



ZONING AMENDMENT

PUBLIC HEARING - CHECKLIST

Zoning Amendment/Conditional Rezone CCZO Section 07-06-05/07-06-07

Check the applicable application type:

☐ Rezone

☒ Conditional Rezone with Development Agreement

THE FOLLOWING ITEMS MUST BE SUBMITTED WITH THIS APPLICATION TO BE DEEMED COMPLETE (PLEASE CHECK OFF THE ITEMS REQUIRED):

Description	Applicant	Staff
Master Application completed and signed.	X	
Letter of Intent (see standards on next page)	X	
Land Use Worksheet	X	
Neighborhood Meeting form was completed and signed	see RZ2022-0012	
Completed Agency Acknowledgement form including:	see RZ2022-0012	
Southwest District Health		
Irrigation District		
Fire District		
Highway District/Idaho Transportation Dept		
Area of City Impact (If applicable)		
Conditional Rezone:	X	
Proposed conditions of approval and/or Concept Plan (can be a draft survey/draft preliminary plat/drawing)		
Deed or evidence of property interest to the subject property	see RZ2022-0012	
Fee: Rezone: Per Adopted Fee Schedule Conditional Rezone: Per Adopted Fee Schedule Text Amendment: Per Adopted Fee Schedule	X	
Fees are non-refundable		

***DISCLAIMER:** The subject property shall be in compliance with the public nuisance ordinance, the building code and the zoning code before the Director can accept the application.

REZONE OPTION:

When considering a zoning map amendment (rezone) of a property, a conditional rezone is recommended when considering conceptual site plan and/or addressing potential impacts through mitigation strategies and measures such as restricting uses, limiting the area to be rezoned to retain agricultural uses, and agricultural preservation methods such as buffers and disclosures. Without a conditional rezone, no conditions can be considered as part of the rezone application.

The applicant/owner and DSD Planner must sign (below) if the conditional rezone option was discussed and the applicant/owner declined the option.

Applicant/Owner: Elizabeth Allen Date March 30, 2025

DSD Planner: _____ Date _____

SUBMITTAL STANDARDS

LETTER OF INTENT STANDARDS	
Description of proposed use: expand on the Land Use Worksheet	
Description of the existing use.	
Expected impacts and traffic of future development.	
Explanation of how the proposed rezone is consistent with the Comprehensive Plan and specific zoning criteria.	
Conditional Rezone:	
Explanation/Description of the Concept Plan	
Proposed conditions of approval	



ZONING AMENDMENT PUBLIC HEARING - MASTER APPLICATION

4/2/2025

PROPERTY OWNER	OWNER NAME: 6 Point Properties LLC	
	MAILING ADDRESS: 16402 Orchard Avenue, Caldwell, Idaho 83707	
	PHONE: 541-786-2403	EMAIL: 6pointdevelopment@gmail.com
I consent to this application and allow DSD staff / Commissioners to enter the property for site inspections. If the owner(s) is a business entity, please include business documents, including those that indicate the person(s) who are eligible to sign. Signature: <u>Kristin Short</u> <u>4/2/2025</u> Date: <u>4/2/25</u>		

APPLICANT: IF DIFFERING FROM THE PROPERTY OWNER	APPLICANT NAME: Elizabeth Allen	
	COMPANY NAME: Bristlecone Land Use Consulting	
	MAILING ADDRESS: 1330 Williams Lane, Nampa, Idaho 83686	
	PHONE: 907-978-3439	EMAIL: elizabeth@bristleconelanduseconsulting.com

SITE INFO	STREET ADDRESS:	
	PARCEL NUMBER: R3286200000	
	PARCEL SIZE: 62.991	
	CHECK THE APPLICABLE APPLICATION TYPE:	
	☐ REZONE	☒ CONDITIONAL REZONE WITH DEVELOPMENT AGREEMENT
	CURRENT ZONING: A	PROPOSED ZONING: CR-R1
	FLOOD ZONE (YES/NO) No	ZONING DISTRICT:

FOR DSD STAFF COMPLETION ONLY:

CASE NUMBER	DATE RECEIVED:
RECEIVED BY:	APPLICATION FEE: CK MO CC CASH

LAND USE WORKSHEET

PLEASE CHECK ALL THAT APPLY TO YOUR REQUEST:

GENERAL INFORMATION

- 1. DOMESTIC WATER:** ☒ Individual Domestic Well ☐ Centralized Public Water System ☐ City
☐ N/A – Explain why this is not applicable: _____
☒ How many Individual Domestic Wells are proposed? 48

- 2. SEWER (Wastewater)** ☒ Individual Septic ☐ Centralized Sewer system
☐ N/A – Explain why this is not applicable: _____

- 3. IRRIGATION WATER PROVIDED VIA:**
☐ Surface ☒ Irrigation Well ☐ None

- 4. IF IRRIGATED, PROPOSED IRRIGATION:**
☒ Pressurized ☐ Gravity

- 5. ACCESS:**
☒ Frontage ☐ Easement Easement width _____ Inst. # _____

- 6. INTERNAL ROADS:**
☒ Public ☐ Private Road User's Maintenance Agreement Inst # _____

- 7. FENCING** ☐ Fencing will be provided (Please show location on site plan)
Type: _____ Height: _____

- 8. STORMWATER:** ☒ Retained on site ☒ Swales ☐ Ponds ☒ Borrow Ditches
☐ Other: _____

- 9. SOURCES OF SURFACE WATER ON OR NEARBY PROPERTY:** (i.e. creeks, ditches, canals, lake)
Forest Canal

RESIDENTIAL USES

1. NUMBER OF LOTS REQUESTED:

☒ Residential 48 ☐ Commercial _____ ☐ Industrial _____
☒ Common 2 ☐ Non-Buildable _____

2. FIRE SUPPRESSION:

☒ Water supply source: Well or tank

3. INCLUDED IN YOUR PROPOSED PLAN?

☐ Sidewalks ☐ Curbs ☐ Gutters ☐ Street Lights ☒ None

NON-RESIDENTIAL USES

1. SPECIFIC USE: _____

2. DAYS AND HOURS OF OPERATION:

☐ Monday _____ to _____
☐ Tuesday _____ to _____
☐ Wednesday _____ to _____
☐ Thursday _____ to _____
☐ Friday _____ to _____
☐ Saturday _____ to _____
☐ Sunday _____ to _____

3. WILL YOU HAVE EMPLOYEES? ☐ Yes If so, how many? _____ ☐ No

4. WILL YOU HAVE A SIGN? ☐ Yes ☐ No ☐ Lighted ☐ Non-Lighted

Height: _____ ft Width: _____ ft. Height above ground: _____ ft

What type of sign: _____ Wall _____ Freestanding _____ Other _____

5. PARKING AND LOADING:

How many parking spaces? _____

Is there is a loading or unloading area? _____

ANIMAL CARE-RELATED USES

1. MAXIMUM NUMBER OF ANIMALS: _____

2. HOW WILL ANIMALS BE HOUSED AT THE LOCATION?

☐ Building ☐ Kennel ☐ Individual Housing ☐ Other _____

3. HOW DO YOU PROPOSE TO MITIGATE NOISE?

☐ Building ☐ Enclosure ☐ Barrier/Berm ☐ Bark Collars

4. ANIMAL WASTE DISPOSAL

☐ Individual Domestic Septic System ☐ Animal Waste Only Septic System

☐ Other: _____



Bristlecone

LAND USE CONSULTING

April 2, 2025

Canyon County
Development Services Department
111 N. 11th Avenue, Room 310
Caldwell, Idaho 83605

RE: TILLMAN RIDGE CONDITIONAL REZONE LETTER OF INTENT

Dear Mr. Lister,

On behalf of the property owner, we are pleased to submit this letter of intent for the Tillman Ridge Conditional Rezone. We propose a Conditional Rezone from A (Agriculture) to R-1 (Single Family Residential) for Parcel R3286200000. The approximately 63-acre parcel is located at the southwest corner of Karcher Road/HWY 55 and Kimball Avenue. A preliminary plat consisting of 50 lots (48 residential lots and two (2) common lots) with an average lot size of one (1) acre is forthcoming after the approval of this request. This request was presented before the Planning and Zoning Commission on March 13, 2025 as a rezone. The hearing was continued at the request of the Commission to revise the application to be a conditional rezone.

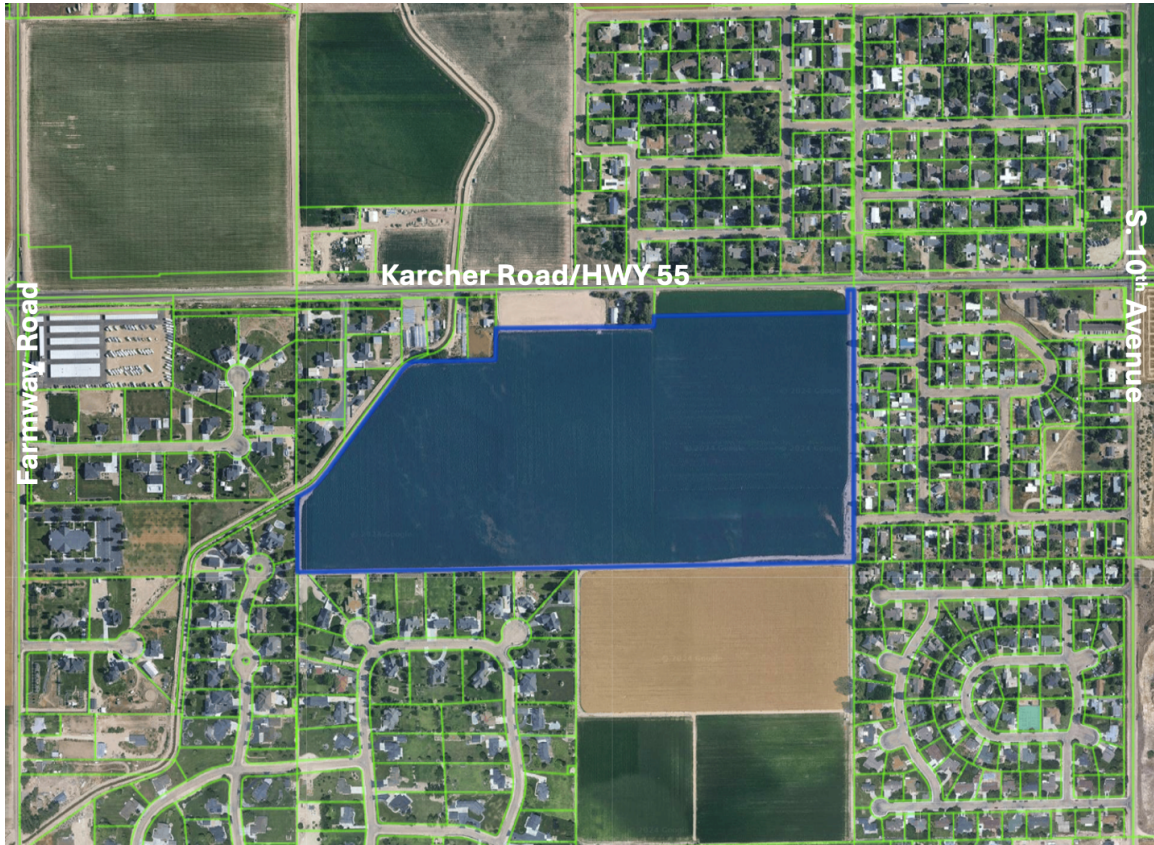


Image 1. Aerial image of the subject parcel and surrounding area.

Conceptual Development Plan Details

As shown in Exhibit A, the Tillman Ridge Subdivision will be a 50-lot subdivision consisting of 48 buildable lots for custom single-family homes and four unbuildable lots for stormwater retention. Each lot will be served by individual wells, individual septic, and pressurized irrigation. Fire suppression will be available via an additional well or alternative method of water supply in accordance with the International Fire Code. A public street will provide internal connectivity. Access to the subdivision will be provided on Highway 55 on the north. On the east side, the subdivision will connect to the Kimball Avenue and Vista Drive intersection, which provides a connection to 10th Avenue. A stub street on the south side of the subdivision will offer future connectivity to the south.

Conditional Rezone Criteria Analysis

The information below provides an analysis of the conditional rezone criteria and the agency comments that the Development Services Department has received in response to the agency notice.

1. Is the proposed conditional rezone change generally consistent with the comprehensive plan?

Response:

The proposed conditional rezone to R-1 is consistent with Canyon County 2020 Comprehensive Plan ("Plan"), which designates the future land use of the subject property and the properties to the north, south, east, and west as Residential. In addition to aligning with the future land use map, the proposed zone change aligns with the following goals and policies:

Property Rights Policy 8. Promote orderly development that benefits the public good and protects the individual with a minimum of conflict.

Population Goal 1. Consider population growth trends when making land use decisions.

Population Policy 3. Encourage future population to locate in areas that are conducive for residential living and that do not pose an incompatible land use to other land uses.

Economic Development Policy 6. Encourage commercial and residential development in a controlled, planned, and constructive manner, which will enhance, not destroy, the existing lifestyle and environmental beauty of Canyon County.

Chapter 4 Economic Development Policy 7. Canyon County should identify areas of the county suitable for commercial, industrial and residential development. New development should be located in close proximity to existing infrastructure and in areas where agricultural uses are not diminished.

Land Use Goal 1. To encourage growth and development in an orderly fashion, minimize adverse impacts on differing land uses, public health, safety, infrastructure and services.

Land Use Goal 2. To provide for the orderly growth and accompanying development of the resources within the county that is compatible with the surrounding area.

Land Use Goal 4. To encourage development in those areas of the county which provide the most favorable conditions for future community services.

Chapter 4 Land Use Residential Policy 2. Encourage residential development in areas where agricultural uses are not viable.

Chapter 4 Land Use Residential Policy 3. Encourage compatible residential areas or zones within the county so that public services and facilities may be extended and provided in the most economical and efficient manner.

Chapter 11 Housing Goal 1. Encourage opportunities for a diversity of housing choices in Canyon County.

As discussed in Chapter 2 of the Plan, based on COMPASS projections, the population in Canyon County in 2025 was anticipated to be 255,796. The current population of Canyon County, based on U.S. Census data, is estimated at 257,674. To help accommodate the growth in population, the proposed conditional rezone, and forthcoming preliminary plat will provide 48 buildable lots for single-family homes. Providing housing within this area of Canyon County will help reduce the need to provide housing in rural areas that are not anticipated to be annexed into city limits.

In a letter dated January 4, 2024, provided to the Development Services Department, the City of Caldwell commented on this proposal as the subject property is within the Area of City Impact. Although the Idaho Local Land Use Planning Act now requires that the County Comprehensive Plan apply to areas of city impact, we evaluated the City of Caldwell's Comprehensive Plan. The subject property's future land use designation is Residential Estates in the City of Caldwell's existing Comprehensive Plan. In their update to their Comprehensive Plan (not yet adopted at the time of application submittal), the future land use of the subject property may change to Highway Corridor, which would support a mixed land use with high-density residential with commercial services. High-density residential and commercial development for the subject property would not be compatible with the existing built environment as it is surrounded by established single-family residential uses with average minimum lot sizes ranging from 0.29 to 2.30 acres. The subject property does not currently have a path of annexation.

2. When considering the surrounding land uses, is the proposed conditional rezone more appropriate than the current zoning designation?

An R-1 zoning designation is more appropriate than the existing Agriculture zoning designation. As shown in Image 3, the subject property is immediately adjacent to RR (Rural Residential) zoning on the north and east and is primarily surrounded by single-family residential subdivisions on all sides. A property just south of the subject property, shown in yellow at the bottom of Image 2, was Conditionally Rezoned to Single Family Residential (CR-R1) and is currently in the process of being platted with 34 residential lots, two common lots, and one irrigation control

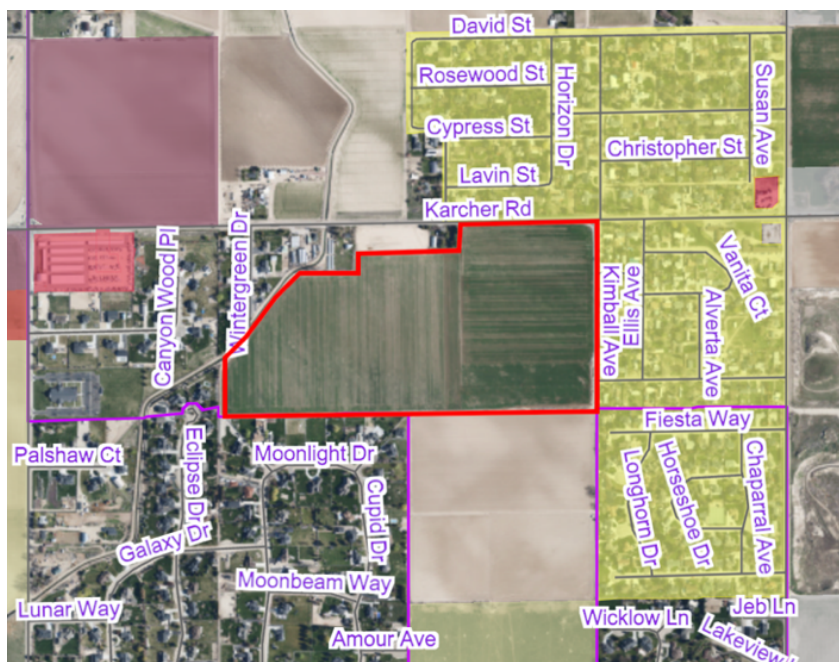


Image 2. Zoning Map.

lot (Norse Landing Subdivision). One parcel sits between the Norse Landing Subdivision and the subject property.

We recognize that the soils of the subject property are identified as Prime Farmland as explained in a letter to DSD from Canyon Soil Conservation District dated April 29, 2023, but due to the immediate surrounding built environment of residential, the planned widening of Karcher Road/HWY 55, and the forthcoming subdivision to the south (Norse Landing), the subject property has become too fragmented for farming and the number of residences in the area makes the movement of farm equipment challenging. As the subject property is within an area of city impact, rezoning the subject property will provide the opportunity to develop single-family homes to provide housing in an area where growth is planned instead of parcels outside of areas of city impact where agriculture is the primary use.

3. Is the proposed conditional rezone compatible with surrounding land uses;

As explained in Criteria 2 and 4, the primary surrounding land use is single-family residential. The proposal is compatible with the surrounding residential uses and will fill a gap between the adjacent residential subdivisions.

4. Will the proposed conditional rezone negatively affect the character of the area? What measures will be implemented to mitigate impacts?

As explained under Criteria 1 and 2, the immediate surrounding area is primarily single-family residential and will not be negatively affected by a conditional rezone to R-1 (Single Family Residential). The forthcoming preliminary plat proposes 48 single-family residential lots with an average lot size of 1 acre that will provide uses consistent with the area's existing residential character. As shown in the Exhibit B, the subject property is surrounded by residential subdivisions. The average lot size of these subdivisions ranges from 0.29 to 2.30 acres, as outlined in Exhibit B. An R-1 zoning designation requires an average minimum lot size of 1.00 acre, which will provide a residential development compatible with the area's single-family character.

To mitigate concerns about compatibility, we propose the following condition: *The subdivision shall maintain an average lot size of 1 acre with no more than 48 buildable lots.*

During the first public hearing with the Planning and Zoning Commission, a member of the public raised concerns about the potential decrease in the number of geese as the property develops. The subject property is not situated within the boundaries of the Deer Flat National Wildlife Refuge, nor is it classified as a sensitive area for conservation. The proposed conditional rezone will not impact the Deer Flat National Wildlife Refuge or nearby protected areas for geese (shown in Image 4 on the east side of 10th Avenue).

5. Will adequate facilities and services including sewer, water, drainage, irrigation and utilities be provided to accommodate the proposed conditional rezone?

Adequate services facilities and services will be provided to accommodate zoning map amendment to R-1 (Single Family Residential) as outlined below:

Sewer: The lots will be served by individual septic systems.

Water: Individual wells will serve each residential lot. A community water system was explored and discussed with Idaho Department of Water Resources. While a community water system can be constructed, it was illuminated as an option since it would require a higher density development due to the cost of the system. In addition, the lot sizes would need to decrease from 1 acre to at least 0.5

acres, which would double the number of housing units. Based on the built environment of the area, this increase in density is not appropriate and would increase the amount of water needed to serve the subdivision.

Drainage: All stormwater will be retained on-site with swales.

Irrigation: Each residential lot and common lot will be utilized with pressurized irrigation via a priority right irrigation well.

Utilities: The area is served by Idaho Power and Intermountain Gas. Utility easements will be provided at the time of platting.

6. Does the proposed conditional rezone require public street improvements in order to provide adequate access to and from the subject property to minimize undue interference with existing or future traffic patterns created by the proposed development? What measures have been taken to mitigate road improvements or traffic impacts?

Response:

A Traffic Impact Study (“TIS”)(Attachment 2) has been completed and reviewed by the Idaho Transportation Department (ITD) and Highway District 4. ITD has plans to widen Karcher Road/Highway 55 to five lanes. To accommodate ITD’s planned improvements, the property owner has dedicated the required amount of right-of-way to ITD (approximately six (6) acres). ITD has reviewed and accepted the TIS with the access proposed on Highway 55 and had no additional recommendations or requirements at this time (Attachment 2)

CHD#4 provided two comments to DSD dated May 23, 2023, and August 9, 2023. In response to the May 23, 2023 comment letter, the revised TIS has been submitted, ROW has been dedicated, and specific improvements will be addressed at the time of platting.

7. Does legal access to the subject property for the conditional rezone exist or will it exist at the time of development?

Response:

Legal access to the subject property exists and will be provided at the time of development. Access will be provided via Highway 55, which has been reviewed and deemed appropriate by the Idaho Transportation Department. The subdivision will connect to Vista Drive, a public local road that provides access to 10th Avenue. An additional stub connection will be provided on the south side of the subdivision for future connectivity. No connections will be made to Devon Drive, Fiesta Way, Castle Way, or any other private roads located in adjacent subdivisions.

8. Will the proposed conditional rezone impact essential public services and facilities, such as schools, police, fire and emergency medical services? What measures will be implemented to mitigate impacts?

Response:

The conditional rezone will not significantly impact essential public services and facilities.

Schools—The area is served by the Vallivue School District. Census Bureau data has found that there is approximately one public school child for every three housing units. For single-family attached homes, the average child per unit is 0.39. This would equate to 18 children in a subdivision with 48

residences¹. Assuming that not all 18 children are the same age, the impact on the school district would be negligible.

Based on a letter dated February 25, 2025, from Vallivue School District, students residing in the subdivision would attend West Canyon Elementary School, Vallivue Middle School, and Vallivue High School.

Fire – Caldwell Fire Department serves the area. Based on discussions with the Caldwell Fire Department, fire hydrants will be required to be installed in the subdivision at the time of development. The hydrants can be connected to a well, tank, or an alternative method of water supply in accordance with the International Fire Code. (Attachment 2)

To mitigate the concern about fire suppression, we propose the following condition:

The subdivision will provide fire hydrants connected to a well, water tank, or an alternative method of water supply as deemed appropriate by the Caldwell Fire Department and in accordance with the International Fire Code.

Police – Canyon County Sheriff's Department serves the area.

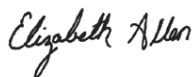
Conclusion

As explained above, the requested zoning designation of R-1 is compatible with the existing character of the area, aligns with the Comprehensive Plan, and fulfills the criteria for rezoning. We have proposed the following conditions to mitigate concerns and we thank you for your time and consideration.

1. *The subdivision shall maintain an average lot size of 1 acre with no more than 48 buildable lots.*
2. *The subdivision will provide fire hydrants connected to a well, water tank, or an alternative method of water supply as deemed appropriate by the Caldwell Fire Department and in accordance with the International Fire Code.*

Please do not hesitate to contact me if you have any questions.

Sincerely,



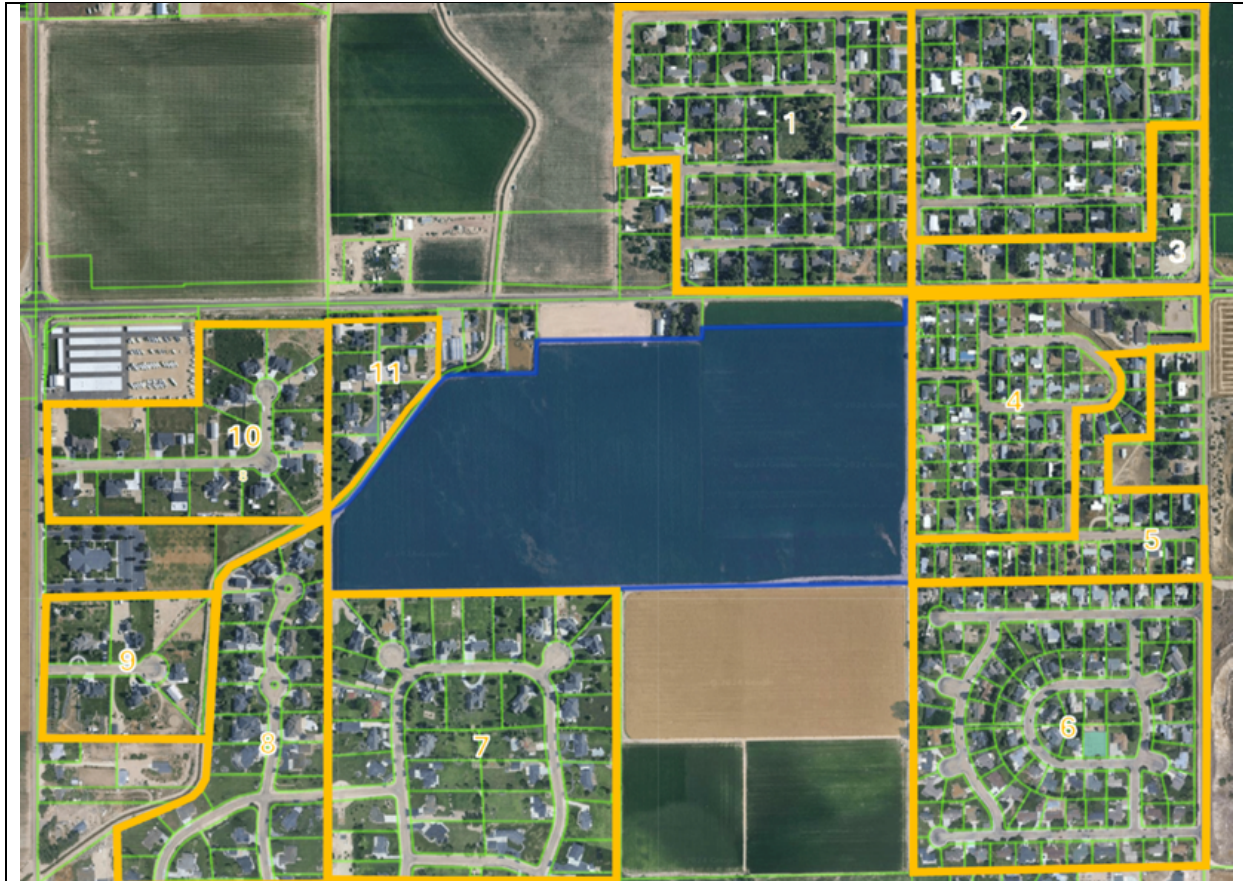
Elizabeth Allen
Bristlecone Land Use Consulting
Principal

Attachments:

1. Traffic Impact Study
2. ITD Development Staff Report
3. Correspondence with Caldwell Fire Department

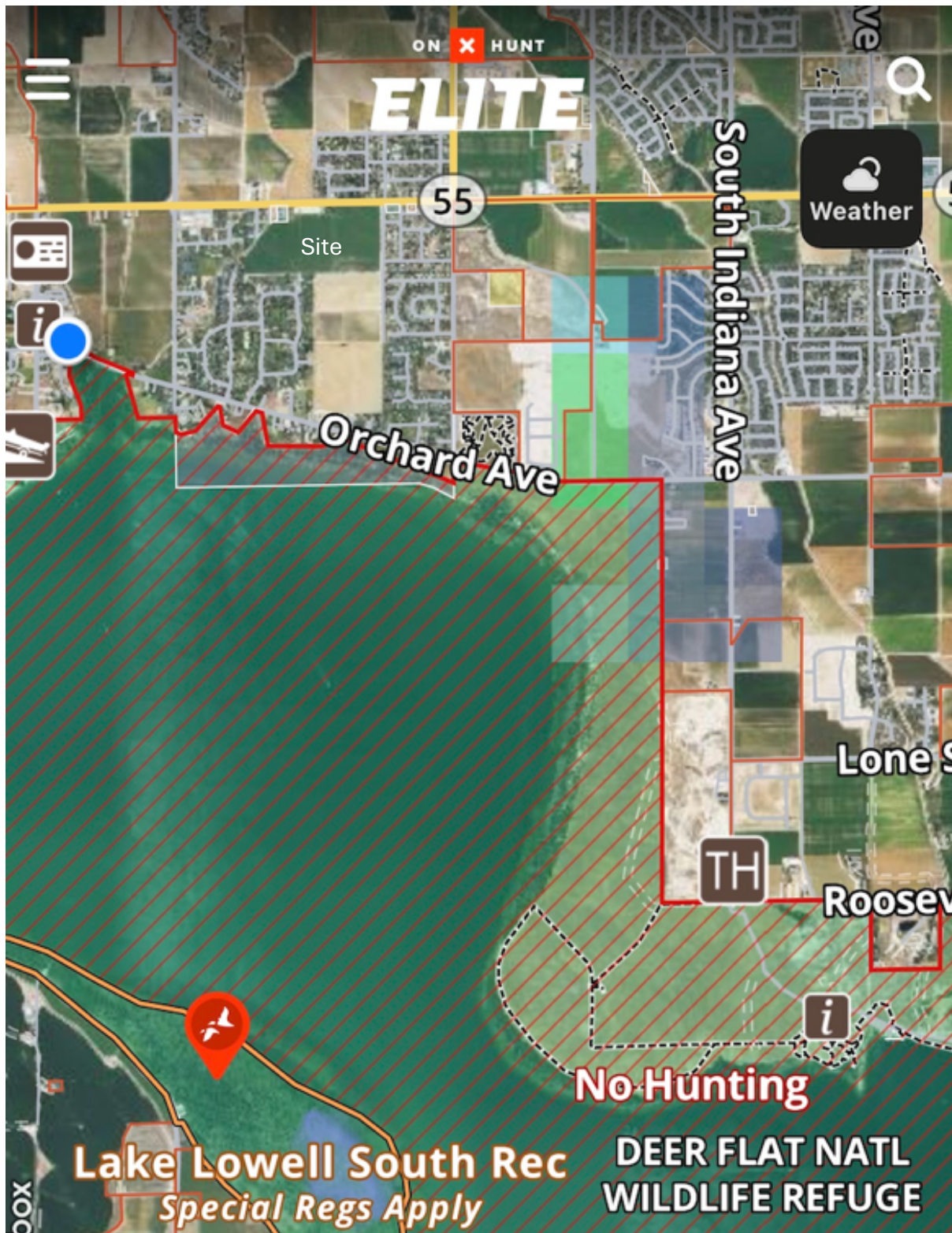
¹ <https://eyeonhousing.org/2020/05/one-public-school-child-for-every-three-homes/>

Exhibit B
Surrounding Subdivisions



Subdivision Name	Label	Acres	No. of Lots	Average Lot Size
Somerset West	1	36.89	57	0.65
Stecher Sub-Amended	2	30.27	49	0.62
Stecher	3	10.07	14	0.72
Vanal Heights	4	28.60	70	0.41
Vanal Heights Re-Subdivision	5	6.08	21	0.29
El Rancho Heights	6	40.00	96	0.32
Moonstruck PH 3	7	11.98	11	1.09
Moonstruck PH 2		25.75	27	0.95
Moonstruck West	8	44.44	56	0.79
Autumn Falls	9	11.49	5	2.30
Canyon Lake Estates PH 1	10	22.94	19	1.21
Wintergreen	11	7.26	7	1.04

Exhibit C
Hunting Areas



Attachment 1
Traffic Impact Study

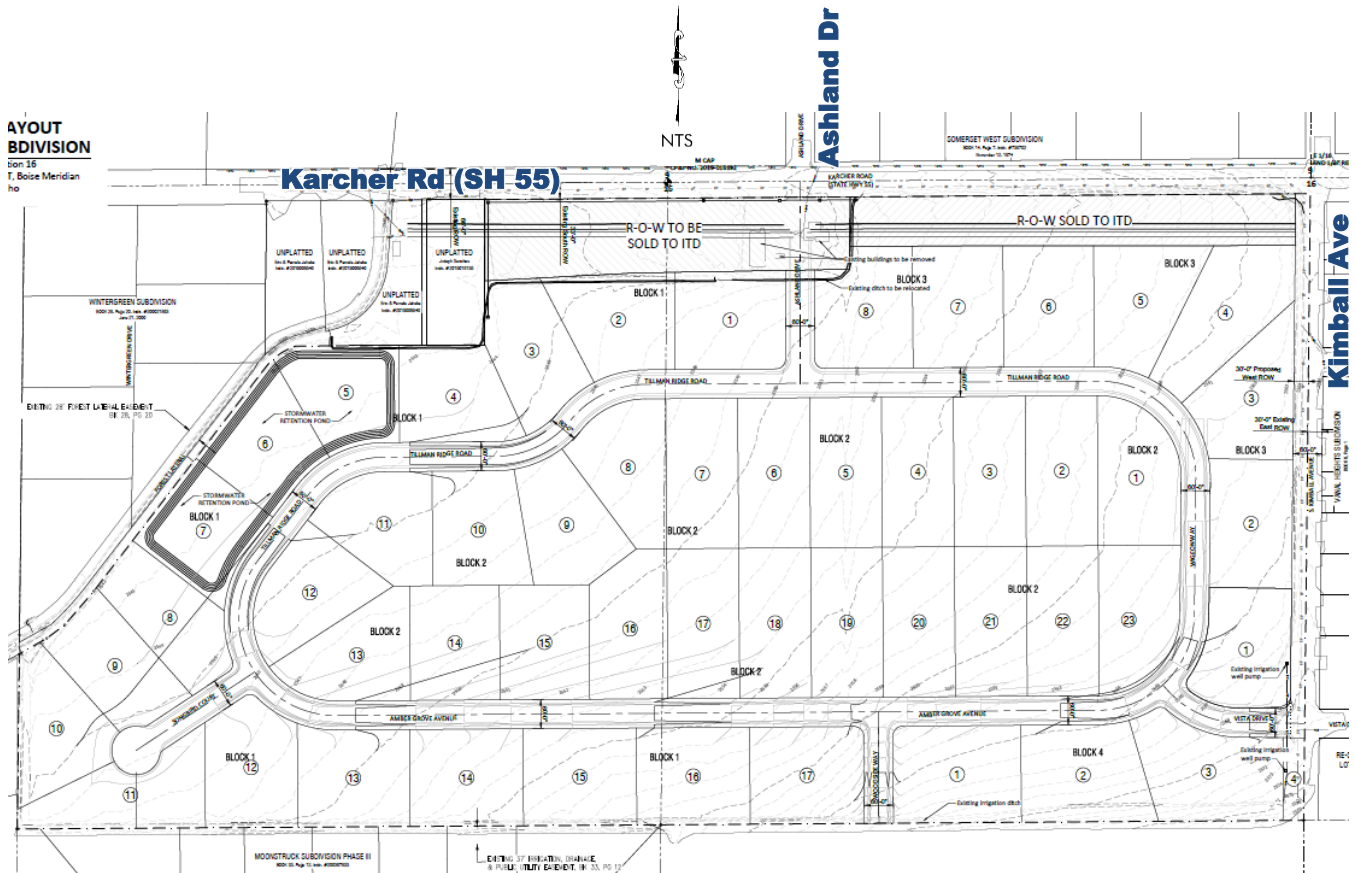
TRAFFIC IMPACT STUDY UPDATE

TILLMAN RIDGE SUBDIVISION

Caldwell, Idaho

July 15, 2022

Updated December 13, 2024



Prepared For:

Dr. William McGuire

Prepared By:

CR ENGINEERING, INC.

181 East 50th Street
Garden City, ID 83714
(208) 841-4996

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EXECUTIVE SUMMARY

Tillman Ridge Subdivision is a proposed residential development located southwest of the Kimball Avenue and Karcher Road (SH 55) intersection in Canyon County, Idaho, as shown in **Figure 1.1**. The original traffic impact study (TIS) for the proposed development was completed in July 2022. The original site plan has been revised. Additionally, the design of the SH 55 corridor project has been changed. CR Engineering, Inc. has been retained to prepare a TIS update to reflect the revised site plan, SH 55 corridor improvements, and current traffic data.

The scope of this TIS update remains the same as the original TIS, which was determined through coordination with Highway District No. 4 (HD4) and the Idaho Transportation Department (ITD). The TIS update evaluated the potential traffic impacts resulting from background traffic growth, in-process developments within the area, and the proposed development, and identified improvements to mitigate the traffic impacts if needed. Traffic impacts were evaluated under weekday AM and PM peak hour traffic conditions based on the proposed land uses and site accesses as shown in the revised preliminary site plan. **Table 1** summarizes the improvements needed to mitigate the traffic impacts for the following analysis years' traffic conditions:

- 2024 Existing traffic
- 2027 Build-out year background traffic
- 2027 Build-out year total traffic
- 2032 Horizon year background traffic
- 2032 Horizon year total traffic

Table 1 – Intersection Improvements Summary

Intersection		2024 Existing	2027 Build-Out Year		2032 Horizon Year	
			Background	Total	Background	Total
①	Kimball Ave and Karcher Rd	None	Intersection closed per SH 55 corridor improvements			
②	S 10 th Ave and Karcher Rd	None	SH 55 corridor improvements	None beyond prior improvements	None beyond prior improvements	None beyond prior improvements
③	Vista Dr and S 10 th Ave	None	None	None	None	None
④	Ashland Dr (Site Access) and Karcher Rd	Not analyzed		SH 55 corridor improvements and construct NB approach	None beyond prior improvements	None beyond prior improvements

1.0 Proposed Development

- 1.1 Tillman Ridge Subdivision is a proposed residential development containing 49 single-family lots with an estimated 2027 build-out year
- 1.2 Based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition*, the proposed development is estimated to generate approximately 523 trips per weekday, 39 trips during the AM peak hour, and 51 trips during the PM peak hour at full build-out.
 - All trips generated by the site were assumed to be made by personal and commercial vehicles
 - Some children residing in the development are anticipated to walk/bike to the existing/proposed schools within the vicinity of the site
 - No internal capture trips or pass-by trips were assumed in the traffic analysis
 - The estimated site traffic distribution patterns are:
 - 10% north of the site traveling on S 10th Avenue
 - 5% south of the site traveling on S 10th Avenue
 - 10% west of the site traveling on Karcher Road
 - 75% east of the site traveling on Karcher Road
- 1.3 The development is proposing two full-movement accesses, one on Karcher Road and one on Kimball Avenue:
 - **Site Access on Karcher Road**
 - Located approximately 1,300 feet east of Wintergreen Drive, a private driveway, and 1,030 feet west of Kimball Avenue, aligning with Ashland Drive
 - Meets IDAPA access spacing from nearest upstream and downstream of unsignalized intersection
 - The site access intersection is anticipated to meet minimum operational thresholds under 2027 build-out year and 2032 horizon year total traffic conditions as an unsignalized intersection
 - **Site Access on Kimball Avenue**
 - Located approximately 750 feet south of Devon Drive, aligning with Vista Drive to the east
 - Meets 330 feet minimum local road spacing on Kimball Avenue, a 25-mph local road
 - The site access intersection is anticipated to carry minimal traffic with Kimball Avenue disconnected from Karcher Road
 - Does not warrant turn lanes under 2027 build-out year or 2032 horizon year total traffic conditions based on NCHRP Report 457 *Evaluating Intersection Improvements: An Engineering Study Guide*
 - Anticipated to meet minimum operational thresholds under 2027 build-out and 2032 horizon year total traffic conditions under all site access scenarios

2.0 2024 Existing Traffic Conditions

- 2.1 Review of the most current five-year (2019-2023) crash data at the study area intersections show no apparent safety issues:
 - Kimball Avenue and Karcher Road intersection
 - Five (5) report crashes with four (4) rear-end crashes due to inattention or following too close
 - Estimated crash rate is 0.21 crashes per million entering vehicles (ACC/MEV)
 - S 10th Avenue and Karcher Road intersection
 - 16 reported crashes with 11 rear-end crashes and four (4) angle crashes
 - Estimated crash rate is 0.42 ACC/MEV

- Vista Drive and S 10th Avenue intersection
 - No reported crashes

- 2.2 With 2024 existing traffic, all study area intersections meet HD4 and ITD minimum operational thresholds analyzed with the existing intersection control and lane configuration. Additionally, none of the unsignalized study area intersections require turn lanes based on NCHRP Report 457 or ITD turn-lane guidelines. As a result, no intersection improvements are needed to mitigate 2024 existing traffic operations

3.0 2027 Build-Out Year Background Traffic Conditions

- 3.1 The SH 55 corridor improvements are anticipated to be implemented by 2027 and are included in the background traffic condition analysis. The following improvements as outlined in the *SH-55, Farmway Road to Middleton Road Project* were included on Karcher Road within the study area:
- Widen Karcher Road to two travel lanes in each direction with a two-way left-turn lane
 - Close the existing approaches of Kimball Avenue and Ellis Avenue
 - **S 10th Avenue and Karcher Road intersection** – upgrade signal and widen intersection with the following lanes:
 - Karcher Road approaches – one left-turn lane two through lanes, and one right-turn lane
 - S 10th Avenue approaches – one left-turn and one shared through/right-turn lane (existing)
 - **Ashland Drive and Karcher Road intersection** – widen intersection with the following lanes:
 - Eastbound approach – one left-turn lane and two through lanes
 - Westbound approach – two through lanes and one right-turn lane
 - Southbound approach – one shared lane (existing)
- 3.2 2027 build-out year background traffic was estimated by extrapolating the 2024 existing counts with the following annual growth rates based on the traffic forecasts from the Community Planning Association of Southwest Idaho (COMPASS) travel demand model:
- 6.0% on Karcher Road
 - 2.0% on all other study area roadways
- 3.3 Off-site traffic from two in-process developments in the vicinity of the site was also included in the 2027 background traffic:
- Passero Ridge Subdivision – A residential development with 335 single-family lots located north of Orchard Avenue between S 10th Avenue and Montana Avenue
 - 29 lots have been constructed and occupied
 - Norse Landing Subdivision – A residential development with 34 single-family lots located north of Orchard Avenue between Moonstruck Drive and Kimball Avenue
- 3.4 With the SH 55 corridor improvements and closures of Kimball Avenue and Ellis Avenue, existing traffic north of Karcher Road is anticipated to shift to Ashland Drive or S 10th Avenue, depending on their origin/destination. Existing traffic south of Karcher Road will be required to shift to S 10th Avenue until another connection to Karcher Road west of the Kimball Avenue location is available
- 3.5 With 2027 build-out year background traffic, all study area intersections are anticipated to meet minimum operational thresholds analyzed with the existing intersection control and lane configuration or with the SH 55 corridor improvements. As a result, no additional improvements are needed to mitigate 2027 background traffic operations:
- The S 10th Avenue and Karcher Road intersection is anticipated to meet minimum operational thresholds with and without the SH 55 corridor improvements
 - The Vista Drive and S 10th Avenue intersection is not anticipated to require turn lanes based on NCHRP Report 457 turn lane guidelines

4.0 2027 Build-Out Year Total Traffic Conditions

- 4.1 With 2027 build-out year total traffic, all study area intersections are anticipated to continue to meet minimum operational thresholds analyzed with the existing intersection control and lane configuration or with the SH 55 corridor improvements. Additionally, none of the unsignalized study area intersections are anticipated to warrant turn lanes based on NCHRP Report 457 or ITD turn lane guidelines. As a result, no additional improvements are needed to mitigate 2027 total traffic operations
- 4.2 The proposed site access on Karcher Road aligning with Ashland Drive will remain a full-movement intersection with the widening of Karcher Road to five lanes. The access on Karcher Road is needed to serve the site and reduce potential traffic impacts on the existing local roads within the adjacent neighborhood:
 - With access on Karcher Road, approximately 143 vehicles per day generated by the development are anticipated to travel on Vista Drive through the existing Vanal Heights Subdivision to access the transportation system
 - Without access on Karcher Road, the entirety of Tillman Ridge Subdivision (523 vehicles per day) will be required to travel on Vista Drive through the existing Vanal Heights Subdivision to access the transportation system
 - Increasing traffic on Vista Drive, a narrow local road with front-on housing, may lead to potential safety issues for schoolchildren, cyclists, and pedestrians

5.0 2032 Horizon Year Background Traffic Conditions

- 5.1 With 2032 horizon year background traffic, all study area intersections are anticipated to continue to meet minimum operational thresholds analyzed with the existing intersection control and lane configuration or with the SH 55 corridor improvements. Additionally, none of the unsignalized study area intersections are anticipated to require turn lanes based on NCHRP Report 457 or ITD turn lane guidelines. As a result, no additional improvements are needed to mitigate the 2032 horizon year background traffic operations

6.0 2032 Horizon Year Total Traffic Conditions

- 6.1 With 2032 horizon year total traffic, all study area intersections are anticipated to continue to meet minimum operational thresholds analyzed with the existing intersection control and lane configuration or with the SH 55 corridor improvements. Additionally, none of the unsignalized study area intersections are anticipated to require turn lanes based on NCHRP Report 457 or ITD turn lane guidelines. As a result, no additional improvements are needed to mitigate the 2032 horizon year total traffic operations

1.0 INTRODUCTION

CR Engineering, Inc. has been retained to prepare a traffic impact study (TIS) update for the proposed Tillman Ridge Subdivision, located southwest of the Kimball Avenue and Karcher Road (SH 55) intersection in Canyon County, Idaho. **Figure 1.1** shows the site location and its vicinity. The TIS update evaluated the potential traffic impacts resulting from background traffic growth, in-process developments in the area, and the proposed development, and identified improvements to mitigate the impacts if needed. The scope of this TIS update remains the same as the original TIS, which was determined through coordination with the Idaho Transportation Department (ITD) and Highway District No. 4 (HD4).

