

**Transportation Impact Study
Coal Creek Village
Louisville, Colorado**



January 14, 2021

Revised: March 25, 2025

Revised: April 23, 2025

Revised: June 896, 2025

PREPARED FOR:

Markel Homes

5723 Arapahoe Avenue, Ste 2B

Boulder, CO 80303

(303) 339-6116

Contact: Jason Markel

PREPARED BY:

McDowell Engineering, LLC

PO Box 4259

Eagle, CO 81631

970.623.0788

Contact: Kari J. McDowell Schroeder, PE, PTOE

Statement of Engineering Qualifications

Kari J. McDowell Schroeder, PE, PTOE is a Transportation and Traffic Engineer for McDowell Engineering, LLC. Ms. McDowell Schroeder has over twenty-eight years of extensive traffic and transportation engineering experience. She has completed numerous transportation studies and roadway design projects throughout Colorado. Ms. McDowell Schroeder is a licensed Professional Engineer in the State of Colorado and has her certification as a Professional Traffic Operations Engineer from the Institute of Transportation Engineers.

Table of Contents

1.0	EXECUTIVE SUMMARY	8
2.0	PROJECT DESCRIPTION.....	13
2.1	RECENT CAPITAL IMPROVEMENTS AND STUDIES	14
2.2	PROXIMATE DEVELOPMENT PROJECTS	15
2.3	PROJECT ACCESS LOCATIONS	15
2.4	INTERSECTION ANALYSIS LOCATIONS.....	16
3.0	EXISTING TRANSPORTATION SYSTEM	17
3.1	DESCRIPTION OF EXISTING TRANSPORTATION SYSTEM	17
3.2	TRANSPORTATION NETWORK ACCESS CONTROL AND INFRASTRUCTURE IMPROVEMENT IMPLEMENTATION	18
3.3	TRAFFIC DATA COLLECTION	22
4.0	FUTURE BACKGROUND TRAFFIC PROJECTIONS	23
4.1	BACKGROUND ANNUAL TRAFFIC GROWTH.....	23
4.2	PROXIMATE DEVELOPMENT PROJECTS	23
4.3	TRAVEL ROUTE ADJUSTMENTS FOR MODIFIED ACCESS CONTROL SCENARIOS	23
4.4	YEAR 2026 BACKGROUND TRAFFIC FORECASTS.....	25
4.5	YEAR 2045 BACKGROUND TRAFFIC FORECASTS.....	26
4.6	BACKGROUND TRAFFIC LEVEL OF SERVICE.....	30
5.0	PROJECT TRAFFIC.....	37
5.1	TRIP GENERATION	37
5.2	TRIP DISTRIBUTION	42
5.3	INTERNAL SITE CIRCULATION	42
5.4	FRONT STREET CONNECTION ANALYSIS SCENARIOS	42
5.5	TRAVEL ROUTE ADJUSTMENTS FOR MODIFIED ACCESS SCENARIOS	43
5.6	SITE-GENERATED TRAFFIC.....	44
5.7	TOTAL TRAFFIC.....	44
6.0	TRANSPORTATION IMPACT ANALYSIS.....	64
6.1	TOTAL TRAFFIC LEVEL OF SERVICE	64
6.2	INTERSECTION QUEUES.....	74
6.3	SITE DESIGN AND TRAFFIC CIRCULATION EVALUATION	75
6.4	TURN LANE REQUIREMENTS	80
6.5	SH 42 AND CANNON CIRCLE STATE HIGHWAY ACCESS PERMIT	86
6.6	GRIFFITH STREET QUEUING ANALYSIS FOR RAILROAD	86
7.0	RECOMMENDATIONS AND CONCLUSIONS	90
8.0	APPENDIX.....	94
1.0	EXECUTIVE SUMMARY.....	6
2.0	PROJECT DESCRIPTION.....	10
2.1	RECENT CAPITAL IMPROVEMENTS AND STUDIES	11
2.2	PROXIMATE DEVELOPMENT PROJECTS	12

2.3	PROJECT ACCESS LOCATIONS	12
2.4	INTERSECTION ANALYSIS LOCATIONS	13
3.0	EXISTING TRANSPORTATION SYSTEM	14
3.1	DESCRIPTION OF EXISTING TRANSPORTATION SYSTEM	14
3.2	TRANSPORTATION NETWORK ACCESS CONTROL AND INFRASTRUCTURE IMPROVEMENT IMPLEMENTATION	15
3.3	TRAFFIC DATA COLLECTION	18
4.0	FUTURE BACKGROUND TRAFFIC PROJECTIONS	20
4.1	BACKGROUND ANNUAL TRAFFIC GROWTH	20
4.2	PROXIMATE DEVELOPMENT PROJECTS	20
4.3	TRAVEL ROUTE ADJUSTMENTS FOR MODIFIED ACCESS CONTROL SCENARIOS	20
4.4	YEAR 2026 BACKGROUND TRAFFIC FORECASTS	22
4.5	YEAR 2045 BACKGROUND TRAFFIC FORECASTS	23
4.6	BACKGROUND TRAFFIC LEVEL OF SERVICE	27
5.0	PROJECT TRAFFIC	32
5.1	TRIP GENERATION	32
5.2	TRIP DISTRIBUTION	35
5.3	INTERNAL SITE CIRCULATION	35
5.4	FRONT STREET CONNECTION ANALYSIS SCENARIOS	35
5.5	TRAVEL ROUTE ADJUSTMENTS FOR MODIFIED ACCESS SCENARIOS	36
5.6	SITE GENERATED TRAFFIC	37
5.7	TOTAL TRAFFIC	37
6.0	TRANSPORTATION IMPACT ANALYSIS	56
6.1	TOTAL TRAFFIC LEVEL OF SERVICE	56
6.2	INTERSECTION QUEUES	62
6.3	SITE DESIGN AND TRAFFIC CIRCULATION EVALUATION	63
6.4	TURN LANE REQUIREMENTS	68
6.5	SH 42 AND CANNON CIRCLE STATE HIGHWAY ACCESS PERMIT	74
6.6	GRIFFITH STREET QUEUING ANALYSIS FOR RAILROAD	74
7.0	RECOMMENDATIONS AND CONCLUSIONS	78
8.0	APPENDIX	81

Figures

Figure 1: Vicinity Map	13
Figure 2: Current Site Plan	14
Figure 3: 2026 Background Schematic Diagram	26
Figure 4: 2045 Background Schematic Diagram	26
Figure 5: Year 2026 Background Traffic	28
Figure 6: Year 2045 Background Traffic	29
Figure 7: Year 2026 Total – With Front Street Connection Schematic Diagram.....	44
Figure 8: Year 2045 Total – With Front Street Connection Schematic Diagram.....	44
Figure 9: Year 2026 Total – Without Front Street Connection Schematic Diagram	45
Figure 10: Year 2045 Total – Without Front Street Connection Schematic Diagram	45
Figure 11: Project Generated Traffic Distribution – Scenario C (Residential).....	48
Figure 12: Project Generated Traffic Distribution – Scenario C (Retail)	49
Figure 13: Project Generated Traffic Assignment – Scenario C (Residential & Retail)	50
Figure 14: Project Generated Traffic Distribution – Scenario D (Residential)	51
Figure 15: Project Generated Traffic Distribution – Scenario D (Retail).....	52
Figure 16: Project Generated Traffic Assignment – Scenario D (Residential & Retail).....	53
Figure 17: Project Generated Traffic Distribution – Scenario E (Residential).....	54
Figure 18: Project Generated Traffic Distribution – Scenario E (Retail)	55
Figure 19: Project Generated Traffic Assignment – Scenario E (Residential & Retail)	56
Figure 20: Project Generated Traffic Distribution – Scenario F (Residential)	57
Figure 21: Project Generated Traffic Distribution – Scenario F (Retail)	58
Figure 22: Project Generated Traffic Assignment – Scenario F (Residential & Retail)	59
Figure 23: Year 2026 Total Traffic (With Front Street Connection)	60
Figure 24: Year 2026 Total Traffic (Without Front Street Connection)	61
Figure 25: Year 2045 Total Traffic (With Front Street Connection)	62
Figure 26: Year 2045 Total Traffic (Without Front Street Connection)	63
Figure 27: Year 2045 Total Daily Traffic (vpd) (With Front Street Connection).....	78
Figure 28: Year 2045 Total Daily Traffic (vpd) (Without Front Street Connection)	78
Figure 29: Year 2045 Total Morning Peak Hour Traffic (vph) (With Front Street Connection)	79
Figure 30: Year 2045 Total Evening Peak Hour Traffic (vph) (With Front Street Connection)	79
Figure 31: Year 2045 Total Saturday Peak Hour Traffic (vph) (With Front Street Connection).....	79
Figure 32: Anticipated Queue Lengths for Railroad Operations.....	87
Figure 1: Vicinity Map	10
Figure 2: Current Site Plan	11
Figure 3: 2026 Background Schematic Diagram	23
Figure 4: 2045 Background Schematic Diagram	23
Figure 5: Year 2026 Background Traffic	25
Figure 6: Year 2045 Background Traffic	26
Figure 7: Year 2026 Total – With Front Street Connection Schematic Diagram.....	37
Figure 8: Year 2045 Total – With Front Street Connection Schematic Diagram.....	37
Figure 9: Year 2026 Total – Without Front Street Connection Schematic Diagram	38
Figure 10: Year 2045 Total – Without Front Street Connection Schematic Diagram	38
Figure 11: Project Generated Traffic Distribution – Scenario C (Residential).....	40
Figure 12: Project Generated Traffic Distribution – Scenario C (Retail)	41
Figure 13: Project Generated Traffic Assignment – Scenario C (Residential & Retail)	42
Figure 14: Project Generated Traffic Distribution – Scenario D (Residential)	43

Figure 15: Project Generated Traffic Distribution—Scenario D (Retail).....	44
Figure 16: Project Generated Traffic Assignment—Scenario D (Residential & Retail).....	45
Figure 17: Project Generated Traffic Distribution—Scenario E (Residential).....	46
Figure 18: Project Generated Traffic Distribution—Scenario E (Retail)	47
Figure 19: Project Generated Traffic Assignment—Scenario E (Residential & Retail)	48
Figure 20: Project Generated Traffic Distribution—Scenario F (Residential).....	49
Figure 21: Project Generated Traffic Distribution—Scenario F (Retail)	50
Figure 22: Project Generated Traffic Assignment—Scenario F (Residential & Retail)	51
Figure 23: Year 2026 Total Traffic (With Front Street Connection).....	52
Figure 24: Year 2026 Total Traffic (Without Front Street Connection)	53
Figure 25: Year 2045 Total Traffic (With Front Street Connection).....	54
Figure 26: Year 2045 Total Traffic (Without Front Street Connection)	55
Figure 27: Year 2045 Total Daily Traffic (vpd) (With Front Street Connection).....	66
Figure 28: Year 2045 Total Daily Traffic (vpd) (Without Front Street Connection)	66
Figure 29: Year 2045 Total Morning Peak Hour Traffic (vph) (With Front Street Connection)	67
Figure 30: Year 2045 Total Evening Peak Hour Traffic (vph) (With Front Street Connection)	67
Figure 31: Year 2045 Total Saturday Peak Hour Traffic (vph) (With Front Street Connection).....	67
Figure 32: Anticipated Queue Lengths for Railroad Operations	75

Tables

Table 1: Coal Creek Village Land Use	13
Table 2: Intersection Access Control.....	18
Table 3: Background Traffic Figures Summary	27
Table 4: HCM Level of Service Criteria	30
Table 5: Background Traffic Level of Service	31
Table 6: ITE Land Use Codes	37
Table 7: Project Trip Generation.....	39
Table 8: Total Traffic Figures Summary	46
Table 9: Total Traffic LOS (with the Front Street Connection).....	68
Table 10: Total Traffic LOS (without the Front Street Connection)	71
Table 11: Anticipated Front Street Traffic Volumes with and without the Connection between South Boulder Road and Griffith Street	77
Table 12: Auxiliary Turn Lane Recommendations	81
Table 13: Auxiliary Turn Lane Recommendations (Continued)	82
Table 14: Queuing Summary (3 Minute Delay).....	88
Table 15: Queuing Summary (5 Minute Delay).....	88
Table 1: Coal Creek Village Land Use	10
Table 2: Intersection Access Control.....	15
Table 3: Background Traffic Figures Summary	24
Table 4: HCM Level of Service Criteria	27
Table 5: Background Traffic Level of Service	28
Table 6: ITE Land Use Codes	32
Table 7: Project Trip Generation.....	34
Table 8: Total Traffic Figures Summary	39
Table 9: Total Traffic LOS (with the Front Street Connection).....	60
Table 10: Total Traffic LOS (without the Front Street Connection)	61
Table 11: Anticipated Front Street Traffic Volumes with and without the Connection between South Boulder Road and Griffith Street	65
Table 12: Auxiliary Turn Lane Recommendations	69
Table 13: Auxiliary Turn Lane Recommendations (Continued)	70
Table 14: Queuing Summary (3 Minute Delay).....	76
Table 15: Queuing Summary (5 Minute Delay).....	76

1.0 Executive Summary

Coal Creek Village is a proposed residential development located southwest of the intersection of South Boulder Road and Colorado State Highway 42. The development proposes the following land uses:

Land Use Category	Qty	Units
Multifamily Housing	188	dwelling units
Commercial/Retail	13,530	square feet
Existing Empanada Shop (1030 E. South Boulder Road.)	430	square feet

Trip Generation: The proposed development is expected to generate a total of 1,839 vehicle trips on the adjacent roadway network over the course of an average weekday (vpd). This includes 220 vehicle trips per hour (vph) during the morning peak hour, 244vph during the evening peak hour, and 144vph during the Saturday peak hour.

Internal Site Circulation: The proposed street configuration for Coal Creek Village provides good internal circulation as well as providing alternate routes to access adjacent arterial streets. ~~During peak hours of~~ Drivers wanting to go west on South Boulder Road or north on SH 42 may need to alter their travel routes, as left turns out of the site are prohibited onto these two roadways.

Sidewalks are proposed throughout the development. Adjacent access to transit is provided at South Boulder Road and Main Street.

Site Access: The new Coal Creek Village is proposing four access locations. Three of the four accesses exist, and the fourth access will need to be constructed. Two accesses will have direct connectivity to South Boulder Road, one access will have direct connectivity to State Highway 42, and the fourth access will have direct connectivity to Front Street. The four accesses are listed below. Refer to the site plan in **Figure 2**.

1. Front Street and South Boulder Road
2. Cannon Circle and South Boulder Road
3. Cannon Circle and State Highway 42
4. Front Street and Harper Street (with and without the Front Street connection)

This study analyzes the transportation impacts with and without the Front Street connection.

Intersection Analysis: Year 2026 and Year 2045 background and total traffic conditions were modeled and analyzed. Total traffic conditions were analyzed with and without

the Front Street connection from South Boulder Road to Griffith Street. Additionally, future access control, infrastructure improvements, and traffic from the Delo Boom development were factored into these projections.

Infrastructure recommendations based upon future traffic conditions, access restrictions, and operations are detailed in **Section 7.0**. A summary of the necessary improvements is included below.

Front Street Connection: This TIS includes analysis of scenarios with and without the Front Street connection. Due to the sites' direct access to S. Boulder Road with heavy through volumes, the site accesses will have restricted turning movements. Without the Front Street connection, this creates additional weave and U-turn movements on S. Boulder Road. The City is not comfortable with the safety concerns associated with these movements. Both the City staff and the TIS recommendations are to include the Front Street connection.

The Front Street connection provides numerous benefits to the Louisville community. The Front Street connection will allow for transportation redundancy as part of a gridded street network. Gridded networks have more capacity and increase circulation with narrower roadways that are safer for pedestrians and other multimodal traffic. It also aligns with the City's previous planning efforts.

Without the Front Street connection, there is anticipated to be an additional 25% of the exiting site distribution that would use the eastbound U-turn, which amounts to between 8 to 18vph. This equates to an anticipated increase of between 40% and 85% for the eastbound U-turn movements on South Boulder Road in the long-term traffic scenarios. This includes a difficult weave movement across two or three lanes of traffic in the 400 feet between the from the northern site accesses to the eastbound left turn lane at the signalized intersection.

~~Coal Creek Station will operate with acceptable conditions both with and without the Front Street connection from South Boulder Road to Griffith Street. Under~~Under both scenarios, Front Street is anticipated to stay within Front Street's local residential street capacity.

~~However, the Front Street connection provides numerous benefits to the Louisville community. The Front Street connection will allow for transportation redundancy as part of a gridded street network. Gridded networks have more capacity with narrower roadways that are safer for pedestrians and other multimodal traffic. It also aligns with the City's previous planning efforts.~~

With the Front Street connection, it is recommended that traffic calming measures are constructed to attenuate operations on Front Street. Several measures that may be considered are described in the City of Louisville's *Transportation Master Plan*. This document's Neighborhood Traffic Management Program (NTMP) focuses on

neighborhood-level traffic calming and safety improvements. These improvements help maintain the City's family-friendly small-town character. Examples of tools utilized within an NTMP include, but are not limited to the following.

- Enhanced or raised pedestrian crossings
- Medians and/or entry islands
- Curb extensions
- Speed humps or cushions
- Speed monitoring and enforcement campaigns
- Education campaigns

~~Without the Front Street connection, there is anticipated to be 45% more eastbound U-turn movements on South Boulder Road. This includes a weave movement from the northern site accesses to the eastbound left turn lane at the signalized intersection.~~

Intersection #2 - South Boulder Road and Front Street Intersection: With the development of ~~Coal Creek Station~~Coal Creek Village, the eastbound right turn lane needs to be extended to include 75' of storage and a 13.5:1 taper to accommodate the anticipated site-generated traffic. Alternately, the construction of a bay taper would be acceptable and may help facilitate the addition of an adjacent transit stop. The westbound left turn lane is constrained by the back-to-back turn lane to the adjacent access.

The northbound movement is restricted to right turn movements. Therefore, the northbound movement out of the site does not require a separate turn lane. No acceleration lane is required for this movement onto South Boulder Road.

Intersection #3 - South Boulder Road and Cannon Circle intersection: The City is considering the restriction of the left turns from the side streets at the South Boulder Road and Cannon Circle intersection as mentioned in the South Boulder Road Corridor Evaluation. Per the analysis included in this report, McDowell Engineering recommends that the left turn and through movements are restricted at Cannon Street at the time of Coal Creek Village buildout. This can be accomplished with the construction of a raised center median at the intersection.

~~With the construction of Coal Creek Station~~Coal Creek Village, ~~it is recommended this access will be further restricted from a full movement to a ¾ movement access, prohibiting the northbound and southbound through and left turn movements by extending the raised center median.~~

With the development of ~~Coal Creek Station~~Coal Creek Village, an eastbound right turn lane needs to be constructed to include 50' of storage and a 13.5:1 taper to accommodate the anticipated site-generated traffic. Alternately, the construction of

a bay taper would be acceptable. The westbound left turn lane is constrained by the back-to-back turn lane to the adjacent access. The 95th percentile queue for this movement is less than the available storage length + taper length. Therefore, no changes are recommended to the westbound left deceleration lanes.

The northbound movement is restricted to right turn movements. Therefore, the northbound movement out of the site does not require a separate turn lane.

Intersection #4 – South Boulder Road and SH 42 intersection: The City's Future 42 plan proposes improvements to this intersection in the future. This analysis supports the City's planned improvements.

Intersection #5 - SH 42 and Cannon Circle intersection: With the construction of ~~Coal Creek Station~~ Coal Creek Village, this intersection will be restricted to a ¾ movement by extending the existing center median in SH 42. The median should be installed per the Future 42 plan and align with the SH 42 Trail and Bike Lane designs.

The eastbound movement will be restricted to right turn only movements. Therefore, no deceleration lane is needed for this movement.

This intersection and the median should be installed per the implementation of the Future 42 pPlan, including the trail and bike lane components.

A new State Highway Access Permit is required for this access onto SH 42.

Intersection #6 – SH 42 and Griffith Street intersection: The City's Future 42 Plan proposes a future traffic signal installation at this intersection. The additional traffic from Coal Creek Village will not meet MUTCD traffic signal warrants at this intersection, future conditions with other growth likely will. This analysis supports the City's planned improvements.

Intersection #7 – Griffith Street and Front Street Intersection: No improvements are required at this intersection.

Intersection #8 – Griffith Street and Front Street intersection: This is a full-movement intersection with stop-control on the north and south legs. No additional turn lanes are required.

It is recommended that with the Front Street connection, ~~a pedestrian crossing of Griffith Street is installed with a rectangular, rapid flashing beacon (RRFB) to assist pedestrians in crossing Griffith Street.~~ additional traffic calming features ~~are~~ may be incorporated such as curb extensions/bulbouts and ~~a raised pedestrian crossings,~~ enhanced signage and striping per further discussion with City Staff. The applicant has prepared a separate, schematic traffic control plan to be included in the application.

Additionally, with the Front Street connection, this intersection should have 'Do Not Block Intersection' signage and striping added that will assist with traffic accessing Front Street.

~~Intersection of Griffith Street and the BNSF Railroad~~: This at-grade railroad crossing sees multiple trains crossings per day, with each impacting the crossing for three to five minutes at a time. During the crossing, traffic queues on Griffith Street back up in either direction. As described above, it is recommended that the intersection of Griffith Street and Front Street has 'Do Not Block Intersection' signage and striping added that will assist with traffic accessing Front Street.

