

MASTER APPLICATION

CANYON COUNTY DEVELOPMENT SERVICES DEPARTMENT

111 North 11th Avenue, #140, Caldwell, ID 83605

www.canyonco.org/dsd.aspx Phone: 208-454-7458 Fax: 208-454-6633



PROPERTY OWNER	OWNER NAME: William B McGuire 2011 Revocable Trust	
	MAILING ADDRESS: 4023 Spyglass Road, Chico, California 95973	
	PHONE: 530-513-0085	EMAIL: bill.mcguire.hobie@gmail.com

I consent to this application and allow DSD staff / Commissioners to enter the property for site inspections. If owner(s) are a business entity, please include business documents, including those that indicate the person(s) who are eligible to sign.

Signature:

Date: 9-18-19-2021

(AGENT) ARCHITECT ENGINEER BUILDER	CONTACT NAME: Elizabeth Allen	
	COMPANY NAME: Bristlecone Land Use Consulting LLC	
	MAILING ADDRESS: P.O. Box 3953, Nampa, Idaho 83653	
	PHONE: 907-978-3439	EMAIL: elizabeth@bristleconelanduseconsulting.com

SITE INFO	STREET ADDRESS:		
	PARCEL #: R3283200000		LOT SIZE/AREA: 62.991 acres
	LOT:	BLOCK:	SUBDIVISION:
	QUARTER: N 1/4	SECTION: 16	TOWNSHIP: 3N
	ZONING DISTRICT: AG	FLOODZONE (YES/NO): No	

HEARING LEVEL APPS	<input type="checkbox"/> CONDITIONAL USE	<input type="checkbox"/> COMP PLAN AMENDMENT	<input type="checkbox"/> CONDITIONAL REZONE
	<input checked="" type="checkbox"/> ZONING AMENDMENT (REZONE)	<input type="checkbox"/> DEV. AGREEMENT MODIFICATION	<input type="checkbox"/> VARIANCE > 33%
	<input type="checkbox"/> MINOR REPLAT	<input type="checkbox"/> VACATION	<input type="checkbox"/> APPEAL
	<input type="checkbox"/> SHORT PLAT SUBDIVISION	<input type="checkbox"/> PRELIMINARY PLAT SUBDIVISION	<input type="checkbox"/> FINAL PLAT SUBDIVISION

DIRECTORS DECISION APPS	<input checked="" type="checkbox"/> ADMINISTRATIVE LAND DIVISION	<input type="checkbox"/> EASEMENT REDUCTION	<input type="checkbox"/> SIGN PERMIT
	<input type="checkbox"/> PROPERTY BOUNDARY ADJUSTMENT	<input type="checkbox"/> HOME BUSINESS	<input type="checkbox"/> VARIANCE 33% >
	<input type="checkbox"/> PRIVATE ROAD NAME	<input type="checkbox"/> TEMPORARY USE	<input type="checkbox"/> DAY CARE
	<input type="checkbox"/> OTHER _____		

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

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



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

AFFIDAVIT OF LEGAL INTEREST

I, bill McGuire, 4023 Spyglass Road
(name) (address)

Chico, CA 95973
(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, Bristlecone Land Use Consulting, P.O. Box 3953, Nampa, Idaho 83653
(name) (address)

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 19 day of September, 20 24.

Handwritten signature of Bill McGuire over the date line.

STATE OF IDAHO)

ss

COUNTY OF CANYON)

On this See day of See, in the year 20, before me See,
a notary public, personally appeared See, 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: _____

My Commission Expires: _____

CERTIFICATE OF ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)

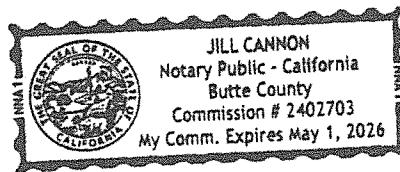
County of Butte)

On Sept 19, 2024 before me, Jill Cannon, Notary Public,
personally appeared William Bradford McGuire,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed
to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their
authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity
upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing
paragraph is true and correct.

WITNESS my hand and official seal.

Signature Jill Cannon (Seal)





Bristlecone

LAND USE CONSULTING

January 6, 2024

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

RE: TILLMAN RIDGE REZONE UPDATED LETTER OF INTENT

Dear Mr. Lister,

On behalf of the property owner, we are pleased to submit this updated letter of intent for the Tillman Ridge Rezone. We are proposing a Zoning Map Amendment 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 52 lots (48 residential lots and four (4) common lots) with an average lot size of one (1) acre is forthcoming after the approval of this request.

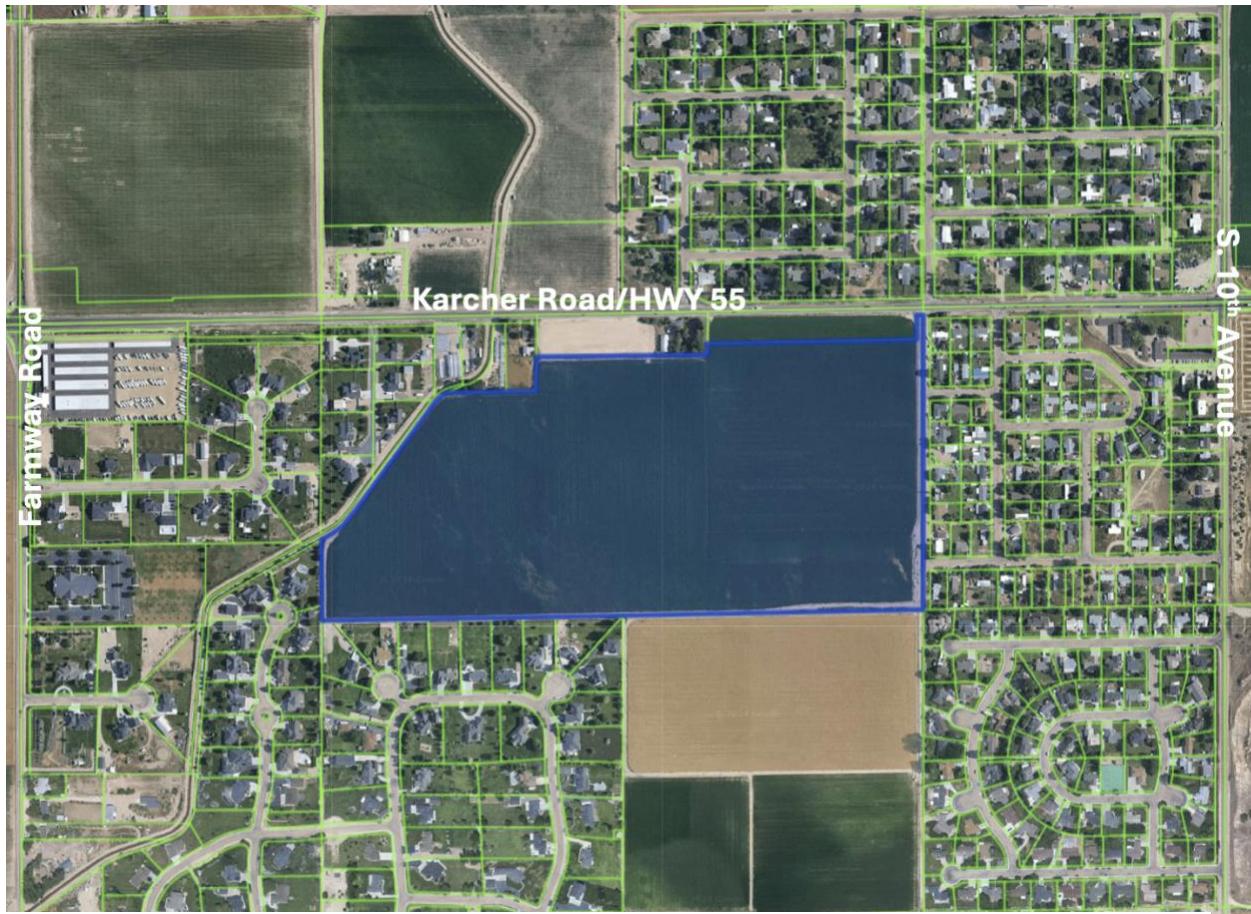


Image 1. Aerial image of the subject parcel and surrounding area.

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

A. Is the proposed zone change generally consistent with the comprehensive plan;

The proposed zone change 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 rezone, and forthcoming preliminary plat will provide 44 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), 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.

B. When considering the surrounding land uses, is the proposed zone change 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 1, 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 lot (Norse Landing Subdivision). One parcel sits between the Norse Landing Subdivision and the subject property.

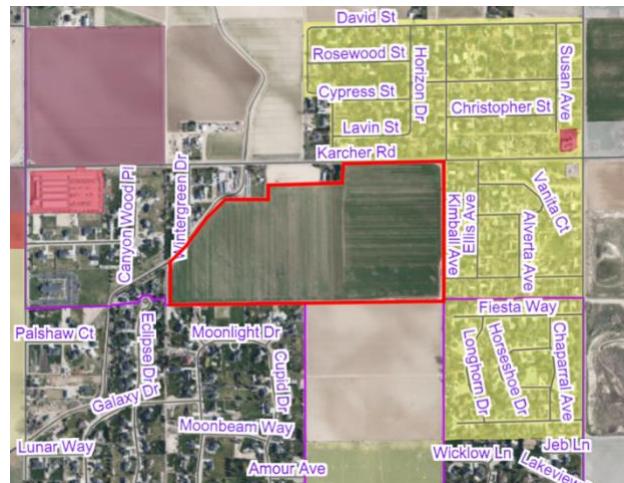


Image 2. Zoning Map.

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.

C. Is the proposed zoning map amendment compatible with surrounding land uses;

As explained in B and D, the primary surrounding land use is single-family residential. The proposed zoning map amendment to R-1 is compatible with the surrounding residential uses and will fill a gap between the adjacent residential subdivisions.

D. Will the proposed zoning map amendment negatively affect the character of the area? What measures will be implemented to mitigate impacts?

As explained in A and B, the immediate surrounding area is primarily single-family residential and will not be negatively affected by a zoning map amendment to R-1 (Single Family Residential). The forthcoming preliminary plat proposes 44 single-family residential lots that will provide uses consistent with the area's existing residential character. As shown in the image in Table 1, 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 Table 1. 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.

Table 1. 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
Vanah Heights	4	28.60	70	0.41
Vanah 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

E. Will adequate facilities and services including sewer, water, drainage, irrigation and utilities be provided to accommodate the proposed zoning map amendment;

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 at the time of development.
- Water: Individual wells will serve each residential lot at the time of development.
- Drainage: All stormwater will be retained on-site with swales.
- Irrigation: Each residential lot and common lot will utilize 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.

F. Does legal access to the subject property for the zoning map amendment exist or will it exist at the time of development;

Legal access to the subject property exists and will be provided at the time of development. The main access will be via Vista Drive, which provides access to S. 10th Avenue. Kimball Avenue runs along the eastern boundary of the subject property and no longer allows access to Karcher Road.

G. Does the proposed zoning map amendment 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; and

A Traffic Impact Study (“TIS”) was included with this application at the time of subdivision. A revision was requested by the Idaho Transportation Department (“ITD”) in a letter submitted to the Development Services Department (“DSD”) dated January 16, 2024. The revised TIS has been prepared and submitted to DSD, ITD, and Canyon Highway District No. 4 (“CHD#4”). ITD has planned to widen Karcher Road/Highway 55. To accommodate this project, the property owner has dedicated the required amount of right-of-way to ITD (approximately six (6) acres). No additional mitigation measures are needed at this time.

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. The August 9, 2023 comment letter provided comments on the preliminary plat submitted with this application. DSD has since changed its policy and no longer permits preliminary plat applications to proceed with a rezone application and requires the preliminary plat to proceed only after the rezone is approved. Therefore, the CHD#4 comments will be addressed when the preliminary plat moves forward.

H. Will the proposed zoning map amendment impact essential public services and facilities, such as schools, police, fire and emergency medical services? What measures will be implemented to mitigate impacts? (Ord. 16-007, 6-20-2016)

The proposed zoning map amendment to R-1 will not impact essential public services and facilities. The Caldwell Fire Department, Caldwell Police Department, and Canyon County

Sheriff serve the area. The area falls under the Vallivue School District. Vallivue School District provided a comment letter to DSD on January 17, 2024, explaining that two new elementary schools will open in 2025 and that Vallivue High School has not reached capacity. In the forthcoming Preliminary Plat, 48 buildable lots are planned. As not every household will have school-age children, the proposal is not anticipated to impact schools.

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 thank you for your time and consideration.

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

Sincerely,



Elizabeth Allen
Bristlecone Land Use Consulting
Principal

Dan Lister

From: Elizabeth Allen <elizabeth@bristleconelanduseconsulting.com>
Sent: Wednesday, January 8, 2025 9:03 AM
To: Dan Lister
Subject: Re: [External] Tillman Letter of Intent

Hi Dan

We would like to proceed as is. My client would like to keep it as a standard rezone at this time. I explained the risks and they are comfortable proceeding.

Elizabeth Allen
Owner/Principal Planner
Bristlecone Land Use Consulting
208-477-1059



On Wed, Jan 8, 2025 at 8:55 AM Dan Lister <Daniel.Lister@canyoncounty.id.gov> wrote:

Elizabeth,

The updated letter of intent was received. I should have time next week to review the updated narrative and revised TIS.

Based on our previous discussions, the following items were stated as potentially being submitted:

- TIS review comments by ITD and CDH4/City of Caldwell;
- Review comments from Caldwell Engineering regarding the use of well and septic versus city services/community system; and
- Revising the application from a Rezone to a Conditional Rezone.

Please let me know if you are planning to provide the above items or wish to proceed as is.

Sincerely,

Dan Lister, Principal Planner

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: Sunday, January 5, 2025 5:03 PM

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

Subject: [External] Tillman Letter of Intent

Hi Dan,

I have attached the updated letter of intent for Tillman Ridge.

Thank you,

Elizabeth Allen
Owner/Principal Planner
Bristlecone Land Use Consulting
208-477-1059

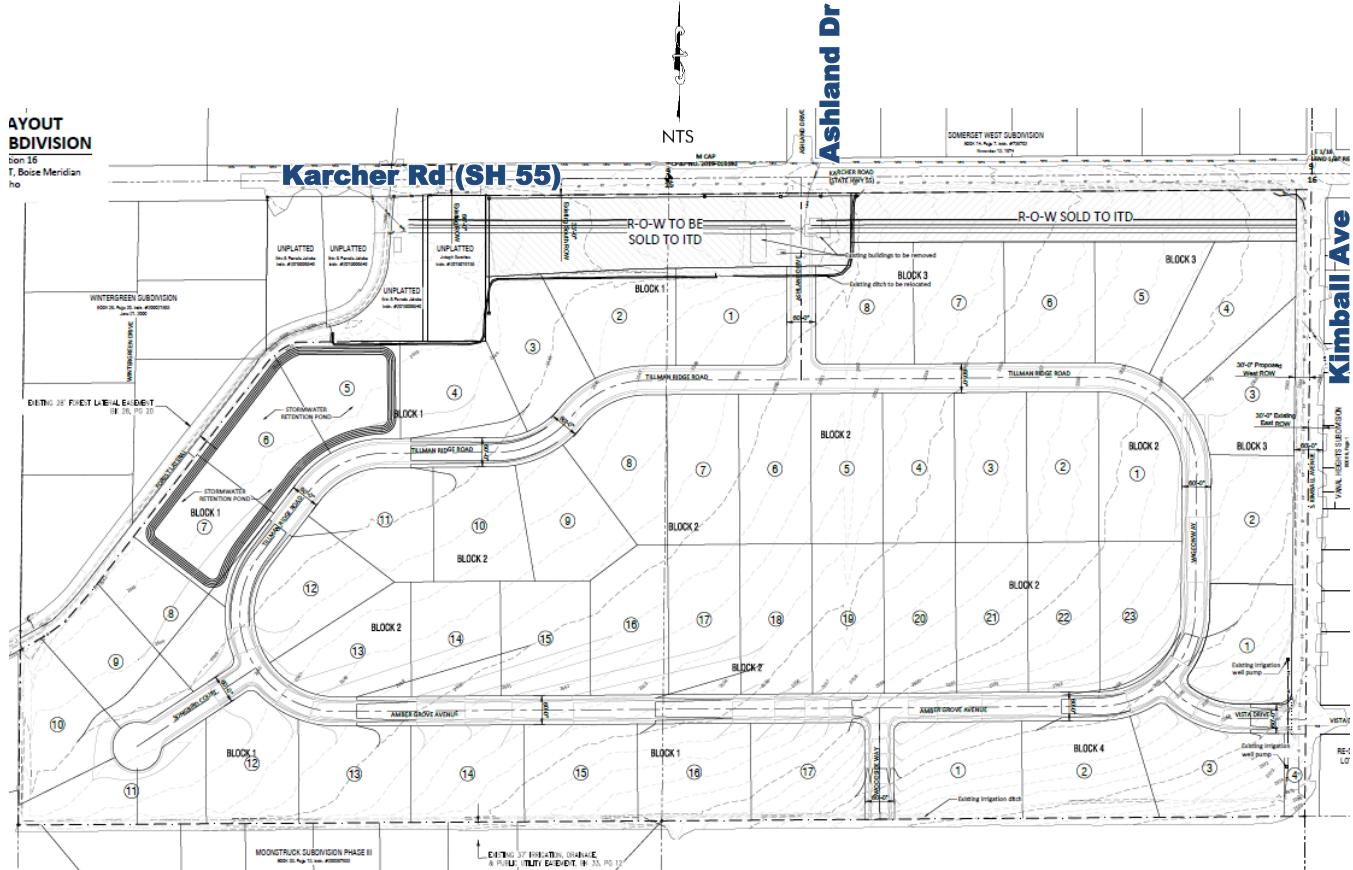
TRAFFIC IMPACT STUDY UPDATE

TILLMAN RIDGE SUBDIVISION

Caldwell, Idaho

July 15, 2022

Updated December 13, 2024



Prepared For:

Dr. William McGuire

Prepared By:

G 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

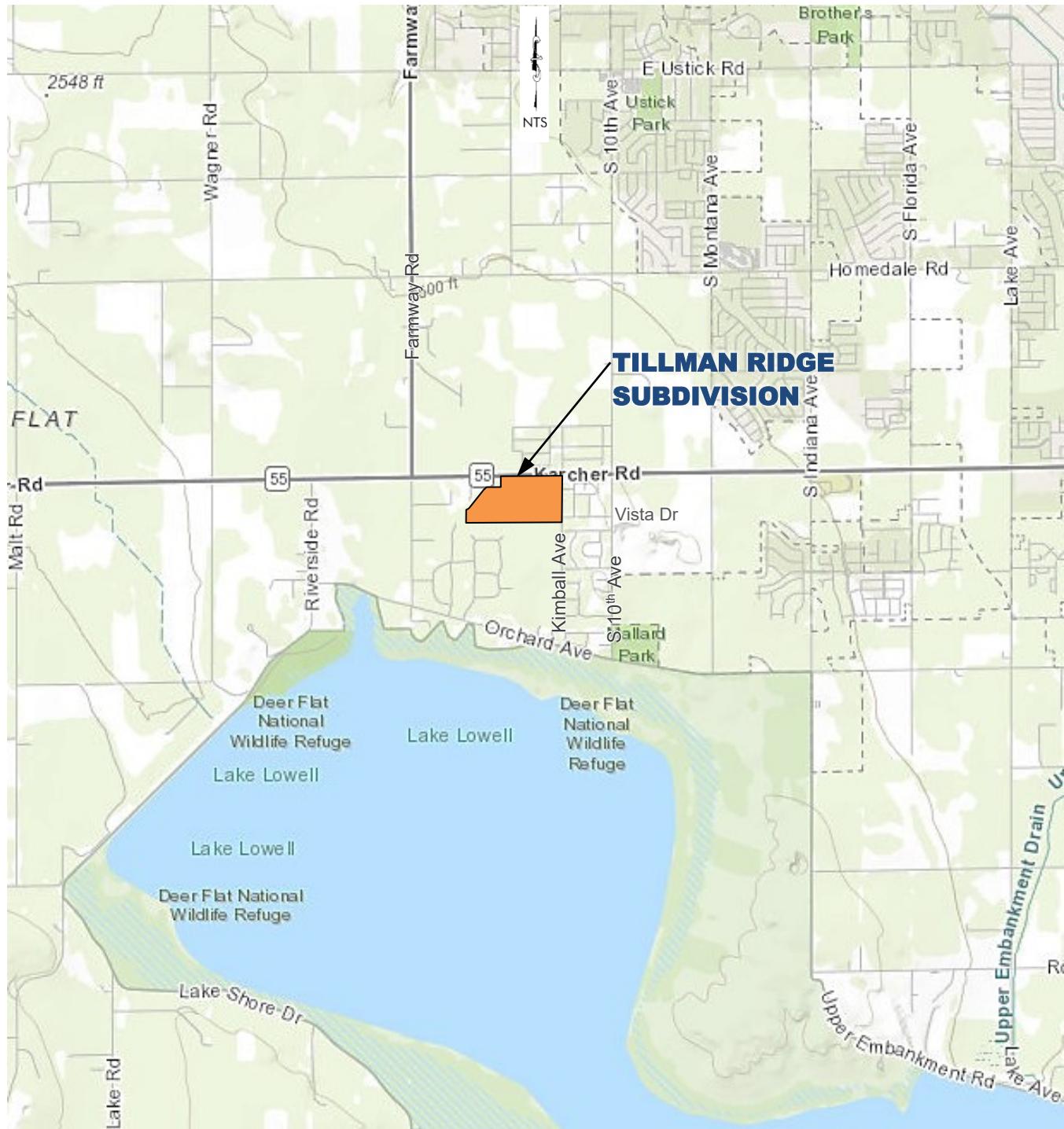
6.0 2032 Horizon Year Total Traffic Conditions

- 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).