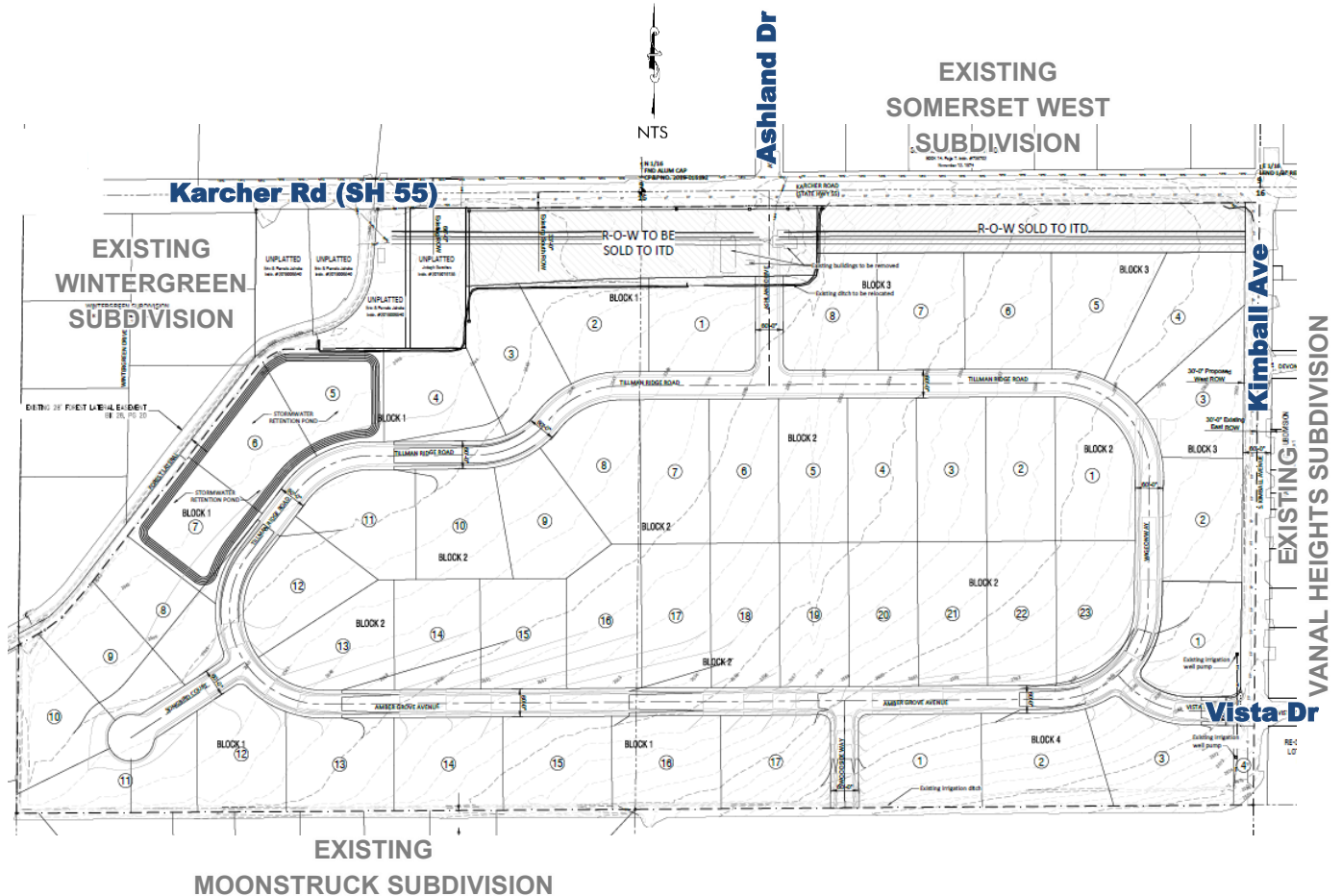
Figure 1.1 – Site Location and Vicinity



1.1 Proposed Development

Figure 1.2 shows the preliminary site plan with the proposed site access locations. Tillman Ridge Subdivision is a proposed residential development estimated to contain 49 single-family lots. Based on the preliminary site plan, the development is proposing two full site accesses, one on Karcher Road aligning with Ashland Drive to the north and one on Kimball Avenue aligning with Vista Drive to the east. In addition, a stub road will be constructed to the south for connection for future development; no plans for development immediately south of Tillman Ridge Subdivision are known at this time. The anticipated build-out year is 2027 but this may change depending on the market conditions.

Figure 1.2 – Preliminary Site Plan



1.2 Study Approach

The TIS update was prepared following ITD *IDAPA 39.03.42 – Rules Governing Highway Right-of-Way Encroachments on State Rights-of-Way* and the *Highway Standards and Development Procedures* for the Association of Canyon County Highway District (ACCHD). The scope of this TIS update remains the same as the original TIS, which was determined through coordination with ITD and HD4.

1.3 Study Area

The following study area intersections were identified for the traffic impact analysis:

- Kimball Avenue and Karcher Road (SH 55) intersection
- S 10th Avenue and Karcher Road intersection
- Vista Drive and S 10th Avenue intersection
- Proposed site access intersection

1.4 Study Period

The analysis peak periods are the AM and PM peak hours of operation of the transportation system. The analysis years and traffic conditions are:

- 2024 Existing traffic
- 2027 Build-out year background traffic
- 2027 Build-out year total traffic
- 2032 Horizon year background traffic
- 2032 Horizon year total traffic

1.5 Analysis Methods and Performance Measure Thresholds

Intersection capacity analysis was performed using Synchro 12 (Version 12.2.3.12), which utilizes the HCM 7th Edition (HCM7) methodologies. All parameters used in the analysis were based on existing data when available or Synchro default values, when not available. Level of service (LOS) for intersections is based on the average delay of vehicles traveling through the intersection on a scale of A (best) to F (worst).

The study area roadways and intersections fall under the jurisdiction of HD4 and ITD. For this study, the minimum operational thresholds for HD4 intersections are LOS D with a maximum volume-to-capacity (v/c) ratio of 1.00 for any lane group. For ITD intersections, mitigation improvements are required for any individual movement either operating at LOS F or with a v/c ratio greater than 0.90 (*Memo No. 39, District 3 Operational Procedures*).

2.0 EXISTING CONDITIONS

2.1 Roadway Network, Intersection Control, and Lane Configuration

A brief description of the existing roadways within the study area is summarized in **Table 2.1** below. The roadway functional classification is based on the 2011 HD4 Functional Classification Map and the ITD iPlan OpenData ArcGIS database. **Figure 2.1** summarizes the study area intersection control and lane configuration.

Table 2.1 – Existing Roadway Characteristics

Roadway	Functional Classification	Number of Lanes	Posted Speed Limit (mph)	Pedestrian Facilities
Karcher Rd (SH 55)	Principal Arterial (Statewide Route)	2-3	55	• No sidewalk or bicycle lanes
Kimball Ave	Local Road	2	20 north / 25 south of Karcher Rd	• No sidewalk or bicycle lanes
S 10 th Ave	Minor Arterial	2	35	• No sidewalk or bicycle lanes
Vista Dr	Local Road	2	25	• No sidewalk or bicycle lanes
Ashland Dr	Local Road	2	20	• No sidewalk or bicycle lanes

2.2 Existing Traffic Volumes

Weekday AM and PM peak hour traffic counts were obtained at the study area intersections on November 14, 2024. The peak hour intersection turning movement counts were collected on a weekday for a 2-hour period at 15-minute intervals between 7:00 and 9:00 during the AM peak hour and between 4:00 and 6:00 PM during the PM peak hour. Existing intersection turning movement counts are included in the appendix. **Figure 2.2** summarizes the existing 2024 peak hour traffic.

2.3 Intersection Crash Data

The most current five-year (2019-2023) crash data was obtained from the ITD Highway Safety website (<https://itd.idaho.gov/safety>). **Table 2.2** summarizes the crash data for the study area intersection. A review of the historical crash data shows no major crash patterns at the study area intersections. The study area intersection crash rates are less than 1.00 crashes per million entering vehicles (ACC/MEV).

Table 2.2 – Intersection Crash Data (2019-2023)

Intersection	Total Crashes	Crash Severity			Notes	Crash Rate (ACC/MEV)
		PDO	Injury	Fatal		
① Kimball Ave and Karcher Rd	5	3	2	0	• 4 rear-end crashes due to inattention or following too close	0.21
② S 10 th Ave and Karcher Rd	16	8	8	0	• 11 rear-end crashes, 4 angle crashes	0.42
③ Vista Dr and S 10 th Ave	No reported crashes					

Figure 2.1 – 2024 Existing Intersection Control and Lane Configuration

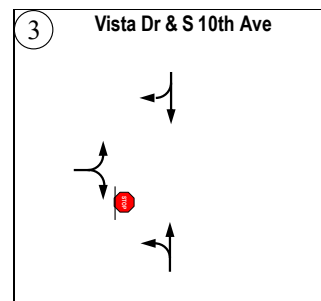
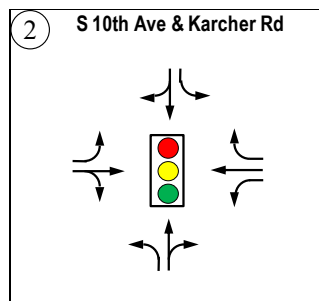
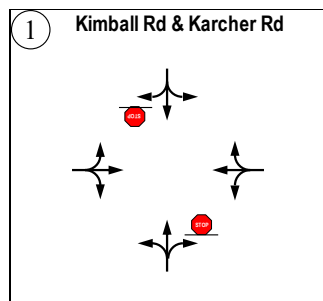
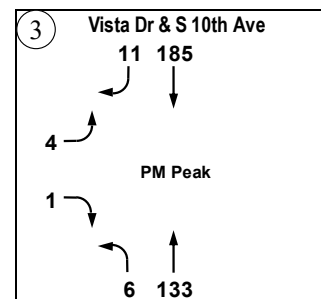
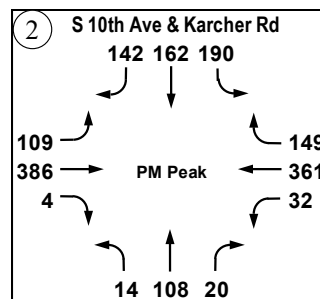
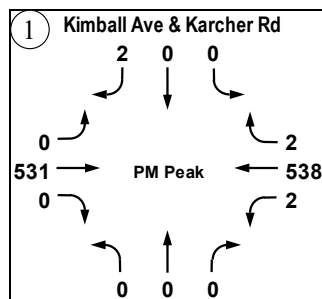
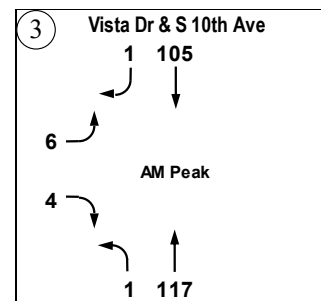
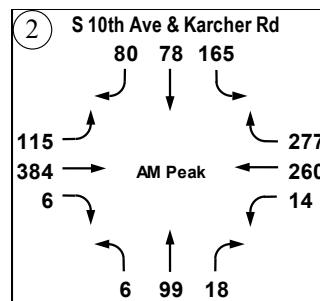
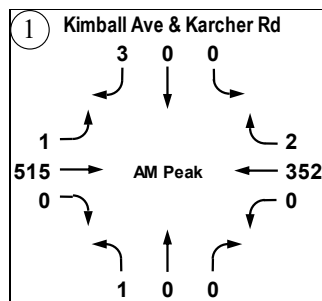


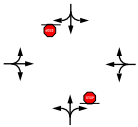
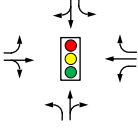
Figure 2.2 – 2024 Existing Peak Hour Traffic



2.4 Intersection Operations

To determine the existing traffic operations, the study area intersections were analyzed with the existing intersection control and lane configuration and 2024 peak hour traffic. Copies of the analysis reports are included in the appendix. **Table 2.3** summarizes the intersection capacity analysis results. All study area intersections currently meet HD4 and ITD minimum operational thresholds under 2024 existing traffic conditions.

Table 2.3 – Intersection Operations – 2024 Existing Traffic

Intersection	Control / Lane	Intersection or Lane Group	AM Peak Hour			PM Peak Hour		
			LOS	Delay [s/veh]	v/c Ratio	LOS	Delay [s/veh]	v/c Ratio
① Kimball Ave and Karcher Rd		NB	C	21	0.01	A	-	-
		EB	A	10	< 0.01	A	-	-
		WB	A	-	-	A	9	< 0.01
		SB	B	11	0.01	B	12	< 0.01
② S 10 th Ave and Karcher Rd		Intersection	C	21	0.65	C	21	0.69
		EBL	C	27	0.78	C	27	0.78
		EBTR	B	17	0.76	B	17	0.75
		WBL	C	30	0.46	C	27	0.51
		WBT	B	19	0.68	B	19	0.79
		WBR	C	21	0.80	B	16	0.39
		NBL	C	33	0.43	C	29	0.46
		NBTR	C	24	0.65	C	23	0.63
		SBL	C	33	0.81	C	29	0.80
③ Vista Dr and S 10 th Ave		NB	A	9	< 0.01	A	8	0.01
		EB	A	10	0.02	B	11	0.01
		SB	-	-	-	-	-	-

2.5 Intersection Mitigation

All study area intersections currently meet HD4 and ITD minimum operational thresholds. None of the unsignalized study area intersections require turn lanes based on NCHRP Report 457 *Evaluating Intersection Improvements: An Engineering Study Guide* or ITD turn lane guidelines. As a result, no intersection improvements are needed to mitigate 2024 existing traffic operations.

3.0 2027 BUILD-OUT YEAR BACKGROUND TRAFFIC CONDITIONS

3.1 Roadway Network

ITD completed the study and design of the Karcher Road (SH 55) corridor improvements between Farmway Road and Middleton Road (*SH-55, Farmway Road to Middleton Road Project*). Based on the current project design plans, the following improvements are included on Karcher Road within the study area:

- Widen Karcher Road to two travel lanes in each direction with a two-way left-turn lane
- Close the existing approaches of Kimball Avenue and Ellis Avenue
- S 10th Avenue and Karcher Road intersection – widen the intersection and upgrade the signal with the following lanes:
 - Karcher Road approaches – one left-turn lane two through lanes, and one right-turn lane
 - S 10th Avenue approaches – one left-turn and one shared through/right-turn lane (existing)
- Ashland Drive and Karcher Road intersection – widen intersection with the following lanes:
 - Eastbound approach – one left-turn lane and two through lanes
 - Westbound approach – two through lanes and one right-turn lane
 - Southbound approach – one shared lane (existing)

According to the project webpage (<https://itdprojects.idaho.gov/pages/55Farmway>), the improvements are under construction and are anticipated to be completed by 2027. **Figure 3.1** summarizes the intersection control and lane configuration for 2027 background traffic conditions with the SH 55 corridor improvements.

3.2 Background Traffic

Background traffic growth from 2024 to 2027 was estimated by extrapolating the 2024 existing traffic counts with the following annual growth rates:

- Karcher Road (SH 55) – 6.0%
- All other study area roadways – 2.0%

These annual traffic growth rates are based on COMPASS forecasts between 2019 and 2030 and other accepted TIS in the area. COMPASS forecasts are included in the appendix. In addition, two in-process developments in the area that are expected to contribute off-site traffic to the study area intersections were included in background traffic:

- Passero Ridge Subdivision – A residential development with 335 single-family lots located north of Orchard Avenue between S 10th Avenue and Montana Avenue with a build-out year of 2026
 - Approximately 10% (29 DU) of Passero Ridge Subdivision has been constructed/occupied
- Norse Landing Subdivision – A residential development with 34 single-family lots located north of Orchard Avenue between Moonstruck Drive and Kimball Avenue

With the corridor widening and road closures as discussed above, traffic north of Karcher Road is anticipated to shift to Ashland Drive or 10th Avenue, depending on their origin/destination. Kimball Avenue traffic south of Karcher Road and Ellis Drive traffic will be required to shift to 10th Avenue until another connection to Karcher Road west of the Kimball Avenue location is available.

Figure 3.2 summarizes the projected 2027 AM and PM peak hour background traffic at the study area intersections.

Figure 3.1 – 2027 Intersection Control and Lane Configuration

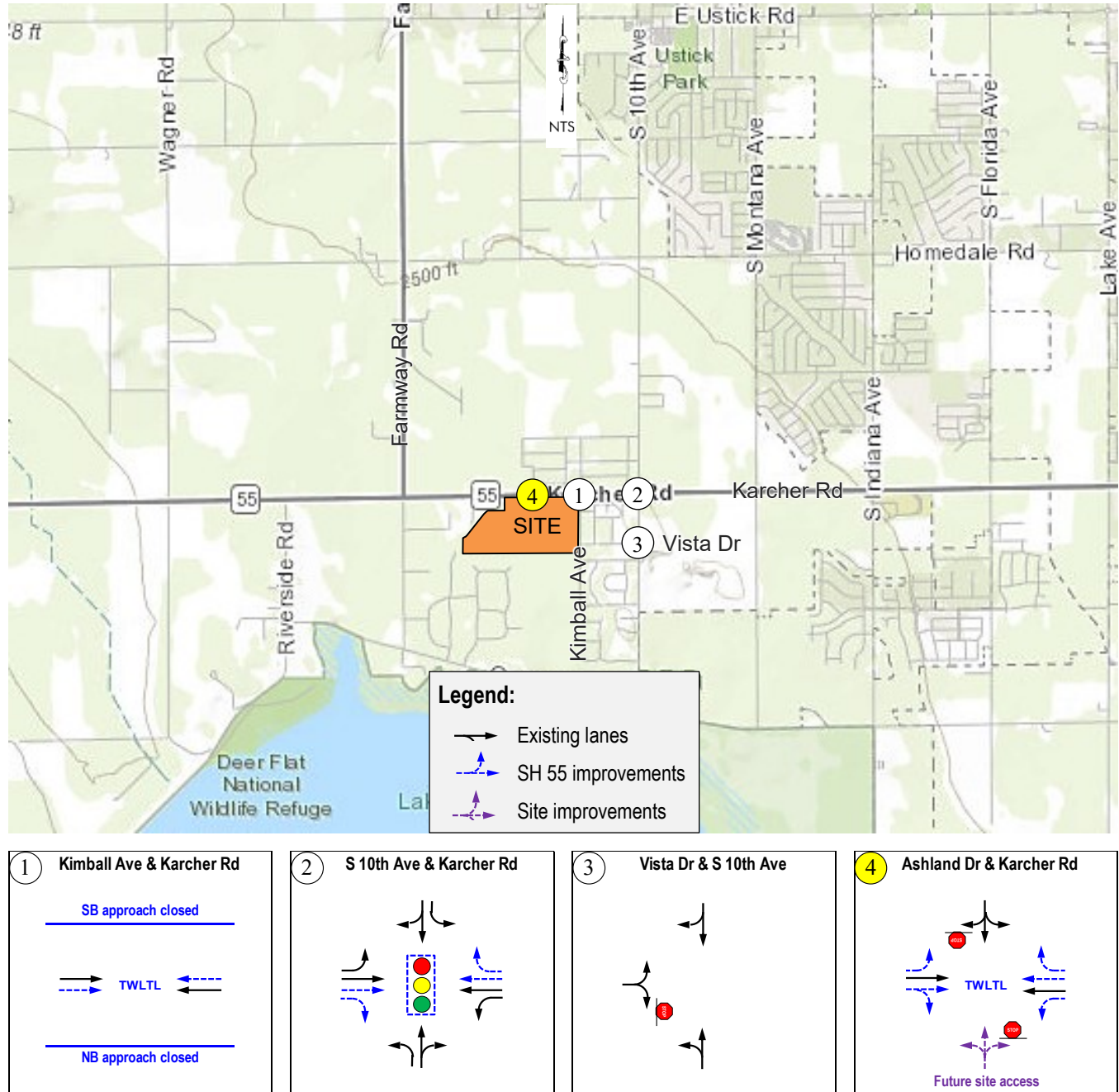
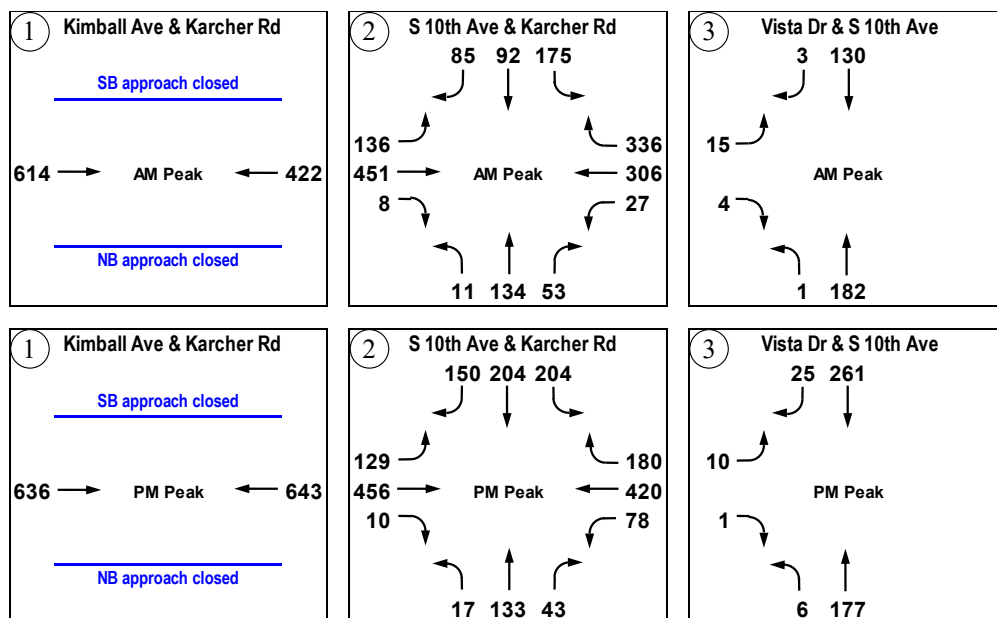


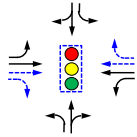
Figure 3.2 – 2027 Build-Out Year Peak Hour Background Traffic



3.3 Intersection Operations

To determine the 2027 background traffic operations, the study area intersections were analyzed with the existing intersection control and lane configuration or with the SH 55 corridor improvements. Copies of the analysis reports are included in the appendix. **Table 3.1** summarizes the intersection capacity analysis results. Based on traffic analysis results, all study area intersections are anticipated to meet minimum operational thresholds under 2027 background traffic conditions.

Table 3.1 – Intersection Operations – 2027 Build-Out Year Background Traffic

Intersection		Control / Lane SH 55 Improvements	Intersection or Lane Group	AM Peak Hour			PM Peak Hour		
				LOS	Delay [s/veh]	v/c Ratio	LOS	Delay [s/veh]	v/c Ratio
①	Kimball Ave and Karcher Rd	Intersection closed with SH 55 corridor improvements							
②	S 10 th Ave ¹ and Karcher Rd		Intersection	C	25	0.61	C	21	0.68
			EBL	D	38	0.80	C	26	0.78
			EBT	B	16	0.41	B	18	0.62
			EBR	B	14	0.02	B	16	0.03
			WBL	C	35	0.53	C	26	0.68
			WBT	B	19	0.36	B	20	0.65
			WBR	C	24	0.85	B	20	0.63
			NBL	D	37	0.45	C	28	0.48
			NBTR	C	29	0.77	C	22	0.69
			SBL	D	47	0.83	C	29	0.81
SBTR	B	20	0.42	B	18	0.77			
③	Vista Dr and S 10 th Ave		NB	A	9	< 0.01	A	8	0.01
			EB	B	11	0.03	B	12	0.02
			SB	-	-	-	-	-	-

¹ Intersection meets minimum operational thresholds without SH 55 corridor improvements

3.4 Intersection Mitigation

All study area intersections are anticipated to meet HD4 and ITD minimum operational thresholds under 2027 background traffic conditions. The Vista Drive and S 10th Avenue intersection is not anticipated to warrant any turn lane based on NCHRP Report 457 turn lane guidelines. As a result, no additional intersection improvements are needed to mitigate 2027 build-out year background traffic operations.

4.0 2027 BUILD-OUT YEAR TOTAL TRAFFIC CONDITIONS

4.1 Roadway Network

The study area roadways and intersections are expected to remain the same as 2027 background traffic conditions as shown in Figure 3.1. The development is planning to improve Kimball Avenue and Karcher Road along the site frontages. In addition, Tillman Ridge Subdivision is proposing to construct the south leg of the Ashland Drive and Karcher Road intersection, as well as constructing the west leg of the Vista Drive and Kimball Avenue intersection for site access.

4.2 Site Traffic

4.2.1 Trip Generation

Site trip generation is estimated using the procedures recommended in the latest edition of the *Trip Generation Manual (11th Edition)*, published by the Institute of Transportation Engineers (ITE). **Table 4.1** summarizes the site trip generation. At full build-out, Tillman Ridge Subdivision is estimated to generate 523 trips per weekday, 39 trips during the AM peak hour, and 51 trips during the PM peak hour.

Table 4.1 – Build-Out Site Trip Generation Summary

Land Use	ITE Code	Size	Unit	Period	Total Trips	Entering		Exiting	
Single-Family Detached Housing	210	49	DU	Weekday Daily (vpd)	523	50%	261	50%	262
				AM Peak Hour (vph)	39	25%	9	75%	30
				PM Peak Hour (vph)	51	63%	32	37%	19

4.2.2 Trip Capture

Based on ITE methodologies, the development is not expected to retain trips internally within the site. No reduction for internal trip capture was assumed in the traffic analysis.

4.2.3 Pass-By Trips

The development is not expected to generate pass-by trips. No pass-by trips were assumed in the traffic analysis.

4.2.4 Modal Split

For traffic analysis purposes, all trips generated by the development were assumed to be made by personal and commercial vehicles. Some children residing in the development are anticipated to walk/bike to the existing/proposed schools within the vicinity of the site

4.2.5 Trip Distribution and Assignment

Site traffic was distributed and assigned to the external roadway system based on current travel patterns, site layout, and the general location of the site within the area. **Figure 4.1** shows the estimated site traffic distribution patterns for the proposed development. **Figure 4.2** and **Figure 4.3** summarize the estimated AM and PM peak hour site traffic with the proposed accesses as shown in the site plan.

4.3 Total Traffic

The 2027 site traffic is added to the 2027 background traffic as determined above to obtain the 2027 total traffic. **Figure 4.4** and **Figure 4.5** summarize the estimated 2027 peak hour total traffic at the study area intersections. **Table 4.2** summarizes the proportionate share of the site traffic at each study area intersection.

Intersection		% Site Traffic of 2027 Total Traffic		
		AM Peak	PM Peak	Average
①	Kimball Ave and Karcher Rd	Intersection closed with SH 55 corridor improvements		
②	S 10 th Ave and Karcher Rd	1.8%	2.1%	1.9%
③	Vista Dr and S 10 th Ave	3.7%	3.0%	3.3%
④	Ashland Dr/Access and Karcher Rd	2.5%	2.8%	2.7%

Figure 4.2 – 2027 Build-Out Year AM Peak Hour Site Traffic

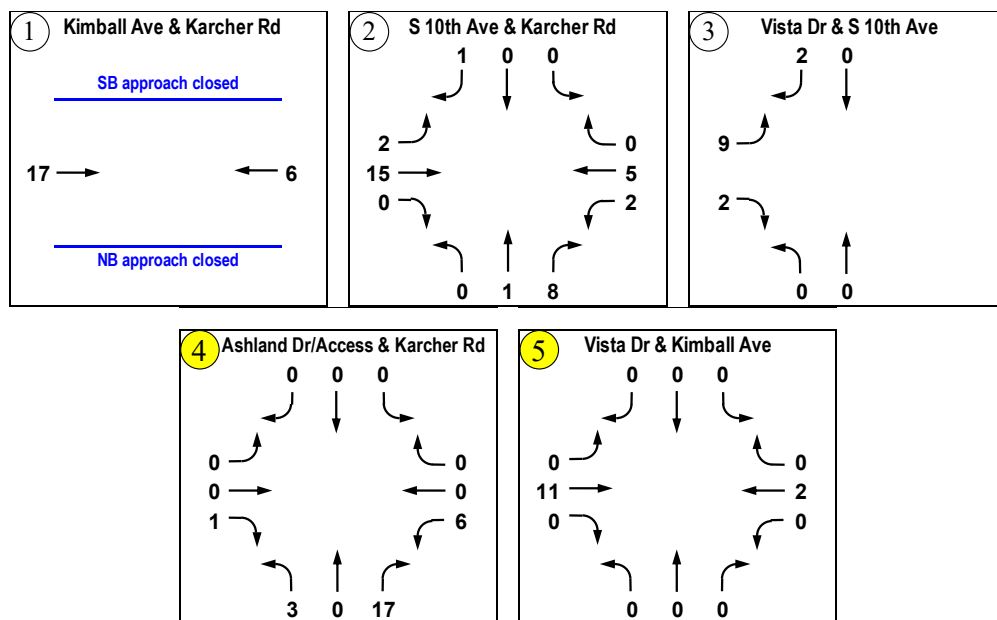
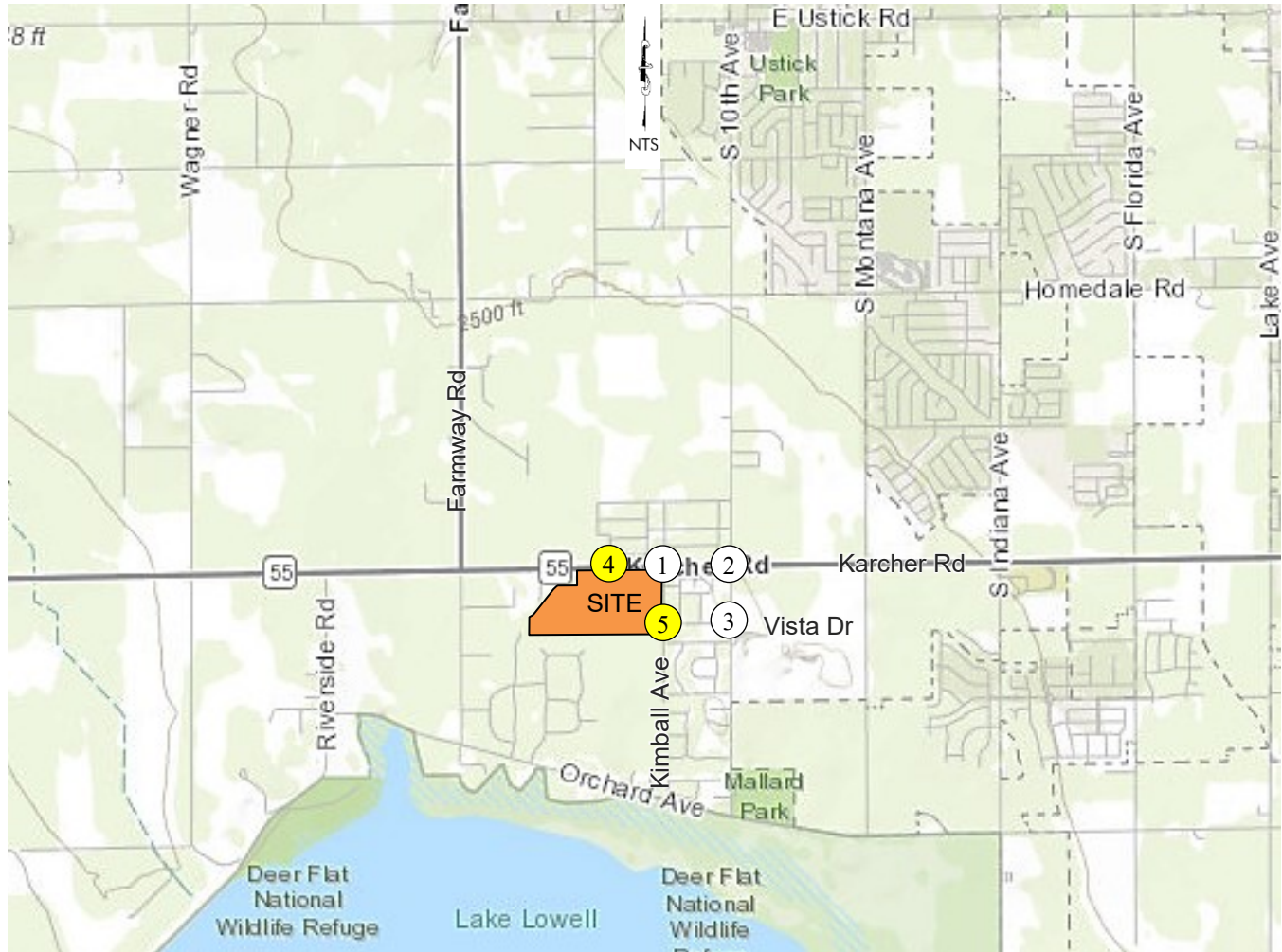


Figure 4.3 – 2027 Build-Out Year PM Peak Hour Site Traffic

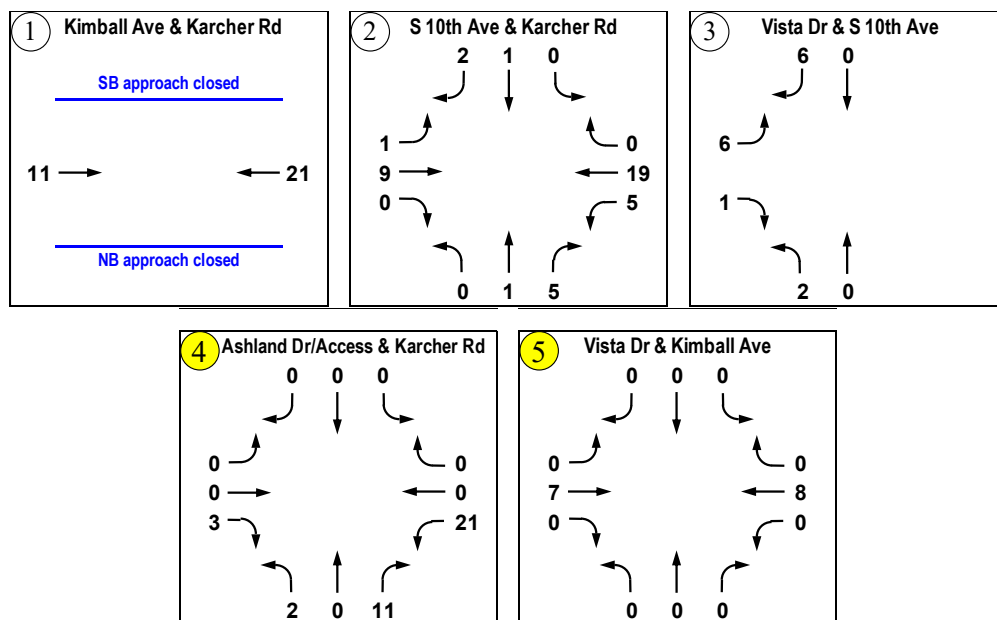
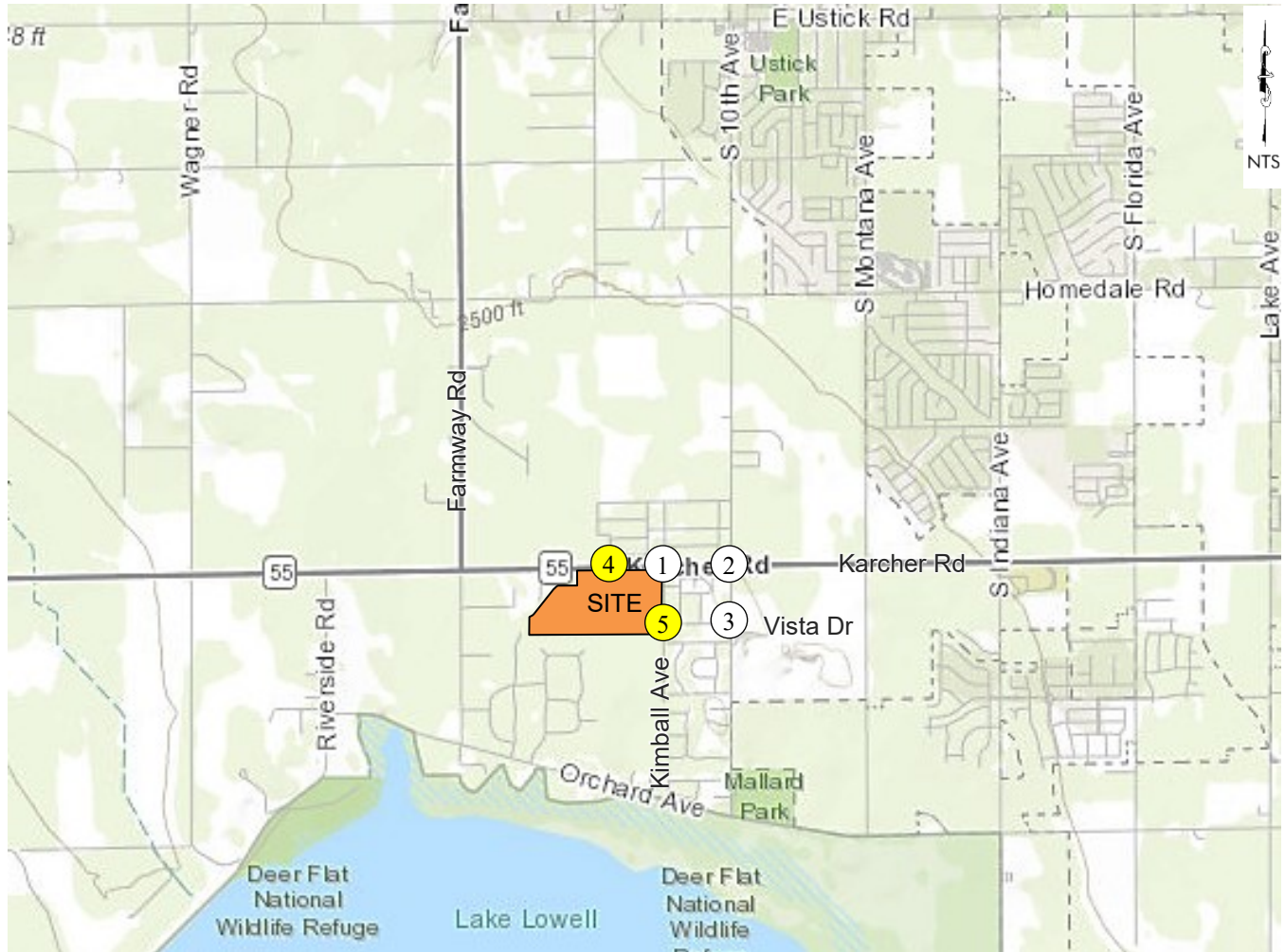


Figure 4.4 – 2027 Build-Out Year AM Peak Hour Total Traffic

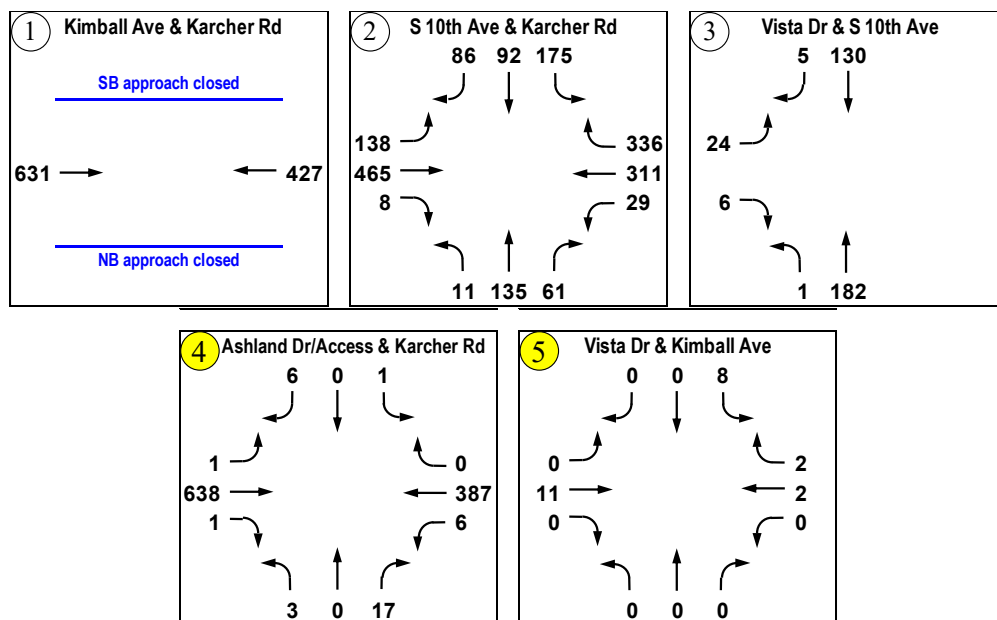
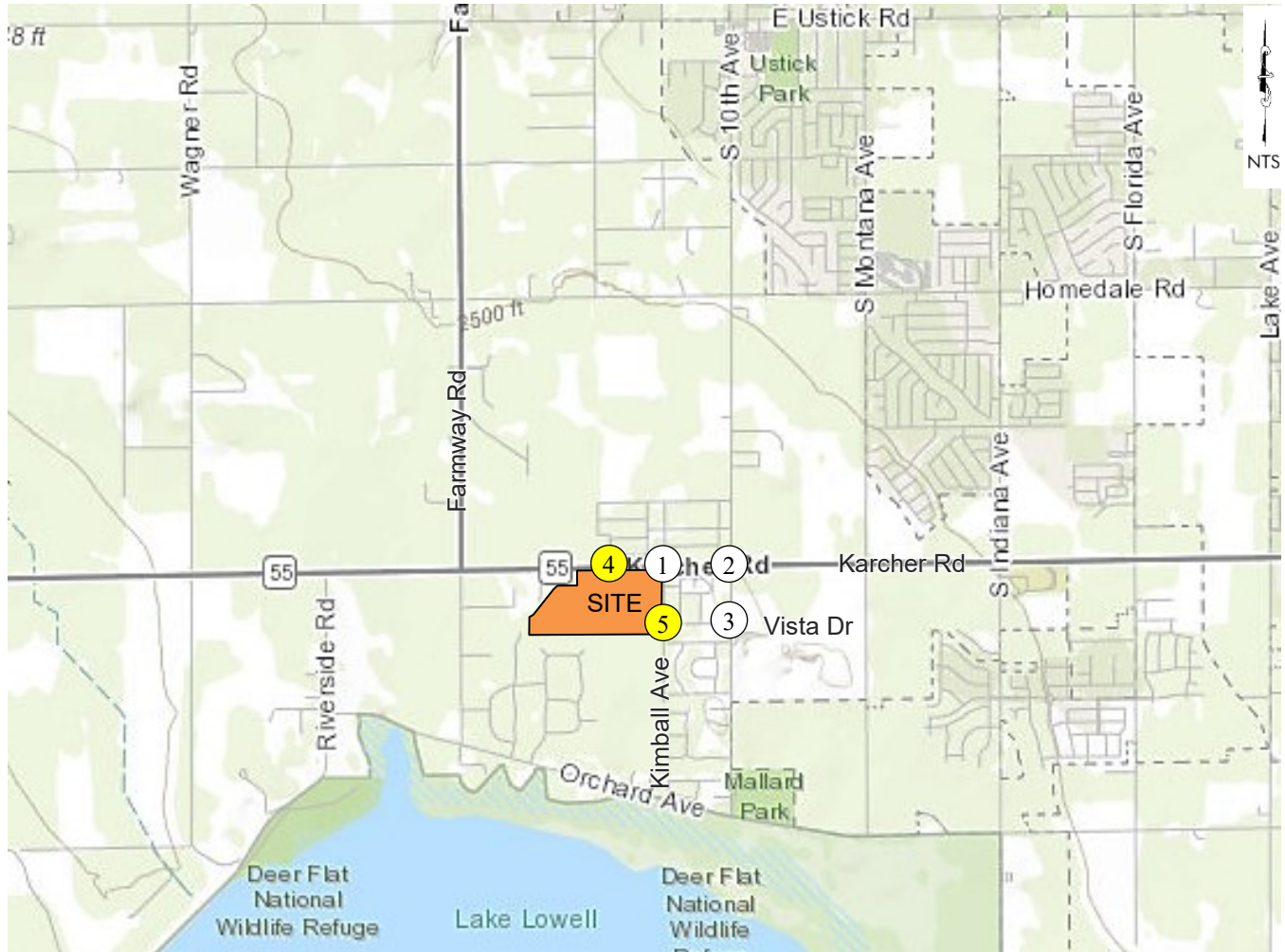
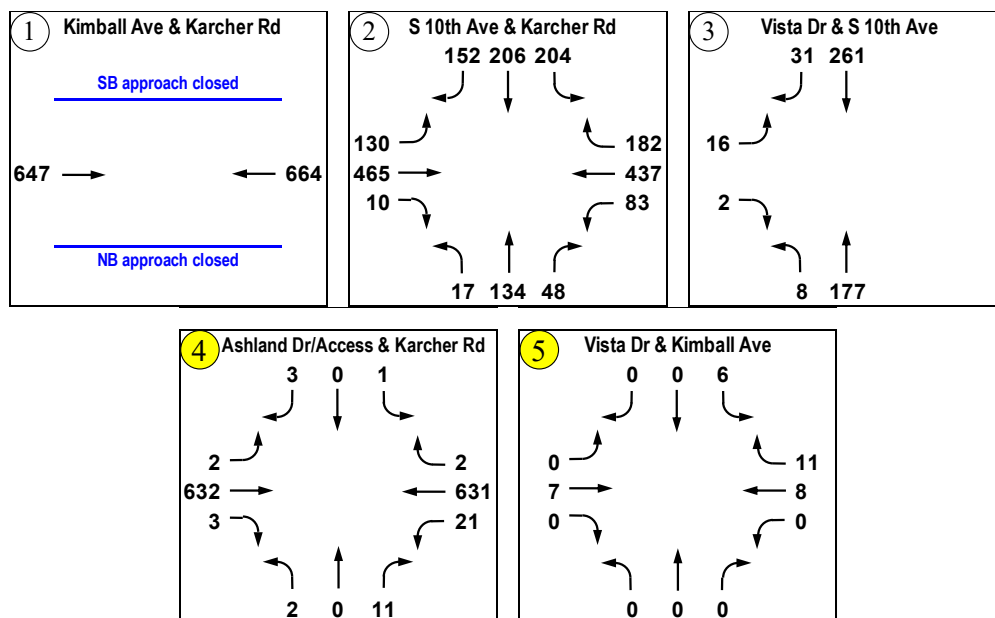
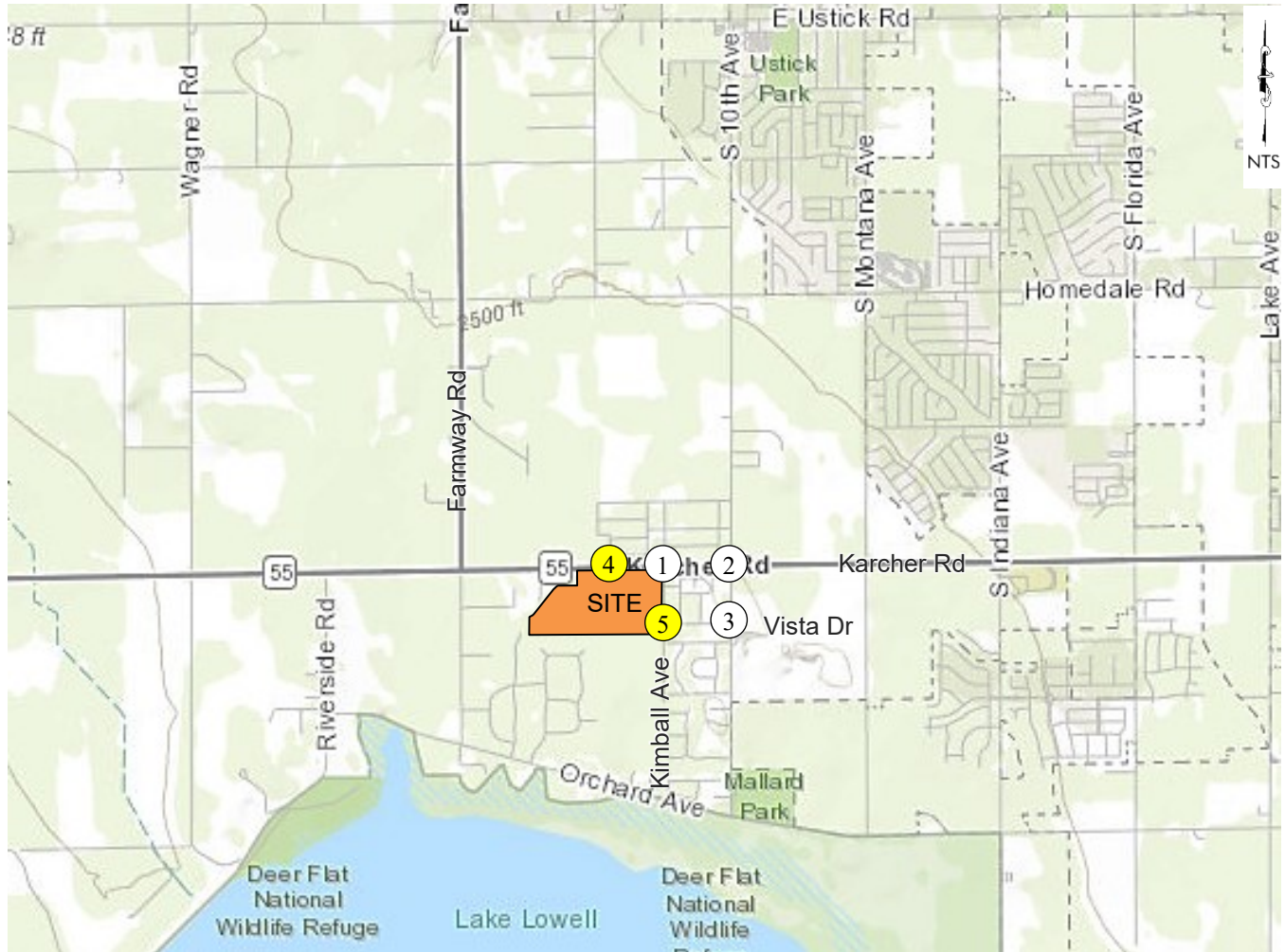


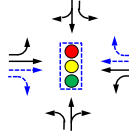
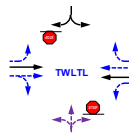
Figure 4.5 – 2027 Build-Out Year PM Peak Hour Total Traffic



4.4 Intersection Operations

To determine the 2027 total traffic operations, the study area intersections were analyzed with the existing intersection control and lane configuration or with the SH 55 corridor improvements. Copies of the analysis reports are included in the appendix. **Table 4.3** summarizes the intersection capacity analysis results. All study area intersections are anticipated to meet HD4 and ITD minimum operational thresholds under 2027 total traffic conditions.