Intersection #9 – Griffith Street and Main Street Intersection: No improvements are required at this intersection.

Intersection #10 – Front Street and Harper Street intersection with the Front Street Connection: This is currently a free-flowing intersection. There is an unimproved alley access as a third, north leg. With the buildout of ~~Coal Creek Station~~ Coal Creek Village and a connection of Front Street from South Boulder Road to Griffith Street, it is recommended that Front Street is designed as the through street and Harper Street is stop-controlled with a stop sign. ~~The installation of a stop sign, and stop bar, and painted pedestrian crosswalk should be included on the this north east leg of Front Street. The north leg and west side of this intersection is recommended to have a painted pedestrian crosswalk.~~

Intersection #11 – SH 42 and Harper Street intersection: The existing volume of eastbound right turns from Harper Street onto SH 42 exceeds the *Access Code's* requirement to construct an acceleration lane for this movement. With the implementation of the *Future 42* Plan, this volume is anticipated to increase because current traffic making the eastbound left movement will likely make a right turn instead. Coal Creek Village's site traffic is not anticipated to impact this movement. At a minimum, the construction of an acceleration lane should be incorporated into the implementation of Future 42 plans.

Figure 1: Vicinity Map

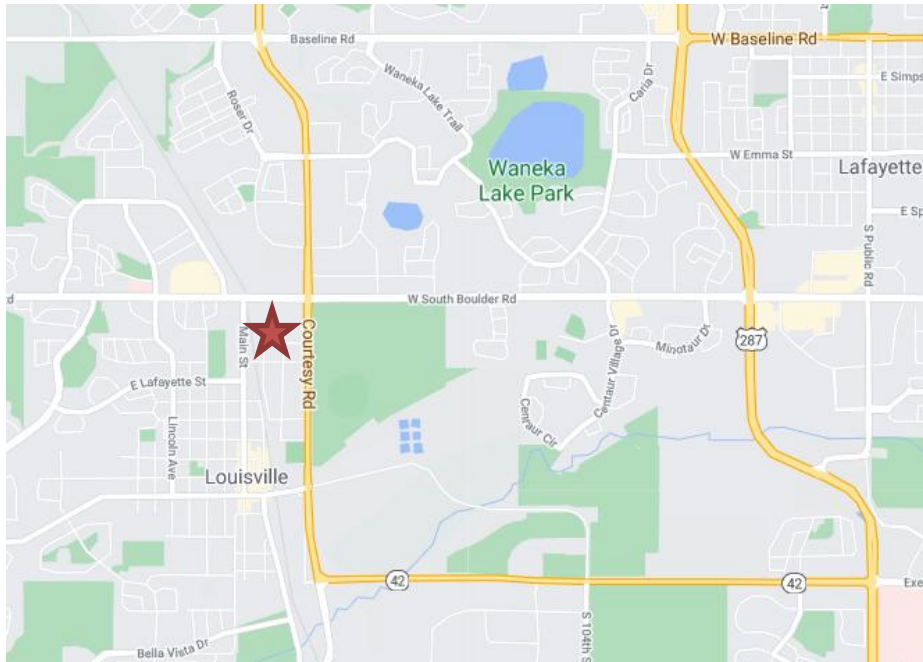
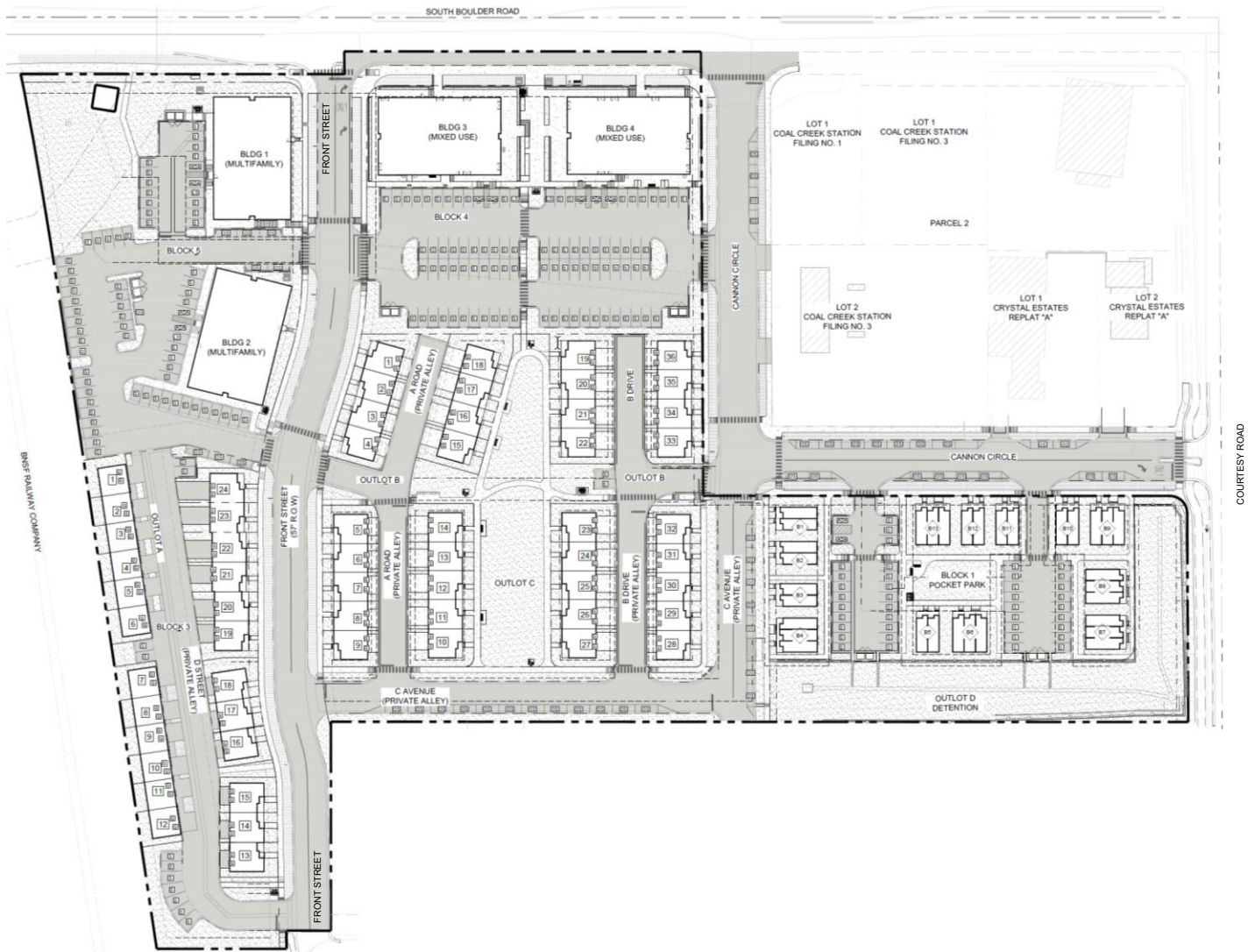


Table 1: Coal Creek Village Land Use

Land Use Category	Qty	Units
Multifamily Housing	188	dwelling units
Commercial/Retail	13,530	square feet
Existing Empanada Shop (1030 E. South Boulder Road.)	430	square feet

Figure 2: Current Site Plan



2.1 Recent Capital Improvements and Studies

Recent South Boulder Road Access Restrictions: The City of Louisville restricted northbound and southbound left turns at the intersection of South Boulder Road and Front Street by extending the raised median in Summer 2022. The westbound left turn is still allowed.

(Courtesy Road) Future 42 Corridor Plan: The City of Louisville completed *Future 42*⁹, a SH 42 corridor study, in December 2022. The study recommended improvements to the intersection of South Boulder Road and SH 42 as well as the SH 42 corridor that may impact construction of walk/detention pond/retaining wall at southwest corner of Cannon Circle. The Year 2045 background traffic and Year 2045 total traffic conditions assume additional turn lanes at the intersection of South Boulder Road and SH 42 per the *Future 42* plan. Refer to an excerpt in the **Appendix**.

Future 42 includes a recommendation that the intersection of SH 42 and Griffith Street is signalized in the future. Therefore, this analysis assumes that this intersection is signalized in both the Year 2045 background traffic and Year 2045 total traffic conditions.

Future 42 includes a recommendation that the intersections of SH 42 with Cannon Circle and Harper Street, are restricted to right-in, right-out only movements in the future. Therefore, this analysis assumes that this intersection is restricted in both the Year 2045 background traffic and Year 2045 total traffic conditions.

Refer to a table of the access restriction assumptions for each analysis scenario in **Table 2**.

Transportation Master Plan: The *City of Louisville Transportation Master Plan*¹⁰ identifies recommended improvements for the South Boulder Road corridor. Key considerations were bus rapid transit, improvements to bus stops and frequency of transit service, eliminating right-turn lanes, and providing underpasses and at-grade pedestrian crossings. Refer to an excerpt in **Appendix G**.

South Boulder Road Corridor Evaluation: The City of Louisville also prepared a *South Boulder Road Corridor Evaluation*¹¹. This analysis determined that signalization is not appropriate at Cannon Circle due to spacing constraints to the SH 42 traffic signal. Therefore, pedestrian and signage improvements at the Canon Circle intersection were recommended. Additionally, the Commercial Driveway extension to the north was suggested as an alternative roadway connection.

2.2 Proximate Development Projects

The Delo Boom project is proposed to be located on the southeast corner of the Griffith Street and Cannon Street intersection in Louisville, Colorado. The project is proposed to include 36 townhomes, 99 multifamily units, and 4,000 square feet of retail space. It is expected that the project will be completed in the next couple of years. The anticipated traffic associated with the proposed Delo Boom project is included in the short-term and long-term background traffic projections. Data from the *Delo Boom Traffic Impact Study*¹² was used for these projections. Figures for the Year 2026 and Year 2045 Delo Boom traffic assignment are included in the **Appendix**.

2.3 Project Access Locations

The new Coal Creek Village is proposing four access locations. Three of the four accesses exist, and the fourth access will need to be constructed. Two accesses will have direct connectivity to South Boulder Road, one access will have direct connectivity to State Highway 42, and the fourth access will have direct connectivity to Front Street. The four accesses are listed below. Refer to the site plan in **Figure 2**.

5. Front Street and South Boulder Road
6. Cannon Circle and South Boulder Road
7. Cannon Circle and State Highway 42
8. Front Street and Harper Street

This study analyzes the transportation impacts with and without the Front Street connection. Refer to **Section 3.2** of the report for more information on the two alternatives modeling the anticipated transportation network impacts with and without the Front Street connection.

2.4 Intersection Analysis Locations

This report also studies several additional off-site intersections. The analysis locations and modeling methodology were discussed with City of Louisville Engineering staff before performing the analysis.

1. Main Street & South Boulder Road
2. Front Street & South Boulder Road (Existing Site Access)
3. Cannon Circle & South Boulder Road (Existing Site Access)
4. Courtesy Road & South Boulder Road
5. Cannon Circle & Courtesy Road (SH 42) (Existing Site Access)
6. Griffith Street & Courtesy Road (SH 42)
7. Griffith Street & Cannon Street
8. Griffith Street & Front Street
9. Griffith Street & Main Street
10. Front Street & Harper Street (Proposed Site Access – Modeled with and without this connection.)
11. Harper Street & Courtesy Road (SH 42)

3.0 Existing Transportation System

3.1 Description of Existing Transportation System

Highway 42 (SH 42 / Courtesy Road): SH 42 is a north/south major arterial street that is classified as an NR-A roadway by CDOT's *Online Transportation Information System*¹ (OTIS). Within the City of Louisville, the local street name is Courtesy Road. It is a four-lane street with auxiliary lanes north of South Boulder Road and narrows to a two-lane street with auxiliary lanes south of the development site. The posted speed limit is 45 mph in both directions in the vicinity of the site. There is a southbound bike lane on the segment of the highway adjacent to this development.

The Future 42 Plan adopted by the City of Louisville (See Section 2.1) informs the ~~will affect the project with~~ the different intersection improvement scenarios (See Section 3.2) that are studied in this TIS.

South Boulder Road: South Boulder Road is a four-lane divided, east/west major arterial street with auxiliary lanes at some intersections. It is owned and operated by the City of Louisville. The roadway has high traffic volumes, local transit service, on-street bike lanes, and several traffic generators. The speed limit is 35 mph in both directions in the vicinity of the site.

Front Street: Front Street is a two-lane north/south local residential street. As a residential street within the City of Louisville, its speed limit is 25 mph.

Within the development, Front Street will be a dedicated public street replacing the south driveway and connecting to the existing street to the south.

Cannon Circle: Cannon Circle is a local street that loops around the west and south sides of the commercial properties at the southwest corner of SH 42 and South Boulder Road. A portion of the street has not been constructed. The north-south segment extends 290 feet south from South Boulder Road. The east-west segment extends 200 feet west from SH 42.

Griffith Street: Griffith Street is a two-lane, east-west street that connects Main Street to SH 42. Griffith Street has on-street parking. It has sidewalks on a majority of the roadway. The BNSF railroad has an at-grade crossing of Griffith Street between Main Street and Front Street.

Harper Street: Harper Street is a two-lane, east-west street that connects Front Street to SH 42. Harper Street has sidewalks on both sides and on-street parking. It provides access to the residences in the areas.

¹ Colorado Department of Transportation, Online Transportation Information System.

Main Street: Main Street is a busy two-lane road that is central to Downtown and connects to South Boulder Road. Main Street is lined with retail and parking in Downtown and provides direct access to Louisville Middle School. It has a posted speed limit of 25mph.

BNSF Railroad: The BNSF Railroad has an active freight line through Louisville. Both at-grade crossings at South Boulder Road and Griffith Street have crossbucks and warning systems installed.

3.2 Transportation Network Access Control and Infrastructure Improvement Implementation

There are several anticipated access control changes in both the background traffic and total traffic scenarios. Intersection access control is summarized in **Table 2**. These assumptions were reviewed with City staff.

Table 2: Intersection Access Control

#	Intersection	Year 2024 Existing	Year 2025 Background	Year 2045 Background	Year 2025 Total - With Front Street Connection	Year 2045 Total - With Front Street Connection	Year 2025 Total - Without Front Street Connection	Year 2045 Total - Without Front Street Connection
1	Main Street & South Boulder Road	Signal	Signal	Signal	Signal	Signal	Signal	Signal
2	Front Street & South Boulder Road	3/4 Movement	3/4 Movement	3/4 Movement	3/4 Movement	3/4 Movement	3/4 Movement	3/4 Movement
3	Cannon Circle & South Boulder Road	Full Movement	Full Movement	Full Movement	3/4 Movement	3/4 Movement	3/4 Movement	3/4 Movement
4	Courtesy Road & South Boulder Road	Signal - Exist	Signal - Exist	Signal - Future 42 Conditions	Signal - Exist	Signal - Future 42 Conditions	Signal - Exist	Signal - Future 42 Conditions
5	Cannon Circle & SH 42 (Courtesy Road)	Full Movement	Full Movement	RIRO ³	3/4 Movement	RIRO ³	3/4 Movement	RIRO ³
6	Griffith Street & SH 42 (Courtesy Road)	Full Movement	Full Movement	Signal	Full Movement	Signal	Full Movement	Signal
7	Griffith Street & Cannon Street	Full Movement	Full Movement	Full Movement	Full Movement	Full Movement	Full Movement	Full Movement
8	Griffith Street & Front Street	Full Movement	Full Movement	Full Movement	Full Movement	Full Movement	Full Movement	Full Movement
9	Griffith Street & Main Street	Full Movement	Full Movement	Full Movement	Full Movement	Full Movement	Full Movement	Full Movement
10	Front Street & Harper Street	Full Movement ¹	Full Movement ¹	Full Movement ¹	Full Movement ²	Full Movement ²	Full Movement ¹	Full Movement ¹
11	Harper Street & SH 42 (Courtesy Road)	Full Movement	Full Movement	RIRO ³	Full Movement	RIRO ³	Full Movement	RIRO ³
Scenario		A	A	B	C	D	E	F

Notes: ¹Not Stop Controlled (Free Flowing)

²Westbound Stop Controlled

³RIRO = Right-In-Right-Out

Key infrastructure improvement assumptions used in the traffic modeling analyses are summarized below.

- Intersection #3 - South Boulder Road and Cannon Circle
 - Developer constructs a ¾ movement intersection at site development

- Intersection #4 - South Boulder Road and SH 42
 - City constructing signalized intersection improvements in future
- Intersection #5 - SH 42 and Cannon Circle intersection
 - Developer constructs a ¾ movement intersection at site development
 - City restricts to RIRO movements in the future with signalization of Intersection #6
- Intersection #6 - SH 42 and Griffith Street
 - City constructs a traffic signal in the future
- Intersection #10 – Front Street and Harper Street
 - With Front Street Connection: Developer constructs a north leg and installs a stop sign for westbound Harper Street
 - Without Front Street Connection: No change from existing conditions
- Intersection #11 – SH 42 and Harper Street
 - City restricts to RIRO movements in the future with signalization of SH 42 and Griffith Street

Key infrastructure improvements are described in detail below.

Intersection #1 - South Boulder Road and Main Street Intersection: This 3-legged intersection is signalized. The signal is coordinated with the BNSF Railroad crossing that is located on the eastern leg of the intersection.

The City of Louisville’s *Louisville South Boulder Road Connectivity Plan* and, as well as the DRCOG South Boulder Road Corridor Study¹⁷ both identify a future pedestrian underpass on the western leg of the intersection.

Intersection #2 - South Boulder Road and Front Street Intersection: This intersection serves a private driveway to an apartment complex to the north and the site’s existing commercial driveway to the south. In the Summer of 2022, the City of Louisville made changes to the configuration of the South Boulder Road and Front Street intersection by restricting the northbound and southbound left turns.

No additional changes to this intersection are expected.

Intersection #3 - South Boulder Road and Cannon Circle intersection: This full-movement intersection currently serves a commercial driveway to the north and

Cannon Circle to the south. This intersection has westbound and eastbound left turn lanes.

The City of Louisville completed a *South Boulder Road Corridor Evaluation*¹¹. The resulting recommendations determined that signalization is not appropriate at Cannon Circle due to spacing constraints to the SH 42 traffic signal. Refer to an excerpt in the **Appendix**.

With the buildout of ~~Coal Creek Station~~Coal Creek Village, this intersection will be restricted to a $\frac{3}{4}$ movement, with left turns out of the site restricted. Therefore, all total traffic scenarios are modeled with the northbound left turn lane restricted.

Intersection #4 - South Boulder Road and SH 42 intersection: This is a full-movement, signalized intersection. The intersection is owned by CDOT and maintained by the City of Louisville. There are double left-turn lanes on all four legs of the intersection. There are westbound and southbound right-turn lanes. U-turns are permitted.

The *Future 42* plan depicts intersection improvements that include northbound and eastbound channelized right turn lanes. The Year 2045 background and total traffic scenarios are modeled assuming the westbound and southbound right turn lanes are constructed.

Intersection #5 - SH 42 and Cannon Circle intersection: This is currently a full-movement "T" intersection. This intersection has a single auxiliary turn lane: northbound left. Southbound SH 42 is two lanes wide through the intersection. Northbound SH 42 has a single through-lane approaching the intersection, then widens to two lanes north of the intersection.

With the buildout of ~~Coal Creek Station~~Coal Creek Village, this intersection will be restricted to a $\frac{3}{4}$ movement, with left turns out of the site restricted. Therefore, Year 2026 total traffic scenarios are modeled with the eastbound left turns restricted.

Per the *Future 42* Plan, the TIS assumes that the Cannon Circle access allows right-in, right-out movements only. This improvement would likely coincide with the signalization of the SH 42 and Griffith Street intersection. Therefore, Year 2045 background and total traffic scenarios are modeled with the northbound and eastbound left turns restricted.

Intersection #6 - SH 42 and Griffith Street intersection: This is currently a full-movement intersection. The east and west legs are stop-controlled. Griffith Street is a public roadway that has an at-grade railroad crossing and accesses Main Street. The east leg of this intersection accesses the Louisville Sports Complex. This intersection currently has southbound and northbound left turn lanes and a southbound right turn lane.

Per the *Future 42 Plan*, the TIS assumes that this intersection will be signalized in the future. Therefore, Year 2045 background and total traffic scenarios are modeled with a traffic signal.

Intersection #7 – Griffith Street and Cannon Street intersection: This is a full-movement intersection with stop-control on the north and south legs.

No additional changes to this intersection are expected.

Intersection #8 – Griffith Street and Front Street intersection: This is a full-movement intersection with stop-control on the north and south legs.

No additional changes to this intersection are expected.

Intersection #9 – Griffith Street and Main Street intersection: This is a full-movement “T” intersection. The north and south legs are stop-controlled.

No additional changes to this intersection are expected.

Intersection #10 – Front Street and Harper Street intersection: This is currently a free-flowing intersection. There is unimproved alley access as a third, north leg. All background scenarios assume no change in the current configuration.

This intersection is modeled with two scenarios.

