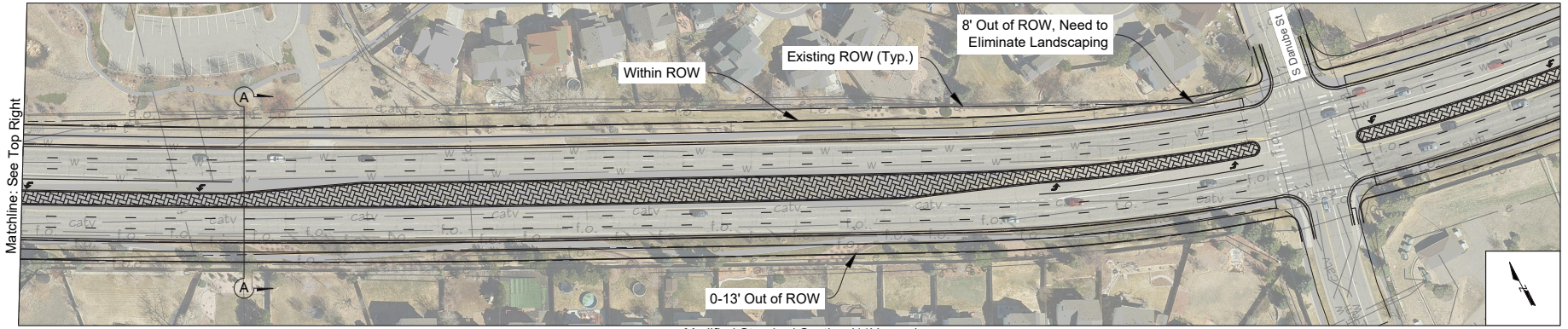

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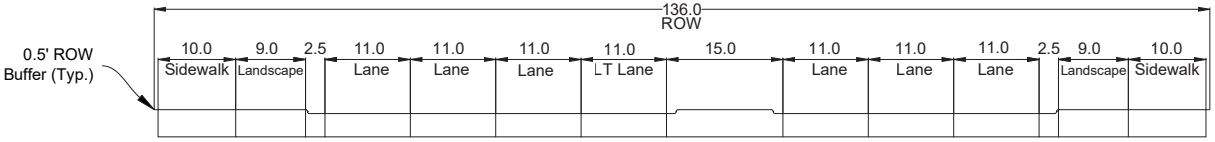
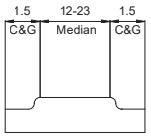


Section A-A
S Tower Rd to S Danube St



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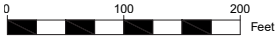
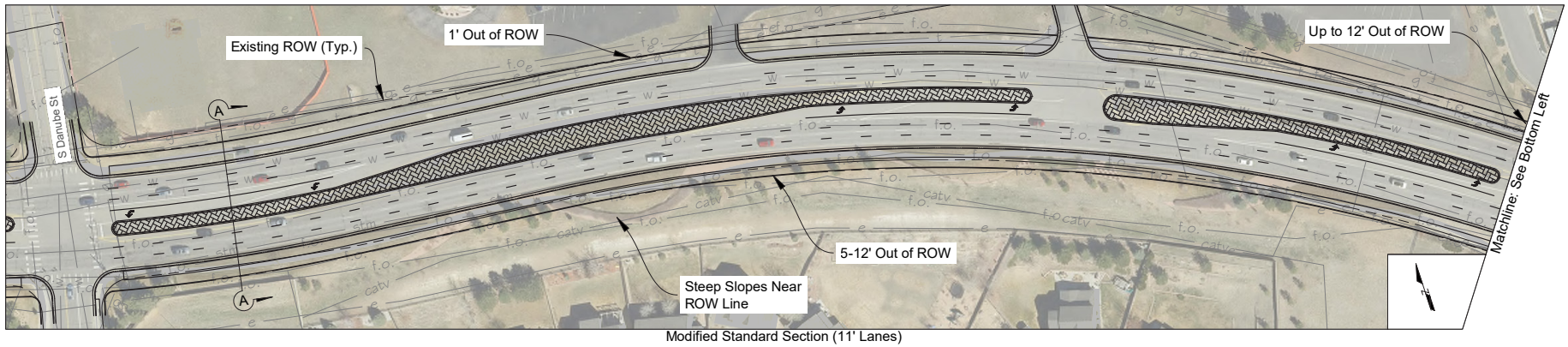


Smoky Hill Corridor Study
Recommended Alternatives Conceptual Layouts
S Tower Rd to S Danube St (Sheet 3)
Date: 03/08/2022



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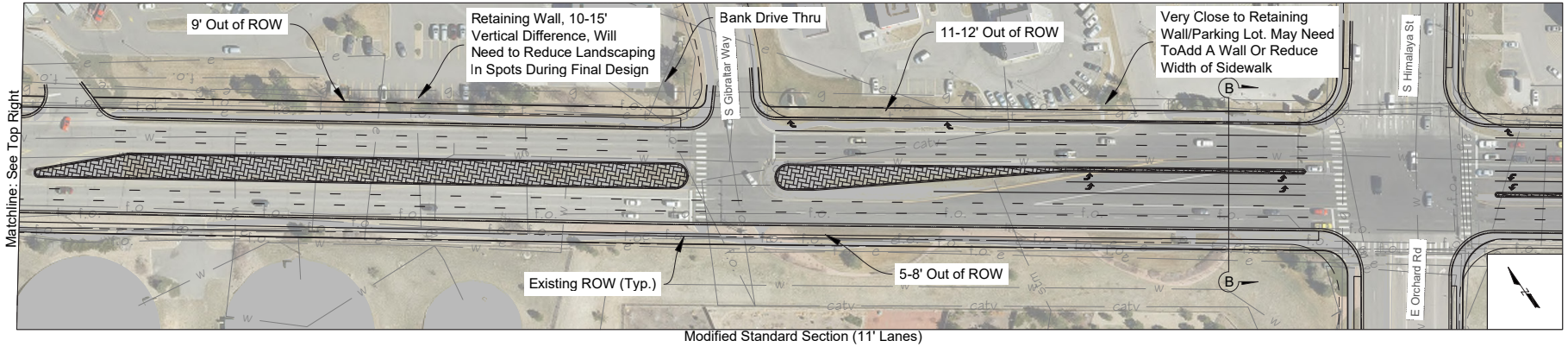
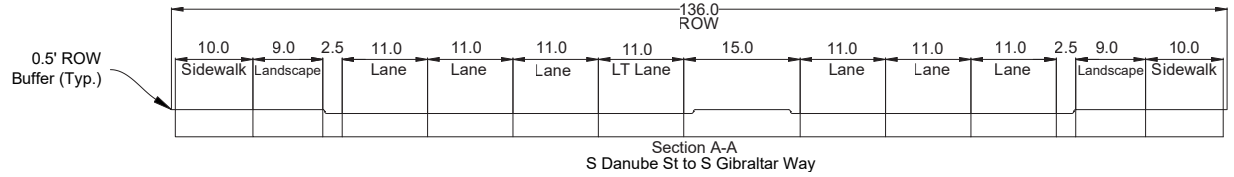
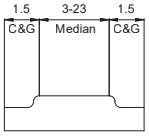


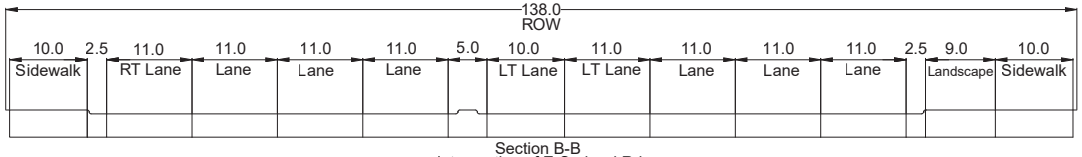
Modified Standard Section (11' Lanes)