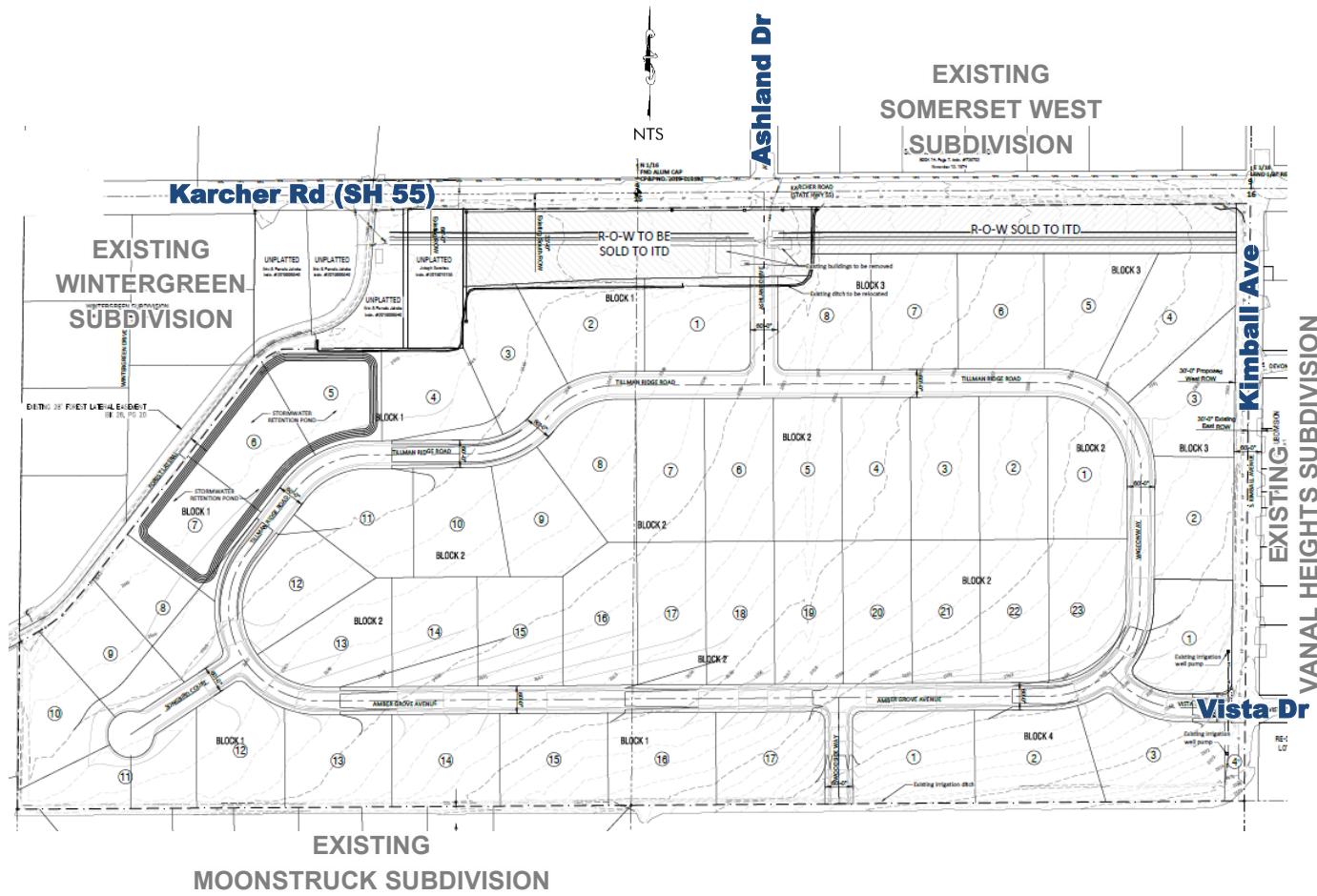
Figure 1.1 – Site Location and Vicinity



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

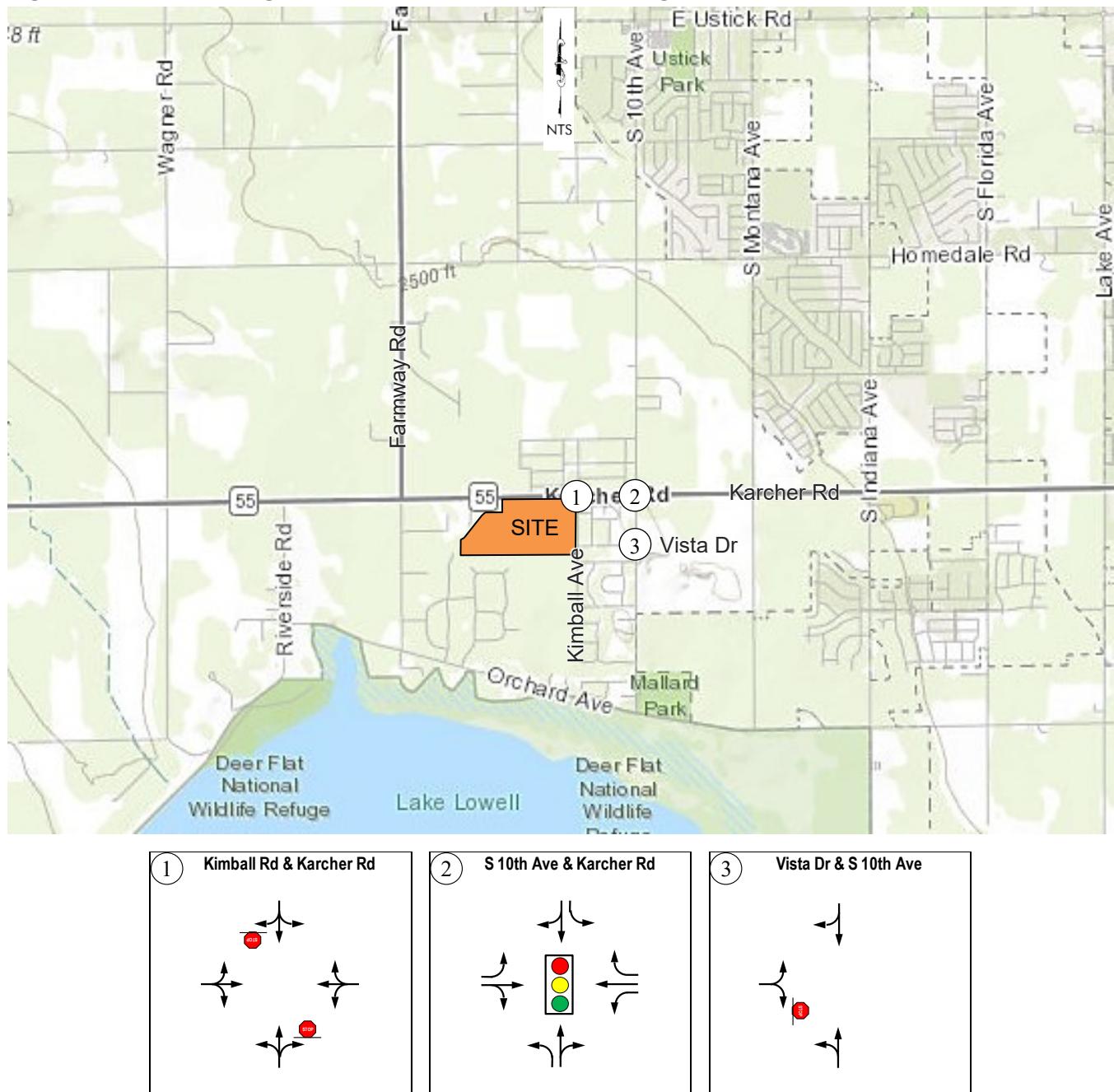
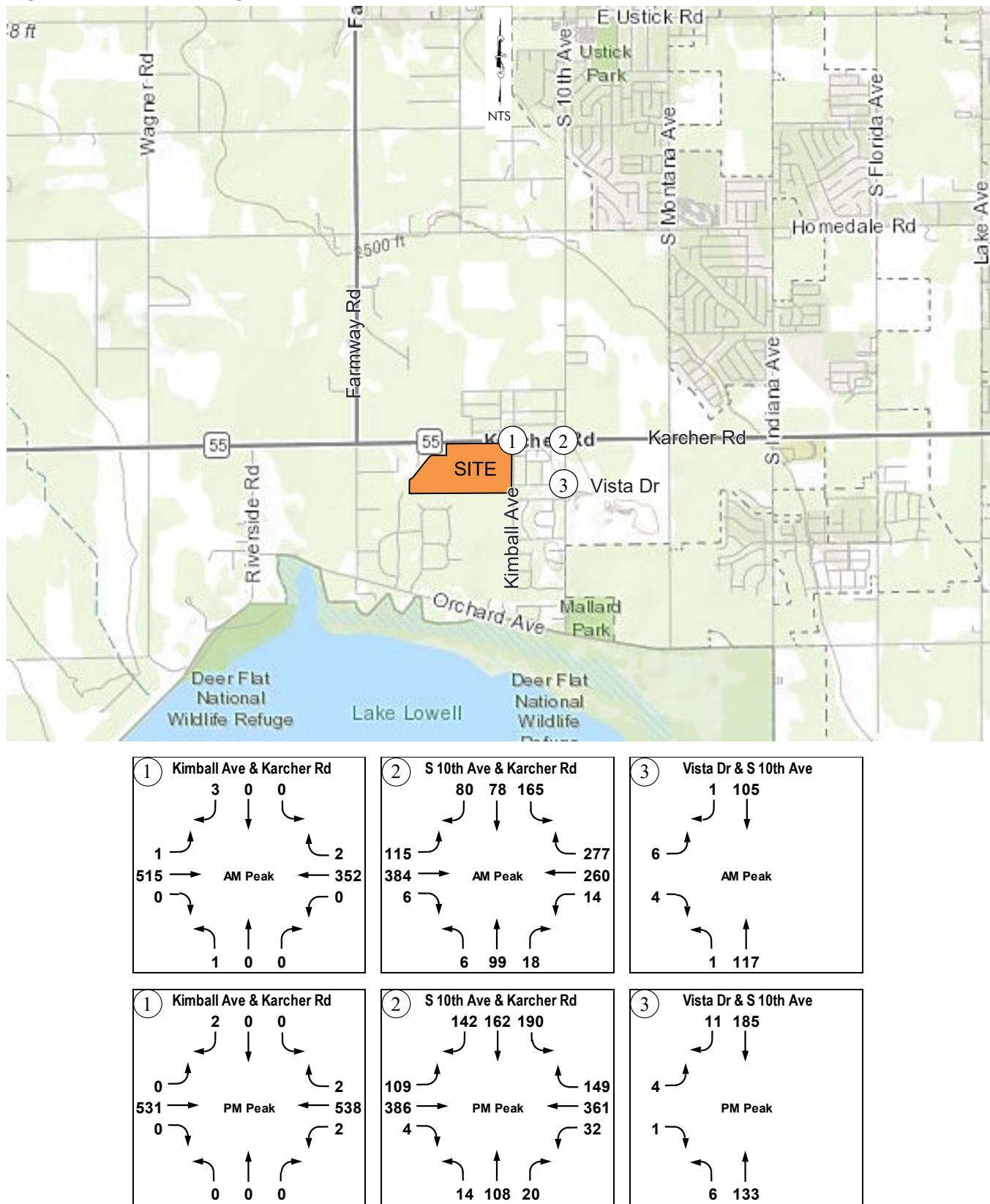


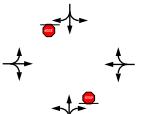
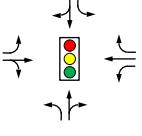
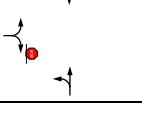
Figure 2.2 – 2024 Existing Peak Hour Traffic



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
		SBTR	B	18	0.44	B	20	0.76
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

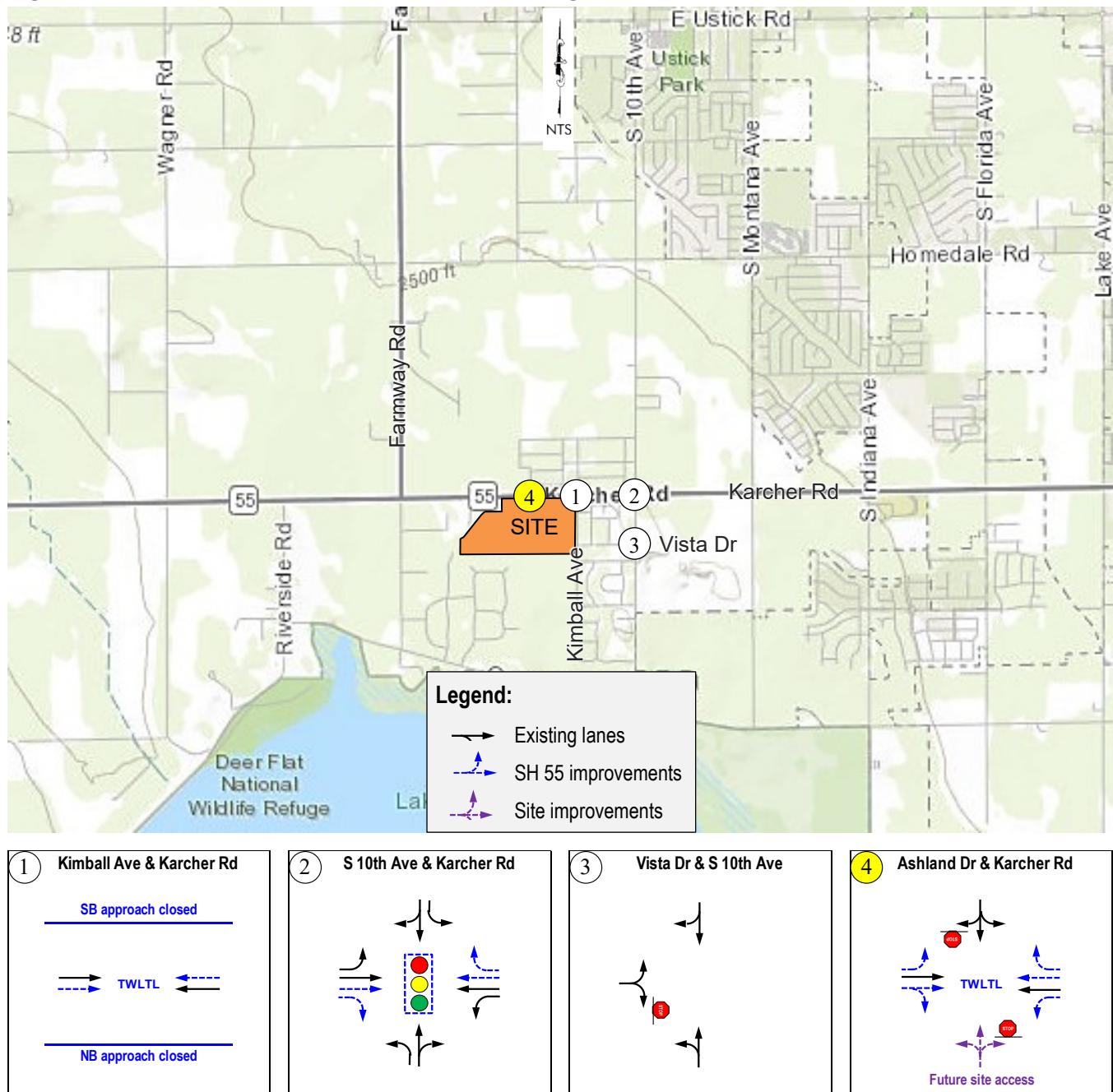
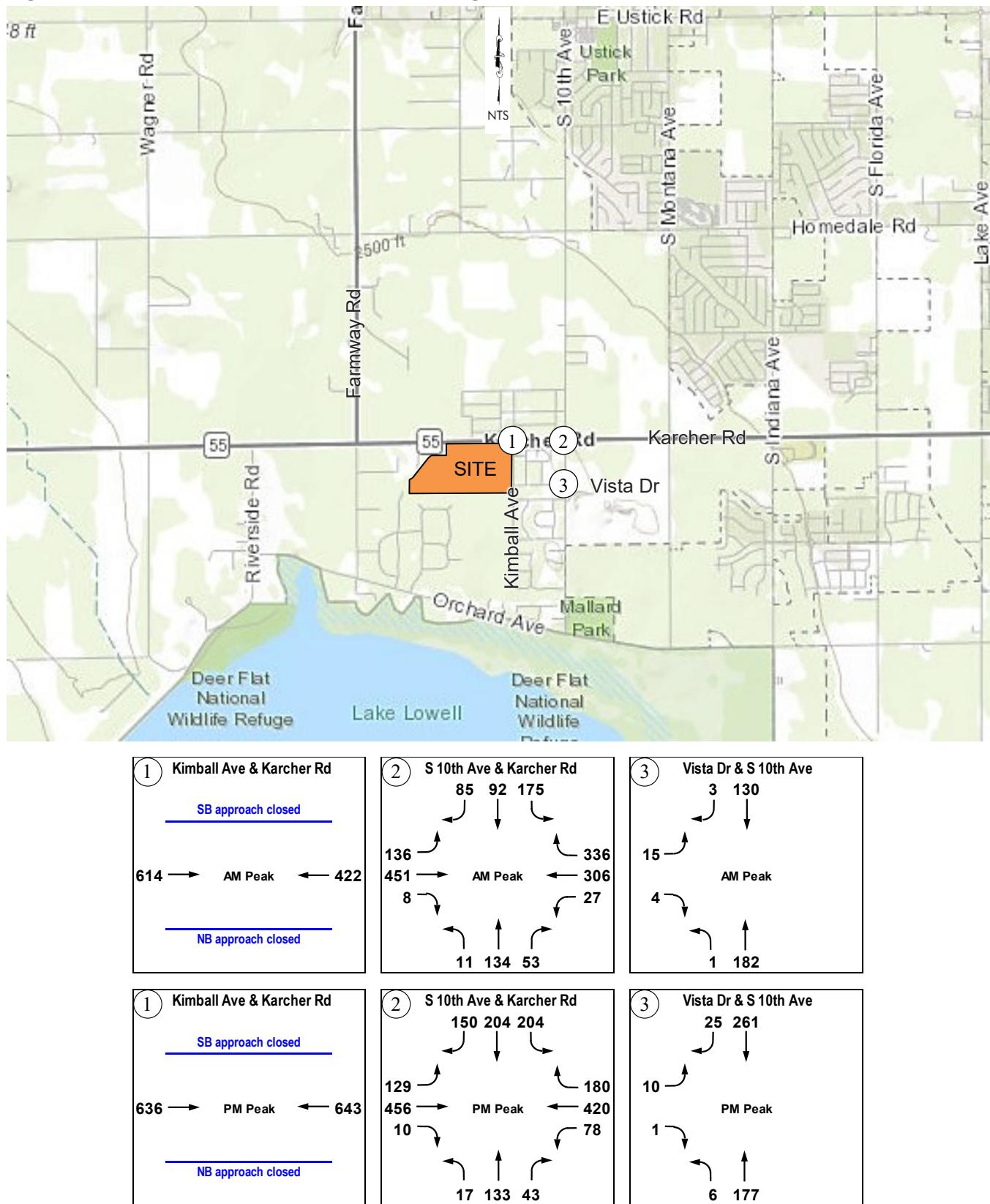


Figure 3.2 – 2027 Build-Out Year Peak Hour Background Traffic



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

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.

Table 4.2 – Build-Out Site Traffic Percentage at Study Area Intersections

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 4.1 – Estimated Site Traffic Distribution Patterns