In the Year 2026 and Year 2045 total traffic scenarios with the Front Street connection, it is recommended that Front Street becomes the through street, resulting in the installation of westbound stop-control. This connection aligns with the City of Louisville’s previous *The Highway 42 Revitalization Area Framework Plan*¹⁴ and *42 Gateway Alternative Analysis Report*¹⁵ plans to connect South Boulder Road and Griffith Street via Front Street. Excerpts from these reports are included in the **Appendix**.

Intersection #11 - SH 42 and Harper Street intersection: This is currently an eastbound stop-controlled full-movement “T” intersection. This intersection is located within SH 42’s transition area between two southbound through lanes at South Boulder Road and a separate single southbound through lane and southbound right turn lane on SH 42 for Griffith Street. There is a double yellow stripe for northbound through traffic at the intersection. Vehicles are still making left turns into and out of Harper Street across the double yellow stripe.

Per the *Future 42 Plan*, the TIS assumes that the Harper Street access allows right-in, right-out movements only. This improvement would likely coincide with the signalization of the SH 42 and Griffith Street intersection. Therefore, Year 2045 background and total traffic scenarios are modeled with the northbound and eastbound left turns restricted.

3.3 Traffic Data Collection

Existing Traffic Volumes: Both weekday and weekend peak traffic operations were studied at the study area intersections. Weekday morning peak hour turning movement counts were collected on Tuesday, November 5, 2024, from 7:00am to 9:00am. Weekday evening peak hour turning movement counts were collected on Tuesday, November 5, 2024, from 4:00pm to 6:00pm. Saturday mid-day peak hour turning movement counts were collected on Saturday, November 2, 2022 from 11:00am to 1:00pm. During the data collection, the weather was clear and school was in session. This data replaces and updates previous traffic data that was collected in August 2020 and November 2022.

Traffic movements at the intersection of SH 42 and Harper Street were determined from the counts collected at the adjacent intersections of SH 42 with Cannon Circle and Griffith Street.

The traffic data collection showed that the peak traffic occurred from 7:45am to 8:45am and 4:00pm to 5:00pm during the weekday. Saturday peak hour traffic occurred from 11:30am to 12:30pm. Raw traffic data is included in the **Appendix**.

4.0 Future Background Traffic Projections

Background traffic refers to the anticipated future traffic without the development of the proposed ~~Coal Creek Station~~Coal Creek Village project.

The existing traffic counts are used to determine the forecasted background traffic volumes using industry-standard background annual traffic growth rates, additional adjacent development traffic, and travel route adjustments for modified access control scenarios.

4.1 Background Annual Traffic Growth

Growth factors for South Boulder Road, SH 42, and Main Street were derived from the traffic volume projections for 2020 and 2050 published by the *Denver Regional Council of Governments*² (DRCOG). The resulting average annual growth rate was 1.30% for these corridors. Calculations are included in the **Appendix**.

All properties served by the opposing driveways on the north side of South Boulder Road, the east side of SH 42, and along Griffith Street are assumed to be built out. Therefore, no growth rate was applied to these access points.

4.2 Proximate Development Projects

As described in **Section 2.2**, the Delo Boom project is anticipated to impact the analysis intersections. Data from the *Delo Boom Traffic Impact Study*¹² was used for all future Year 2026 and Year 2045 traffic projections. Figures for the Year 2026 and Year 2045 Delo Boom traffic assignment are included in the **Appendix**.

4.3 Travel Route Adjustments for Modified Access Control Scenarios

As described in **Section 3.2**, there are several anticipated access control changes in both the background traffic and total traffic scenarios. Modifications to the allowed turning movements at the analysis intersections, future construction of a traffic signal at SH 42 and Griffith Street, and scenarios with and without Front Street connection from South Boulder Road to Griffith Street will impact the travel routes of both existing and future traffic.

- Background and total traffic modifications for each applicable scenario were calculated based on data from DRCOG and the *Louisville Transportation Masterplan*. Data referencing residents' and visitors' origins and destinations was compared to anticipated travel time differences. Additionally, South Boulder Road and SH 42 are already at capacity during peak traffic hours. This makes it difficult to make certain left and through movements from side streets. Long signal cycle

² Denver Regional Council of Governments, 2020 & 2050 Model Assigned All-Day Volumes. August 2022.

lengths (120 seconds) at the intersection of SH 42 and South Boulder Road can cause substantial side street delay along these corridors. The delay caused by this difficulty impacts the travel route and travel time.

Gravity-based travel time calculations were used to determine ideal origin and destination routes based upon both distance and trip time. Travel time tools for existing routes were compared using Google Maps and Apple Maps - two mobile apps that are regularly utilized by drivers to route them to their destination efficiently.

City of Louisville's *Transportation Master Plan* provided statistics on the community's activity centers, areas of future development potential, locations of where Louisville residents work, and locations of where Louisville employees live.

- Currently, 40% of all trips made within, to, or from Louisville are work-related.³
- Approximately 93% of Louisville employees live outside of Louisville, and 7% live within the City, which has influences on commuting corridors including US 36, US 287, and Hwy 119⁴
- Louisville residents work in Boulder (28%) and Denver (14%). Approximately 89% of employed residents work outside of Louisville, which has influences on commuting corridors including US 36, US 287, and Hwy 119⁵
- Anticipated increased queuing distance, delays, and congestion along South Boulder Road with increased background traffic growth, since South Boulder Road is already at capacity

Most of the study area intersections are impacted by the access modifications described below. Specific modifications for each applicable scenario are included in the **Appendix**.

Intersection #3 - South Boulder Road and Cannon Circle intersection: With the development of ~~Coal Creek Station~~Coal Creek Village, this intersection will be restricted to a ¾ movement, with left turns out of the site restricted. Vehicles desiring to make a northbound left turn movement out of the site were redistributed on South Boulder Road. Details of this shift can be found in the **Appendix**.

Intersection #4 - South Boulder Road and SH 42 intersection: Due to the restriction of left turns out of the site at Cannon Circle with the development of ~~Coal Creek Station~~Coal Creek Village, additional U-turn movements are anticipated at this signalized intersection. A significant weave motion between the site accesses and the SH 42 traffic signal are anticipated to accommodate both U-turns at the signal and

³ Louisville TMP, August 2019, Page 3-17

⁴ Louisville TMP, August 2019, Page 3-16

⁵ Louisville TMP, August 2019, Page 3-15

eastbound left turn movements onto SH 42 to use an alternate route to access destinations north and west of the site.

Intersection #5 - SH 42 and Cannon Circle intersection: With the buildout of ~~Coal Creek Station~~ Coal Creek Village, this intersection will be restricted to a $\frac{3}{4}$ movement, with left turns out of the site restricted. Per the *Future 42 Plan*, the Cannon Circle access will allow right-in, right-out movements only in Year 2045 background and total traffic scenarios.

Vehicles desiring to make left turns at this access were re-routed on SH 42. Details of this shift can be found in the **Appendix**.

Intersection #6 - SH 42 and Griffith Street intersection: Per the *Future 42 Plan*, this intersection will be signalized in the future. Therefore, it will be easier to make an eastbound left turn movement in the future at this intersection. Details of this shift can be found in the **Appendix**.

At current intersection volumes, no signal warrants are met. Nor is the intersection anticipated to meet MUTCD warrant volumes with the long-term buildout conditions of Coal Creek Village. The City should monitor the intersection volumes in the future to determine when the intersection may meet MUTCD signal warrant volumes. for an appre

Intersection #10 – Front Street and Harper Street intersection: This is currently a free-flowing intersection. There is an unimproved alley access as a third, north leg. All background scenarios assume no change in the current configuration.

This intersection is modeled with two scenarios.

In the Year 2026 and Year 2045 total traffic scenarios with the Front Street connection, it is recommended that Front Street becomes the through street, resulting in the installation of westbound stop-control. Additional traffic are anticipated to utilize the Front Street connection. Details of this shift can be found in the **Appendix**.

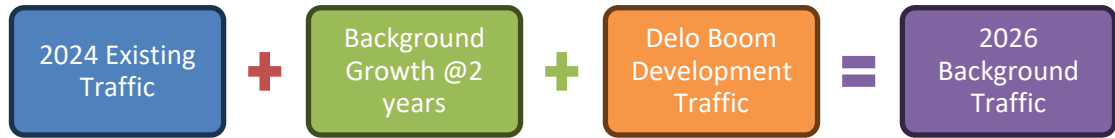
Intersection #11 - SH 42 and Harper Street intersection: Per the *Future 42 Plan*, the Harper Street access will allow right-in, right-out movements only in Year 2045 background and total traffic scenarios. Vehicles desiring to make left turns at this access were re-routed on SH 42. Details of this shift can be found in the **Appendix**.

4.4 Year 2026 Background Traffic Forecasts

The forecasted Year 2026 background traffic is the combination of the November 2024 existing traffic volumes with the applied average annual traffic growth on the mainline streets and Delo Boom traffic assignment. This calculation methodology is

depicted in ~~Figure 3~~**Figure 3**. The resulting projected Year 2026 background traffic volumes can be seen in ~~Figure 5~~**Figure 5**.

Figure 3: 2026 Background Schematic Diagram



4.5 Year 2045 Background Traffic Forecasts

The forecasted Year 2045 background traffic is the combination of the November 2024 existing traffic volumes with the applied average annual traffic growth on the mainline streets, Delo Boom traffic assignment, and redistributed traffic for the anticipated access control changes. This calculation methodology is depicted in ~~Figure 4~~**Figure 4**. The resulting projected Year 2026 background traffic volumes can be seen in ~~Figure 6~~**Figure 6**.

Figure 4: 2045 Background Schematic Diagram



Table 3 summarizes the background traffic intersection scenarios and the corresponding figures used to calculate them.

Table 3: Background Traffic Figures Summary

Scenario (from Table 2)	Existing Traffic	Annual Growth Rate	DeLo Boom Traffic	Travel Route Adjustments Figures	Background Traffic Figures
Scenario A: Year 2026 Background Traffic	Appendix Figure AP01: Year 2024 Existing Traffic	Section 4.1	Appendix Figure AP02: Year 2026 Background Traffic (DeLo Boom Development)	Appendix Figure AP04: Year 2045 Background Adjust (Int #5 & #6 Redistribution)	Figure 5: Year 2026 Background Traffic
Scenario B: Year 2045 Background Traffic	Appendix Figure AP01: Year 2024 Existing Traffic	Figure 16: Project Generated Traffic Assignment – Scenario D (Residential & Retail)	Appendix Figure AP03: Year 2045 Background Traffic (DeLo Boom Development)	Appendix Figure AP04: Year 2045 Background Adjust (Int #5 & #6 Redistribution)	Figure 6: Year 2045 Background Traffic

Figure 5: Year 2026 Background Traffic

Figure 6: Year 2045 Background Traffic

4.6 Background Traffic Level of Service

Using *Highway Capacity Manual*⁶ (HCM) methodology, Synchro Version 10 software was used to determine the delay and Level of Service (LOS.) HCM LOS is defined by the following criteria:

Table 4: HCM Level of Service Criteria

LOS	Expected Delay to Minor Street Traffic	Average Signal Delay (Seconds/Vehicle)	Average Stop-Controlled Delay (Seconds/Vehicle)
A	Little or no delay.	0-10	0-10
B	Short traffic delays.	>10-20	>10-15
C	Average traffic delays.	>20-35	>15-25
D	Long traffic delays.	>35-55	>25-35
E	Very long traffic delays.	>55-80	>35-50
F	When volume exceeds the capacity of the lane extreme delays will be encountered with queuing that may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improving the intersection.	>80	>50

Table 5 shows the resulting LOS as determined by HCM analysis. The Synchro reports for the background level of service analysis can be found in the **Appendix**. These projections reflect the peak morning and evening traffic in Year 2026 and Year 2045.

⁶ Highway Capacity Manual, 6th Edition. Transportation Research Board, 2016.

Table 5: Background Traffic Level of Service

#	Intersection	Traffic Control	Approach	Year 2026 Background Level of Service (Delay in Seconds)			Year 2045 Background Level of Service (Delay in Seconds)		
				AM	PM	SAT	AM	PM	SAT
1	South Boulder Road & Main Street	Signal	EBT	A (7.5)	A (9.6)	A (6.6)	A (8.5)	B (10.8)	A (7.0)
			EBR	A (1.3)	A (2.4)	A (1.4)	A (2.1)	A (3.0)	A (1.4)
			WBL	A (5.1)	A (7.4)	A (3.1)	A (5.1)	A (9.5)	A (2.9)
			WBT	A (5.9)	A (6.6)	A (3.2)	A (7.3)	A (7.9)	A (2.9)
			NBL	D (55.0)	E (55.3)	D (47.5)	D (53.1)	E (59.8)	D (47.0)
			NBR	B (13.9)	B (15.3)	B (14.4)	B (14.1)	C (29.0)	B (15.0)
2	South Boulder Road & Front Street	3/4, NB/SB Stop	WBL	C (15.3)	C (24.3)	B (12.9)	C (20.5)	E (41.3)	C (16.3)
			NB	A (0.0)	C (15.9)	B (12.3)	A (0.0)	C (20.1)	B (14.0)
			SB	C (15.3)	B (13.3)	B (12.0)	C (19.1)	C (15.6)	B (13.6)
3	South Boulder Road & Cannon Circle	NB/SB Stop	EBL	C (16.6)	C (16.9)	B (12.5)	C (24.8)	D (25.8)	C (15.6)
			WBL	B (10.9)	C (16.2)	B (10.6)	B (12.5)	C (23.2)	B (12.2)
			NB	B (12.0)	E (47.6)	E (44.3)	B (13.6)	F (186.8)	F (91.1)
			SB	E (50.0)	F (324.2)	F (53.2)	F (194.7)	F (1776.7)	F (216.3)
4	SH 42 (Courtesy Road) & South Boulder Road	Signal	EBL	E (55.1)	F (121.1)	F (505.8)	E (63.8)	F (215.3)	F (863.0)
			EBT	C (30.2)	D (46.2)	C (25.2)	C (29.4)	D (41.7)	C (25.8)
			EBR	-	-	-	B (11.3)	A (9.1)	A (1.8)
			WBL	E (61.5)	F (109.4)	E (75.6)	E (65.1)	F (167.8)	F (99.5)
			WBT	D (42.5)	D (47.3)	C (33.7)	D (48.4)	E (56.6)	C (34.9)
			WBR	A (4.9)	A (7.8)	A (1.8)	A (8.5)	B (14.5)	A (3.7)
			NBL	E (63.0)	F (180.8)	F (183.0)	F (529.6)	F (305.6)	F (313.5)
			NBT	C (32.6)	E (76.8)	C (26.6)	D (35.5)	D (48.8)	C (25.0)
			NBR	-	-	-	A (9.4)	B (12.2)	A (7.4)
			SBL	F (193.3)	F (240.4)	F (94.1)	F (321.4)	F (372.3)	F (152.0)
			SBT	D (37.0)	D (38.6)	C (29.2)	D (39.2)	D (40.2)	C (29.1)
5	SH 42 (Courtesy Rd) & Cannon Circle	EB Stop	EB	F (65.1)	D (28.5)	E (38.2)	A (0.0)	C (15.2)	B (12.2)
			NBL	B (14.1)	B (11.0)	C (15.7)	-	-	-
6	SH 42 (Courtesy Road) & Griffith Street	EB/WB Stop	EB	F (76.4)	F (96.9)	E (39.2)	-	-	-
			WB	F (70.2)	F (115.0)	D (26.5)	-	-	-
			NB	A (0.5)	A (0.2)	A (0.3)	-	-	-
			SB	A (0.0)	A (0.0)	A (0.1)	-	-	-
6	SH 42 (Courtesy Road) & Griffith Street	Signal	EBL	-	-	-	C (26.7)	C (25.3)	C (20.5)
			EBT	-	-	-	A (0.7)	A (0.5)	B (11.0)
			WBL	-	-	-	C (24.0)	C (24.0)	B (18.5)
			WBT	-	-	-	C (21.0)	C (21.0)	B (13.3)
			NBL	-	-	-	C (26.5)	C (25.1)	B (17.7)
			NBT	-	-	-	A (3.9)	A (4.9)	A (4.8)
			SBL	-	-	-	C (29.0)	C (32.0)	B (17.5)
			SBT	-	-	-	A (4.4)	A (5.2)	A (4.7)
7	Griffith Street & Cannon Street	NB/SB Stop	EB	A (0.0)	A (0.2)	A (0.0)	A (0.0)	A (0.3)	A (0.0)
			WB	A (1.0)	A (0.0)	A (1.5)	A (1.0)	A (0.0)	A (1.5)
			NB	A (9.9)	B (10.3)	A (9.4)	A (9.6)	A (9.9)	A (9.2)
			SB	A (8.9)	B (10.7)	A (9.1)	A (8.9)	B (10.7)	A (9.2)
8	Griffith Street & Front Street	NB/SB Stop	EB	A (0.2)	A (0.4)	A (0.7)	A (0.2)	A (0.4)	A (0.7)
			WB	A (0.2)	A (0.2)	A (0.1)	A (0.2)	A (0.2)	A (0.1)
			NB	A (9.9)	A (10.0)	A (9.8)	A (9.8)	A (9.9)	A (9.7)
			SB	A (9.3)	A (9.2)	A (8.8)	A (9.3)	A (9.2)	A (8.8)
9	Griffith Street & Main Street	WB Stop	WB	B (13.9)	B (12.9)	B (11.2)	B (13.6)	B (12.8)	B (11.2)
			SB	A (1.3)	A (0.0)	A (0.9)	A (1.2)	A (0.0)	A (0.7)
10	Harper Street & Front Street	None	WB	-	-	-	-	-	-
			SB	-	-	-	-	-	-
11	SH 42 (Courtesy Rd) & Harper Street	EB Stop	EB	D (33.7)	F (118.0)	E (40.9)	B (14.7)	C (18.2)	B (12.9)
			NBL	B (10.4)	B (10.7)	A (9.3)	-	-	-

#	Intersection	Traffic Control	Approach	Year 2026 Background Level of Service (Delay in Seconds)			Year 2045 Background Level of Service (Delay in Seconds)		
				AM	PM	SAT	AM	PM	SAT
1	South Boulder Road & Main Street	Signal	EBT	A (7.5)	A (9.6)	A (6.6)	A (8.5)	B (10.8)	A (7.0)
			EBR	A (1.3)	A (2.4)	A (1.4)	A (2.1)	A (3.0)	A (1.4)
			WBL	A (5.1)	A (7.4)	A (3.1)	A (5.1)	A (9.5)	A (2.9)
			WBT	A (5.9)	A (6.6)	A (3.2)	A (7.3)	A (7.9)	A (2.9)
			NBL	D (55.0)	E (55.3)	D (47.5)	D (53.1)	E (59.8)	D (47.0)
2	South Boulder Road & Front Street	3/4, NB/SB Stop	NBR	B (13.9)	B (15.3)	B (14.4)	B (14.1)	C (29.0)	B (15.0)
			WBL	C (15.3)	C (24.3)	B (12.9)	C (20.5)	E (41.3)	C (16.3)
			NB	A (0.0)	C (15.9)	B (12.3)	A (0.0)	C (20.1)	B (14.0)
3	South Boulder Road & Cannon Circle	NB/SB Stop	SB	C (15.3)	B (13.3)	B (12.0)	C (19.1)	C (15.6)	B (13.6)
			EBL	C (16.6)	C (16.9)	B (12.5)	C (24.8)	D (25.8)	C (15.6)
			WBL	B (10.9)	C (16.2)	B (10.6)	B (12.5)	C (23.2)	B (12.2)
			NB	B (12.0)	E (47.6)	E (44.3)	B (13.6)	F (186.8)	F (91.1)
4	SH 42 (Courtesy Road) & South Boulder Road	Signal	SB	E (50.0)	F (324.2)	F (53.2)	F (194.7)	F (1776.7)	F (216.3)
			EBL	E (55.1)	F (121.1)*	F (505.8)*	E (63.8)*	F (215.3)*	F (863.0)*
			EBT	C (30.2)	D (46.2)*	C (25.2)	C (29.4)	D (41.7)*	C (25.8)
			EBR	-	-	-	B (11.3)	A (9.1)	A (1.8)
			WBL	E (61.5)	F (109.4)*	E (75.6)*	E (65.1)*	F (167.8)*	F (99.5)*
			WBT	D (42.5)	D (47.3)	C (33.7)	D (48.4)*	E (56.6)*	C (34.9)
			WBR	A (4.9)	A (7.8)	A (1.8)	A (8.5)	B (14.5)	A (3.7)
			NBL	E (63.0)	F (180.8)*	F (183.0)*	F (529.6)*	F (305.6)*	F (313.5)*
			NBT	C (32.6)	E (76.8)*	C (26.6)	D (35.5)	D (48.8)*	C (25.0)
			NBR	-	-	-	A (9.4)	B (12.2)	A (7.4)
			SBL	F (193.3)*	F (240.4)*	F (94.1)*	F (321.4)*	F (372.3)*	F (152.0)*
5	SH 42 (Courtesy Rd) & Cannon Circle	EB Stop	SBT	D (37.0)	D (38.6)	C (29.2)	D (39.2)	D (40.2)	C (29.1)
			SBR	B (17.0)	A (6.0)	A (5.4)	C (31.8)*	A (9.2)	A (6.9)
6	SH 42 (Courtesy Rd) & Griffith Street	EB Stop	EB	F (65.1)	D (28.5)	E (38.2)	A (0.0)	C (15.2)	B (12.2)
			NBL	B (14.1)	B (11.0)	C (15.7)	-	-	-
		EB/WB Stop	EB	F (76.4)	F (96.9)	E (39.2)	-	-	-
			WB	F (70.2)	F (115.0)	D (26.5)	-	-	-
7	Griffith Street & Cannon Street	NB/SB Stop	NB	A (0.5)	A (0.2)	A (0.3)	-	-	-
			SB	A (0.0)	A (0.0)	A (0.1)	-	-	-
8	SH 42 (Courtesy Road) & Griffith Street	Signal	EB	-	-	-	C (26.7)	C (25.3)	C (20.5)
			EBT	-	-	-	A (0.7)	A (0.5)	B (11.0)
			WBL	-	-	-	C (24.0)	C (24.0)	B (18.5)
			WBT	-	-	-	C (21.0)	C (21.0)	B (13.3)
			NBL	-	-	-	C (26.5)	C (25.1)	B (17.7)
			NBT	-	-	-	A (3.9)	A (4.9)	A (4.8)
			SBL	-	-	-	C (29.0)	C (32.0)	B (17.5)
			SBT	-	-	-	A (4.4)	A (5.2)	A (4.7)
9	Griffith Street & Front Street	NB/SB Stop	SBR	-	-	-	A (0.6)	A (1.7)	A (0.7)
			EB	A (0.0)	A (0.2)	A (0.0)	A (0.0)	A (0.3)	A (0.0)
			WB	A (1.0)	A (0.0)	A (1.5)	A (1.0)	A (0.0)	A (1.5)
			NB	A (9.9)	B (10.3)	A (9.4)	A (9.6)	A (9.9)	A (9.2)
10	Griffith Street & Main Street	WB Stop	SB	A (8.9)	B (10.7)	A (9.1)	A (8.9)	B (10.7)	A (9.2)
			EB	A (0.2)	A (0.4)	A (0.7)	A (0.2)	A (0.4)	A (0.7)
11	Griffith Street & Harper Street	None	WB	A (0.2)	A (0.2)	A (0.1)	A (0.2)	A (0.2)	A (0.1)
			NB	A (9.9)	A (10.0)	A (9.8)	A (9.8)	A (9.9)	A (9.7)
			SB	A (9.3)	A (9.2)	A (8.8)	A (9.3)	A (9.2)	A (8.8)
			WB	B (13.9)	B (12.9)	B (11.2)	B (13.6)	B (12.8)	B (11.2)
12	SH 42 (Courtesy Rd) & Harper Street	EB Stop	SB	A (1.3)	A (0.0)	A (0.9)	A (1.2)	A (0.0)	A (0.7)
			EB	D (33.7)	F (118.0)	E (40.9)	B (14.7)	C (18.2)	B (12.9)
13			NBL	B (10.4)	B (10.7)	A (9.3)	-	-	-