Section A-A
S Danube St to S Gibraltar Way

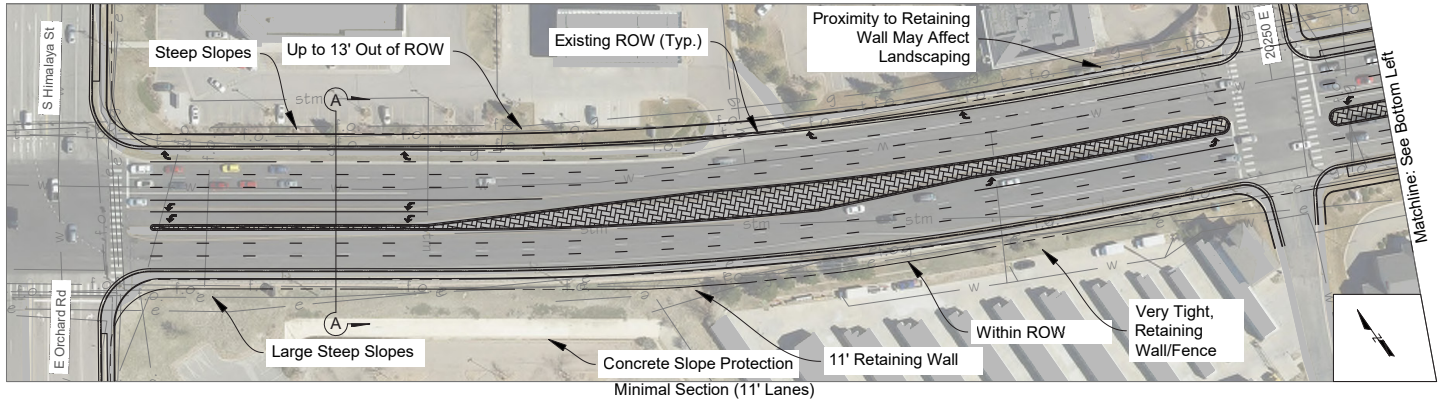


Median Section

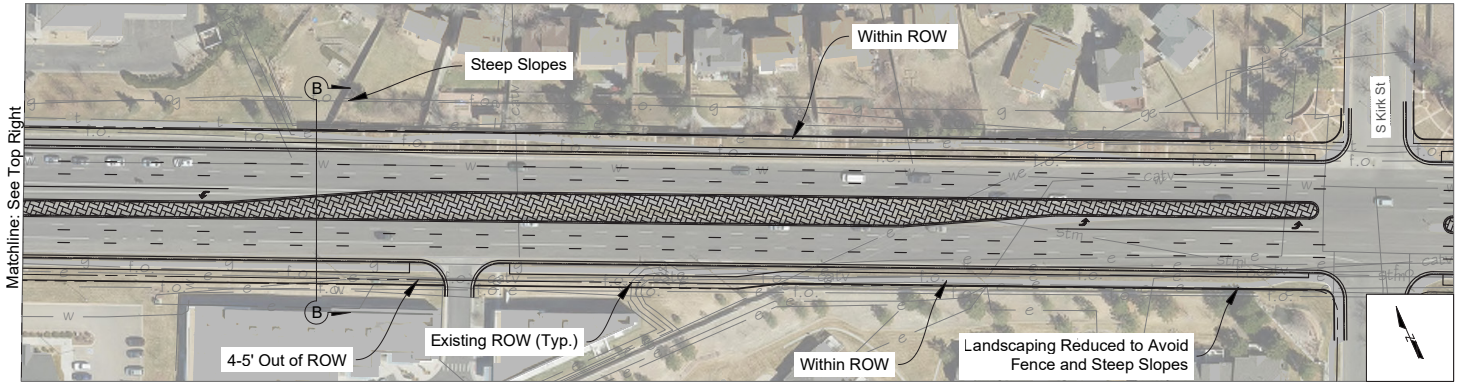


Section B-B
Intersection of E Orchard Rd

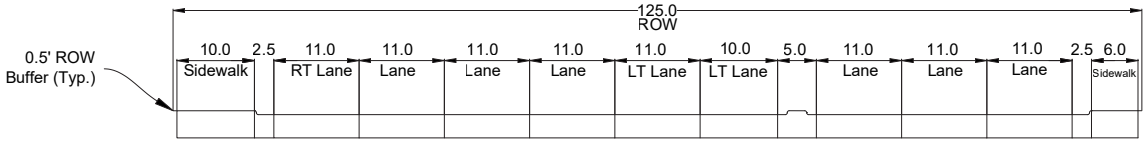
Smoky Hill Corridor Study
Recommended Alternatives Conceptual Layouts
S Danube St to E Orchard Rd (Sheet 4)
Date: 03/08/2022



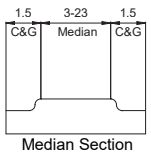
Minimal Section (11' Lanes)



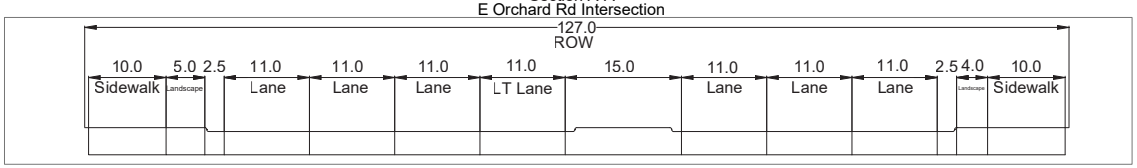
Modified Standard Section (11' Lanes)



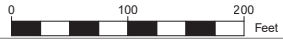
Section A-A
E Orchard Rd Intersection



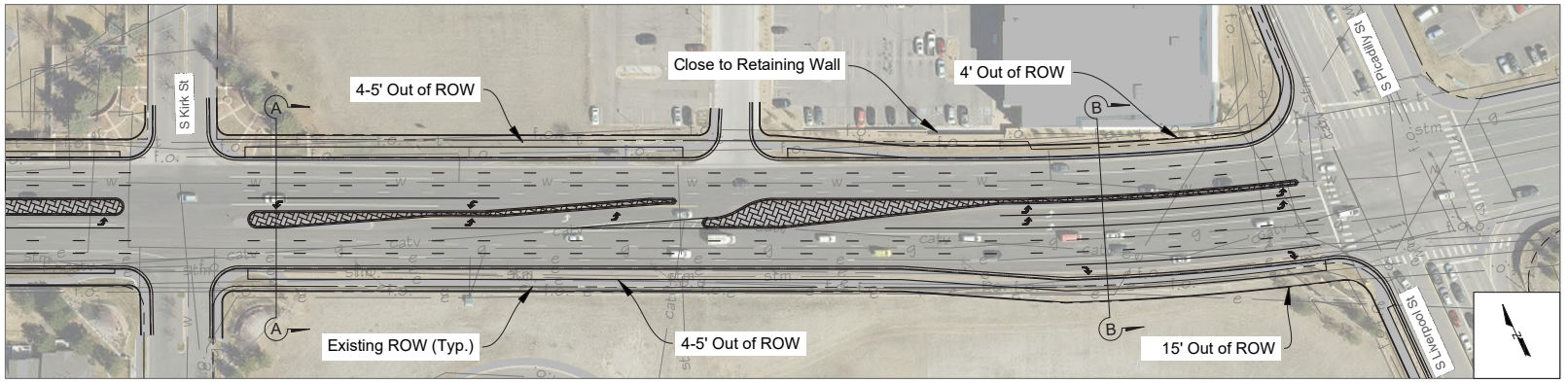
Median Section



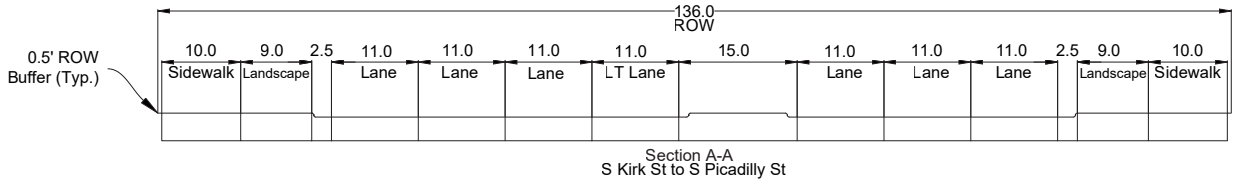
Section B-B
E Orchard Rd to S Kirk St



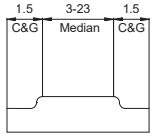
Smoky Hill Corridor Study
Recommended Alternatives Conceptual Layouts
E Orchard Rd to S Kirk St (Sheet 5)
Date: 03/08/2022



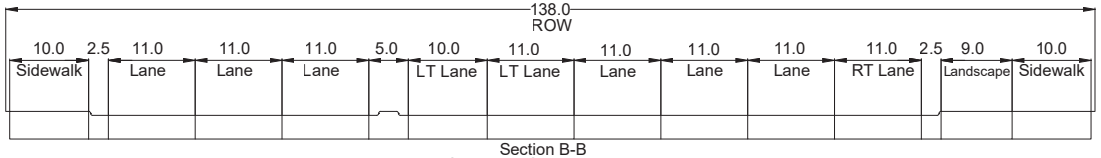
Modified Standard Section (11' Lanes)



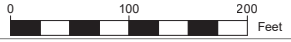
Section A-A
S Kirk St to S Picadilly St



Median Section



Section B-B
S Picadilly St Intersection



Smoky Hill Corridor Study
Recommended Alternatives Conceptual Layouts
S Kirk St to S Picadilly St (Sheet 6)
Date: 03/08/2022

APPENDIX E: TRAFFIC VOLUMES AND ANALYSIS

Auxiliary Right Turn Treatments

A key consideration for the alternatives was considering whether widening could be completed within the existing corridor right-of-way. As part of this process, modifications to auxiliary right turn treatments for the eastbound and westbound right turn movements on Smoky Hill Road were considered. At signalized intersections, where exclusive right turn lanes are currently installed, the potential for converting these to shared through and right -turn lanes was considered.