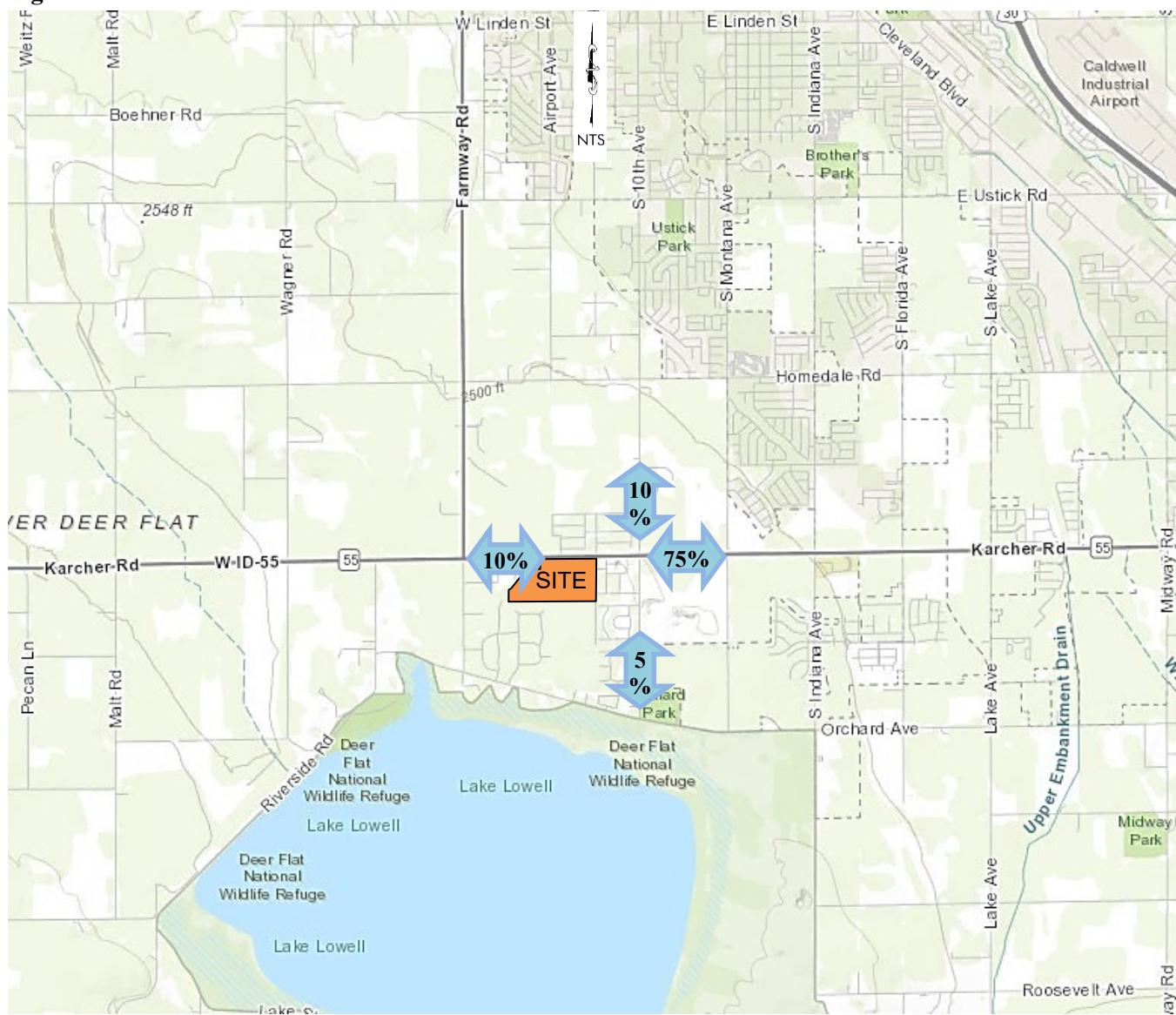


Figure 4.2 – 2027 Build-Out Year AM Peak Hour Site Traffic

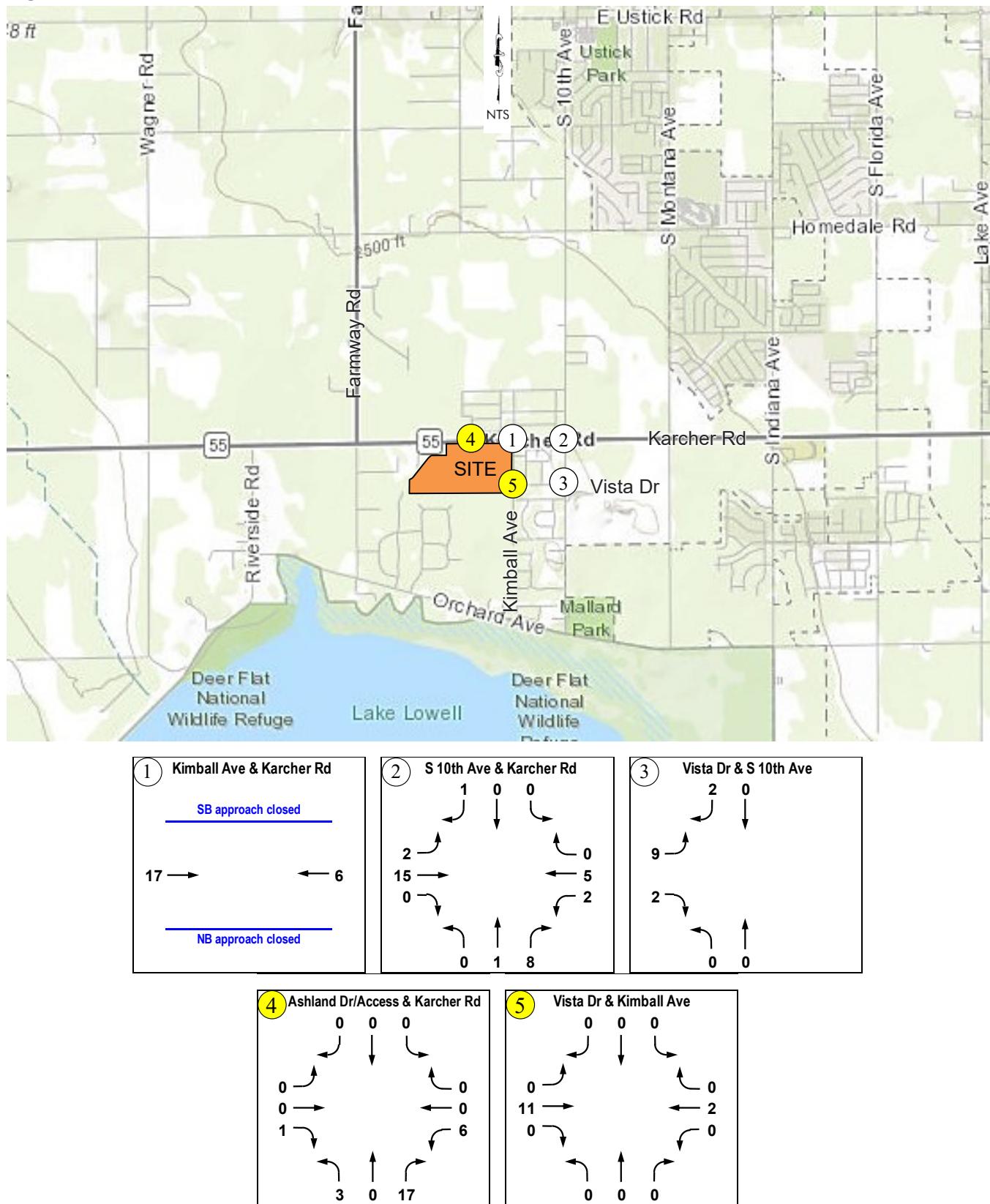


Figure 4.3 – 2027 Build-Out Year PM Peak Hour Site Traffic

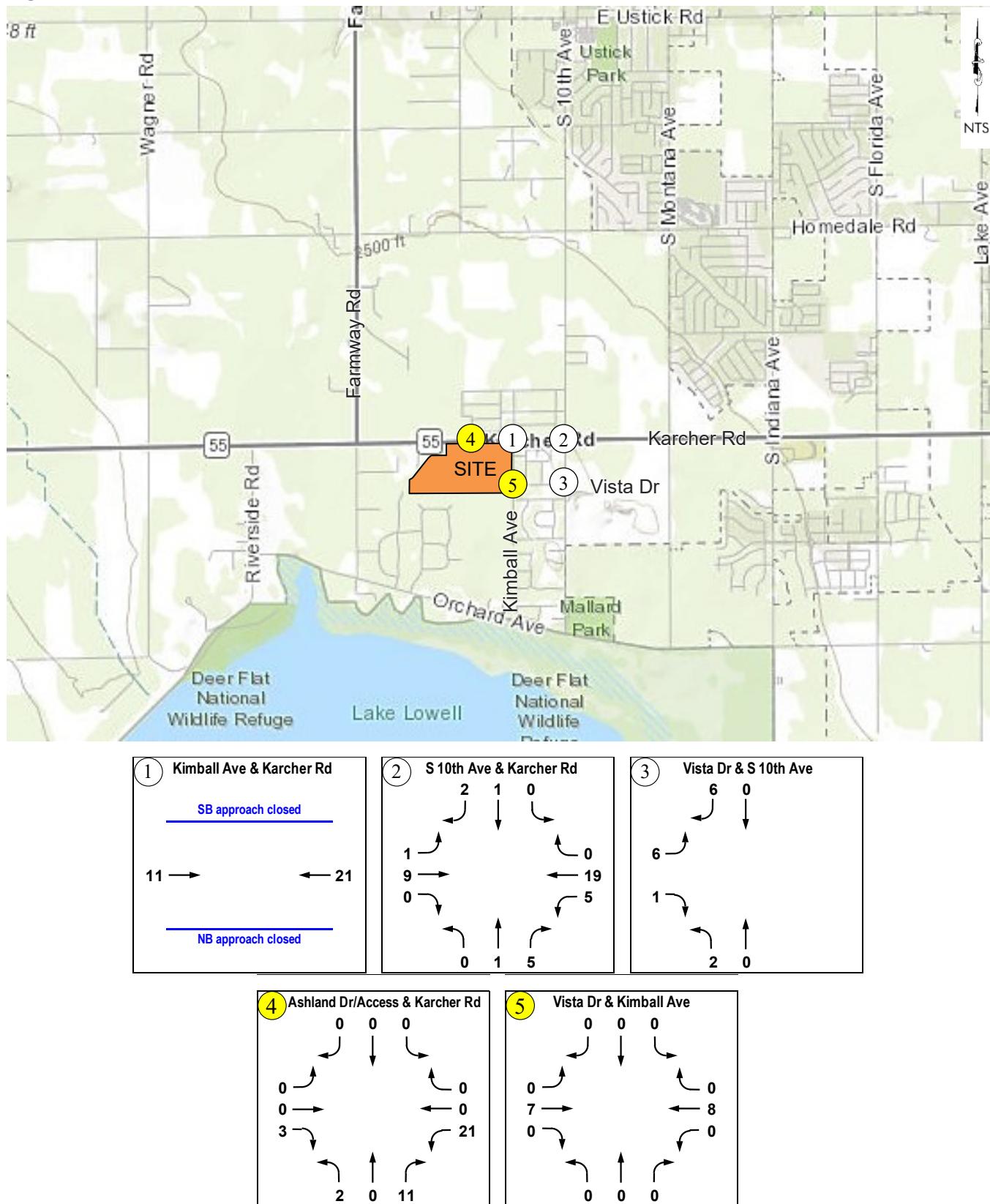


Figure 4.4 – 2027 Build-Out Year AM Peak Hour Total Traffic

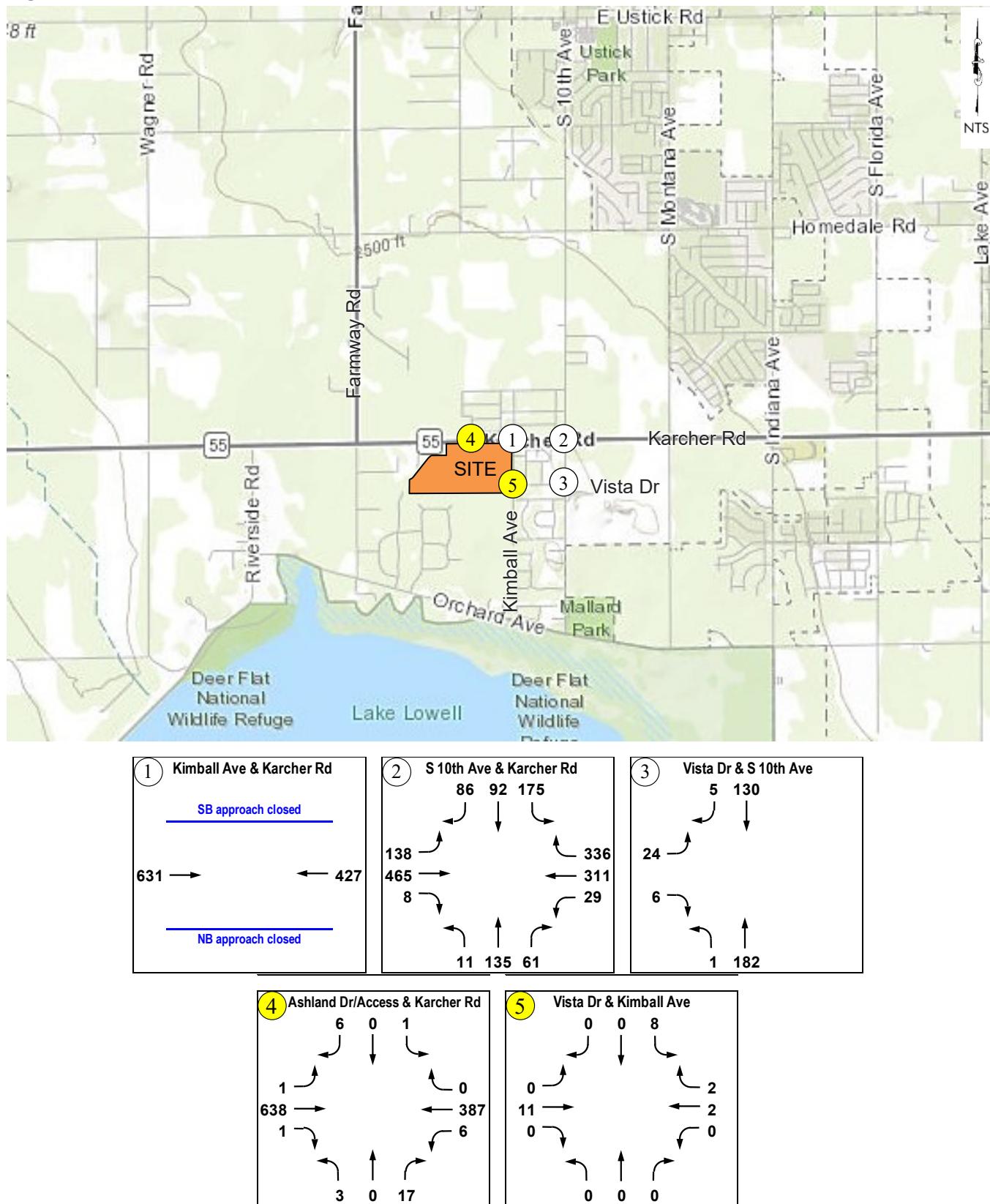
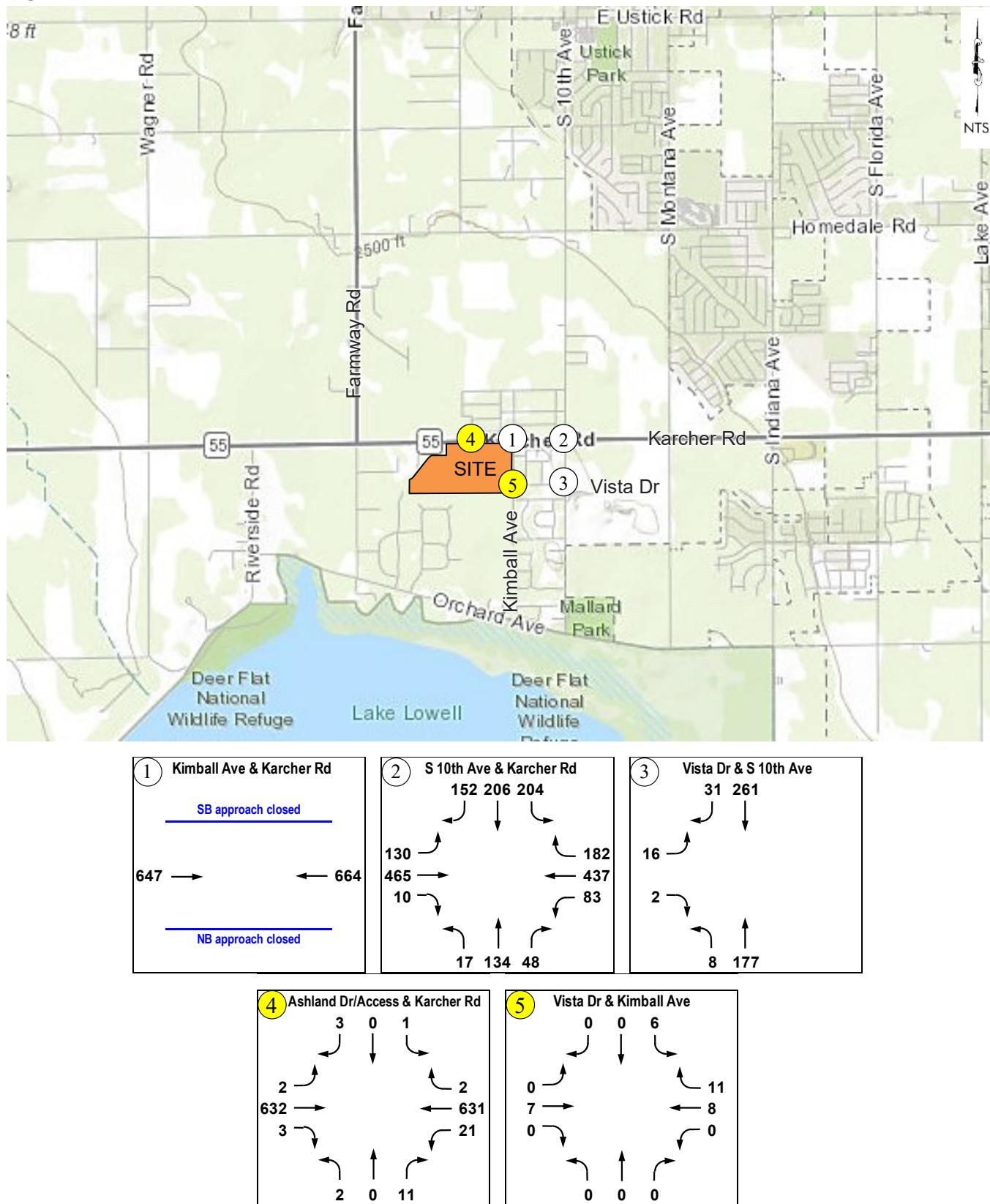


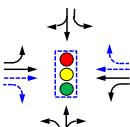
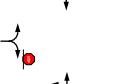
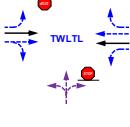
Figure 4.5 – 2027 Build-Out Year PM Peak Hour Total Traffic



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
(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 $\frac{1}{2}$ 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

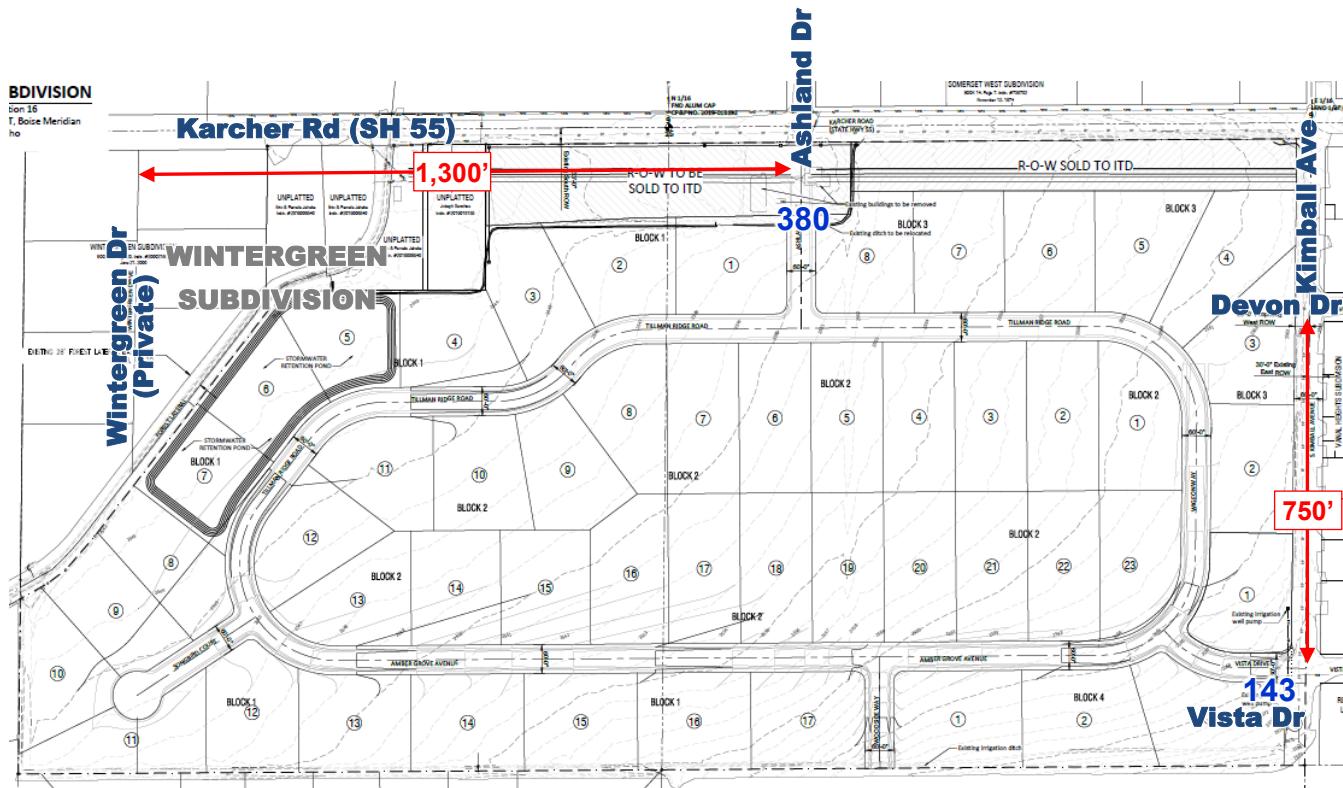
Site access spacing on Karcher Road (SH 55), a 55-mph principal arterial statewide route along the site frontage, is governed by ITD and is determined by IDAPA 39.03.42 *Rules Governing Highway Right-of-Way Encroachments on State Rights-of-Way*. The minimum spacing requirements on Karcher Road along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

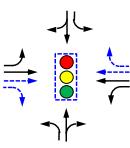
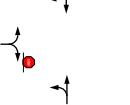


4.8 Alternate Site Access Scenario

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.

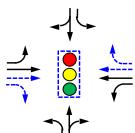
5.2 Background Traffic

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.

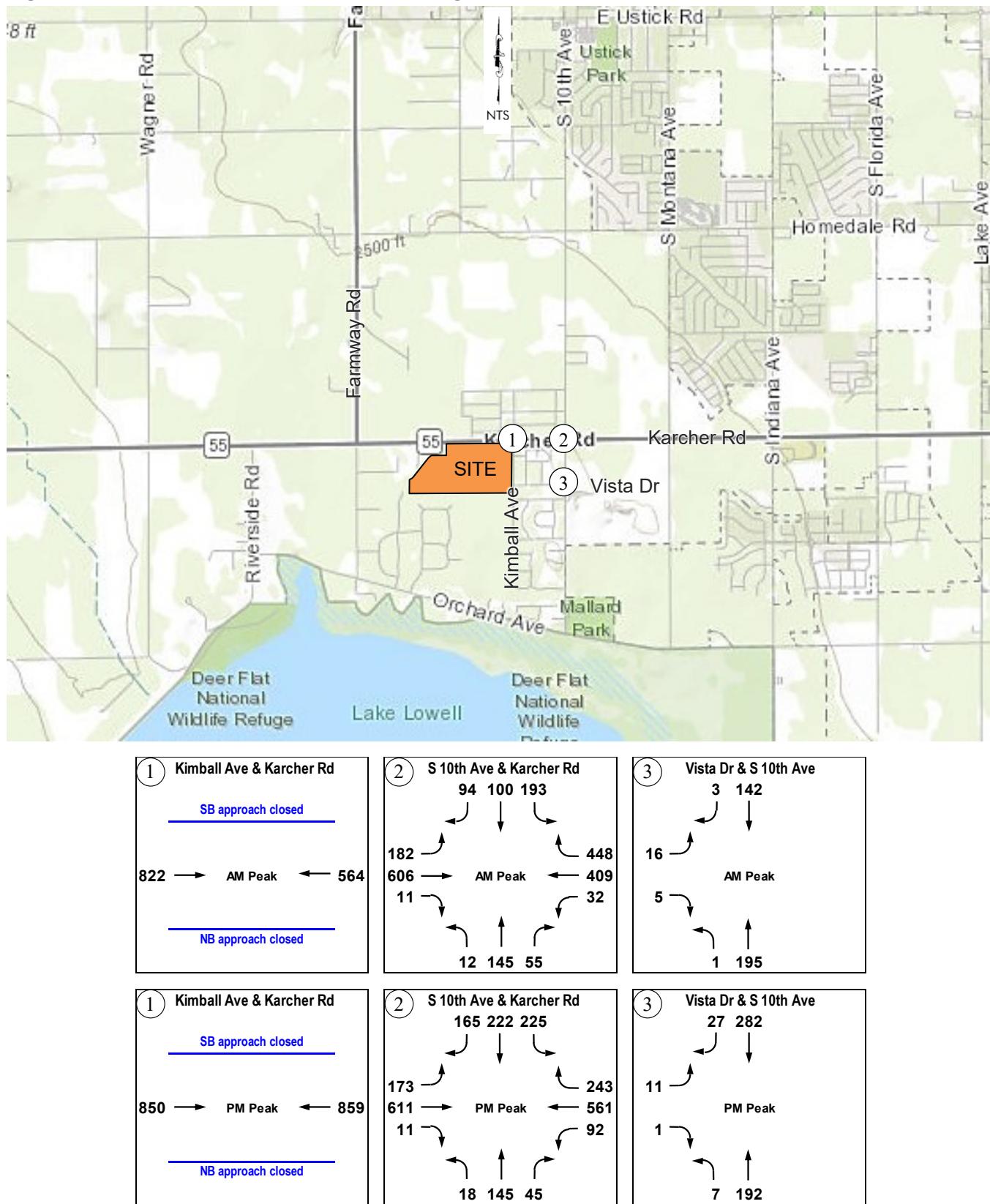
Table 5.1 – Intersection Operations – 2032 Horizon Year Background Traffic

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

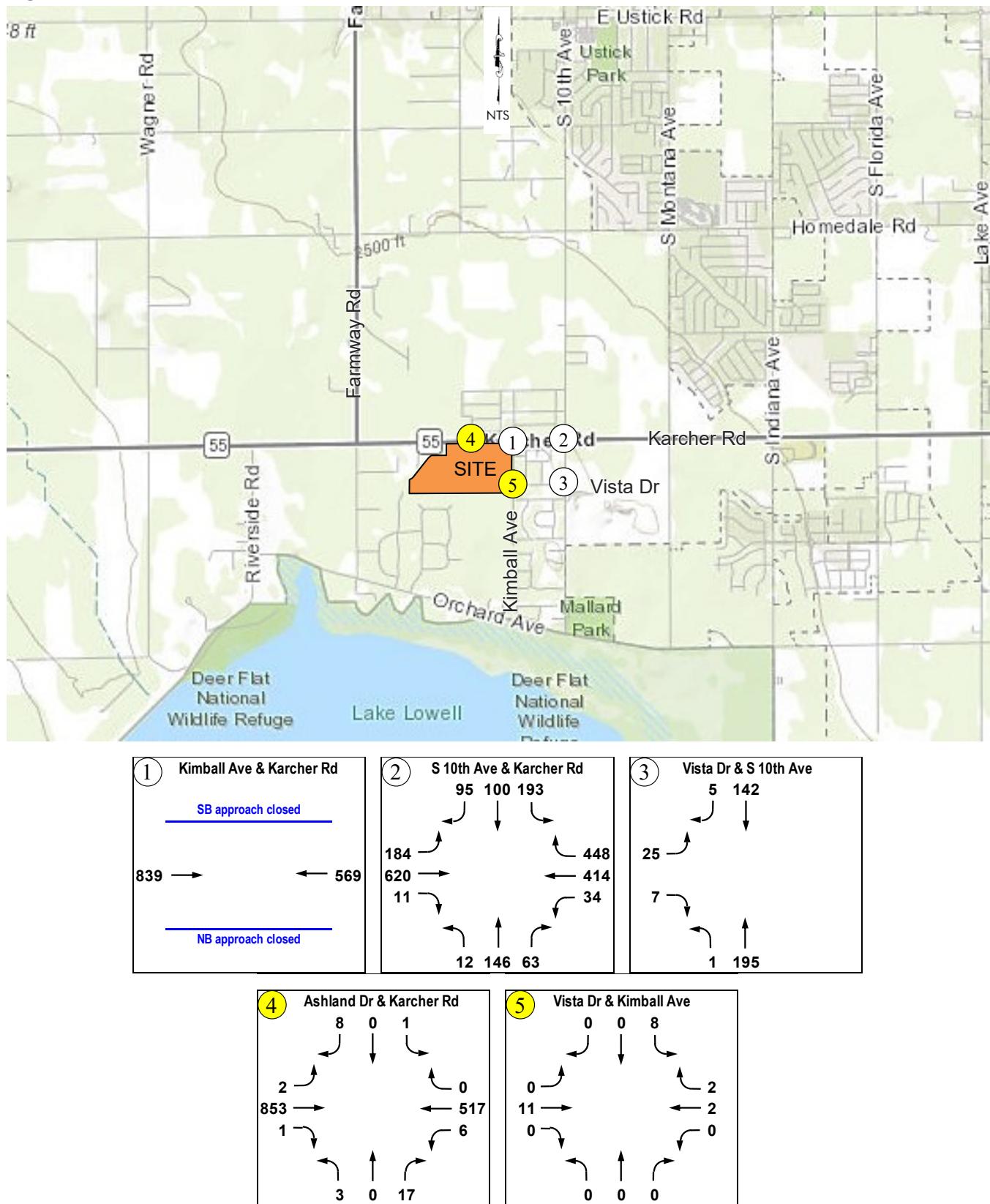
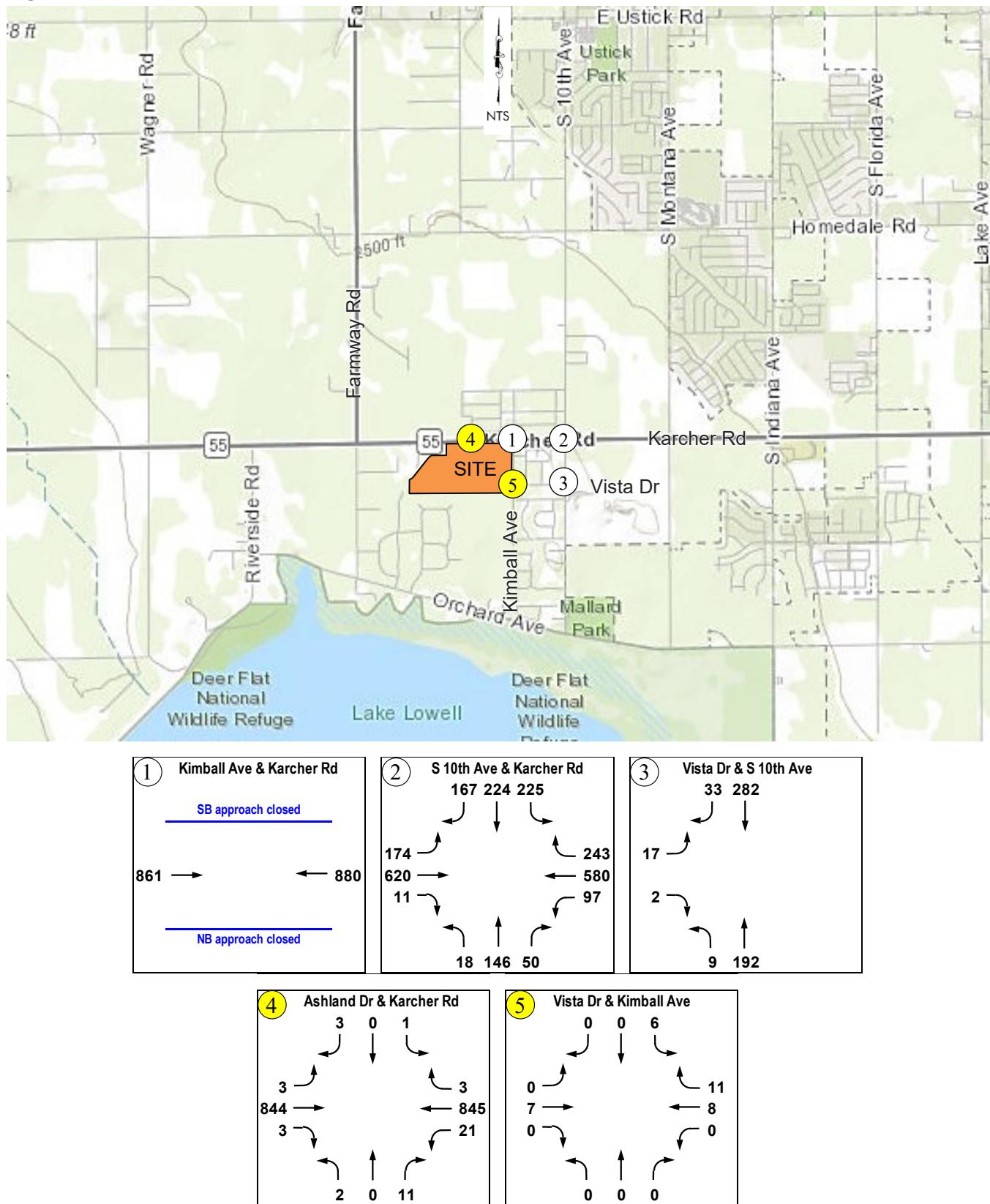


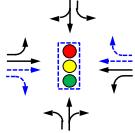
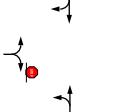
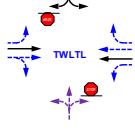
Figure 6.2 – 2032 Horizon Year PM Peak Hour Total Traffic



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.