Table 4.3 – Intersection Operations – 2027 Build-Out Year Total Traffic

Intersection		Control / Lane SH 55 Improvements Site Improvements	Intersection or Lane Group	AM Peak Hour			PM Peak Hour		
				LOS	Delay [s/veh]	v/c Ratio	LOS	Delay [s/veh]	v/c Ratio
①	Kimball Ave and Karcher Rd	Intersection closed with SH 55 corridor improvements							
②	S 10 th Ave ¹ and Karcher Rd		Intersection	C	25	0.62	C	21	0.68
			EBL	D	40	0.80	C	26	0.79
			EBT	B	17	0.43	B	19	0.62
			EBR	B	14	0.02	B	16	0.03
			WBL	D	35	0.54	C	27	0.71
			WBT	B	20	0.37	B	20	0.66
			WBR	C	25	0.85	C	20	0.62
			NBL	D	38	0.45	C	29	0.48
			NBTR	C	29	0.78	C	22	0.70
			SBL	D	48	0.83	C	30	0.81
SBTR	C	20	0.41	B	18	0.77			
③	Vista Dr and S 10 th Ave		NB	A	9	< 0.01	A	8	0.01
			EB	B	11	0.05	B	12	0.04
			SB	-	-	-	-	-	-
④	Ashland Dr ¹ and Karcher Rd		NB	B	12	0.04	B	12	0.02
			EBL	A	8	< 0.01	A	9	< 0.01
			EBT	-	-	-	-	-	-
			EBR	-	-	-	-	-	-
			WBL	A	9	0.01	A	9	0.02
			WBT	-	-	-	-	-	-
			WBR	-	-	-	-	-	-
			SB	B	10	0.01	B	12	0.01

¹ Intersection meets minimum operational thresholds without SH 55 corridor improvements

4.5 Intersection Mitigation

All study area intersections are anticipated to continue to meet HD4 and ITD minimum operational thresholds under 2027 build-out total traffic conditions. The unsignalized study area intersections are not anticipated to warrant any turn lane based on NCHRP Report 457 or ITD turn lane guidelines. As a result, no additional intersection improvements are needed to mitigate 2027 build-out year total traffic operations.

The Ashland Drive and Karcher Road intersection is anticipated to warrant a westbound left-turn lane if the SH 55 corridor improvements are not constructed.

The Vista Drive and Kimball Avenue intersection is anticipated to carry minimal traffic with Kimball Avenue disconnected from Karcher Road. The intersection is anticipated to meet minimum operational thresholds.

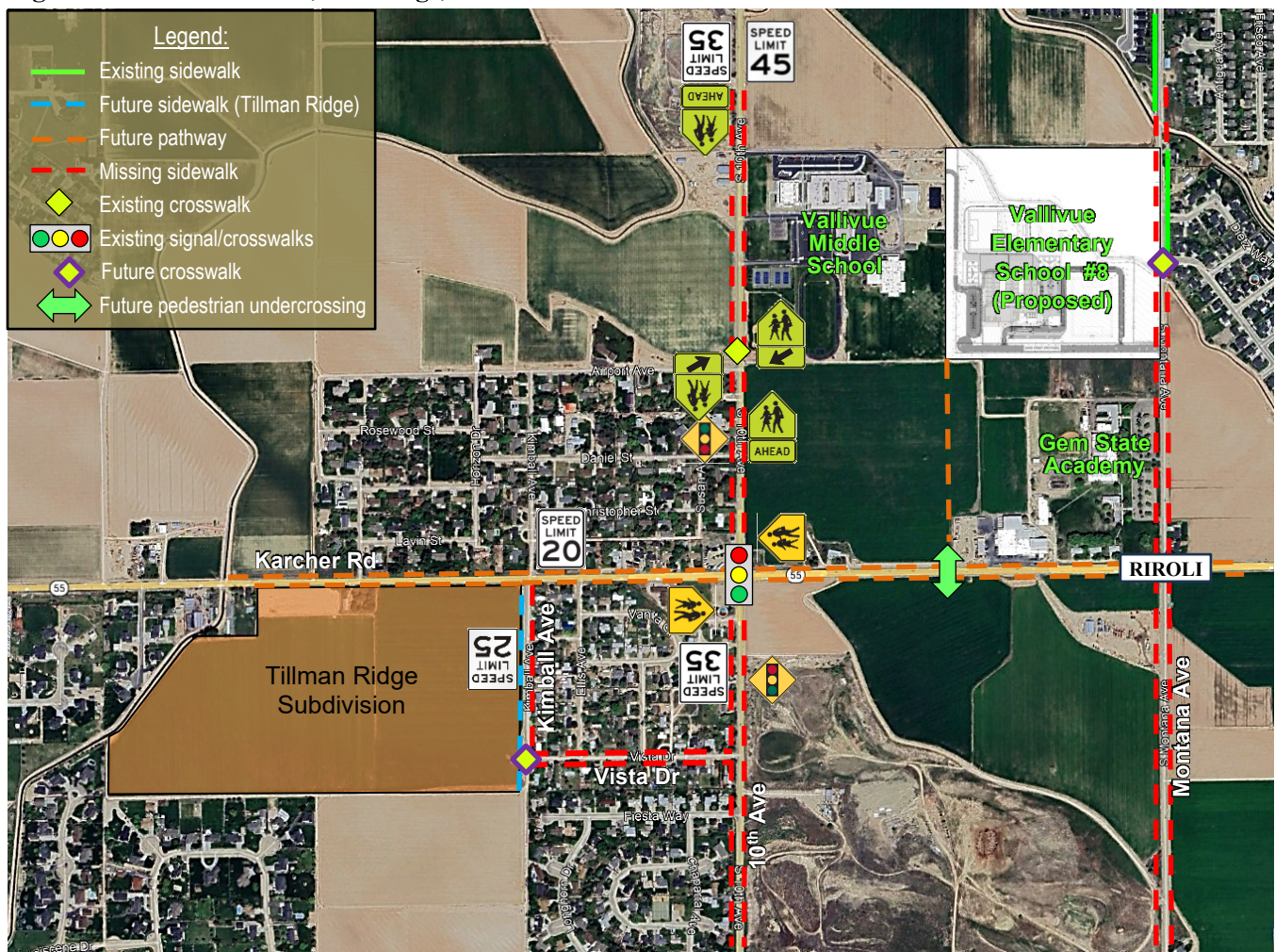
4.6 School Routes and Crossings

Tillman Ridge Subdivision is located approximately ½ mile southwest of the existing Vallivue Middle School and the proposed Vallivue Middle School #8. Some children residing in the development are expected to walk/bike to/from school. **Figure 4.6** summarizes the existing school facilities and potential school routes between Tillman Ridge Subdivision and the schools. No existing sidewalks were observed along the school routes. The development is expected to construct sidewalks on Kimball Avenue along the site frontages. Sidewalk on S 10th Avenue will be constructed with future development northeast of the S 10th Avenue and Karcher Road intersection or future roadway widening of S 10th Avenue. The future undercrossing and pathways along Karcher Road will be constructed with the SH 55 corridor improvements.

Based on the anticipated school routes, existing signage, and crossings, the following improvements are suggested to better accommodate schoolchildren circulation between the site and schools:

- Upgrade the existing School Crossing Assembly signs on Karcher Avenue at S 10th Avenue from traditional yellow to fluorescent yellow-green color as stated in the 2009 Edition of the Manual on Uniform Traffic Control Devices (MUTCD)
- Install a new crosswalk on the north side of the Kimball Avenue and Vista Drive intersection
- Install sidewalk on the east side of S 10th Avenue between Vallivue Middle School and Karcher Road
- Install sidewalk on the west side of S 10th Avenue between Karcher Road and Vista Drive
- Install sidewalk on the north side of Vista Drive

Figure 4.6 – School Route, Crossings, and Facilities



4.7 Site Access and Circulation

Figure 4.7 shows the proposed site access locations, internal circulation, and ADT estimate. Tillman Ridge Subdivision is proposing two full accesses, one on Karcher Road to align with the existing Ashland Drive, and one on Kimball Avenue to align with the existing Vista Drive. A stub road is also proposed to the south for future connectivity with the existing vacant parcel.

Site access spacing on Kimball Avenue, a 25-mph local road along the site frontage, is governed by HD4 and is determined by the Highway Standards and Development Procedures for the Association of Canyon County Highway Districts (ACCHD). According to HD4 access spacing requirements, the minimum spacing is:

- 1/8-mile (660 feet) local road spacing on same side of roadway
- 1/16-mile (330 feet) local road spacing on opposite side of roadway
- 270 feet driveway spacing for a minor generator taking access on a local road on same side of roadway

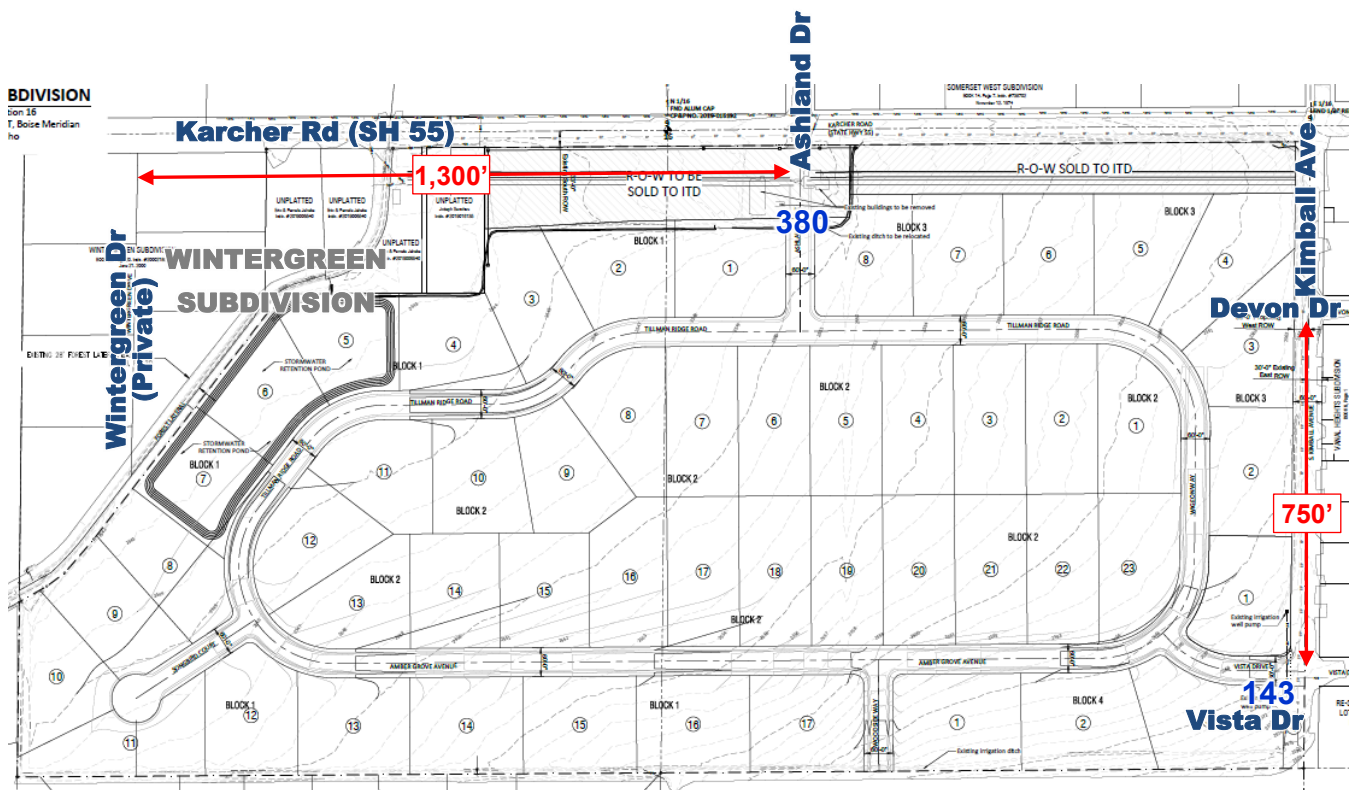
Site access spacing on Karcher Road (SH 55), a 55-mph principal arterial statewide route along the site frontage, is governed by ITD and is determined by IDAPA 39.03.42 *Rules Governing Highway Right-of-Way Encroachments on State Rights-of-Way*. The minimum spacing requirements on Karcher Road along the site frontage are:

- 1,320 feet public road spacing
- 790 feet driveway distance upstream from public road intersection
- 500 feet driveway distance downstream from unsignalized public road intersection
- 500 feet separation distance between unsignalized accesses

Both proposed site access intersections meet access spacing guidelines as full-movement accesses.

The proposed internal roadways are local streets with front-on housing. All internal local roadways are expected to carry less than 1,000 vehicles per weekday (vpd). Tillman Ridge Subdivision is forecasted to add 143 trips per weekday to Vista Drive under 2027 build-out conditions.

Figure 4.7 – Site Access, Circulation, and ADT Estimate with Full Access on Karcher Road



4.8 Alternate Site Access Scenario

HD4 requested additional traffic impact analysis without a direct site access on Karcher Road. This site access scenario will divert all site traffic onto Vista Drive and primarily impacts two study area intersections, the Vista Drive and S 10th Avenue intersection and the S 10th Avenue and Karcher Road intersection.

Table 4.4 summarizes the intersection capacity analysis results without a direct site access on Karcher Road. The impacted intersections are anticipated to meet minimum operational thresholds. No additional improvements are needed.

Table 4.4 – Intersection Operations – 2027 Build-Out Year Total Traffic (No Direct Access to Karcher Road)

Intersection		Control / Lane SH 55 Improvements	Intersection or Lane Group	AM Peak Hour			PM Peak Hour		
				LOS	Delay [s/veh]	v/c Ratio	LOS	Delay [s/veh]	v/c Ratio
②	S 10 th Ave and Karcher Rd		Intersection	C	26	0.64	C	22	0.70
			EBL	D	41	0.80	C	26	0.78
			EBT	B	17	0.42	B	19	0.66
			EBR	B	15	0.02	B	16	0.04
			WBL	D	36	0.57	C	27	0.78
			WBT	C	20	0.37	B	20	0.65
			WBR	C	26	0.85	C	21	0.64
			NBL	D	38	0.47	C	28	0.48
			NBTR	C	30	0.79	C	22	0.71
			SBL	D	50	0.84	C	30	0.81
SBTR	C	20	0.40	B	18	0.75			
③	Vista Dr and S 10 th Ave		NB	A	9	< 0.01	A	8	0.01
			EB	B	11	0.09	B	13	0.06
			SB	-	-	-	-	-	-

5.0 2032 HORIZON YEAR BACKGROUND TRAFFIC CONDITIONS

5.1 Roadway Network

The study area roadways and intersections are anticipated to remain the same as 2027 background traffic conditions as shown in Figure 3.1.

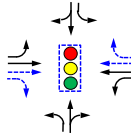
5.2 Background Traffic

2032 background traffic was estimated by extrapolating the 2024 existing traffic counts with the annual growth rates and including off-site traffic as discussed in Section 3.2. **Figure 5.1** summarizes the 2032 AM and PM peak hour background traffic at the study area intersections.

5.3 Intersection Operations

To determine the 2032 background traffic operations, the study area intersections were analyzed with the existing intersection control and lane configuration or with the SH 55 corridor improvements. Copies of the analysis reports are included in the appendix. **Table 5.1** summarizes the intersection capacity analysis results. Based on traffic analysis results, all study area intersections are anticipated to continue to meet minimum operational thresholds under 2032 background traffic conditions.

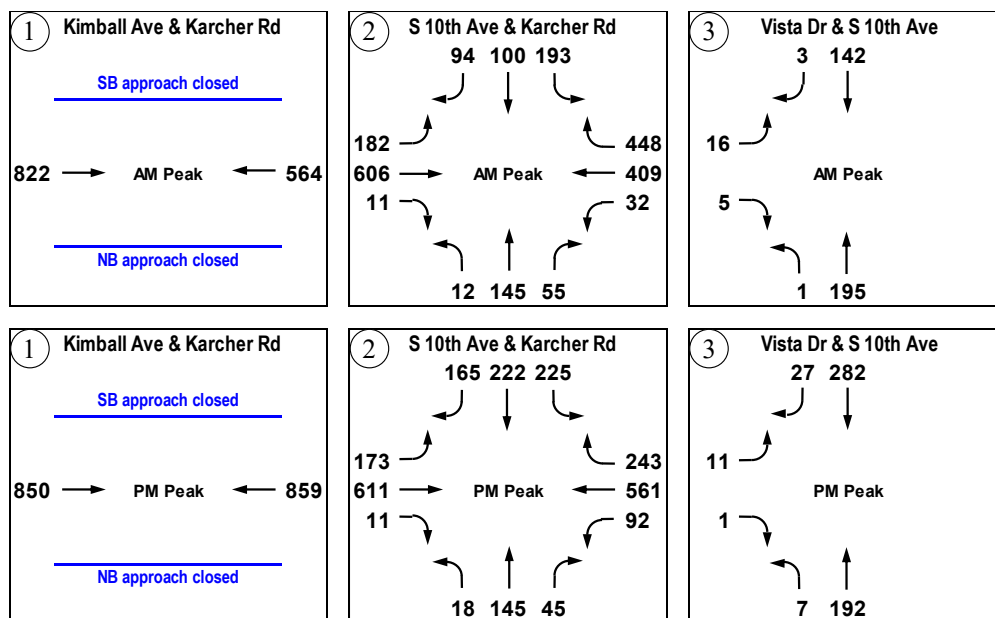
Table 5.1 – Intersection Operations – 2032 Horizon Year Background Traffic

Intersection	Control / Lane SH 55 Improvements	Intersection or Lane Group	AM Peak Hour			PM Peak Hour		
			LOS	Delay [s/veh]	v/c Ratio	LOS	Delay [s/veh]	v/c Ratio
① Kimball Ave and Karcher Rd		Intersection closed with SH 55 corridor improvements						
② S 10 th Ave and Karcher Rd		Intersection	C	25	0.64	C	23	0.69
		EBL	D	38	0.84	C	29	0.80
		EBT	B	18	0.49	B	20	0.64
		EBR	B	15	0.02	B	16	0.02
		WBL	D	43	0.59	C	33	0.78
		WBT	C	24	0.46	C	23	0.73
		WBR	C	20	0.71	B	14	0.42
		NBL	D	45	0.47	C	34	0.49
		NBTR	D	36	0.81	C	27	0.74
		SBL	D	37	0.85	C	28	0.82
③ Vista Dr and S 10 th Ave		NB	A	9	< 0.01	A	8	0.01
		EB	B	11	0.04	B	12	0.03
		SB	-	-	-	-	-	-

5.4 Intersection Mitigation

All study area intersections are anticipated to meet HD4 and ITD minimum operational thresholds under 2032 background traffic conditions. The Vista Drive and S 10th Avenue intersection is not anticipated to warrant any turn lane based on NCHRP Report 457 turn lane guidelines. As a result, no additional intersection improvements are needed to mitigate 2032 horizon year background traffic operations.

Figure 5.1 – 2032 Horizon Year Peak Hour Background Traffic



6.0 2032 HORIZON YEAR TOTAL TRAFFIC CONDITIONS

6.1 Roadway Network

The study area roadways and intersections are expected to remain the same as 2032 background traffic conditions. With the SH 55 corridor improvements, the proposed access on Karcher Road aligning with Ashland Drive will continue to permit all movements into and out of the development.

6.2 Site Traffic

Site traffic trip generation, modal split, and distribution are expected to remain the same as discussed in the previous section.

6.3 Total Traffic

The build-out site traffic was added to the 2032 background traffic as determined above to obtain the 2032 horizon year total traffic. **Figure 6.1** and **Figure 6.2** summarize the estimated 2032 peak hour total traffic at the study area intersections. **Table 6.1** summarizes the proportionate share of the site traffic at each study area intersection under the 2032 horizon year total traffic conditions.

Table 6.1 – Build-Out Site Traffic Percentage at Study Area Intersections

Intersection		% Site Traffic of 2032 Total Traffic		
		AM Peak	PM Peak	Average
①	Kimball Ave and Karcher Rd	Intersection closed with SH 55 corridor improvements		
②	S 10 th Ave and Karcher Rd	1.4%	1.7%	1.6%
③	Vista Dr and S 10 th Ave	3.4%	2.8%	3.1%
④	Ashland Dr/Access and Karcher Rd	1.9%	2.1%	2.0%

Figure 6.1 – 2032 Horizon Year AM Peak Hour Total Traffic

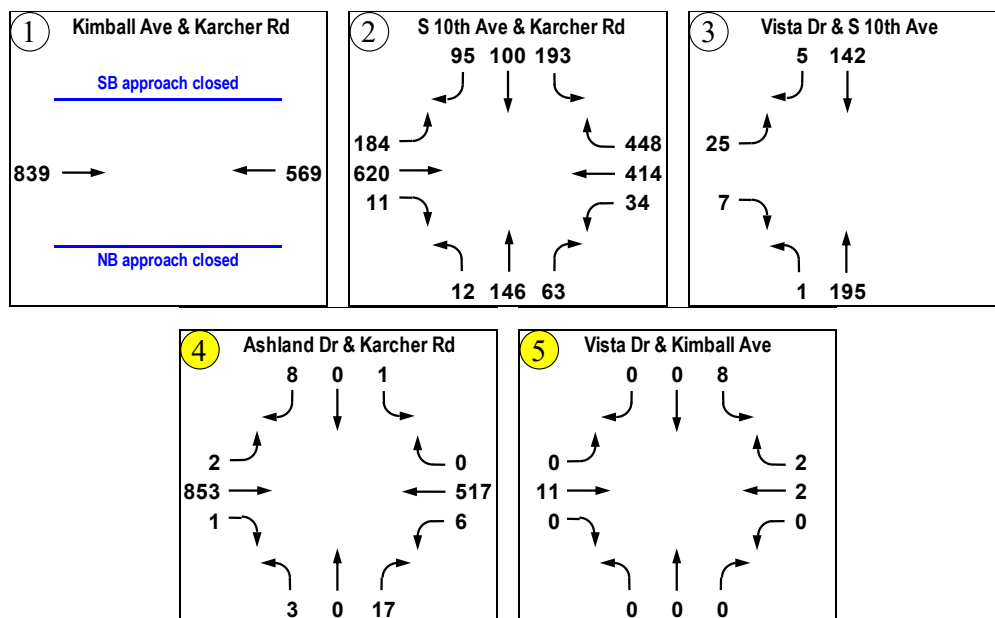
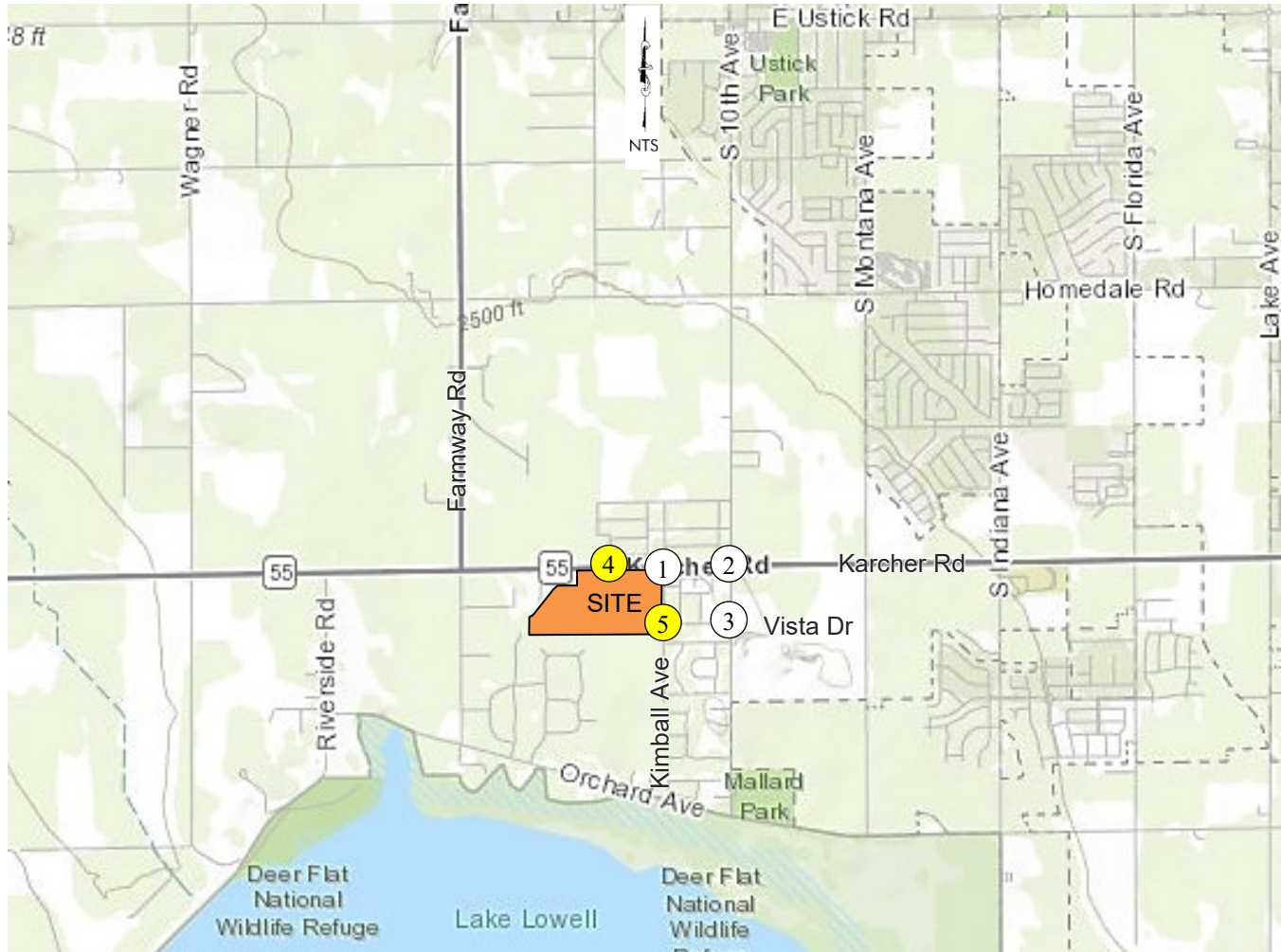
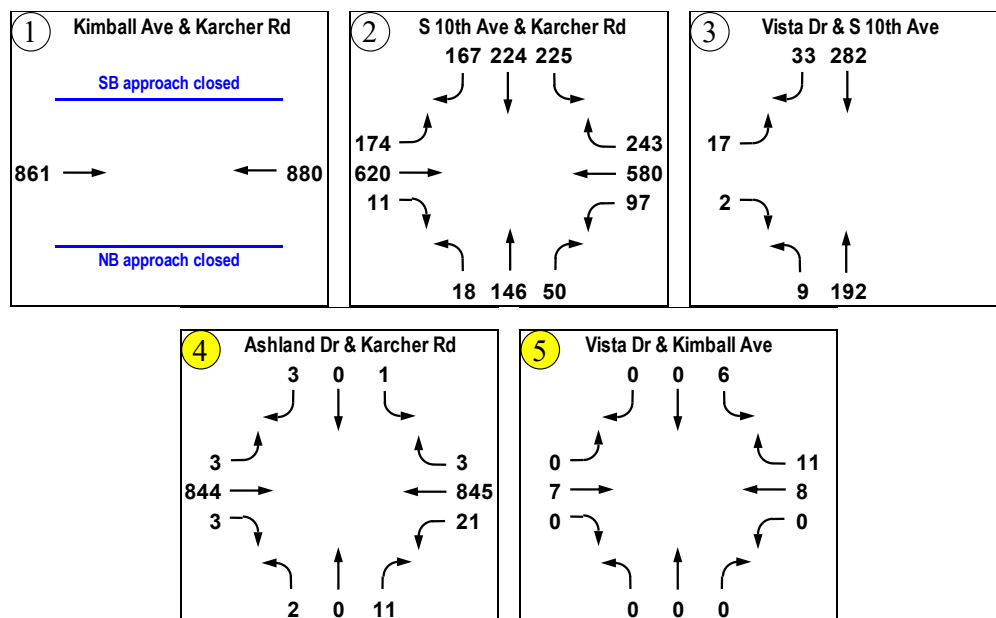
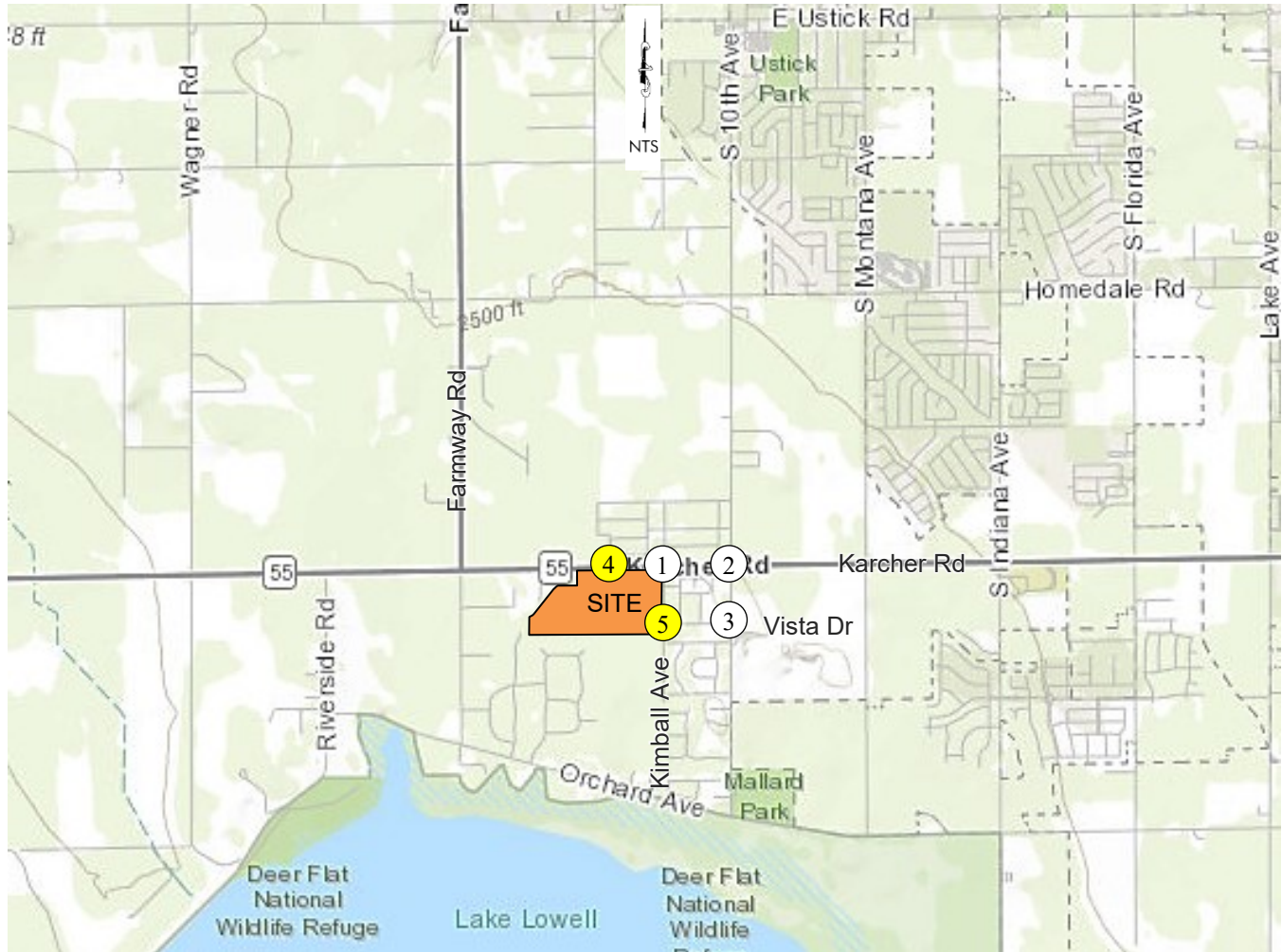


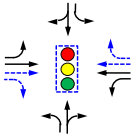
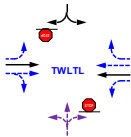
Figure 6.2 – 2032 Horizon Year PM Peak Hour Total Traffic



6.4 Intersection Operations

To determine the 2032 total traffic operations, the study area intersections were analyzed with the existing intersection control and lane configuration or with the SH 55 corridor improvements. Copies of the calculations are included in the appendix. **Table 6.2** summarizes the intersection capacity analysis results. All study area intersections are anticipated to meet HD4 and ITD minimum operational thresholds under 2032 horizon total traffic conditions.

Table 6.2 – Intersection Operations – 2032 Horizon Year Total Traffic

Intersection		Control / Lane SH 55 Improvements Site Improvements	Intersection or Lane Group	AM Peak Hour			PM Peak Hour		
				LOS	Delay [s/veh]	v/c Ratio	LOS	Delay [s/veh]	v/c Ratio
①	Kimball Ave and Karcher Rd	Intersection closed with SH 55 corridor improvements							
②	S 10 th Ave ¹ and Karcher Rd		Intersection	C	26	0.66	C	23	0.70
			EBL	D	39	0.84	C	30	0.80
			EBT	B	19	0.49	C	21	0.65
			EBR	B	15	0.02	B	17	0.02
			WBL	D	45	0.62	C	33	0.78
			WBT	C	24	0.45	C	24	0.74
			WBR	B	19	0.70	B	15	0.41
			NBL	D	47	0.47	C	35	0.50
			NBTR	D	37	0.82	C	28	0.75
			SBL	D	39	0.85	C	29	0.82
			SBTR	C	25	0.44	C	22	0.80
③	Vista Dr and S 10 th Ave		NB	A	9	< 0.01	A	8	0.01
			EB	B	11	0.06	B	13	0.04
			SB	-	-	-	-	-	-
④	Ashland Dr and Karcher Rd		NB	B	14	0.05	B	13	0.03
			EBL	A	9	< 0.01	A	10	< 0.01
			EBT	-	-	-	-	-	-
			EBR	-	-	-	-	-	-
			WBL	B	10	0.01	A	10	0.03
			WBT	-	-	-	-	-	-
			WBR	-	-	-	-	-	-
			SB	B	11	0.02	B	14	0.01

6.5 Intersection Mitigation

All study area intersections are anticipated to continue to meet HD4 and ITD minimum operational thresholds under 2032 horizon year total traffic conditions. The unsignalized study area intersections are not anticipated to warrant any turn lane based on NCHRP Report 457 or ITD turn lane guidelines. As a result, no additional intersection improvements are needed to mitigate 2032 horizon year total traffic operations.

6.6 Site Access and Circulation

As discussed in Section 4.7, all proposed site access locations meet access spacing guidelines. All internal local roadways are expected to carry less than 1,000 vpd. The development is estimated to add 143 vpd on Vista Drive. The total average daily traffic on Vista Avenue is projected to be less than 1,000 vpd.

The proposed site access intersections are not anticipated to warrant any turn lane based on ITD and NCHRP Report 457 turn lane guidelines.

The Vista Drive and Kimball Avenue intersection is anticipated to carry minimal traffic with Kimball Avenue disconnected from Karcher Road. The intersection is anticipated to meet minimum operational thresholds.

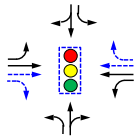
6.7 Alternate Site Access Scenario

HD4 has requested analysis to determine the need for Tillman Ridge Subdivision to access SH 55. In this scenario, the development only constructs the Vista Drive to access the external roadway network via S 10th Avenue. **Table 6.3** summarizes the intersection capacity analysis results with the alternate site access scenario. All study area intersections are anticipated to meet HD4 and ITD minimum operational thresholds.

With no direct access to Karcher Road and the closure of Kimball Avenue and Ellis Drive, all site traffic will utilize Vista Drive to enter and exit the site. The ADT on Vista Drive west of S 10th Avenue is anticipated to exceed 1,000 vpd but less than 2,000 vpd.

Vista Drive is a narrow local road with front-on housing. The Vista Drive segment between Kimball Avenue and S 10th Street is straight with no existing traffic calming measures in place to reduce potential speeding. Schoolchildren residing within the site and existing homes are anticipated to walk/bike on Vista Drive to/from schools within the area. Adding additional vehicular traffic onto Vista Drive may lead to potential safety issues. Therefore, direct access on Karcher Road is needed to reduce site traffic on Vista Drive.