A target 2050 volume of 150 vehicles per hour (vph) was applied as a threshold to convert shared through and -right turn lanes to dedicated right turn lanes to mitigate operations at intersections. Conversely, right turn volumes were analyzed to see if existing dedicated right turn lanes could be modified to through-right turn lanes to support the third through lane in each direction. **Table E.1** shows each intersection, the AM and PM right turn volumes for 2020 and 2050, existing conditions, and alternatives for each signalized intersection. The right turn treatments were then included in the alternative development. This included changes converting dedicated right turns to shared through/ and right turn lanes at some locations where turning volumes were lower and converting to dedicated right turns at higher volume locations.

Table E.1: Right Turn Treatments at Signalized Intersections

Signalized Intersection	Movement	2020 Vol. (vph) AM/PM	2050 Vol. (vph) AM/PM	Existing Condition	Recommended Condition
Buckley Rd	EBR	148/115	185/140	Dedicated Right	Shared Right
	WBR	149/214	175/302	Shared Right	Dedicated Right
Telluride St	EBR	32/74	30/75	Dedicated Right	Shared Right
	WBR	20/28	20/30	Dedicated Right	Shared Right
Tower Rd	EBR	36/41	45/50	Dedicated Right	Shared Right
	WBR	21/66	21/95	Dedicated Right	Shared Right
Biscay Cir	EBR	11/19	10/20	Shared Right	Shared Right
	WBR	13/73	15/75	Shared Right	Shared Right
Danube St	EBR	10/33	10/35	Shared Right	Shared Right
	WBR	10/25	5/30	Shared Right	Shared Right
Gibraltar Way	WBR	77/174	80/180	Shared Right	Dedicated Right
Orchard Rd/ Himalaya St	EBR	29/56	88/125	Shared Right	Shared Right
	WBR	178/226	236/280	Dedicated Right	Dedicated Right
20250 E/ Safeway Entrance	EBR	22/19	20/20	Dedicated Right	Shared Right
	WBR	13/77	15/80	Dedicated Right	Shared Right
Liverpool St/ Picadilly St	EBR	196/342	380/595	Dedicated Right	Dedicated Right
	WBR	13/91	15/105	Dedicated Right	Shared Right

Note: "Shared Right" refers to a shared through and right turn lane.

Auxiliary Left -Turn Treatments

Some intersections along Smoky Hill Road have single left turn lanes with a striped buffer that provided opportunities for implementing dual left turns. Dual left turn lanes were included in the proposed alternatives for Buckley Road (northbound left), Orchard Road/Himalaya Street (eastbound left), and Liverpool Street/Picadilly Street (southbound left).

Additionally, dual left turn lanes were added to the alternative for the eastbound and westbound left turns at Buckley Road. The City of Aurora currently has a project that will construct this improvement that is in the design stage.

Impact of Proposed Recommended Alternative Improvements

Motorist Operations

The Recommended Alternative Improvements were compared against the No-Build Alternative based on 2050 forecasted traffic volumes. Overall, the Recommended Alternative Improvements performed better than the No Build Alternative under 2050 conditions.

Intersection Performance

A breakdown of LOS and V/C ratio for the existing geometry, the 2020 No-Build, 2050 No-Build, and the 2050 Preliminary Recommended Alternative is provided in **Table E.2.**

Table E.2: Intersection Performance Comparison

Intersection	2020 No Build		2050 (No-Build)		2050 Recommended Alternative)	
	Intersection LOS AM (PM)	Intersection Max V/C AM (PM)	Intersection LOS AM (PM)	Intersection MAX V/C AM (PM)	Intersection LOS AM (PM)	Intersection MAX V/C AM (PM)
Buckley Rd	D(D)	0.98 (0.97)	E (F)	1.05 (1.18)	D (D)	0.95 (1.00)
Telluride St	A (A)	0.73 (0.51)	A (A)	0.78 (0.66)	A (A)	0.79 (0.51)
Tower Rd	C (C)	0.79 (0.67)	D (C)	0.97 (1.00)	D (D)	0.92 (0.89)
Biscay Cir	A (B)	0.45 (0.59)	A (C)	0.78 (0.73)	A (A)	0.76 (0.63)
Danube St	A (A)	0.44 (0.58)	A (A)	0.52 (0.66)	A (A)	0.52 (0.56)
Gibraltar Way	A (B)	0.50 (0.72)	A (B)	0.58 (0.84)	A (A)	0.58 (0.73)
Orchard Rd/ Himalaya St	C (C)	0.59 (0.81)	C (F)	0.85 (1.24)	C (D)	0.81 (0.92)
20250 E/ Safeway Entrance	A (A)	0.37 (0.69)	A (A)	0.52 (0.80)	A (A)	0.36 (0.69)
Liverpool St/ Picadilly St	C (D)	0.74 (0.77)	D (D)	0.86 (1.08)	D (C)	0.84 (0.88)

As shown, under the 2020 No Build conditions, most intersections are operating at LOS D or better and V/C ratios less than 0.95 (the point where over capacity conditions begin, and signalized operations become more challenging). The key exceptions are at the Buckley Road intersection that operates at intersection LOS D during both peak periods and V/C ratios of 0.98/0.97 during the AM/PM peak periods and at the Liverpool Street/Picadilly Street intersection that operates at LOS D in the PM peak period.

In 2050 under the No-Build Alternative, the Buckley Road intersection will degrade to intersection LOS E/F in the AM/PM peak periods and V/C ratios exceeding 1.00. The Orchard Road/Himalaya Street intersection will also degrade to LOS F and a V/C ratio of 1.24 during the PM peak period. The Tower Road intersection (both peak periods) and Liverpool Street/Picadilly Street intersections (PM peak) will have V/C ratios exceeding 0.95.

In 2050 with the Recommended Improvements, all intersections will operate at LOS D or better and all (except one) with V/C ratios of less than 0.95. For V/C ratios, the one exception is at Buckley Road where V/C ratios will be at 0.95/1.00 in the AM/PM peaks suggesting that this intersection will be operating at capacity with the Recommended Alternative Improvements by 2050.