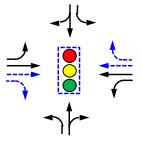
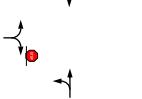
6.7 Alternate Site Access Scenario

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	0.66	C	24	0.70
			EBL	D	0.85	C	30	0.80
			EBT	B	0.49	C	22	0.69
			EBR	B	0.02	B	18	0.03
			WBL	D	0.66	C	32	0.78
			WBT	C	0.45	C	24	0.73
			WBR	B	0.70	B	15	0.42
			NBL	D	0.49	C	35	0.50
			NBTR	D	0.84	C	28	0.76
			SBL	D	0.86	C	29	0.82
(3)	Vista Dr and S 10 th Ave		NB	A	< 0.01	A	8	0.01
			EB	B	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	0	0	0	170	0	0	0	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	0	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	0	219
Hourly Total	0	2	1	3	0	6	0	0	309	1	0	310	0	0	0	1	0	0	0	2	533	0	0	0	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	0	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	0	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	0	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	0	202
Hourly Total	0	0	0	2	0	2	0	0	348	3	0	351	0	0	0	0	0	0	0	0	502	0	0	0	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	0	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	0	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	0	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	0	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	0	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	0	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	0	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	0	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	0	1015

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

Time	Southbound Kimball Ave						Westbound Karcher Rd						Norhtbound 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	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	0	0	0	0	0	0	122	0	0	0	204
8:15 AM	0	0	0	0	0	0	0	0	100	2	0	102	0	0	0	0	0	0	0	0	0	0	0	142	0	0	0	244
8:30 AM	0	0	0	2	0	2	0	0	84	0	0	84	0	0	0	0	0	0	0	0	0	0	0	121	0	0	0	207
Peak Hour Total	0	0	0	3	0	3	0	0	352	2	0	354	0	1	0	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	0.000	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%	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
Southbound	
Cars	3
Heavy	0
Total	3



AM Peak Hour Volumes

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

Cars	Heavy	Total	Vehicles Entering Intersection	Vehicles Exiting Intersection	Total Vehicles on Leg
2	0	2	354	356	869
323	29	352			
0	0	0			
0	0	0			
0	0	0			

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



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
4:15 PM	0	0	0	1	0	1	0	0	1	151	1	0	153	0	0	0	0	0	0	0	0	0	133	0	0	133	287
4:30 PM	0	0	0	0	0	0	0	0	1	117	1	0	119	0	0	0	0	0	0	0	0	0	143	0	0	143	262
4:45 PM	0	0	0	0	0	0	0	0	0	123	0	0	123	0	0	0	0	0	0	0	0	0	138	0	0	138	261
5:00 PM	0	0	0	1	0	1	0	0	0	147	0	0	147	0	0	0	0	0	0	0	0	0	117	0	0	117	265
Peak Hour Total	0	0	0	2	0	2	0	2	0	538	2	0	542	0	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	0.000	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%	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%	0.00%	5.08%	0.00%	0.00%	5.08%	3.4%

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



PM Peak Hour Volumes

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

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection	Total Vehicles on Leg
				542	1073
				2	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			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

Time	Southbound S 10th Ave						Westbound Karcher Rd						Norhtbound S 10th Ave						Eastbound Karcher Rd						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	
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
Southbound	
Cars	73
Heavy	7
Total	80
Vehicles Exiting Intersection	491



AM Peak Hour Volumes

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

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

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

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	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	
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
Southbound	
Cars	139
Heavy	3
Total	142
Vehicles Exiting Intersection	366



 	PM Peak Hour Volumes		
	Cars	0	13
	Heavy	0	0
	Total	0	14
	Cars	108	20
	Heavy	0	0

 	Westbound	Vehicles Entering Intersection	542	Total Vehicles on Leg	1138		
	Northbound	Vehicles Entering Intersection	142				
	Total Vehicles On Leg		340				

 	Northbound		
	Cars	0	13
	Heavy	0	0
	Total	0	14
	Cars	108	20
	Heavy	0	0



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	0	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

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	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach		
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%	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
Southbound	
Cars	1
Heavy	0
Total	1



AM Peak Hour Volumes

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

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

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



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	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach		
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	0	1	82
4:45 PM	0	0	46	4	0	50	0	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	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	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	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	0.000	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%	0.00%	0.75%	0.00%	0.00%	0.72%	0.00%	0.00%	0.00%	0.00%	0.00%	0.3%	

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



PM Peak Hour Volumes

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

Cars	Heavy	Total	Vehicles Entering Intersection	Vehicles Exiting Intersection	Westbound	
					Southbound	Northbound
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	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	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	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	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	1	0	0	0	1	0	0	139	0	0	139	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	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	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	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

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
7:15 AM	0	1	0	1	0	2	0	0	78	0	0	78	0	0	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	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	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	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	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	0.000	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%	0.00%	6.90%	0.00%	0.00%	6.90%	7.3%	

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



AM Peak Hour Volumes

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

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



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	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
4:15 PM	0	0	0	0	0	0	0	0	0	145	1	0	146	0	0	0	0	0	0	0	0	0	131	0	0	131	277
4:30 PM	0	1	0	1	0	2	0	0	0	121	0	0	121	0	0	0	0	0	0	0	1	142	0	0	0	143	266
4:45 PM	0	0	0	0	0	0	0	0	0	115	0	0	115	0	0	0	0	0	0	1	139	0	0	0	140	255	
5:00 PM	0	0	0	0	0	0	0	0	0	149	1	0	150	0	0	0	0	0	0	0	0	115	0	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	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
Southbound	
Cars	1
Heavy	0
Total	1
Vehicles Exiting Intersection	4



PM Peak Hour Volumes

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

Cars	Heavy	Total	Vehicles Entering Intersection	Vehicles Exiting Intersection	Total Vehicles on Leg
2	0	2	532	528	1060
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	0	Vehicles Exiting Intersection 0				
Total Vehicles On Leg						0

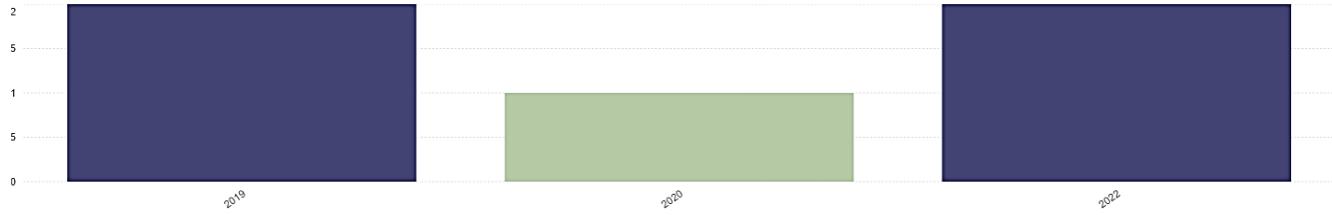


APPENDIX B: Intersection Crash Data

Kimball Road and Karcher Road Intersection 2019-2023 Crash Data



Crashes by Year



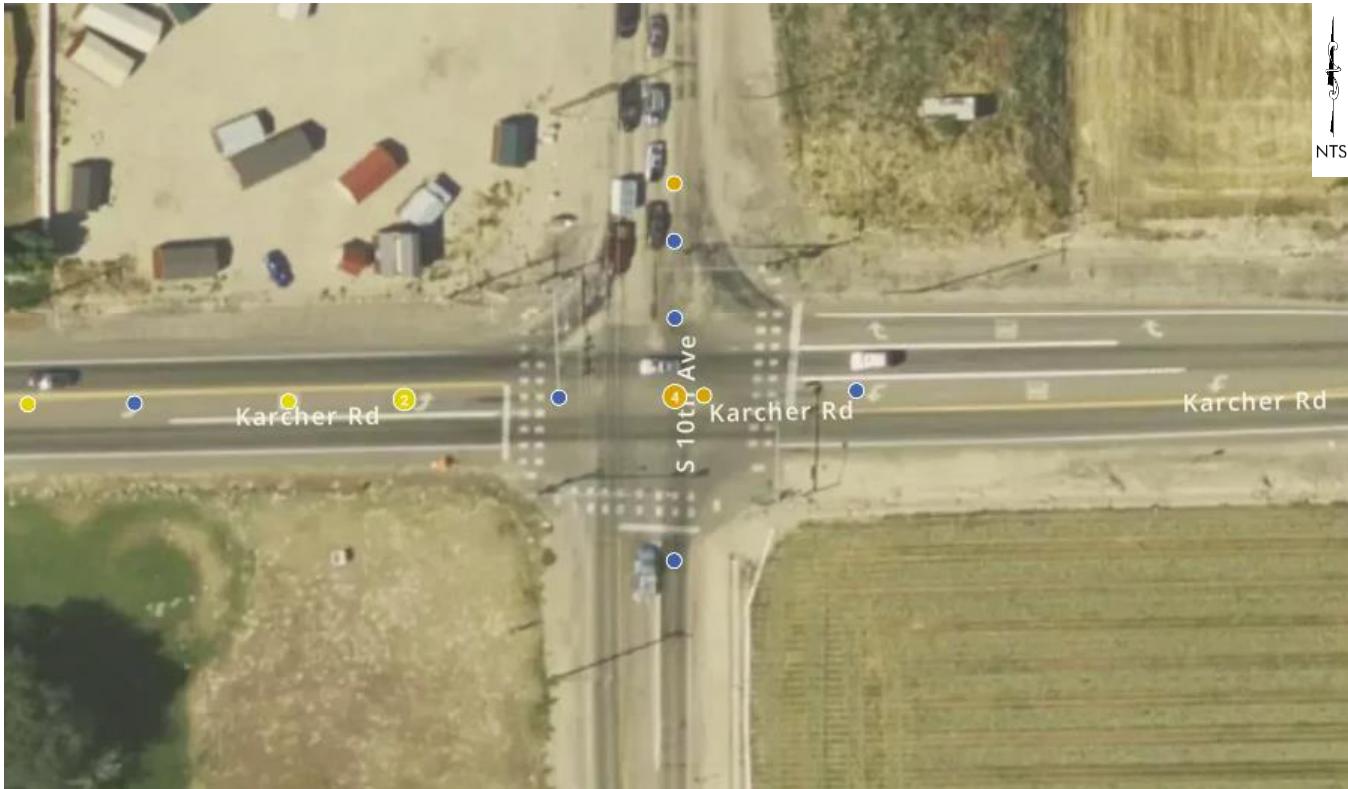
This chart shows the total # Crashes by Year

Crashes by Crash Type

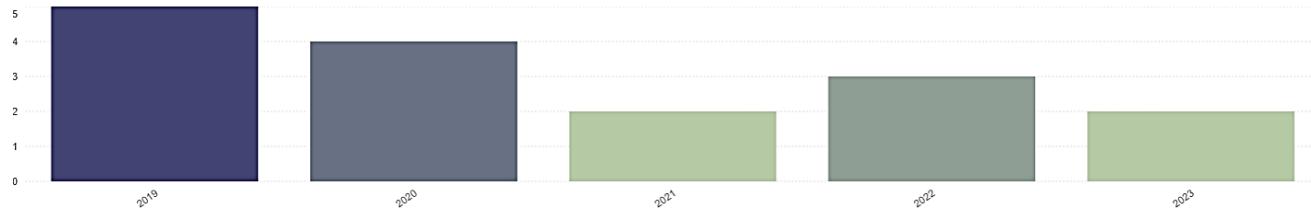
Rear-End 4	Loss of Control 1	Overtur 1	Ran Off Road 1
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Contributing Circumstances (All)	Total Crashes	
Asleep, Drowsy, Fatigued	1	
Following Too Close	3	
Inattention	2	
None	5	

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

Rear-End	Angle	Angle Turning	Came Back on	Loss of Control
11	4	1	1	1
Ran Off Road	Overturn	Side Swipe Opposite		
3	1	1		

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

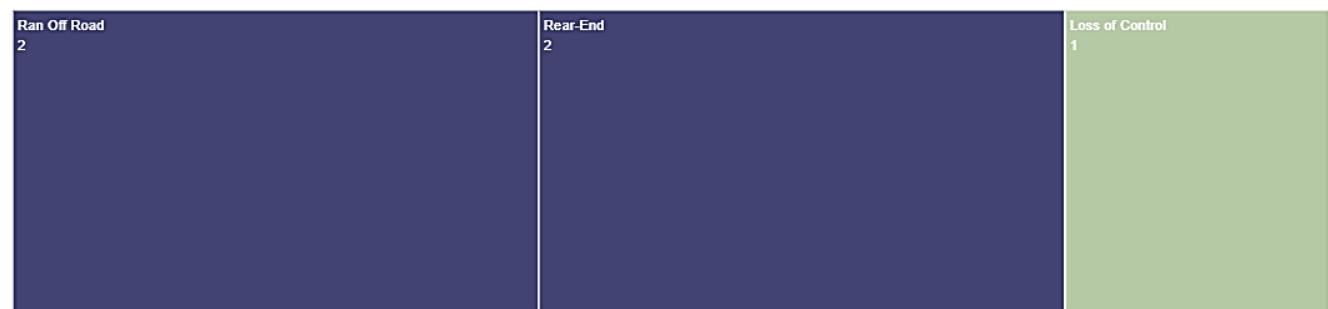


Crashes by Year



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

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 (Q _b), 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		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(l)	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						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+R _c), s	12.9	11.6	6.3	23.8	5.7	18.8	10.6	19.5				
Change Period (Y+R _c), 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 Level of Service			C			
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		77.5			Sum of lost time (s)			21.4				
Intersection Capacity Utilization		54.0%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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	-	-	

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	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 (Q _b), 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
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		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(l)	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						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+R _c), s	12.5	11.3	7.1	21.1	6.1	17.6	9.6	18.6				
Change Period (Y+R _c), 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

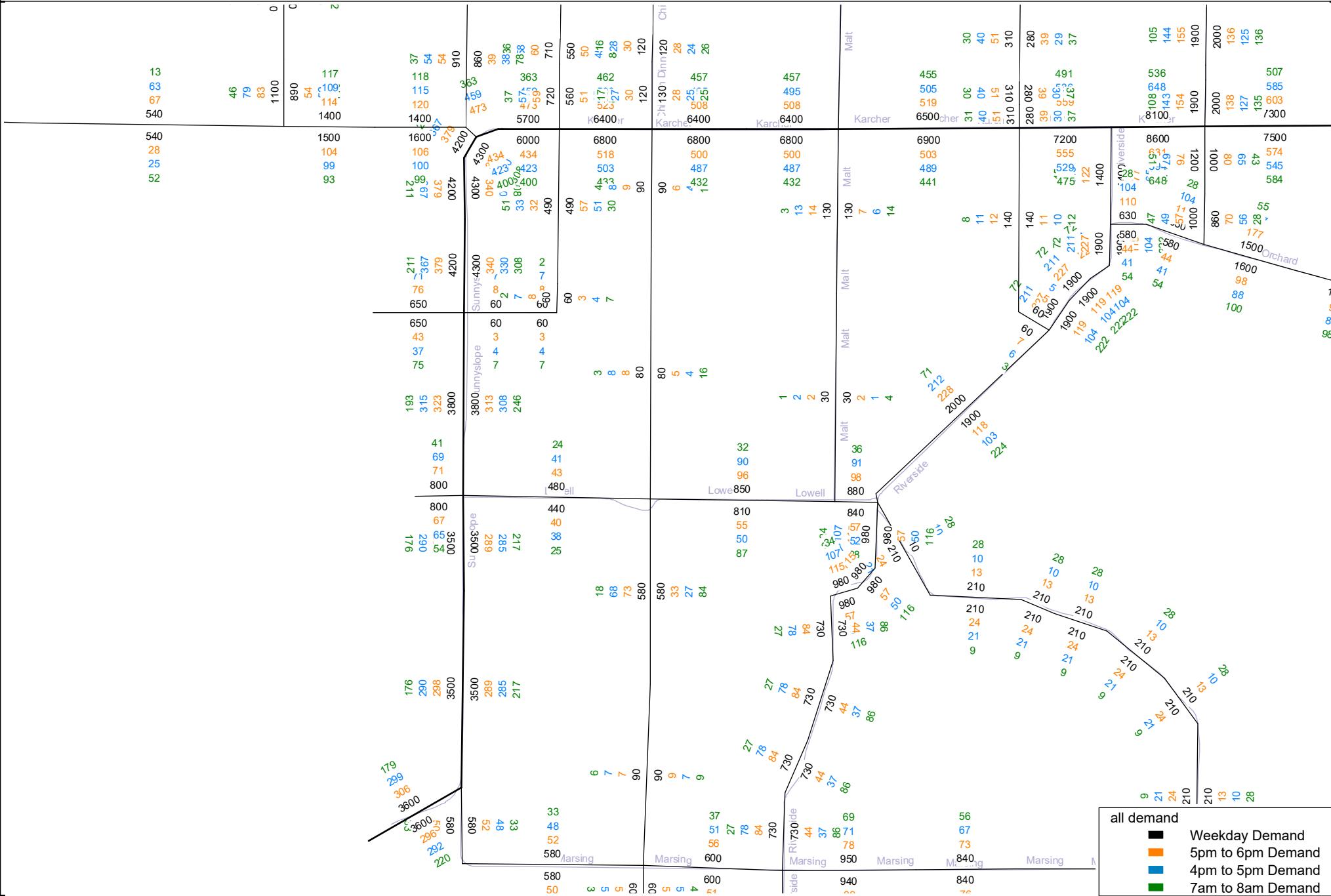
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑	↑	↑	↑		↑	↑	
Traffic Volume (vph)	109	386	4	32	361	149	14	108	20	190	162	142
Future Volume (vph)	109	386	4	32	361	149	14	108	20	190	162	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		78.5			Sum of lost time (s)				21.4			
Intersection Capacity Utilization		64.2%			ICU Level of Service				C			
Analysis Period (min)		15										
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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

2021 Build: 2021 Demographics and 2021 Funded Networks

7/20/2021



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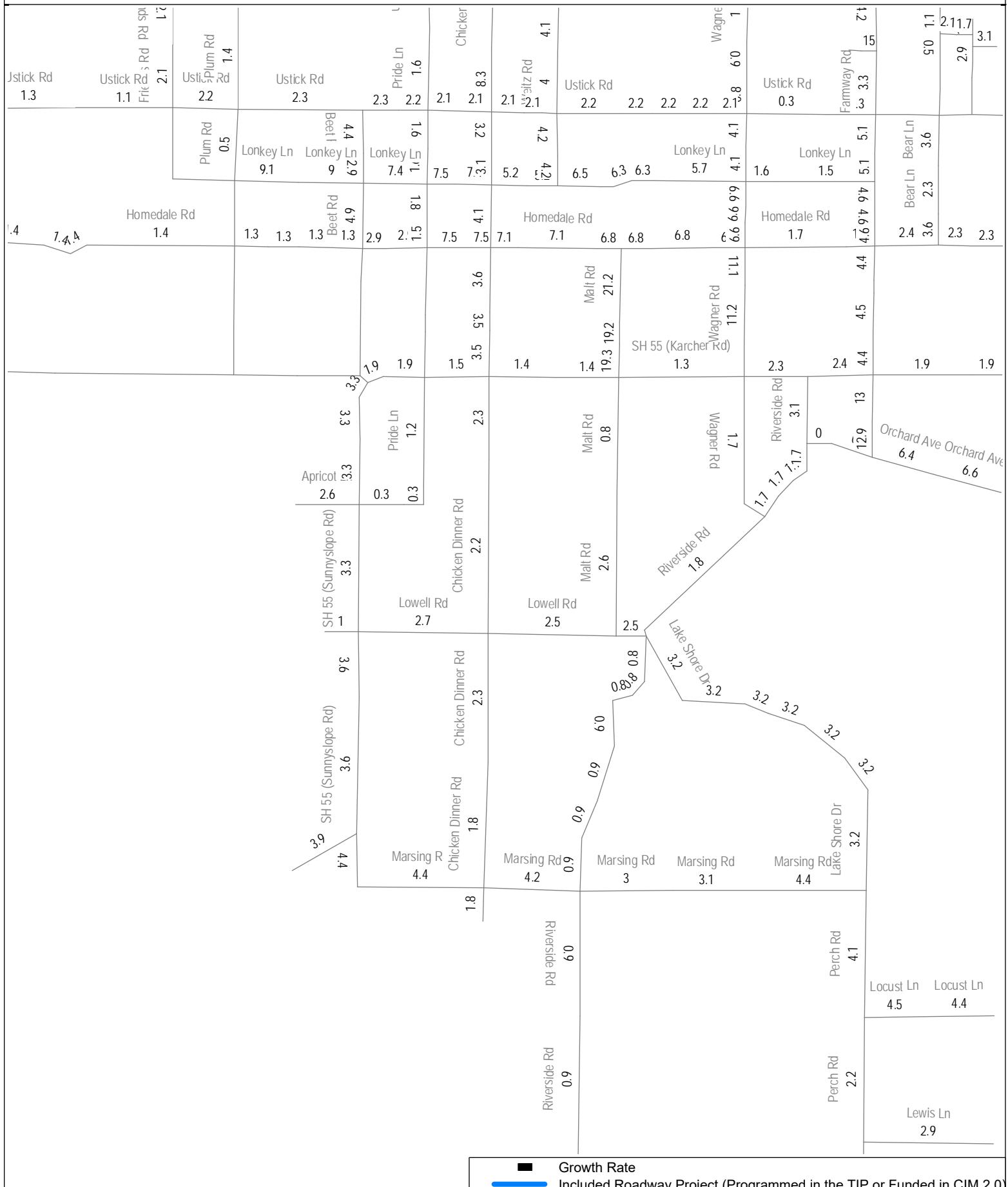
New Regional Model calibrated to 2011/12 conditions - completed in January 2015



(Licensed to Community Planning Association)

2021 Peak Hour to 2025 Peak Hour Compounded Annual Growth Rates

7/20/2021



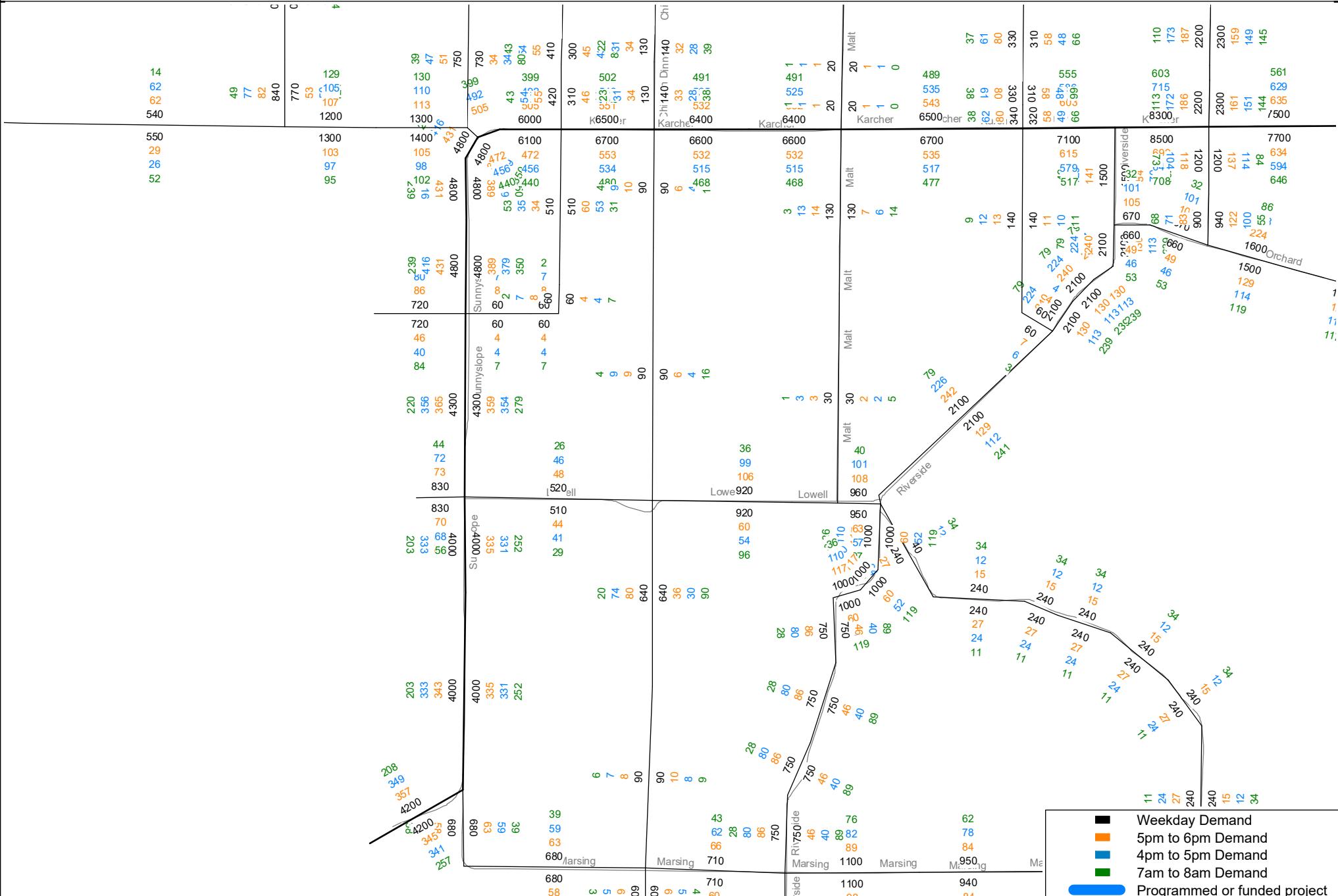
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COMPASS reserves the right to rerun the model for any reason deemed necessary.