* Indicates LOS F with volume exceeding capacity (delays in seconds likely not accurate due to modelling method limitations)

As can be seen in ~~Table 5~~~~Table 5~~, unsignalized intersections on South Boulder Road and SH 42 will continue to see longer wait times/delay as traffic on these arterial streets continue to grow and there are less gaps in traffic to make a left turn movement onto the larger road. Left turns at the South Boulder Road and SH 42 traffic signal continue to be starved for time, resulting in failing LOS for these movements. These degradations and failures will occur with or without the addition of the proposed ~~Coal Creek Station~~Coal Creek Village traffic.

Intersection #1 - South Boulder Road and Main Street Intersection: This 3-legged intersection is signalized. The signal is coordinated with the BNSF Railroad crossing that is located on the eastern leg of the intersection.

This intersection will see acceptable LOS A and B on all mainline eastbound and westbound movements. As is typical with side streets to major arterials, the side street receives less green time from the traffic signal. As the signal timing is currently set, Main Street is anticipated to operate with failing LOS E and F. Overall intersection LOS is B or better through Year 2045 background traffic conditions.

Intersection #2 - South Boulder Road and Front Street Intersection: This unsignalized intersection is anticipated to operate at an acceptable overall intersection LOS A for Year 2026 background traffic conditions and LOS B through Year 2045 background traffic conditions.

The northbound right turn movement is anticipated to operate LOS C or better through background Year 2045 conditions.

The westbound left turn is currently operating at an acceptable LOS C. By Year 2045 background traffic conditions, this movement is anticipated to degrade to a LOS E, as gaps in South Boulder Road traffic decrease.

Intersection #3 - South Boulder Road and Cannon Circle intersection: This full-movement intersection currently serves a commercial driveway to the north and Cannon Circle to the south. All mainline South Boulder Road movements are anticipated to operate at an acceptable LOS of D or better through Year 2045 background traffic conditions.

As is typical with unsignalized side street traffic accessing a major arterial, side street traffic operations for left and through movements will continue to degrade over time as traffic volumes on South Boulder Road continue to grow. The northbound and southbound movements are anticipated to experience failing LOS F operations.

The City of Louisville completed a *South Boulder Road Corridor Evaluation*¹¹. The resulting recommendations determined that signalization is not appropriate at

Cannon Circle due to spacing constraints to the SH 42 traffic signal. Refer to an excerpt in the **Appendix**.

Intersection #4 - South Boulder Road and SH 42 intersection: This is a full-movement, signalized intersection. The *Future 42* plan depicts intersection improvements that include northbound and eastbound channelized right turn lanes. The Year 2045 background and total traffic scenarios are modeled assuming the westbound and southbound right turn lanes are constructed. Even with these future improvements, this intersection has movements that are anticipated to operate at a failing LOS F for both Year 2026 and Year 2045 background conditions. The overall intersection LOS is between D and F for these scenarios.

This intersection has below acceptable LOS due to the high traffic volumes it handles. The current traffic volumes are too high to be flushed out of the intersection within one cycle during peak traffic hours. This causes vehicles to wait in queues for more than one cycle. LOS on the north and south legs of SH 42 are slightly better than on the South Boulder Road's east and west legs. This is due to CDOT's prioritization of SH 42 and giving the highway more green time.

Intersection #5 - SH 42 and Cannon Circle intersection: This is currently a full-movement "T" intersection. Mainline SH 42 is anticipated to operate at good LOS in Year 2026 background traffic conditions. However, the eastbound leg is already experiencing failing LOS F during peak traffic hours.

Future 42 identifies that this access will be restricted to right-in, right-out only movements in the future. This improvement would likely coincide with the signalization of the SH 42 and Griffith Street intersection. With the access restriction, this access will operate at acceptable LOS C or better through Year 2045 background traffic conditions.

Intersection #6 - SH 42 and Griffith Street intersection: This is currently a full-movement intersection. Mainline SH 42 is anticipated to operate at acceptable LOS A under short-term background traffic conditions. However, the side streets are currently seeing significant delays during peak traffic. The west leg is currently operating at a LOS F due to the delay experienced turning out onto SH 42.

Per the *Future 42* Plan, the TIS assumes that this intersection will be signalized in the future. Year 2045 background and total traffic scenarios are modeled with a traffic signal. The signal timing used assumed a half-cycle (from the South Boulder Road intersection) of 60 seconds for the morning and evening peak hours and 50 seconds for the Saturday peak hour. The green time on SH 42 was prioritized. The maximum bandwidth was used to coordinate the signals with the SH 42 and South Boulder Road intersection. This improved the northbound LOS at the SH 42 and South Boulder Road intersection. The southbound movement into this intersection was limited by the constraints of the upstream South Boulder Road cycle.

The side street operations are anticipated to improve to LOS C with signalization. Mainline SH 42 may degrade due to the added delay to the corridor. SH 42 is anticipated to operate at a LOS D or better through Year 2045 background traffic conditions.

Intersection #7 – Griffith Street and Cannon Street intersection: This is a full-movement intersection with stop-control on the north and south legs. This intersection is anticipated to operate at acceptable LOS A or B for all movements for both Year 2026 and Year 2045 background conditions.

Intersection #8 – Griffith Street and Front Street intersection: This is a full-movement intersection with stop-control on the north and south legs. This intersection is anticipated to operate at LOS A for all movements for both Year 2026 and Year 2045 background conditions.

Intersection #9 – Griffith Street and Main Street intersection: This is a full-movement “T” intersection. The east leg is stop-controlled. This intersection is anticipated to operate at LOS B or better for all movements for both Year 2026 and Year 2045 background conditions.

Intersection #10 – Front Street and Harper Street intersection: This is currently a free-flowing intersection. There is an unimproved alley access as a third, north leg. All background scenarios assume no change in the current configuration. All legs of this intersection are anticipated to operate at a LOS A.

Intersection #11 – SH 42 and Harper Street intersection: Left turns at this intersection currently experience delay into and out of the site during peak traffic on SH 42. Currently, through movements on SH 42 are operating at a LOS A. Eastbound Harper Street is operating at a LOS F during the evening peak hour.

Per the *Future 42* Plan, the Harper Street access will be restricted to right-in, right-out movements by the Year 2045 background traffic conditions. With this scenario, the eastbound movement is anticipated to improve to a LOS C.

5.0 Project Traffic

5.1 Trip Generation

The Institute of Transportation Engineers’ (ITE) *11th Edition of the Trip Generation Manual*⁷ (*Trip Generation Manual*) was used to determine the anticipated trip generation for the Coal Creek Village development. Site-generated traffic volumes were determined for the weekday morning peak hour, the weekday afternoon peak hour, and the Saturday midday peak hour.

The trip generation analysis used the following ITE Land Uses:

Table 6: ITE Land Use Codes

ITE Code	Land Use Category	Size	
220	Multifamily Housing (Low-Rise)	188	Dwelling Units
822	Retail Plaza (<40K)	13.53	1000 Sq. Ft. GFA*
930	Fast Casual Restaurant (Existing Empanada Shop)	0.43	1000 Sq. Ft. GFA*

GFA = Gross Floor Area

As per ITE’s *Trip Generation Handbook*⁸ methodology, the trip generation regression equations and average rates were utilized as part of this analysis.

Existing Empanada Shop: As previously mentioned, the existing Empanada shop was operating during the November 2024 traffic data collection. Therefore, the existing and background traffic counts already include the empanada shop’s traffic.

It is anticipated that with the buildout of the ~~Coal Creek Station~~Coal Creek Village project, a portion of Coal Creek Village’s residents and patrons will access the empanada shop. Therefore, an internal capture reduction is applied to the existing empanada shop’s traffic in the total traffic scenarios.

Multimodal Reduction: A five percent (5%) multimodal reduction was applied to all the proposed land uses. The development is within walking and biking distance to Louisville Middle School, Fairview Montessori School, the Louisville Sports Complex, and various commercial facilities. There are bike lanes on South Boulder Road and on SH 42. There are bus stops for the RTD DASH Route adjacent to the development on South Boulder Road.

Internal Capture: Internal capture traffic refers to trips that occur within a mixed-use development (like trips between a residential area and a retail area within the same site), rather than trips that originate or end outside the development. This capture

⁷ Trip Generation Manual, 11th Edition. Institute of Transportation Engineers, 2021.

⁸ Trip Generation Handbook, 3rd Edition. Institute of Transportation Engineers, 2017.

reduces the overall number of trips that would otherwise use the external road network.

The ITE *Trip Generation Handbook*⁹ was used to determine the internal capture reductions for the proposed residential and commercial developments. Internal reduction calculations for the average weekday, AM peak hour, and PM peak hour are included in the **Appendix**. Data for the Saturday peak hour was not available. Therefore, the internal reductions rates for the PM peak hour were used for the Saturday peak hour.

Project Trip Generation: The proposed development is expected to generate a total of 1,839 vehicle trips on the adjacent roadway network over the course of an average weekday (vpd). This includes ~~220~~ 175 vehicle trips per hour (vph) during the morning peak hour, 244vph during the evening peak hour, and 144vph during the Saturday peak hour.

The existing empanada shop is already generating traffic, as detailed in the traffic counts and ~~Table 7~~ Table 7. The additional development is anticipated to generate an additional 1,779 vehicle trips on the adjacent roadway network over the course of an average weekday (vpd). This includes 173 vehicle trips per hour (vph) during the morning peak hour, 238vph during the evening peak hour, and 132vph during the Saturday peak hour.

⁹ Trip Generation Handbook, 2nd Edition. Institute of Transportation Engineers, 2004.

Table 7: Project Trip Generation

ITE Trip Generation Equation ³								Average Weekday	Morning Peak Hour Inbound		Morning Peak Hour Outbound		Evening Peak Hour Inbound		Evening Peak Hour Outbound		Saturday Peak Hour Inbound		Saturday Peak Hour Outbound		
ITE Code	Units ²		Eq. Coef	Avg. Weekday	AM Peak Hour	PM Peak Hour	Sat. Peak Hour	Trips (vpd)	% Trips	Trips (vph)	% Trips	Trips (vph)	% Trips	Trips (vph)	% Trips	Trips (vph)	% Trips	Trips (vph)	% Trips	Trips (vph)	
Existing Land Use																					
Empanada Shop (Actual Derived Rate Equations) ⁶		0.43	kSF	Type a= b=	Rate 139.53	Rate 4.65	Rate 13.95	Rate 27.91	60	50%	1	50%	1	50%	3	50%	3	58%	7	42%	5
Existing External Restaurant Vehicular Trips									60	1		1		3		3		7		5	
Internal Capture Reduction ⁴									-23	0		0		-1		-1		-2		-2	
External Restaurant Vehicular Trips with Buildout of Coal Creek Station ⁷								37	1		1		2		2		5		3		
									2				4				8				
Proposed Residential Land Use																					
#220 - Multifamily Housing (Low-Rise)		188	DU	Type a= b=	A 6.41 75.31	A 0.35 28.13	A 0.42 34.78	Rate 0.41	1,280	24%	23	76%	71	62%	71	38%	43	51%	39	49%	38
Multi-Modal Reduction		-5%							-64	-1		-4		-4		-2		-2		-2	
Vehicular Trips									1,216	22		67		67		41		37		36	
Internal Capture Reduction ⁴									-82	-3		-2		-10		-9		-6		-5	
Project External Residential Vehicular Trips								1,134	19		65		57		32		31		31		
									84				89				62				
Proposed Commercial Land Use																					
#822 - Retail Plaza ⁵		13.53	kSF	Type a= b=	A 42.20 229.68	Rate 7.60	Rate 13.24	Rate 6.57	801	50%	51	50%	51	54%	97	46%	82	51%	45	49%	44
Multi-Modal Reduction		-5%							-40	-3		-3		-5		-4		-2		-2	
Vehicular Trips									761	48		48		92		78		43		42	
Internal Capture Reduction ⁴									-93	-3		-4		-9		-10		-5		-6	
Project External Commercial Vehicular Trips								668	45		44		83		68		38		36		
									89				151				74				
Project Trip Generation Summary																					
Existing External Restaurant Vehicular Trips								60	1		1		3		3		7		5		
External Restaurant Vehicular Trips with Buildout of Coal Creek Station ⁷								37	1		1		2		2		5		3		
									2				4				8				
Project External Residential Vehicular Trips								1,134	19		65		57		32		31		31		
									84				89				62				
Project External Commercial Vehicular Trips (Less Empanada Shop Internal Capture)								645	45		44		82		67		36		34		
									89				149				70				
Project Total New Vehicular Trips (Restaurant's new internal capture + residential + commercial)								1,779	64		109		139		99		67		65		
									173				238				132				
Project Total Vehicular Trips (Including Existing Restaurant + Restaurant's new internal capture + residential + commercial)								1,839	110		110		142		102		74		70		
									220				244				144				

Notes:

¹ Values obtained from *Trip Generation, 11th Edition*, Institute of Transportation Engineers, September 2021.

² vpd = vehicle trips per day, vph = vehicle trips per hour, DU = Dwelling Units, kSF = 1,000 Square Feet

³ Fitted curve equations from ITE Land Uses - Equation Type A is $T = a * X + b$, Equation Type B is $\ln(T) = a * \ln(X) + b$, Rate is $T = a * X$

⁴ Internal capture reductions were obtained from the *ITE Trip Generation Handbook*, Second Edition, June 2004. See calculations in Appendix.

⁵ The ITE Trip Generation Manual did not have available data for the directional distribution of the Saturday peak hour. Therefore, the distribution from mid-rise multifamily housing was

⁶ Trip generation rates were calculated from existing traffic counts onsite. Weekday rates were estimated by using a 10% DHV rate based upon the PM Peak hour. A minimum of 1vph inbound/outbound was used for the AM peak (Actual counts were 0vph inbound and 0vph outbound)

⁷ ~~External Restaurant Vehicular Trips are the sum of the empanada shop existing traffic with the anticipated internal capture traffic reduction that will occur at project buildout.~~

ITE Trip Generation Equation ³								Average Weekday	Morning Peak Hour		Evening Peak Hour		Saturday Peak Hour							
ITE Code	Units ²	Eq. Coef	Avg. Weekday	AM Peak Hour	PM Peak Hour	Sat. Peak Hour	Trips (vpd)	% Trips	Trips (vph)	% Trips	Trips (vph)	% Trips	Trips (vph)	% Trips	Trips (vph)					
Existing Land Use																				
Empanada Shop (Actual Derived Rate Equations) ⁶	0.43	kSF	Type a= b=	Rate 139.53	Rate 4.65	Rate 13.95	Rate 27.91	60	50%	1	50%	1	50%	3	58%	7	42%	5		
Existing External Restaurant Vehicular Trips								60	1	1	3	3	7	5						
Internal Capture Reduction ⁴								-23	0	0	-1	-1	-2	-2						
External Restaurant Vehicular Trips with Buildout of Coal Creek Station ⁷								37	1	1	2	2	5	3						
									2		4		8							
Proposed Residential Land Use																				
#220 - Multifamily Housing (Low-Rise)	188	DU	Type a= b=	A 6.41 75.31	A 0.35 28.13	A 0.42 34.78	Rate 0.41	1,280	24%	23	76%	71	62%	71	38%	43	51%	39	49%	38
Multi-Modal Reduction		-5%						-64	-1	-4	-4	-2	-2	-2						
Vehicular Trips								1,216	22	67	67	41	37	36						
Internal Capture Reduction ⁴								-82	-3	-2	-10	-9	-6	-5						
Project External Residential Vehicular Trips								1,134	19	65	57	32	31	31						
									84		89		62							
Proposed Commercial Land Use																				
#822 - Retail Plaza ⁵	13.53	kSF	Type a= b=	A 42.20 229.68	Rate 7.60	Rate 13.24	Rate 6.57	801	50%	51	50%	51	54%	97	46%	82	51%	45	49%	44
Multi-Modal Reduction		-5%						-40	-3	-3	-5	-4	-2	-2						
Vehicular Trips								761	48	48	92	78	43	42						
Internal Capture Reduction ⁴								-93	-3	-4	-9	-10	-5	-6						
Project External Commercial Vehicular Trips								668	45	44	83	68	38	36						
									89		151		74							
Project Trip Generation Summary																				
Existing External Restaurant Vehicular Trips								60	1	1	3	3	7	5						
External Restaurant Vehicular Trips with Buildout of Coal Creek Station ⁷								37	1	1	2	2	5	3						
									2		4		8							
Project External Residential Vehicular Trips								1,134	19	65	57	32	31	31						
									84		89		62							
Project External Commercial Vehicular Trips (Less Empanada Shop Internal Capture)								645	45	44	82	67	36	34						
									89		149		70							
Project Total New Vehicular Trips (Restaurant's new internal capture + residential + commercial)								1,779	64	109	139	99	67	65						
									173		238		132							
Project Total Vehicular Trips (Including Existing Restaurant + Restaurant's new internal capture + residential + commercial)								1,839	65	110	142	102	74	70						
									175		244		144							

Notes:

¹ Values obtained from *Trip Generation, 11th Edition*, Institute of Transportation Engineers, September 2021.

² vpd = vehicle trips per day, vph = vehicle trips per hour, DU = Dwelling Units, kSF = 1,000 Square Feet

³ Fitted curve equations from ITE Land Uses - Equation Type A is $T = a * X + b$, Equation Type B is $\ln(T) = a * \ln(X) + b$, Rate is $T = a * X$

⁴ Internal capture reductions were obtained from the *ITE Trip Generation Handbook*, Second Edition, June 2004. See calculations in Appendix.

⁵ The ITE Trip Generation Manual did not have available data for the directional distribution of the Saturday peak hour. Therefore, the distribution from mid-rise multifamily housing was used.

⁶ Trip generation rates were calculated from existing traffic counts onsite. Weekday rates were estimated by using a 10% DHV rate based upon the PM Peak hour. A minimum of 1vph inbound/outbound was used for the AM peak (Actual counts were 0vph inbound and 0vph outbound)

⁷ External Restaurant Vehicular Trips are the sum of the empanada shop existing traffic with the anticipated internal capture traffic reduction that will occur at project buildout.

5.2 Trip Distribution

The distribution of project-generated vehicular traffic on adjacent roadways is influenced by several factors including the following:

- The location of the site relative to other commercial and healthcare facilities and the roadway network.
- The configuration of the existing and proposed adjacent roadway network
- Relative location of neighboring population centers.
- The proposed development has four accesses.
 - Distributions per access are dependent upon the general origin/destination of traffic.
 - Access restrictions are being imposed for ~~Coal Creek Station~~ Coal Creek Village's two accesses onto South Boulder Road and access onto SH 42. This will significantly impact ~~Coal Creek Station~~ Coal Creek Village's residents and patrons that wish to make the following movements:
 - Westbound on South Boulder Road
 - Northbound on SH 42
- Access control variations for each analysis scenario (from ~~Table 2~~ Table 2), with consideration for travel times and access configurations and restrictions.