Table 6.3 – Intersection Operations – 2032 Horizon Year Total Traffic (No Direct Access to Karcher Road)

Intersection	Control / Lane SH 55 Improvements	Intersection or Lane Group	AM Peak Hour			PM Peak Hour		
			LOS	Delay [s/veh]	v/c Ratio	LOS	Delay [s/veh]	v/c Ratio
② S 10 th Ave and Karcher Rd		Intersection	C	27	0.66	C	24	0.70
		EBL	D	41	0.85	C	30	0.80
		EBT	B	20	0.49	C	22	0.69
		EBR	B	16	0.02	B	18	0.03
		WBL	D	46	0.66	C	32	0.78
		WBT	C	25	0.45	C	24	0.73
		WBR	B	20	0.70	B	15	0.42
		NBL	D	47	0.49	C	35	0.50
		NBTR	D	38	0.84	C	28	0.76
		SBL	D	40	0.86	C	29	0.82
		SBTR	C	25	0.43	C	22	0.79
③ Vista Dr and S 10 th Ave		NB	A	9	< 0.01	A	8	0.01
		EB	B	11	0.09	B	13	0.07
		SB	-	-	-	-	-	-

APPENDIX A: Traffic Counts

**Kimball Ave & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024**

Time	Southbound Kimball Ave						Westbound Karcher Rd						Northbound Kimball Ave						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
7:00 AM	0	1	1	1	0	3	0	0	74	1	0	75	0	0	0	0	0	0	0	0	115	0	0	115	193
7:15 AM	0	0	0	0	0	0	0	0	69	0	0	69	0	0	0	1	0	1	0	0	170	0	0	170	240
7:30 AM	0	1	0	1	0	2	0	0	79	0	0	79	0	0	0	0	0	0	0	1	118	0	0	119	200
7:45 AM	0	0	0	1	0	1	0	0	87	0	0	87	0	0	0	0	0	0	0	1	130	0	0	131	219
Hourly Total	0	2	1	3	0	6	0	0	309	1	0	310	0	0	0	1	0	1	0	2	533	0	0	535	852
8:00 AM	0	0	0	0	0	0	0	0	81	0	0	81	0	1	0	0	0	1	0	0	122	0	0	122	204
8:15 AM	0	0	0	0	0	0	0	0	100	2	0	102	0	0	0	0	0	0	0	0	142	0	0	142	244
8:30 AM	0	0	0	2	0	2	0	0	84	0	0	84	0	0	0	0	0	0	0	0	121	0	0	121	207
8:45 AM	0	0	0	0	0	0	0	0	83	1	0	84	0	1	0	0	0	1	0	0	117	0	0	117	202
Hourly Total	0	0	0	2	0	2	0	0	348	3	0	351	0	2	0	0	0	2	0	0	502	0	0	502	857

**Kimball Ave & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024**

Time	Southbound Kimball Ave						Westbound Karcher Rd						Northbound Kimball Ave						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
4:00 PM	0	0	0	0	0	0	0	0	123	0	0	123	0	0	0	0	0	0	0	0	107	1	0	108	231
4:15 PM	0	0	0	1	0	1	0	1	151	1	0	153	0	0	0	0	0	0	0	0	133	0	0	133	287
4:30 PM	0	0	0	0	0	0	0	1	117	1	0	119	0	0	0	0	0	0	0	0	143	0	0	143	262
4:45 PM	0	0	0	0	0	0	0	0	123	0	0	123	0	0	0	0	0	0	0	0	138	0	0	138	261
Hourly Total	0	0	0	1	0	1	0	2	514	2	0	518	0	0	0	0	0	0	0	0	521	1	0	522	1041
5:00 PM	0	0	0	1	0	1	0	0	147	0	0	147	0	0	0	0	0	0	0	0	117	0	0	117	265
5:15 PM	0	0	0	0	0	0	0	0	141	0	0	141	0	0	0	1	0	1	0	1	128	0	0	129	271
5:30 PM	0	1	0	0	0	1	0	0	126	0	0	126	0	0	0	0	0	0	0	0	113	0	0	113	240
5:45 PM	0	0	0	2	0	2	0	0	137	0	0	137	0	0	0	0	0	0	0	0	100	0	0	100	239
Hourly Total	0	1	0	3	0	4	0	0	551	0	0	551	0	0	0	1	0	1	0	1	458	0	0	459	1015

Kimball Ave & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024
AM Peak Hour

Time	Southbound Kimball Ave						Westbound Karcher Rd						Northbound Kimball Ave						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
7:45 AM	0	0	0	1	0	1	0	0	87	0	0	87	0	0	0	0	0	0	0	1	130	0	0	131	219
8:00 AM	0	0	0	0	0	0	0	0	81	0	0	81	0	1	0	0	0	1	0	0	122	0	0	122	204
8:15 AM	0	0	0	0	0	0	0	0	100	2	0	102	0	0	0	0	0	0	0	0	142	0	0	142	244
8:30 AM	0	0	0	2	0	2	0	0	84	0	0	84	0	0	0	0	0	0	0	0	121	0	0	121	207
Peak Hour Total	0	0	0	3	0	3	0	0	352	2	0	354	0	1	0	0	0	1	0	1	515	0	0	516	874
PHF	0.000	0.000	0.000	0.375	0.000	0.375	0.000	0.000	0.880	0.250	0.000	0.868	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.250	0.907	0.000	0.000	0.908	0.895
Heavy Vehicle %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.24%	0.00%	0.00%	8.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	6.41%	0.00%	0.00%	6.59%	7.2%

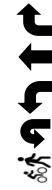
Total Vehicles On Leg			6		
Vehicles Entering Intersection 3			Vehicles Exiting Intersection 3		
Southbound					
Cars	3	0	0	0	0
Heavy	0	0	0	0	0
Total	3	0	0	0	0



Total Vehicles on Leg 872	Vehicles Entering Intersection 516	Eastbound	Cars	Heavy	Total
	Vehicles Exiting Intersection 356		0	0	0
			0	0	0
			0	1	1
			482	33	515
			0	0	0

AM Peak Hour Volumes

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 354	Total Vehicles on Leg 869
2	0	2			
323	29	352			
0	0	0			
0	0	0			
0	0	0			
				Vehicles Exiting Intersection 515	



Cars	0	0	1	0	0
Heavy	0	0	0	0	0
Total	0	0	1	0	0
Northbound					
Vehicles Entering Intersection			1		
Vehicles Exiting Intersection			0		
Total Vehicles On Leg			1		



Kimball Ave & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024
PM Peak Hour

Time	Southbound Kimball Ave						Westbound Karcher Rd						Northbound Kimball Ave						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	
4:15 PM	0	0	0	1	0	1	0	1	151	1	0	153	0	0	0	0	0	0	0	0	133	0	0	133	287
4:30 PM	0	0	0	0	0	0	0	1	117	1	0	119	0	0	0	0	0	0	0	0	143	0	0	143	262
4:45 PM	0	0	0	0	0	0	0	0	123	0	0	123	0	0	0	0	0	0	0	0	138	0	0	138	261
5:00 PM	0	0	0	1	0	1	0	0	147	0	0	147	0	0	0	0	0	0	0	0	117	0	0	117	265
Peak Hour Total	0	0	0	2	0	2	0	2	538	2	0	542	0	0	0	0	0	0	0	0	531	0	0	531	1075
PHF	0.000	0.000	0.000	0.500	0.000	0.500	0.000	0.500	0.891	0.500	0.000	0.886	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.928	0.000	0.000	0.928	0.936
Heavy Vehicle %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.86%	0.00%	0.00%	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.08%	0.00%	0.00%	5.08%	3.4%

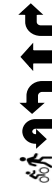
Total Vehicles On Leg			4		
Vehicles Entering Intersection 2			Vehicles Exiting Intersection 2		
Southbound					
Cars	2	0	0	0	0
Heavy	0	0	0	0	0
Total	2	0	0	0	0



Total Vehicles on Leg 1071	Vehicles Entering Intersection 531	Eastbound	Cars	Heavy	Total
	Vehicles Exiting Intersection 540		0	0	0
			0	0	0
			0	0	0
			504	27	531
			0	0	0

PM Peak Hour Volumes

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 542	Total Vehicles on Leg 1073
2	0	2			
528	10	538			
2	0	2			
0	0	0			
0	0	0			
				Vehicles Exiting Intersection 531	



Cars	0	0	0	0	0
Heavy	0	0	0	0	0
Total	0	0	0	0	0
Northbound					
Vehicles Entering Intersection			0		
Vehicles Exiting Intersection			2		
Total Vehicles On Leg			2		



**S 10th Ave & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024**

Time	Southbound S 10th Ave						Westbound Karcher Rd						Northbound S 10th Ave						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
7:00 AM	0	24	8	10	0	42	0	2	59	26	0	87	0	4	16	3	0	23	0	17	93	4	0	114	266
7:15 AM	0	28	20	17	0	65	0	0	48	32	0	80	0	5	29	4	0	38	0	24	121	7	0	152	335
7:30 AM	0	30	14	14	0	58	0	2	68	54	0	124	0	2	24	3	0	29	0	24	99	2	0	125	336
7:45 AM	0	41	17	18	0	76	0	2	61	51	0	114	0	2	27	7	0	36	0	23	102	4	0	129	355
Hourly Total	0	123	59	59	0	241	0	6	236	163	0	405	0	13	96	17	0	126	0	88	415	17	0	520	1292
8:00 AM	0	40	20	20	0	80	0	6	59	91	0	156	0	1	16	2	0	19	0	34	86	0	0	120	375
8:15 AM	0	54	27	28	0	109	0	4	72	81	0	157	0	1	32	6	0	39	0	34	97	0	0	131	436
8:30 AM	0	30	15	18	0	63	0	4	57	26	0	87	0	1	16	8	0	25	0	27	112	1	0	140	315
8:45 AM	0	23	18	17	0	58	0	1	63	32	0	96	0	3	13	4	0	20	0	21	84	0	0	105	279
Hourly Total	0	147	80	83	0	310	0	15	251	230	0	496	0	6	77	20	0	103	0	116	379	1	0	496	1405

**S 10th Ave & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024**

Time	Southbound S 10th Ave						Westbound Karcher Rd						Northbound S 10th Ave						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
4:00 PM	0	48	29	32	0	109	0	2	90	34	0	126	0	6	29	6	0	41	0	22	78	3	0	103	379
4:15 PM	0	31	35	39	0	105	0	3	91	42	0	136	0	9	23	4	0	36	0	36	86	2	0	124	401
4:30 PM	0	48	38	33	0	119	0	6	79	37	0	122	0	4	23	12	0	39	0	17	116	0	0	133	413
4:45 PM	0	50	46	26	0	122	0	7	95	40	0	142	0	2	25	3	0	30	0	33	95	1	0	129	423
Hourly Total	0	177	148	130	0	455	0	18	355	153	0	526	0	21	100	25	0	146	0	108	375	6	0	489	1616
5:00 PM	0	41	33	42	0	116	0	9	93	39	0	141	0	4	34	3	0	41	0	30	80	2	0	112	410
5:15 PM	0	51	45	41	0	137	0	10	94	33	0	137	0	4	26	2	0	32	0	29	95	1	0	125	431
5:30 PM	0	45	29	33	0	107	0	5	104	34	0	143	0	2	26	7	0	35	0	21	93	3	0	117	402
5:45 PM	0	40	27	38	0	105	0	6	93	31	0	130	0	1	29	8	0	38	0	26	68	2	0	96	369
Hourly Total	0	177	134	154	0	465	0	30	384	137	0	551	0	11	115	20	0	146	0	106	336	8	0	450	1612

S 10th Ave & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024
AM Peak Hour

Time	Southbound S 10th Ave						Westbound Karcher Rd						Northbound S 10th Ave						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
7:30 AM	0	30	14	14	0	58	0	2	68	54	0	124	0	2	24	3	0	29	0	24	99	2	0	125	336
7:45 AM	0	41	17	18	0	76	0	2	61	51	0	114	0	2	27	7	0	36	0	23	102	4	0	129	355
8:00 AM	0	40	20	20	0	80	0	6	59	91	0	156	0	1	16	2	0	19	0	34	86	0	0	120	375
8:15 AM	0	54	27	28	0	109	0	4	72	81	0	157	0	1	32	6	0	39	0	34	97	0	0	131	436
Peak Hour Total	0	165	78	80	0	323	0	14	260	277	0	551	0	6	99	18	0	123	0	115	384	6	0	505	1502
PHF	0.000	0.764	0.722	0.714	0.000	0.741	0.000	0.583	0.903	0.761	0.000	0.877	0.000	0.750	0.773	0.643	0.000	0.788	0.000	0.846	0.941	0.375	0.000	0.964	0.861
Heavy Vehicle %	0.00%	8.48%	3.85%	8.75%	0.00%	7.43%	0.00%	0.00%	10.77%	3.25%	0.00%	6.72%	0.00%	0.00%	2.02%	5.56%	0.00%	2.44%	0.00%	4.35%	7.03%	0.00%	0.00%	6.34%	6.4%

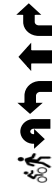
Total Vehicles On Leg			814		
Vehicles Entering Intersection		323	Vehicles Exiting Intersection		491
Southbound					
Cars	73	75	151	0	0
Heavy	7	3	14	0	0
Total	80	78	165	0	0



Total Vehicles on Leg 851	Vehicles Entering Intersection 505	Eastbound	Cars	Heavy	Total
	Vehicles Exiting Intersection 346		0	0	0
			0	0	0
			110	5	115
			357	27	384
			6	0	6

AM Peak Hour Volumes

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 551	Total Vehicles on Leg 1118
268	9	277			
232	28	260			
14	0	14			
0	0	0			
0	0	0			
				Vehicles Exiting Intersection 567	



Cars	0	0	6	97	17
Heavy	0	0	0	2	1
Total	0	0	6	99	18
Northbound					
Vehicles Entering Intersection			Vehicles Exiting Intersection		
123			98		
Total Vehicles On Leg			221		



S 10th Ave & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024
PM Peak Hour

Time	Southbound S 10th Ave						Westbound Karcher Rd						Northbound S 10th Ave						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	
4:30 PM	0	48	38	33	0	119	0	6	79	37	0	122	0	4	23	12	0	39	0	17	116	0	0	133	413
4:45 PM	0	50	46	26	0	122	0	7	95	40	0	142	0	2	25	3	0	30	0	33	95	1	0	129	423
5:00 PM	0	41	33	42	0	116	0	9	93	39	0	141	0	4	34	3	0	41	0	30	80	2	0	112	410
5:15 PM	0	51	45	41	0	137	0	10	94	33	0	137	0	4	26	2	0	32	0	29	95	1	0	125	431
Peak Hour Total	0	190	162	142	0	494	0	32	361	149	0	542	0	14	108	20	0	142	0	109	386	4	0	499	1677
PHF	0.000	0.931	0.880	0.845	0.000	0.901	0.000	0.800	0.950	0.931	0.000	0.954	0.000	0.875	0.794	0.417	0.000	0.866	0.000	0.826	0.832	0.500	0.000	0.938	0.973
Heavy Vehicle %	0.00%	2.63%	0.62%	2.11%	0.00%	1.82%	0.00%	0.00%	2.22%	3.36%	0.00%	2.40%	0.00%	7.14%	0.00%	0.00%	0.00%	0.70%	0.00%	4.59%	5.70%	0.00%	0.00%	5.41%	3.0%

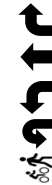
Total Vehicles On Leg			860		
Vehicles Entering Intersection		494	Vehicles Exiting Intersection		366
Southbound					
Cars	139	161	185	0	0
Heavy	3	1	5	0	0
Total	142	162	190	0	0



Total Vehicles on Leg 1016	Vehicles Entering Intersection 499	Eastbound	Cars	Heavy	Total	
			0	0	0	
			0	0	0	
	Vehicles Exiting Intersection 517		104	5	109	
			364	22	386	
			4	0	4	

PM Peak Hour Volumes

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 542	Total Vehicles on Leg 1138
144	5	149			
353	8	361			
32	0	32			
0	0	0			
0	0	0			
				Vehicles Exiting Intersection 596	



Cars	0	0	13	108	20
Heavy	0	0	1	0	0
Total	0	0	14	108	20
Northbound					
Vehicles Entering Intersection			142		
Vehicles Exiting Intersection			198		
Total Vehicles On Leg			340		



**Vista Dr & S 10th Ave
Caldwell, Idaho
Thursday, November 14, 2024**

Time	Southbound S 10th Ave						Westbound Vista Dr						Northbound S 10th Ave						Eastbound Vista Dr						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
7:00 AM	0	0	12	2	0	14	0	0	0	0	0	0	0	0	20	0	0	20	0	1	0	2	0	3	37
7:15 AM	0	0	32	0	0	32	0	0	0	0	0	0	0	1	35	0	0	36	0	2	0	1	0	3	71
7:30 AM	0	0	20	0	0	20	0	0	0	0	0	0	0	0	28	0	0	28	0	3	0	1	0	4	52
7:45 AM	0	0	22	0	0	22	0	0	0	0	0	0	0	0	33	0	5	33	0	0	0	1	0	1	56
Hourly Total	0	0	86	2	0	88	0	0	0	0	0	0	0	1	116	0	5	117	0	6	0	5	0	11	216
8:00 AM	0	0	31	1	0	32	0	0	0	0	0	0	0	0	21	0	0	21	0	1	0	1	0	2	55
8:15 AM	0	0	29	2	0	31	0	0	0	0	0	0	0	1	35	0	0	36	0	2	0	0	0	2	69
8:30 AM	0	0	21	0	0	21	0	0	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	0	44
8:45 AM	0	0	19	0	0	19	0	0	0	0	0	0	0	0	21	0	0	21	0	1	0	0	0	1	41
Hourly Total	0	0	100	3	0	103	0	0	0	0	0	0	0	1	100	0	0	101	0	4	0	1	0	5	209

**Vista Dr & S 10th Ave
Caldwell, Idaho
Thursday, November 14, 2024**

Time	Southbound S 10th Ave						Westbound Vista Dr						Northbound S 10th Ave						Eastbound Vista Dr						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
4:00 PM	0	0	37	4	2	41	0	0	0	0	0	0	0	0	36	0	0	36	0	1	0	0	0	1	78
4:15 PM	0	0	39	3	0	42	0	0	0	0	0	0	0	2	37	0	0	39	0	1	0	0	0	1	82
4:30 PM	0	0	43	1	0	44	0	0	0	0	0	0	0	0	37	0	0	37	0	1	0	0	0	1	82
4:45 PM	0	0	46	4	0	50	0	0	0	0	0	0	0	2	31	0	0	33	0	0	0	0	0	0	83
Hourly Total	0	0	165	12	2	177	0	0	0	0	0	0	0	4	141	0	0	145	0	3	0	0	0	3	325
5:00 PM	0	0	40	2	0	42	0	0	0	0	0	0	0	2	35	0	0	37	0	3	0	1	0	4	83
5:15 PM	0	0	56	4	0	60	0	0	0	0	0	0	0	2	30	0	0	32	0	0	0	0	0	0	92
5:30 PM	0	0	36	5	0	41	0	0	0	0	0	0	0	2	37	0	0	39	0	2	0	0	0	2	82
5:45 PM	0	0	30	1	0	31	0	0	0	0	0	0	0	2	33	0	0	35	0	1	0	0	0	1	67
Hourly Total	0	0	162	12	0	174	0	0	0	0	0	0	0	8	135	0	0	143	0	6	0	1	0	7	324

Vista Dr & S 10th Ave
Caldwell, Idaho
Thursday, November 14, 2024
AM Peak Hour

Time	Southbound S 10th Ave						Westbound Vista Dr						Norhtbound S 10th Ave						Eastbound Vista Dr						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
7:15 AM	0	0	32	0	0	32	0	0	0	0	0	0	0	1	35	0	0	36	0	2	0	1	0	3	71
7:30 AM	0	0	20	0	0	20	0	0	0	0	0	0	0	0	28	0	0	28	0	3	0	1	0	4	52
7:45 AM	0	0	22	0	0	22	0	0	0	0	0	0	0	0	33	0	5	33	0	0	0	1	0	1	56
8:00 AM	0	0	31	1	0	32	0	0	0	0	0	0	0	0	21	0	0	21	0	1	0	1	0	2	55
Peak Hour Total	0	0	105	1	0	106	0	0	0	0	0	0	0	1	117	0	5	118	0	6	0	4	0	10	234
PHF	0.000	0.000	0.820	0.250	0.000	0.828	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.836	0.000	0.250	0.819	0.000	0.500	0.000	1.000	0.000	0.625	0.824
Heavy Vehicle %	0.00%	0.00%	2.86%	0.00%	0.00%	2.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	2.56%	0.00%	0.00%	3.39%	0.00%	16.67%	0.00%	0.00%	0.00%	10.00%	3.4%

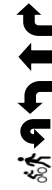
Total Vehicles On Leg			229		
Vehicles Entering Intersection 106			Vehicles Exiting Intersection 123		
Southbound					
Cars	1	102	0	0	0
Heavy	0	3	0	0	0
Total	1	105	0	0	0



Total Vehicles on Leg 12	Vehicles Entering Intersection 10	Eastbound	Cars	Heavy	Total
	Vehicles Exiting Intersection 2		0	0	0
			0	0	0
			5	1	6
			0	0	0
			4	0	4

AM Peak Hour Volumes

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 0	Total Vehicles on Leg 0
0	0	0			
0	0	0			
0	0	0			
0	0	0			
0	0	0			
				Vehicles Exiting Intersection 0	



						
Cars	5	0	0	114	0	
Heavy	0	0	1	3	0	
Total	5	0	1	117	0	
Northbound						
Vehicles Entering Intersection			118	Vehicles Exiting Intersection		109
Total Vehicles On Leg			227			

Vista Dr & S 10th Ave
Caldwell, Idaho
Thursday, November 14, 2024
PM Peak Hour

Time	Southbound S 10th Ave						Westbound Vista Dr						Northbound S 10th Ave						Eastbound Vista Dr						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
4:30 PM	0	0	43	1	0	44	0	0	0	0	0	0	0	0	37	0	0	37	0	1	0	0	0	1	82
4:45 PM	0	0	46	4	0	50	0	0	0	0	0	0	0	2	31	0	0	33	0	0	0	0	0	0	83
5:00 PM	0	0	40	2	0	42	0	0	0	0	0	0	0	2	35	0	0	37	0	3	0	1	0	4	83
5:15 PM	0	0	56	4	0	60	0	0	0	0	0	0	0	2	30	0	0	32	0	0	0	0	0	0	92
Peak Hour Total	0	0	185	11	0	196	0	0	0	0	0	0	0	6	133	0	0	139	0	4	0	1	0	5	340
PHF	0.000	0.000	0.826	0.688	0.000	0.817	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.899	0.000	0.000	0.939	0.000	0.333	0.000	0.250	0.000	0.313	0.924
Heavy Vehicle %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.75%	0.00%	0.00%	0.72%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.3%

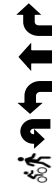
Total Vehicles On Leg			333		
Vehicles Entering Intersection 196			Vehicles Exiting Intersection 137		
Southbound					
Cars	11	185	0	0	0
Heavy	0	0	0	0	0
Total	11	185	0	0	0



Total Vehicles on Leg 22	Vehicles Entering Intersection 5	Eastbound	Cars	Heavy	Total
	Vehicles Exiting Intersection 17		0	0	0
			0	0	0
			4	0	4
			0	0	0
			1	0	1

PM Peak Hour Volumes

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 0	Total Vehicles on Leg 0
0	0	0			
0	0	0			
0	0	0			
0	0	0			
0	0	0			
				Vehicles Exiting Intersection 0	



Cars	0	0	6	132	0
Heavy	0	0	0	1	0
Total	0	0	6	133	0
Northbound					
Vehicles Entering Intersection			Vehicles Exiting Intersection		
139			186		
Total Vehicles On Leg			325		



**Ashland Dr & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024**

Time	Southbound Ashland Dr						Westbound Karcher Rd						Northbound Ashland Dr						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	
7:00 AM	0	2	0	2	0	4	0	0	69	0	0	69	0	0	0	0	0	0	0	0	112	0	0	112	185
7:15 AM	0	1	0	1	0	2	0	0	78	0	0	78	0	0	0	0	0	0	0	0	158	0	0	158	238
7:30 AM	0	0	0	0	0	0	0	0	84	0	0	84	0	0	0	0	0	0	0	0	123	0	0	123	207
7:45 AM	0	0	0	2	0	2	0	0	88	0	0	88	0	0	0	0	0	0	0	0	132	0	0	132	222
Hourly Total	0	3	0	5	0	8	0	0	319	0	0	319	0	0	0	0	0	0	0	0	525	0	0	525	852
8:00 AM	0	0	0	0	0	0	0	0	75	0	0	75	0	0	0	0	0	0	0	0	123	0	0	123	198
8:15 AM	0	2	0	0	0	2	0	0	94	0	0	94	0	0	0	0	0	0	0	0	130	0	0	130	226
8:30 AM	0	0	0	0	0	0	0	0	80	0	0	80	0	0	0	0	0	0	0	0	121	0	0	121	201
8:45 AM	0	0	0	0	0	0	0	0	78	0	0	78	0	0	0	0	0	0	0	0	116	0	0	116	194
Hourly Total	0	2	0	0	0	2	0	0	327	0	0	327	0	0	0	0	0	0	0	0	490	0	0	490	819

**Ashland Dr & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024**

Time	Southbound Ashland Dr						Westbound Karcher Rd						Northbound Ashland Dr						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	<i>Vehicle Approach Total</i>	
4:00 PM	0	1	0	0	0	1	0	0	139	0	0	139	0	0	0	0	0	0	0	0	101	0	0	101	241
4:15 PM	0	0	0	0	0	0	0	0	145	1	0	146	0	0	0	0	0	0	0	0	131	0	0	131	277
4:30 PM	0	1	0	1	0	2	0	0	121	0	0	121	0	0	0	0	0	0	0	1	142	0	0	143	266
4:45 PM	0	0	0	0	0	0	0	0	115	0	0	115	0	0	0	0	0	0	0	1	139	0	0	140	255
Hourly Total	0	2	0	1	0	3	0	0	520	1	0	521	0	0	0	0	0	0	0	2	513	0	0	515	1039
5:00 PM	0	0	0	0	0	0	0	0	149	1	0	150	0	0	0	0	0	0	0	0	115	0	0	115	265
5:15 PM	0	0	0	0	0	0	0	0	133	2	0	135	0	0	0	0	0	0	0	0	134	0	0	134	269
5:30 PM	0	1	0	0	0	1	0	0	136	0	0	136	0	0	0	0	0	0	0	0	122	0	0	122	259
5:45 PM	0	0	0	0	0	0	0	0	128	0	0	128	0	0	0	0	0	0	0	0	101	0	0	101	229
Hourly Total	0	1	0	0	0	1	0	0	546	3	0	549	0	0	0	0	0	0	0	0	472	0	0	472	1022

Ashland Dr & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024
AM Peak Hour

Time	Southbound Ashland Dr						Westbound Karcher Rd						Norhtbound Ashland Dr						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
7:15 AM	0	1	0	1	0	2	0	0	78	0	0	78	0	0	0	0	0	0	0	0	158	0	0	158	238
7:30 AM	0	0	0	0	0	0	0	0	84	0	0	84	0	0	0	0	0	0	0	0	123	0	0	123	207
7:45 AM	0	0	0	2	0	2	0	0	88	0	0	88	0	0	0	0	0	0	0	0	132	0	0	132	222
8:00 AM	0	0	0	0	0	0	0	0	75	0	0	75	0	0	0	0	0	0	0	0	123	0	0	123	198
Peak Hour Total	0	1	0	3	0	4	0	0	325	0	0	325	0	0	0	0	0	0	0	0	536	0	0	536	865
PHF	0.000	0.250	0.000	0.375	0.000	0.500	0.000	0.000	0.923	0.000	0.000	0.923	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.848	0.000	0.000	0.848	0.909
Heavy Vehicle %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.00%	0.00%	0.00%	8.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.90%	0.00%	0.00%	6.90%	7.3%

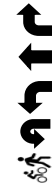
Total Vehicles On Leg			4		
Vehicles Entering Intersection 4			Vehicles Exiting Intersection 0		
Southbound					
Cars	3	0	1	0	0
Heavy	0	0	0	0	0
Total	3	0	1	0	0



Total Vehicles on Leg 864	Vehicles Entering Intersection 536	Eastbound	Cars	Heavy	Total	
			0	0	0	
			0	0	0	
			0	0	0	
	Vehicles Exiting Intersection 328		499	37	536	
			0	0	0	

AM Peak Hour Volumes

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 325	Total Vehicles on Leg 862
0	0	0			
299	26	325			
0	0	0			
0	0	0		Vehicles Exiting Intersection 537	
0	0	0			



Cars	0	0	0	0	0
Heavy	0	0	0	0	0
Total	0	0	0	0	0
Northbound					
Vehicles Entering Intersection			Vehicles Exiting Intersection		
0			0		
Total Vehicles On Leg			0		



Ashland Dr & Karcher Rd
Caldwell, Idaho
Thursday, November 14, 2024
PM Peak Hour

Time	Southbound Ashland Dr						Westbound Karcher Rd						Northbound Ashland Dr						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
4:15 PM	0	0	0	0	0	0	0	0	145	1	0	146	0	0	0	0	0	0	0	0	131	0	0	131	277
4:30 PM	0	1	0	1	0	2	0	0	121	0	0	121	0	0	0	0	0	0	0	1	142	0	0	143	266
4:45 PM	0	0	0	0	0	0	0	0	115	0	0	115	0	0	0	0	0	0	0	1	139	0	0	140	255
5:00 PM	0	0	0	0	0	0	0	0	149	1	0	150	0	0	0	0	0	0	0	0	115	0	0	115	265
Peak Hour Total	0	1	0	1	0	2	0	0	530	2	0	532	0	0	0	0	0	0	0	2	527	0	0	529	1063
PHF	0.000	0.250	0.000	0.250	0.000	0.250	0.000	0.000	0.889	0.500	0.000	0.887	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.928	0.000	0.000	0.925	0.959
Heavy Vehicle %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.70%	0.00%	0.00%	1.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.93%	0.00%	0.00%	4.91%	3.3%

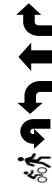
Total Vehicles On Leg			6		
Vehicles Entering Intersection 2			Vehicles Exiting Intersection 4		
Southbound					
Cars	1	0	1	0	0
Heavy	0	0	0	0	0
Total	1	0	1	0	0



Total Vehicles on Leg 1060	Vehicles Entering Intersection 529	Eastbound	Cars	Heavy	Total
	Vehicles Exiting Intersection 531		0	0	0
			0	0	0
			2	0	2
			501	26	527
			0	0	0

PM Peak Hour Volumes

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 532	Total Vehicles on Leg 1060
2	0	2			
521	9	530			
0	0	0			
0	0	0			
0	0	0			



Cars	0	0	0	0	0
Heavy	0	0	0	0	0
Total	0	0	0	0	0
Northbound					
Vehicles Entering Intersection			Vehicles Exiting Intersection		
0			0		
Total Vehicles On Leg			0		

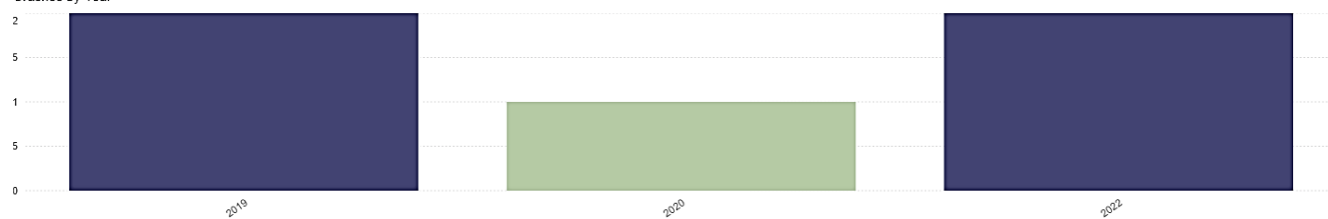


APPENDIX B: Intersection Crash Data

Kimball Road and Karcher Road Intersection 2019-2023 Crash Data

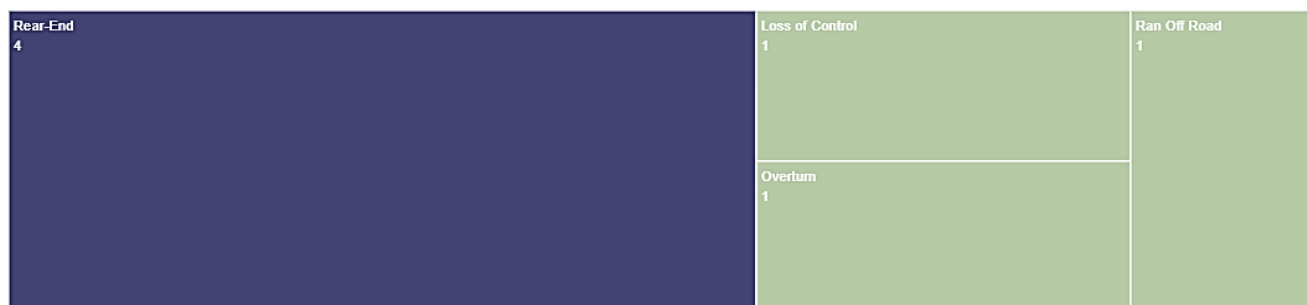


Crashes by Year



This chart shows the total # Crashes by Year

Crashes by Crash Type

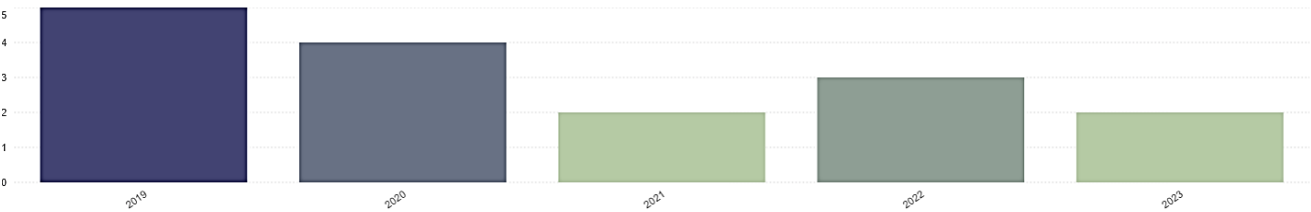


Contributing Circumstances (All)	Total Crashes	
Asleep, Drowsy, Fatigued	1	
Following Too Close	3	
Inattention	2	
None	5	

10th Avenue and Karcher Road Intersection 2019-2023 Crash Data

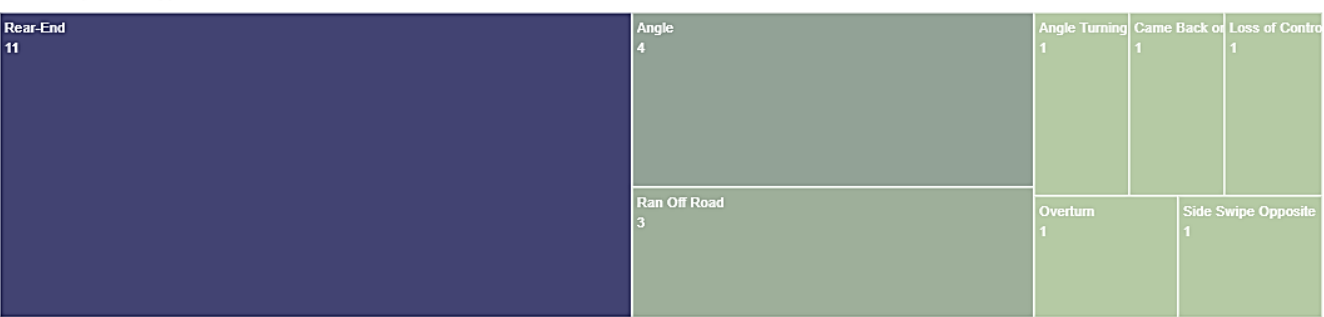


Crashes by Year



This chart shows the total # Crashes by Year

Crashes by Crash Type

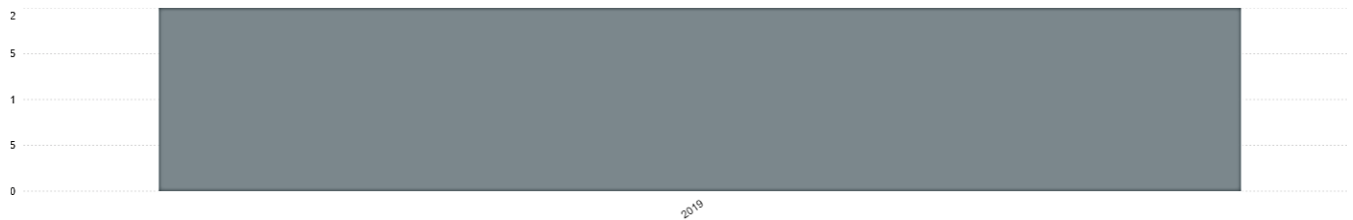


Contributing Circumstances (All)	Total Crashes	
Alcohol Impaired	3	
Asleep, Drowsy, Fatigued	1	
Drug Impaired	1	
Emotional – Depressed, Angry, ...	1	
Exceeded Posted Speed	1	
Failed to Maintain Lane	1	
Failed to Obey Signal	4	
Following Too Close	6	
Foot Slipped Off or Caught On ...	2	
Improper Overtaking	1	
Improper Turn	1	
Inattention	3	
Light Defect	1	
None	16	
Speed Too Fast For Conditions	1	

Ashland Drive & Karcher Road Intersection 2019-2023 Crash Data

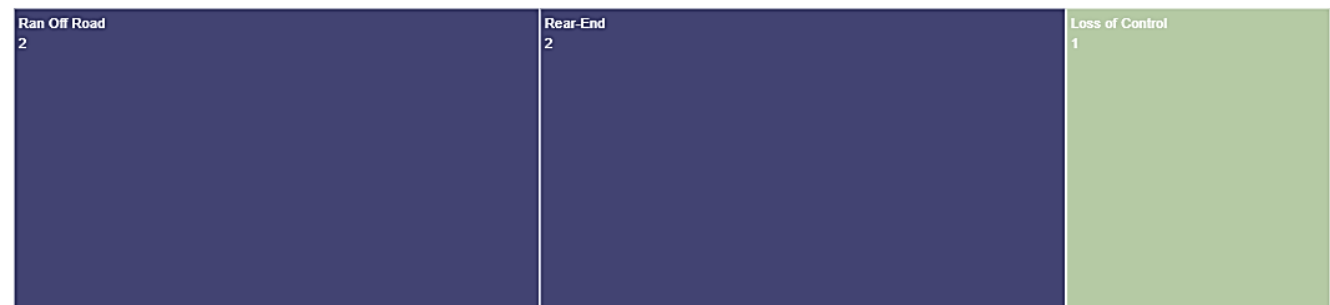


Crashes by Year



This chart shows the total # Crashes by Year

Crashes by Crash Type



Contributing Circumstances (All)	Total Crashes	
Following Too Close	2	
None	2	

APPENDIX C: 2024 Synchro Reports

HCM 7th TWSC
1: Kimball Ave & Karcher Rd

2024 Existing
AM Peak Hour

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	515	0	0	352	2	1	0	0	0	0	3
Future Vol, veh/h	1	515	0	0	352	2	1	0	0	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	100	6	2	2	8	2	2	2	2	2	2	2
Mvmt Flow	1	572	0	0	391	2	1	0	0	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	393	0	0	572	0	0	966	968	572	967	967	392
Stage 1	-	-	-	-	-	-	574	574	-	392	392	-
Stage 2	-	-	-	-	-	-	391	393	-	574	574	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	784	-	-	1001	-	-	234	254	519	234	254	657
Stage 1	-	-	-	-	-	-	504	503	-	632	606	-
Stage 2	-	-	-	-	-	-	633	606	-	504	503	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	784	-	-	1001	-	-	233	253	519	233	254	657
Mov Cap-2 Maneuver	-	-	-	-	-	-	233	253	-	233	254	-
Stage 1	-	-	-	-	-	-	503	502	-	632	606	-
Stage 2	-	-	-	-	-	-	630	606	-	503	502	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v 0.02		0	20.56	10.51
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	233	3	-	-	1001	-	-	657
HCM Lane V/C Ratio	0.005	0.001	-	-	-	-	-	0.005
HCM Control Delay (s/veh)	20.6	9.6	0	-	0	-	-	10.5
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

2024 Existing
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	384	6	14	260	277	6	99	18	165	78	80
Future Volume (veh/h)	115	384	6	14	260	277	6	99	18	165	78	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1796	1870	1870	1752	1856	1870	1870	1811	1781	1841	1767
Adj Flow Rate, veh/h	134	447	7	16	302	322	7	115	21	192	91	93
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	4	7	2	2	10	3	2	2	6	8	4	9
Cap, veh/h	171	589	9	35	446	400	16	177	32	236	206	211
Arrive On Green	0.10	0.33	0.33	0.02	0.25	0.25	0.01	0.12	0.12	0.14	0.25	0.25
Sat Flow, veh/h	1753	1764	28	1781	1752	1572	1781	1539	281	1697	834	853
Grp Volume(v), veh/h	134	0	454	16	302	322	7	0	136	192	0	184
Grp Sat Flow(s),veh/h/ln	1753	0	1791	1781	1752	1572	1781	0	1820	1697	0	1687
Q Serve(g_s), s	4.1	0.0	12.3	0.5	8.5	10.5	0.2	0.0	3.9	6.0	0.0	5.0
Cycle Q Clear(g_c), s	4.1	0.0	12.3	0.5	8.5	10.5	0.2	0.0	3.9	6.0	0.0	5.0
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.15	1.00		0.51
Lane Grp Cap(c), veh/h	171	0	598	35	446	400	16	0	210	236	0	417
V/C Ratio(X)	0.78	0.00	0.76	0.46	0.68	0.80	0.43	0.00	0.65	0.81	0.00	0.44
Avail Cap(c_a), veh/h	311	0	1784	320	1745	1566	320	0	826	301	0	763
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.1	0.0	16.2	26.5	18.3	19.1	26.9	0.0	23.1	22.8	0.0	17.4
Incr Delay (d2), s/veh	3.0	0.0	0.8	3.4	0.7	1.5	6.4	0.0	1.3	9.8	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.8	0.0	6.9	0.4	4.9	5.6	0.2	0.0	2.9	5.0	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	27.1	0.0	17.0	29.9	19.0	20.6	33.3	0.0	24.4	32.6	0.0	17.6
LnGrp LOS	C		B	C	B	C	C		C	C		B
Approach Vol, veh/h	588				640				143		376	
Approach Delay, s/veh	19.3				20.1				24.8		25.3	
Approach LOS	B				C				C		C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.9	11.6	6.3	23.8	5.7	18.8	10.6	19.5				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 25	9.8	54.4	9.8	24.7	9.7	54.4				
Max Q Clear Time (g_c+l1), s	8.0	5.9	2.5	14.3	2.2	7.0	6.1	12.5				
Green Ext Time (p_c), s	0.0	0.4	0.0	1.5	0.0	0.6	0.0	1.4				
Intersection Summary												
HCM 7th Control Delay, s/veh	21.3											
HCM 7th LOS	C											
Notes												
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2024 Existing
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	384	6	14	260	277	6	99	18	165	78	80
Future Volume (vph)	115	384	6	14	260	277	6	99	18	165	78	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.98		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1773		1770	1727	1568	1770	1809		1671	1648	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1773		1770	1727	1568	1770	1809		1671	1648	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	134	447	7	16	302	322	7	115	21	192	91	93
RTOR Reduction (vph)	0	1	0	0	0	230	0	6	0	0	27	0
Lane Group Flow (vph)	134	453	0	16	302	92	7	130	0	192	157	0
Heavy Vehicles (%)	4%	7%	2%	2%	10%	3%	2%	2%	6%	8%	4%	9%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	9.9	31.0		1.1	22.1	22.1	0.9	14.2		9.9	23.2	
Effective Green, g (s)	9.9	31.0		1.1	22.1	22.1	0.9	14.2		9.9	23.2	
Actuated g/C Ratio	0.13	0.40		0.01	0.29	0.29	0.01	0.18		0.13	0.30	
Clearance Time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	221	709		25	492	447	20	331		213	493	
v/s Ratio Prot	c0.08	c0.26		0.01	0.17		0.00	c0.07		c0.11	0.10	
v/s Ratio Perm						0.06						
v/c Ratio	0.61	0.64		0.64	0.61	0.21	0.35	0.39		0.90	0.32	
Uniform Delay, d1	32.0	18.7		38.0	24.0	21.0	38.0	27.9		33.3	21.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	1.4		35.0	1.6	0.1	3.8	0.3		35.3	0.1	
Delay (s)	35.2	20.1		73.0	25.6	21.1	41.8	28.1		68.6	21.2	
Level of Service	D	C		E	C	C	D	C		E	C	
Approach Delay (s/veh)		23.6			24.5			28.8			45.4	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			29.0									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			77.5									
Intersection Capacity Utilization			54.0%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th TWSC
3: S 10th Ave & Vista Dr

2024 Existing
AM Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	4	1	117	105	1
Future Vol, veh/h	6	4	1	117	105	1
Conflicting Peds, #/hr	5	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	16	2	100	3	2	3
Mvmt Flow	7	5	1	143	128	1

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	279	129	129	0	-	0
Stage 1	129	-	-	-	-	-
Stage 2	150	-	-	-	-	-
Critical Hdwy	6.56	6.22	5.1	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.318	3.1	-	-	-
Pot Cap-1 Maneuver	682	921	1022	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	681	921	1022	-	-	-
Mov Cap-2 Maneuver	681	-	-	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	9.81	0.07	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	15	-	761	-	-
HCM Lane V/C Ratio	0.001	-	0.016	-	-
HCM Control Delay (s/veh)	8.5	0	9.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 7th TWSC
1: Kimball Ave & Karcher Rd

2024 Existing
PM Peak Hour

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	531	0	2	538	2	0	0	0	0	0	2
Future Vol, veh/h	0	531	0	2	538	2	0	0	0	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	5	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	565	0	2	572	2	0	0	0	0	0	2
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	574	0	0	565	0	0	1141	1144	565	1143	1143	573
Stage 1	-	-	-	-	-	-	565	565	-	578	578	-
Stage 2	-	-	-	-	-	-	577	579	-	565	565	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	999	-	-	1007	-	-	178	200	524	177	200	519
Stage 1	-	-	-	-	-	-	510	508	-	502	501	-
Stage 2	-	-	-	-	-	-	502	501	-	510	508	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	999	-	-	1007	-	-	176	199	524	177	200	519
Mov Cap-2 Maneuver	-	-	-	-	-	-	176	199	-	177	200	-
Stage 1	-	-	-	-	-	-	510	508	-	500	500	-
Stage 2	-	-	-	-	-	-	499	499	-	510	508	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0			0.03			0			11.97		
HCM LOS							A			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	-	999	-	-	7	-	-	519				
HCM Lane V/C Ratio	-	-	-	-	0.002	-	-	0.004				
HCM Control Delay (s/veh)	0	0	-	-	8.6	0	-	12				
HCM Lane LOS	A	A	-	-	A	A	-	B				
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0				

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

2024 Existing
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	386	4	32	361	149	14	108	20	190	162	142
Future Volume (veh/h)	109	386	4	32	361	149	14	108	20	190	162	142
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1811	1870	1870	1870	1856	1796	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	112	398	4	33	372	154	14	111	21	196	167	146
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	6	2	2	2	3	7	2	2	3	2	2
Cap, veh/h	143	534	5	65	469	394	30	176	33	245	219	191
Arrive On Green	0.08	0.30	0.30	0.04	0.25	0.25	0.02	0.11	0.11	0.14	0.24	0.24
Sat Flow, veh/h	1739	1790	18	1781	1870	1572	1711	1529	289	1767	921	805
Grp Volume(v), veh/h	112	0	402	33	372	154	14	0	132	196	0	313
Grp Sat Flow(s),veh/h/ln	1739	0	1808	1781	1870	1572	1711	0	1818	1767	0	1725
Q Serve(g_s), s	3.3	0.0	10.4	0.9	9.7	4.2	0.4	0.0	3.6	5.6	0.0	8.8
Cycle Q Clear(g_c), s	3.3	0.0	10.4	0.9	9.7	4.2	0.4	0.0	3.6	5.6	0.0	8.8
Prop In Lane	1.00		0.01	1.00		1.00	1.00		0.16	1.00		0.47
Lane Grp Cap(c), veh/h	143	0	539	65	469	394	30	0	209	245	0	410
V/C Ratio(X)	0.78	0.00	0.75	0.51	0.79	0.39	0.46	0.00	0.63	0.80	0.00	0.76
Avail Cap(c_a), veh/h	325	0	1893	336	1959	1647	323	0	868	330	0	820
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	16.5	24.6	18.2	16.2	25.3	0.0	21.9	21.7	0.0	18.4
Incr Delay (d2), s/veh	3.5	0.0	0.8	2.3	1.2	0.2	4.1	0.0	1.2	7.0	0.0	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.0	5.9	0.7	6.0	2.1	0.3	0.0	2.6	4.5	0.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.9	0.0	17.2	26.8	19.4	16.4	29.4	0.0	23.1	28.6	0.0	19.6
LnGrp LOS	C		B	C	B	B	C		C	C		B
Approach Vol, veh/h	514				559		146				509	
Approach Delay, s/veh	19.3				19.0		23.7				23.1	
Approach LOS	B				B		C				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.5	11.3	7.1	21.1	6.1	17.6	9.6	18.6				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 25	9.8	54.4	9.8	24.7	9.7	54.4				
Max Q Clear Time (g_c+l1), s	7.6	5.6	2.9	12.4	2.4	10.8	5.3	11.7				
Green Ext Time (p_c), s	0.1	0.4	0.0	1.3	0.0	1.0	0.0	1.4				