Growth Rate

Included Roadway Project (Programmed in the TIP or Funded in CIM 2.0)

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

7/20/2021



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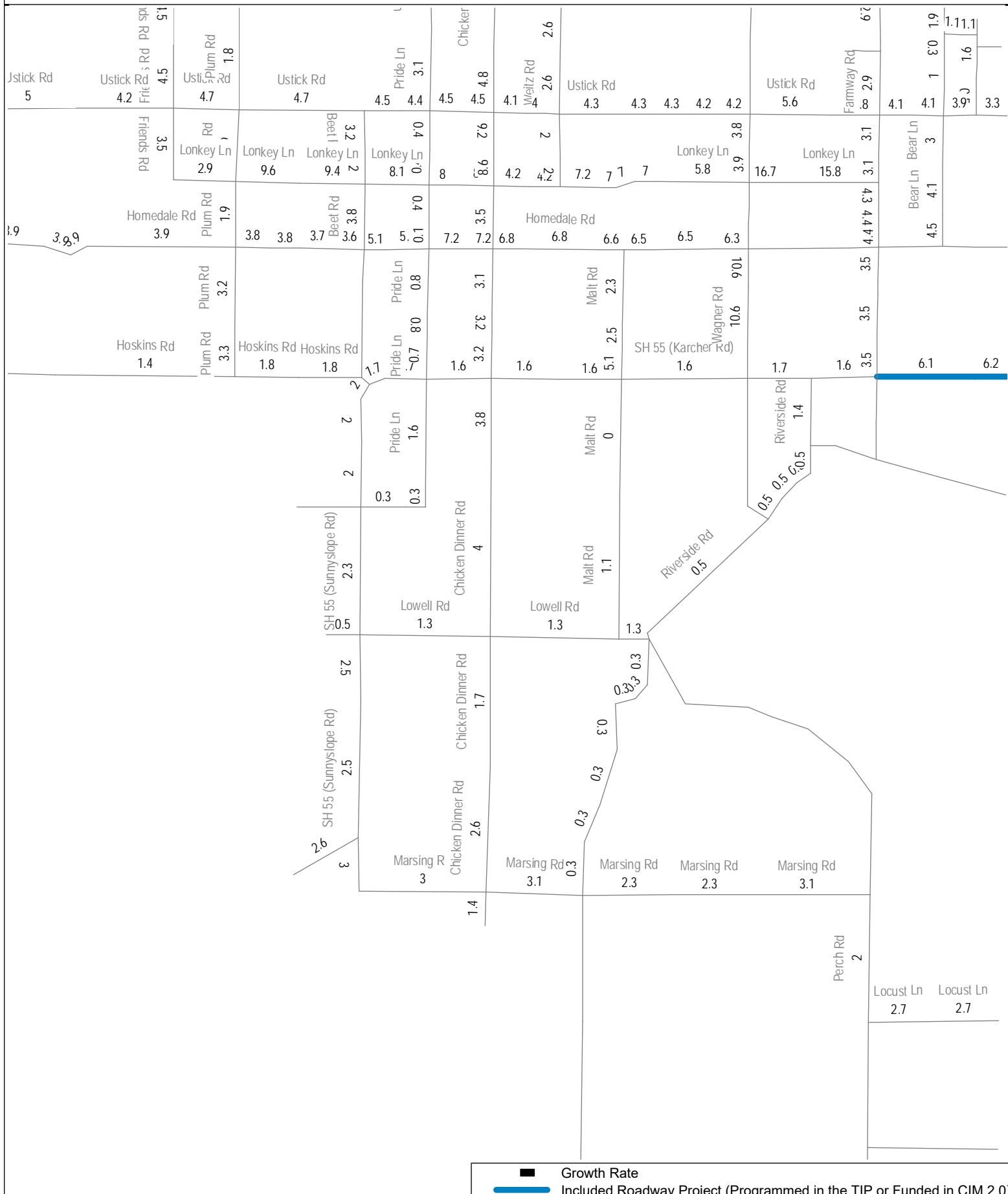
New Regional Model calibrated to 2011/12 conditions - completed in January 2015



(Licensed to Community Planning Association)

2025 Peak Hour to 2030 Peak Hour Compounded Annual Growth Rates

7/20/2021



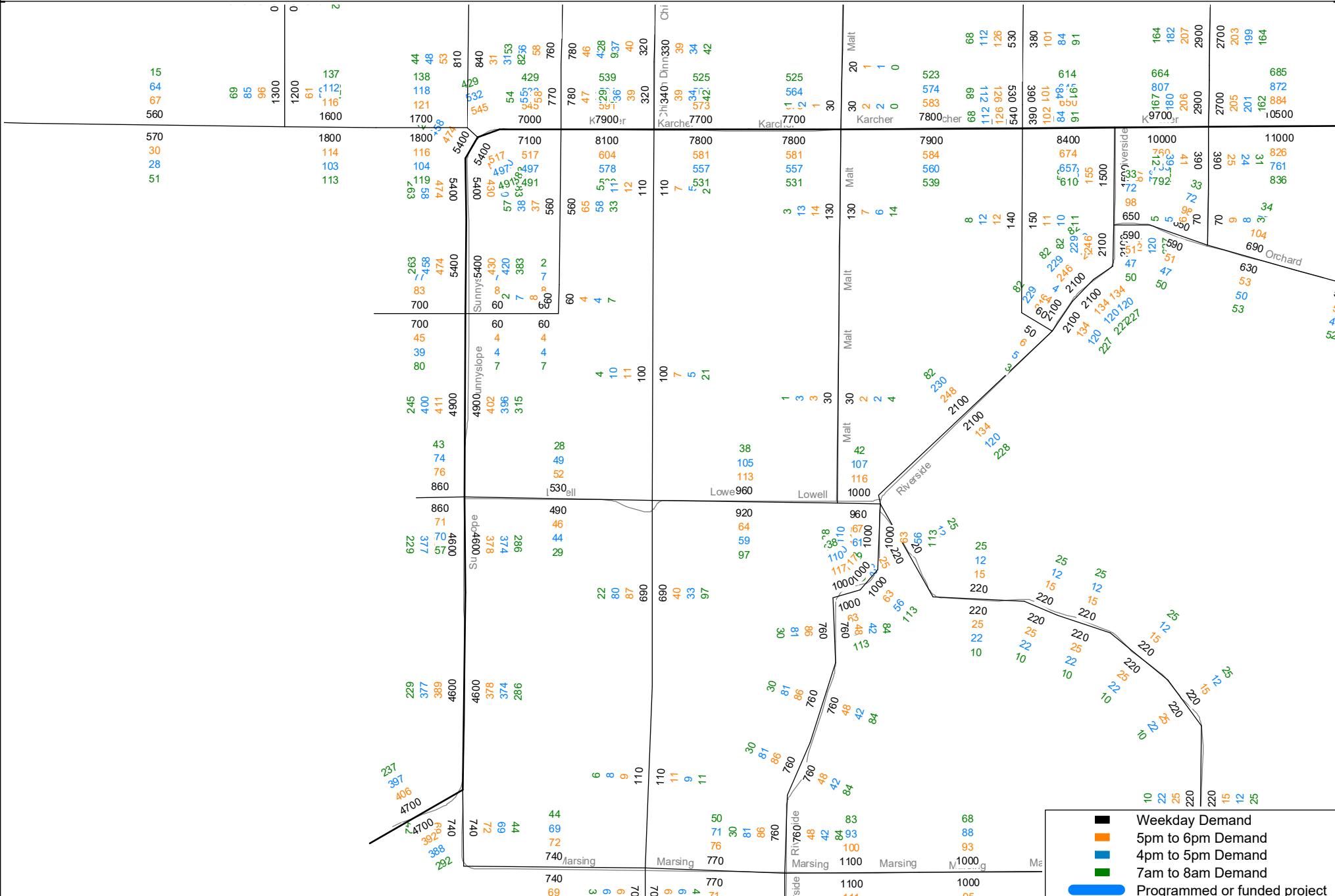
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COMPASS reserves the right to rerun the model for any reason deemed necessary.

Growth Rate

Included Roadway Project (Programmed in the TIP or Funded in CIM 2.0)

2030 Build: Daily, 5pm to 6pm Peak, 4pm to 5pm Peak and 7am to 8am Peak Demand

7/20/2021



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Roadway assumptions per CIM 2040 2.0 (Dec 2018) and reconciled demographic data set as of April 2019

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 (Q _b), 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		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(l)	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						743			220			390
Approach Delay, s/veh						22.5			29.3			33.2
Approach LOS						C			C			C
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R _c), s	14.5	15.5	7.3	29.5	6.2	23.8	12.5	24.3				
Change Period (Y+R _c), 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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	1.00	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	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	W			U	R	
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 (Q _b), 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		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(l)	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+R _c), s	12.8	12.8	8.6	16.9	6.3	19.3	10.3	15.2				
Change Period (Y+R _c), 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	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	EBC	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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	1.00	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	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	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 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.68										
Actuated Cycle Length (s)		72.8					Sum of lost time (s)		21.4			
Intersection Capacity Utilization		60.7%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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/v	11.87	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
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 (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 (Q _b), 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		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(l)	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+R _c), s	14.4	15.4	7.3	29.2	6.2	23.6	12.4	24.1				
Change Period (Y+R _c), 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	9.4	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
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 (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 (Q _b), 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(l)	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						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											D
HCM 2000 Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	85.4											21.4
Intersection Capacity Utilization	71.1%											C
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 (Q _b), 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		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(l)	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+R _c), s	14.6	16.1	7.5	29.9	6.2	24.5	12.7	24.6				
Change Period (Y+R _c), 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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	1.00	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	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	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 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		73.3			Sum of lost time (s)				21.4			
Intersection Capacity Utilization		55.3%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

Intersection

Int Delay, s/veh 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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												
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

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 (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 (Q _b), 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		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(l)	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+R _c), s	13.0	13.1	8.8	17.3	6.3	19.7	10.4	15.6				
Change Period (Y+R _c), 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	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	EBC	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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	1.00	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	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 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.68										
Actuated Cycle Length (s)		73.6			Sum of lost time (s)				21.4			
Intersection Capacity Utilization		61.4%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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/v	12.01	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												
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
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 (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 (Q _b), 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		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(l)	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						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+l1), 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									
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			
<hr/>											
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
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 (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 (Q _b), 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		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(l)	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						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+l1), 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	1	2	3	4	5	6	7	8	9	10	11	12
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											D
HCM 2000 Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	86.5											21.4
Intersection Capacity Utilization	72.3%											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									
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		
<hr/>								
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 (Q _b), 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		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(l)	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						751			251			391
Approach Delay, s/veh						23.7			30.1			34.9
Approach LOS						C			C			C
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R _c), s	14.8	17.0	7.8	30.0	6.5	25.3	12.8	25.0				
Change Period (Y+R _c), 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	9.8	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	EBC	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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	1.00	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	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 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		73.1			Sum of lost time (s)				21.4			
Intersection Capacity Utilization		55.9%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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 (Q _b), 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		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(l)	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+R _c), s	13.0	13.5	9.1	16.5	6.5	20.0	10.4	15.3				
Change Period (Y+R _c), 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	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	EBC	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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	1.00	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	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	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										C
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		72.6										21.4
Intersection Capacity Utilization		60.8%										B
Analysis Period (min)		15										
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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/v	12.44	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 (Q _b), 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		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(l)	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+R _c), s	17.6	18.1	8.0	39.0	6.5	29.2	16.7	30.3				
Change Period (Y+R _c), 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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	1.00	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	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 Level of Service			C				
HCM 2000 Volume to Capacity ratio	0.64											
Actuated Cycle Length (s)	98.9				Sum of lost time (s)			21.4				
Intersection Capacity Utilization	62.0%				ICU Level of Service			B				
Analysis Period (min)	15											
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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/v	10.81	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 (Q _b), 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		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(l)	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												
Approach Delay, s/veh	819				924				214			631
Approach LOS	21.9				21.8				27.8			24.1
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R _c), s	15.4	14.5	9.5	23.4	6.6	23.3	13.4	19.6				
Change Period (Y+R _c), 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	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	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	3	4	5	6	7	8	9	10	11	12
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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	1.00	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	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						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 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		95.3			Sum of lost time (s)				21.4			
Intersection Capacity Utilization		68.9%			ICU Level of Service				C			
Analysis Period (min)		15										
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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/v	12.32	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 (Q _b), 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		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(l)	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+R _c), s	18.0	19.0	8.2	40.9	6.5	30.5	17.2	31.9				
Change Period (Y+R _c), 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	12.6	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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	1.00	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	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	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						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												

Intersection

Int Delay, s/veh 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑	↑	
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/v 10.98 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 (Q _b), 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		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(l)	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+R _c), s	15.6	15.0	9.9	24.0	6.6	24.0	13.6	20.3				
Change Period (Y+R _c), 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	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	EBC	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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	1.00	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	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	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						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												

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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									
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		
<hr/>								
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 (Q _b), 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		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(l)	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+R _c), s	18.4	20.3	8.5	41.5	6.9	31.8	17.4	32.6				
Change Period (Y+R _c), 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	EBC	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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	1.00	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	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						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 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		100.4			Sum of lost time (s)				21.4			
Intersection Capacity Utilization		63.5%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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 (Q _b), 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		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(l)	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+R _c), s	15.6	15.4	10.8	22.6	6.8	24.3	13.5	19.9				
Change Period (Y+R _c), 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	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	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	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	1.00	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	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						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												

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			U	R	
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/v	12.93	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	-	-	

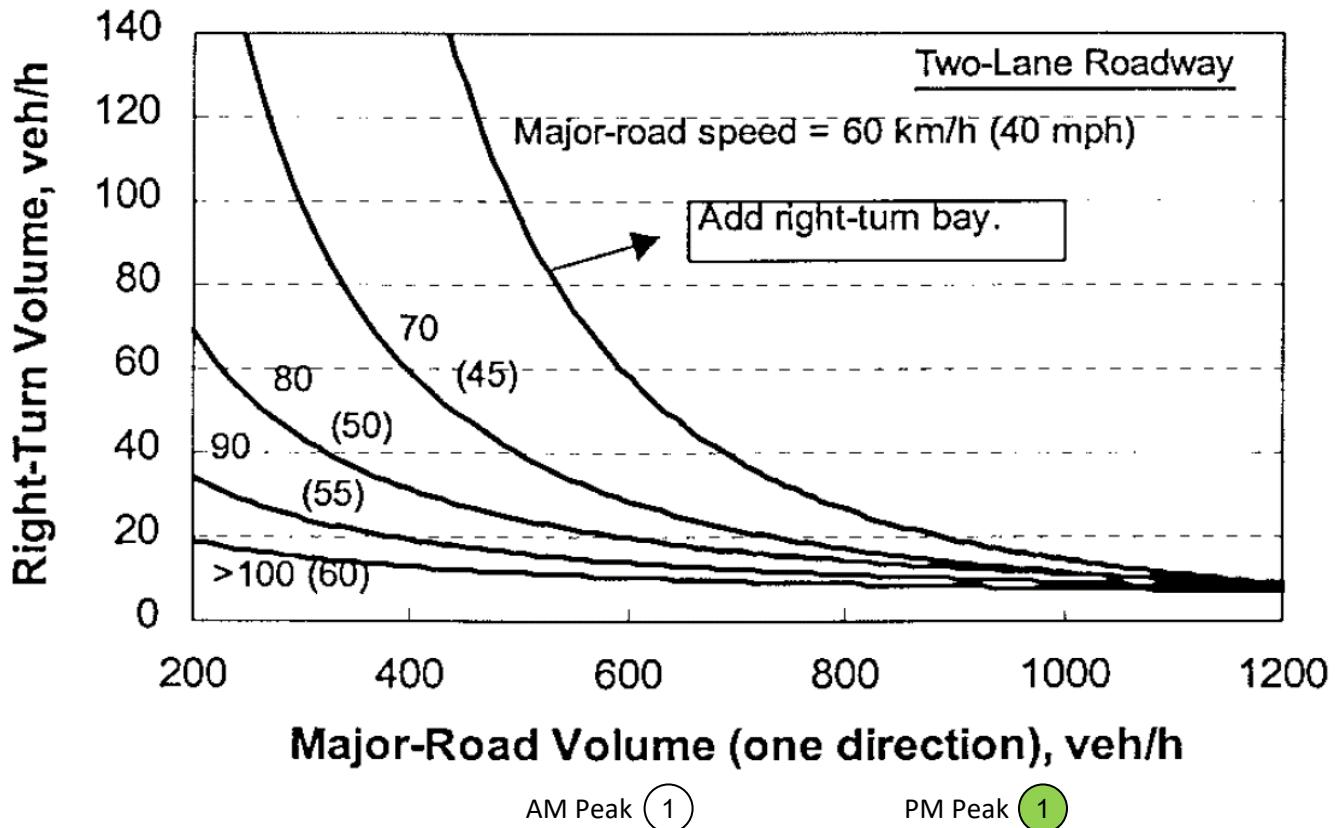
APPENDIX I: Turn Lane Guidelines Worksheets