From the review of the traffic data, TMP data, and factors described above; it was determined that generally 30% of site traffic is coming from/going to the west on South Boulder Road, 20% has destinations/origins to the north on SH 42, 20% has destinations/origins to the south on SH 42, 20% has destinations/origins to the south in the Main Street area, and 10% has destinations/origins to the east on South Boulder Road.

5.3 Internal Site Circulation

The proposed street configuration for Coal Creek Village provides good internal circulation and alternate routes to access adjacent arterial streets. Access restrictions will require that drivers wanting to go west on South Boulder Road or north on SH 42 may need to adjust their travel routes, as left turns out of the site are prohibited onto these two roadways.

Sidewalks are proposed throughout the development. Adjacent access to transit is provided at South Boulder Road and Main Street.

5.4 Front Street Connection Analysis Scenarios

This study analyzes the transportation impacts with and without the Front Street connection. Refer to **Section 3.2** of the report for more information on the two alternatives modeling the anticipated transportation network impacts with and without the Front Street connection.

With the Front Street Connection: In the Year 2026 and Year 2045 total traffic scenarios with the Front Street connection, it is recommended that Front Street becomes the through street, resulting in the installation of westbound stop-control. This connection aligns with the City of Louisville's previous *The Highway 42 Revitalization Area Framework Plan*¹⁴ and *42 Gateway Alternative Analysis Report*¹⁵ plans to connect South Boulder Road and Griffith Street via Front Street. Excerpts from these reports are included in the **Appendix**.

Additionally, per Louisville's *Transportation Master Plan*, "Louisville's transportation network is focused on a few major corridors, for which there aren't many readily available substitutes. This means it may be difficult to shift travel to lesser-traveled routes that would help handle additional future capacity."

Front Street is an example of an alternative roadway connector that can provide the traditional gridded street network that is more efficient and has more capacity for the area. This also allows for narrower street sections that benefit pedestrian and multimodal travel. The Front Street connection provides redundancy for Louisville's transportation network in the event of an emergencies, such as fire and other emergency response providers.

As traffic volumes on South Boulder Road and SH 42 are significant and anticipated to increase over time, the City of Louisville is implementing access control restrictions on side streets. As access restrictions are being imposed for ~~Coal Creek Station~~ Coal Creek Village's two accesses onto South Boulder Road and access onto SH 42, some site traffic is anticipated to utilize Front Street to access their destinations. Details are of the site traffic's anticipated directional distribution and background traffic's travel route adjustments are documented in the **Appendix**.

Without the Front Street Connection: In the Year 2026 and Year 2045 total traffic scenarios without the Front Street connection, no changes from the current conditions are considered. Thus, no additional traffic volume is anticipated on Front Street.

Combined with the South Boulder Road and SH 42 access restrictions, ~~Coal Creek Station~~ Coal Creek Village's residents and patrons that wish to make westbound movements on South Boulder Road and northbound movements on SH 42 will be required to make weave movements across South Boulder Road to access the eastbound left turn lane at the SH 42 traffic signal to make U-turns or left turns onto SH 42 for an alternate travel route.

5.5 Travel Route Adjustments for Modified Access Scenarios

As detailed in **Section 4.3**, modifications to the allowed turning movements at the analysis intersections, future construction of a traffic signal at SH 42 and Griffith Street, and scenarios with and without Front Street connection from South Boulder

Road to Griffith Street will impact the travel routes of both existing and future traffic. Specific modifications for each applicable scenario are included in the **Appendix**.

5.6 Site-Generated Traffic

When the anticipated project trip generation (~~Table 7~~~~Table 7~~) is applied for the anticipated retail and residential distributions, the result is the new anticipated traffic assignment for the proposed Coal Creek Village. Traffic assignment for each analysis scenario is a combination of the following trip generation and directional distribution as shown below in ~~Table 8~~~~Table 8~~.

For instance, for Scenario C (Year 2025 Total Traffic with a Front Street connection), the anticipated vehicular traffic assignment (~~Figure 13~~~~Figure 13~~) is the result of applying the anticipated trip generation (~~Table 7~~~~Table 7~~) to the residential distribution (~~Figure 11~~~~Figure 11~~) and the retail distribution (~~Figure 12~~~~Figure 12~~).

5.7 Total Traffic

The forecasted Year 2026 and Year 2045 total traffic is the combination of the background traffic forecasts with Coal Creek Village's anticipated traffic assignment, and travel route adjustments for that scenario. Both the short-term and long-term projections include scenarios with and without the Front Street connection.

Figure 7: Year 2026 Total – With Front Street Connection Schematic Diagram



Figure 8: Year 2045 Total – With Front Street Connection Schematic Diagram



Figure 9: Year 2026 Total – Without Front Street Connection Schematic Diagram

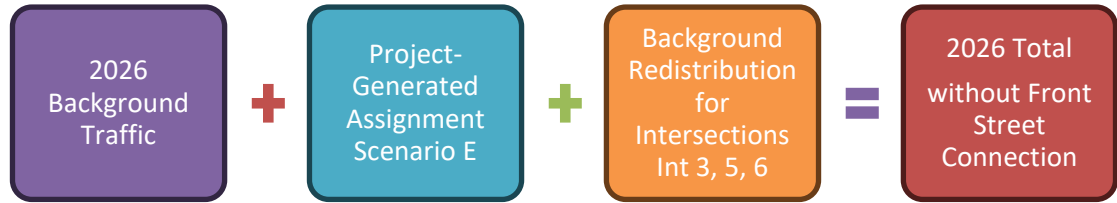


Figure 10: Year 2045 Total – Without Front Street Connection Schematic Diagram

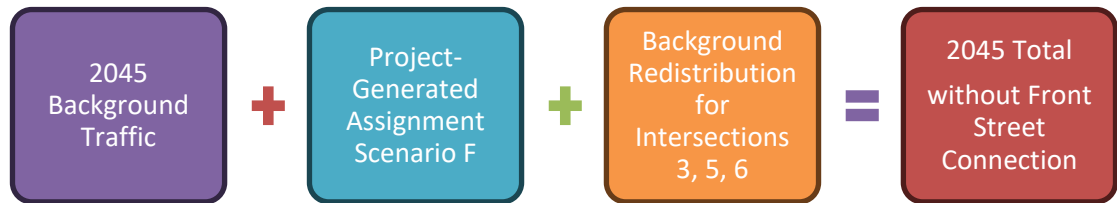


Table 8~~Table 8~~ summarizes the background traffic intersection scenarios and the corresponding figures used to calculate them.

Table 8: Total Traffic Figures Summary

Scenario (from <u>Table 2</u>)	Distribution Figures	Assignment Figures	Travel Route Adjustments Figures	Total Traffic Figures
Scenario C: Year 2026 Total Traffic with Front Street Connection	<u>Figure 11: Project Generated Traffic Distribution – Scenario C (Residential)</u> Figure 11: Project Generated Traffic Distribution – Scenario C (Residential) <u>Figure 12: Project Generated Traffic Distribution – Scenario C (Retail)</u> Figure 12: Project Generated Traffic Distribution – Scenario C (Retail)	<u>Figure 13: Project Generated Traffic Assignment – Scenario C (Residential & Retail)</u> Figure 13: Project Generated Traffic Assignment – Scenario C (Residential & Retail)	Appendix Figure AP05: Background Adjust for Total (Int #3 Redistribution) Appendix Figure AP06: Front Street Diverted Traffic (Year 2026)	<u>Figure 7: Year 2026 Total – With Front Street Connection Schematic Diagram</u> Figure 7: Year 2026 Total – With Front Street Connection Schematic Diagram
Scenario D: Year 2045 Total Traffic with Front Street Connection	<u>Figure 14: Project Generated Traffic Distribution – Scenario D (Residential)</u> Figure 14: Project Generated Traffic Distribution – Scenario D (Residential) <u>Figure 15: Project Generated Traffic Distribution – Scenario D (Retail)</u> Figure 15: Project Generated Traffic Distribution – Scenario D (Retail)	<u>Figure 16: Project Generated Traffic Assignment – Scenario D (Residential & Retail)</u> Figure 16: Project Generated Traffic Assignment – Scenario D (Residential & Retail)	Appendix Figure AP05: Background Adjust for Total (Int #3 Redistribution) Appendix Figure AP07: Front Street Diverted Traffic (Year 2045)	<u>Figure 8: Year 2045 Total – With Front Street Connection Schematic Diagram</u> Figure 8: Year 2045 Total – With Front Street Connection Schematic Diagram

Scenario E: Year 2026 Total Traffic without Front Street Connection	<u>Figure 17: Project Generated Traffic Distribution – Scenario E (Residential)</u>Figure 17: Project Generated Traffic Distribution – Scenario E (Residential) <u>Figure 18: Project Generated Traffic Distribution – Scenario E (Retail)</u>Figure 18: Project Generated Traffic Distribution – Scenario E (Retail)	<u>Figure 19: Project Generated Traffic Assignment – Scenario E (Residential & Retail)</u>Figure 19: Project Generated Traffic Assignment – Scenario E (Residential & Retail)	Appendix Figure AP05: Background Adjust for Total (Int #3 Redistribution)	<u>Figure 9: Year 2026 Total – Without Front Street Connection Schematic Diagram</u>Figure 9: Year 2026 Total – Without Front Street Connection Schematic Diagram
Scenario F: Year 2045 Total Traffic without Front Street Connection	<u>Figure 20: Project Generated Traffic Distribution – Scenario F (Residential)</u>Figure 20: Project Generated Traffic Distribution – Scenario F (Residential) <u>Figure 21: Project Generated Traffic Distribution – Scenario F (Retail)</u>Figure 21: Project Generated Traffic Distribution – Scenario F (Retail)	<u>Figure 22: Project Generated Traffic Assignment – Scenario F (Residential & Retail)</u>Figure 22: Project Generated Traffic Assignment – Scenario F (Residential & Retail)	Appendix Figure AP05: Background Adjust for Total (Int #3 Redistribution)	<u>Figure 10: Year 2045 Total – Without Front Street Connection Schematic Diagram</u>Figure 10: Year 2045 Total – Without Front Street Connection Schematic Diagram

Figure 11: Project Generated Traffic Distribution – Scenario C (Residential)

Figure 12: Project Generated Traffic Distribution – Scenario C (Retail)

Figure 13: Project Generated Traffic Assignment – Scenario C (Residential & Retail)

Figure 14: Project Generated Traffic Distribution – Scenario D (Residential)

Figure 15: Project Generated Traffic Distribution – Scenario D (Retail)

Figure 16: Project Generated Traffic Assignment – Scenario D (Residential & Retail)

Figure 17: Project Generated Traffic Distribution – Scenario E (Residential)

Figure 18: Project Generated Traffic Distribution – Scenario E (Retail)

Figure 19: Project Generated Traffic Assignment – Scenario E (Residential & Retail)

Figure 20: Project Generated Traffic Distribution – Scenario F (Residential)

Figure 21: Project Generated Traffic Distribution – Scenario F (Retail)

Figure 22: Project Generated Traffic Assignment – Scenario F (Residential & Retail)

Figure 23: Year 2026 Total Traffic (With Front Street Connection)

Figure 24: Year 2026 Total Traffic (Without Front Street Connection)

Figure 25: Year 2045 Total Traffic (With Front Street Connection)

Figure 26: Year 2045 Total Traffic (Without Front Street Connection)

6.0 Transportation Impact Analysis

6.1 Total Traffic Level of Service

An HCM analysis under total traffic conditions was performed for the proposed site access under both short-term Year 2026 and long-term Year 2045 traffic conditions. Scenarios with and without the Front Street connection were analyzed. The results can be seen in Table 9~~Table 9~~. The Synchro reports for the total traffic level of service analysis can be found in the **Appendix**.

Intersection #1 - South Boulder Road and Main Street Intersection: This 3-legged intersection is signalized. The signal is coordinated with the BNSF Railroad crossing that is located on the eastern leg of the intersection.

With the addition of project-generated traffic, the operations on Main Street will slightly degrade.

The City's proposed future pedestrian underpass of South Boulder Road should allow for better signal timing at this intersection. It is recommended that the City update the corridor's signal timing plans every five years. The future pedestrian underpass will increase the mainline efficiency by eliminating pedestrian signal calls.

Intersection #2 - South Boulder Road and Front Street Intersection: This unsignalized intersection is anticipated to operate at an acceptable overall intersection LOS through Year 2045 total traffic conditions.

With the construction of ~~Coal Creek Station~~Coal Creek Village, the westbound left turn lane is anticipated to degrade to a LOS C with long-term Year 2045 total traffic conditions with the Front Street connection. Without the Front Street connection, this movement anticipated to operate at a LOS D or better through the same time period. Total traffic conditions have less opposing traffic for this movement. Additionally, more traffic making the northbound right movement. Therefore, the northbound LOS result is higher than that of background traffic with a lower northbound volume.

As South Boulder Road traffic continues to increase over time, the City should observe the corridor for necessary access control revisions.

Intersection #3 - South Boulder Road and Cannon Circle intersection: This full-movement intersection currently serves a commercial driveway to the north and Cannon Circle to the south.

A Synchro HCM analysis was conducted by not restricting the northbound movement (allowing the left, through, and right northbound movements). This analysis demonstrated that a 95th percentile queue length of nine vehicles, as well as a LOS F

delay in excess of 300 seconds would occur. Therefore, McDowell Engineering recommends that this access is restricted at the time of development.

~~With the construction of Coal Creek Station~~Coal Creek Village, this access will be further restricted from to a $\frac{3}{4}$ movement access, prohibiting the northbound and southbound through and left turn movements. With the recommend access restriction, eEastbound and westbound left turns will still be permitted. With these restrictions, the eastbound and westbound left turns are anticipated to be able to use the gaps in South Boulder traffic created by the adjacent traffic signal during peak hours. These movements are anticipated to experience a LOS D or better with or without the Front Street connection. This is a better LOS than background operations due to the elimination of the difficult through and left turns from the side streets.

Without the Front Street connection, there is anticipated to be 45% more eastbound U-turn movements on South Boulder Road. This includes a weave movement from the northern site accesses to the eastbound left turn lane at the signalized intersection.

Intersection #4 - South Boulder Road and SH 42 intersection: This is a full-movement, signalized intersection. The *Future 42* plan depicts intersection improvements that include northbound and eastbound channelized right turn lanes. The Year 2045 total traffic scenario is modeled assuming the westbound and southbound right turn lanes are constructed. Even with these future improvements, this intersection has movements that are anticipated to operate at a failing LOS F for both Year 2026 and Year 2045 background and total traffic conditions.

This intersection has below acceptable LOS due to the high traffic volumes it handles. The current traffic volumes are too high to be flushed out of the intersection within one cycle during peak traffic hours. This causes vehicles to wait in queues for more than one cycle. LOS on the north and south legs of SH 42 are slightly better than on the South Boulder Road's east and west legs. This is due to CDOT's prioritization of SH 42 and giving the highway more green time.

The addition of ~~Coal Creek Station~~Coal Creek Village traffic can anticipate slightly lower LOS from the background traffic conditions. Without the Front Street connection, there is anticipated to be a significant weave movement from project traffic egressing the site to access the eastbound left turn lane at the SH 42 traffic signal. Additional eastbound to westbound U-turn volume at the signal is also anticipated due to the site's access restrictions on South Boulder Road.

Intersection #5 - SH 42 and Cannon Circle intersection: This is currently a full-movement "T" intersection. With the buildout of ~~Coal Creek Station~~Coal Creek Village, this intersection will be restricted to a $\frac{3}{4}$ movement, with left turns out of the site restricted. With the restriction of this difficult movement, Year 2026 total traffic operations are anticipated to be LOS B or better with or without the Front Street connection.

Per the *Future 42* Plan, this TIS assumes that the Cannon Circle access is restricted to right-in, right-out movements only. Therefore, Year 2045 total traffic scenarios are anticipated to be LOS C or better with or without the Front Street connection.

Intersection #6 - SH 42 and Griffith Street intersection: This is currently a full-movement intersection. With the buildout of ~~Coal Creek Station~~Coal Creek Village, short-term Year 2026 total traffic operations are anticipated to continue to degrade. SH 42 is anticipated to continue to operate at a LOS B or better. Side street traffic is anticipated to continue to operate at a LOS F with or without the project-generated traffic and with or without the Front Street connection. This will occur with or without the Front Street connection.

Signalization of the SH 42 and Griffith Street intersection will improve the side street LOS to an acceptable LOS C in Year 2045 total traffic conditions. Mainline SH 42 is likely to degrade to a lower LOS E with the additional delay caused by the signal construction.

Intersection #7 – Griffith Street and Cannon Street intersection: This is a full-movement intersection with stop-control on the north and south legs. With the buildout of ~~Coal Creek Station~~Coal Creek Village, operations are anticipated to remain acceptable LOS A or B through Year 2045 total traffic conditions. The additional traffic is anticipated to have a nominal impact on the intersection delay with or without the Front Street connection.

Intersection #8 – Griffith Street and Front Street intersection: This is a full-movement intersection with stop-control on the north and south legs. With the buildout of ~~Coal Creek Station~~Coal Creek Village, operations are anticipated to remain acceptable LOS A or B through long-term total traffic conditions. With the Front Street connection, the anticipated LOS of the north leg is LOS B through Year 2045 total traffic conditions. Without the Front Street connection, the anticipated LOS of the north leg is LOS A through Year 2045 total traffic conditions. The additional traffic is anticipated to have a nominal impact on the intersection delay with or without the Front Street connection.

Intersection #9 – Griffith Street and Main Street intersection: This is a full-movement “T” intersection. The east leg is stop-controlled.

With the buildout of ~~Coal Creek Station~~Coal Creek Village, operations are anticipated to remain acceptable through long-term total traffic conditions. Main Street will continue to operate at an acceptable LOS A through Year 2045 total traffic conditions. With the Front Street connection, the anticipated LOS of the east leg is LOS B through Year 2045 total traffic conditions. Without the Front Street connection, the anticipated LOS of the east leg is LOS C during the morning peak hour through Year 2045 total traffic conditions.

These results are comparable to the anticipated operations with or without the addition of the ~~Coal Creek Station~~Coal Creek Village traffic. The additional traffic is anticipated to have a nominal impact on the intersection delay with or without the Front Street connection.

Intersection #10 – Front Street and Harper Street intersection: This is currently a free-flowing intersection. There is an unimproved alley access as a third, north leg. Scenarios E and F analyze total traffic conditions without the Front Street connection.

With the buildout of ~~Coal Creek Station~~Coal Creek Village and with or without the connection of Front Street, all legs of this intersection are anticipate to operate at a LOS A.

Intersection #11 – SH 42 and Harper Street intersection: Both with and without the construction of ~~Coal Creek Station~~Coal Creek Village, left turns at this intersection currently experience delay into and out of the site during peak traffic on SH 42. Currently, through movements on SH 42 are operating at a LOS A. Eastbound Harper Street is operating at a LOS F during the evening peak hour.

Per the *Future 42* Plan, the Harper Street access will be restricted to right-in, right-out movements by the Year 2045 total traffic conditions. With this scenario, the eastbound movement is anticipated to improve to a LOS C.