Corridor Operations

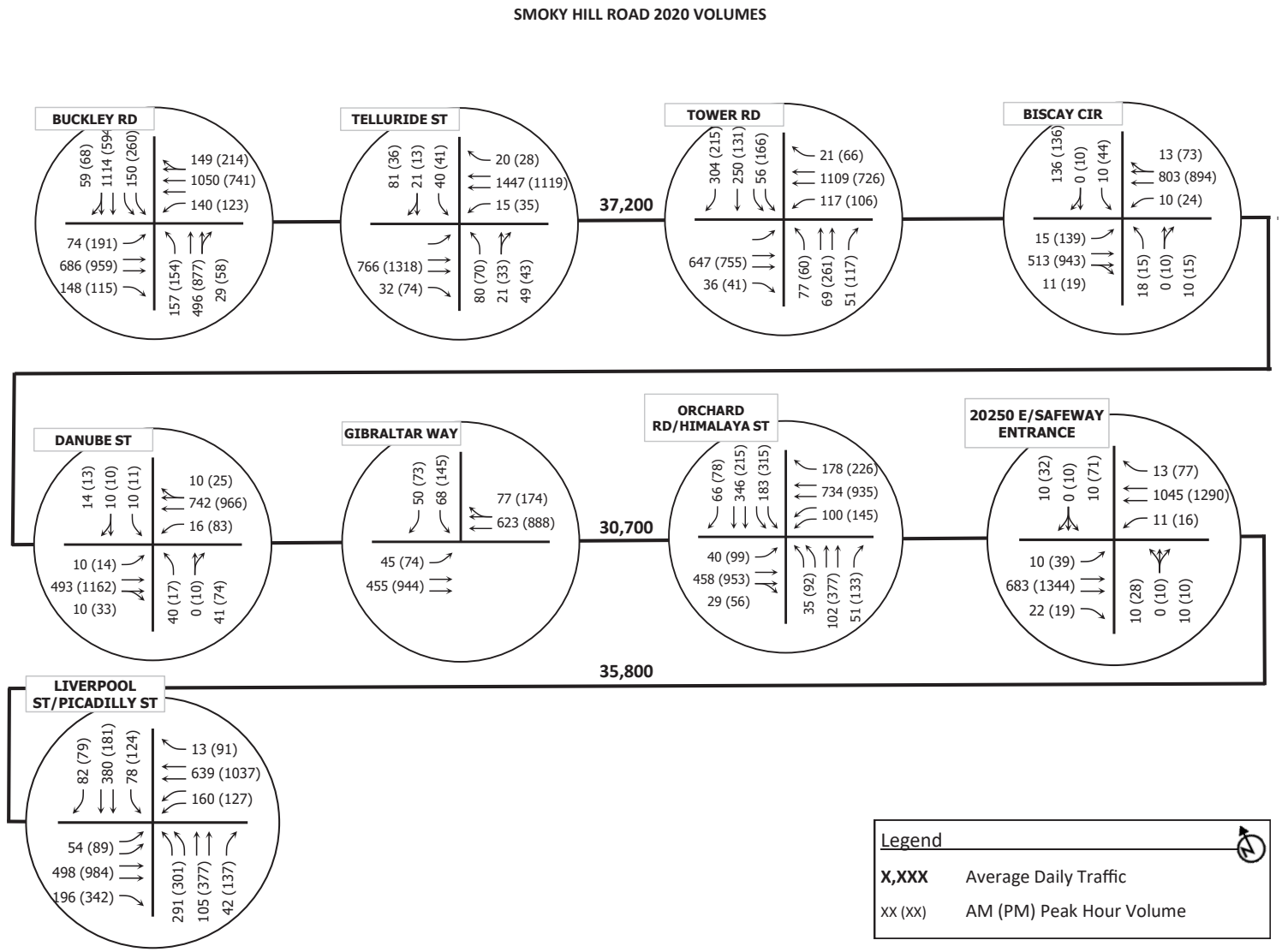
To consider corridor operations with the different alternatives, the arterial level of service was determined using Synchro. The arterial level of service analysis provides several measures of effectiveness including signal delay, speed, travel time, and a level of service for the arterial. This is based on Highway Capacity Manual method for analyzing arterials.

Table E.3 shows measures of effectiveness for arterial level of service. Comparing the No-Build and Recommended Alternatives under 2050 conditions, the PM Peak period will benefit substantially from the Recommended Alternative Improvements. This includes travel time improvements of 278.8 seconds eastbound and 90.5 seconds westbound during the PM Peak period. The corridor will operate under arterial LOS C in 2050 with the alternative improvements in both directions and peak periods. This will provide a similar arterial performance to the 2020 No-Build conditions.

Table E.3: Arterial Level of Service

Intersection	MOE	2020 No-Build AM (PM)	2050 No-Build AM (PM)	Recommended Alternative AM (PM)
Eastbound	Signal Delay (s)	102.3 (134.8)	134.8 (339.1)	131.4 (120.3)
	Speed (mph)	27.5 (25.5)	25.5 (16.0)	25.7 (26.4)
	Travel Time (s)	413.5 (446.0)	446.0 (710.3)	442.6 (431.5)
	Arterial LOS	C (C)	C (E)	C (C)
Westbound	Signal Delay (s)	111.6 (146.9)	169.4 (242.4)	124.9 (151.9)
	Speed (mph)	26.5 (23.9)	23.3 (19.7)	25.7 (23.7)
	Travel Time (s)	421.6 (441.4)	479.4 (536.9)	434.9 (446.4)
	Arterial LOS	C (C)	C (D)	C (C)