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

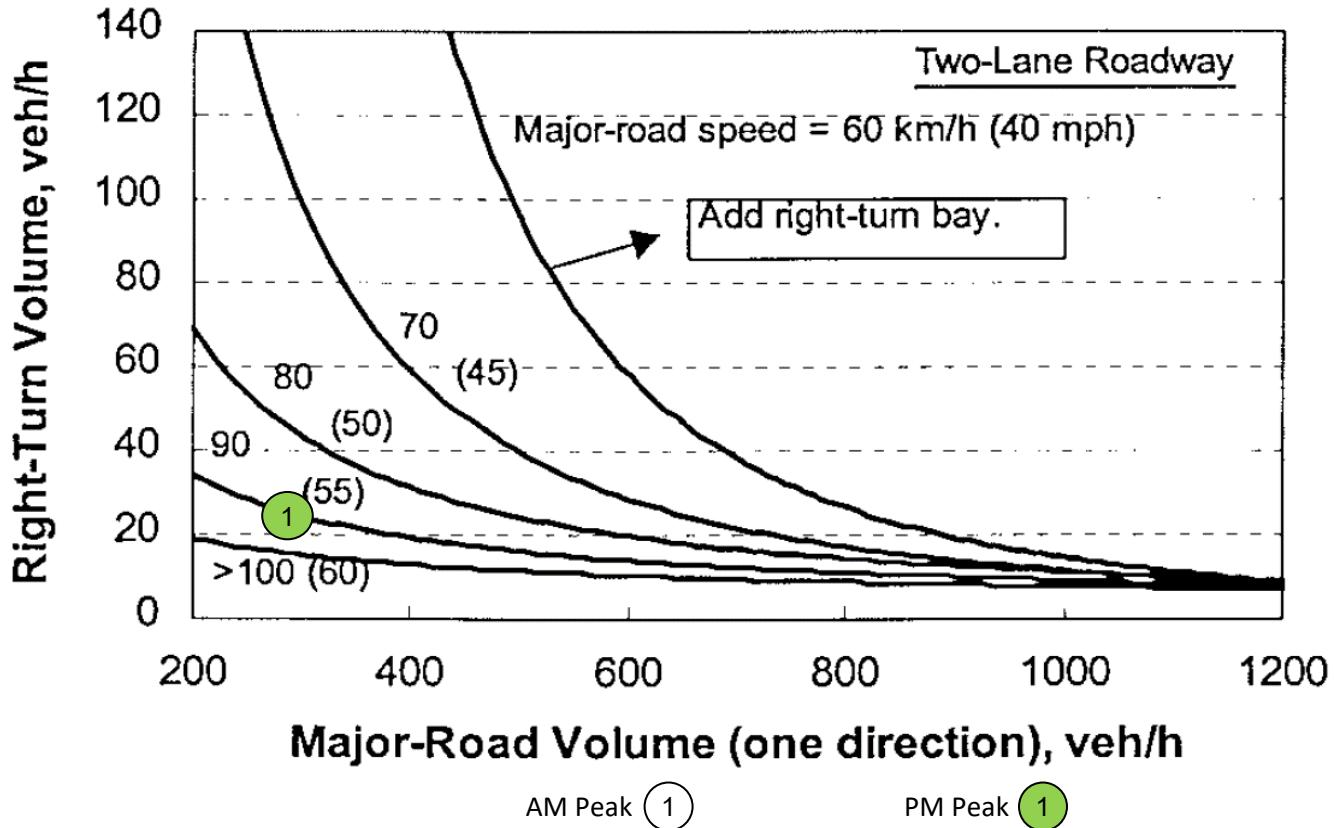


Tillman Ridge Subdivision
Canyon County, Idaho

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

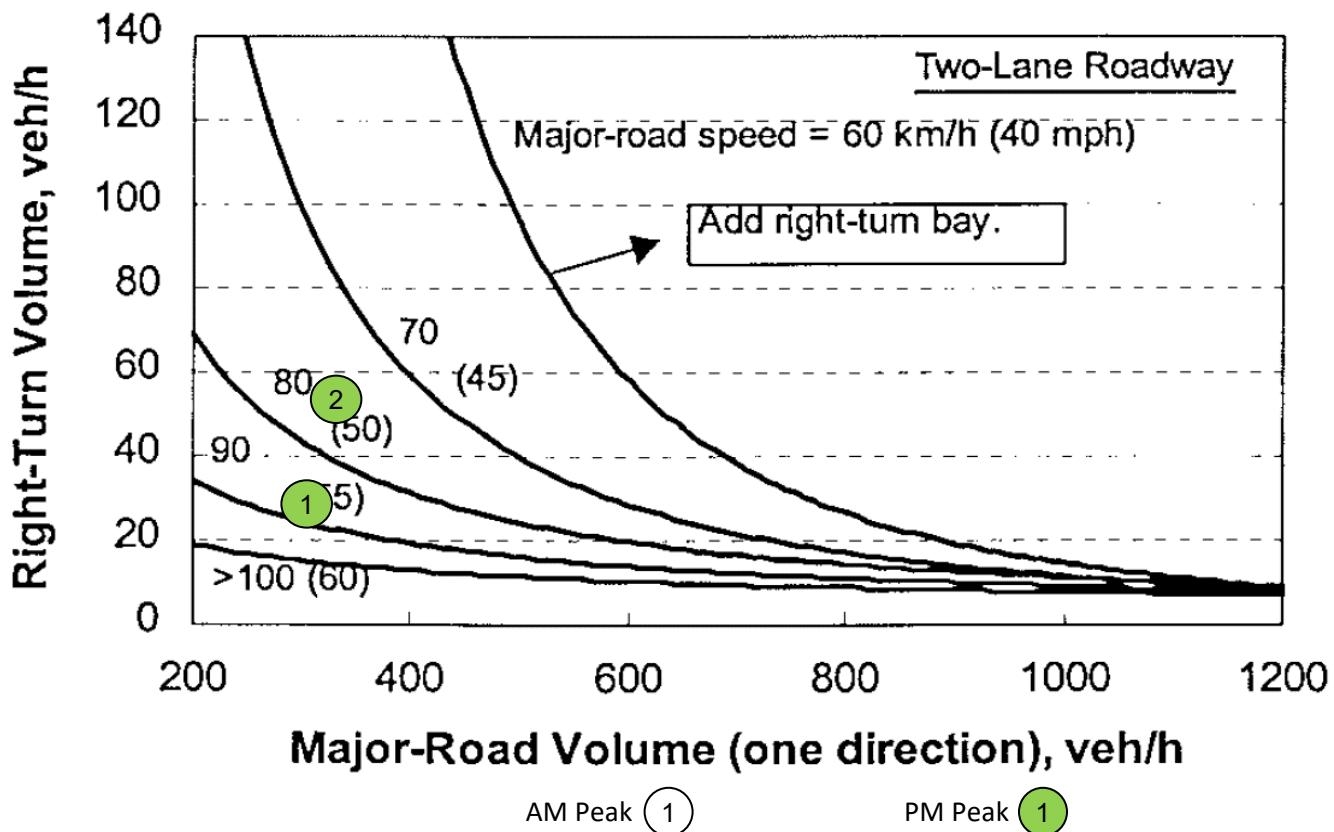


Tillman Ridge Subdivision
Canyon County, Idaho

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

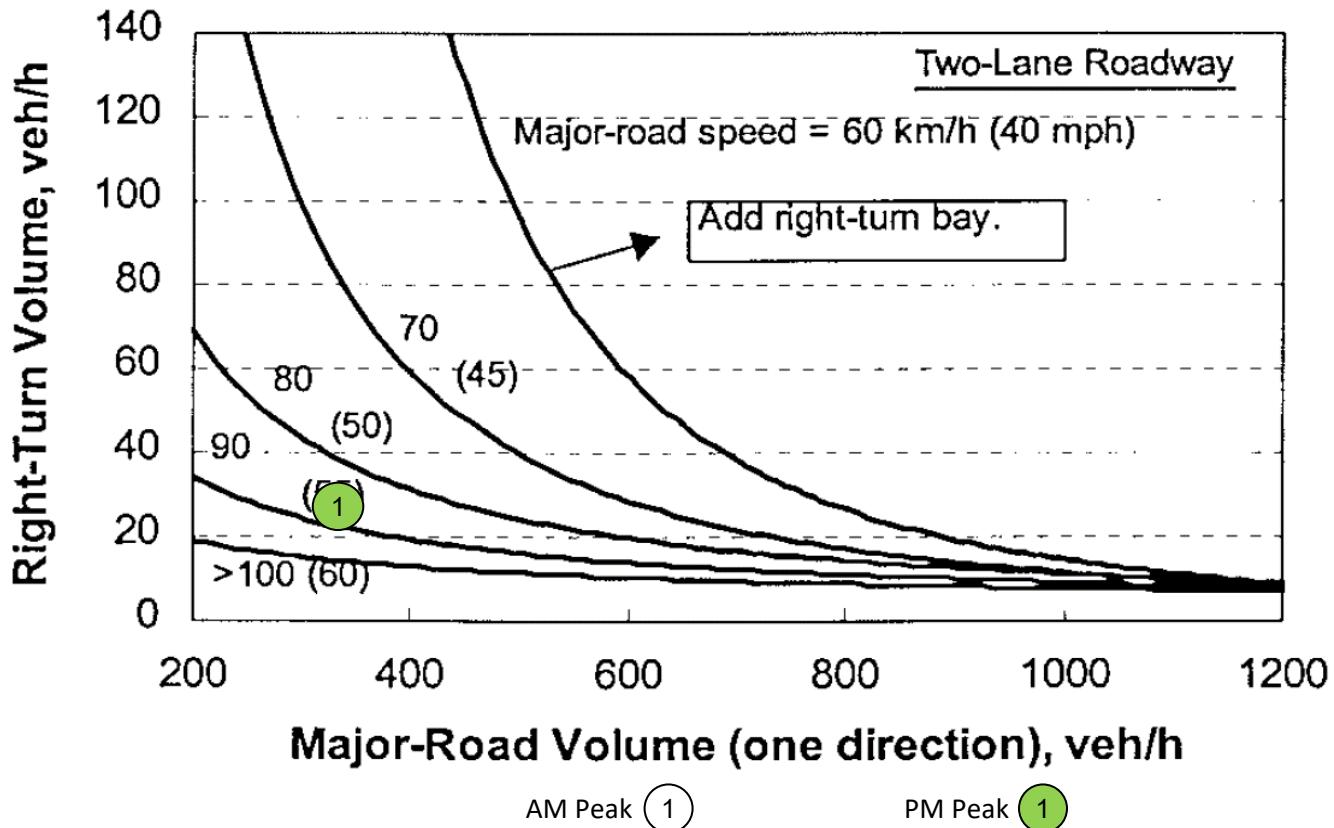


Tillman Ridge Subdivision
Canyon County, Idaho

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

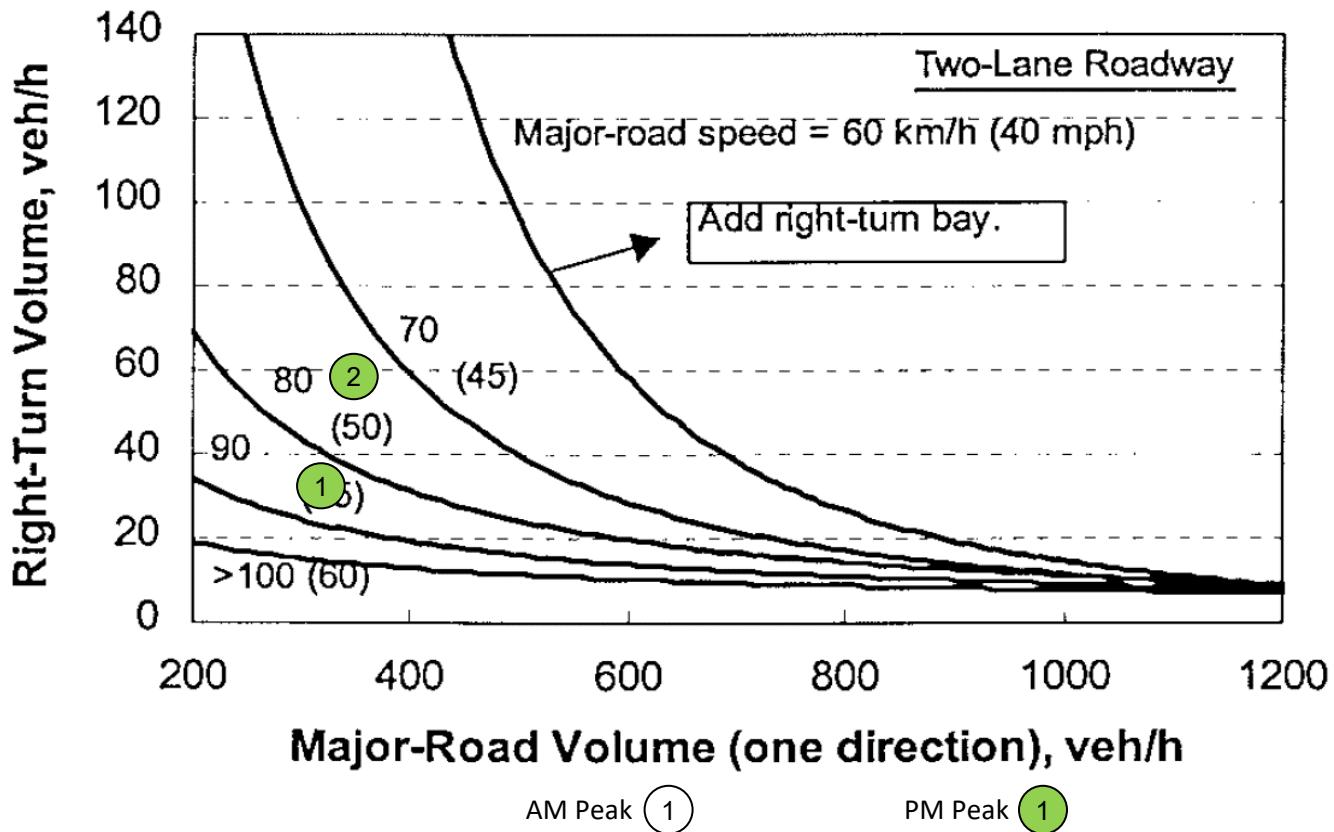


Tillman Ridge Subdivision
Canyon County, Idaho

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

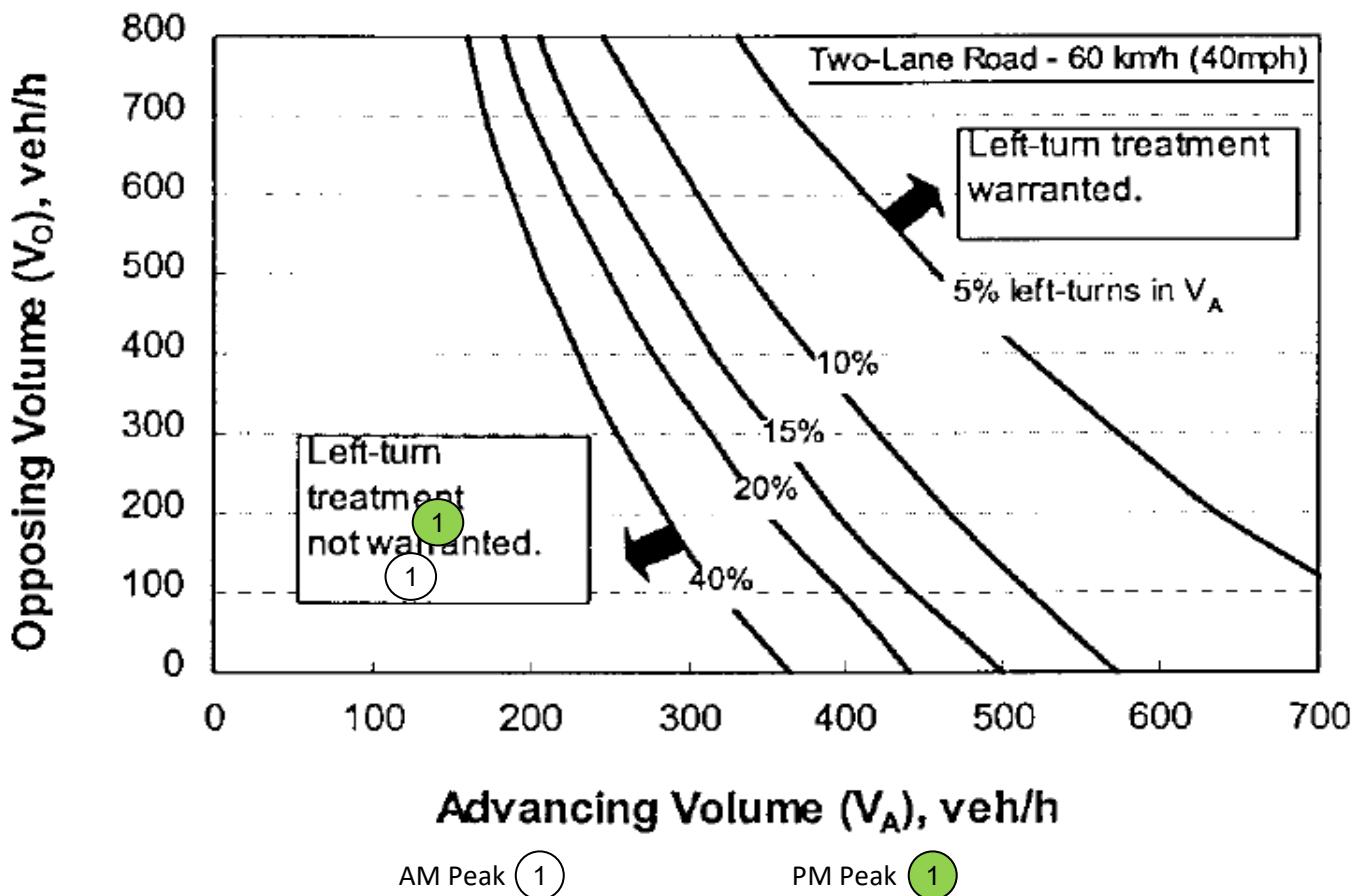
* Right-Turn Volume Less Than 10 vph or Major Road Volume Less Than 200 vph - Not Warranted



Tillman Ridge Subdivision
Canyon County, Idaho

NCHRP 457 Left-Turn Lane Analysis
2024 Existing Traffic

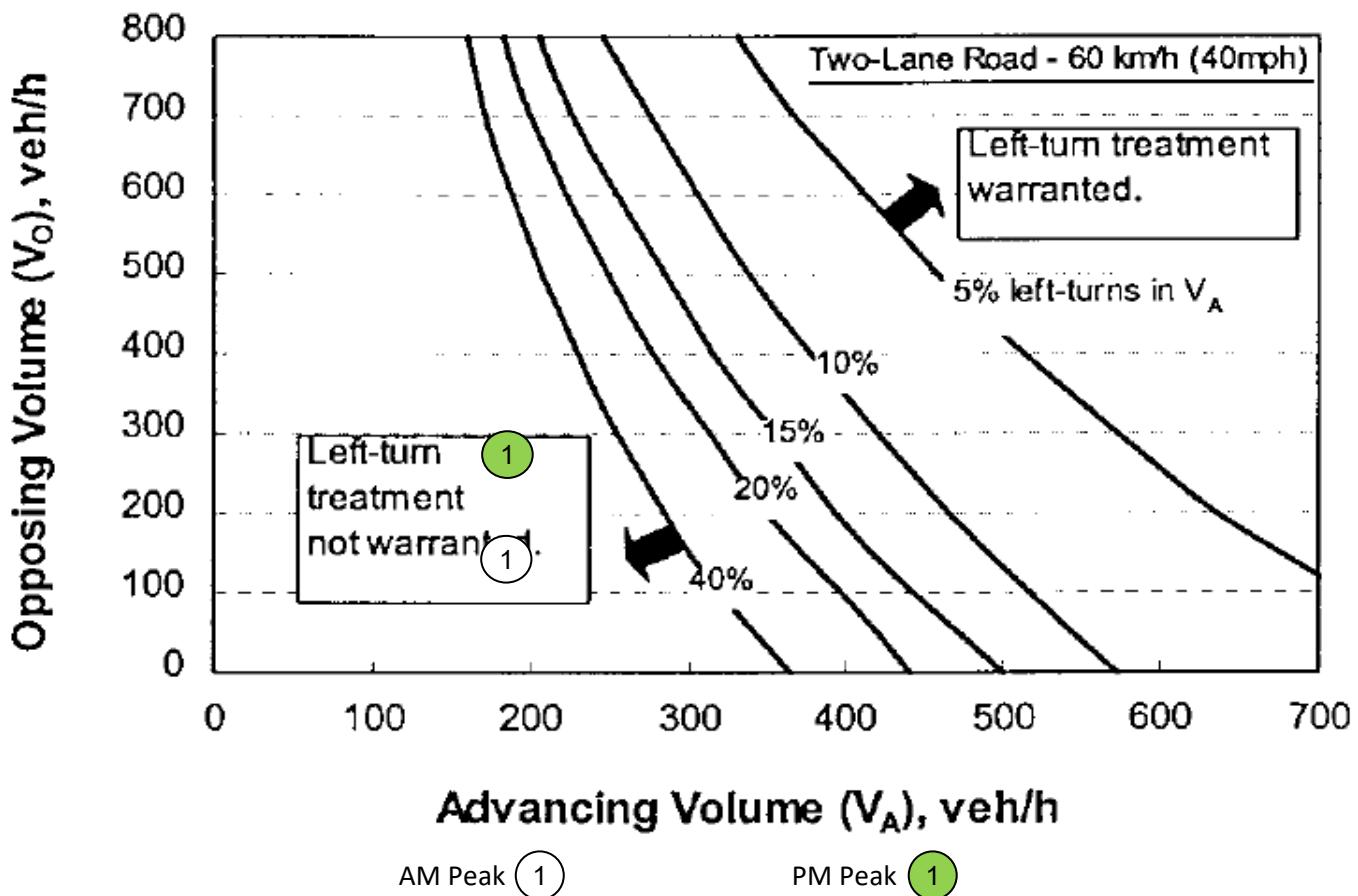
Intersection	Approach	Speed Limit [mph]	Peak Hour	Advancing Volume [vph]	Opposing Volume [vph]	Left-Turn Volume (%)	Meet Warrant?
(1) Vista Drive & S 10th Avenue	NB	35	AM	118	106	0.8%	No
			PM	139	196	4.3%	No



Tillman Ridge Subdivision
Canyon County, Idaho

NCHRP 457 Left-Turn Lane Analysis
2027 Background Traffic

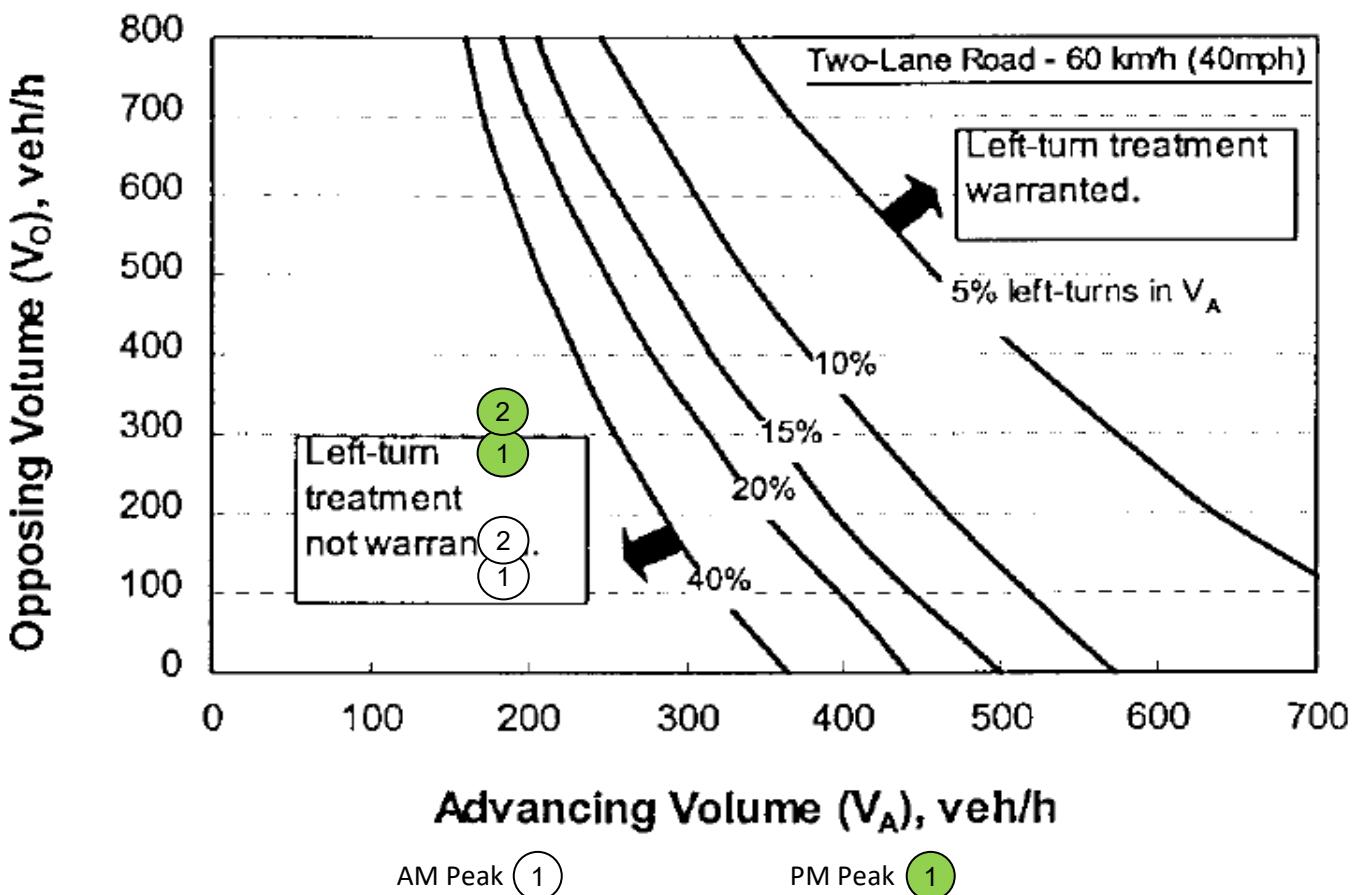
Intersection	Approach	Speed Limit [mph]	Peak Hour	Advancing Volume [vph]	Opposing Volume [vph]	Left-Turn Volume (%)	Meet Warrant?
(1) Vista Drive & S 10th Avenue	NB	35	AM	183	133	0.5%	No
			PM	183	285	3.3%	No



Tillman Ridge Subdivision
Canyon County, Idaho

NCHRP 457 Left-Turn Lane Analysis
2027 Total Traffic

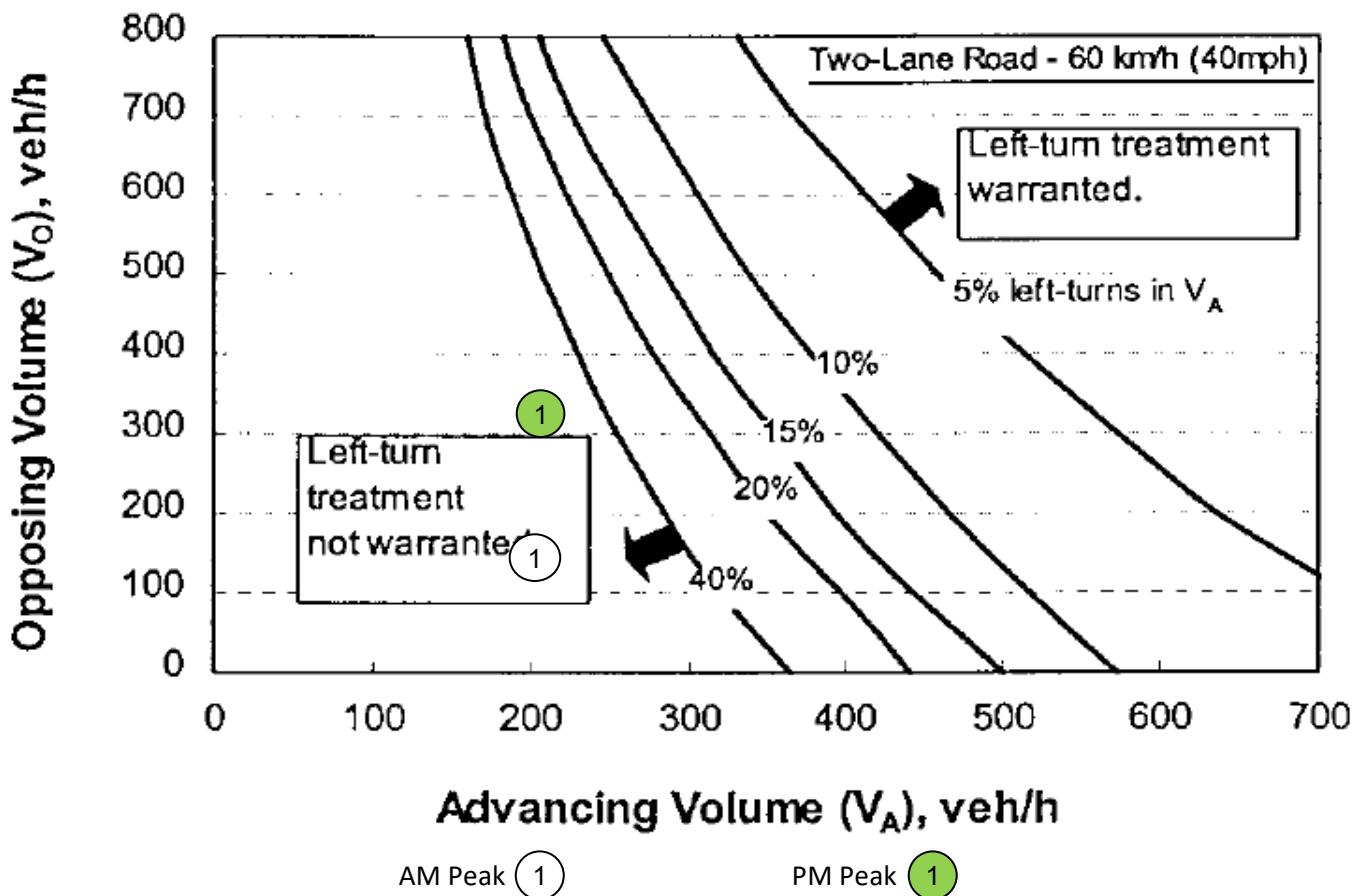
Intersection	Approach	Speed Limit [mph]	Peak Hour	Advancing Volume [vph]	Opposing Volume [vph]	Left-Turn Volume (%)	Meet Warrant?
(1)	Vista Drive & S 10th Avenue	NB	35	AM	184	135	0.8%
				PM	185	292	4.1%
(2)	Vista Drive & S 10th Avenue (No Karcher Access)	NB	35	AM	184	142	0.8%
				PM	185	316	4.1%