Table 9: Total Traffic LOS (with the Front Street Connection)

#	Intersection	Traffic Control	Approach	Year 2026 Total with Front Street Level of Service (Delay in Seconds)			Year 2045 Total with Front Street Level of Service (Delay in Seconds)		
				AM	PM	SAT	AM	PM	SAT
1	South Boulder Road & Main Street	Signal	EBT	A (8.2)	A (10.0)	A (7.0)	A (9.4)	B (13.1)	A (7.7)
			EBR	A (1.4)	A (2.5)	A (1.5)	A (2.2)	A (3.3)	A (1.5)
			WBL	A (5.2)	A (9.3)	A (3.4)	A (4.9)	B (12.8)	A (3.5)
			WBT	A (5.8)	A (6.2)	A (3.3)	A (7.0)	A (7.6)	A (3.4)
			NBL	E (58.4)	E (61.8)	D (48.4)	E (56.2)	E (59.2)	D (47.7)
2	South Boulder Road & Front Street	3/4, NB/SB Stop	NBR	B (13.7)	C (32.8)	B (13.9)	B (13.8)	D (49.3)	B (14.3)
			WBL	B (11.6)	C (18.5)	B (12.1)	B (13.3)	D (26.8)	B (14.2)
			NB	B (12.4)	C (16.9)	B (12.7)	B (14.1)	C (22.1)	B (14.5)
3	South Boulder Road & Cannon Circle	3/4 NB/SB Stop	SB	C (15.5)	B (13.6)	B (12.2)	C (19.4)	C (16.0)	B (13.9)
			EBL	C (17.1)	C (18.0)	B (13.0)	D (26.0)	D (29.8)	C (16.7)
			WBL	B (10.7)	C (16.8)	B (10.9)	B (12.3)	D (25.4)	B (12.6)
4	SH 42 (Courtesy Road) & South Boulder Road	Signal	NB	B (12.6)	C (19.2)	B (12.9)	B (14.5)	D (26.6)	B (15.0)
			SB	C (16.1)	C (15.3)	B (13.2)	C (20.8)	C (19.4)	C (15.4)
			EBL	F (545.3)*	F (953.6)*	F (596.3)*	F (953.0)*	F (1559.4)*	F (964.2)*
			EBT	C (30.5)	D (45.8)*	C (25.7)	C (29.3)	D (41.9)*	C (26.1)
			EBR	-	-	-	A (9.8)	A (6.7)	A (1.2)
			WBL	E (61.5)	F (109.4)*	E (75.6)*	E (65.1)*	F (167.8)*	F (99.5)*
			WBT	D (42.8)	D (48.1)	C (33.8)	D (49.0)*	E (58.5)*	D (35.1)
			WBR	A (4.9)	A (7.8)	A (1.8)	A (8.5)	B (14.5)	A (3.7)
			NBL	E (63.3)	F (191.3)*	F (187.7)*	F (568.5)*	F (379.1)*	F (341.8)*
			NBT	C (32.6)	E (76.8)*	C (26.6)	D (36.8)	D (48.2)*	C (24.9)
			NBR	-	-	-	B (10.1)	B (13.2)	A (7.4)
5	SH 42 (Courtesy Rd) & Cannon Circle	EB Stop	SBL	F (193.3)*	F (240.4)*	F (94.1)*	F (321.4)*	F (372.3)*	F (152.0)*
			SBT	D (37.0)	D (38.6)	C (29.2)	D (39.2)	D (40.2)	C (29.1)
6	SH 42 (Courtesy Road) & Griffith Street	EB Stop	SBR	C (22.3)	A (8.2)	A (6.0)	D (40.4)*	B (16.4)	B (11.1)
			EB	B (12.6)	B (13.1)	B (11.2)	B (14.6)	C (15.3)	B (12.3)
			NBL	B (11.6)	B (11.1)	B (10.1)	-	-	-
6	SH 42 (Courtesy Road) & Griffith Street	EB/WB Stop	EB	F (81.6)	F (96.8)	E (35.4)	-	-	-
			WB	F (77.4)	F (137.2)	D (27.7)	-	-	-
			NB	A (0.5)	A (0.3)	A (0.3)	-	-	-
			SB	A (0.0)	A (0.0)	A (0.1)	-	-	-
6	SH 42 (Courtesy Road) & Griffith Street	Signal	EB	-	-	-	C (27.1)	C (25.6)	C (20.4)
			EBT	-	-	-	A (1.0)	A (1.0)	A (9.1)
			WBL	-	-	-	C (24.0)	C (24.0)	B (18.5)
			WBT	-	-	-	C (21.0)	C (21.0)	B (13.3)
			NBL	-	-	-	C (26.8)	C (25.6)	B (17.8)
			NBT	-	-	-	A (4.4)	A (5.7)	A (4.8)
			SBL	-	-	-	C (28.8)	C (33.0)	B (17.6)
			SBT	-	-	-	A (5.1)	A (6.8)	A (4.7)
7	Griffith Street & Cannon Street	NB/SB Stop	SBR	-	-	-	A (0.6)	A (2.0)	A (0.7)
			EB	A (0.0)	A (0.2)	A (0.0)	A (0.0)	A (7.5)	A (0.0)
			WB	A (1.0)	A (0.0)	A (1.4)	A (1.0)	A (0.0)	A (1.4)
			NB	B (10.1)	B (10.6)	A (9.6)	A (9.7)	B (10.2)	A (9.3)
8	Griffith Street & Front Street	NB/SB Stop	SB	A (8.9)	B (11.0)	A (9.2)	A (8.9)	B (11.1)	A (9.3)
			EB	A (0.5)	A (1.3)	A (1.2)	A (0.6)	A (1.3)	A (1.3)
			WB	A (0.2)	A (0.2)	A (0.1)	A (0.2)	A (0.2)	A (0.1)
			NB	B (10.3)	B (10.4)	B (10.1)	B (10.2)	B (10.3)	A (10.0)
9	Griffith Street & Main Street	WB Stop	SB	A (9.9)	B (10.4)	A (9.4)	A (9.9)	B (10.5)	A (9.5)
			WB	C (15.2)	B (13.7)	B (11.6)	B (14.8)	B (13.6)	B (11.5)
10	Harper Street & Front Street	WB Stop	SB	A (1.2)	A (0.0)	A (0.9)	A (1.2)	A (0.0)	A (0.7)
			WB	A (9.6)	A (9.7)	A (9.5)	A (9.7)	A (9.7)	A (9.6)
			SB	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
11	SH 42 (Courtesy Rd) & Harper Street	EB Stop	EB	D (33.7)	F (118.0)	E (40.9)	B (14.5)	C (17.7)	B (12.7)
			NBL	B (10.4)	B (10.7)	A (9.3)	-	-	-

#	Intersection	Traffic Control	Approach	Year 2026 Total with Front Street Level of Service (Delay in Seconds)			Year 2045 Total with Front Street Level of Service (Delay in Seconds)		
				AM	PM	SAT	AM	PM	SAT
1	South Boulder Road & Main Street	Signal	EBT	A (8.2)	A (10.0)	A (7.0)	A (9.4)	B (13.1)	A (7.7)
			EBR	A (1.4)	A (2.5)	A (1.5)	A (2.2)	A (3.3)	A (1.5)
			WBL	A (5.2)	A (9.3)	A (3.4)	A (4.9)	B (12.8)	A (3.5)
			WBT	A (5.8)	A (6.2)	A (3.3)	A (7.0)	A (7.6)	A (3.4)
			NBL	E (58.4)	E (61.8)	D (48.4)	E (56.2)	E (59.2)	D (47.7)
			NBR	B (13.7)	C (32.8)	B (13.9)	B (13.8)	D (49.3)	B (14.3)
2	South Boulder Road & Front Street	3/4, NB/SB Stop	WBL	B (11.6)	C (18.5)	B (12.1)	B (13.3)	D (26.8)	B (14.2)
			NB	B (12.4)	C (16.9)	B (12.7)	B (14.1)	C (22.1)	B (14.5)
			SB	C (15.5)	B (13.6)	B (12.2)	C (19.4)	C (16.0)	B (13.9)
3	South Boulder Road & Cannon Circle	3/4 NB/SB Stop	EBL	C (17.1)	C (18.0)	B (13.0)	D (26.0)	D (29.8)	C (16.7)
			WBL	B (10.7)	C (16.8)	B (10.9)	B (12.3)	D (25.4)	B (12.6)
			NB	B (12.6)	C (19.2)	B (12.9)	B (14.5)	D (26.6)	B (15.0)
4	SH 42 (Courtesy Road) & South Boulder Road	Signal	SB	C (16.1)	C (15.3)	B (13.2)	C (20.8)	C (19.4)	C (15.4)
			EBL	F (545.3)	F (953.6)	F (596.3)	F (953.0)	F	F (964.2)
			EBT	C (30.5)	D (45.8)	C (25.7)	C (29.3)	D (41.9)	C (26.1)
			EBR	-	-	-	A (9.8)	A (6.7)	A (1.2)
			WBL	E (61.5)	F (109.4)	E (75.6)	E (65.1)	F (167.8)	F (99.5)
			WBT	D (42.8)	D (48.1)	C (33.8)	D (49.0)	E (58.5)	D (35.1)
			WBR	A (4.9)	A (7.8)	A (1.8)	A (8.5)	B (14.5)	A (3.7)
			NBL	E (63.3)	F (191.3)	F (187.7)	F (568.5)	F (379.1)	F (341.8)
			NBT	C (32.6)	E (76.8)	C (26.6)	D (36.8)	D (48.2)	C (24.9)
			NBR	-	-	-	B (10.1)	B (13.2)	A (7.4)
			SBL	F (193.3)	F (240.4)	F (94.1)	F (321.4)	F (372.3)	F (152.0)
			SBT	D (37.0)	D (38.6)	C (29.2)	D (39.2)	D (40.2)	C (29.1)
5	SH 42 (Courtesy Rd) & Cannon Circle	EB Stop	SBR	C (22.3)	A (6.2)	A (6.0)	D (40.4)	B (16.4)	B (11.1)
			EB	B (12.6)	B (13.1)	B (11.2)	B (14.6)	C (15.3)	B (12.3)
			NBL	B (11.6)	B (11.1)	B (10.1)	-	-	-
6	SH 42 (Courtesy Road) & Griffith Street	EB/WB Stop	EB	F (81.6)	F (96.8)	E (35.4)	-	-	-
			WB	F (77.4)	F (137.2)	D (27.7)	-	-	-
			NB	A (0.5)	A (0.3)	A (0.3)	-	-	-
			SB	A (0.0)	A (0.0)	A (0.1)	-	-	-
6	SH 42 (Courtesy Road) & Griffith Street	Signal	EBL	-	-	-	C (27.1)	C (25.6)	C (20.4)
			EBT	-	-	-	A (1.0)	A (1.0)	A (9.1)
			WBL	-	-	-	C (24.0)	C (24.0)	B (18.5)
			WBT	-	-	-	C (21.0)	C (21.0)	B (13.3)
			NBL	-	-	-	C (26.8)	C (25.6)	B (17.8)
			NBT	-	-	-	A (4.4)	A (5.7)	A (4.8)
			SBL	-	-	-	C (28.8)	C (33.0)	B (17.6)
			SBT	-	-	-	A (5.1)	A (6.8)	A (4.7)
7	Griffith Street & Cannon Street	NB/SB Stop	SBR	-	-	-	A (0.6)	A (2.0)	A (0.7)
			EB	A (0.0)	A (0.2)	A (0.0)	A (0.0)	A (7.5)	A (0.0)
			WB	A (1.0)	A (0.0)	A (1.4)	A (1.0)	A (0.0)	A (1.4)
			NB	B (10.1)	B (10.6)	A (9.6)	A (9.7)	B (10.2)	A (9.3)
8	Griffith Street & Front Street	NB/SB Stop	SB	A (8.9)	B (11.0)	A (9.2)	A (8.9)	B (11.1)	A (9.3)
			EB	A (0.5)	A (1.3)	A (1.2)	A (0.6)	A (1.3)	A (1.3)
			WB	A (0.2)	A (0.2)	A (0.1)	A (0.2)	A (0.2)	A (0.1)
			NB	B (10.3)	B (10.4)	B (10.1)	B (10.2)	B (10.3)	A (10.0)
9	Griffith Street & Main Street	WB Stop	SB	A (9.9)	B (10.4)	A (9.4)	A (9.9)	B (10.5)	A (9.5)
			WB	C (15.2)	B (13.7)	B (11.6)	B (14.8)	B (13.6)	B (11.5)
10	Harper Street & Front Street	WB Stop	SB	A (1.2)	A (0.0)	A (0.9)	A (1.2)	A (0.0)	A (0.7)
			WB	A (9.6)	A (9.7)	A (9.5)	A (9.7)	A (9.7)	A (9.6)
11	SH 42 (Courtesy Rd) & Harper Street	EB Stop	SB	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
			EB	D (33.7)	F (118.0)	E (40.9)	B (14.5)	C (17.7)	B (12.7)
			NBL	B (10.4)	B (10.7)	A (9.3)	-	-	-

* Indicates LOS F with volume exceeding capacity (delays in seconds likely not accurate due to modelling method limitations)

Table 10: Total Traffic LOS (without the Front Street Connection)

#	Intersection	Traffic Control	Approach	Year 2026 Total without Front Street Level of Service (Delay in Seconds)			Year 2045 Total without Front Street Level of Service (Delay in Seconds)		
				AM	PM	SAT	AM	PM	SAT
1	South Boulder Road & Main Street	Signal	EBT	A (8.0)	A (9.7)	A (6.8)	A (9.2)	B (13.6)	A (7.5)
			EBR	A (1.4)	A (2.4)	A (1.4)	A (2.3)	A (3.3)	A (1.5)
			WBL	A (5.0)	A (8.4)	A (3.2)	A (4.7)	B (11.6)	A (3.2)
			WBT	A (5.5)	A (6.1)	A (3.1)	A (6.8)	A (7.7)	A (3.3)
			NBL	D (55.0)	E (59.9)	D (47.5)	D (53.1)	E (55.1)	D (47.0)
			NBR	B (13.9)	D (38.7)	B (14.4)	B (14.0)	E (55.7)	B (15.0)
2	South Boulder Road & Front Street	3/4, NB/SB Stop	WBL	B (11.9)	C (19.5)	B (12.3)	B (13.4)	D (29.7)	B (14.6)
			NB	B (13.0)	C (18.3)	B (13.1)	B (14.8)	D (26.6)	C (15.2)
			SB	C (15.6)	B (13.6)	B (12.3)	C (19.5)	C (16.2)	B (13.9)
3	South Boulder Road & Cannon Circle	3/4 NB/SB Stop	EBL	C (17.4)	C (18.3)	B (13.2)	D (26.5)	D (31.2)	C (16.9)
			WBL	B (11.0)	C (17.4)	B (11.0)	B (12.7)	D (28.8)	B (13.0)
			NB	B (13.2)	C (20.3)	B (13.2)	B (15.0)	D (32.3)	C (15.6)
			SB	C (16.4)	C (15.4)	B (13.3)	C (21.0)	C (19.6)	C (15.5)
4	SH 42 (Courtesy Road) & South Boulder Road	Signal	EBL	F (597.4)*	F (969.9)*	F (615.7)*	F (977.5)*	F (1631.4)*	F (990.3)*
			EBT	C (30.9)	D (52.9)*	C (25.8)	C (29.6)	D (42.6)*	C (26.2)
			EBR	-	-	-	B (11.9)	A (9.6)	A (2.6)
			WBL	E (61.5)	F (109.4)*	E (75.6)*	E (65.1)*	F (167.8)*	F (99.5)*
			WBT	D (42.8)	D (48.1)	C (33.8)	D (49.2)*	E (58.8)*	D (35.2)
			WBR	A (4.9)	A (7.8)	A (1.8)	A (8.5)	B (14.5)	A (3.7)
			NBL	E (63.3)	F (191.3)*	F (187.7)*	F (597.5)*	F (421.6)*	F (356.1)*
			NBT	C (32.6)	E (76.8)*	C (26.6)	D (35.5)	D (48.6)*	C (25.0)
			NBR	-	-	-	A (9.4)	B (12.1)	A (7.4)
			SBL	F (193.3)*	F (240.4)*	F (94.1)*	F (321.4)*	F (372.3)*	F (152.0)*
			SBT	D (37.1)	D (38.8)	C (29.3)	D (39.4)	D (40.6)	C (29.2)
			SBR	C (27.1)	A (8.8)	A (6.9)	D (45.7)	B (19.9)	B (12.5)
5	SH 42 (Courtesy Rd) & Cannon Circle	EB Stop	EB	B (12.9)	B (13.5)	B (11.3)	B (14.9)	C (16.3)	B (12.5)
			NBL	B (11.7)	B (11.5)	B (10.2)	-	-	-
6	SH 42 (Courtesy Road) & Griffith Street	EB/WB Stop	EB	F (85.8)	F (110.3)	E (41.9)	-	-	-
			WB	A (0.0)	A (0.0)	D (27.3)	-	-	-
			NB	A (0.5)	A (0.2)	A (0.3)	-	-	-
			SB	A (0.0)	A (0.0)	A (0.1)	-	-	-
6	SH 42 (Courtesy Road) & Griffith Street	Signal	EBL	-	-	-	C (26.7)	C (24.9)	C (20.4)
			EBT	-	-	-	A (0.7)	A (0.5)	B (11.0)
			WBL	-	-	-	C (24.0)	C (24.0)	B (18.5)
			WBT	-	-	-	C (21.0)	C (21.0)	B (13.3)
			NBL	-	-	-	C (26.5)	C (25.1)	B (17.7)
			NBT	-	-	-	A (3.9)	A (5.0)	A (4.8)
			SBL	-	-	-	C (29.0)	C (32.0)	B (17.8)
			SBT	-	-	-	A (4.4)	A (5.2)	A (4.7)
7	Griffith Street & Cannon Street	NB/SB Stop	EB	A (0.0)	A (0.2)	A (0.0)	A (0.0)	A (0.3)	A (0.0)
			WB	A (0.9)	A (0.0)	A (1.4)	A (0.9)	A (0.0)	A (1.4)
			NB	A (10.0)	B (10.4)	A (9.4)	A (9.6)	A (10.0)	A (9.2)
			SB	A (8.9)	B (10.8)	A (9.2)	A (8.9)	B (10.8)	A (9.2)
8	Griffith Street & Front Street	NB/SB Stop	EB	A (0.2)	A (0.4)	A (0.7)	A (0.2)	A (0.4)	A (0.7)
			WB	A (0.1)	A (0.2)	A (0.1)	A (0.2)	A (0.2)	A (0.1)
			NB	A (10.0)	A (10.0)	A (9.8)	A (9.9)	A (10.0)	A (9.7)
			SB	A (9.4)	A (9.3)	A (8.8)	A (9.3)	A (9.3)	A (8.8)
9	Griffith Street & Main Street	WB Stop	WB	B (14.4)	B (13.6)	B (11.6)	B (14.0)	B (13.7)	B (11.5)
			SB	A (1.3)	A (0.0)	A (0.9)	A (1.2)	A (0.0)	A (0.7)
10	Harper Street & Front Street	None	WB	-	-	-	-	-	-
			SB	-	-	-	-	-	-
11	SH 42 (Courtesy Rd) & Harper Street	EB Stop	EB	D (33.7)	F (118.0)	E (40.9)	B (14.7)	C (18.2)	B (12.9)
			NBL	B (10.4)	B (10.7)	A (9.3)	-	-	-

#	Intersection	Traffic Control	Approach	Year 2026 Total without Front Street Level of Service (Delay in Seconds)			Year 2045 Total without Front Street Level of Service (Delay in Seconds)		
				AM	PM	SAT	AM	PM	SAT
1	South Boulder Road & Main Street	Signal	EBT	A (8.0)	A (9.7)	A (6.8)	A (9.2)	B (13.6)	A (7.5)
			EBR	A (1.4)	A (2.4)	A (1.4)	A (2.3)	A (3.3)	A (1.5)
			WBL	A (5.0)	A (8.4)	A (3.2)	A (4.7)	B (11.6)	A (3.2)
			WBT	A (5.5)	A (6.1)	A (3.1)	A (6.8)	A (7.7)	A (3.3)
			NBL	D (55.0)	E (59.9)	D (47.5)	D (53.1)	E (55.1)	D (47.0)
2	South Boulder Road & Front Street	3/4, NB/SB Stop	NBR	B (13.9)	D (38.7)	B (14.4)	B (14.0)	E (55.7)	B (15.0)
			WBL	B (11.9)	C (19.5)	B (12.3)	B (13.4)	D (29.7)	B (14.6)
			NB	B (13.0)	C (18.3)	B (13.1)	B (14.8)	D (26.6)	C (15.2)
3	South Boulder Road & Cannon Circle	3/4 NB/SB Stop	SB	C (15.6)	B (13.6)	B (12.3)	C (19.5)	C (16.2)	B (13.9)
			EBL	C (17.4)	C (18.3)	B (13.2)	D (26.5)	D (31.2)	C (16.9)
			WBL	B (11.0)	C (17.4)	B (11.0)	B (12.7)	D (28.8)	B (13.0)
			NB	B (13.2)	C (20.3)	B (13.2)	B (15.0)	D (32.3)	C (15.6)
4	SH 42 (Courtesy Road) & South Boulder Road	Signal	SB	C (16.4)	C (15.4)	B (13.3)	C (21.0)	C (19.6)	C (15.5)
			EBL	F (597.4)	F (969.9)	F (615.7)	F (977.5)	F (1631.4)	F (990.3)
			EBT	C (30.9)	D (52.9)	C (25.8)	C (29.6)	D (42.6)	C (26.2)
			EBR	-	-	-	B (11.9)	A (9.6)	A (2.6)
			WBL	E (61.5)	F (109.4)	E (75.6)	E (65.1)	F (167.8)	F (99.5)
			WBT	D (42.8)	D (48.1)	C (33.8)	D (49.2)	E (58.8)	D (35.2)
			WBR	A (4.9)	A (7.8)	A (1.8)	A (8.5)	B (14.5)	A (3.7)
			NBL	E (63.3)	F (191.3)	F (187.7)	F (597.5)	F (421.6)	F (356.1)
			NBT	C (32.6)	E (76.8)	C (26.6)	D (35.5)	D (48.6)	C (25.0)
			NBR	-	-	-	A (9.4)	B (12.1)	A (7.4)
			SBL	F (193.3)	F (240.4)	F (94.1)	F (321.4)	F (372.3)	F (152.0)
5	SH 42 (Courtesy Rd) & Cannon Circle	EB Stop	SBT	D (37.1)	D (38.8)	C (29.3)	D (39.4)	D (40.6)	C (29.2)
			SBR	C (27.1)	A (8.8)	A (6.9)	D (45.7)	B (19.9)	B (12.5)
			EB	B (12.9)	B (13.5)	B (11.3)	B (14.9)	C (16.3)	B (12.5)
6	SH 42 (Courtesy Road) & Griffith Street	EB/WB Stop	NBL	B (11.7)	B (11.5)	B (10.2)	-	-	-
			EB	F (85.8)	F (110.3)	E (41.9)	-	-	-
			WB	A (0.0)	A (0.0)	D (27.3)	-	-	-
			NB	A (0.5)	A (0.2)	A (0.3)	-	-	-
6	SH 42 (Courtesy Road) & Griffith Street	Signal	SB	A (0.0)	A (0.0)	A (0.1)	-	-	-
			EBL	-	-	-	C (26.7)	C (24.9)	C (20.4)
			EBT	-	-	-	A (0.7)	A (0.5)	B (11.0)
			WBL	-	-	-	C (24.0)	C (24.0)	B (18.5)
			WBT	-	-	-	C (21.0)	C (21.0)	B (13.3)
			NBL	-	-	-	C (26.5)	C (25.1)	B (17.7)
			NBT	-	-	-	A (3.9)	A (5.0)	A (4.8)
			SBL	-	-	-	C (29.0)	C (32.0)	B (17.8)
7	Griffith Street & Cannon Street	NB/SB Stop	SBT	-	-	-	A (4.4)	A (5.2)	A (4.7)
			SBR	-	-	-	A (0.6)	A (1.7)	A (0.8)
			EB	A (0.0)	A (0.2)	A (0.0)	A (0.0)	A (0.3)	A (0.0)
			WB	A (0.9)	A (0.0)	A (1.4)	A (0.9)	A (0.0)	A (1.4)
8	Griffith Street & Front Street	NB/SB Stop	NB	A (10.0)	B (10.4)	A (9.4)	A (9.6)	A (10.0)	A (9.2)
			SB	A (8.9)	B (10.8)	A (9.2)	A (8.9)	B (10.8)	A (9.2)
			EB	A (0.2)	A (0.4)	A (0.7)	A (0.2)	A (0.4)	A (0.7)
			WB	A (0.1)	A (0.2)	A (0.1)	A (0.2)	A (0.2)	A (0.1)
9	Griffith Street & Main Street	WB Stop	NB	A (10.0)	A (10.0)	A (9.8)	A (9.9)	A (10.0)	A (9.7)
			SB	A (9.4)	A (9.3)	A (8.8)	A (9.3)	A (9.3)	A (8.8)
10	Harper Street & Front Street	None	WB	B (14.4)	B (13.6)	B (11.6)	B (14.0)	B (13.7)	B (11.5)
			SB	A (1.3)	A (0.0)	A (0.9)	A (1.2)	A (0.0)	A (0.7)
11	SH 42 (Courtesy Rd) & Harper Street	EB Stop	WB	-	-	-	-	-	-
			SB	-	-	-	-	-	-
			EB	D (33.7)	F (118.0)	E (40.9)	B (14.7)	C (18.2)	B (12.9)
			NBL	B (10.4)	B (10.7)	A (9.3)	-	-	-

* Indicates LOS F with volume exceeding capacity (delays in seconds likely not accurate due to modelling method limitations)

6.2 Intersection Queues

Synchro's HCM modeling software was used to analyze intersection operations, including estimated 95th Percentile Queues for each scenario. A table detailing the traffic queues is included in the **Appendix**.