Intersection Summary

HCM 7th Control Delay, s/veh	20.7
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2024 Existing
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	386	4	32	361	149	14	108	20	190	162	142
Future Volume (vph)	109	386	4	32	361	149	14	108	20	190	162	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.98		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1790		1770	1863	1568	1687	1818		1752	1732	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	1790		1770	1863	1568	1687	1818		1752	1732	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	112	398	4	33	372	154	14	111	21	196	167	146
RTOR Reduction (vph)	0	1	0	0	0	96	0	6	0	0	23	0
Lane Group Flow (vph)	112	401	0	33	372	58	14	126	0	196	290	0
Heavy Vehicles (%)	5%	6%	2%	2%	2%	3%	7%	2%	2%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	9.1	29.6		2.5	22.9	22.9	1.0	15.1		10.0	24.1	
Effective Green, g (s)	9.1	29.6		2.5	22.9	22.9	1.0	15.1		10.0	24.1	
Actuated g/C Ratio	0.12	0.38		0.03	0.29	0.29	0.01	0.19		0.13	0.31	
Clearance Time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	199	674		56	543	457	21	349		223	531	
v/s Ratio Prot	c0.07	c0.22		0.02	c0.20		0.01	0.07		c0.11	c0.17	
v/s Ratio Perm						0.04						
v/c Ratio	0.56	0.60		0.59	0.69	0.13	0.67	0.36		0.88	0.55	
Uniform Delay, d1	32.8	19.6		37.5	24.6	20.4	38.6	27.5		33.7	22.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	0.9		9.8	2.9	0.0	47.8	0.2		29.2	0.6	
Delay (s)	35.0	20.6		47.3	27.5	20.5	86.4	27.8		62.9	23.3	
Level of Service	C	C		D	C	C	F	C		E	C	
Approach Delay (s/veh)		23.7			26.7			33.4			38.5	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			29.9									
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			78.5									
Intersection Capacity Utilization			64.2%									
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	1	6	133	185	11
Future Vol, veh/h	4	1	6	133	185	11
Conflicting Peds, #/hr	6	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	1	7	145	201	12

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	371	207	213	0	-	0
Stage 1	207	-	-	-	-	-
Stage 2	164	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	630	833	1357	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	627	833	1357	-	-	-
Mov Cap-2 Maneuver	627	-	-	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	866	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v10.51		0.33	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	78	-	659	-	-
HCM Lane V/C Ratio	0.005	-	0.008	-	-
HCM Control Delay (s/veh)	7.7	0	10.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

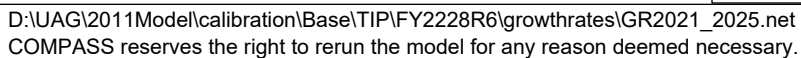
APPENDIX D: COMPASS Reports

7/20/2021

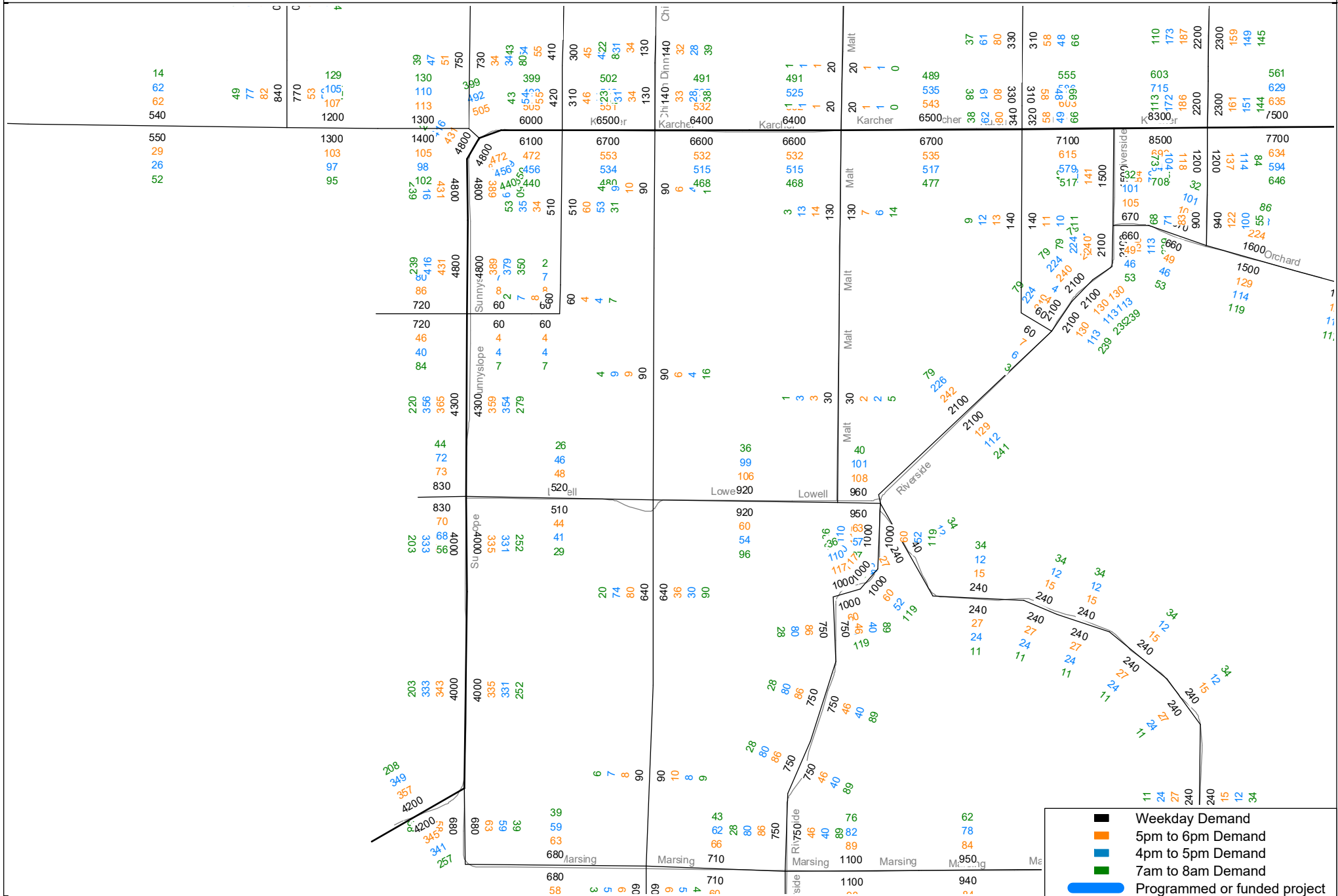


New Regional Model calibrated to 2011/12 conditions - completed in January 2015

7/20/2021



2025 Build: Daily, 5pm to 6pm Peak, 4pm to 5pm Peak and 7am to 8am Peak Demand
7/20/2021



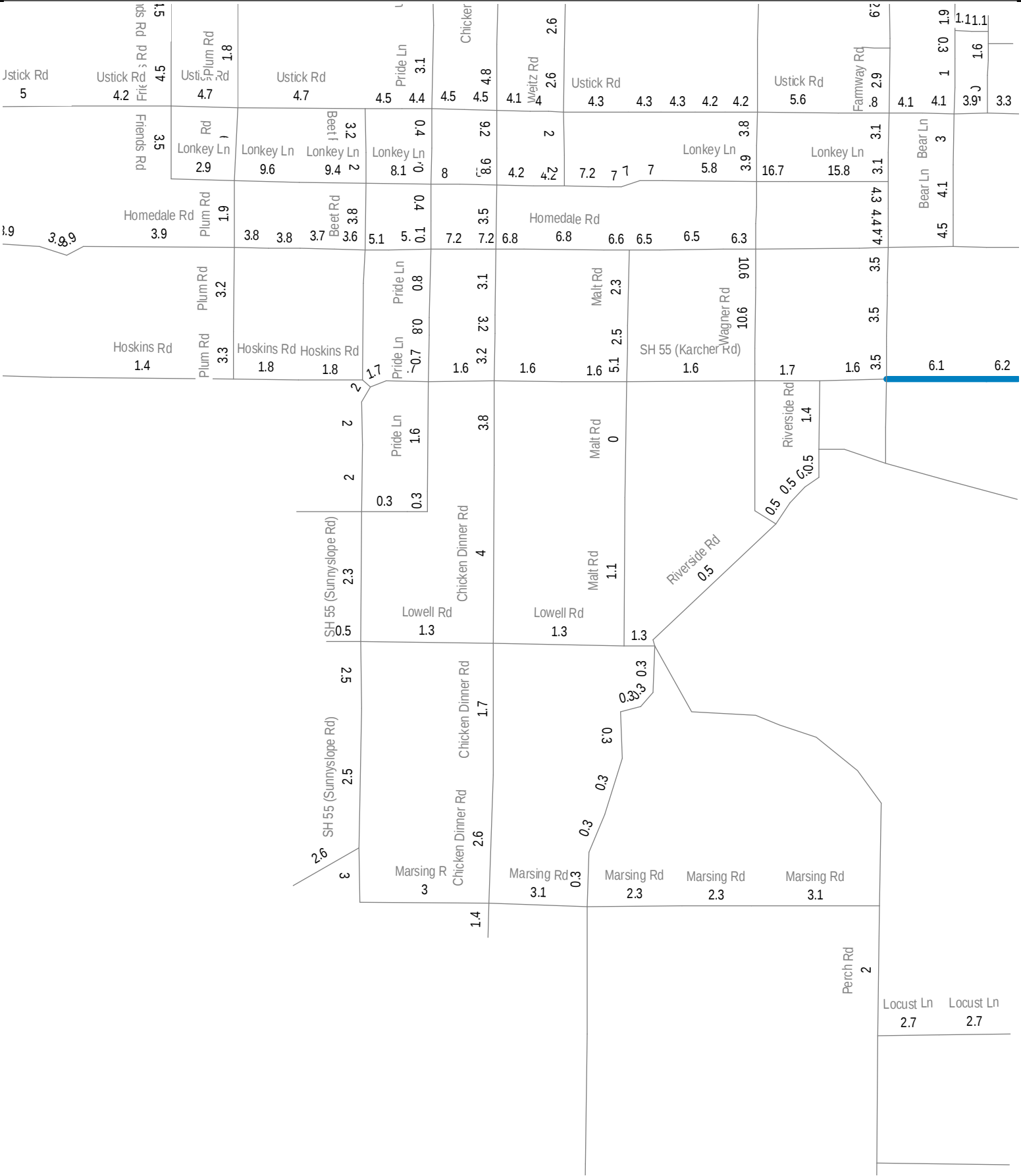
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New Regional Model calibrated to 2011/12 conditions - completed in January 2015



(Licensed to Community Planning Association)

2025 Peak Hour to 2030 Peak Hour Compounded Annual Growth Rates
7/20/2021



7/20/2021



cube

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APPENDIX E: 2027 Background Synchro Reports

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

2027 Background
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	136	451	8	27	306	336	11	134	53	175	92	85
Future Volume (veh/h)	136	451	8	27	306	336	11	134	53	175	92	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1796	1870	1870	1752	1856	1870	1870	1811	1781	1841	1767
Adj Flow Rate, veh/h	151	501	9	30	340	373	12	149	59	194	102	94
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	7	2	2	10	3	2	2	6	8	4	9
Cap, veh/h	189	1220	567	57	933	441	27	194	77	233	244	225
Arrive On Green	0.11	0.36	0.36	0.03	0.28	0.28	0.01	0.15	0.15	0.14	0.28	0.28
Sat Flow, veh/h	1753	3413	1585	1781	3328	1572	1781	1275	505	1697	882	813
Grp Volume(v), veh/h	151	501	9	30	340	373	12	0	208	194	0	196
Grp Sat Flow(s),veh/h/ln	1753	1706	1585	1781	1664	1572	1781	0	1780	1697	0	1694
Q Serve(g_s), s	5.6	7.4	0.2	1.1	5.5	14.9	0.4	0.0	7.5	7.4	0.0	6.3
Cycle Q Clear(g_c), s	5.6	7.4	0.2	1.1	5.5	14.9	0.4	0.0	7.5	7.4	0.0	6.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.28	1.00		0.48
Lane Grp Cap(c), veh/h	189	1220	567	57	933	441	27	0	271	233	0	469
V/C Ratio(X)	0.80	0.41	0.02	0.53	0.36	0.85	0.45	0.00	0.77	0.83	0.00	0.42
Avail Cap(c_a), veh/h	255	2525	1173	261	2462	1163	261	0	794	246	0	754
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.1	16.1	13.9	31.8	19.3	22.7	32.6	0.0	27.2	28.0	0.0	19.8
Incr Delay (d2), s/veh	8.8	0.1	0.0	2.8	0.1	1.8	4.4	0.0	1.7	18.6	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.5	4.2	0.1	0.8	3.2	8.4	0.4	0.0	5.6	7.2	0.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.8	16.2	13.9	34.6	19.3	24.4	37.0	0.0	28.9	46.6	0.0	20.0
LnGrp LOS	D	B	B	C	B	C	D		C	D		B
Approach Vol, veh/h	661			743			220			390		
Approach Delay, s/veh	21.1			22.5			29.3			33.2		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.5	15.5	7.3	29.5	6.2	23.8	12.5	24.3				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 30	9.8	49.4	9.8	29.7	9.7	49.4				
Max Q Clear Time (g_c+l1), s	9.4	9.5	3.1	9.4	2.4	8.3	7.6	16.9				
Green Ext Time (p_c), s	0.0	0.7	0.0	1.9	0.0	0.7	0.0	1.8				

Intersection Summary

HCM 7th Control Delay, s/veh 24.9
HCM 7th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2027 Background
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (vph)	136	451	8	27	306	336	11	134	53	175	92	85
Future Volume (vph)	136	451	8	27	306	336	11	134	53	175	92	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3374	1583	1770	3282	1568	1770	1764		1671	1657	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	3374	1583	1770	3282	1568	1770	1764		1671	1657	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	151	501	9	30	340	373	12	149	59	194	102	94
RTOR Reduction (vph)	0	0	6	0	0	294	0	12	0	0	24	0
Lane Group Flow (vph)	151	501	3	30	340	79	12	196	0	194	172	0
Heavy Vehicles (%)	4%	7%	2%	2%	10%	3%	2%	2%	6%	8%	4%	9%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	9.8	22.8	22.8	2.5	15.4	15.4	1.0	16.1		9.8	24.9	
Effective Green, g (s)	9.8	22.8	22.8	2.5	15.4	15.4	1.0	16.1		9.8	24.9	
Actuated g/C Ratio	0.14	0.31	0.31	0.03	0.21	0.21	0.01	0.22		0.14	0.34	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	234	1061	497	61	697	333	24	391		225	569	
v/s Ratio Prot	c0.09	c0.15		0.02	0.10		0.01	c0.11		c0.12	0.10	
v/s Ratio Perm			0.00			0.05						
v/c Ratio	0.65	0.47	0.01	0.49	0.49	0.24	0.50	0.50		0.86	0.30	
Uniform Delay, d1	29.7	20.0	17.1	34.4	25.1	23.7	35.5	24.7		30.7	17.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.5	0.1	0.0	2.3	0.2	0.1	5.8	0.4		26.3	0.1	
Delay (s)	34.2	20.1	17.1	36.6	25.3	23.8	41.3	25.0		57.0	17.5	
Level of Service	C	C	B	D	C	C	D	C		E	B	
Approach Delay (s/veh)		23.3			25.0			25.9			37.2	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			26.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			72.5			Sum of lost time (s)			21.4			
Intersection Capacity Utilization			54.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	4	1	182	130	3
Future Vol, veh/h	15	4	1	182	130	3
Conflicting Peds, #/hr	5	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	16	2	100	3	2	3
Mvmt Flow	17	4	1	202	144	3

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	356	146	148	0	-	0
Stage 1	146	-	-	-	-	-
Stage 2	209	-	-	-	-	-
Critical Hdwy	6.56	6.22	5.1	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.318	3.1	-	-	-
Pot Cap-1 Maneuver	615	901	1003	-	-	-
Stage 1	848	-	-	-	-	-
Stage 2	793	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	615	901	1003	-	-	-
Mov Cap-2 Maneuver	615	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	793	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v10.65		0.05	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	10	-	659	-	-
HCM Lane V/C Ratio	0.001	-	0.032	-	-
HCM Control Delay (s/veh)	8.6	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

2027 Background
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	456	10	78	420	180	17	133	43	204	204	150
Future Volume (veh/h)	129	456	10	78	420	180	17	133	43	204	204	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1811	1870	1870	1870	1856	1796	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	133	470	10	80	433	186	18	137	44	210	210	155
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	6	2	2	2	3	7	2	2	3	2	2
Cap, veh/h	170	759	349	118	666	295	38	199	64	260	274	202
Arrive On Green	0.10	0.22	0.22	0.07	0.19	0.19	0.02	0.15	0.15	0.15	0.27	0.27
Sat Flow, veh/h	1739	3441	1585	1781	3554	1572	1711	1356	436	1767	1000	738
Grp Volume(v), veh/h	133	470	10	80	433	186	18	0	181	210	0	365
Grp Sat Flow(s),veh/h/ln	1739	1721	1585	1781	1777	1572	1711	0	1792	1767	0	1738
Q Serve(g_s), s	3.8	6.3	0.3	2.2	5.8	5.6	0.5	0.0	4.9	5.9	0.0	9.9
Cycle Q Clear(g_c), s	3.8	6.3	0.3	2.2	5.8	5.6	0.5	0.0	4.9	5.9	0.0	9.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.24	1.00		0.42
Lane Grp Cap(c), veh/h	170	759	349	118	666	295	38	0	263	260	0	476
V/C Ratio(X)	0.78	0.62	0.03	0.68	0.65	0.63	0.48	0.00	0.69	0.81	0.00	0.77
Avail Cap(c_a), veh/h	330	3328	1533	342	3437	1521	328	0	1046	336	0	1010
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	18.0	15.6	23.3	19.2	19.1	24.7	0.0	20.7	21.1	0.0	17.0
Incr Delay (d2), s/veh	3.0	0.3	0.0	2.5	0.4	0.8	3.4	0.0	1.2	8.2	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.5	3.5	0.1	1.5	3.4	3.0	0.4	0.0	3.4	4.9	0.0	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.5	18.3	15.6	25.8	19.6	20.0	28.1	0.0	21.9	29.3	0.0	18.0
LnGrp LOS	C	B	B	C	B	B	C		C	C		B
Approach Vol, veh/h	613			699			199			575		
Approach Delay, s/veh	19.8			20.4			22.4			22.1		
Approach LOS	B			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.8	12.8	8.6	16.9	6.3	19.3	10.3	15.2				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 30	9.8	49.4	9.8	29.7	9.7	49.4				
Max Q Clear Time (g_c+I1), s	7.9	6.9	4.2	8.3	2.5	11.9	5.8	7.8				
Green Ext Time (p_c), s	0.1	0.6	0.0	1.7	0.0	1.3	0.0	1.8				

Intersection Summary

HCM 7th Control Delay, s/veh 20.9
HCM 7th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2027 Background
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	456	10	78	420	180	17	133	43	204	204	150
Future Volume (vph)	129	456	10	78	420	180	17	133	43	204	204	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3406	1583	1770	3539	1568	1687	1795		1752	1744	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3406	1583	1770	3539	1568	1687	1795		1752	1744	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	133	470	10	80	433	186	18	137	44	210	210	155
RTOR Reduction (vph)	0	0	7	0	0	148	0	10	0	0	19	0
Lane Group Flow (vph)	133	470	3	80	433	38	18	171	0	210	346	0
Heavy Vehicles (%)	5%	6%	2%	2%	2%	3%	7%	2%	2%	3%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	9.9	18.6	18.6	6.3	14.9	14.9	1.1	16.7		9.9	25.5	
Effective Green, g (s)	9.9	18.6	18.6	6.3	14.9	14.9	1.1	16.7		9.9	25.5	
Actuated g/C Ratio	0.14	0.26	0.26	0.09	0.20	0.20	0.02	0.23		0.14	0.35	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	233	870	404	153	724	320	25	411		238	610	
v/s Ratio Prot	c0.08	c0.14		0.05	0.12		0.01	0.10		c0.12	c0.20	
v/s Ratio Perm			0.00			0.02						
v/c Ratio	0.57	0.54	0.01	0.52	0.60	0.12	0.72	0.42		0.88	0.57	
Uniform Delay, d1	29.5	23.4	20.2	31.8	26.2	23.6	35.7	23.9		30.9	19.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	0.4	0.0	1.5	0.9	0.1	60.2	0.2		28.8	0.7	
Delay (s)	31.6	23.8	20.2	33.3	27.1	23.7	95.8	24.1		59.7	19.9	
Level of Service	C	C	C	C	C	C	F	C		E	B	
Approach Delay (s/veh)		25.4			26.9			30.6			34.4	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			28.9									
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			72.8									
Intersection Capacity Utilization			60.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	1	6	177	261	25
Future Vol, veh/h	10	1	6	177	261	25
Conflicting Peds, #/hr	6	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	1	7	192	284	27

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	509	297	311	0	-	0
Stage 1	297	-	-	-	-	-
Stage 2	211	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	524	742	1250	-	-	-
Stage 1	754	-	-	-	-	-
Stage 2	824	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	521	742	1250	-	-	-
Mov Cap-2 Maneuver	521	-	-	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	824	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v11.87		0.26	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	59	-	536	-	-
HCM Lane V/C Ratio	0.005	-	0.022	-	-
HCM Control Delay (s/veh)	7.9	0	11.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 7th Signalized Intersection Summary

2027 Background - No SH 55 Improvements

2: S 10th Ave & Karcher Rd

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	136	451	8	27	306	336	11	134	53	175	92	85
Future Volume (veh/h)	136	451	8	27	306	336	11	134	53	175	92	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1796	1870	1870	1752	1856	1870	1870	1811	1781	1841	1767
Adj Flow Rate, veh/h	151	501	9	30	340	373	12	149	59	194	102	94
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	7	2	2	10	3	2	2	6	8	4	9
Cap, veh/h	189	626	11	57	489	439	27	193	77	234	243	224
Arrive On Green	0.11	0.36	0.36	0.03	0.28	0.28	0.01	0.15	0.15	0.14	0.28	0.28
Sat Flow, veh/h	1753	1759	32	1781	1752	1572	1781	1275	505	1697	882	813
Grp Volume(v), veh/h	151	0	510	30	340	373	12	0	208	194	0	196
Grp Sat Flow(s),veh/h/ln	1753	0	1791	1781	1752	1572	1781	0	1780	1697	0	1694
Q Serve(g_s), s	5.6	0.0	17.0	1.1	11.5	14.9	0.4	0.0	7.5	7.4	0.0	6.3
Cycle Q Clear(g_c), s	5.6	0.0	17.0	1.1	11.5	14.9	0.4	0.0	7.5	7.4	0.0	6.3
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.28	1.00		0.48
Lane Grp Cap(c), veh/h	189	0	638	57	489	439	27	0	270	234	0	468
V/C Ratio(X)	0.80	0.00	0.80	0.53	0.70	0.85	0.45	0.00	0.77	0.83	0.00	0.42
Avail Cap(c_a), veh/h	256	0	1468	263	1436	1289	263	0	665	248	0	631
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.9	0.0	19.2	31.6	21.4	22.6	32.4	0.0	27.0	27.9	0.0	19.7
Incr Delay (d2), s/veh	8.5	0.0	0.9	2.8	0.7	1.8	4.4	0.0	1.8	18.3	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.5	0.0	9.7	0.8	7.2	8.3	0.4	0.0	5.5	7.2	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.4	0.0	20.1	34.4	22.1	24.4	36.8	0.0	28.8	46.1	0.0	19.9
LnGrp LOS	D		C	C	C	C	D		C	D		B
Approach Vol, veh/h	661			743			220			390		
Approach Delay, s/veh	24.1			23.8			29.2			32.9		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.4	15.4	7.3	29.2	6.2	23.6	12.4	24.1				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 25	9.8	54.4	9.8	24.7	9.7	54.4				
Max Q Clear Time (g_c+I1), s	9.4	9.5	3.1	19.0	2.4	8.3	7.6	16.9				
Green Ext Time (p_c), s	0.0	0.6	0.0	1.7	0.0	0.6	0.0	1.6				

Intersection Summary

HCM 7th Control Delay, s/veh	26.2
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2027 Background - No SH 55 Improvements

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	451	8	27	306	336	11	134	53	175	92	85
Future Volume (vph)	136	451	8	27	306	336	11	134	53	175	92	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1772		1770	1727	1568	1770	1764		1671	1657	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1772		1770	1727	1568	1770	1764		1671	1657	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	151	501	9	30	340	373	12	149	59	194	102	94
RTOR Reduction (vph)	0	1	0	0	0	250	0	12	0	0	24	0
Lane Group Flow (vph)	151	509	0	30	340	123	12	196	0	194	172	0
Heavy Vehicles (%)	4%	7%	2%	2%	10%	3%	2%	2%	6%	8%	4%	9%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	10.1	34.3		2.5	26.6	26.6	1.0	18.3		10.1	27.4	
Effective Green, g (s)	10.1	34.3		2.5	26.6	26.6	1.0	18.3		10.1	27.4	
Actuated g/C Ratio	0.12	0.40		0.03	0.31	0.31	0.01	0.21		0.12	0.32	
Clearance Time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	202	702		51	531	482	20	373		195	524	
v/s Ratio Prot	c0.09	c0.29		0.02	0.20		0.01	c0.11		c0.12	0.10	
v/s Ratio Perm						0.08						
v/c Ratio	0.75	0.73		0.59	0.64	0.26	0.60	0.53		0.99	0.33	
Uniform Delay, d1	37.0	22.1		41.5	25.8	22.5	42.6	30.3		38.2	22.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.4	3.2		10.7	2.0	0.1	30.1	0.6		62.6	0.1	
Delay (s)	49.3	25.3		52.2	27.8	22.6	72.6	30.9		100.7	22.7	
Level of Service	D	C		D	C	C	E	C		F	C	
Approach Delay (s/veh)		30.8			26.2			33.1			61.5	
Approach LOS		C			C			C			E	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			35.3									D
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			86.5							21.4		
Intersection Capacity Utilization			66.1%								C	
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th Signalized Intersection Summary

2027 Background - No SH 55 Improvements

2: S 10th Ave & Karcher Rd

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	456	10	78	420	180	17	133	43	204	204	150
Future Volume (veh/h)	129	456	10	78	420	180	17	133	43	204	204	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1811	1870	1870	1870	1856	1796	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	133	470	10	80	433	186	18	137	44	210	210	155
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	6	2	2	2	3	7	2	2	3	2	2
Cap, veh/h	168	556	12	107	517	434	37	187	60	254	262	193
Arrive On Green	0.10	0.31	0.31	0.06	0.28	0.28	0.02	0.14	0.14	0.14	0.26	0.26
Sat Flow, veh/h	1739	1767	38	1781	1870	1572	1711	1356	436	1767	1000	738
Grp Volume(v), veh/h	133	0	480	80	433	186	18	0	181	210	0	365
Grp Sat Flow(s),veh/h/ln	1739	0	1804	1781	1870	1572	1711	0	1792	1767	0	1738
Q Serve(g_s), s	4.7	0.0	15.5	2.8	13.6	6.0	0.6	0.0	6.0	7.2	0.0	12.2
Cycle Q Clear(g_c), s	4.7	0.0	15.5	2.8	13.6	6.0	0.6	0.0	6.0	7.2	0.0	12.2
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.24	1.00		0.42
Lane Grp Cap(c), veh/h	168	0	567	107	517	434	37	0	247	254	0	455
V/C Ratio(X)	0.79	0.00	0.85	0.75	0.84	0.43	0.49	0.00	0.73	0.83	0.00	0.80
Avail Cap(c_a), veh/h	271	0	1577	280	1635	1374	269	0	714	275	0	690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.5	0.0	19.9	28.8	21.2	18.5	30.1	0.0	25.7	25.9	0.0	21.5
Incr Delay (d2), s/veh	3.1	0.0	1.4	3.8	1.4	0.2	3.7	0.0	1.6	15.7	0.0	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.3	0.0	9.1	2.0	8.7	3.3	0.5	0.0	4.5	7.0	0.0	8.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.6	0.0	21.3	32.6	22.6	18.7	33.8	0.0	27.3	41.6	0.0	23.6
LnGrp LOS	C		C	C	C	B	C		C	D		C
Approach Vol, veh/h	613			699			199			575		
Approach Delay, s/veh	23.3			22.7			27.9			30.2		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.3	13.9	8.9	25.2	6.5	21.6	11.3	22.8				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 25	9.8	54.4	9.8	24.7	9.7	54.4				
Max Q Clear Time (g_c+l1), s	9.2	8.0	4.8	17.5	2.6	14.2	6.7	15.6				
Green Ext Time (p_c), s	0.0	0.5	0.0	1.5	0.0	1.1	0.0	1.6				

Intersection Summary

HCM 7th Control Delay, s/veh	25.5
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2027 Background - No SH 55 Improvements

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	456	10	78	420	180	17	133	43	204	204	150
Future Volume (vph)	129	456	10	78	420	180	17	133	43	204	204	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1788		1770	1863	1568	1687	1795		1752	1744	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	1788		1770	1863	1568	1687	1795		1752	1744	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	133	470	10	80	433	186	18	137	44	210	210	155
RTOR Reduction (vph)	0	1	0	0	0	98	0	10	0	0	20	0
Lane Group Flow (vph)	133	479	0	80	433	88	18	171	0	210	345	0
Heavy Vehicles (%)	5%	6%	2%	2%	2%	3%	7%	2%	2%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	10.1	30.0		6.5	26.3	26.3	2.2	17.5		10.1	25.4	
Effective Green, g (s)	10.1	30.0		6.5	26.3	26.3	2.2	17.5		10.1	25.4	
Actuated g/C Ratio	0.12	0.35		0.08	0.31	0.31	0.03	0.20		0.12	0.30	
Clearance Time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	203	628		134	573	482	43	367		207	518	
v/s Ratio Prot	c0.08	c0.27		0.05	0.23		0.01	0.10		c0.12	c0.20	
v/s Ratio Perm						0.06						
v/c Ratio	0.66	0.76		0.60	0.76	0.18	0.42	0.47		1.01	0.67	
Uniform Delay, d1	36.0	24.6		38.2	26.7	21.7	41.0	29.9		37.7	26.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.7	4.9		4.7	5.0	0.1	2.4	0.3		66.4	2.5	
Delay (s)	41.7	29.5		42.9	31.7	21.7	43.4	30.2		104.0	28.8	
Level of Service	D	C		D	C	C	D	C		F	C	
Approach Delay (s/veh)		32.1			30.3			31.4			56.3	
Approach LOS		C			C			C			E	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			38.1									
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			85.4									
Intersection Capacity Utilization			71.1%									
Analysis Period (min)			15									
c Critical Lane Group												

APPENDIX F: 2027 Total Synchro Reports

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

2027 Total
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	465	8	29	311	336	11	135	61	175	92	86
Future Volume (veh/h)	138	465	8	29	311	336	11	135	61	175	92	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1796	1870	1870	1752	1856	1870	1870	1811	1781	1841	1767
Adj Flow Rate, veh/h	153	517	9	32	346	373	12	150	68	194	102	96
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	7	2	2	10	3	2	2	6	8	4	9
Cap, veh/h	191	1217	565	59	932	440	27	193	87	233	246	231
Arrive On Green	0.11	0.36	0.36	0.03	0.28	0.28	0.01	0.16	0.16	0.14	0.28	0.28
Sat Flow, veh/h	1753	3413	1585	1781	3328	1572	1781	1219	552	1697	872	821
Grp Volume(v), veh/h	153	517	9	32	346	373	12	0	218	194	0	198
Grp Sat Flow(s),veh/h/ln	1753	1706	1585	1781	1664	1572	1781	0	1771	1697	0	1693
Q Serve(g_s), s	5.8	7.8	0.2	1.2	5.7	15.2	0.5	0.0	8.0	7.6	0.0	6.5
Cycle Q Clear(g_c), s	5.8	7.8	0.2	1.2	5.7	15.2	0.5	0.0	8.0	7.6	0.0	6.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.31	1.00		0.48
Lane Grp Cap(c), veh/h	191	1217	565	59	932	440	27	0	280	233	0	477
V/C Ratio(X)	0.80	0.42	0.02	0.54	0.37	0.85	0.45	0.00	0.78	0.83	0.00	0.41
Avail Cap(c_a), veh/h	250	2478	1151	257	2416	1142	257	0	776	242	0	739
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.6	16.6	14.2	32.4	19.7	23.1	33.2	0.0	27.5	28.6	0.0	19.9
Incr Delay (d2), s/veh	9.9	0.1	0.0	2.8	0.1	1.8	4.4	0.0	1.8	19.5	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.8	4.5	0.1	0.9	3.4	8.5	0.4	0.0	6.0	7.5	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.5	16.7	14.2	35.2	19.8	24.9	37.6	0.0	29.3	48.1	0.0	20.1
LnGrp LOS	D	B	B	D	B	C	D		C	D		C
Approach Vol, veh/h	679			751			230			392		
Approach Delay, s/veh	21.8			23.0			29.7			33.9		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.6	16.1	7.5	29.9	6.2	24.5	12.7	24.6				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 30	9.8	49.4	9.8	29.7	9.7	49.4				
Max Q Clear Time (g_c+l1), s	9.6	10.0	3.2	9.8	2.5	8.5	7.8	17.2				
Green Ext Time (p_c), s	0.0	0.7	0.0	1.9	0.0	0.7	0.0	1.8				

Intersection Summary

HCM 7th Control Delay, s/veh 25.4
HCM 7th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2027 Total
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	465	8	29	311	336	11	135	61	175	92	86
Future Volume (vph)	138	465	8	29	311	336	11	135	61	175	92	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3374	1583	1770	3282	1568	1770	1754		1671	1655	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	3374	1583	1770	3282	1568	1770	1754		1671	1655	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	153	517	9	32	346	373	12	150	68	194	102	96
RTOR Reduction (vph)	0	0	6	0	0	293	0	14	0	0	25	0
Lane Group Flow (vph)	153	517	3	32	346	80	12	204	0	194	173	0
Heavy Vehicles (%)	4%	7%	2%	2%	10%	3%	2%	2%	6%	8%	4%	9%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	9.8	23.1	23.1	2.6	15.8	15.8	1.0	16.5		9.8	25.3	
Effective Green, g (s)	9.8	23.1	23.1	2.6	15.8	15.8	1.0	16.5		9.8	25.3	
Actuated g/C Ratio	0.13	0.32	0.32	0.04	0.22	0.22	0.01	0.23		0.13	0.35	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	232	1063	498	62	707	337	24	394		223	571	
v/s Ratio Prot	c0.09	c0.15		0.02	0.11		0.01	c0.12		c0.12	0.10	
v/s Ratio Perm			0.00			0.05						
v/c Ratio	0.66	0.49	0.01	0.52	0.49	0.24	0.50	0.52		0.87	0.30	
Uniform Delay, d1	30.2	20.3	17.2	34.7	25.2	23.8	35.9	24.9		31.1	17.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.1	0.1	0.0	3.0	0.2	0.1	5.8	0.5		27.5	0.1	
Delay (s)	35.3	20.4	17.2	37.7	25.4	23.9	41.7	25.4		58.6	17.7	
Level of Service	D	C	B	D	C	C	D	C		E	B	
Approach Delay (s/veh)		23.7			25.2			26.2			37.9	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			27.3									
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			73.3							21.4		
Intersection Capacity Utilization			55.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th TWSC
3: S 10th Ave & Vista Dr

2027 Total
AM Peak Hour

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	6	1	182	130	5
Future Vol, veh/h	24	6	1	182	130	5
Conflicting Peds, #/hr	5	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	16	2	100	3	2	3
Mvmt Flow	27	7	1	202	144	6
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	357	147	150	0	-	0
Stage 1	147	-	-	-	-	-
Stage 2	209	-	-	-	-	-
Critical Hdwy	6.56	6.22	5.1	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.318	3.1	-	-	-
Pot Cap-1 Maneuver	614	900	1001	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	793	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	614	900	1001	-	-	-
Mov Cap-2 Maneuver	614	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	793	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s/v10.79		0.05		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	10	-	655	-	-	
HCM Lane V/C Ratio	0.001	-	0.051	-	-	
HCM Control Delay (s/veh)	8.6	0	10.8	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

HCM 7th TWSC
4: Access/Ashland Dr & Karcher Rd

2027 Total
AM Peak Hour

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	638	1	6	387	0	3	0	17	1	0	6
Future Vol, veh/h	1	638	1	6	387	0	3	0	17	1	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	6	2	2	8	2	2	2	2	2	2	2
Mvmt Flow	1	701	1	7	425	0	3	0	19	1	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	425	0	0	702	0	0	930	1142	351	791	1143	213
Stage 1	-	-	-	-	-	-	704	704	-	438	438	-
Stage 2	-	-	-	-	-	-	226	438	-	353	704	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1130	-	-	891	-	-	222	199	645	280	199	793
Stage 1	-	-	-	-	-	-	394	438	-	567	577	-
Stage 2	-	-	-	-	-	-	756	577	-	637	437	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1130	-	-	891	-	-	218	197	645	270	197	793
Mov Cap-2 Maneuver	-	-	-	-	-	-	319	314	-	390	311	-
Stage 1	-	-	-	-	-	-	393	437	-	563	573	-
Stage 2	-	-	-	-	-	-	744	573	-	618	437	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0.01			0.14			11.7			10.27		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	559	1130	-	-	891	-	-	691
HCM Lane V/C Ratio	0.039	0.001	-	-	0.007	-	-	0.011
HCM Control Delay (s/veh)	11.7	8.2	-	-	9.1	-	-	10.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

HCM 7th Signalized Intersection Summary

2027 Total

2: S 10th Ave & Karcher Rd

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	465	10	83	437	182	17	134	48	204	206	152
Future Volume (veh/h)	130	465	10	83	437	182	17	134	48	204	206	152
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1811	1870	1870	1870	1856	1796	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	134	479	10	86	451	188	18	138	49	210	212	157
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	6	2	2	2	3	7	2	2	3	2	2
Cap, veh/h	171	770	355	122	683	302	38	197	70	260	276	205
Arrive On Green	0.10	0.22	0.22	0.07	0.19	0.19	0.02	0.15	0.15	0.15	0.28	0.28
Sat Flow, veh/h	1739	3441	1585	1781	3554	1572	1711	1318	468	1767	998	739
Grp Volume(v), veh/h	134	479	10	86	451	188	18	0	187	210	0	369
Grp Sat Flow(s),veh/h/ln	1739	1721	1585	1781	1777	1572	1711	0	1786	1767	0	1737
Q Serve(g_s), s	3.9	6.5	0.3	2.5	6.1	5.7	0.5	0.0	5.2	6.0	0.0	10.2
Cycle Q Clear(g_c), s	3.9	6.5	0.3	2.5	6.1	5.7	0.5	0.0	5.2	6.0	0.0	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.26	1.00		0.43
Lane Grp Cap(c), veh/h	171	770	355	122	683	302	38	0	267	260	0	481
V/C Ratio(X)	0.79	0.62	0.03	0.71	0.66	0.62	0.48	0.00	0.70	0.81	0.00	0.77
Avail Cap(c_a), veh/h	324	3264	1504	335	3371	1492	322	0	1022	329	0	991
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.9	18.2	15.8	23.7	19.5	19.3	25.2	0.0	21.0	21.5	0.0	17.3
Incr Delay (d2), s/veh	3.0	0.3	0.0	2.8	0.4	0.8	3.5	0.0	1.2	8.8	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.6	3.7	0.1	1.7	3.6	3.1	0.4	0.0	3.6	5.1	0.0	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.9	18.5	15.8	26.5	19.9	20.1	28.6	0.0	22.3	30.3	0.0	18.3
LnGrp LOS	C	B	B	C	B	C	C		C	C		B
Approach Vol, veh/h	623			725			205			579		
Approach Delay, s/veh	20.1			20.7			22.8			22.6		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	13.1	8.8	17.3	6.3	19.7	10.4	15.6				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 30	9.8	49.4	9.8	29.7	9.7	49.4				
Max Q Clear Time (g_c+I1), s	8.0	7.2	4.5	8.5	2.5	12.2	5.9	8.1				
Green Ext Time (p_c), s	0.1	0.6	0.0	1.8	0.0	1.3	0.0	1.9				

Intersection Summary

HCM 7th Control Delay, s/veh	21.3
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2027 Total
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (vph)	130	465	10	83	437	182	17	134	48	204	206	152
Future Volume (vph)	130	465	10	83	437	182	17	134	48	204	206	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3406	1583	1770	3539	1568	1687	1790		1752	1744	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3406	1583	1770	3539	1568	1687	1790		1752	1744	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	479	10	86	451	188	18	138	49	210	212	157
RTOR Reduction (vph)	0	0	7	0	0	149	0	11	0	0	19	0
Lane Group Flow (vph)	134	479	3	86	451	39	18	176	0	210	350	0
Heavy Vehicles (%)	5%	6%	2%	2%	2%	3%	7%	2%	2%	3%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	9.9	18.8	18.8	6.6	15.4	15.4	1.1	17.0		9.9	25.8	
Effective Green, g (s)	9.9	18.8	18.8	6.6	15.4	15.4	1.1	17.0		9.9	25.8	
Actuated g/C Ratio	0.13	0.26	0.26	0.09	0.21	0.21	0.01	0.23		0.13	0.35	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	231	870	404	158	740	328	25	413		235	611	
v/s Ratio Prot	c0.08	c0.14		0.05	0.13		0.01	0.10		c0.12	c0.20	
v/s Ratio Perm			0.00			0.03						
v/c Ratio	0.58	0.55	0.01	0.54	0.61	0.12	0.72	0.43		0.89	0.57	
Uniform Delay, d1	29.9	23.7	20.4	32.1	26.4	23.6	36.1	24.1		31.3	19.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.4	0.0	2.0	1.0	0.1	60.2	0.3		31.2	0.8	
Delay (s)	32.3	24.2	20.4	34.1	27.4	23.7	96.2	24.4		62.6	20.2	
Level of Service	C	C	C	C	C	C	F	C		E	C	
Approach Delay (s/veh)		25.9			27.2			30.7			35.6	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			29.4									
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			73.6							21.4		
Intersection Capacity Utilization			61.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th TWSC
3: S 10th Ave & Vista Dr

2027 Total
PM Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	2	8	177	261	31
Future Vol, veh/h	16	2	8	177	261	31
Conflicting Peds, #/hr	6	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	2	9	192	284	34

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	516	301	317	0	-	0
Stage 1	301	-	-	-	-	-
Stage 2	216	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	519	739	1243	-	-	-
Stage 1	751	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	515	739	1243	-	-	-
Mov Cap-2 Maneuver	515	-	-	-	-	-
Stage 1	745	-	-	-	-	-
Stage 2	820	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v12.01		0.34	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	78	-	533	-	-
HCM Lane V/C Ratio	0.007	-	0.037	-	-
HCM Control Delay (s/veh)	7.9	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 7th TWSC
4: Access/Ashland Dr & Karcher Rd

2027 Total
PM Peak Hour

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	632	3	21	631	2	2	0	11	1	0	3
Future Vol, veh/h	2	632	3	21	631	2	2	0	11	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	5	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	658	3	22	657	2	2	0	11	1	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	659	0	0	661	0	0	1036	1367	331	1034	1367	329
Stage 1	-	-	-	-	-	-	664	664	-	701	701	-
Stage 2	-	-	-	-	-	-	372	703	-	333	666	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	925	-	-	923	-	-	186	146	665	186	146	667
Stage 1	-	-	-	-	-	-	416	456	-	395	439	-
Stage 2	-	-	-	-	-	-	620	438	-	654	456	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	925	-	-	923	-	-	180	142	665	178	142	667
Mov Cap-2 Maneuver	-	-	-	-	-	-	302	265	-	292	261	-
Stage 1	-	-	-	-	-	-	415	455	-	386	429	-
Stage 2	-	-	-	-	-	-	603	428	-	641	455	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0.03			0.29			11.57			12.19		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	561	925	-	-	923	-	-	505
HCM Lane V/C Ratio	0.024	0.002	-	-	0.024	-	-	0.008
HCM Control Delay (s/veh)	11.6	8.9	-	-	9	-	-	12.2
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0