APPENDIX E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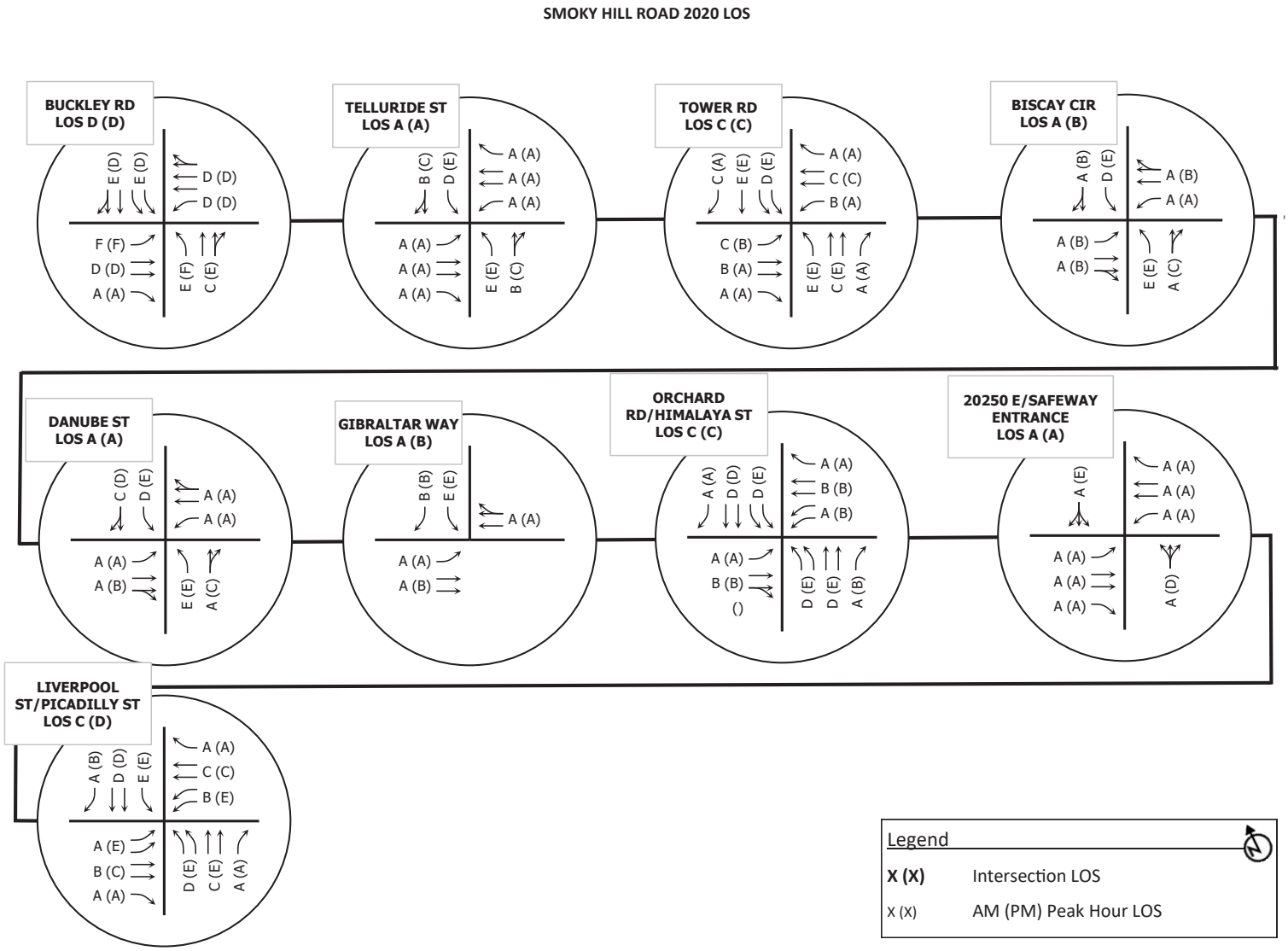
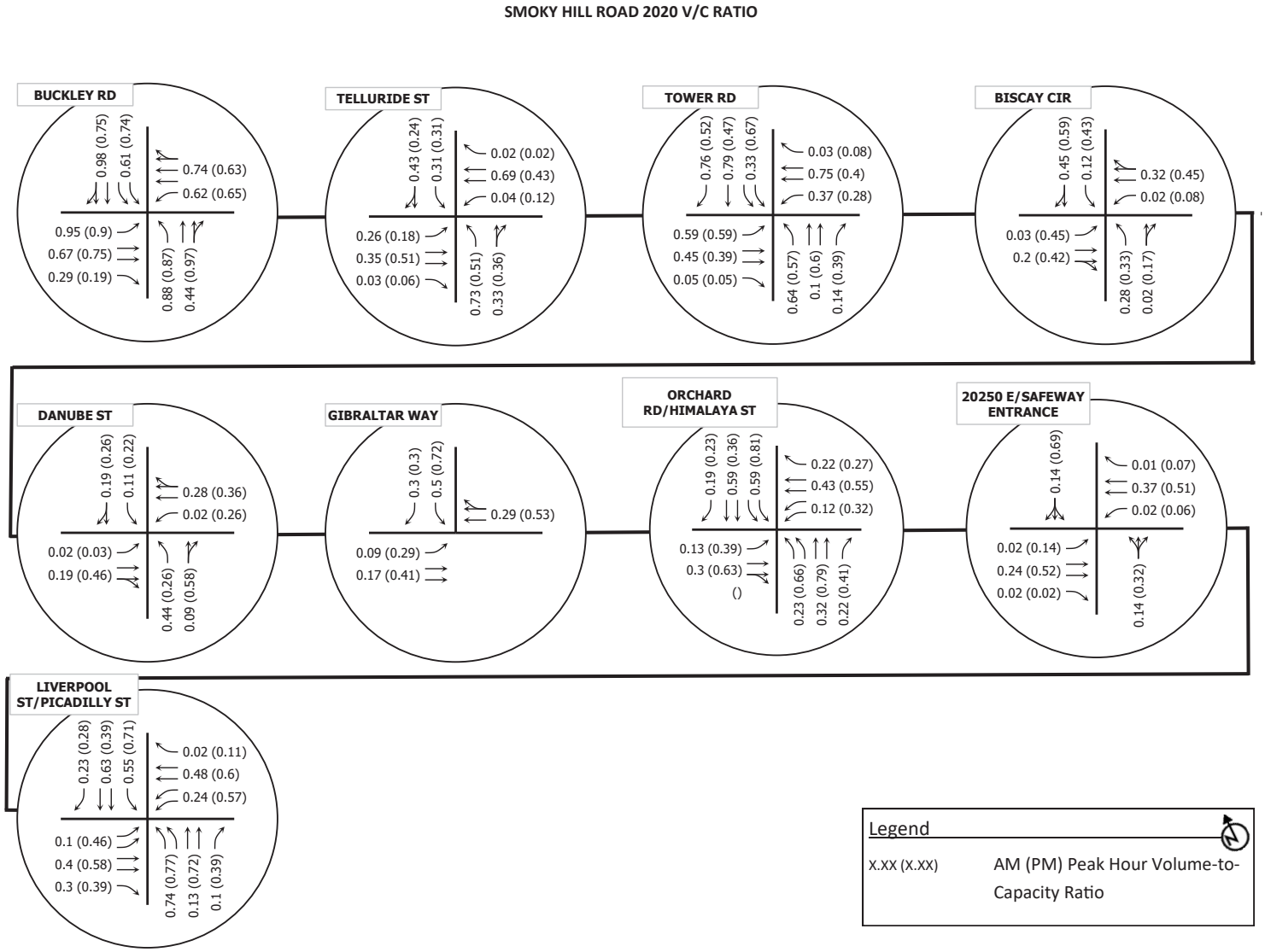
BUCKLEY RD
59 (68)
1114 (594
150 (260)
149 (214)
1050 (741)
140 (123)
74 (191)
686 (959)
148 (115)
157 (154)
496 (877)
29 (58)
TELLURIDE ST
81 (36)
21 (13)
40 (41)
20 (28)
1447 (1119)
15 (35)
766 (1318)
32 (74)
80 (70)
21 (33)
49 (43)
37,200
TOWER RD
304 (215)
250 (131)
56 (166)
21 (66)
1109 (726)
117 (106)
647 (755)
36 (41)
77 (60)
69 (261)
51 (117)
BISCAY CIR
136 (136)
0 (10)
10 (44)
13 (73)
803 (894)
10 (24)
15 (139)
513 (943)
11 (19)
18 (15)
0 (10)
10 (15)
DANUBE ST
14 (13)
10 (10)
10 (11)
10 (25)
742 (966)
16 (83)
10 (14)
493 (1162)
10 (33)
40 (17)
0 (10)
41 (74)
GIBRALTAR WAY
50 (73)
68 (145)
77 (174)
623 (888)
45 (74)
455 (944)
30,700
ORCHARD RD/HIMALAYA ST
66 (78)
346 (215)
183 (315)
178 (226)
734 (935)
100 (145)
40 (99)
458 (953)
29 (56)
35 (92)
102 (377)
51 (133)
20250 E/SAFEWAY ENTRANCE
10 (32)
0 (10)
10 (71)
13 (77)
1045 (1290)
11 (16)
10 (39)
683 (1344)
22 (19)
10 (28)
0 (10)
10 (10)
35,800
LIVERPOOL ST/PICADILLY ST
82 (79)
380 (181)
78 (124)
13 (91)
639 (1037)
160 (127)
54 (89)
498 (984)
196 (342)
291 (301)
105 (377)
42 (137)
Legend
X,XXX Average Daily Traffic
XX (XX) AM (PM) Peak Hour Volume

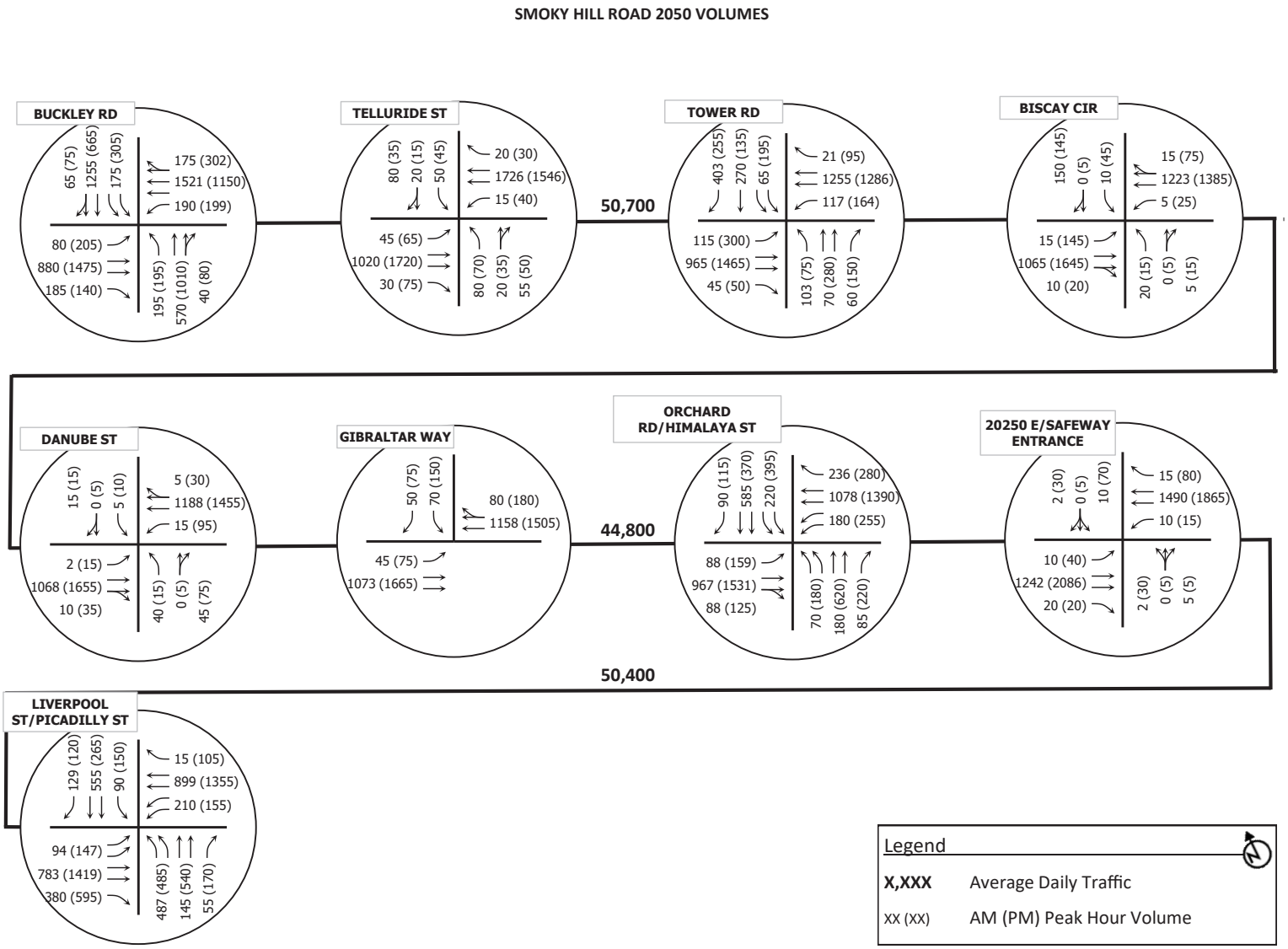
APPENDIX E


SMOKY HILL ROAD 2020 LOS
BUCKLEY RD
LOS D (D)
TELLURIDE ST
LOS A (A)
TOWER RD
LOS C (C)
BISCAY CIR
LOS A (B)
DANUBE ST
LOS A (A)
GIBRALTAR WAY
LOS A (B)
ORCHARD
RD/HIMALAYA ST
LOS C (C)
20250 E/SAFEWAY
ENTRANCE
LOS A (A)
LIVERPOOL
ST/PICADILLY ST
LOS C (D)
Legend
X (X) Intersection LOS
X (X) AM (PM) Peak Hour LOS