Intersection #1 - South Boulder Road and Main Street Intersection: This signalized intersection has excessive queues. The eastbound queues are anticipated to back up past Centennial Drive. Westbound queues can reach Steele Street. Northbound queues can exceed 500 feet, but are rarely anticipated to impact the private driveway to the south of the signal.

Train crossing events will increase these anticipated queues.

The City's proposed future pedestrian underpass of South Boulder Road should allow for better signal timing at this intersection. It is recommended that the City update the corridor's signal timing plans every five years. The future pedestrian underpass will increase the mainline efficiency by eliminating pedestrian signal calls.

Intersection #2 - South Boulder Road and Front Street Intersection: Intersection queues are anticipated to be less than two vehicles. The queues are accommodated by existing infrastructure.

Intersection #3 - South Boulder Road and Cannon Circle intersection: This intersection is currently experiencing a 75 feet northbound queue and 250 feet southbound queues. With Coal Creek Village's conversion of this access to $\frac{3}{4}$ movement, the left turn is restricted and all queues are anticipated to be less than two vehicles.

Intersection #4 - South Boulder Road and SH 42 intersection: Existing conditions at this signal are currently experiencing left turn movement volumes that exceed the intersection's capacity.

Currently, eastbound queues reach 350 feet. In the future, it is anticipated that the queues could reach 750 feet. The westbound left queue is anticipated to reach approximately 550 feet.

The northbound queue is anticipated to reach 500 feet during evening peak traffic. Southbound queues are anticipated to reach 500 feet during the morning peak hour.

The *Future 42* plan depicts intersection improvements that include northbound and eastbound channelized right turn lanes that will improve operations at the intersection.

Intersection #5 - SH 42 and Cannon Circle intersection: All queues are anticipated to be less than one vehicle.

Intersection #6 - SH 42 and Griffith Street intersection: This is currently a stop-controlled, full-movement intersection. The eastbound queue reaches five vehicles during the evening peak hour.

Signalization of the SH 42 and Griffith Street intersection will improve the side street queues. The added mainline delay on SH 42 will create a queue of 275 feet for the northbound left turn during the evening peak hour. Dependent upon the signal timing implemented when the signal is constructed, the queue associated with the Louisville Sports Complex could reach 250 feet.

Intersection #7 – Griffith Street and Cannon Street intersection: With all scenarios, the northbound queue is anticipated to be less than one vehicle.

Intersection #8 – Griffith Street and Front Street intersection: With the front street connection, the southbound queue is anticipated to be one vehicle or less. Without the Front Street connection, the southbound queue is minimal.

Intersection #9 – Griffith Street and Main Street intersection: The southbound left turn can anticipate a queue of less than one vehicle in all scenarios. During school pick up and drop off or train crossings, the queues can be anticipated to be longer. Refer to the additional train analysis in **Section 6.6**.

Intersection #10 – Front Street and Harper Street intersection: With all scenarios, the northbound queue is anticipated to be less than one vehicle.

Intersection #11 – SH 42 and Harper Street intersection: Under current conditions, queues are anticipated for the eastbound left movement. With the Future 42 access restriction implemented, the eastbound queue is anticipated to be less than one vehicle.

6.3 Site Design and Traffic Circulation Evaluation

The proposed street configuration for Coal Creek Village provides good internal circulation and alternate routes to access adjacent arterial streets. Access restrictions will require that drivers wanting to go west on South Boulder Road or north on SH 42 may need to adjust their travel routes, as left turns out of the site are prohibited onto these two roadways.

Analysis Scenario with the Front Street Connection: The current site plan includes a Front Street connection. This connection aligns with the City of Louisville’s previous *The Highway 42 Revitalization Area Framework Plan*¹⁴ and *42 Gateway Alternative Analysis Report*¹⁵ plans to connect South Boulder Road and Griffith Street via Front Street. Excerpts from these reports are included in the **Appendix**.

The Front Street connection will allow for transportation redundancy as part of a gridded street network. Gridded networks have more capacity with narrower roadways that are safer for pedestrians and other multimodal traffic.

In the Year 2026 and Year 2045 total traffic scenarios with the Front Street connection, it is recommended that Front Street becomes the through street, resulting in the installation of westbound stop-control on Harper Street.

With the Front Street connection, it is recommended that traffic calming measures are constructed to attenuate operations on Front Street. Several measures that may be considered are described in the City of Louisville's *Transportation Master Plan*. This document's Neighborhood Traffic Management Program (NTMP) focuses on neighborhood-level traffic calming and safety improvements. These improvements help maintain the City's family-friendly small-town character. Examples of tools utilized within an NTMP include, but are not limited to the following.

- Enhanced or raised pedestrian crossings
- Medians and/or entry islands
- Curb extensions
- Speed humps or cushions
- Speed monitoring and enforcement campaigns
- Education campaigns

Analysis Scenario without the Front Street Connection: A second scenario does not include vehicular access from the proposed ~~Coal Creek Station~~ Coal Creek Village to Front Street. With this option, pedestrian and multimodal connectivity are still encouraged.

In the Year 2026 and Year 2045 total traffic scenarios without the Front Street connection, no changes from the current conditions are considered. Therefore, there no additional vehicular traffic is anticipated without the Front Street connection.

Without the Front Street connection, both ~~Coal Creek Station~~ Coal Creek Village and other surrounding background traffic will have travel paths impacted by the access control on South Boulder Road and SH 42. Drivers are more likely to make weave movements egressing the South Boulder Road accesses to reach the eastbound left turn lane at the signalized intersection of South Boulder Road and SH 42. Without the Front Street connection, there is anticipated to be 45% more eastbound U-turn movements on South Boulder Road. This includes a weave movement from the northern site accesses to the eastbound left turn lane at the signalized intersection.

Table 11: Anticipated Front Street Traffic Volumes with and without the Connection between South Boulder Road and Griffith Street

Scenario	Traffic Volume in vph (vehicle trips per hour)			Time between vehicles (average gap time)		
	AM	PM	SAT	AM	PM	SAT
Total 2045 With Front St Connection	79 vph	93 vph	67 vph	1 car every 45 seconds	1 car every 38 seconds	1 car every 53 seconds
Total 2045 Without Front St Connection	9 vph	13 vph	13 vph	1 car every 400 seconds (6.5 minutes)	1 car every 276 seconds (4.6 minutes)	1 car every 276 seconds (4.6 minutes)

The anticipated total Year 2045 daily traffic volume on Front Street was calculated at a location directly north of Griffith Street. The same methodology graphically represented in

Figure 8

~~Figure 8~~ and ~~Figure 10~~ **Figure 10** was used for the scenarios with and without the Front Street connection, respectively.

Front Street is anticipated to have less than 1,000vpd, which is considered the local residential roadway capacity for livability. In actuality, the roadway can technically handle a much larger volume of vehicles. Different municipalities typically use 1,000 – 1,500vpd as the capacity of a local residential roadway. This analysis conservatively uses the 1,000vpd capacity.

The following figures provide a breakdown of the anticipated future Year 2045 traffic volumes on Front Street with and without the Front Street connection. The total daily capacity is considered to be a conservative 1,000vpd. The total hourly capacity, using a design hourly volume of 10%, is considered to be 100vph.

A local residential street has a capacity of 1,000vpd based upon the livability of a street. This is subjective value, as the roadway can physically and operationally handle significantly more vehicles.

Under both scenarios, Front Street is anticipated to have less than 1,000vpd.

Figure 27: Year 2045 Total Daily Traffic (vpd) (With Front Street Connection)

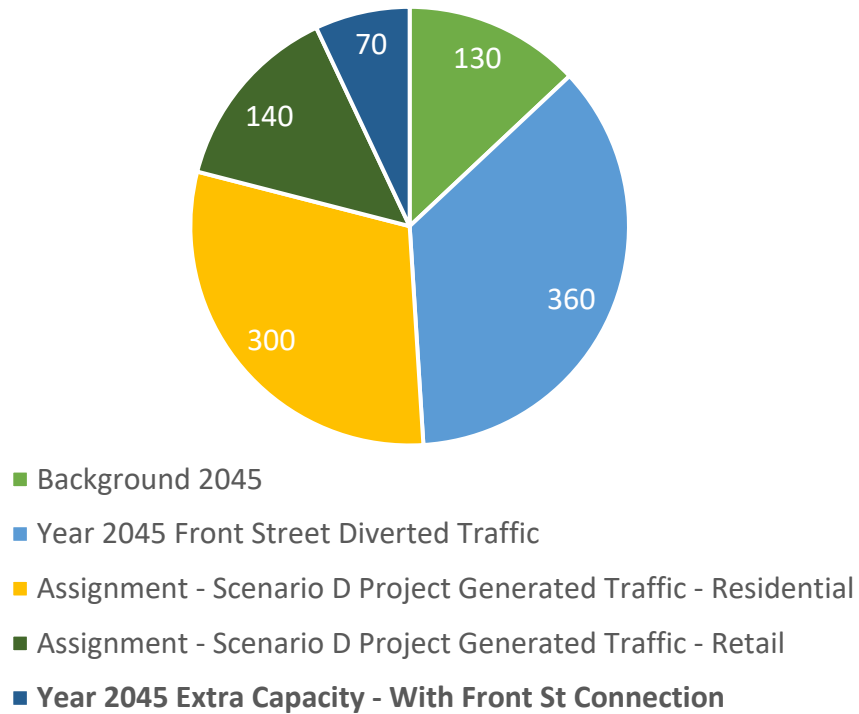
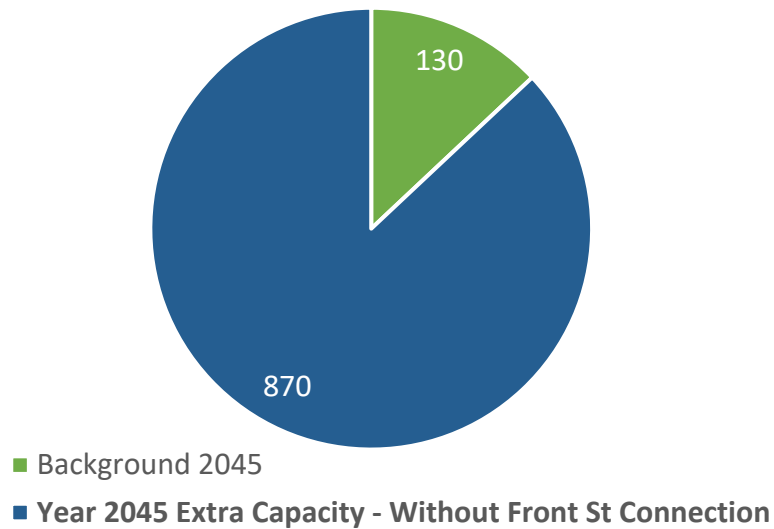


Figure 28: Year 2045 Total Daily Traffic (vpd) (Without Front Street Connection)



The excess capacity on Front Street in each of these scenarios is depicted in bold and dark blue.

Similarly, the anticipated total Year 2045 hourly peak traffic volumes were calculated at a location directly north of Griffith Street. Front Street is anticipated to have less than 100vph, which is considered the local residential roadway capacity for livability.

Figure 29: Year 2045
Total Morning Peak Hour
Traffic (vph) (With Front
Street Connection)

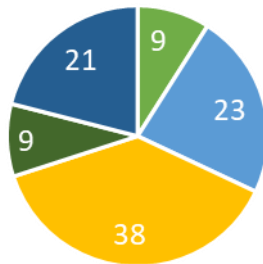


Figure 30: Year 2045
Total Evening Peak Hour
Traffic (vph) (With Front
Street Connection)

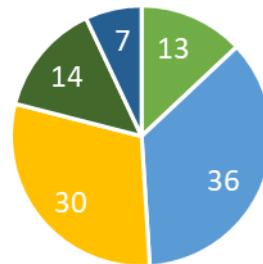
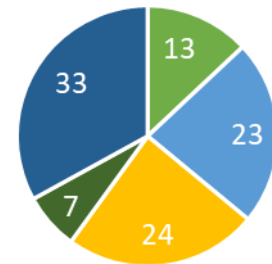


Figure 31: Year 2045
Total Saturday Peak Hour
Traffic (vph) (With Front
Street Connection)



- Background 2045
- Year 2045 Front Street Diverted Traffic
- Assignment - Scenario D Project Generated Traffic - Residential
- Assignment - Scenario D Project Generated Traffic - Retail
- Year 2045 Extra Capacity - With Front St Connection

Cannon Circle Access: Cannon Circle will also provide two of the accesses to the development. Cannon Circle is platted as an L-shaped City street. The north-south leg intersects South Boulder Road one block west of SH 42. The east-west leg intersects SH 42 one block south of South Boulder Road.

Canon Circle approaching SH 42 may require access restriction to the adjacent lot. There is a potential corner clearance problem with an existing driveway. The driveway on Cannon Circle to 1110 E South Boulder Road is about 20 feet south of the stop bar. If there are two or more northbound queued up at the stop sign, the southbound left turn into the driveway will be blocked. Someone waiting to make the left turn into the driveway could cause a backup that extends into the eastbound through lanes on South Boulder Road.

The City may want to implement a countermeasure. One option is to install a “Do Not Block Driveway” sign and appropriate lane markings. Another option is to construct a raised median on Cannon Circle, making the driveway a right-in/right-out access. This intersection may have movements restricted in the future at the direction of the City.

Northbound left turns onto South Boulder Road: The City is considering the restriction of the ~~recently restricted the~~ left turns from the side streets at the South Boulder Road and Cannon Circle~~Front Street~~ intersection as mentioned in the *South Boulder Road Corridor Evaluation*. Per the analysis included in this report, McDowell Engineering recommends that the left turn and through movements are restricted at Cannon Street at the time of Coal Creek Village buildout. This can be accomplished with the construction of a raised center median at the intersection.

~~As traffic continues to increase on South Boulder Road, the available gaps in traffic for vehicles wanting to turn left from the side streets onto mainline will continue to decrease over time. Eventually, the City may consider restricting movements at Cannon Circle as well. There is not an industry standard for when a left turn restriction should be imposed. It is at the discretion of the City and is typically based on the levels of congestion or the number of crashes. This intersection may have movements restricted in the future at the direction of the City. This is noted on the Site Plan in Figure 2 and Appendix.~~

6.4 Turn Lane Requirements

The need for auxiliary turn lanes were assessed per the *State of Colorado State Highway Access Code*¹⁰ (*Access Code*) for CDOT's SH 42. The City of Louisville *Design and Construction Standards* does not have turn lane requirements, so the *Access Code* requirements were compared to the 95th Percentile Queue lengths for the Year 2050 total traffic conditions and current site geometric constraints for the turning movements that are not on the State Highway system. Refer to Table 12~~Table 12~~ below for the auxiliary turn lane recommendations and details.

¹⁰ State of Colorado State Highway Access Code, 2002.

Table 12: Auxiliary Turn Lane Recommendations

Table 13: Auxiliary Turn Lane Recommendations (Continued)

Intersection #1 - South Boulder Road and Main Street Intersection: This existing signalized intersection has adequate eastbound right and westbound left turn lanes for normal operations through Year 2045 total traffic operations. The northbound movement on Main Street can be anticipated to queue up to over 200' at the signal. This queue is anticipated to block approximately one residential driveway during peak traffic operations.

During railroad crossings at this intersection, longer queues occur. It takes a few minutes for the queues to dissipate.

These conditions occur with or without the addition of the ~~Coal Creek Station~~Coal Creek Village project-generated traffic.

Intersection #2 - South Boulder Road and Front Street Intersection: Mainline South Boulder Road operates at an equivalent classification as a CDOT NRB roadway. It has a posted speed limit of 45mph.

With the development of ~~Coal Creek Station~~Coal Creek Village, the eastbound right turn lane needs to be extended to include 75' of storage and a 13.5:1 taper to accommodate the anticipated site-generated traffic. The westbound left turn lane is constrained by the back-to-back turn lane to the adjacent access.

The northbound movement is restricted to right turn movements. Therefore, the northbound movement out of the site does not require a separate turn lane. No acceleration lane is required for this movement onto South Boulder Road.

Intersection #3 - South Boulder Road and Cannon Circle intersection: With the construction of ~~Coal Creek Station~~Coal Creek Village, this access will be further restricted from to a $\frac{3}{4}$ movement access, prohibiting the northbound and southbound through and left turn movements.

Mainline South Boulder Road operates at an equivalent classification as a CDOT NRB roadway. It has a posted speed limit of 45mph.

With the development of ~~Coal Creek Station~~Coal Creek Village, an eastbound right turn lane needs to be constructed to include 50' of storage and a 13.5:1 taper to accommodate the anticipated site-generated traffic. The westbound left turn lane is constrained by the back-to-back turn lane to the adjacent access. The 95th percentile queue for this movement is less than the available storage length + taper length. Therefore, no changes are recommended to the westbound left deceleration lanes.

The northbound movement is restricted to right turn movements. Therefore, the northbound movement out of the site does not require a separate turn lane.

Intersection #4 - South Boulder Road and SH 42 intersection: This is a full-movement, signalized intersection. The *Future 42* plan depicts intersection improvements that

include the construction of channelized northbound and eastbound right turn lanes. The Year 2045 total traffic scenario is modeled assuming the westbound and southbound right turn lanes are constructed. Even with these future improvements, this intersection has movements that are anticipated to operate at a failing LOS F for both Year 2026 and Year 2045 background and total traffic conditions.

The existing eastbound and westbound left turn lane queues exceed the available capacity. Both of the median islands are constrained by a back-to-back left turn lane at the adjacent access.

The northbound and southbound left turn lanes also need to be extended to accommodate the existing queue lengths. All of the turn lane and intersection improvements should be coordinated with the implementation of the City's *Future 42* plan.

Intersection #5 - SH 42 and Cannon Circle intersection: This is currently a full-movement "T" intersection. With the buildout of ~~Coal Creek Station~~Coal Creek Village, this intersection will be restricted to a $\frac{3}{4}$ movement by extending the existing center median in SH 42.

The eastbound movement will be restricted to right turn only movements. Therefore, no deceleration lane is needed for this movement.

The northbound left turn movement will remain until the *Future 42* plan is implemented. Per the Access Code, this movement should have a deceleration lane that is 435' in length, including a 13.5:1 taper. Any modifications to the turn lane need to be coordinated with CDOT, as the movement is temporary and the associated median is back-to-back with the southbound left turn lane into the Louisville Sports Complex.