HCM 7th Signalized Intersection Summary

2027 Total - No SH 55 Improvements

2: S 10th Ave & Karcher Rd

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	465	8	29	311	336	11	135	61	175	92	86
Future Volume (veh/h)	138	465	8	29	311	336	11	135	61	175	92	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1796	1870	1870	1752	1856	1870	1870	1811	1781	1841	1767
Adj Flow Rate, veh/h	153	517	9	32	346	373	12	150	68	194	102	96
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	7	2	2	10	3	2	2	6	8	4	9
Cap, veh/h	191	625	11	60	488	438	27	192	87	233	245	231
Arrive On Green	0.11	0.36	0.36	0.03	0.28	0.28	0.01	0.16	0.16	0.14	0.28	0.28
Sat Flow, veh/h	1753	1760	31	1781	1752	1572	1781	1219	552	1697	872	821
Grp Volume(v), veh/h	153	0	526	32	346	373	12	0	218	194	0	198
Grp Sat Flow(s),veh/h/ln	1753	0	1791	1781	1752	1572	1781	0	1771	1697	0	1693
Q Serve(g_s), s	5.8	0.0	18.1	1.2	12.0	15.2	0.5	0.0	8.0	7.5	0.0	6.4
Cycle Q Clear(g_c), s	5.8	0.0	18.1	1.2	12.0	15.2	0.5	0.0	8.0	7.5	0.0	6.4
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.31	1.00		0.48
Lane Grp Cap(c), veh/h	191	0	636	60	488	438	27	0	279	233	0	476
V/C Ratio(X)	0.80	0.00	0.83	0.54	0.71	0.85	0.45	0.00	0.78	0.83	0.00	0.42
Avail Cap(c_a), veh/h	252	0	1441	258	1410	1265	258	0	650	243	0	619
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.4	0.0	19.9	32.2	21.9	23.1	33.0	0.0	27.4	28.4	0.0	19.8
Incr Delay (d2), s/veh	9.7	0.0	1.1	2.8	0.7	1.8	4.4	0.0	1.8	19.2	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.8	0.0	10.3	0.9	7.6	8.5	0.4	0.0	5.9	7.4	0.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.1	0.0	21.0	34.9	22.7	24.9	37.4	0.0	29.2	47.6	0.0	20.0
LnGrp LOS	D		C	C	C	C	D		C	D		B
Approach Vol, veh/h	679			751			230			392		
Approach Delay, s/veh	25.0			24.3			29.6			33.6		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.6	15.9	7.5	29.6	6.2	24.3	12.7	24.4				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 25	9.8	54.4	9.8	24.7	9.7	54.4				
Max Q Clear Time (g_c+I1), s	9.5	10.0	3.2	20.1	2.5	8.4	7.8	17.2				
Green Ext Time (p_c), s	0.0	0.6	0.0	1.7	0.0	0.6	0.0	1.7				

Intersection Summary

HCM 7th Control Delay, s/veh	26.9
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2027 Total - No SH 55 Improvements

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	465	8	29	311	336	11	135	61	175	92	86
Future Volume (vph)	138	465	8	29	311	336	11	135	61	175	92	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1773		1770	1727	1568	1770	1754		1671	1655	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1773		1770	1727	1568	1770	1754		1671	1655	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	153	517	9	32	346	373	12	150	68	194	102	96
RTOR Reduction (vph)	0	1	0	0	0	244	0	13	0	0	25	0
Lane Group Flow (vph)	153	525	0	32	346	129	12	205	0	194	173	0
Heavy Vehicles (%)	4%	7%	2%	2%	10%	3%	2%	2%	6%	8%	4%	9%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	10.1	34.1		3.8	27.7	27.7	1.0	18.9		10.1	28.0	
Effective Green, g (s)	10.1	34.1		3.8	27.7	27.7	1.0	18.9		10.1	28.0	
Actuated g/C Ratio	0.11	0.39		0.04	0.31	0.31	0.01	0.21		0.11	0.32	
Clearance Time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	198	685		76	542	492	20	375		191	525	
v/s Ratio Prot	c0.09	c0.30		0.02	0.20		0.01	c0.12		c0.12	0.10	
v/s Ratio Perm						0.08						
v/c Ratio	0.77	0.77		0.42	0.64	0.26	0.60	0.55		1.02	0.33	
Uniform Delay, d1	37.9	23.6		41.1	26.0	22.6	43.4	30.8		39.1	23.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.6	4.6		1.4	1.8	0.1	30.1	0.9		69.3	0.1	
Delay (s)	53.5	28.2		42.5	27.8	22.7	73.5	31.7		108.3	23.1	
Level of Service	D	C		D	C	C	E	C		F	C	
Approach Delay (s/veh)		33.9			25.9			33.9			65.3	
Approach LOS		C			C			C			E	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			37.0									D
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			88.2							21.4		
Intersection Capacity Utilization			67.4%								C	
Analysis Period (min)			15									
c Critical Lane Group												

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	1	638	1	6	387	0	3	0	17	1	0	6
Future Vol, veh/h	1	638	1	6	387	0	3	0	17	1	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	100	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	6	2	2	8	2	2	2	2	2	2	2
Mvmt Flow	1	701	1	6	425	0	3	0	19	1	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	425	0	0	702	0	0	1141	1141	702	1141	1142	425
Stage 1	-	-	-	-	-	-	704	704	-	437	437	-
Stage 2	-	-	-	-	-	-	437	437	-	703	704	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1134	-	-	895	-	-	178	201	438	178	200	629
Stage 1	-	-	-	-	-	-	428	440	-	598	579	-
Stage 2	-	-	-	-	-	-	598	579	-	428	439	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1134	-	-	895	-	-	174	199	438	169	199	629
Mov Cap-2 Maneuver	-	-	-	-	-	-	174	199	-	169	199	-
Stage 1	-	-	-	-	-	-	427	439	-	594	575	-
Stage 2	-	-	-	-	-	-	588	575	-	409	439	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0.01			0.13			15.74			13.09		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	357	3	-	-	895	-	-	453
HCM Lane V/C Ratio	0.062	0.001	-	-	0.007	-	-	0.017
HCM Control Delay (s/veh)	15.7	8.2	0	-	9	-	-	13.1
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

HCM 7th Signalized Intersection Summary

2027 Total - No SH 55 Improvements

2: S 10th Ave & Karcher Rd

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	465	10	83	437	182	17	134	48	204	206	152
Future Volume (veh/h)	130	465	10	83	437	182	17	134	48	204	206	152
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1811	1870	1870	1870	1856	1796	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	134	479	10	86	451	188	18	138	49	210	212	157
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	6	2	2	2	3	7	2	2	3	2	2
Cap, veh/h	169	568	12	111	533	448	37	185	66	253	263	195
Arrive On Green	0.10	0.32	0.32	0.06	0.28	0.28	0.02	0.14	0.14	0.14	0.26	0.26
Sat Flow, veh/h	1739	1768	37	1781	1870	1572	1711	1318	468	1767	998	739
Grp Volume(v), veh/h	134	0	489	86	451	188	18	0	187	210	0	369
Grp Sat Flow(s),veh/h/ln	1739	0	1804	1781	1870	1572	1711	0	1786	1767	0	1737
Q Serve(g_s), s	4.8	0.0	16.2	3.1	14.6	6.2	0.7	0.0	6.5	7.4	0.0	12.8
Cycle Q Clear(g_c), s	4.8	0.0	16.2	3.1	14.6	6.2	0.7	0.0	6.5	7.4	0.0	12.8
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.26	1.00		0.43
Lane Grp Cap(c), veh/h	169	0	580	111	533	448	37	0	250	253	0	458
V/C Ratio(X)	0.79	0.00	0.84	0.78	0.85	0.42	0.49	0.00	0.75	0.83	0.00	0.81
Avail Cap(c_a), veh/h	262	0	1527	272	1583	1331	261	0	689	267	0	667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	20.3	29.7	21.7	18.7	31.1	0.0	26.5	26.8	0.0	22.1
Incr Delay (d2), s/veh	3.9	0.0	1.3	4.4	1.5	0.2	3.8	0.0	1.7	17.2	0.0	2.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.5	0.0	9.6	2.3	9.2	3.4	0.5	0.0	4.8	7.4	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.3	0.0	21.6	34.1	23.1	18.9	34.9	0.0	28.2	43.9	0.0	24.9
LnGrp LOS	C		C	C	C	B	C		C	D		C
Approach Vol, veh/h	623			725			205			579		
Approach Delay, s/veh	23.9			23.3			28.8			31.8		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.5	14.3	9.2	26.3	6.6	22.3	11.6	23.9				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 25	9.8	54.4	9.8	24.7	9.7	54.4				
Max Q Clear Time (g_c+I1), s	9.4	8.5	5.1	18.2	2.7	14.8	6.8	16.6				
Green Ext Time (p_c), s	0.0	0.6	0.0	1.6	0.0	1.1	0.0	1.7				

Intersection Summary

HCM 7th Control Delay, s/veh	26.3
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2027 Total - No SH 55 Improvements

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	465	10	83	437	182	17	134	48	204	206	152
Future Volume (vph)	130	465	10	83	437	182	17	134	48	204	206	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1788		1770	1863	1568	1687	1790		1752	1744	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	1788		1770	1863	1568	1687	1790		1752	1744	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	479	10	86	451	188	18	138	49	210	212	157
RTOR Reduction (vph)	0	1	0	0	0	94	0	10	0	0	20	0
Lane Group Flow (vph)	134	488	0	86	451	94	18	177	0	210	349	0
Heavy Vehicles (%)	5%	6%	2%	2%	2%	3%	7%	2%	2%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	10.1	30.8		6.7	27.3	27.3	2.2	17.6		10.1	25.5	
Effective Green, g (s)	10.1	30.8		6.7	27.3	27.3	2.2	17.6		10.1	25.5	
Actuated g/C Ratio	0.12	0.36		0.08	0.32	0.32	0.03	0.20		0.12	0.29	
Clearance Time (s)	5.3	5.6		5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	200	636		137	587	494	42	364		204	514	
v/s Ratio Prot	c0.08	c0.27		0.05	0.24		0.01	0.10		c0.12	c0.20	
v/s Ratio Perm						0.06						
v/c Ratio	0.67	0.77		0.63	0.77	0.19	0.43	0.49		1.03	0.68	
Uniform Delay, d1	36.6	24.7		38.7	26.7	21.6	41.5	30.4		38.2	26.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.7	5.0		6.3	5.4	0.1	2.5	0.4		70.9	2.8	
Delay (s)	43.3	29.7		45.0	32.2	21.6	44.1	30.8		109.1	29.7	
Level of Service	D	C		D	C	C	D	C		F	C	
Approach Delay (s/veh)		32.6			31.0			32.0			58.5	
Approach LOS		C			C			C			E	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			39.0			HCM 2000 Level of Service					D	
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			86.5			Sum of lost time (s)					21.4	
Intersection Capacity Utilization			72.3%			ICU Level of Service					C	
Analysis Period (min)			15									
c Critical Lane Group												

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Traffic Vol, veh/h	2	632	3	21	631	2	2	0	11	1	0	3
Future Vol, veh/h	2	632	3	21	631	2	2	0	11	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	5	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	658	3	22	657	2	2	0	11	1	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	659	0	0	661	0	0	1365	1367	660	1365	1368	658
Stage 1	-	-	-	-	-	-	664	664	-	702	702	-
Stage 2	-	-	-	-	-	-	701	703	-	663	666	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	929	-	-	927	-	-	125	147	463	125	147	464
Stage 1	-	-	-	-	-	-	450	458	-	429	440	-
Stage 2	-	-	-	-	-	-	429	440	-	451	458	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	929	-	-	927	-	-	120	143	463	118	143	464
Mov Cap-2 Maneuver	-	-	-	-	-	-	120	143	-	118	143	-
Stage 1	-	-	-	-	-	-	448	457	-	419	430	-
Stage 2	-	-	-	-	-	-	416	430	-	438	456	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0.03			0.29			16.67			18.64		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	322	6	-	-	927	-	-	268
HCM Lane V/C Ratio	0.042	0.002	-	-	0.024	-	-	0.016
HCM Control Delay (s/veh)	16.7	8.9	0	-	9	-	-	18.6
HCM Lane LOS	C	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

No Access on SH 55
2027 Total AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	136	451	9	34	306	336	14	137	75	175	93	85
Future Volume (veh/h)	136	451	9	34	306	336	14	137	75	175	93	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1796	1870	1870	1752	1856	1870	1870	1811	1781	1841	1767
Adj Flow Rate, veh/h	151	501	10	38	340	373	16	152	83	194	103	94
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	7	2	2	10	3	2	2	6	8	4	9
Cap, veh/h	188	1194	555	67	928	438	34	191	105	232	255	233
Arrive On Green	0.11	0.35	0.35	0.04	0.28	0.28	0.02	0.17	0.17	0.14	0.29	0.29
Sat Flow, veh/h	1753	3413	1585	1781	3328	1572	1781	1137	621	1697	886	809
Grp Volume(v), veh/h	151	501	10	38	340	373	16	0	235	194	0	197
Grp Sat Flow(s),veh/h/ln	1753	1706	1585	1781	1664	1572	1781	0	1759	1697	0	1695
Q Serve(g_s), s	5.9	7.8	0.3	1.5	5.7	15.6	0.6	0.0	8.9	7.8	0.0	6.5
Cycle Q Clear(g_c), s	5.9	7.8	0.3	1.5	5.7	15.6	0.6	0.0	8.9	7.8	0.0	6.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.35	1.00		0.48
Lane Grp Cap(c), veh/h	188	1194	555	67	928	438	34	0	296	232	0	487
V/C Ratio(X)	0.80	0.42	0.02	0.57	0.37	0.85	0.47	0.00	0.79	0.84	0.00	0.40
Avail Cap(c_a), veh/h	244	2422	1125	251	2362	1116	251	0	753	236	0	723
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.4	17.2	14.8	32.9	20.2	23.7	33.8	0.0	27.8	29.3	0.0	20.0
Incr Delay (d2), s/veh	10.4	0.1	0.0	2.8	0.1	1.8	3.7	0.0	1.8	20.6	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.9	4.6	0.2	1.1	3.4	8.8	0.5	0.0	6.6	7.7	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.8	17.3	14.8	35.8	20.3	25.6	37.5	0.0	29.6	49.9	0.0	20.2
LnGrp LOS	D	B	B	D	C	C	D		C	D		C
Approach Vol, veh/h	662			751			251			391		
Approach Delay, s/veh	22.6			23.7			30.1			34.9		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.8	17.0	7.8	30.0	6.5	25.3	12.8	25.0				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 30	9.8	49.4	9.8	29.7	9.7	49.4				
Max Q Clear Time (g_c+I1), s	9.8	10.9	3.5	9.8	2.6	8.5	7.9	17.6				
Green Ext Time (p_c), s	0.0	0.8	0.0	1.9	0.0	0.7	0.0	1.8				

Intersection Summary

HCM 7th Control Delay, s/veh 26.3
HCM 7th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2000 Intersection V/C
2: S 10th Ave & Karcher Rd

No Access on SH 55
2027 Total AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	451	9	34	306	336	14	137	75	175	93	85
Future Volume (vph)	136	451	9	34	306	336	14	137	75	175	93	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3374	1583	1770	3282	1568	1770	1740		1671	1658	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	3374	1583	1770	3282	1568	1770	1740		1671	1658	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	151	501	10	38	340	373	16	152	83	194	103	94
RTOR Reduction (vph)	0	0	7	0	0	297	0	17	0	0	23	0
Lane Group Flow (vph)	151	501	3	38	340	76	16	218	0	194	174	0
Heavy Vehicles (%)	4%	7%	2%	2%	10%	3%	2%	2%	6%	8%	4%	9%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	9.8	20.8	20.8	3.9	14.8	14.8	1.1	17.3		9.8	26.0	
Effective Green, g (s)	9.8	20.8	20.8	3.9	14.8	14.8	1.1	17.3		9.8	26.0	
Actuated g/C Ratio	0.13	0.28	0.28	0.05	0.20	0.20	0.02	0.24		0.13	0.36	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	232	960	450	94	664	317	26	411		224	589	
v/s Ratio Prot	c0.09	c0.15		0.02	0.10		0.01	c0.13		c0.12	0.10	
v/s Ratio Perm			0.00			0.05						
v/c Ratio	0.65	0.52	0.01	0.40	0.51	0.24	0.62	0.53		0.87	0.30	
Uniform Delay, d1	30.0	22.0	18.7	33.5	25.9	24.4	35.8	24.4		31.0	17.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	0.2	0.0	1.0	0.3	0.1	26.7	0.7		26.9	0.1	
Delay (s)	34.9	22.2	18.7	34.5	26.2	24.6	62.5	25.0		57.9	17.1	
Level of Service	C	C	B	C	C	C	E	C		E	B	
Approach Delay (s/veh)		25.1			25.8			27.4			37.3	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			28.0									
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			73.1									
Intersection Capacity Utilization			55.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th TWSC
3: S 10th Ave & Vista Dr

No Access on SH 55
2027 Total AM Peak Hour

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	6	1	182	130	12
Future Vol, veh/h	43	6	1	182	130	12
Conflicting Peds, #/hr	5	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	16	2	100	3	2	3
Mvmt Flow	48	7	1	202	144	13

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	361	151	158	0	-	0
Stage 1	151	-	-	-	-	-
Stage 2	209	-	-	-	-	-
Critical Hdwy	6.56	6.22	5.1	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.318	3.1	-	-	-
Pot Cap-1 Maneuver	611	895	993	-	-	-
Stage 1	844	-	-	-	-	-
Stage 2	793	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	610	895	993	-	-	-
Mov Cap-2 Maneuver	610	-	-	-	-	-
Stage 1	843	-	-	-	-	-
Stage 2	793	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.2	0.05	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	10	-	635	-	-
HCM Lane V/C Ratio	0.001	-	0.086	-	-
HCM Control Delay (s/veh)	8.6	0	11.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

No Access on SH 55
2027 Total PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	456	13	102	418	182	19	135	57	204	208	150
Future Volume (veh/h)	129	456	13	102	418	182	19	135	57	204	208	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1811	1870	1870	1870	1856	1796	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	133	470	13	105	431	188	20	139	59	210	214	155
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	6	2	2	2	3	7	2	2	3	2	2
Cap, veh/h	169	720	331	135	659	292	41	196	83	260	284	206
Arrive On Green	0.10	0.21	0.21	0.08	0.19	0.19	0.02	0.16	0.16	0.15	0.28	0.28
Sat Flow, veh/h	1739	3441	1585	1781	3554	1572	1711	1246	529	1767	1008	730
Grp Volume(v), veh/h	133	470	13	105	431	188	20	0	198	210	0	369
Grp Sat Flow(s),veh/h/ln	1739	1721	1585	1781	1777	1572	1711	0	1775	1767	0	1739
Q Serve(g_s), s	3.9	6.5	0.3	3.0	5.9	5.8	0.6	0.0	5.5	6.0	0.0	10.1
Cycle Q Clear(g_c), s	3.9	6.5	0.3	3.0	5.9	5.8	0.6	0.0	5.5	6.0	0.0	10.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.30	1.00		0.42
Lane Grp Cap(c), veh/h	169	720	331	135	659	292	41	0	279	260	0	490
V/C Ratio(X)	0.78	0.65	0.04	0.78	0.65	0.64	0.48	0.00	0.71	0.81	0.00	0.75
Avail Cap(c_a), veh/h	324	3264	1504	335	3371	1492	322	0	1016	329	0	992
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.0	18.9	16.4	23.6	19.7	19.6	25.1	0.0	20.8	21.5	0.0	17.0
Incr Delay (d2), s/veh	3.0	0.4	0.0	3.6	0.4	0.9	3.2	0.0	1.3	8.8	0.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.6	3.7	0.2	2.1	3.5	3.1	0.5	0.0	3.8	5.1	0.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.0	19.2	16.4	27.2	20.1	20.5	28.3	0.0	22.1	30.3	0.0	17.9
LnGrp LOS	C	B	B	C	C	C	C		C	C		B
Approach Vol, veh/h	616			724			218			579		
Approach Delay, s/veh	20.6			21.2			22.7			22.4		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	13.5	9.1	16.5	6.5	20.0	10.4	15.3				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	9.7	* 30	9.8	49.4	9.8	29.7	9.7	49.4				
Max Q Clear Time (g_c+I1), s	8.0	7.5	5.0	8.5	2.6	12.1	5.9	7.9				
Green Ext Time (p_c), s	0.1	0.7	0.0	1.7	0.0	1.3	0.0	1.8				

Intersection Summary

HCM 7th Control Delay, s/veh 21.5
HCM 7th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2000 Intersection V/C
2: S 10th Ave & Karcher Rd

No Access on SH 55
2027 Total PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	456	13	102	418	182	19	135	57	204	208	150
Future Volume (vph)	129	456	13	102	418	182	19	135	57	204	208	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3406	1583	1770	3539	1568	1687	1779		1752	1745	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3406	1583	1770	3539	1568	1687	1779		1752	1745	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	133	470	13	105	431	188	20	139	59	210	214	155
RTOR Reduction (vph)	0	0	10	0	0	152	0	13	0	0	19	0
Lane Group Flow (vph)	133	470	3	105	431	36	20	185	0	210	350	0
Heavy Vehicles (%)	5%	6%	2%	2%	2%	3%	7%	2%	2%	3%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	9.9	15.4	15.4	8.5	13.9	13.9	2.2	17.5		9.9	25.2	
Effective Green, g (s)	9.9	15.4	15.4	8.5	13.9	13.9	2.2	17.5		9.9	25.2	
Actuated g/C Ratio	0.14	0.21	0.21	0.12	0.19	0.19	0.03	0.24		0.14	0.35	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.6	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	234	722	335	207	677	300	51	428		238	605	
v/s Ratio Prot	c0.08	c0.14		0.06	0.12		0.01	0.10		c0.12	c0.20	
v/s Ratio Perm			0.00			0.02						
v/c Ratio	0.57	0.65	0.01	0.51	0.64	0.12	0.39	0.43		0.88	0.58	
Uniform Delay, d1	29.3	26.1	22.6	30.1	27.0	24.3	34.5	23.3		30.8	19.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	1.6	0.0	0.7	1.4	0.1	1.8	0.3		28.8	0.8	
Delay (s)	31.2	27.8	22.6	30.8	28.5	24.4	36.4	23.6		59.6	20.2	
Level of Service	C	C	C	C	C	C	D	C		E	C	
Approach Delay (s/veh)		28.4			27.7			24.8			34.5	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			29.5									
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			72.6							21.4		
Intersection Capacity Utilization			60.8%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th TWSC
3: S 10th Ave & Vista Dr

No Access on SH 55
2027 Total PM Peak Hour

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	2	8	177	261	55
Future Vol, veh/h	28	2	8	177	261	55
Conflicting Peds, #/hr	6	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	2	9	192	284	60

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	529	314	343	0	-	0
Stage 1	314	-	-	-	-	-
Stage 2	216	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	510	727	1216	-	-	-
Stage 1	741	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	506	727	1216	-	-	-
Mov Cap-2 Maneuver	506	-	-	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	820	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v12.44		0.35	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	78	-	516	-	-
HCM Lane V/C Ratio	0.007	-	0.063	-	-
HCM Control Delay (s/veh)	8	0	12.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

APPENDIX G: 2032 Background Synchro Reports

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

2032 Background
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	182	606	11	32	409	448	12	145	55	193	100	94
Future Volume (veh/h)	182	606	11	32	409	448	12	145	55	193	100	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1796	1870	1870	1752	1856	1870	1870	1811	1781	1841	1767
Adj Flow Rate, veh/h	202	673	12	36	454	498	13	161	61	214	111	104
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	7	2	2	10	3	2	2	6	8	4	9
Cap, veh/h	242	1379	640	61	995	705	28	199	76	253	253	237
Arrive On Green	0.14	0.40	0.40	0.03	0.30	0.30	0.02	0.15	0.15	0.15	0.29	0.29
Sat Flow, veh/h	1753	3413	1585	1781	3328	1572	1781	1293	490	1697	874	819
Grp Volume(v), veh/h	202	673	12	36	454	498	13	0	222	214	0	215
Grp Sat Flow(s),veh/h/ln	1753	1706	1585	1781	1664	1572	1781	0	1782	1697	0	1693
Q Serve(g_s), s	9.3	12.1	0.4	1.6	9.2	21.2	0.6	0.0	10.0	10.2	0.0	8.6
Cycle Q Clear(g_c), s	9.3	12.1	0.4	1.6	9.2	21.2	0.6	0.0	10.0	10.2	0.0	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.27	1.00		0.48
Lane Grp Cap(c), veh/h	242	1379	640	61	995	705	28	0	275	253	0	489
V/C Ratio(X)	0.84	0.49	0.02	0.59	0.46	0.71	0.47	0.00	0.81	0.85	0.00	0.44
Avail Cap(c_a), veh/h	629	2037	946	211	1183	793	211	0	857	609	0	1222
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.8	18.3	14.8	39.4	23.5	18.4	40.4	0.0	33.8	34.3	0.0	24.0
Incr Delay (d2), s/veh	2.9	0.1	0.0	3.4	0.1	1.9	4.5	0.0	2.2	3.0	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.8	7.3	0.2	1.3	5.8	10.9	0.5	0.0	7.7	7.6	0.0	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.7	18.4	14.8	42.8	23.7	20.4	44.9	0.0	36.0	37.3	0.0	24.2
LnGrp LOS	D	B	B	D	C	C	D		D	D		C
Approach Vol, veh/h	887			988			235			429		
Approach Delay, s/veh	22.7			22.7			36.5			30.7		
Approach LOS	C			C			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.6	18.1	8.0	39.0	6.5	29.2	16.7	30.3				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	29.7	* 40	9.8	49.4	9.8	59.7	29.7	29.4				
Max Q Clear Time (g_c+l1), s	12.2	12.0	3.6	14.1	2.6	10.6	11.3	23.2				
Green Ext Time (p_c), s	0.3	0.8	0.0	2.6	0.0	0.9	0.2	1.6				

Intersection Summary

HCM 7th Control Delay, s/veh 25.3
HCM 7th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2000 Intersection V/C

2: S 10th Ave & Karcher Rd

2032 Background
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	182	606	11	32	409	448	12	145	55	193	100	94
Future Volume (vph)	182	606	11	32	409	448	12	145	55	193	100	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3374	1583	1770	3282	1568	1770	1767		1671	1656	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	3374	1583	1770	3282	1568	1770	1767		1671	1656	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	202	673	12	36	454	498	13	161	61	214	111	104
RTOR Reduction (vph)	0	0	8	0	0	251	0	9	0	0	23	0
Lane Group Flow (vph)	202	673	4	36	454	247	13	213	0	214	192	0
Heavy Vehicles (%)	4%	7%	2%	2%	10%	3%	2%	2%	6%	8%	4%	9%
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	16.7	34.5	34.5	4.1	21.8	39.7	2.0	21.1		17.9	37.0	
Effective Green, g (s)	16.7	34.5	34.5	4.1	21.8	39.7	2.0	21.1		17.9	37.0	
Actuated g/C Ratio	0.17	0.35	0.35	0.04	0.22	0.40	0.02	0.21		0.18	0.37	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	293	1176	552	73	723	629	35	376		302	619	
v/s Ratio Prot	c0.12	c0.20		0.02	0.14	0.07	0.01	c0.12		c0.13	0.12	
v/s Ratio Perm			0.00			0.09						
v/c Ratio	0.69	0.57	0.01	0.49	0.63	0.39	0.37	0.57		0.71	0.31	
Uniform Delay, d1	38.7	26.2	21.0	46.4	34.9	21.0	47.8	34.8		38.0	21.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	0.4	0.0	1.9	1.2	0.1	2.4	1.2		6.1	0.1	
Delay (s)	44.0	26.6	21.0	48.3	36.1	21.2	50.2	36.0		44.1	22.0	
Level of Service	D	C	C	D	D	C	D	D		D	C	
Approach Delay (s/veh)		30.5			29.0			36.8			33.1	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			30.9									
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			98.9									
Intersection Capacity Utilization			62.0%									
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	5	1	195	142	3
Future Vol, veh/h	16	5	1	195	142	3
Conflicting Peds, #/hr	5	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	16	2	100	3	2	3
Mvmt Flow	18	6	1	217	158	3

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	383	159	161	0	-	0
Stage 1	159	-	-	-	-	-
Stage 2	224	-	-	-	-	-
Critical Hdwy	6.56	6.22	5.1	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.318	3.1	-	-	-
Pot Cap-1 Maneuver	593	886	990	-	-	-
Stage 1	836	-	-	-	-	-
Stage 2	781	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	592	886	990	-	-	-
Mov Cap-2 Maneuver	592	-	-	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	781	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v10.81		0.04	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	9	-	643	-	-
HCM Lane V/C Ratio	0.001	-	0.036	-	-
HCM Control Delay (s/veh)	8.6	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

2032 Background
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	173	611	11	92	561	243	18	145	45	225	222	165
Future Volume (veh/h)	173	611	11	92	561	243	18	145	45	225	222	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1811	1870	1870	1870	1856	1796	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	178	630	11	95	578	251	19	149	46	232	229	170
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	6	2	2	2	3	7	2	2	3	2	2
Cap, veh/h	223	977	450	122	792	602	38	201	62	283	285	212
Arrive On Green	0.13	0.28	0.28	0.07	0.22	0.22	0.02	0.15	0.15	0.16	0.29	0.29
Sat Flow, veh/h	1739	3441	1585	1781	3554	1572	1711	1371	423	1767	997	740
Grp Volume(v), veh/h	178	630	11	95	578	251	19	0	195	232	0	399
Grp Sat Flow(s),veh/h/ln	1739	1721	1585	1781	1777	1572	1711	0	1794	1767	0	1737
Q Serve(g_s), s	6.2	10.1	0.3	3.3	9.5	7.4	0.7	0.0	6.5	8.0	0.0	13.4
Cycle Q Clear(g_c), s	6.2	10.1	0.3	3.3	9.5	7.4	0.7	0.0	6.5	8.0	0.0	13.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.24	1.00		0.43
Lane Grp Cap(c), veh/h	223	977	450	122	792	602	38	0	263	283	0	497
V/C Ratio(X)	0.80	0.64	0.02	0.78	0.73	0.42	0.49	0.00	0.74	0.82	0.00	0.80
Avail Cap(c_a), veh/h	684	3253	1498	278	2511	1363	267	0	994	695	0	1374
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.6	19.7	16.2	28.8	22.7	14.2	30.4	0.0	25.7	25.5	0.0	20.8
Incr Delay (d2), s/veh	2.5	0.3	0.0	4.0	0.5	0.2	3.6	0.0	1.6	2.2	0.0	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.3	6.0	0.2	2.5	6.0	3.7	0.6	0.0	4.8	5.9	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.1	20.0	16.2	32.7	23.2	14.4	34.0	0.0	27.2	27.8	0.0	22.0
LnGrp LOS	C	B	B	C	C	B	C		C	C		C
Approach Vol, veh/h	819			924			214			631		
Approach Delay, s/veh	21.9			21.8			27.8			24.1		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.4	14.5	9.5	23.4	6.6	23.3	13.4	19.6				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	24.7	* 35	9.8	59.4	9.8	49.7	24.7	44.4				
Max Q Clear Time (g_c+I1), s	10.0	8.5	5.3	12.1	2.7	15.4	8.2	11.5				
Green Ext Time (p_c), s	0.3	0.7	0.0	2.4	0.0	1.7	0.2	2.5				

Intersection Summary

HCM 7th Control Delay, s/veh	22.9
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2000 Intersection V/C 2: S 10th Ave & Karcher Rd

2032 Background
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	173	611	11	92	561	243	18	145	45	225	222	165
Future Volume (vph)	173	611	11	92	561	243	18	145	45	225	222	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3406	1583	1770	3539	1568	1687	1797		1752	1744	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3406	1583	1770	3539	1568	1687	1797		1752	1744	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	178	630	11	95	578	251	19	149	46	232	229	170
RTOR Reduction (vph)	0	0	8	0	0	139	0	8	0	0	17	0
Lane Group Flow (vph)	178	630	3	95	578	112	19	187	0	232	382	0
Heavy Vehicles (%)	5%	6%	2%	2%	2%	3%	7%	2%	2%	3%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	15.2	27.1	27.1	9.5	21.3	39.6	2.3	19.1		18.3	35.1	
Effective Green, g (s)	15.2	27.1	27.1	9.5	21.3	39.6	2.3	19.1		18.3	35.1	
Actuated g/C Ratio	0.16	0.28	0.28	0.10	0.22	0.42	0.02	0.20		0.19	0.37	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	274	968	450	176	790	651	40	360		336	642	
v/s Ratio Prot	c0.10	c0.18		0.05	c0.16	0.03	0.01	0.10		c0.13	c0.22	
v/s Ratio Perm			0.00			0.04						
v/c Ratio	0.65	0.65	0.01	0.54	0.73	0.17	0.48	0.52		0.69	0.59	
Uniform Delay, d1	37.6	29.9	24.5	40.8	34.3	17.5	45.9	34.0		35.9	24.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	1.2	0.0	1.6	3.0	0.0	3.2	0.5		4.9	1.0	
Delay (s)	41.5	31.1	24.5	42.4	37.4	17.6	49.1	34.5		40.7	25.3	
Level of Service	D	C	C	D	D	B	D	C		D	C	
Approach Delay (s/veh)		33.3			32.5			35.8			31.0	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			32.7									
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			95.3							21.4		
Intersection Capacity Utilization			68.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	1	7	192	282	27
Future Vol, veh/h	11	1	7	192	282	27
Conflicting Peds, #/hr	6	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	1	8	209	307	29

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	551	321	336	0	-	0
Stage 1	321	-	-	-	-	-
Stage 2	230	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	495	720	1223	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	492	720	1223	-	-	-
Mov Cap-2 Maneuver	492	-	-	-	-	-
Stage 1	730	-	-	-	-	-
Stage 2	808	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v12.32		0.28	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	63	-	505	-	-
HCM Lane V/C Ratio	0.006	-	0.026	-	-
HCM Control Delay (s/veh)	8	0	12.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

APPENDIX H: 2032 Total Synchro Reports

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

2032 Total
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	620	11	34	414	448	12	146	63	193	100	95
Future Volume (veh/h)	184	620	11	34	414	448	12	146	63	193	100	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1796	1870	1870	1752	1856	1870	1870	1811	1781	1841	1767
Adj Flow Rate, veh/h	204	689	12	38	460	498	13	162	70	214	111	106
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	7	2	2	10	3	2	2	6	8	4	9
Cap, veh/h	242	1398	649	62	1016	713	28	197	85	251	253	242
Arrive On Green	0.14	0.41	0.41	0.03	0.31	0.31	0.02	0.16	0.16	0.15	0.29	0.29
Sat Flow, veh/h	1753	3413	1585	1781	3328	1572	1781	1239	535	1697	865	826
Grp Volume(v), veh/h	204	689	12	38	460	498	13	0	232	214	0	217
Grp Sat Flow(s),veh/h/ln	1753	1706	1585	1781	1664	1572	1781	0	1774	1697	0	1692
Q Serve(g_s), s	9.8	12.9	0.4	1.8	9.6	21.8	0.6	0.0	10.9	10.6	0.0	9.0
Cycle Q Clear(g_c), s	9.8	12.9	0.4	1.8	9.6	21.8	0.6	0.0	10.9	10.6	0.0	9.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.30	1.00		0.49
Lane Grp Cap(c), veh/h	242	1398	649	62	1016	713	28	0	282	251	0	495
V/C Ratio(X)	0.84	0.49	0.02	0.62	0.45	0.70	0.47	0.00	0.82	0.85	0.00	0.44
Avail Cap(c_a), veh/h	503	2355	1094	203	1717	1044	203	0	717	487	0	977
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.2	18.8	15.1	41.0	24.1	18.8	42.0	0.0	35.0	35.8	0.0	24.7
Incr Delay (d2), s/veh	3.1	0.1	0.0	3.7	0.1	0.5	4.6	0.0	2.3	3.2	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.3	7.8	0.2	1.4	6.1	10.9	0.5	0.0	8.3	7.9	0.0	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.3	18.9	15.1	44.6	24.2	19.3	46.6	0.0	37.3	38.9	0.0	24.9
LnGrp LOS	D	B	B	D	C	B	D		D	D		C
Approach Vol, veh/h	905			996			245			431		
Approach Delay, s/veh	23.4			22.5			37.8			31.9		
Approach LOS	C			C			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	19.0	8.2	40.9	6.5	30.5	17.2	31.9				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	24.7	* 35	9.8	59.4	9.8	49.7	24.7	44.4				
Max Q Clear Time (g_c+I1), s	12.6	12.9	3.8	14.9	2.6	11.0	11.8	23.8				
Green Ext Time (p_c), s	0.2	0.8	0.0	2.7	0.0	0.9	0.2	2.4				

Intersection Summary

HCM 7th Control Delay, s/veh 25.9
HCM 7th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2032 Total
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	620	11	34	414	448	12	146	63	193	100	95
Future Volume (vph)	184	620	11	34	414	448	12	146	63	193	100	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3374	1583	1770	3282	1568	1770	1758		1671	1654	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	3374	1583	1770	3282	1568	1770	1758		1671	1654	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	204	689	12	38	460	498	13	162	70	214	111	106
RTOR Reduction (vph)	0	0	8	0	0	216	0	11	0	0	21	0
Lane Group Flow (vph)	204	689	4	38	460	282	13	221	0	214	196	0
Heavy Vehicles (%)	4%	7%	2%	2%	10%	3%	2%	2%	6%	8%	4%	9%
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	16.6	34.5	34.5	4.2	22.0	39.9	2.1	21.3		17.9	37.1	
Effective Green, g (s)	16.6	34.5	34.5	4.2	22.0	39.9	2.1	21.3		17.9	37.1	
Actuated g/C Ratio	0.17	0.35	0.35	0.04	0.22	0.40	0.02	0.21		0.18	0.37	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	290	1173	550	74	727	630	37	377		301	618	
v/s Ratio Prot	c0.12	c0.20		0.02	0.14	0.08	0.01	c0.13		c0.13	0.12	
v/s Ratio Perm			0.00			0.10						
v/c Ratio	0.70	0.59	0.01	0.51	0.63	0.45	0.35	0.59		0.71	0.32	
Uniform Delay, d1	39.0	26.5	21.2	46.5	34.9	21.6	47.9	35.0		38.2	22.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.2	0.5	0.0	2.5	1.3	0.2	2.1	1.5		6.4	0.1	
Delay (s)	45.2	27.0	21.2	49.0	36.3	21.8	50.0	36.5		44.7	22.2	
Level of Service	D	C	C	D	D	C	D	D		D	C	
Approach Delay (s/veh)		31.0			29.5			37.2			33.3	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			31.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			99.2			Sum of lost time (s)			21.4			
Intersection Capacity Utilization			62.6%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th TWSC
3: S 10th Ave & Vista Dr

2032 Total
AM Peak Hour

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	7	1	195	142	5
Future Vol, veh/h	25	7	1	195	142	5
Conflicting Peds, #/hr	5	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	16	2	100	3	2	3
Mvmt Flow	28	8	1	217	158	6

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	384	161	163	0	-	0
Stage 1	161	-	-	-	-	-
Stage 2	224	-	-	-	-	-
Critical Hdwy	6.56	6.22	5.1	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.318	3.1	-	-	-
Pot Cap-1 Maneuver	592	884	988	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	781	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	591	884	988	-	-	-
Mov Cap-2 Maneuver	591	-	-	-	-	-
Stage 1	834	-	-	-	-	-
Stage 2	781	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v10.98		0.04	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	9	-	637	-	-
HCM Lane V/C Ratio	0.001	-	0.056	-	-
HCM Control Delay (s/veh)	8.6	0	11	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

HCM 7th TWSC
4: Access/Ashland Dr & Karcher Rd

2032 Total
AM Peak Hour

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	853	1	6	517	0	3	0	17	1	0	8
Future Vol, veh/h	2	853	1	6	517	0	3	0	17	1	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	6	2	2	8	2	2	2	2	2	2	2
Mvmt Flow	2	937	1	7	568	0	3	0	19	1	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	568	0	0	938	0	0	1240	1524	469	1054	1524	284
Stage 1	-	-	-	-	-	-	942	942	-	581	581	-
Stage 2	-	-	-	-	-	-	297	581	-	473	943	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1000	-	-	726	-	-	132	117	541	180	117	713
Stage 1	-	-	-	-	-	-	283	340	-	466	498	-
Stage 2	-	-	-	-	-	-	687	498	-	541	339	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1000	-	-	726	-	-	128	116	541	172	116	713
Mov Cap-2 Maneuver	-	-	-	-	-	-	226	233	-	300	231	-
Stage 1	-	-	-	-	-	-	282	339	-	462	493	-
Stage 2	-	-	-	-	-	-	672	493	-	521	339	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0.02			0.11			13.46			10.92		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	447	1000	-	-	726	-	-	618
HCM Lane V/C Ratio	0.049	0.002	-	-	0.009	-	-	0.016
HCM Control Delay (s/veh)	13.5	8.6	-	-	10	-	-	10.9
HCM Lane LOS	B	A	-	-	B	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

2032 Total
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	174	620	11	97	580	243	18	146	50	225	224	167
Future Volume (veh/h)	174	620	11	97	580	243	18	146	50	225	224	167
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1811	1870	1870	1870	1856	1796	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	179	639	11	100	598	251	19	151	52	232	231	172
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	6	2	2	2	3	7	2	2	3	2	2
Cap, veh/h	223	982	452	129	809	609	38	201	69	282	288	215
Arrive On Green	0.13	0.29	0.29	0.07	0.23	0.23	0.02	0.15	0.15	0.16	0.29	0.29
Sat Flow, veh/h	1739	3441	1585	1781	3554	1572	1711	1330	458	1767	996	741
Grp Volume(v), veh/h	179	639	11	100	598	251	19	0	203	232	0	403
Grp Sat Flow(s),veh/h/ln	1739	1721	1585	1781	1777	1572	1711	0	1788	1767	0	1737
Q Serve(g_s), s	6.4	10.5	0.3	3.6	10.1	7.5	0.7	0.0	7.0	8.2	0.0	13.8
Cycle Q Clear(g_c), s	6.4	10.5	0.3	3.6	10.1	7.5	0.7	0.0	7.0	8.2	0.0	13.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.26	1.00		0.43
Lane Grp Cap(c), veh/h	223	982	452	129	809	609	38	0	270	282	0	503
V/C Ratio(X)	0.80	0.65	0.02	0.78	0.74	0.41	0.50	0.00	0.75	0.82	0.00	0.80
Avail Cap(c_a), veh/h	666	3170	1460	271	2447	1334	260	0	965	677	0	1339
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.3	20.2	16.6	29.4	23.1	14.4	31.2	0.0	26.2	26.2	0.0	21.2
Incr Delay (d2), s/veh	2.5	0.3	0.0	3.8	0.5	0.2	3.7	0.0	1.6	2.3	0.0	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.4	6.3	0.2	2.6	6.5	3.8	0.6	0.0	5.2	6.1	0.0	9.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.8	20.5	16.6	33.2	23.6	14.6	34.8	0.0	27.8	28.5	0.0	22.3
LnGrp LOS	C	C	B	C	C	B	C		C	C		C
Approach Vol, veh/h	829			949			222			635		
Approach Delay, s/veh	22.5			22.2			28.4			24.6		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.6	15.0	9.9	24.0	6.6	24.0	13.6	20.3				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	24.7	* 35	9.8	59.4	9.8	49.7	24.7	44.4				
Max Q Clear Time (g_c+I1), s	10.2	9.0	5.6	12.5	2.7	15.8	8.4	12.1				
Green Ext Time (p_c), s	0.3	0.7	0.0	2.5	0.0	1.7	0.2	2.6				

Intersection Summary

HCM 7th Control Delay, s/veh	23.4
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2000 Intersection V/C
2: S 10th Ave & Karcher Rd

2032 Total
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (vph)	174	620	11	97	580	243	18	146	50	225	224	167
Future Volume (vph)	174	620	11	97	580	243	18	146	50	225	224	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3406	1583	1770	3539	1568	1687	1791		1752	1743	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3406	1583	1770	3539	1568	1687	1791		1752	1743	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	179	639	11	100	598	251	19	151	52	232	231	172
RTOR Reduction (vph)	0	0	8	0	0	133	0	9	0	0	17	0
Lane Group Flow (vph)	179	639	3	100	598	118	19	194	0	232	386	0
Heavy Vehicles (%)	5%	6%	2%	2%	2%	3%	7%	2%	2%	3%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	15.5	28.0	28.0	9.8	22.2	40.7	2.3	19.7		18.5	35.9	
Effective Green, g (s)	15.5	28.0	28.0	9.8	22.2	40.7	2.3	19.7		18.5	35.9	
Actuated g/C Ratio	0.16	0.29	0.29	0.10	0.23	0.42	0.02	0.20		0.19	0.37	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	273	980	455	178	807	655	39	362		333	643	
v/s Ratio Prot	c0.10	c0.19		0.06	c0.17	0.03	0.01	0.11		c0.13	c0.22	
v/s Ratio Perm			0.00			0.04						
v/c Ratio	0.66	0.65	0.01	0.56	0.74	0.18	0.49	0.54		0.70	0.60	
Uniform Delay, d1	38.4	30.4	24.7	41.7	34.9	17.8	46.9	34.7		36.8	24.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	1.2	0.0	2.4	3.2	0.0	3.5	0.8		5.1	1.1	
Delay (s)	42.7	31.6	24.7	44.1	38.1	17.8	50.4	35.5		41.8	26.0	
Level of Service	D	C	C	D	D	B	D	D		D	C	
Approach Delay (s/veh)		33.9			33.4			36.8			31.8	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			33.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			97.3			Sum of lost time (s)			21.4			
Intersection Capacity Utilization			69.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th TWSC
3: S 10th Ave & Vista Dr