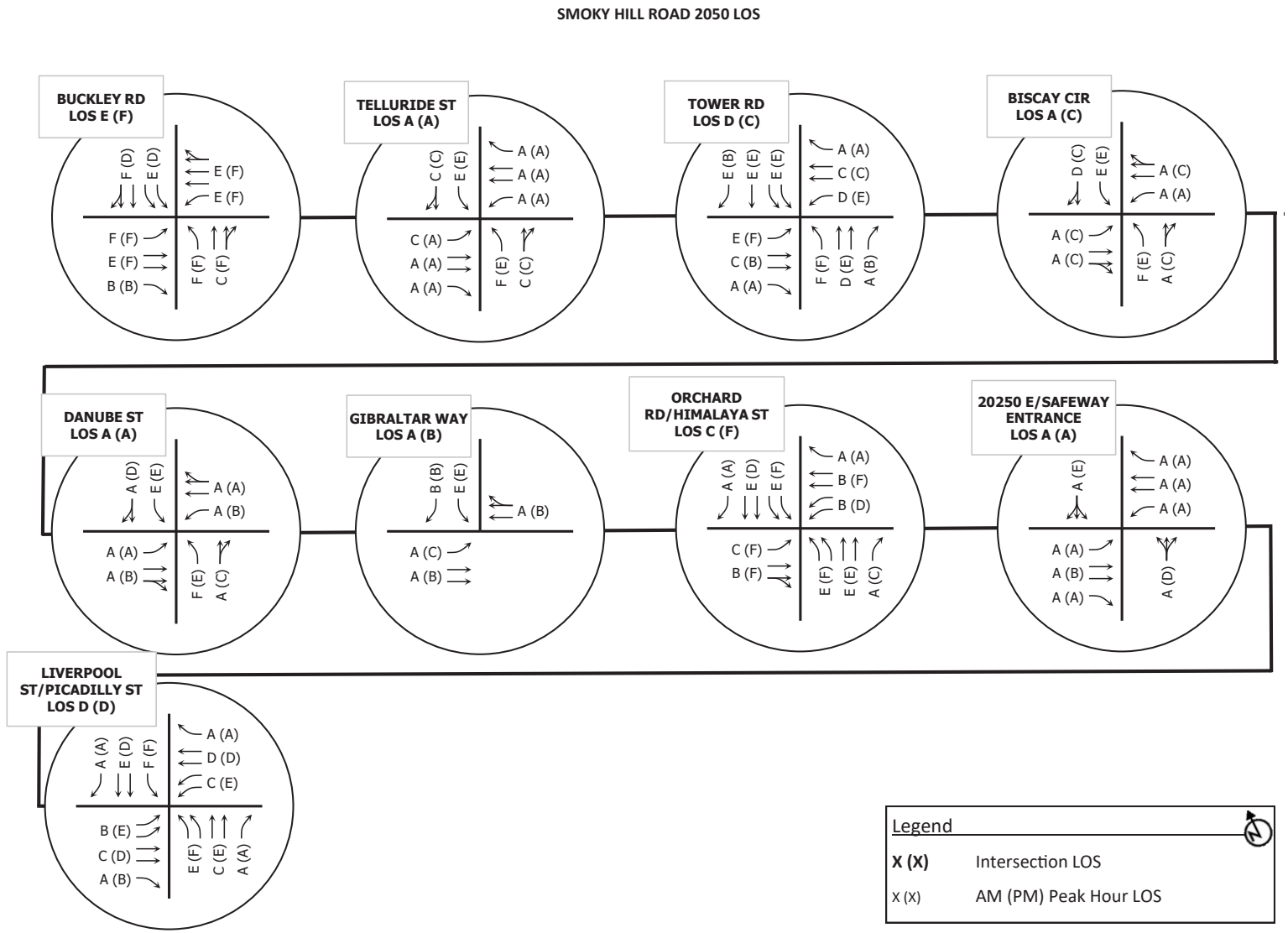
APPENDIX E


SMOKY HILL ROAD 2020 V/C RATIO
BUCKLEY RD
0.98 (0.75)
0.61 (0.74)
0.74 (0.63)
0.62 (0.65)
0.95 (0.9)
0.67 (0.75)
0.29 (0.19)
0.88 (0.87)
0.44 (0.97)
TELLURIDE ST
0.43 (0.24)
0.31 (0.31)
0.02 (0.02)
0.69 (0.43)
0.04 (0.12)
0.26 (0.18)
0.35 (0.51)
0.03 (0.06)
0.73 (0.51)
0.33 (0.36)
TOWER RD
0.76 (0.52)
0.79 (0.47)
0.33 (0.67)
0.03 (0.08)
0.75 (0.4)
0.37 (0.28)
0.59 (0.59)
0.45 (0.39)
0.05 (0.05)
0.64 (0.57)
0.1 (0.6)
0.14 (0.39)
BISCAY CIR
0.45 (0.59)
0.12 (0.43)
0.32 (0.45)
0.02 (0.08)
0.03 (0.45)
0.2 (0.42)
0.28 (0.33)
0.02 (0.17)
DANUBE ST
0.19 (0.26)
0.11 (0.22)
0.28 (0.36)
0.02 (0.26)
0.02 (0.03)
0.19 (0.46)
0.44 (0.26)
0.09 (0.58)
GIBRALTAR WAY
0.3 (0.3)
0.5 (0.72)
0.29 (0.53)
0.09 (0.29)
0.17 (0.41)
ORCHARD RD/HIMALAYA ST
0.19 (0.23)
0.59 (0.36)
0.59 (0.81)
0.22 (0.27)
0.43 (0.55)
0.12 (0.32)
0.13 (0.39)
0.3 (0.63)
()
0.23 (0.66)
0.32 (0.79)
0.22 (0.41)
20250 E/SAFEWAY ENTRANCE
0.14 (0.69)
0.01 (0.07)
0.37 (0.51)
0.02 (0.06)
0.02 (0.14)
0.24 (0.52)
0.02 (0.02)
0.14 (0.32)
LIVERPOOL ST/PICADILLY ST
0.23 (0.28)
0.63 (0.39)
0.55 (0.71)
0.02 (0.11)
0.48 (0.6)
0.24 (0.57)
0.1 (0.46)
0.4 (0.58)
0.3 (0.39)
0.74 (0.77)
0.13 (0.72)
0.1 (0.39)
Legend
X.XX (X.XX)
AM (PM) Peak Hour Volume-to-Capacity Ratio