The southbound right turn lane is not required per CDOT's *Access Code* based upon the anticipated traffic volumes at this access.

Intersection #6 - SH 42 and Griffith Street intersection: This is currently a full-movement intersection. It is planned to be signalized with the implementation of the *Future 42* plan. Upon signalization, it is anticipated that separate eastbound and westbound left turn lanes will need to be constructed. The existing southbound right turn lane should remain. The northbound left turn lane is anticipated to require 435' of deceleration length with 45' of storage. The southbound left turn lane is anticipated to require 435' of deceleration length with 50' of storage. Additional length may be required for the traffic queues associated with the Louisville Sports Complex. These improvements are required with or without the addition of ~~Coal Creek Station~~Coal Creek Village's project-generated traffic.

Intersection #7 – Griffith Street and Cannon Street intersection: This is a full-movement intersection with stop-control on the north and south legs. No additional turn lanes are required.

Intersection #8 – Griffith Street and Front Street intersection: This is a full-movement intersection with stop-control on the north and south legs. No additional turn lanes are required.

Intersection of Griffith Street and the BNSF Railroad: This at-grade railroad crossing sees multiple trains crossings per day, with each impacting the crossing for three to five minutes at a time. During the crossing, traffic queues on Griffith Street back up in either direction. Refer to **Section 6.6** for analysis of the crossing impacts.

It is recommended that the intersection of Griffith Street and Front Street is signed and striped with “Do not block intersection” to allow for ingress and egress movements at the Griffith Street and Front Street intersection during train crossings.

Intersection #9 – Griffith Street and Main Street intersection: This is a full-movement “T” intersection. The east leg is stop-controlled. This is a full-movement intersection with stop-control on the north and south legs. No additional turn lanes are required.

Intersection #10 – Front Street and Harper Street intersection with the Front Street Connection: This is currently a free-flowing intersection. There is an unimproved alley access as a third, north leg. With the buildout of ~~Coal Creek Station~~ Coal Creek Village and a connection of Front Street from South Boulder Road to Griffith Street, it is recommended that Front Street is designed as the through street and Harper Street is stop-controlled with a stop sign. The installation of a stop sign, stop bar, and painted pedestrian crosswalk should be included on the north leg of Front Street.

It is recommended that traffic calming is implemented along Front Street to encourage slower and safer travel speeds.

Intersection #10 – Front Street and Harper Street intersection without the Front Street Connection: This is currently a free-flowing intersection. There is an unimproved alley access as a third, north leg. Without the construction of a Front Street connection from South Boulder Road to Griffith Street, the existing conditions of this intersection would remain in place.

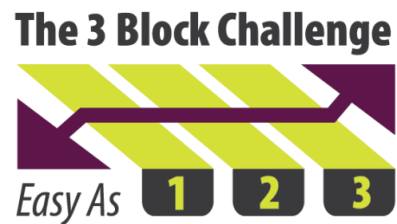
Intersection #11 – SH 42 and Harper Street intersection: The existing volume of eastbound right turns from Harper Street onto SH 42 exceeds the *Access Code*’s requirement to construct an acceleration lane for this movement. With the implementation of the *Future 42* Plan, this volume is anticipated to increase because current traffic making the eastbound left movement will likely make a right turn instead. Coal Creek Village’s site traffic is not anticipated to impact this movement.

At a minimum, the construction of an acceleration lane should be incorporated into the implementation of Future 42 plans.

6.5 SH 42 and Cannon Circle State Highway Access Permit

Per Section 2.6(3) of the Access Code, a new access permit is required by CDOT when the traffic volume is anticipated to increase by 20%. The additional site traffic associated with the proposed ~~Coal Creek Station~~ Coal Creek Village project is anticipated to double traffic at the Cannon Circle access with the Front Street connection. Without the Front Street connection, the project is anticipated to approximately triple traffic on the Cannon Circle Access. Therefore, a new State Highway Access Permit will be required for this intersection. Louisville Middle School

Louisville Middle School is located directly west of the Griffith Street and Main Street intersection. Middle school students are not old enough to drive themselves to school. The school day runs from 8:45am to 3:45pm. Wednesday's schedule runs from 9:45am to 3:45pm. Main Street experiences high traffic congestion during peak dropoff and pickup periods. The Boulder Valley School District has published a *Louisville Middle School Travel Map*¹⁶ encouraging students to walk within a three-block and ½ mile radius of the school. This map is included in the **Appendix**. This traffic impacts traffic queues on Griffith Street. Hug n' Go Lanes are located on the south and west sides of the school.

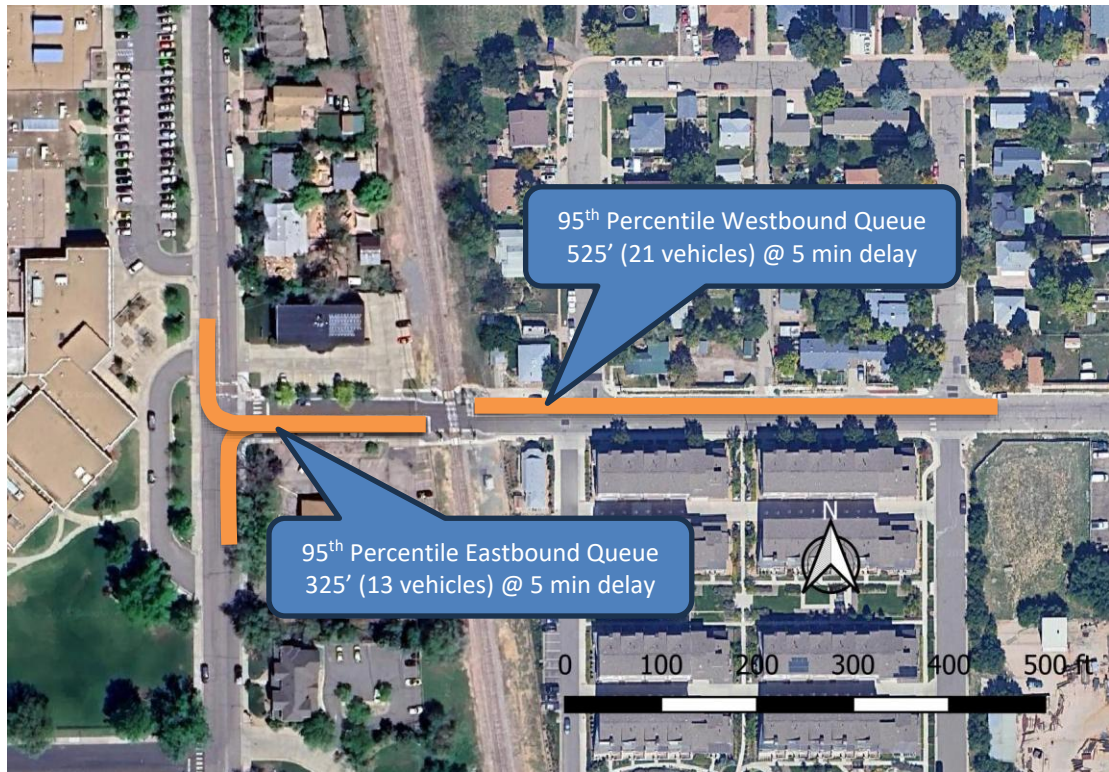


The recommended improvements at the intersection of Griffith Street and Front Street should assist with school queues impacting Griffith Street. The pedestrian crosswalk will facilitate pedestrian access across Griffith Street. The 'Do Not Block Intersection' signing and striping improvements will also assist with Front Street egress onto Griffith Street.

6.6 Griffith Street Queuing Analysis for Railroad

The railroad that runs parallel to Main Street between Main Street and Front Street is anticipated to have delays between three and five minutes when trains are crossing Griffith Street. A queuing analysis was performed on Griffith Street at the railroad crossing.

Figure 32: Anticipated Queue Lengths for Railroad Operations



Both 50th percentile and 95th percentile queues were calculated using a cumulative Poisson distribution. Detailed calculations are available in the **Appendix. Table 14** and **Table 15**. summarize the queuing calculations for all the scenarios assuming a 3 minute or 5 minute railroad delay.

The maximum anticipated 50th and 95th percentile queue lengths occur during the Total 2026 with Front Street PM Peak hour scenario. **Figure 32** shows the 95th percentile queue lengths with a 5 minute delay for this scenario. These queues are 525' for the westbound and 325' for the eastbound. It was assumed that each vehicle occupies 25' in the queue, therefore, the 525' westbound queue is anticipated to contain 21 vehicles and the 325' eastbound queue is anticipated to contain 13 vehicles.

Table 14: Queuing Summary (3 Minute Delay)

Scenario	Sum of (50th Percentile) Queue Length (ft.)		Sum of (95th Percentile) Queue Length (ft.)	
	EB	WB	EB	WB
Background 2026 AM	100	150	200	250
Background 2026 PM	100	175	175	275
Background 2026 SAT	75	100	150	200
Background 2045 AM	100	125	200	225
Background 2045 PM	100	150	175	275
Background 2045 SAT	75	100	150	200
Total 2026 With Front Street AM	100	200	200	325
Total 2026 With Front Street PM	100	225	200	350
Total 2026 With Front Street SAT	75	150	175	250
Total 2026 Without Front Street AM	100	150	200	275
Total 2026 Without Front Street PM	100	175	175	300
Total 2026 Without Front Street SAT	75	125	150	225
Total 2045 With Front Street AM	100	175	200	300
Total 2045 With Front Street PM	100	200	200	350
Total 2045 With Front Street SAT	75	125	175	250
Total 2045 Without Front Street AM	100	125	200	250
Total 2045 Without Front Street PM	100	175	175	300
Total 2045 Without Front Street SAT	75	100	150	200

Table 15: Queuing Summary (5 Minute Delay)

Scenario	Sum of (50th Percentile) Queue Length (ft.)		Sum of (95th Percentile) Queue Length (ft.)	
	EB	WB	EB	WB
Background 2026 AM	175	225	275	375
Background 2026 PM	150	275	275	425
Background 2026 SAT	125	200	225	325
Background 2045 AM	175	200	275	350
Background 2045 PM	150	250	250	400
Background 2045 SAT	125	175	225	300
Total 2026 With Front Street AM	175	350	300	500
Total 2026 With Front Street PM	200	375	325	550
Total 2026 With Front Street SAT	150	250	250	400
Total 2026 Without Front Street AM	175	250	275	400
Total 2026 Without Front Street PM	150	300	275	450
Total 2026 Without Front Street SAT	125	200	225	325
Total 2045 With Front Street AM	175	325	300	475
Total 2045 With Front Street PM	175	350	300	525
Total 2045 With Front Street SAT	125	225	250	375
Total 2045 Without Front Street AM	175	225	275	350
Total 2045 Without Front Street PM	150	300	250	450
Total 2045 Without Front Street SAT	125	175	225	300

Note: Highlighted Line represents the longest anticipated queue

It is anticipated that the addition of development-related traffic will increase the 95th Percentile queue lengths by a maximum of 3 vehicles (75') per 3 minute delay. When the railroad delay is 5 minutes, the 95th Percentile queue lengths are anticipated to be increased by approximately 5 vehicles (125').

7.0 Recommendations and Conclusions

Transportation infrastructure recommendations associated with the construction of the Coal Creek Village project are summarized below.

Front Street Connection:

This TIS includes analysis of scenarios with and without the Front Street connection. Due to the sites' direct access to S. Boulder Road with heavy through volumes, the site accesses will have restricted turning movements. Without the Front Street connection, this creates additional weave and U-turn movements on S. Boulder Road. The City is not comfortable with the safety concerns associated with these movements. Both the City staff and the TIS recommendations are to include the Front Street connection.

The Front Street connection provides numerous benefits to the Louisville community. The Front Street connection will allow for transportation redundancy as part of a gridded street network. Gridded networks have more capacity and increase circulation with narrower roadways that are safer for pedestrians and other multimodal traffic. It also aligns with the City's previous planning efforts.

Without the Front Street connection, there is anticipated to be an additional 25% of the exiting site distribution that would use the eastbound U-turn, which amounts to between 8 to 18vph. This equates to an anticipated increase of between 40% and 85% for the eastbound U-turn movements on South Boulder Road in the long-term traffic scenarios. This includes a difficult weave movement across two or three lanes of traffic in the 400 feet between the northern site accesses to the eastbound left turn lane at the signalized intersection.

Under both scenarios, Front Street is anticipated to stay within Front Street's local residential street capacity.

With the Front Street connection, it is recommended that traffic calming measures are constructed to attenuate operations on Front Street. Several measures that may be considered are described in the City of Louisville's *Transportation Master Plan*. This document's Neighborhood Traffic Management Program (NTMP) focuses on neighborhood-level traffic calming and safety improvements. These improvements help maintain the City's family-friendly small-town character. Examples of tools utilized within an NTMP include, but are not limited to the following.

- Enhanced or raised pedestrian crossings
- Medians and/or entry islands
- Curb extensions

- Speed humps or cushions
- Speed monitoring and enforcement campaigns
- Education campaigns

~~Coal Creek Station~~Coal Creek Village will operate with acceptable conditions both with and without the Front Street connection from South Boulder Road to Griffith Street. Under both scenarios, Front Street is anticipated to stay within Front Street's local residential street capacity.

~~However, the Front Street connection provides numerous benefits to the Louisville community. The Front Street connection will allow for transportation redundancy as part of a gridded street network. Gridded networks have more capacity with narrower roadways that are safer for pedestrians and other multimodal traffic. It also aligns with the City's previous planning efforts.~~

~~With the Front Street connection, it is recommended that traffic calming measures are constructed to attenuate operations on Front Street. Several measures that may be considered are described in the City of Louisville's *Transportation Master Plan*. This document's Neighborhood Traffic Management Program (NTMP) focuses on neighborhood level traffic calming and safety improvements. These improvements help maintain the City's family friendly small town character. Examples of tools utilized within an NTMP include, but are not limited to the following.~~

~~Enhanced or raised pedestrian crossings~~

~~Medians and/or entry islands~~

~~Curb extensions~~

~~Speed humps or cushions~~

~~Speed monitoring and enforcement campaigns~~

~~Education campaigns~~

~~Without the Front Street connection, there is anticipated to be 45% more eastbound U-turn movements on South Boulder Road. This includes a weave movement from the northern site accesses to the eastbound left turn lane at the signalized intersection.~~

Intersection #2 - South Boulder Road and Front Street Intersection: With the development of Coal Creek StationCoal Creek Village, the eastbound right turn lane needs to be extended to include 75' of storage and a 13.5:1 taper to accommodate the anticipated site-generated traffic. The westbound left turn lane is constrained by the back-to-back turn lane to the adjacent access.

The northbound movement is restricted to right turn movements. Therefore, the northbound movement out of the site does not require a separate turn lane. No acceleration lane is required for this movement onto South Boulder Road.

Intersection #3 - South Boulder Road and Cannon Circle intersection: With the construction of ~~Coal Creek Station~~Coal Creek Village, this access will be further restricted from to a $\frac{3}{4}$ movement access, prohibiting the northbound and southbound through and left turn movements by extending the raised center median.

With the development of ~~Coal Creek Station~~Coal Creek Village, an eastbound right turn lane needs to be constructed to include 50' of storage and a 13.5:1 taper to accommodate the anticipated site-generated traffic. The westbound left turn lane is constrained by the back-to-back turn lane to the adjacent access. The 95th percentile queue for this movement is less than the available storage length + taper length. Therefore, no changes are recommended to the westbound left deceleration lanes.

The northbound movement is restricted to right turn movements. Therefore, the northbound movement out of the site does not require a separate turn lane.

Intersection #5 - SH 42 and Cannon Circle intersection: With the construction of ~~Coal Creek Station~~Coal Creek Village, this intersection will be restricted to a $\frac{3}{4}$ movement by extending the existing center median in SH 42.

The eastbound movement will be restricted to right turn only movements. Therefore, no deceleration lane is needed for this movement.

Intersection #8 – Griffith Street and Front Street intersection: This is a full-movement intersection with stop-control on the north and south legs. No additional turn lanes are required.

It is recommended that with the Front Street connection, a pedestrian crossing of Griffith Street is installed with a rectangular, rapid flashing beacon (RRFB) to assist pedestrians in crossing Griffith Street.

Additionally, with the Front Street connection, this intersection should have 'Do Not Block Intersection' signage and striping added that will assist with traffic accessing Front Street.

Intersection of Griffith Street and the BNSF Railroad: This at-grade railroad crossing sees multiple trains crossings per day, with each impacting the crossing for three to five minutes at a time. During the crossing, traffic queues on Griffith Street back up in either direction. As described above, it is recommended that the intersection of Griffith Street and Front Street has 'Do Not Block Intersection' signage and striping added that will assist with traffic accessing Front Street.

Intersection #10 – Front Street and Harper Street intersection with the Front Street Connection: This is currently a free-flowing intersection. There is an unimproved alley access as a third, north leg. With the buildout of ~~Coal Creek Station~~ Coal Creek Village and a connection of Front Street from South Boulder Road to Griffith Street, it is recommended that Front Street is designed as the through street and Harper Street is stop-controlled with a stop sign. The installation of a stop sign, stop bar, and painted pedestrian crosswalk should be included on the north leg of Front Street.

Intersection #11 – SH 42 and Harper Street intersection: The existing volume of eastbound right turns from Harper Street onto SH 42 exceeds the *Access Code*'s requirement to construct an acceleration lane for this movement. With the implementation of the *Future 42* Plan, this volume is anticipated to increase because current traffic making the eastbound left movement will likely make a right turn instead. Coal Creek Village's site traffic is not anticipated to impact this movement. At a minimum, the construction of an acceleration lane should be incorporated into the implementation of Future 42 plans.

8.0 Appendix

Reference Documents

1. *CDOT Online Traffic Information System*. Colorado Department of Transportation, <https://dtdapps.coloradodot.info/otis>
2. *2015 Assigned All Day Model Volumes and 2040 Assigned All Day model Volumes*, Denver Regional Council of Governments, <https://drcog.org/services-and-resources/data-maps-and-modeling/travel-modeling>
3. *Highway Capacity Manual*. Transportation Research Board, 2010.
4. *11th Edition Trip Generation Manual*. Institute of Transportation Engineers, 2021.
5. *Trip Generation Handbook, 3rd Edition*. Institute of Transportation Engineers, 2017.
6. *Trip Generation Handbook, 2nd Edition*. Institute of Transportation Engineers, 2004.
7. *State of Colorado, State Highway Access Code, Volume 2*, Code of Colorado Regulations 601-1, March 2002.
8. *Design and Construction Standards, City of Louisville, Department of Public Works, Engineering Division*, 1994.
9. *Future 42 (SH 42 Corridor Study)*. City of Louisville, December 2022.
10. *City of Louisville Transportation Master Plan*. City of Louisville, 2019.
11. *South Boulder Road Corridor Evaluation*. City of Louisville and FHU, 2022.
12. *Delo Boom Traffic Impact Study*. Kimley Horn, September 2024.
13. *Louisville South Boulder Road Connectivity Plan*. City of Louisville, 2019.
14. *The Highway 42 Revitalization Area Framework Plan*. City of Louisville, May 2003.
15. *42 Gateway Alternative Analysis Report*. City of Louisville, 2013.
16. *Louisville Middle School Travel Map*. Boulder Valley School District, 2024.
- ~~16-17.~~ *DRCOG South Boulder Road Corridor Study*. DRCOG, 2024

Included Documents

Appendix A: Traffic Study Scoping Form and City Staff's Comments

Appendix B: Site Plan (24" x 36" pdf)

Appendix C: Traffic Counts

Appendix D: Background Growth Rate Calculations per DRCOG

Appendix E: Internal Reduction Calculations

Appendix F: Signal Timing Plans

- SH 42 and South Boulder Road
- Main Street and South Boulder Road

Appendix G: *Future 42* Excerpt of Preferred South Boulder Road and SH 42 Design

Appendix H: *Future 42* Excerpt of Preferred SH 42 and Griffith Street Design

Appendix I: *City of Louisville Transportation Master Plan* Excerpt of South Boulder Road Corridor Improvements and Commercial Driveway

Appendix J: *Louisville South Boulder Road Connectivity Plan* Excerpt of South Boulder Road and Main Street Future Pedestrian Underpass

Appendix K: *The Highway 42 Revitalization Area Framework Plan* Excerpt of Framework Plan

Appendix L: *42 Gateway Alternative Analysis Report* Excerpt of Future Roadway Network

Appendix M: Additional Figures

- Figure AP01: Year 2024 Existing Traffic
- Figure AP02: Year 2026 Background Traffic (Delo Boom Development)
- Figure AP03: Year 2045 Background Traffic (Delo Boom Development)
- Figure AP04: Year 2045 Background Adjust (Int #5 & #6 Redistribution)
- Figure AP05: Background Adjust for Total (Int #3 Redistribution)
- Figure AP06: Front Street Diverted Traffic (Year 2026)
- Figure AP07: Front Street Diverted Traffic (Year 2045)

Appendix N: Synchro Modeling Reports

Appendix O: Louisville TMP Pages

Appendix P: Railroad Queuing Calculations

Appendix Q: Louisville Middle School Travel Map

Appendix R: Intersection Queues