2032 Total
PM Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	2	9	192	282	33
Future Vol, veh/h	17	2	9	192	282	33
Conflicting Peds, #/hr	6	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	2	10	209	307	36

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	559	324	342	0	-	0
Stage 1	324	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	490	717	1217	-	-	-
Stage 1	733	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	486	717	1217	-	-	-
Mov Cap-2 Maneuver	486	-	-	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	805	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.46	0.36	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	81	-	503	-	-
HCM Lane V/C Ratio	0.008	-	0.041	-	-
HCM Control Delay (s/veh)	8	0	12.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 7th TWSC
4: Access/Ashland Dr & Karcher Rd

2032 Total
PM Peak Hour

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	844	3	21	845	3	2	0	11	1	0	3
Future Vol, veh/h	3	844	3	21	845	3	2	0	11	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	5	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	879	3	22	880	3	2	0	11	1	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	883	0	0	882	0	0	1371	1814	441	1370	1813	440
Stage 1	-	-	-	-	-	-	887	887	-	924	924	-
Stage 2	-	-	-	-	-	-	484	927	-	446	889	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	762	-	-	762	-	-	105	77	564	105	78	565
Stage 1	-	-	-	-	-	-	305	360	-	290	346	-
Stage 2	-	-	-	-	-	-	533	345	-	561	360	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	762	-	-	762	-	-	101	75	564	100	75	565
Mov Cap-2 Maneuver	-	-	-	-	-	-	216	192	-	207	188	-
Stage 1	-	-	-	-	-	-	304	359	-	282	336	-
Stage 2	-	-	-	-	-	-	515	335	-	548	358	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0.03			0.24			13.21			14.22		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	452	762	-	-	762	-	-	395
HCM Lane V/C Ratio	0.03	0.004	-	-	0.029	-	-	0.011
HCM Control Delay (s/veh)	13.2	9.7	-	-	9.9	-	-	14.2
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

No Access on SH 55
2032 Total AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	182	606	12	39	409	448	15	148	77	193	101	94
Future Volume (veh/h)	182	606	12	39	409	448	15	148	77	193	101	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1796	1870	1870	1752	1856	1870	1870	1811	1781	1841	1767
Adj Flow Rate, veh/h	202	673	13	43	454	498	17	164	86	214	112	104
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	7	2	2	10	3	2	2	6	8	4	9
Cap, veh/h	239	1381	641	66	1012	710	34	196	103	250	263	244
Arrive On Green	0.14	0.40	0.40	0.04	0.30	0.30	0.02	0.17	0.17	0.15	0.30	0.30
Sat Flow, veh/h	1753	3413	1585	1781	3328	1572	1781	1155	606	1697	878	816
Grp Volume(v), veh/h	202	673	13	43	454	498	17	0	250	214	0	216
Grp Sat Flow(s),veh/h/ln	1753	1706	1585	1781	1664	1572	1781	0	1761	1697	0	1694
Q Serve(g_s), s	10.0	13.0	0.4	2.1	9.7	22.5	0.8	0.0	12.2	10.9	0.0	9.1
Cycle Q Clear(g_c), s	10.0	13.0	0.4	2.1	9.7	22.5	0.8	0.0	12.2	10.9	0.0	9.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.34	1.00		0.48
Lane Grp Cap(c), veh/h	239	1381	641	66	1012	710	34	0	299	250	0	506
V/C Ratio(X)	0.85	0.49	0.02	0.66	0.45	0.70	0.49	0.00	0.84	0.86	0.00	0.43
Avail Cap(c_a), veh/h	488	2287	1062	197	1667	1019	197	0	691	473	0	950
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.4	19.6	15.8	42.1	24.9	19.5	43.0	0.0	35.6	36.9	0.0	25.0
Incr Delay (d2), s/veh	3.2	0.1	0.0	4.1	0.1	0.5	4.0	0.0	2.4	3.3	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.5	7.9	0.3	1.7	6.2	11.4	0.7	0.0	9.0	8.1	0.0	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.5	19.7	15.8	46.2	25.0	20.0	47.1	0.0	38.0	40.1	0.0	25.2
LnGrp LOS	D	B	B	D	C	B	D		D	D		C
Approach Vol, veh/h	888			995			267			430		
Approach Delay, s/veh	24.4			23.4			38.6			32.6		
Approach LOS	C			C			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.4	20.3	8.5	41.5	6.9	31.8	17.4	32.6				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	24.7	* 35	9.8	59.4	9.8	49.7	24.7	44.4				
Max Q Clear Time (g_c+l1), s	12.9	14.2	4.1	15.0	2.8	11.1	12.0	24.5				
Green Ext Time (p_c), s	0.2	0.9	0.0	2.6	0.0	0.8	0.2	2.4				

Intersection Summary

HCM 7th Control Delay, s/veh 26.8
HCM 7th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2000 Intersection V/C
2: S 10th Ave & Karcher Rd

No Access on SH 55
2032 Total AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (vph)	182	606	12	39	409	448	15	148	77	193	101	94
Future Volume (vph)	182	606	12	39	409	448	15	148	77	193	101	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3374	1583	1770	3282	1568	1770	1743		1671	1657	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	3374	1583	1770	3282	1568	1770	1743		1671	1657	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	202	673	13	43	454	498	17	164	86	214	112	104
RTOR Reduction (vph)	0	0	9	0	0	217	0	12	0	0	20	0
Lane Group Flow (vph)	202	673	4	43	454	281	17	238	0	214	196	0
Heavy Vehicles (%)	4%	7%	2%	2%	10%	3%	2%	2%	6%	8%	4%	9%
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	16.6	34.3	34.3	4.4	22.0	40.0	2.2	22.4		18.0	38.2	
Effective Green, g (s)	16.6	34.3	34.3	4.4	22.0	40.0	2.2	22.4		18.0	38.2	
Actuated g/C Ratio	0.17	0.34	0.34	0.04	0.22	0.40	0.02	0.22		0.18	0.38	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	287	1152	540	77	719	624	38	388		299	630	
v/s Ratio Prot	c0.12	c0.20		0.02	0.14	0.08	0.01	c0.14		c0.13	0.12	
v/s Ratio Perm			0.00			0.10						
v/c Ratio	0.70	0.58	0.01	0.56	0.63	0.45	0.45	0.61		0.72	0.31	
Uniform Delay, d1	39.6	27.2	21.8	47.0	35.5	22.1	48.5	35.1		38.8	21.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.3	0.5	0.0	4.9	1.3	0.2	3.0	2.0		6.6	0.1	
Delay (s)	45.8	27.7	21.8	52.0	36.9	22.3	51.5	37.1		45.4	22.0	
Level of Service	D	C	C	D	D	C	D	D		D	C	
Approach Delay (s/veh)		31.7			30.2			38.0			33.6	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			32.1									
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			100.4									
Intersection Capacity Utilization			63.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th TWSC
3: S 10th Ave & Vista Dr

No Access on SH 55
2032 Total AM Peak Hour

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	44	7	1	195	142	12
Future Vol, veh/h	44	7	1	195	142	12
Conflicting Peds, #/hr	5	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	16	2	100	3	2	3
Mvmt Flow	49	8	1	217	158	13

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	388	164	171	0	-	0
Stage 1	164	-	-	-	-	-
Stage 2	224	-	-	-	-	-
Critical Hdwy	6.56	6.22	5.1	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.318	3.1	-	-	-
Pot Cap-1 Maneuver	589	880	980	-	-	-
Stage 1	832	-	-	-	-	-
Stage 2	781	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	588	880	980	-	-	-
Mov Cap-2 Maneuver	588	-	-	-	-	-
Stage 1	831	-	-	-	-	-
Stage 2	781	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.43	0.04	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	9	-	616	-	-
HCM Lane V/C Ratio	0.001	-	0.092	-	-
HCM Control Delay (s/veh)	8.7	0	11.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

HCM 7th Signalized Intersection Summary

2: S 10th Ave & Karcher Rd

No Access on SH 55
2032 Total PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	173	611	14	116	561	243	20	147	59	225	226	165
Future Volume (veh/h)	173	611	14	116	561	243	20	147	59	225	226	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1811	1870	1870	1870	1856	1796	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	178	630	14	120	578	251	21	152	61	232	233	170
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	6	2	2	2	3	7	2	2	3	2	2
Cap, veh/h	222	910	419	154	787	599	42	200	80	282	296	216
Arrive On Green	0.13	0.26	0.26	0.09	0.22	0.22	0.02	0.16	0.16	0.16	0.29	0.29
Sat Flow, veh/h	1739	3441	1585	1781	3554	1572	1711	1269	509	1767	1005	733
Grp Volume(v), veh/h	178	630	14	120	578	251	21	0	213	232	0	403
Grp Sat Flow(s),veh/h/ln	1739	1721	1585	1781	1777	1572	1711	0	1779	1767	0	1738
Q Serve(g_s), s	6.4	10.6	0.4	4.3	9.7	7.6	0.8	0.0	7.4	8.2	0.0	13.7
Cycle Q Clear(g_c), s	6.4	10.6	0.4	4.3	9.7	7.6	0.8	0.0	7.4	8.2	0.0	13.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.29	1.00		0.42
Lane Grp Cap(c), veh/h	222	910	419	154	787	599	42	0	280	282	0	512
V/C Ratio(X)	0.80	0.69	0.03	0.78	0.73	0.42	0.50	0.00	0.76	0.82	0.00	0.79
Avail Cap(c_a), veh/h	667	3173	1462	271	2450	1335	260	0	961	678	0	1341
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.3	21.3	17.6	28.8	23.3	14.7	31.0	0.0	26.0	26.2	0.0	20.9
Incr Delay (d2), s/veh	2.5	0.4	0.0	3.2	0.5	0.2	3.5	0.0	1.6	2.3	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.4	6.4	0.2	3.1	6.3	3.8	0.6	0.0	5.4	6.1	0.0	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.8	21.7	17.6	32.1	23.8	14.9	34.5	0.0	27.6	28.5	0.0	21.9
LnGrp LOS	C	C	B	C	C	B	C		C	C		C
Approach Vol, veh/h	822			949			234			635		
Approach Delay, s/veh	23.4			22.5			28.2			24.3		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.6	15.4	10.8	22.6	6.8	24.3	13.5	19.9				
Change Period (Y+Rc), s	5.3	* 5.3	5.2	5.6	5.2	5.3	5.3	5.6				
Max Green Setting (Gmax), s	24.7	* 35	9.8	59.4	9.8	49.7	24.7	44.4				
Max Q Clear Time (g_c+I1), s	10.2	9.4	6.3	12.6	2.8	15.7	8.4	11.7				
Green Ext Time (p_c), s	0.3	0.8	0.0	2.4	0.0	1.7	0.2	2.5				

Intersection Summary

HCM 7th Control Delay, s/veh 23.7
HCM 7th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2000 Intersection V/C
2: S 10th Ave & Karcher Rd

No Access on SH 55
2032 Total PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	173	611	14	116	561	243	20	147	59	225	226	165
Future Volume (vph)	173	611	14	116	561	243	20	147	59	225	226	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3406	1583	1770	3539	1568	1687	1783		1752	1745	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3406	1583	1770	3539	1568	1687	1783		1752	1745	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	178	630	14	120	578	251	21	152	61	232	233	170
RTOR Reduction (vph)	0	0	10	0	0	138	0	10	0	0	16	0
Lane Group Flow (vph)	178	630	4	120	578	113	21	203	0	232	387	0
Heavy Vehicles (%)	5%	6%	2%	2%	2%	3%	7%	2%	2%	3%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	15.4	27.4	27.4	10.3	22.2	40.6	2.4	20.1		18.4	36.1	
Effective Green, g (s)	15.4	27.4	27.4	10.3	22.2	40.6	2.4	20.1		18.4	36.1	
Actuated g/C Ratio	0.16	0.28	0.28	0.11	0.23	0.42	0.02	0.21		0.19	0.37	
Clearance Time (s)	5.3	5.6	5.6	5.2	5.6	5.3	5.2	5.2		5.3	5.3	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	271	957	444	186	805	652	41	367		330	646	
v/s Ratio Prot	c0.10	c0.18		0.07	0.16	0.03	0.01	0.11		c0.13	c0.22	
v/s Ratio Perm			0.00			0.04						
v/c Ratio	0.66	0.66	0.01	0.65	0.72	0.17	0.51	0.55		0.70	0.60	
Uniform Delay, d1	38.6	30.9	25.3	41.8	34.8	17.9	47.0	34.7		37.0	24.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	1.3	0.0	5.6	2.6	0.0	4.4	1.0		5.5	1.0	
Delay (s)	42.9	32.2	25.3	47.5	37.3	17.9	51.4	35.7		42.5	25.8	
Level of Service	D	C	C	D	D	B	D	D		D	C	
Approach Delay (s/veh)		34.4			33.5			37.1			31.9	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			33.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			97.5			Sum of lost time (s)			21.4			
Intersection Capacity Utilization			69.1%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th TWSC
3: S 10th Ave & Vista Dr

No Access on SH 55
2032 Total PM Peak Hour

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	2	9	192	282	57
Future Vol, veh/h	29	2	9	192	282	57
Conflicting Peds, #/hr	6	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	2	10	209	307	62

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	572	337	368	0	-	0
Stage 1	337	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	482	705	1190	-	-	-
Stage 1	723	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	477	705	1190	-	-	-
Mov Cap-2 Maneuver	477	-	-	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	805	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v12.93		0.36	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	81	-	487	-	-
HCM Lane V/C Ratio	0.008	-	0.069	-	-
HCM Control Delay (s/veh)	8.1	0	12.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

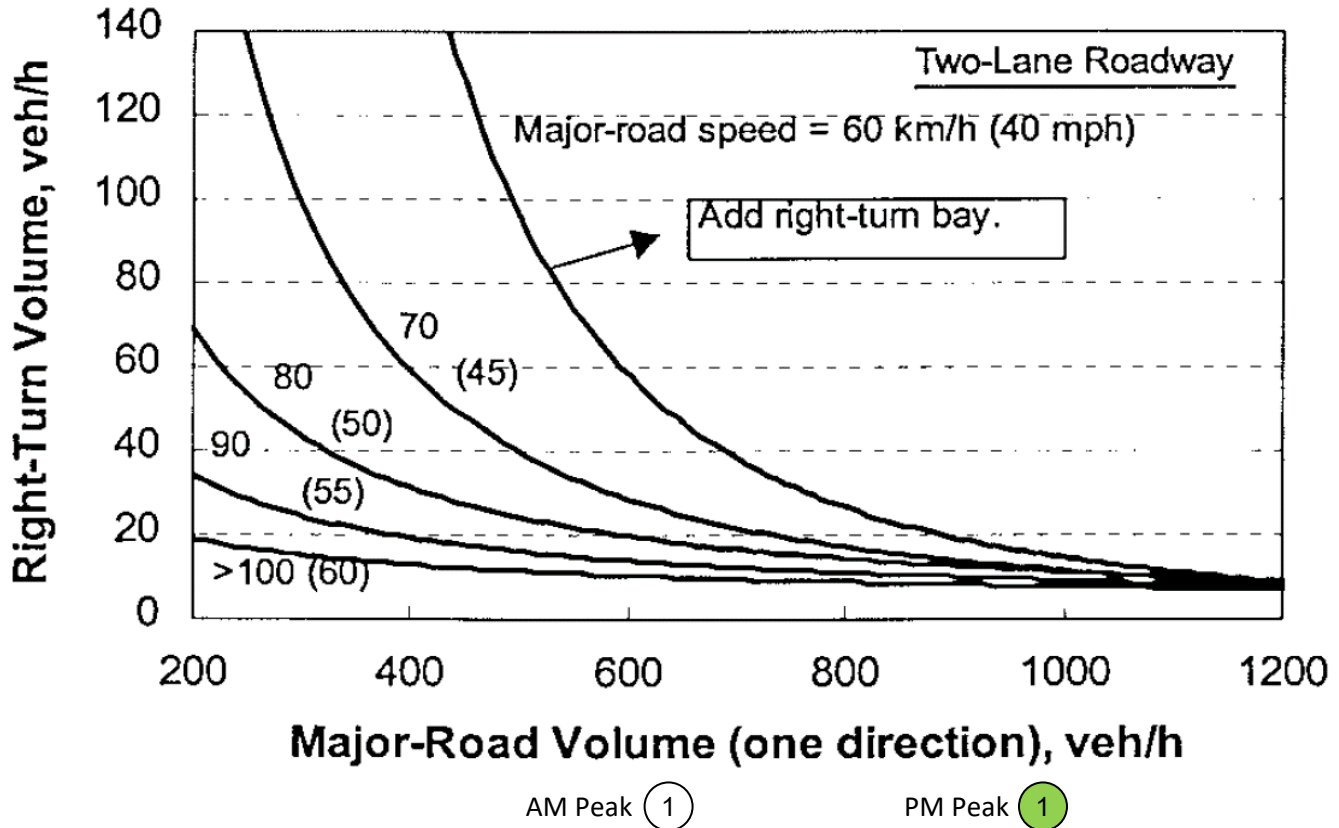
APPENDIX I: Turn Lane Guidelines Worksheets

**Tillman Ridge Subdivision
Canyon County, Idaho**

**NCHRP 457 Right-Turn Lane Analysis
2024 Existing Traffic**

	Intersection	Approach	Speed Limit	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vph)	Meet Warrant?
①	Vista Drive & S 10th Avenue	SB	35	AM	1	106	No*
				PM	11	196	No*

* Right-Turn Volume Less Than 10 vph or Major Road Volume Less Than 200 vph - Not Warranted

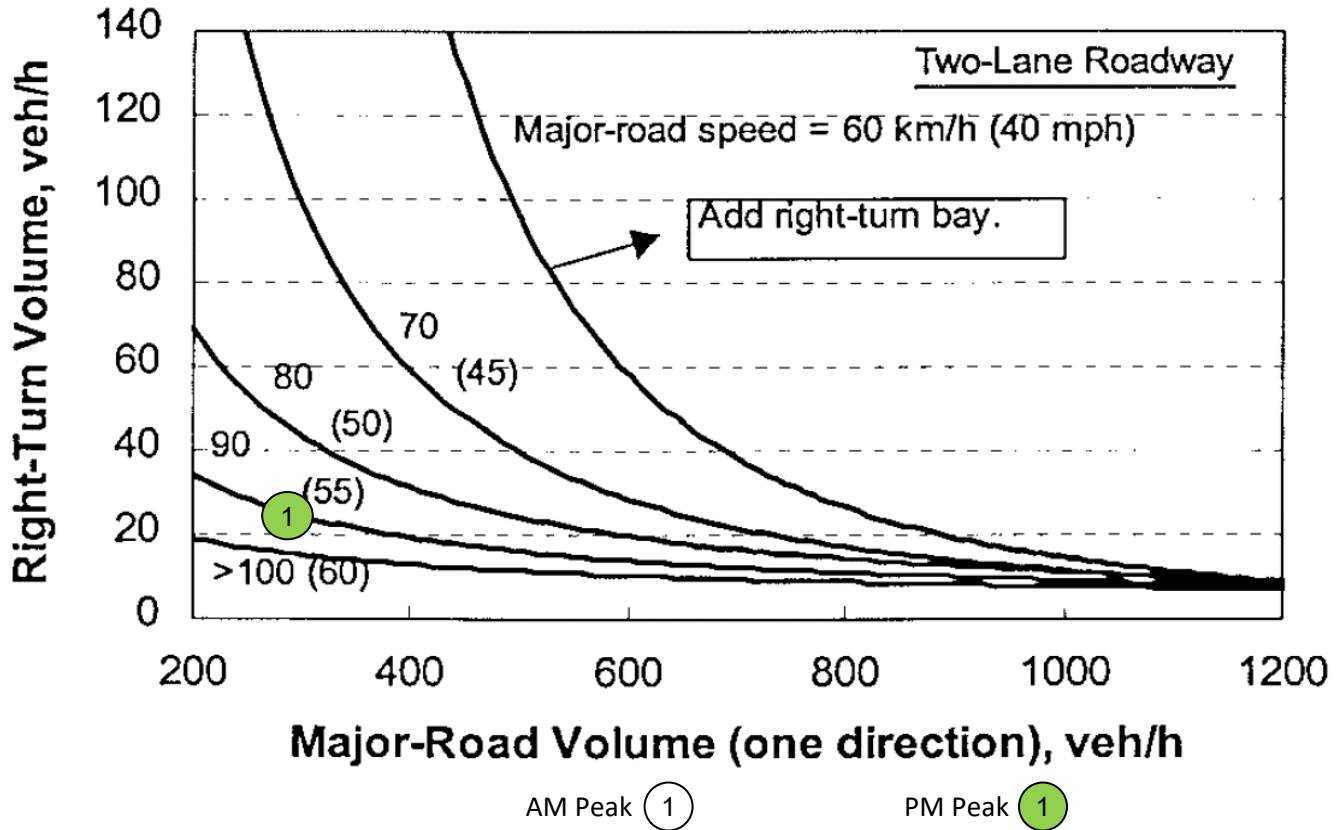


**Tillman Ridge Subdivision
Canyon County, Idaho**

**NCHRP 457 Right-Turn Lane Analysis
2027 Background Traffic**

	Intersection	Approach	Speed Limit	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vph)	Meet Warrant?
①	Vista Drive & S 10th Avenue	SB	35	AM	3	133	No*
				PM	25	285	No

* Right-Turn Volume Less Than 10 vph or Major Road Volume Less Than 200 vph - Not Warranted

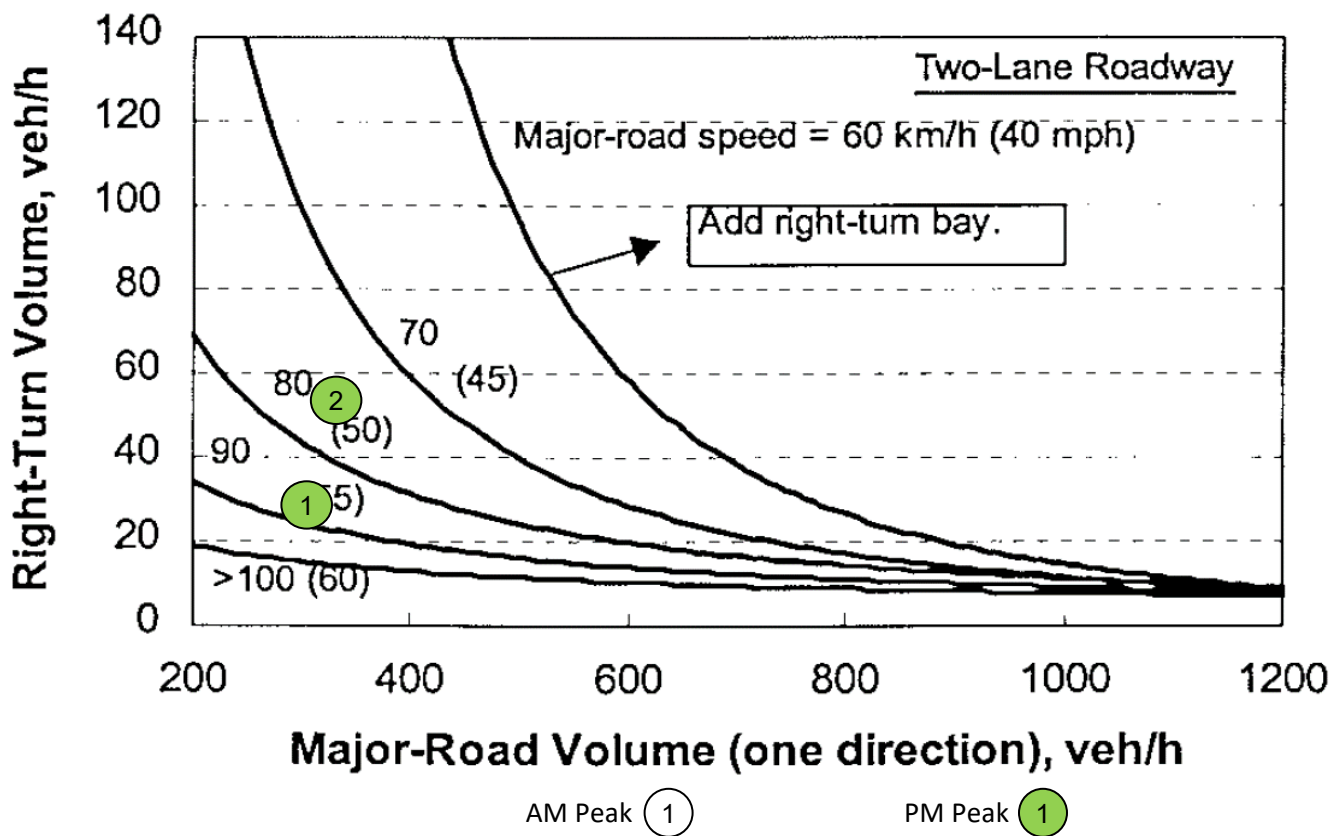


**Tillman Ridge Subdivision
Canyon County, Idaho**

**NCHRP 457 Right-Turn Lane Analysis
2027 Total Traffic**

	Intersection	Approach	Speed Limit	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vph)	Meet Warrant?
①	Vista Drive & S 10th Avenue	SB	35	AM	5	135	No*
				PM	31	292	No
②	Vista Drive & S 10th Avenue (No Karcher Rd Access)	SB	35	AM	12	142	No*
				PM	55	316	No

* Right-Turn Volume Less Than 10 vph or Major Road Volume Less Than 200 vph - Not Warranted

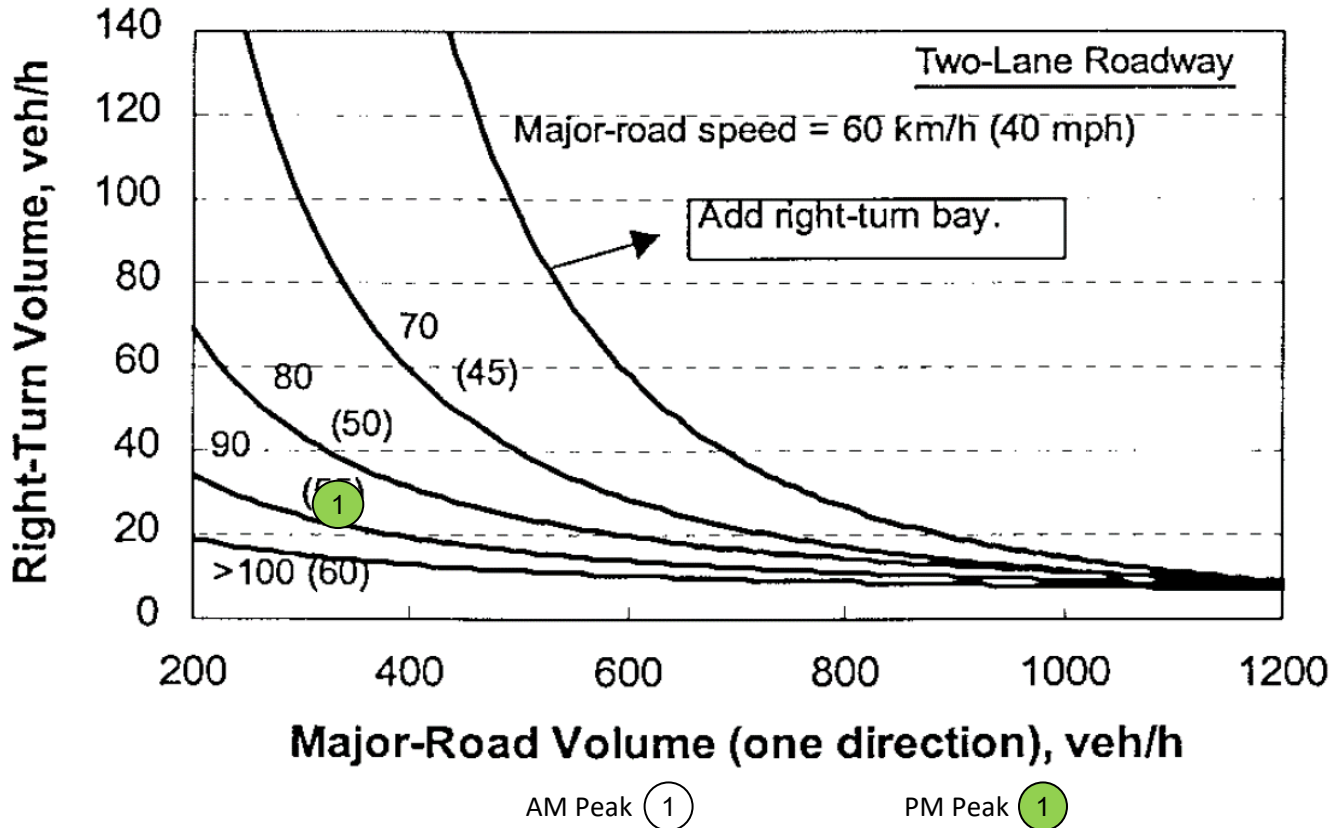


**Tillman Ridge Subdivision
Canyon County, Idaho**

**NCHRP 457 Right-Turn Lane Analysis
2032 Background Traffic**

	Intersection	Approach	Speed Limit	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vph)	Meet Warrant?
①	Vista Drive & S 10th Avenue	SB	35	AM	3	145	No*
				PM	27	308	No

* Right-Turn Volume Less Than 10 vph or Major Road Volume Less Than 200 vph - Not Warranted

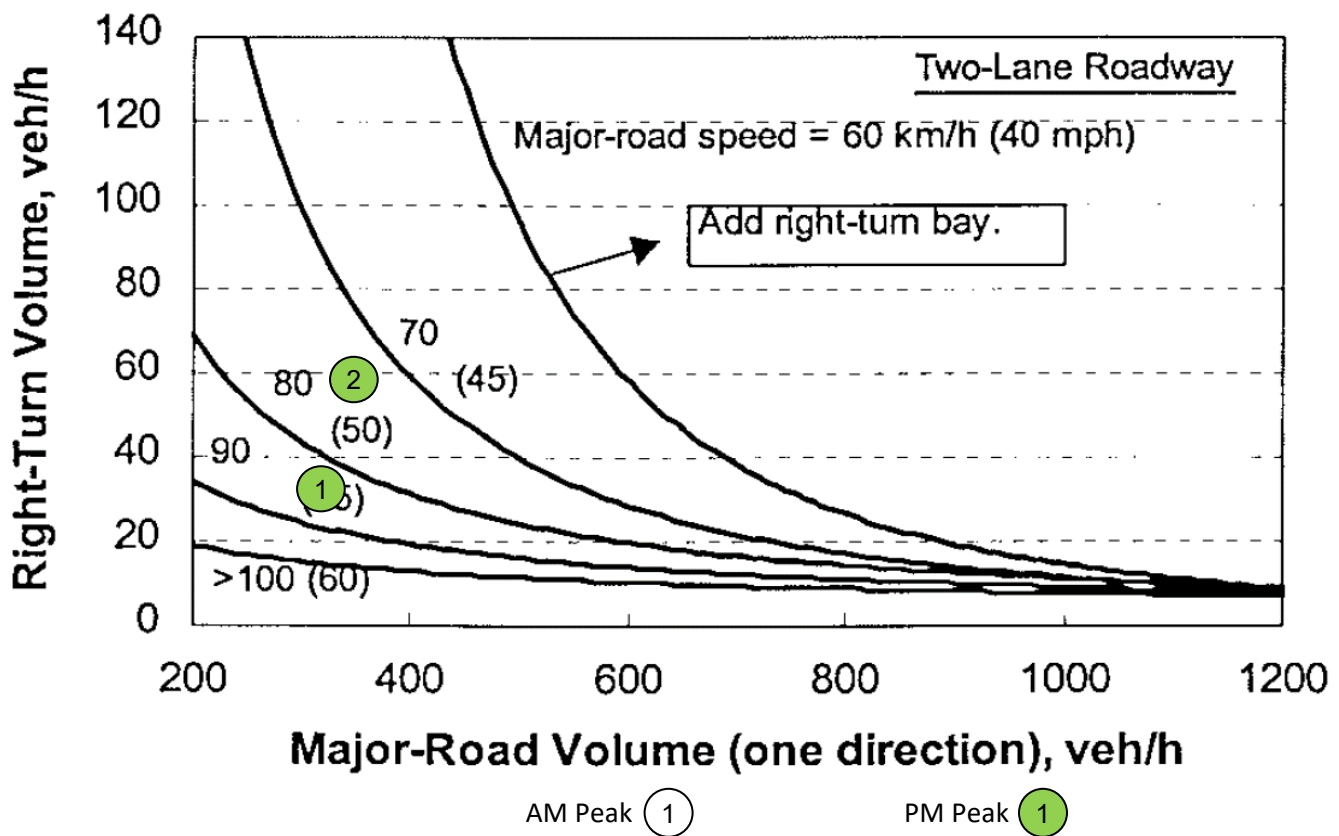


**Tillman Ridge Subdivision
Canyon County, Idaho**

**NCHRP 457 Right-Turn Lane Analysis
2032 Total Traffic**

	Intersection	Approach	Speed Limit	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vph)	Meet Warrant?
①	Vista Drive & S 10th Avenue	SB	35	AM	5	147	No*
				PM	33	315	No
②	Vista Drive & S 10th Avenue (No Karcher Rd Access)	SB	35	AM	12	154	No*
				PM	57	339	No

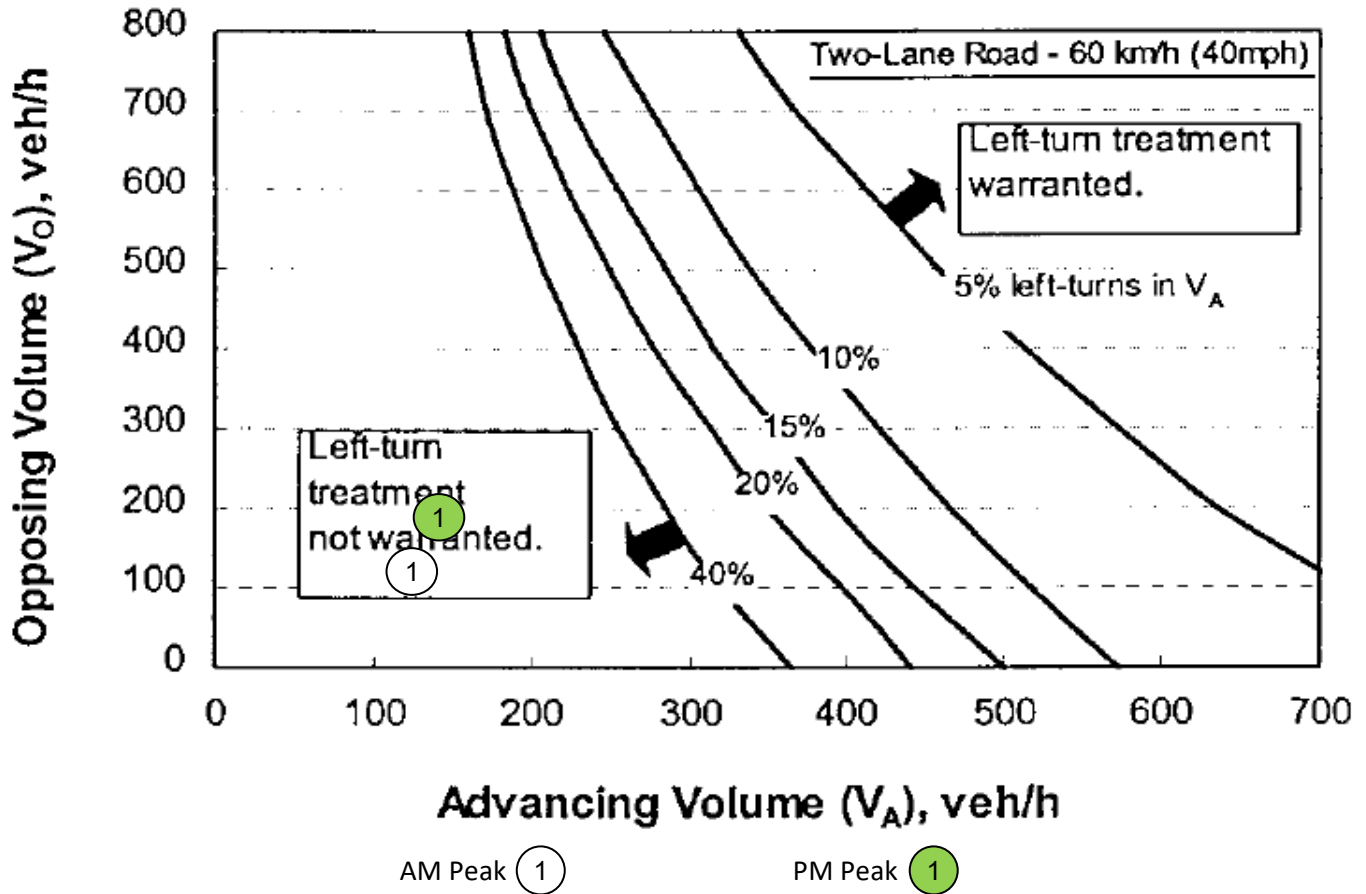
* Right-Turn Volume Less Than 10 vph or Major Road Volume Less Than 200 vph - Not Warranted



**Tillman Ridge Subdivision
Canyon County, Idaho**

**NCHRP 457 Left-Turn Lane Analysis
2024 Existing Traffic**

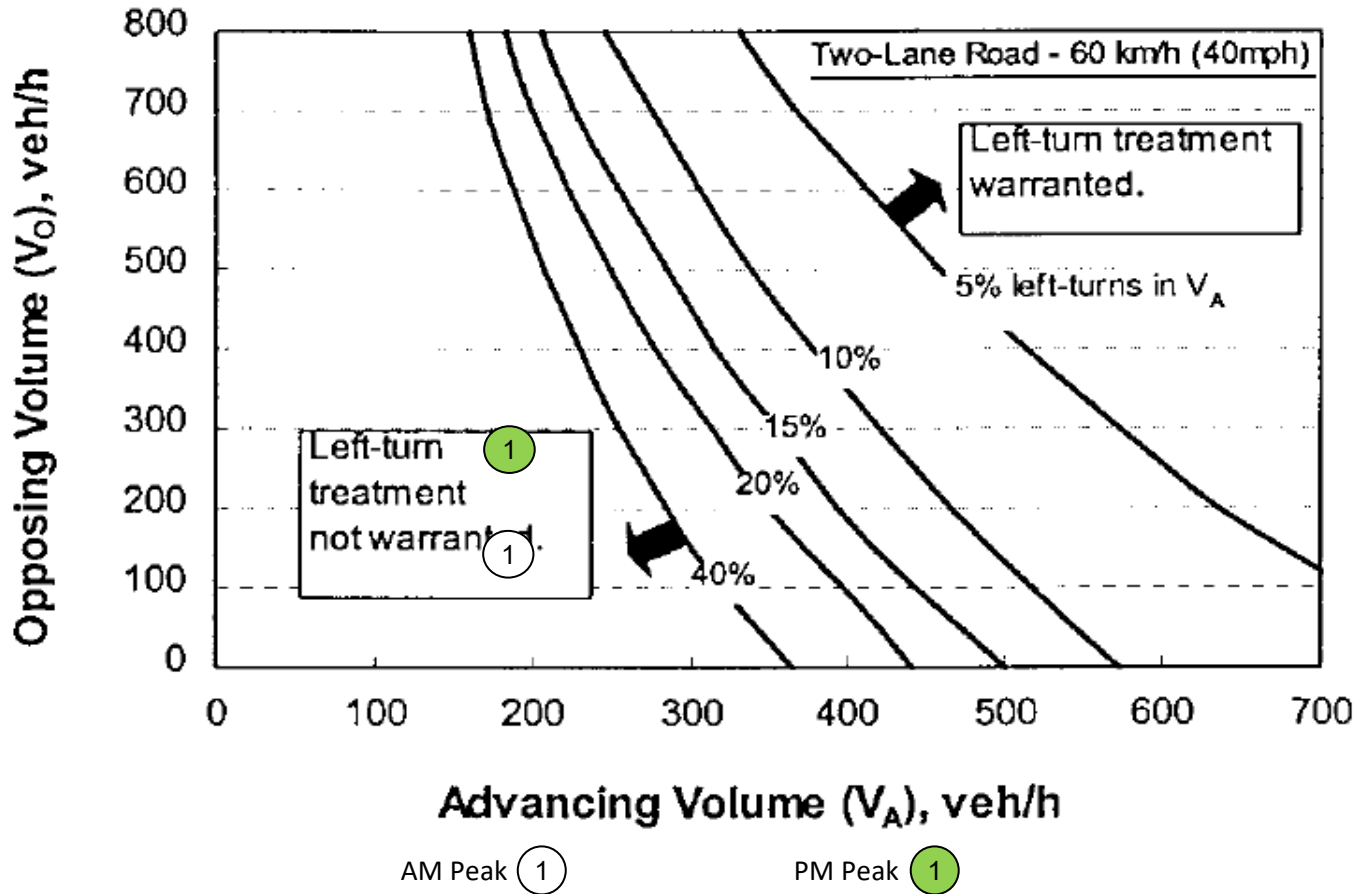
	Intersection	Approach	Speed Limit [mph]	Peak Hour	Advancing Volume [vph]	Opposing Volume [vph]	Left-Turn Volume (%)	Meet Warrant?
①	Vista Drive & S 10th Avenue	NB	35	AM	118	106	0.8%	No
				PM	139	196	4.3%	No



**Tillman Ridge Subdivision
Canyon County, Idaho**

**NCHRP 457 Left-Turn Lane Analysis
2027 Background Traffic**

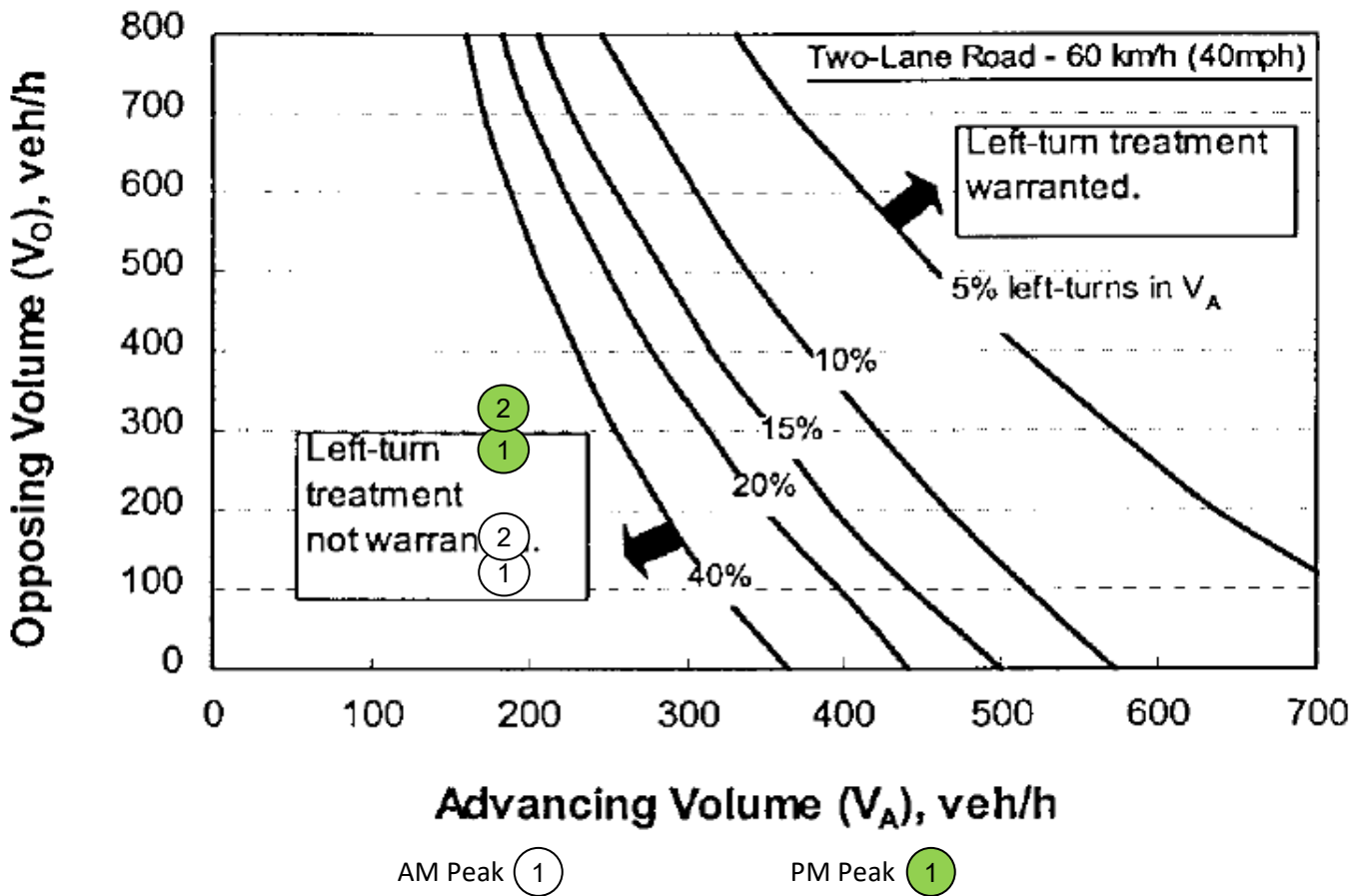
	Intersection	Approach	Speed Limit [mph]	Peak Hour	Advancing Volume [vph]	Opposing Volume [vph]	Left-Turn Volume (%)	Meet Warrant?
①	Vista Drive & S 10th Avenue	NB	35	AM	183	133	0.5%	No
				PM	183	285	3.3%	No