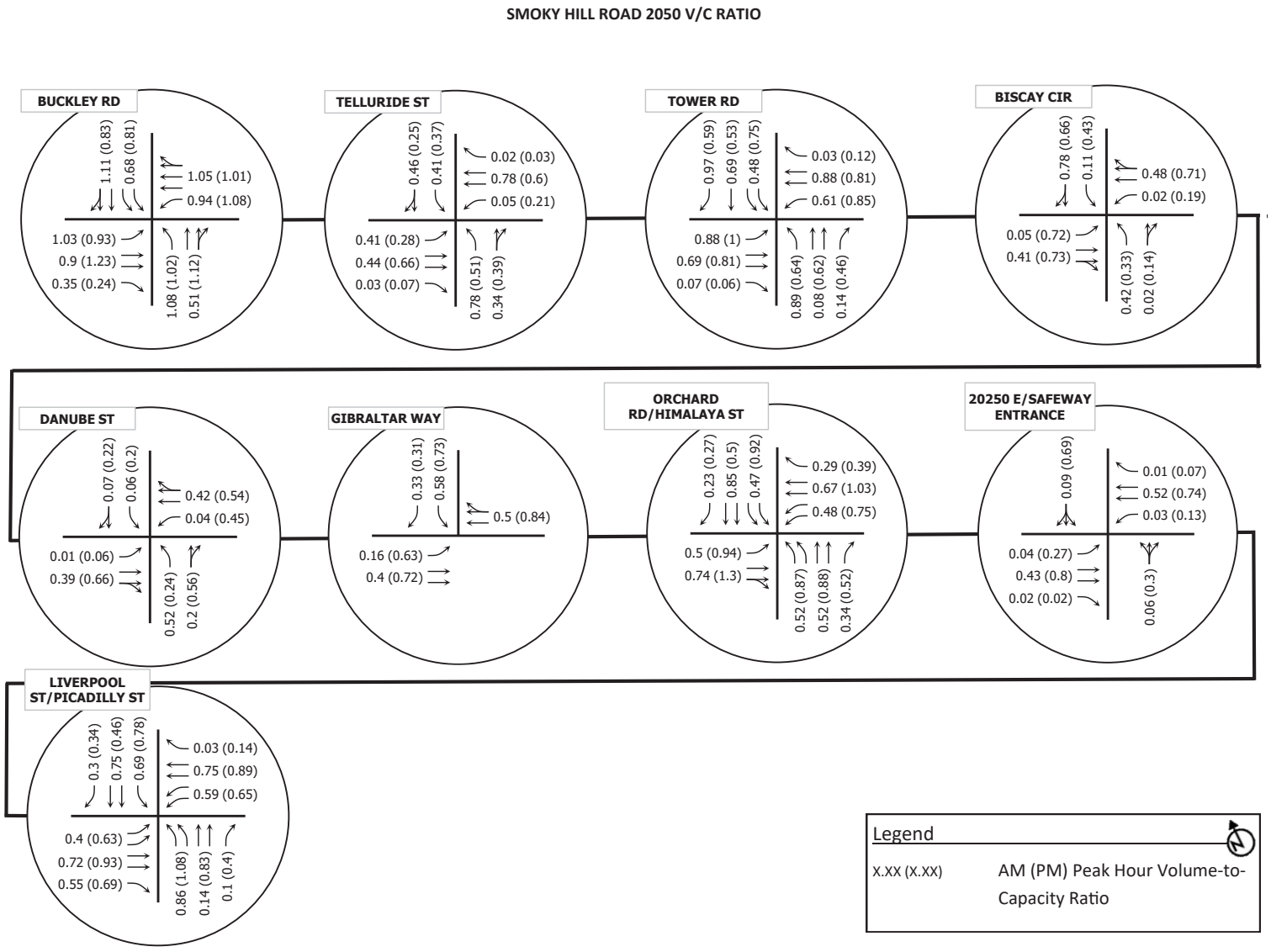
APPENDIX E


SMOKY HILL ROAD 2050 VOLUMES
BUCKLEY RD
65 (75)
1255 (665)
175 (305)
175 (302)
1521 (1150)
190 (199)
80 (205)
880 (1475)
185 (140)
195 (195)
570 (1010)
40 (80)
TELLURIDE ST
80 (35)
20 (15)
50 (45)
20 (30)
1726 (1546)
15 (40)
45 (65)
1020 (1720)
30 (75)
80 (70)
20 (35)
55 (50)
50,700
TOWER RD
403 (255)
270 (135)
65 (195)
21 (95)
1255 (1286)
117 (164)
115 (300)
965 (1465)
45 (50)
103 (75)
70 (280)
60 (150)
BISCAY CIR
150 (145)
0 (5)
10 (45)
15 (75)
1223 (1385)
5 (25)
15 (145)
1065 (1645)
10 (20)
20 (15)
0 (5)
5 (15)
DANUBE ST
15 (15)
0 (5)
5 (10)
5 (30)
1188 (1455)
15 (95)
2 (15)
1068 (1655)
10 (35)
40 (15)
0 (5)
45 (75)
GIBRALTAR WAY
50 (75)
70 (150)
80 (180)
1158 (1505)
45 (75)
1073 (1665)
44,800
ORCHARD RD/HIMALAYA ST
90 (115)
585 (370)
220 (395)
236 (280)
1078 (1390)
180 (255)
88 (159)
967 (1531)
88 (125)
70 (180)
180 (620)
85 (220)
20250 E/SAFEWAY ENTRANCE
2 (30)
0 (5)
10 (70)
15 (80)
1490 (1865)
10 (15)
10 (40)
1242 (2086)
20 (20)
2 (30)
0 (5)
5 (5)
50,400
LIVERPOOL ST/PICADILLY ST
129 (120)
555 (265)
90 (150)
15 (105)
899 (1355)
210 (155)
94 (147)
783 (1419)
380 (595)
487 (485)
145 (540)
55 (170)
Legend
X,XXX Average Daily Traffic
XX (XX) AM (PM) Peak Hour Volume

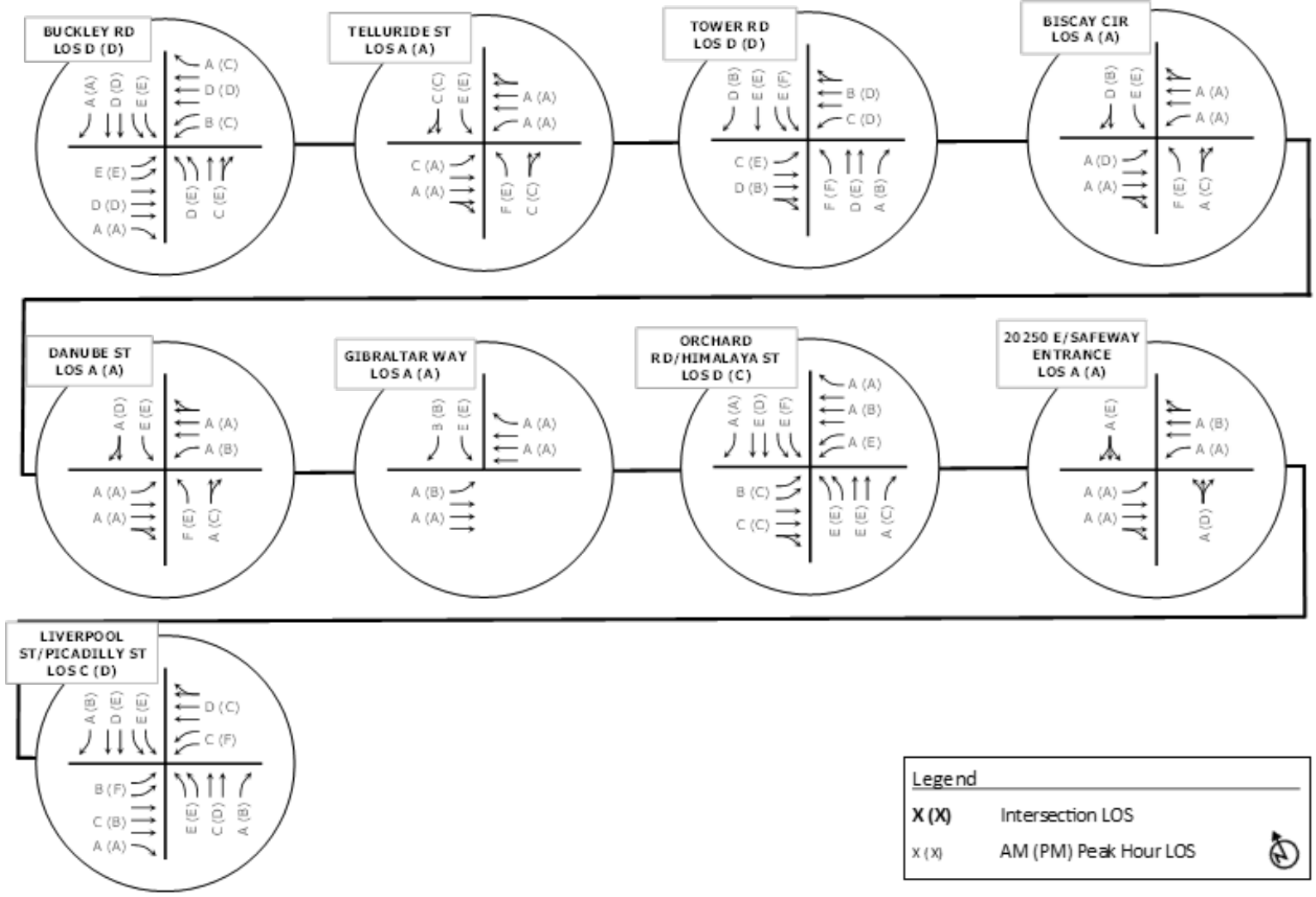
APPENDIX E


SMOKY HILL ROAD 2050 LOS
BUCKLEY RD
LOS E (F)
TELLURIDE ST
LOS A (A)
TOWER RD
LOS D (C)
BISCAY CIR
LOS A (C)
DANUBE ST
LOS A (A)
GIBRALTAR WAY
LOS A (B)
ORCHARD
RD/HIMALAYA ST
LOS C (F)
20250 E/SAFEWAY
ENTRANCE
LOS A (A)
LIVERPOOL
ST/PICADILLY ST
LOS D (D)
Legend
X (X) Intersection LOS
x (x) AM (PM) Peak Hour LOS