Tillman Ridge Subdivision
Canyon County, Idaho

NCHRP 457 Left-Turn Lane Analysis
2032 Background Traffic

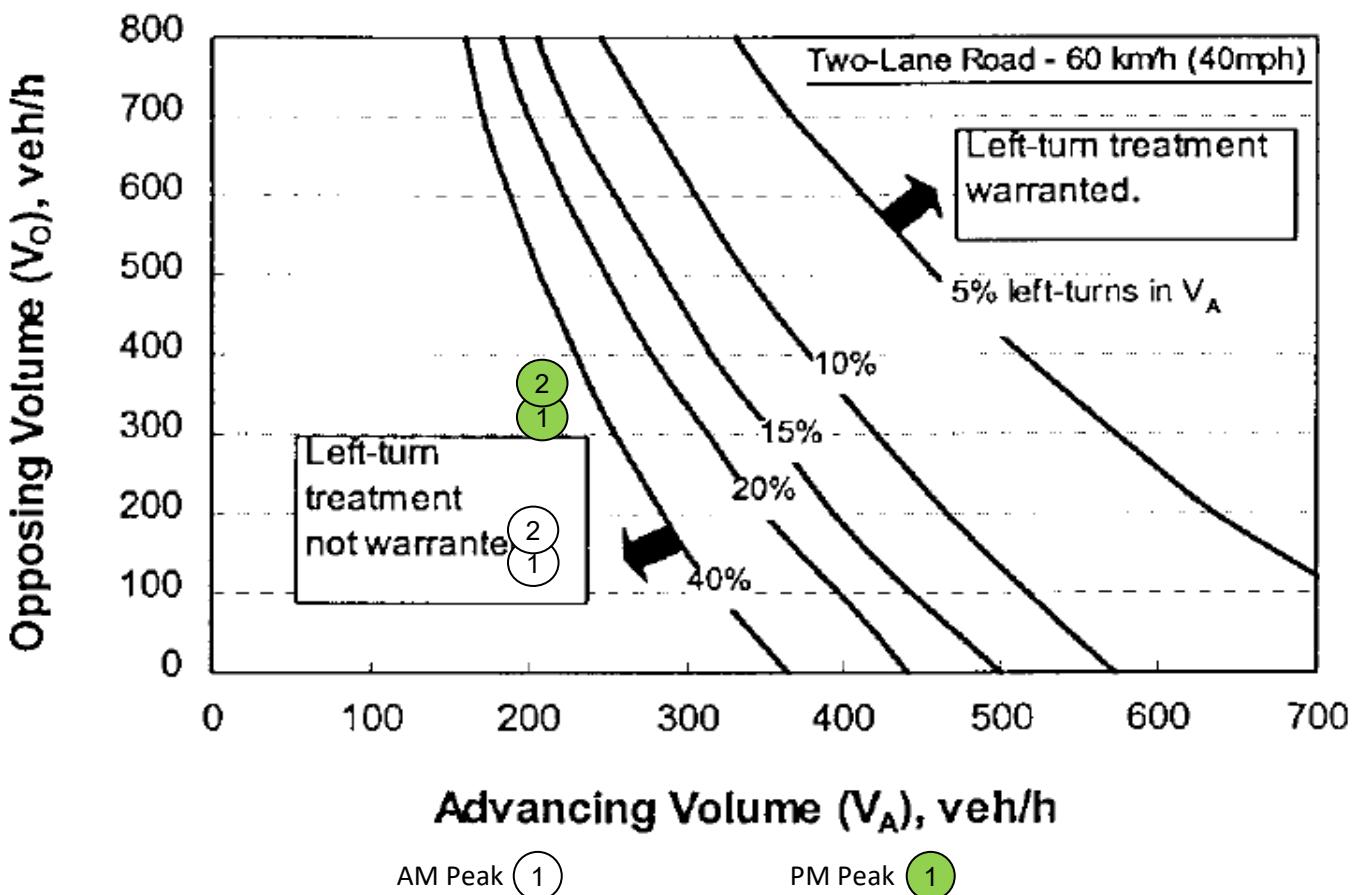
Intersection	Approach	Speed Limit [mph]	Peak Hour	Advancing Volume [vph]	Opposing Volume [vph]	Left-Turn Volume (%)	Meet Warrant?
(1) Vista Drive & S 10th Avenue	NB	35	AM	196	145	0.5%	No
			PM	199	308	3.5%	No



Tillman Ridge Subdivision
Canyon County, Idaho

NCHRP 457 Left-Turn Lane Analysis
2032 Total Traffic

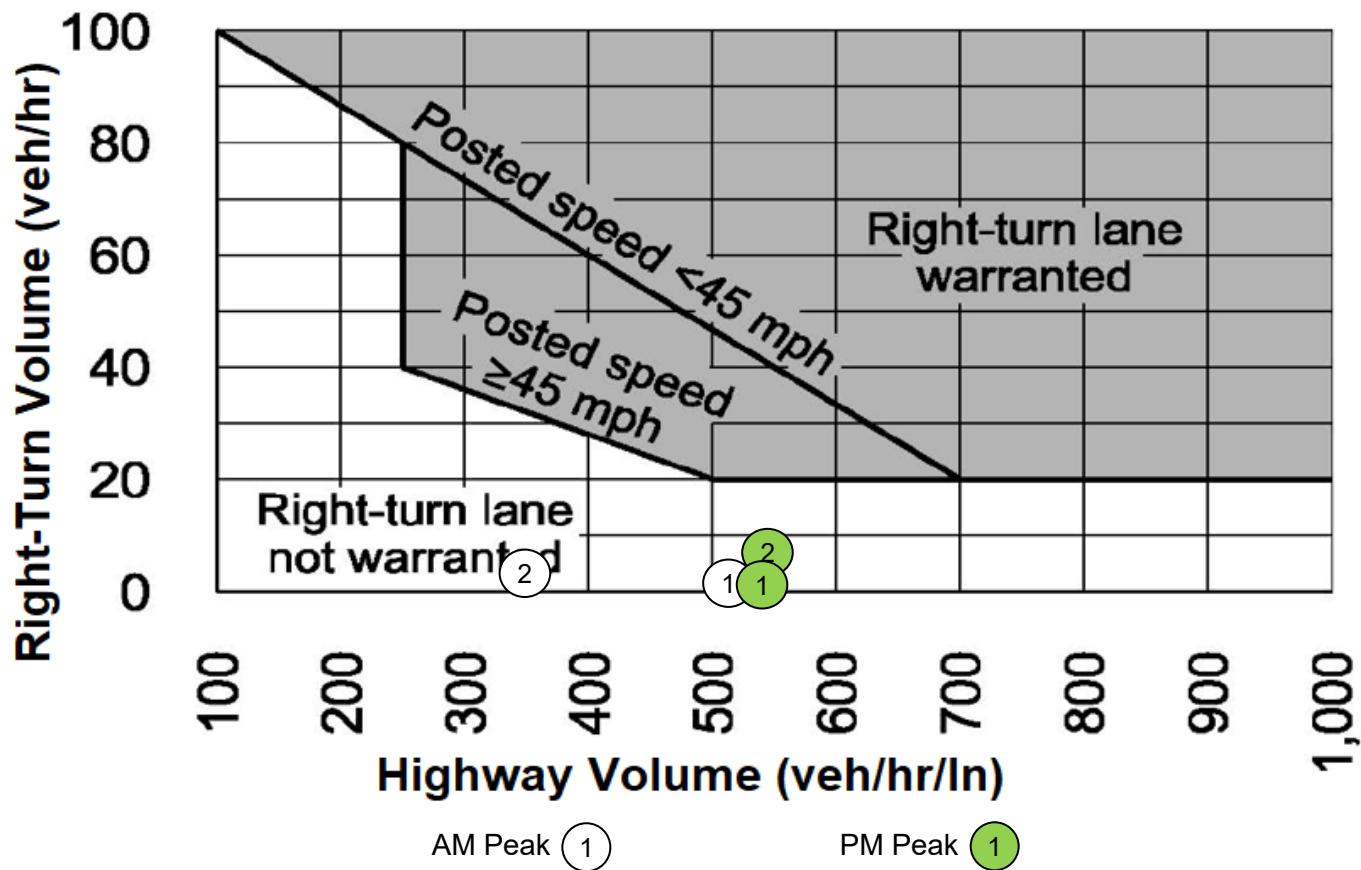
Intersection	Approach	Speed Limit [mph]	Peak Hour	Advancing Volume [vph]	Opposing Volume [vph]	Left-Turn Volume (%)	Meet Warrant?
(1)	Vista Drive & S 10th Avenue	NB	35	AM	197	147	0.7%
				PM	201	315	4.3%
(2)	Vista Drive & S 10th Avenue (No Karcher Access)	NB	35	AM	197	154	0.7%
				PM	201	339	4.3%



Tillman Ridge Subdivision
Canyon County, Idaho

ITD Right-Turn Lane Analysis
2024 Existing Traffic

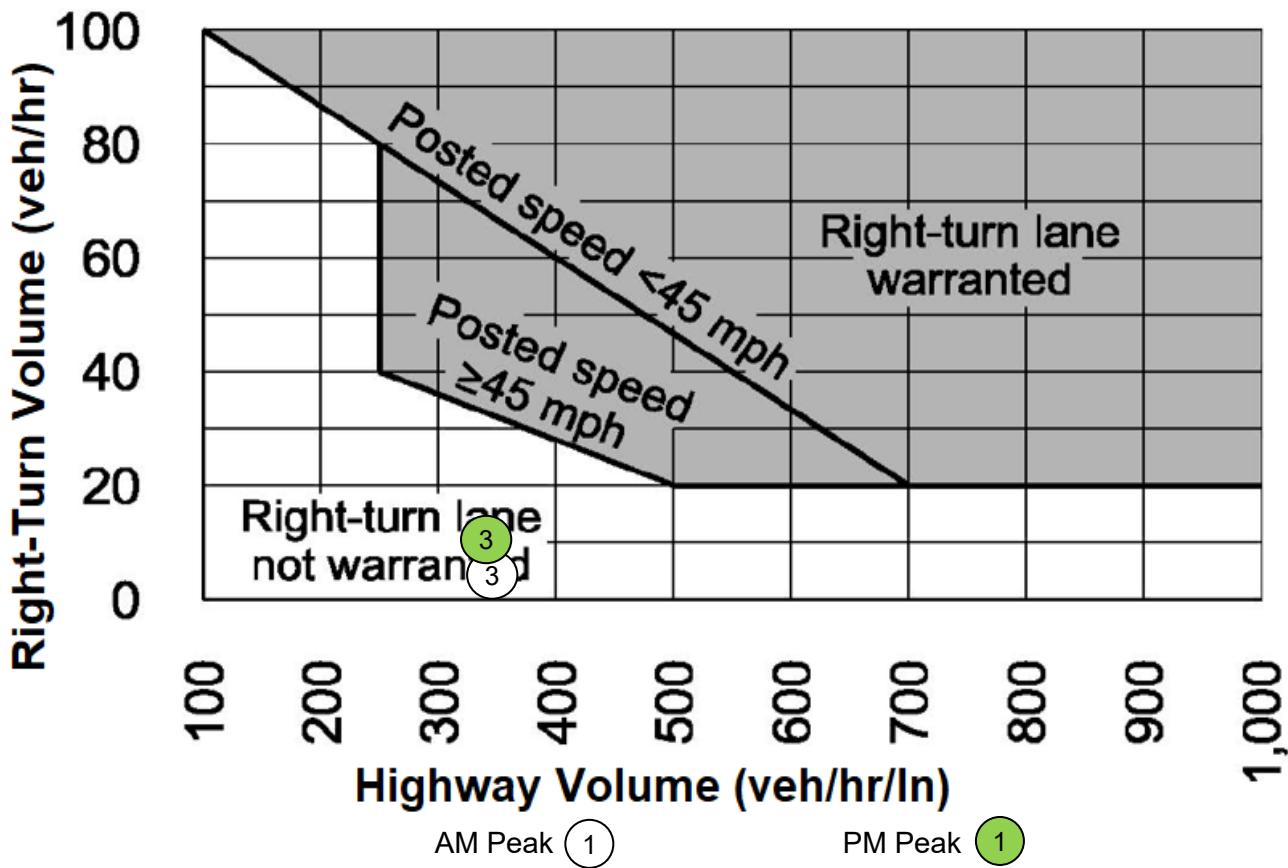
Intersection		Approach	Speed Limit (mph)	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vph)	Meet Warrant?
(1)	Kimball Avenue & Karcher Road	EB	55	AM	0	516	No
				PM	0	531	No
(2)	Kimball Avenue & Karcher Road	WB	55	AM	2	354	No
				PM	2	542	No



Tillman Ridge Subdivision
Canyon County, Idaho

ITD Right-Turn Lane Analysis
2027 Total Traffic

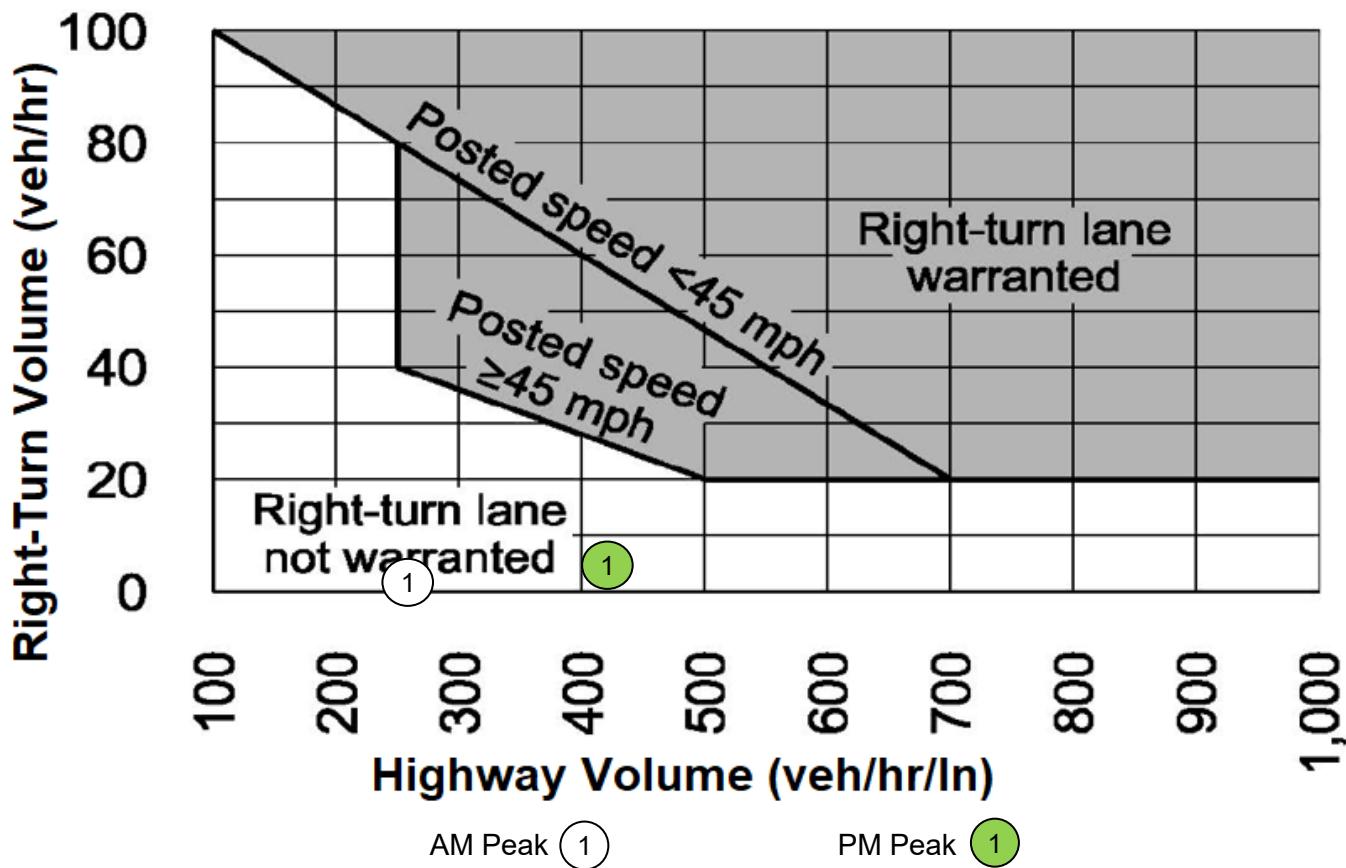
Intersection		Approach	Speed Limit (mph)	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vphpl)	Meet Warrant?
(1)	Kimball Avenue & Karcher Road	EB	55	Closed with SH 55 corridor improvements			
(2)	Kimball Avenue & Karcher Road	WB	55	Closed with SH 55 corridor improvements			
(3)	Ashland Drive &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

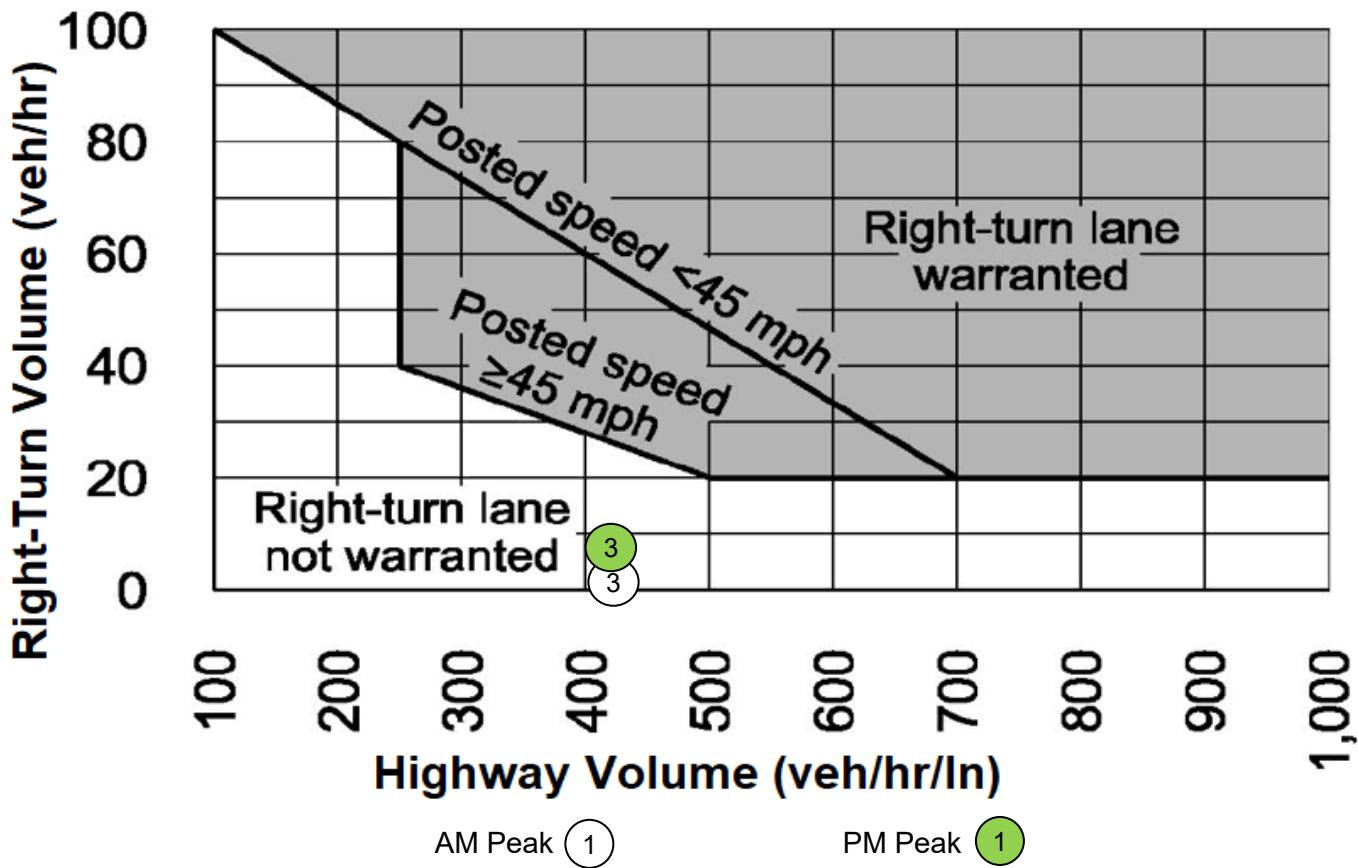
Intersection	Approach	Speed Limit (mph)	Peak Hour	Right-Turn Volume (vph)	Major Road Volume (vphpl)	Meet Warrant?
(1) Ashland Drive & Karcher Road	WB	55		Constructed with SH 55 corridor improvements		



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			

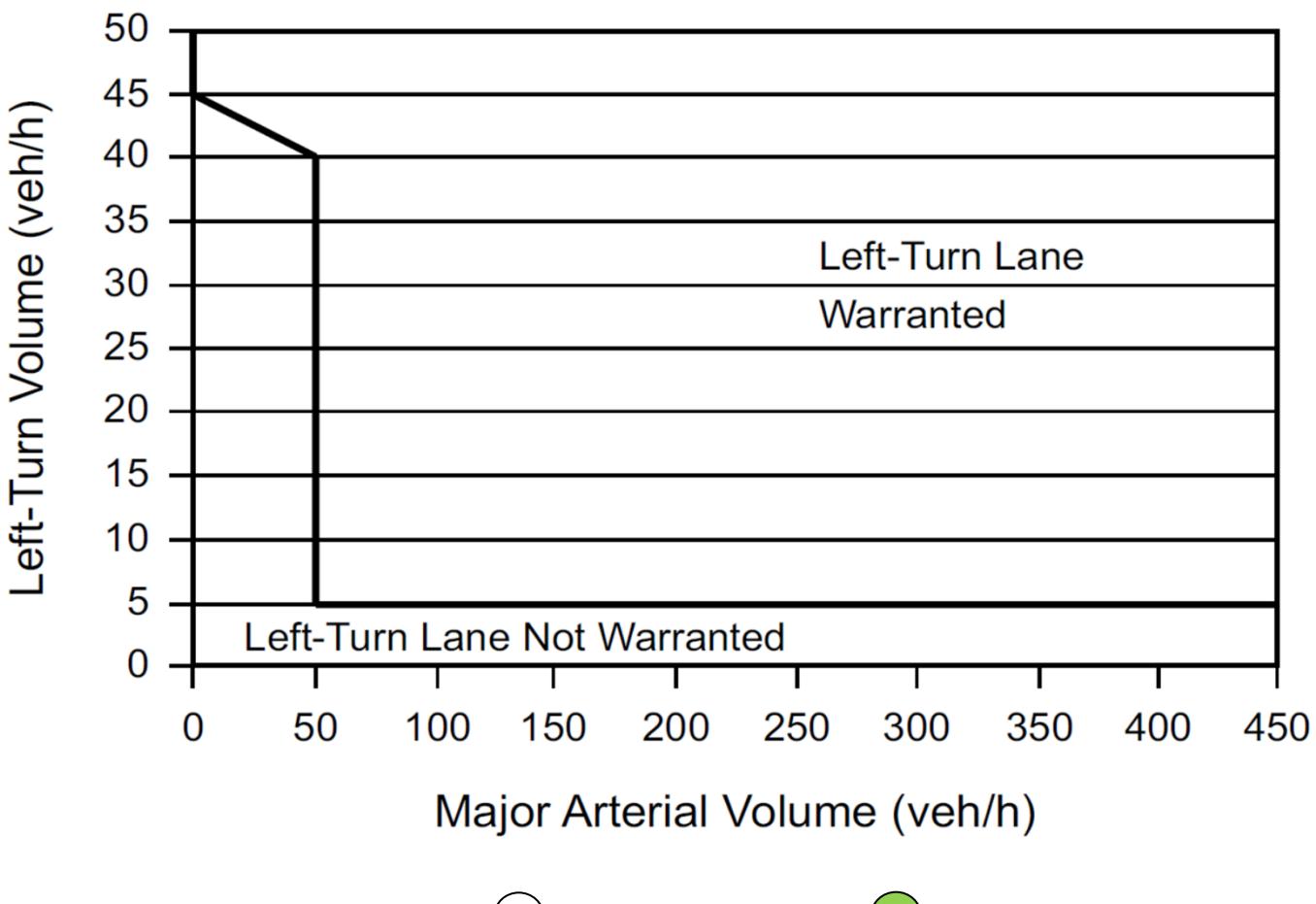


**Tillman Ridge Subdivision
Canyon County, Idaho**

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



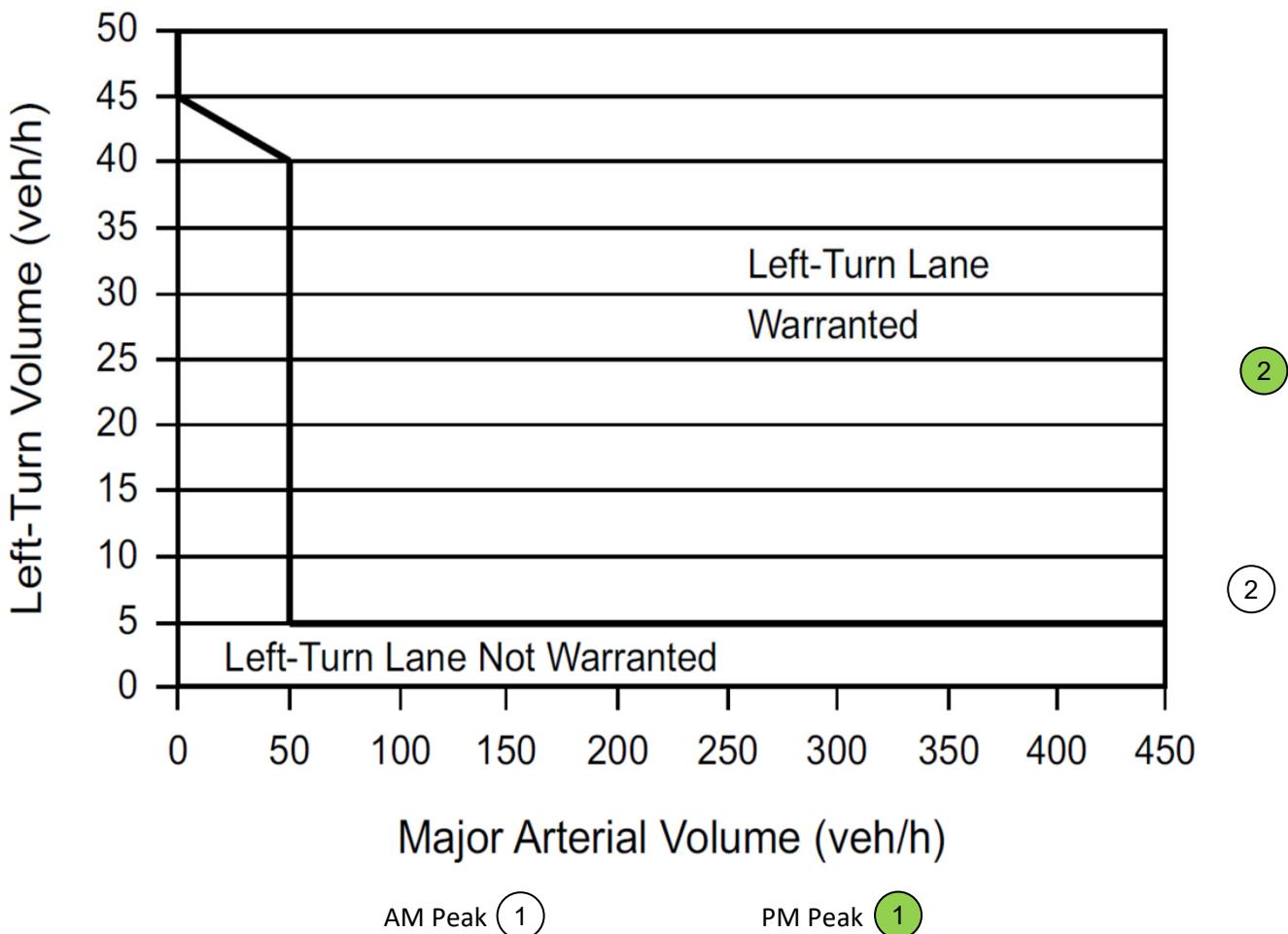
AM Peak (1) PM Peak (1)

**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
				PM	2	645
(2)	Ashland Drive & Karcher Road	WB	55	AM	6	516
				PM	21	645

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





HIGHWAY DISTRICT No.4
15435 HIGHWAY 44
CALDWELL, IDAHO 83607

TELEPHONE 208.454.8135
FAX 208.454.2008

January 14, 2025

Canyon County Commissioners, P&Z
Commission, & Development Services
111 N. 11th Ave Suite 140
Caldwell, Idaho 83605
Attention: Dan Lister

Bristlecone Land Use
Consulting

Attention: Elizabeth Allen-*Via email*

**RE: Tillman Ridge Subdivision
Revised TIS- Review**

Dear Commissioners:

Highway District No. 4 (HD4) has received the agency notice for rezone and revised TIS for Tillman Ridge Subdivision, approximately 69 acres lying south of SH 55 (Karcher Rd) in the N ½ Section 16, T4N R3W, and provides the following comments:

General

The subject property has approximately 1,700-feet of frontage on SH 55 along the north boundary, and approximately 1,320-feet of frontage along Kimball Ave on the east boundary. SH 55 is classified as a principal arterial on the functional classification maps adopted by HD4 and Canyon County, and is under jurisdiction of Idaho Transportation Department. The development is proposing ~50 residential lots, which are anticipated to generate approximately 572 vehicle trips/day.