**Tillman Ridge Subdivision
Canyon County, Idaho**

**NCHRP 457 Left-Turn Lane Analysis
2027 Total Traffic**

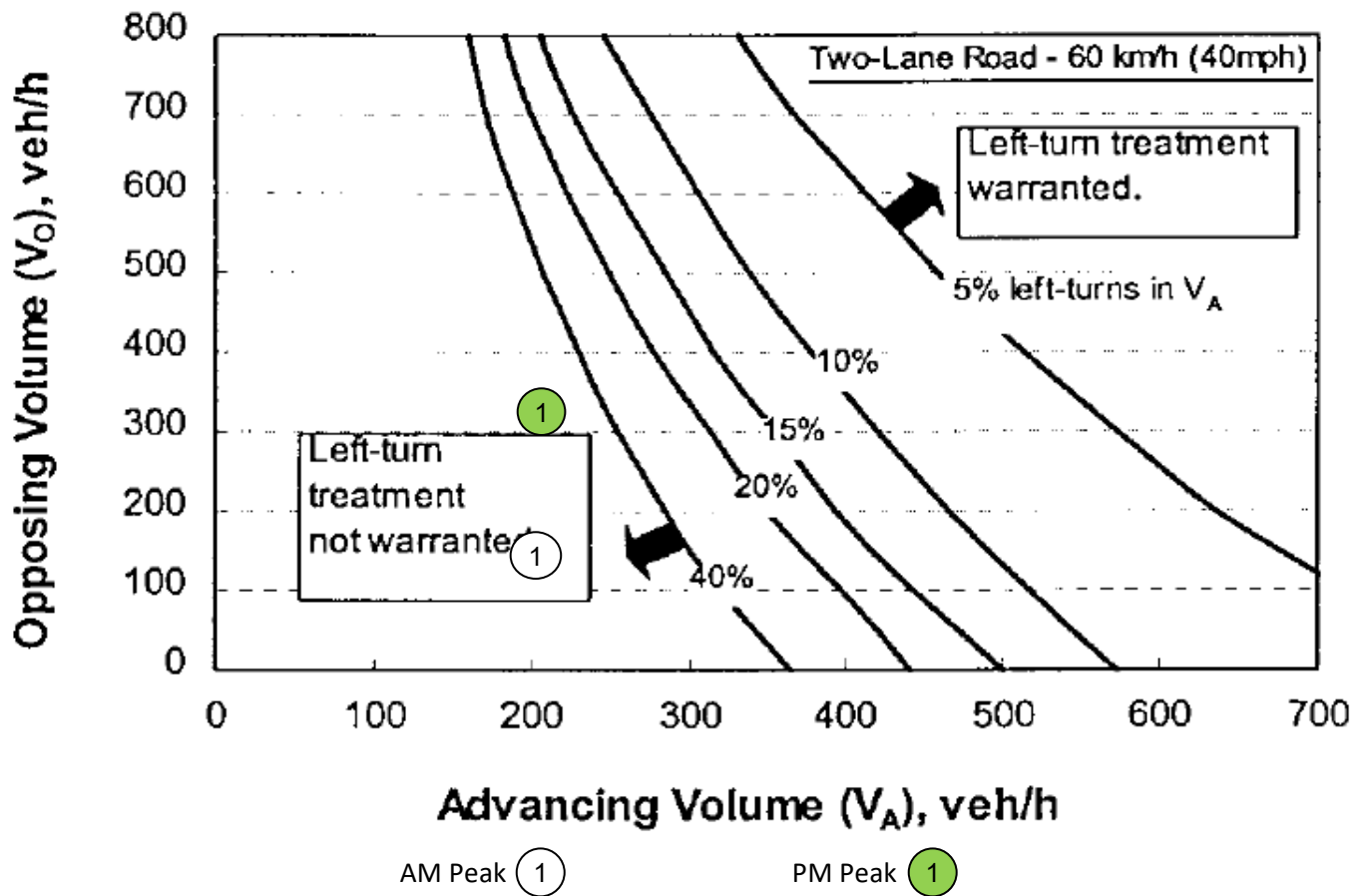
	Intersection	Approach	Speed Limit [mph]	Peak Hour	Advancing Volume [vph]	Opposing Volume [vph]	Left-Turn Volume (%)	Meet Warrant?
①	Vista Drive & S 10th Avenue	NB	35	AM	184	135	0.8%	No
				PM	185	292	4.1%	No
②	Vista Drive & S 10th Avenue (No Karcher Access)	NB	35	AM	184	142	0.8%	No
				PM	185	316	4.1%	No



**Tillman Ridge Subdivision
Canyon County, Idaho**

**NCHRP 457 Left-Turn Lane Analysis
2032 Background Traffic**

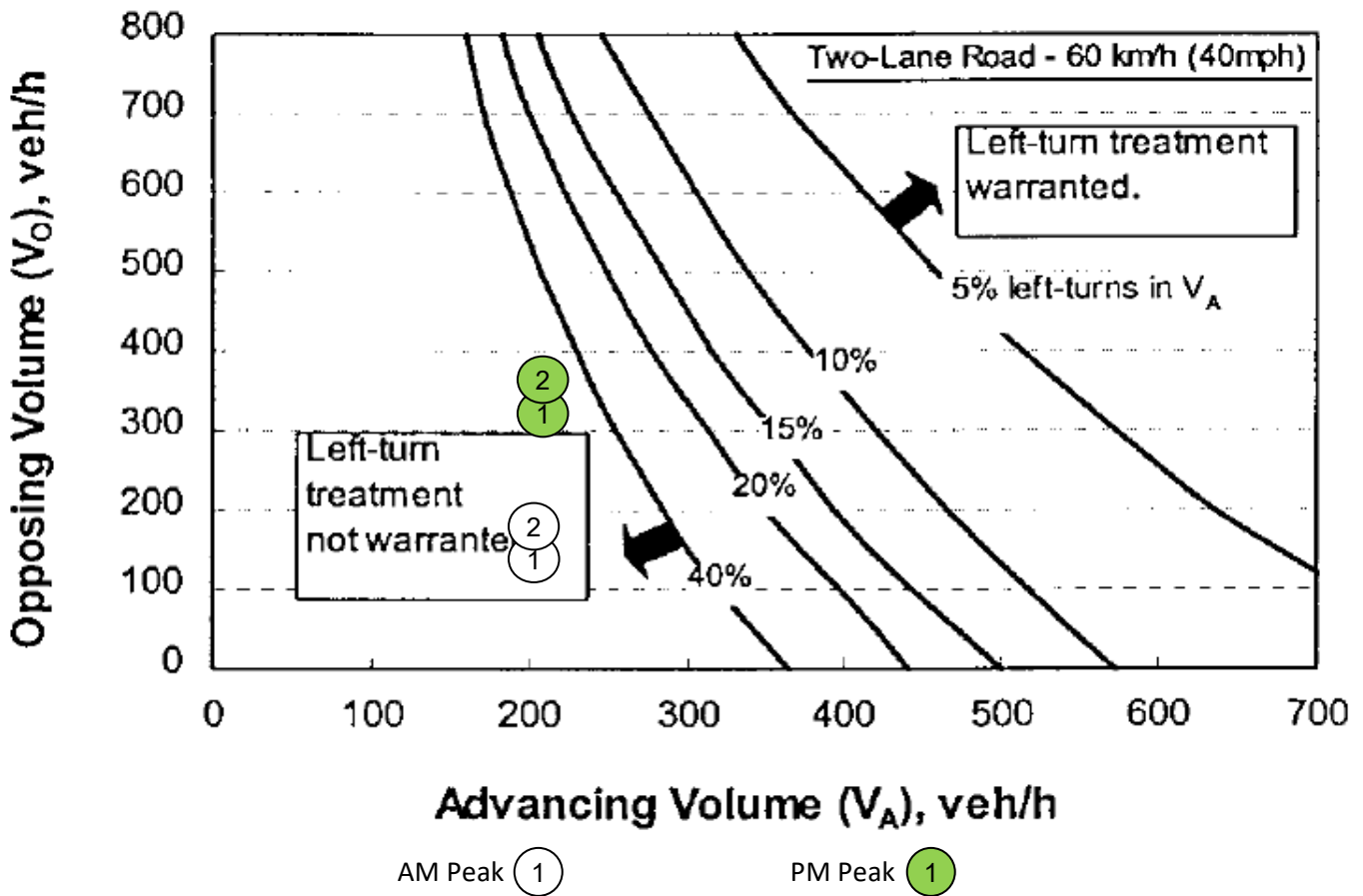
	Intersection	Approach	Speed Limit [mph]	Peak Hour	Advancing Volume [vph]	Opposing Volume [vph]	Left-Turn Volume (%)	Meet Warrant?
①	Vista Drive & S 10th Avenue	NB	35	AM	196	145	0.5%	No
				PM	199	308	3.5%	No



**Tillman Ridge Subdivision
Canyon County, Idaho**

**NCHRP 457 Left-Turn Lane Analysis
2032 Total Traffic**

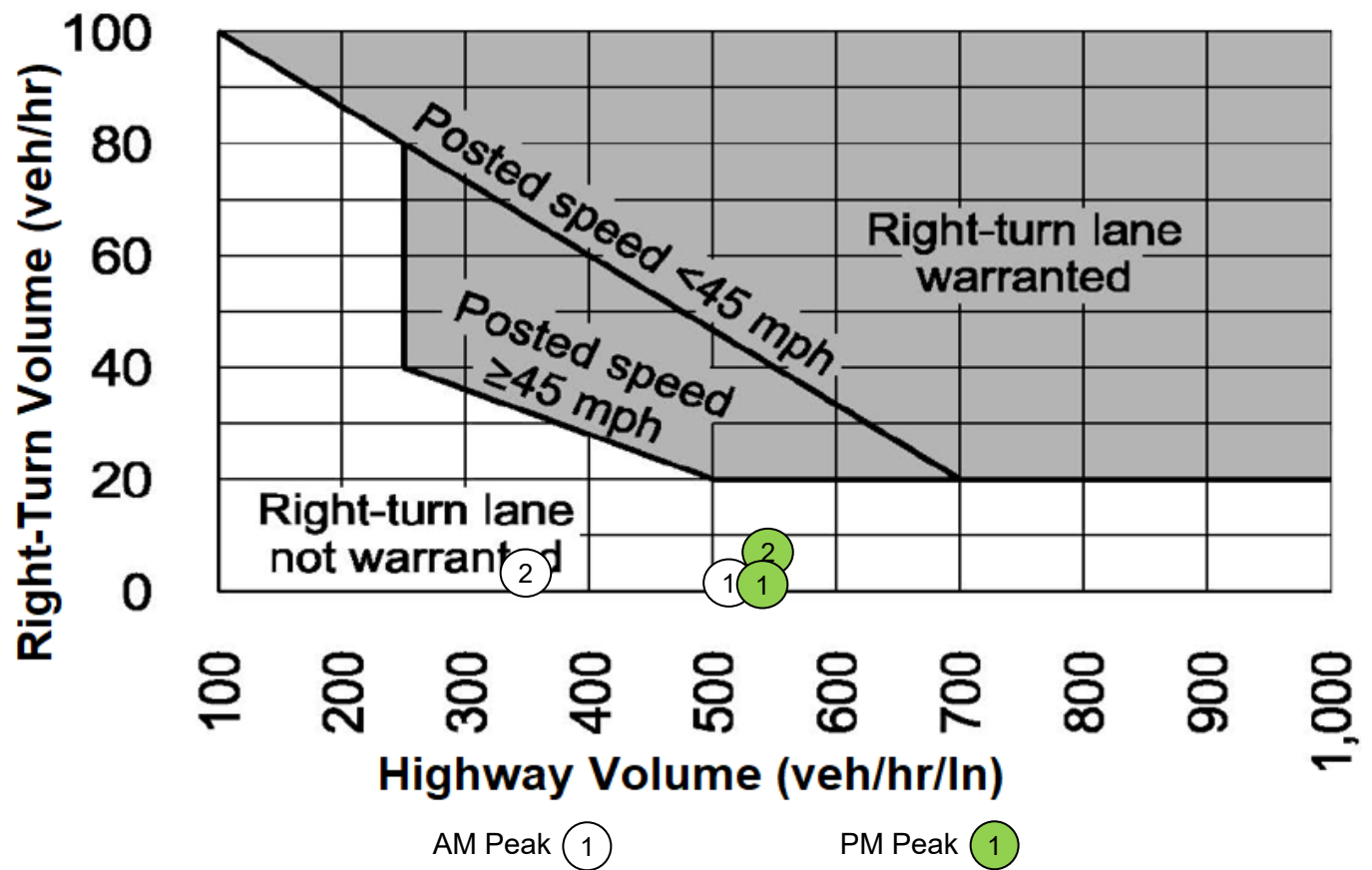
	Intersection	Approach	Speed Limit [mph]	Peak Hour	Advancing Volume [vph]	Opposing Volume [vph]	Left-Turn Volume (%)	Meet Warrant?
①	Vista Drive & S 10th Avenue	NB	35	AM	197	147	0.7%	No
				PM	201	315	4.3%	No
②	Vista Drive & S 10th Avenue (No Karcher Access)	NB	35	AM	197	154	0.7%	No
				PM	201	339	4.3%	No



**Tillman Ridge Subdivision
Canyon County, Idaho**

**ITD Right-Turn Lane Analysis
2024 Existing Traffic**

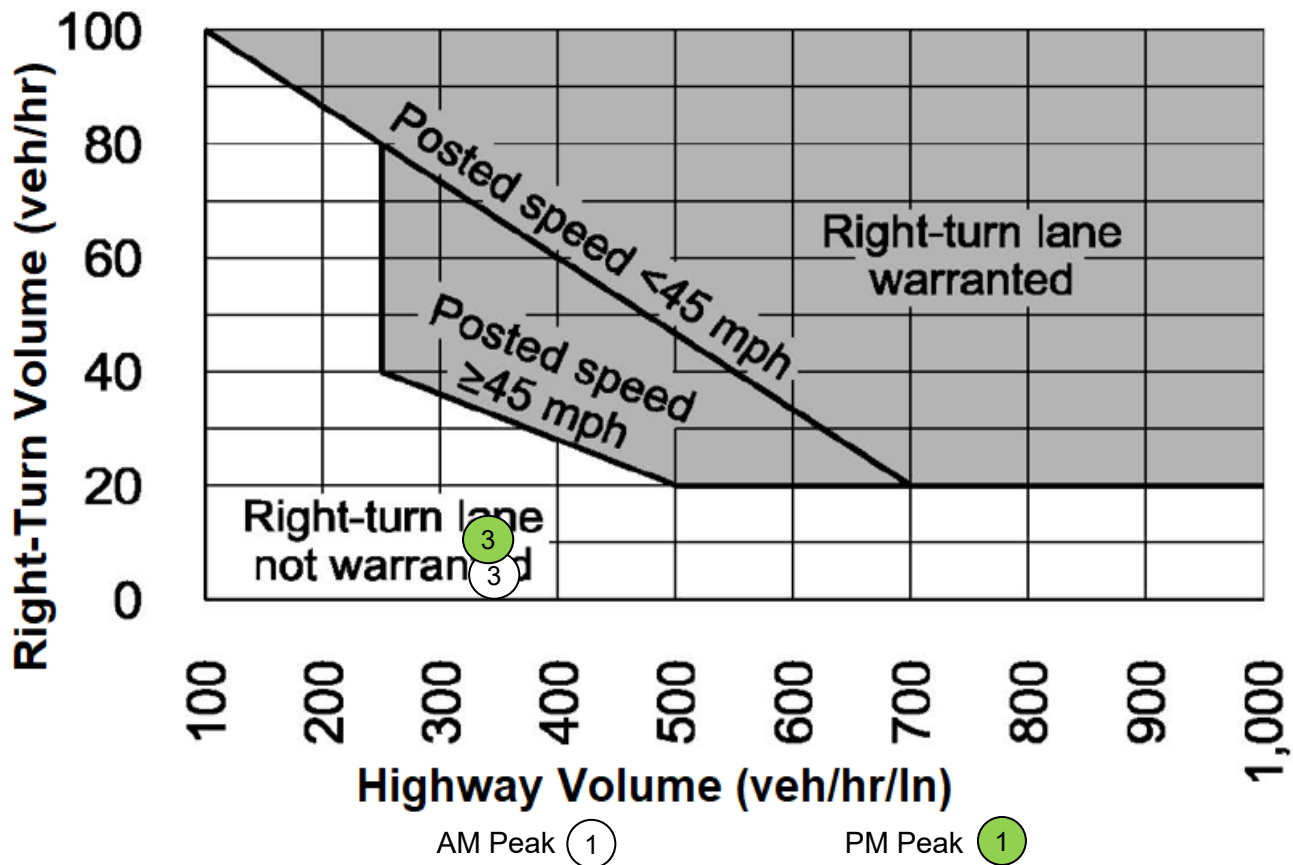
	Intersection	Approach	Speed Limit (mph)	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vph)	Meet Warrant?
①	Kimball Avenue & Karcher Road	EB	55	AM	0	516	No
				PM	0	531	No
②	Kimball Avenue & Karcher Road	WB	55	AM	2	354	No
				PM	2	542	No



**Tillman Ridge Subdivision
Canyon County, Idaho**

**ITD Right-Turn Lane Analysis
2027 Total Traffic**

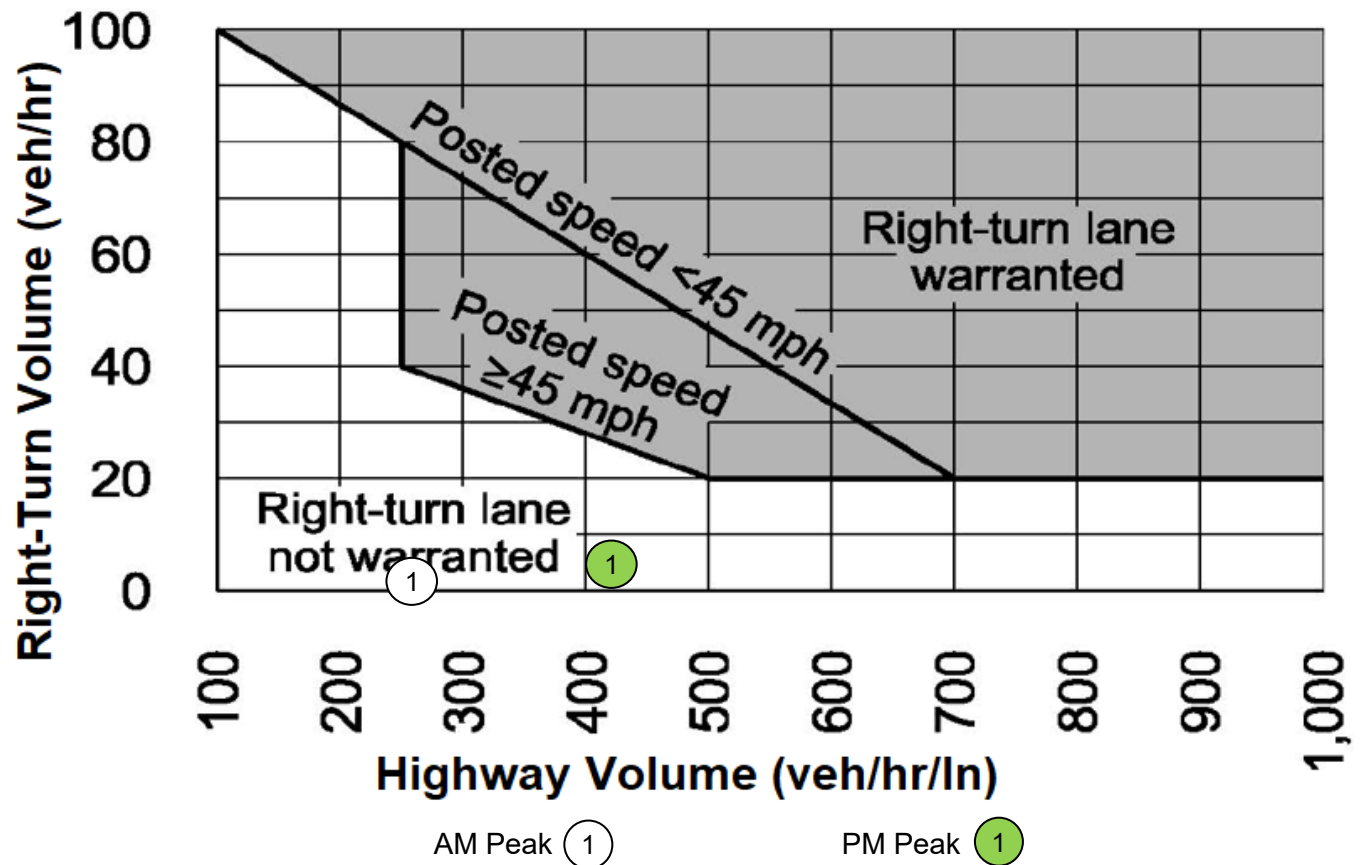
	Intersection	Approach	Speed Limit (mph)	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vphpl)	Meet Warrant?
①	Kimball Avenue & Karcher Road	EB	55	Closed with SH 55 corridor improvements			
②	Kimball Avenue & Karcher Road	WB	55	Closed with SH 55 corridor improvements			
③	Ashland Drive & Karcher Road	EB	55	AM	1	320	No
				PM	3	318	No
④	Ashland Drive & Karcher Road	WB	55	Constructed with SH 55 corridor improvements			



**Tillman Ridge Subdivision
Canyon County, Idaho**

**ITD Right-Turn Lane Analysis
2027 Background Traffic**

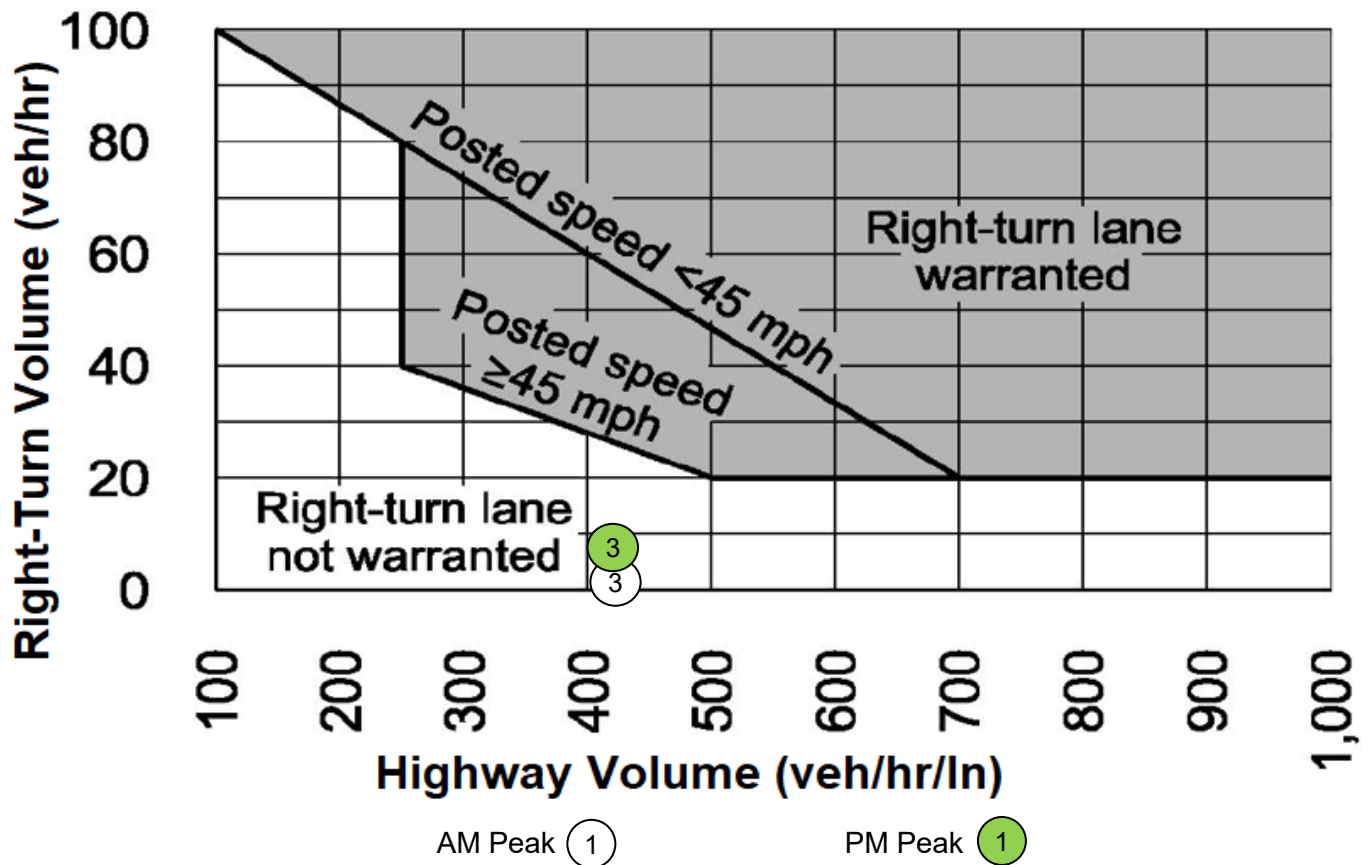
	Intersection	Approach	Speed Limit (mph)	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vphpl)	Meet Warrant?
①	Ashland Drive & Karcher Road	WB	55	Constructed with SH 55 corridor improvements			



**Tillman Ridge Subdivision
Canyon County, Idaho**

**ITD Right-Turn Lane Analysis
2032 Total Traffic**

	Intersection	Approach	Speed Limit (mph)	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vphpl)	Meet Warrant?
①	Kimball Avenue & Karcher Road	EB	55	Closed with SH 55 corridor improvements			
②	Kimball Avenue & Karcher Road	WB	55	Closed with SH 55 corridor improvements			
③	Ashland Drive & Karcher Road	EB	55	AM	1	428	No
				PM	3	425	No
④	Ashland Drive & Karcher Road	WB	55	Constructed with SH 55 corridor improvements			

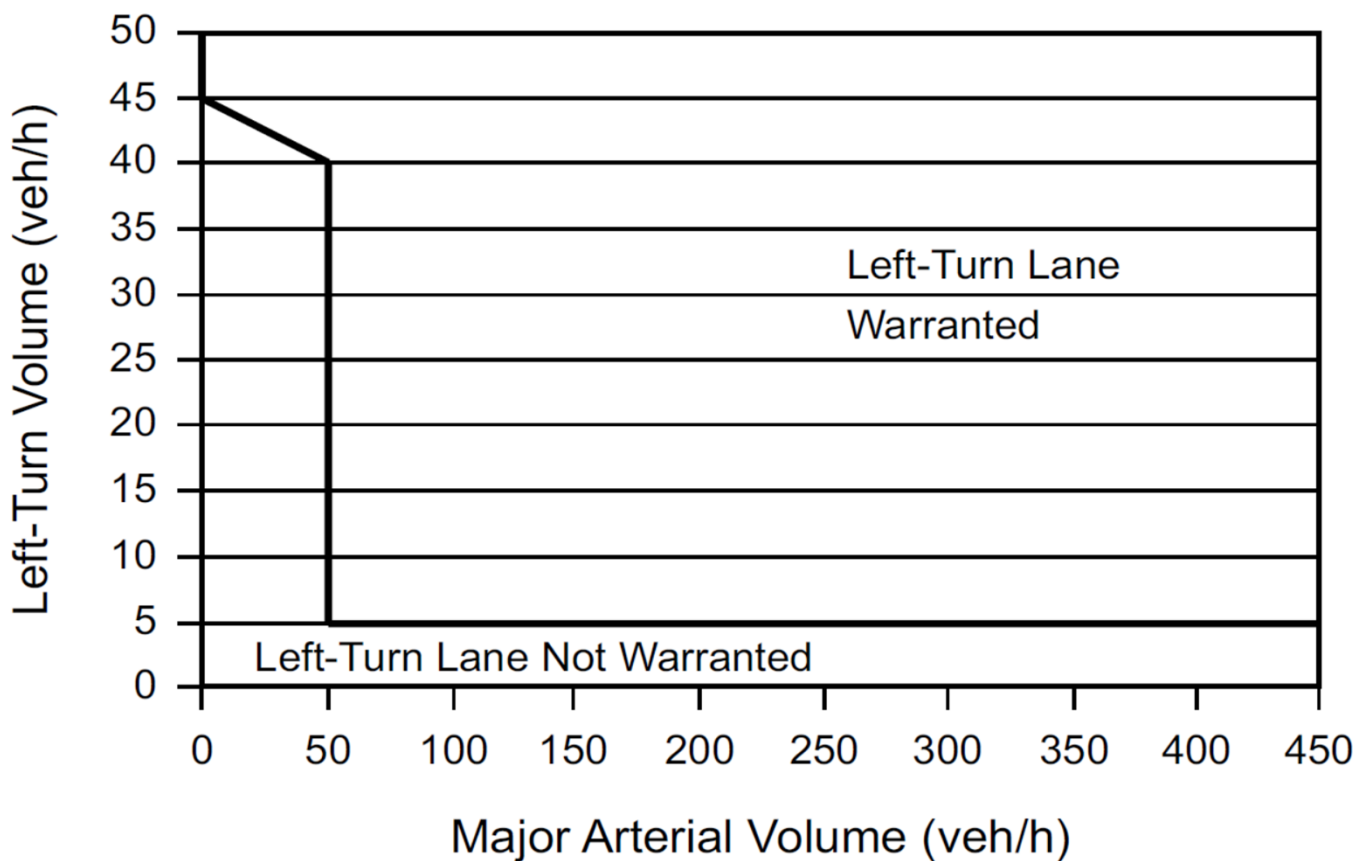


**Tillman Ridge Subdivision
Canyon County, Idaho**

**AASHTO Left-turn Lane Guidelines for Four-Leg Urban Intersections
2024 Existing Traffic**

	Intersection	Approach	Speed Limit [mph]	Peak Hour	Left Turn Volume [vph]	Major Arterial Volume [vphpl]	Meet Warrant?
①	Kimball Avenue & Karcher Road	EB	55	AM	1	435	No*
				PM	0	537	No*
②	Kimball Avenue & Karcher Road	WB	55	AM	0	435	No*
				PM	2	536	No*

* Left-turn volume less than 5 vph - Not Warranted



AM Peak ①

PM Peak ①

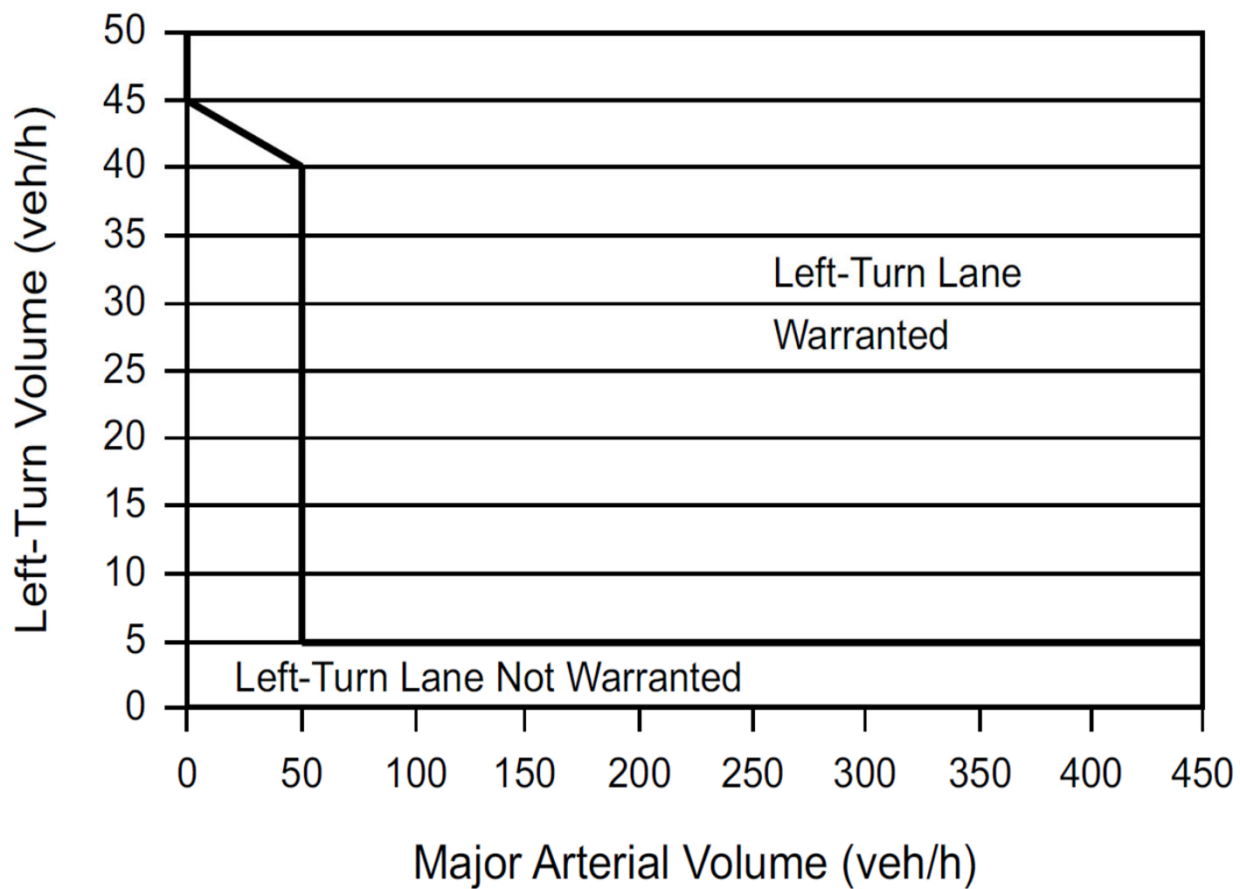
**Tillman Ridge Subdivision
Canyon County, Idaho**

AASHTO Left-turn Lane Guidelines for Four-Leg Urban Intersections

2027 Total Traffic - No SH 55 Corridor Improvements

	Intersection	Approach	Speed Limit [mph]	Peak Hour	Left Turn Volume [vph]	Major Arterial Volume [vphpl]	Meet Warrant?
①	Ashland Drive & Karcher Road	EB	55	AM	1	516	No*
				PM	2	645	No*
②	Ashland Drive & Karcher Road	WB	55	AM	6	516	Yes
				PM	21	645	Yes

* Left-turn volume less than 5 vph - Not Warranted



AM Peak ①

PM Peak ①

Attachment 2
ITD Development Staff Report



**Your Safety • Your Mobility
Your Economic Opportunity**

IDAHO TRANSPORTATION DEPARTMENT

P.O. Box 8028 • Boise, ID 83707-2028

(208) 334-8300 • itd.idaho.gov

February 3, 2025

Elizabeth Allen
Owner/Principal Planner
Bristlecone Land Use Consulting
elizabeth@bristleconelanduseconsulting.com

RE: Tillman Ridge - ITD Development Staff Report

Dear Elizabeth,

The Idaho Transportation Department (ITD) has completed our review of the Tillman Ridge Traffic Impact Study (TIS). The proposed development abuts the southern Right of Way of SH-55 (Karcher Road) MP 11.03, Canyon County, Idaho.

Development Summary

Tillman Ridge is a proposed residential development consisting of 49 single-family residential lots, estimating a 2027 build-out year. One full access approach onto SH-55 (Karcher Road) is being requested.

ITD Staff Requirements

ITD accepts the TIS as submitted with no further recommendation or requirements.

Expiration of Staff Report

In the event the proposed development has not obtained necessary permits within two years, this staff report will no longer be valid and ITD may request an updated TIS to reflect current traffic conditions.

Notices

- This report does not supersede or nullify any local land use requirements or legal property restrictions. Legal property restrictions include but are not limited to easements, access agreements, deed restrictions, plat restrictions, liens or other encumbrances. Removing, modifying, or establishing legal property restrictions is the responsibility of the developer.
- This report does not constitute a permit approval, or denial issued pursuant to IDAPA 29.03.42.

ITD Staff Recommendations are intended to assure that the proposed development will not place an undue burden on the existing State Highway system within the vicinity impacted by the proposed development. Maintaining safety and



**Your Safety • Your Mobility
Your Economic Opportunity**

IDAHO TRANSPORTATION DEPARTMENT

P.O. Box 8028 • Boise, ID 83707-2028

(208) 334-8300 • itd.idaho.gov

mobility for Idaho's motorists is of utmost importance to ITD. We appreciate your improvements to livability in Canyon County, Idaho as we want all residents to travel safely and efficiently on the highway system.

If you have any questions, feel free to contact me at Brian.Duran@itd.idaho.gov or Niki Benyakhlef, Development Services Coordinator at (208)334-8337 or email Niki.Benyakhlef@itd.idaho.gov.

Sincerely,

Brian Duran
Development Services Manager
Idaho Transportation Department | District 3

Cc: Dan Lister, Canyon County Development Services, Principal Planner
Chris Hopper, Highway District 4, District Engineer

Attachment 3
Correspondence with Caldwell Fire Department



Elizabeth Allen <elizabeth@bristleconelanduseconsulting.com>

Tillman Rezone

3 messages

Elizabeth Allen <elizabeth@bristleconelanduseconsulting.com>

Mon, Mar 24, 2025 at 12:15 PM

To: Aperry@cityofcaldwell.org

Cc: Six Point Development <6pointdevelopment@gmail.com>, Roger Smith <roger-j-smith@msn.com>

Hi Alan,

We are currently going through the rezone process in Canyon County followed by the platting process. We have an agency comment letter from you dated April 28, 2023. The rezone case number is RZ2022-0012. We are proposing 1 acre lots, 48 residential lots and 4 common lots with access onto Hwy 55 and 10th Avenue via Vista Drive and a stub to the south. We had our first public hearing with the Canyon County Planning Commission last week and they tabled making a decision for us to find out more information on a few items.

One item was fire services. You mentioned fire hydrants in your letter. We are not annexing into the City or connecting to City services so the development will be served via individual domestic wells or a community system. Can you walk us through what would be required at the time of development for fire?

Thank you,

Elizabeth Allen

Owner/Principal Planner

[Bristlecone Land Use Consulting](http://BristleconeLandUseConsulting.com)

208-477-1059



Alan Perry <aperry@cityofcaldwell.org>

Mon, Mar 24, 2025 at 12:31 PM

To: Elizabeth Allen <elizabeth@bristleconelanduseconsulting.com>

Greetings,

I believe the requirement you are referring to is:

1. Fire hydrants, capable of producing the required fire flow, shall be located along approved fire lanes. Fire hydrant spacing shall meet the requirements of IFC table C105.1.1 (IFC 507.3, IFC B105.2, IFC C105).

All subdivisions regardless of annexation must meet the minimum standards of fire flow/ hydrant(s). This can be accomplished by approved wells, tanks or an alternative method for a private water system.

Can you please provide me with a copy of what you have from this office as I cannot locate the file under Six Point Development.

[Quoted text hidden]

Elizabeth Allen <elizabeth@bristleconelanduseconsulting.com>

Mon, Mar 24, 2025 at 7:12 PM

To: Alan Perry <aperry@cityofcaldwell.org>

Of course. I have attached the comment. The ownership of parcels changed recently, previously under McGuire/Eaton.

Elizabeth Allen

Owner/Principal Planner

[Bristlecone Land Use Consulting.](#)

208-477-1059



[Quoted text hidden]

 **4_28_23 Comment.pdf**
88K

Dan Lister

From: Dan Lister
Sent: Monday, April 7, 2025 1:50 PM
To: 'Six Point Development'
Cc: Elizabeth Allen; Roger Smith
Subject: RE: [External] Conditional Rezone Application

Canyon County DSD

From: Six Point Development <6pointdevelopment@gmail.com>
Sent: Monday, April 7, 2025 1:45 PM
To: Dan Lister <Daniel.Lister@canyoncounty.id.gov>
Cc: Elizabeth Allen <elizabeth@bristleconelanduseconsulting.com>; Roger Smith <roger-j-smith@msn.com>
Subject: Re: [External] Conditional Rezone Application

Also,

Who does the check get made

Kristin Short
Six Point Development
541.786.2403
6pointdevelopment@gmail.com

Inline image

On Mon, Apr 7, 2025 at 1:44 PM Six Point Development <6pointdevelopment@gmail.com> wrote:

Hi Dan,

Please see the attached signed affidavit. Do you want me to mail you the original or hang onto it until I see you?



Canyon County Development Services
111 North 11th Avenue, #310
Caldwell, Idaho 83605
www.canyoncounty.id.gov
208-454-7458

AFFIDAVIT OF LEGAL INTEREST

I, 6 Point Properties LLC, 16402 Orchard Ave
(name) (address)
Caldwell, ID 83607
(city) (state) (zip code)

being first duly sworn upon oath, depose and say:

1. That I am the owner of record of the property described on the attached application and I grant my permission to

Elizabeth Allen (Bristecore Consulting), 1330 Williams Lane
(name) (address) 83686
Idaho (state)

to submit the accompanying application pertaining to the subject property.

2. I agree to indemnify, defend and hold Canyon County and its employees harmless from any claims to liability resulting from any dispute as to the statements contained herein or as to the ownership of the property, which is the subject of the application.

Dated this 7 day of April, 2025.

Kristen Short
(signature)

STATE OF IDAHO)

ss

COUNTY OF CANYON)

On this 7 day of April, in the year 2025, before me Jessica Frazier
a notary public, personally appeared Kristen Short, personally known
to me to be the person whose name is subscribed to the within instrument, and acknowledged to me that
he/she executed the same.



Notary: Jessica Frazier

My Commission Expires: 9/21/2026

Kristin Short
Six Point Development
541.786.2403
6pointdevelopment@gmail.com

Inline image

On Fri, Apr 4, 2025 at 10:48 AM Six Point Development <6pointdevelopment@gmail.com> wrote:

Thank you, Dan !

Elizabeth, I will get a signed affidavit on Monday over to Dan. I will also get a check for submittal as well.

Kristin Short
Six Point Development
541.786.2403
6pointdevelopment@gmail.com

Inline image

On Thu, Apr 3, 2025 at 2:58 PM Dan Lister <Daniel.Lister@canyoncounty.id.gov> wrote:

Elizabeth,

Please make sure the updated application includes the signed and notarized affidavit of legal interest from the new owner allowing you to be the applicant for the case. The file has a notarized affidavit from the new owner for Robert Nash to be the applicant. The submittal must include the development agreement fee of \$500 and renotification fee of \$350 (\$850 total). The adopted fees took affect on 3/28/2025 which increased the fees for development agreements and renoticing.

The letter of intent appears to include proposed development agreement conditions. DSD has not drafted a development agreement. After the Board of County Commissioner's approval, a development agreement will be drafted with approved conditions to be signed by the Board and the property owner.

The preliminary plat will not be reviewed until the rezone application is approved.

Sincerely,

Dan Lister, Planning Supervisor

DSD Office: (208) 454-7458 - Direct Line: (208) 455-5959

Daniel.Lister@canyoncounty.id.gov

Development Services Department (DSD)

Public office hours

Monday, Tuesday, Thursday, and Friday

8 am – 5 pm

Wednesday

1 pm – 5 pm

****We will not be closed during lunch hour ****

PUBLIC RECORD NOTICE: All communications transmitted within the Canyon County email system may be a public record and may be subject to disclosure under the Idaho Public Records Act and, as such, may be copied and reproduced by members of the public.

From: Elizabeth Allen <elizabeth@bristleconelanduseconsulting.com>

Sent: Wednesday, April 2, 2025 7:48 PM

To: Dan Lister <Daniel.Lister@canyoncounty.id.gov>

Cc: Six Point Development <6pointdevelopment@gmail.com>; Roger Smith <roger-j-smith@msn.com>

Subject: [External] Conditional Rezone Application

Hi Dan,

I have attached the conditional rezone application and letter of intent. I think we captured everything. We have two proposed conditions of approval included in the letter of intent.

Do you have a draft DA that we can review?

As far as the preliminary plat goes, are we able to submit the revised preliminary plat, or will we need to wait?

Thank you,

Elizabeth Allen

Owner/Principal Planner

[Bristlecone Land Use Consulting](#)

208-477-1059



Dan Lister

From: Dan Lister
Sent: Thursday, April 10, 2025 9:17 AM
To: 'Elizabeth Allen'
Cc: Six Point Development
Subject: RE: [External] Schools

Elizabeth,

The information provided appears factual. Based on past cases, the P&Z wants evidence of communication between the applicants and the school district to identify mitigation measures that address the developments' cumulative school impacts. Example: MDC LLC (CR2022-0016) worked with the Middleton School District to donate a certain amount of landscaping to reduce landscaping costs for the school district. In the end, the developer and school district agreed to a voluntary amount per dwelling instead.

Sincerely,

Dan Lister, Planning Supervisor

DSD Office: (208) 454-7458 - Direct Line: (208) 455-5959

Daniel.Lister@canyoncounty.id.gov

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From: Elizabeth Allen <elizabeth@bristleconelanduseconsulting.com>

Sent: Thursday, April 10, 2025 7:34 AM

To: Dan Lister <Daniel.Lister@canyoncounty.id.gov>

Cc: Six Point Development <6pointdevelopment@gmail.com>

Subject: [External] Schools

Hi Dan,

Have you had time to review the information we added about schools? Since the impact is minimal do you think that information will suffice for the commissioners?

Thank you

Elizabeth Allen

Owner/Principal Planner

[Bristlecone Land Use Consulting](http://BristleconeLandUseConsulting.com)

208-477-1059