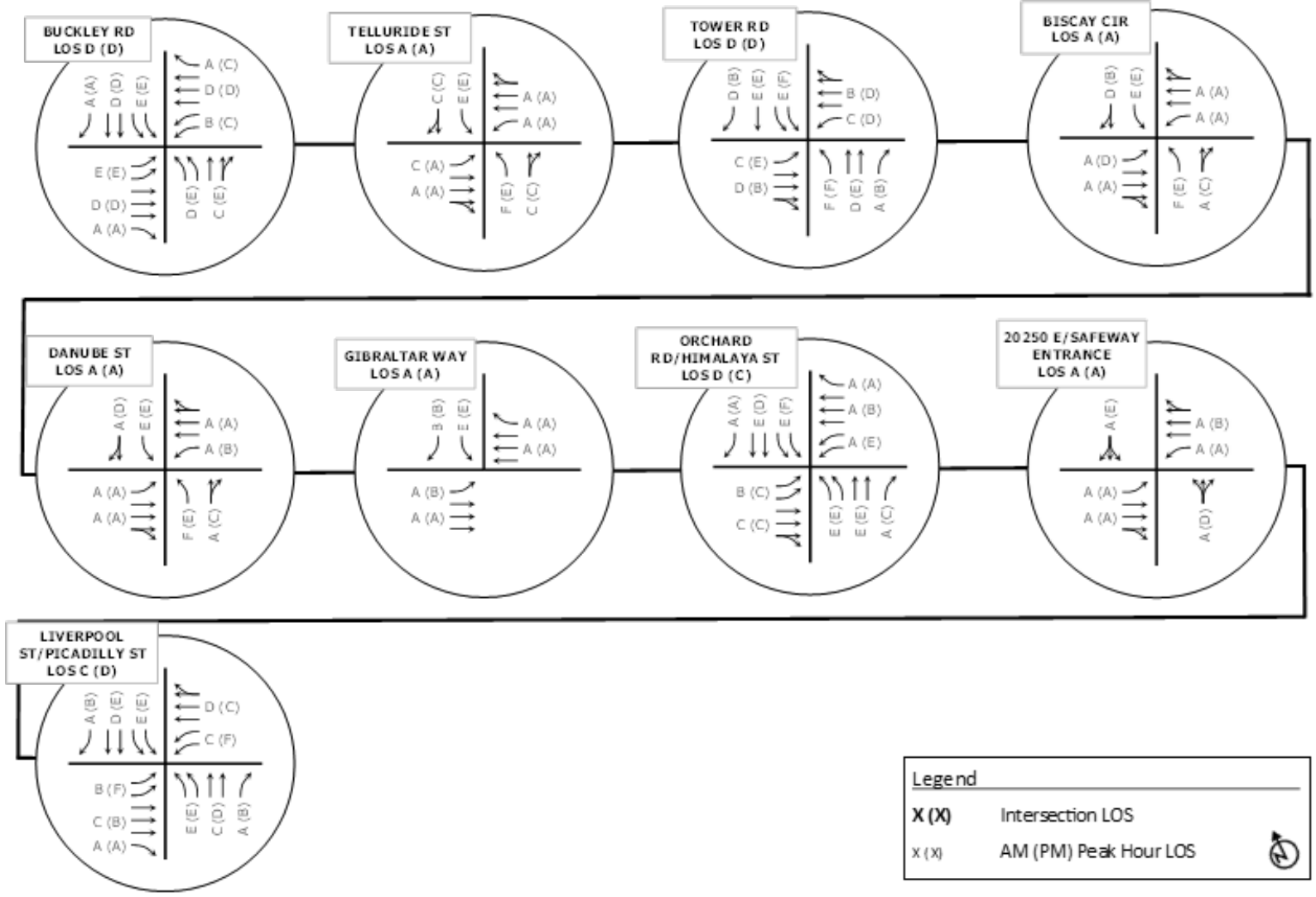
APPENDIX E


SMOKY HILL ROAD 2050 V/C RATIO
BUCKLEY RD
1.11 (0.83)
0.68 (0.81)
1.05 (1.01)
0.94 (1.08)
1.03 (0.93)
0.9 (1.23)
0.35 (0.24)
1.08 (1.02)
0.51 (1.12)
TELLURIDE ST
0.46 (0.25)
0.41 (0.37)
0.02 (0.03)
0.78 (0.6)
0.05 (0.21)
0.41 (0.28)
0.44 (0.66)
0.03 (0.07)
0.78 (0.51)
0.34 (0.39)
TOWER RD
0.97 (0.59)
0.69 (0.53)
0.48 (0.75)
0.03 (0.12)
0.88 (0.81)
0.61 (0.85)
0.88 (1)
0.69 (0.81)
0.07 (0.06)
0.89 (0.64)
0.08 (0.62)
0.14 (0.46)
BISCAY CIR
0.78 (0.66)
0.11 (0.43)
0.48 (0.71)
0.02 (0.19)
0.05 (0.72)
0.41 (0.73)
0.42 (0.33)
0.02 (0.14)
DANUBE ST
0.07 (0.22)
0.06 (0.2)
0.42 (0.54)
0.04 (0.45)
0.01 (0.06)
0.39 (0.66)
0.52 (0.24)
0.2 (0.56)
GIBRALTAR WAY
0.33 (0.31)
0.58 (0.73)
0.5 (0.84)
0.16 (0.63)
0.4 (0.72)
ORCHARD RD/HIMALAYA ST
0.23 (0.27)
0.85 (0.5)
0.47 (0.92)
0.29 (0.39)
0.67 (1.03)
0.48 (0.75)
0.5 (0.94)
0.74 (1.3)
0.52 (0.87)
0.52 (0.88)
0.34 (0.52)
20250 E/SAFEWAY ENTRANCE
0.09 (0.69)
0.01 (0.07)
0.52 (0.74)
0.03 (0.13)
0.04 (0.27)
0.43 (0.8)
0.02 (0.02)
0.06 (0.3)
LIVERPOOL ST/PICADILLY ST
0.3 (0.34)
0.75 (0.46)
0.69 (0.78)
0.03 (0.14)
0.75 (0.89)
0.59 (0.65)
0.4 (0.63)
0.72 (0.93)
0.55 (0.69)
0.86 (1.08)
0.14 (0.83)
0.1 (0.4)
Legend
X.XX (X.XX)
AM (PM) Peak Hour Volume-to-Capacity Ratio

APPENDIX E


BUCKLEY RD
LOS D (D)
TELLURIDE ST
LOS A (A)
TOWER RD
LOS D (D)
BISCAY CIR
LOS A (A)
DANUBE ST
LOS A (A)
GIBRALTAR WAY
LOS A (A)
ORCHARD
RD/HIMALAYA ST
LOS D (C)
20250 E/SAFEWAY
ENTRANCE
LOS A (A)
LIVERPOOL
ST/PICADILLY ST
LOS C (D)
Legend
X (X) Intersection LOS
x (x) AM (PM) Peak Hour LOS

APPENDIX E


BUCKLEY RD
LOS D (D)
TELLURIDE ST
LOS A (A)
TOWER RD
LOS D (D)
BISCAY CIR
LOS A (A)
DANUBE ST
LOS A (A)
GIBRALTAR WAY
LOS A (A)
ORCHARD
RD/HIMALAYA ST
LOS D (C)
20250 E/SAFEWAY
ENTRANCE
LOS A (A)
LIVERPOOL
ST/PICADILLY ST
LOS C (D)
Legend
X (X) Intersection LOS
x (x) AM (PM) Peak Hour LOS