Highway District No. 4 (HD4) received application for review of the revised TIS dated December 13, 2024. The TIS has been reviewed for compliance with HD4's development standards and offers the following comments;

TIS Comments

1. If the Ashland access is approved as a full access, verify with ITD if either acceleration or deceleration lanes are necessary at the subdivision approach. I realize the turn warrants don't identify right turn lanes, however in ITD's design drawing (*sheet 72, 74*) they provided a right turn (deceleration) lane to Ashland (north leg) what are the traffic counts to the subdivision on the north side of HWY 55, are the right turns similar to Tillman sub Ashland Dr approach? The design speed of 55mph may show a benefit to provide eastbound acceleration lane out of the Ashland approach.

Please feel free to contact me with any questions on these comments or HD4 development standards.

Respectfully,


Kraig Wartman

Senior Engineering Tech.
Highway District No. 4

CC Chris Hopper, District Engineer,
ITD-Niki Benyakhlef

DONALD BARKSDALE
CHAIRMAN OF THE BOARD

FRED BUTLER
VICE CHAIRMAN OF THE BOARD

ROBERT D. CARTER
PROJECT MANAGER

THOMAS RITTHALER
ASSISTANT PROJECT MANAGER

APRYL GARDNER
SECRETARY-TREASURER

MARY SUE CHASE
ASSISTANT SECRETARY-
TREASURER

BOISE PROJECT BOARD OF CONTROL

(FORMERLY BOISE U.S. RECLAMATION PROJECT)

2465 OVERLAND ROAD
BOISE, IDAHO 83705-3155

OPERATING AGENCY FOR 167,000
ACRES FOR THE FOLLOWING
IRRIGATION DISTRICTS

NAMPA-MERIDIAN DISTRICT
BOISE-KUNA DISTRICT
WILDER DISTRICT
NEW YORK DISTRICT
BIG BEND DISTRICT

TEL: (208) 344-1141
FAX: (208) 344-1437

08 January 2024

Canyon County Development Services
111 North 11th Ave., Ste. 310
Caldwell, Idaho 83605

RE: Tillman Sub
15453 Karcher Rd.
Caldwell, ID
Forest Canal 200+00
Sec. 16, T3N, R3W, BM.

RZ2022-0012

Above Canal No Surface Water Right

RECEIVED
JAN 11 2024
RECEIVED

Dan Lister:

The United States' Forest Canal lies within the boundary of the above-mentioned location. The easements for this facility are held in the name of the United States through the Bureau of Reclamation under the authority of the Act of August 30, 1890. (26 Stat. 391; 43 U.S.C. 945)

The Boise Project Board of Control is contracted to operate and maintain this facility. We assert the federal easement of 25 feet northwest and 25 feet southeast of the Forest Canal's centerline. Whereas this area is for the operation and maintenance of our facility, no activity should hinder our ability to do so.

The Boise Project does not approve landscaping other than gravel within its easements, as this will certainly increase our cost of maintenance. Easements must remain a flat drivable surface. No variances will be granted.

Fencing, gates and pathways, as may be required, must be constructed just off the canal easement, to ensure public safety and prevent encroachments. No variances will be given.

Parking lots, curbing, light poles, signs, etc. and the placing of asphalt and/or cement over Project facility easements must be approved by Boise Project Board of Control prior to construction.

Project facilities and/or easements that parallel, and are within and/or intended to be within road right-of-ways due to any development of this property must be relocated outside of road right-of-ways.

The construction of any roadway crossings must be conducted only during the non-irrigation season when the canal is dewatered. In any case no work shall take place within the easement before the proper crossing agreements have been secured through the Bureau of Reclamation and the Boise Project Board of Control.

Utilities planning to cross any project facility must do so in accordance with the master policies now held between the Bureau of Reclamation and most of the utilities. In any case, no work shall take place within the easement before proper crossing agreements have been secured through both the Bureau of Reclamation and the Boise Project Board of Control.

Crossing agreements must be secured and signed by all parties prior to March 1st of each year. A time schedule for the construction to be done during the non-irrigation season must be approved by Boise Project prior to any activity within Project easements. No construction will be allowed within the easement boundaries of the Boise Project Board of Control facilities after March 1st of each year. However, on a case-by-case basis, overhead utilities and utilities boring underneath a Project facility may be allowed after March 1st if reviewed and approved by the Boise Project.

The piping and relocation of any Lateral, Canal and/or Drain must be reviewed and approved by the Bureau of Reclamation and Boise Project and is to include all appurtenant boxes and/or structures and must be warranted by the landowner for a period of (5) five-years. The Relocation Agreement must be secured prior to ANY disturbance of that facility.

Storm Drainage and/or Street Runoff must be retained on site.

NO DISCHARGE into any live irrigation system is permitted.

Per Idaho Statutes, Title 42, local irrigation/drainage ditches that cross this property, in order to serve neighboring properties, must remain unobstructed and protected by an appropriate easement by the land owner, developer and contractors.

This development is subject to Idaho Code 31-3805, in accordance, this office is requesting a full-size hard copy of the plans to include all drainage plans.

Wording on the preliminary and final recorded plat needs to state that any proposed and/or future usage of the Boise Project Board of Control facilities are subject to Idaho Statutes, Title 42-1209.

Future preliminary and final plats must call out the Project easements.

Whereas this development is in its preliminary stages, Boise Project Board of Control reserves the right to require changes when our easements and/or facilities are affected by unknown factors even during the construction phase.

If you have any further questions or comments regarding this matter, please do not hesitate to contact me at (208) 344-1141.

Sincerely,



Thomas Ritthaler
Assistant Project Manager, BPBC

tbr/tr

cc: Tony Avermann Watermaster, Div; 4 BPBC
File



Lisa Boyd, Superintendent

5207 S. Montana Avenue
Caldwell, ID 83607
Phone (208) 454-0445
Fax (208) 454-0293

January 17, 2024

Re: Case No. RZ2022-0012

Dear Canyon County Development Services,

At this time it is uncertain which elementary school the K-5 students in the proposed development would attend as the district has yet to confirm the new attendance boundaries for the two new elementary schools to open in the fall of 2025. The district's primary concern for the foreseeable future is the capacity of the Vallivue High School as new developments are approved. Currently, Vallivue High School has an enrollment of approximately 1,300 students with a capacity for 1,800 students.

Sincerely,

A handwritten signature in black ink that reads "J. Palmer".

Joseph Palmer
Assistant Superintendent



CANYON HIGHWAY DISTRICT No. 4

15435 HIGHWAY 44

CALDWELL, IDAHO 83607

TELEPHONE 208/454-8135

FAX 208/454-2008

August 9, 2023

Canyon County P&Z Commission and
County Commissioners
111 N. 11th Ave Suite 140
Caldwell, Idaho 83605
Attention: Samantha Hammond, Planner

Riley Planning Services
300 W. Myrtle Street, Ste. 200-B
Boise, ID 83701
Attention: Penelope Constantikes

**RE: Tillman Ridge Subdivision
aka 15453 Karcher Rd
Preliminary Plat- Review**

Dear Commissioners:

Canyon Highway District No. 4 (CHD4) has received the agency notice for rezone and preliminary plat for Tillman Ridge Subdivision, approximately 69 acres lying south of SH 55 (Karcher Rd) in the N ½ Section 16, T4N R3W, and provides the following comments:

General

The subject property has approximately 1,700-feet of frontage on SH 55 along the north boundary, and approximately 1,320-feet of frontage along Kimball Ave on the east boundary. SH 55 is classified as a principal arterial on the functional classification maps adopted by CHD4 and Canyon County, and is under jurisdiction of Idaho Transportation Department. Kimball Ave is a local road under CHD4 jurisdiction. Existing right-of-way width for Kimball Ave is a 30-foot half width created by plat of Vanal Heights Subdivision in 1960. Ultimate right-of-way width for a local road is 60-feet total. The development is proposing 54 residential lots, which are anticipated to generate approximately 572 vehicle trips/day.

Canyon Highway District No. 4 (CHD4) received application for review of the preliminary plat on March 7, 2023. At this time, the plat has been reviewed for compliance with CHD4's development standards and CHD4 offers the following comments;

Preliminary Plat

1. Verify/Coordinate with ITD for the widening of Karcher Rd/Hwy 55 to reduce impacts to residential lots adjacent to the project boundary. (~90' of ROW S. of existing CL).
2. Revise Sheet 2, Roadway notes to specify "**Canyon Highway District 4**".
3. Revise Sheet 2, Pressure Irrigation notes to specify "*All Pressure irrigation must be outside the ROW, except at crossing, which must be at 90° (no skew), meeting HSDP policy & approved pipe type.*"
4. Revise to identify removal of any encroachments in proposed ROW, (utilities & irrigation from Kimball or local).
5. Revise to add note that direct lot access to Karcher Rd & Kimball is prohibited.
6. Revise to add note that "*The Homeowners Association, underlying property owner or adjacent property owner is responsible for all storm drainage facilities outside the public right-of-way, including all routine and heavy maintenance.*"
7. Revise to identify/label drainage facility locations for public ROW drainage (with flow arrows), borrow ditches shall be designed to convey storm water runoff, they are not intended for disposal/infiltration, Per HSDP 3070.040.
8. Revise Sheet 3, Note #4, per above comment.
9. Revise/Verify centerline radius of public streets, a minimum of 200-feet (25 mph design speed), Curve table provided, provide curve labels on curves.

10. Revise to label Radii;
 - a Verify/label all intersection ROW & edge of road (EP) radii meet HSDP policy 3030.040.
 - b Verify/label Cul-de-sac ROW & EP, radii meet HSDP policy 3030.030.
11. Show typical section for Kimball Ave.
12. Revise Sheet 4, Typical section;
 - a Revise to remove Note "E"
 - b Revise Item Callout #5 to specify 4:1 side slopes, (Per ACCHD-101 dwg).
 - c Revise callout circle 4 to have leader pointing to the shoulder.
 - d Revise to add callout circle 5 to gravel borrow.

Current CHD4 development policy requires that improvements and other infrastructure for public roads be designed, constructed, and approved prior to final approval of the plat by the highway district Board of Commissioners. For complete information on development, procedures, including platting and improvement requirements to be in accordance with the current edition of the Highway Standards and Development Procedures Manual in effect at the time of improvement drawing submittal (HSDP Manual) available on our website at <https://www.canyonhd4.org/resources/forms-and-maps> .

Preliminary plats are presented to the CHD4 Board of Commissioners for approval after review by staff. Please revise the preliminary plat to address the comments above, also, submit a review comment sheet which explains the changes made versus the review comments provided, and submit a single full size hard copy and an electronic copy for subsequent review. Preliminary plats can generally be included on a board agenda for consideration within two weeks of staff approval, subject to available space.

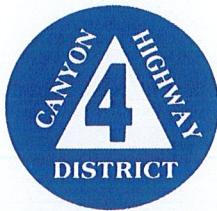
Please feel free to contact me with any questions on these comments.

Respectfully,



Kraig Wartman
Senior Engineering Tech.
Canyon Highway District No. 4

File: SH 55 Karcher Rd- Tillman Ridge Subdivision



CANYON HIGHWAY DISTRICT No. 4
15435 HIGHWAY 44
CALDWELL, IDAHO 83607

TELEPHONE 208/454-8135
FAX 208/454-2008

May 23, 2023

Canyon County P&Z Commission and
County Commissioners
111 N. 11th Ave Suite 140
Caldwell, Idaho 83605
Attention: Samantha Hammond, Planner

William McGuire & Glen Eaton, Applicants

**RE: RZ2022-0012/SD2022-0044 Tillman Ridge Subdivision
Parcels R36862 & R32862010 aka 15453 Karcher Rd**

Dear Commissioners:

Canyon Highway District No. 4 (CHD4) has received the agency notice for rezone and preliminary plat for Tillman Ridge Subdivision, approximately 69 acres lying south of SH 55 (Karcher Rd) in the N ½ Section 16, T4N R3W, and provides the following comments:

General

The subject property has approximately 1,700-feet of frontage on SH 55 along the north boundary, and approximately 1,320-feet of frontage along Kimball Ave on the east boundary. SH 55 is classified as a principal arterial on the functional classification maps adopted by CHD4 and Canyon County, and is under jurisdiction of Idaho Transportation Department. Kimball Ave is a local road under CHD4 jurisdiction. Existing right-of-way width for Kimball Ave is a 30-foot half width created by plat of Vanal Heights Subdivision in 1960. Ultimate right-of-way width for a local road is 60-feet total. The development is proposing 54 residential lots, which are anticipated to generate approximately 572 vehicle trips/day.

Access

Access to the subject property was discussed in preparation of the Traffic Impact Study (TIS) prepared to support the application in February 2022. ITD and CHD4 developed a strategy to minimize impacts to the SH 55 corridor which include:

- Single access to SH 55 located opposite existing Ashland Drive. This access will be a full access (allowing both right- and left-turns) initially, but will be converted to a right-in-right-out access upon completion of the SH 55 widening project in 2026-28.
- As part of the SH 55 widening project, the existing Kimball Ave approach to SH 55 will be removed.
- Internal local road connection to existing Vista Ave on the east boundary will provide access to the signal at 10th Ave/SH 55 for left turn movements.
- Future connection to the south will connect to Orchard Ave via Norse Landing Subdivision.

The access configuration shown on the preliminary plat dated 8/26/22 appears generally consistent with the approved TIS and the CHD4/ITD intent.

Traffic Impacts

As stated above, a TIS was completed for the project in February 2022, and has been approved by CHD4 and ITD. Aside from the access restrictions provided above, the project is not anticipated to significantly degrade Level of Service (LOS) at nearby intersections or roadways after the SH 55 corridor has been widened to 5 lanes. This project is under design, and funding for construction has been established by ITD. Other traffic impacts from the development will be mitigated through dedication of public right-of-way, frontage improvements to Kimball Ave, and traffic impact fees if they are in effect for the area at the time of access permit issuance.

Preliminary Plat

Canyon Highway District No. 4 (CHD4) received application for review of the preliminary plat on March 7, 2023. At this time, the plat has not been reviewed for compliance with CHD4's development standards. Review is estimated to take place within 8-12 weeks at the current pace of applications.

A cursory review of the preliminary plat layout provided with the agency notice shows that the access configuration is generally consistent with direction from CHD4 and ITD, and the lot and street configuration appear to generally meet the right-of-way widths and geometric requirements for public local streets. It is anticipated that this plat may be amended (if necessary) to meet CHD4 development standards without significant changes to lot count, access locations, and street alignment. A complete review of the preliminary plat will be made when the application reaches priority, and comments will be provided to the applicant and/or the plat scheduled for consideration by the CHD4 Board.

CHD4 recommends the plat be updated to reflect the following items prior to review:

- The plat should be amended to show drainage patterns and location/size of storm drain disposal areas
- Verify centerline radius of public streets is a minimum of 200-feet (25 mph design speed)
- Show typical local street section and typical section for Kimball Ave
- Review and confirm the plat meets all requirements of HSDP Manual Section 2130.021 for Preliminary Plats prior to re-submittal.

Provided a revised plat is submitted prior to commencing review, the plat will keep its current place in the review line.

All other platting and improvement requirements to be in accordance with the Highway Standards and Development Procedures Manual (HSDP Manual) available on at <https://www.canyonhd4.org/resources/forms-and-maps> .

CHD4 appreciates the opportunity to provide comment on this proposed development, and requests the Commission make all comments above conditions of approval for the project. Please feel free to contact me with any questions on this request.

Respectfully,



Chris Hopper, P.E.
District Engineer

File: SH 55 Karcher Rd- Tillman Ridge Subdivision



CITY OF *Caldwell, Idaho*

JAROM WAGONER
Mayor

208.455.3011
(f) 208.455.3003

City Hall
411 Blaine Street
Caldwell, Idaho 83605

Post Office Box
P.O. Box 1179
Caldwell, Idaho 83606

For a list of the City
Council members, visit:
Website
www.cityofcaldwell.org

January 4, 2024

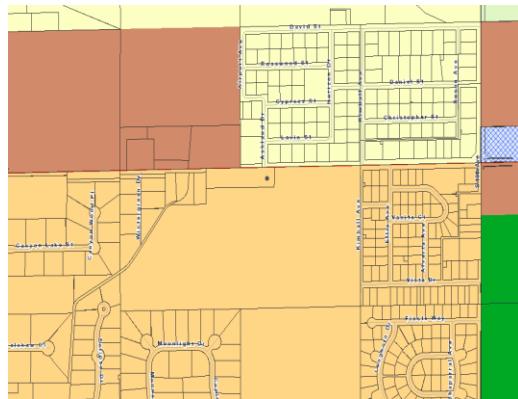
Daniel Lister
Staff Planner
Canyon County Development Services Dept.
111 North 11th Ave. Ste. 340
Caldwell, Idaho 83605

Re: RZ2022-0012
Rezone from "A" to "R-1"
Parcel R32862 and R32862010
Caldwell, Idaho

Dear Mr. Lister

Our office received your notification regarding the rezone request from "A" to and "R-1" zone for the property located at 15453 Karcher Rd, also referenced as Parcel R32862 and R32862010.

This parcels are located within the City of Caldwell's Area of City Impact and within 0.25 mile of the City of Caldwell's incorporated limits.



Comprehensive Plan Map Legend:

Light Brown = Residential Estates
Dark Brown = Highway Corridor
Light Yellow = Low Density Residential

The subject parcels are designated as Residential Estates in the City of Caldwell's Comprehensive Plan.

"The Treasure of the Valley"

The City is in the process of updating their Comprehensive Plan, and future land uses along Karcher Road are anticipated to change with the updated future land use map. Although this area currently is designated as Residential Estates in the City's Current Comprehensive Plan, there is potential for this land use designation to change to a Highway Corridor zone in the future. This zone would allow for a mixed use land-use designation that combines higher density residential with commercial services. The City of Caldwell is not opposed to the proposed rezone to low density residential, but would like to see the frontage along Karcher Road preserved for commercial services at a minimum.

If Canyon County approves the request for rezone, the City of Caldwell would request that street landscape buffers along Karcher Road and Kimball Avenue be installed in accordance with the City of Caldwell's Landscaping Ordinances. This would include the requirement for all common open space requirements, buffers between different land uses, and pathways. Any connection to City services would require a formalized Municipal Services Agreement to be entered into.

Sincerely,

Robin Collins
Director
City of Caldwell Planning and Zoning Department



Your Safety • Your Mobility Your Economic Opportunity

IDAHO TRANSPORTATION DEPARTMENT
P.O. Box 8028 • Boise, ID 83707-2028
(208) 334-8300 • itd.idaho.gov

January 16, 2024

Dan Lister
Principal Planner, Canyon County Development Services Department
111 North 11th Ave., Ste 310
Caldwell, Idaho 83605

VIA EMAIL

Development Application	RZ2022-0012
Project Name	McGuire / Eaton
Project Location	Southside of SH-55 MP 11.35 (15453 Karcher Rd)
Project Description	Rezone for 54 lot subdivision
Applicant	Penelope Constantikes; Riley Planning services, LLC

The Idaho Transportation Department (ITD) reviewed the referenced application(s) and has the following comments:

1. This project abuts the State Highway system.
2. A revised Traffic Impact Study (TIS) dated July 14, 2022 was provided to ITD. However, since that time, there has been multiple changes in design for the SH-55 widening project therefore, an updated TIS is requested.
3. TIS's are only valid for one year. While the applicant is revising the TIS with the current SH-55 plans, ITD also requests updated and current data to be included.

If you have any questions, you may contact me at 208-334-8337.

Sincerely,

Niki Benyakhlef

Niki Benyakhlef
Development Services Coordinator
Niki.Benyakhlef@itd.idaho.gov



January 17, 2024

Daniel Lister, Assistant Planning Manager
111 North 11th Ave.
Ste. 310
Caldwell, Idaho, 83605
Daniel.Lister@canyoncounty.id.gov

Subject: Case No. RZ2022-0012 McGuire / Eaton

Dear Mr. Lister:

Thank you for the opportunity to respond to your request for comment. While DEQ does not review projects on a project-specific basis, we attempt to provide the best review of the information provided. DEQ encourages agencies to review and utilize the Idaho Environmental Guide to assist in addressing project-specific conditions that may apply. This guide can be found at:

<https://www.deq.idaho.gov/public-information/assistance-and-resources/outreach-and-education/>.

The following information does not cover every aspect of this project; however, we have the following general comments to use as appropriate:

1. AIR QUALITY

- Please review IDAPA 58.01.01 for all rules on Air Quality, especially those regarding fugitive dust (58.01.01.651), trade waste burning (58.01.01.600-617), and odor control plans (58.01.01.776).

For questions, contact David Luft, Air Quality Manager, at (208) 373-0550.

- IDAPA 58.01.01.201 requires an owner or operator of a facility to obtain an air quality permit to construct prior to the commencement of construction or modification of any facility that will be a source of air pollution in quantities above established levels. DEQ asks that cities and counties require a proposed facility to contact DEQ for an applicability determination on their proposal to ensure they remain in compliance with the rules.

For questions, contact the DEQ Air Quality Permitting Hotline at 1-877-573-7648.

2. WASTEWATER AND RECYCLED WATER

- DEQ recommends verifying that there is adequate sewer to serve this project prior to approval. Please contact the sewer provider for a capacity statement, declining balance report, and willingness to serve this project.

- IDAPA 58.01.16 and IDAPA 58.01.17 are the sections of Idaho rules regarding wastewater and recycled water. Please review these rules to determine whether this or future projects will require DEQ approval. IDAPA 58.01.03 is the section of Idaho rules regarding subsurface disposal of wastewater. Please review this rule to determine whether this or future projects will require permitting by the district health department.
- All projects for construction or modification of wastewater systems require preconstruction approval. Recycled water projects and subsurface disposal projects require separate permits as well.
- DEQ recommends that projects be served by existing approved wastewater collection systems or a centralized community wastewater system whenever possible. Please contact DEQ to discuss potential for development of a community treatment system along with best management practices for communities to protect ground water.
- DEQ recommends that cities and counties develop and use a comprehensive land use management plan, which includes the impacts of present and future wastewater management in this area. Please schedule a meeting with DEQ for further discussion and recommendations for plan development and implementation.

For questions, contact Valerie Greear, Water Quality Engineering Manager at (208) 373-0550.

3. DRINKING WATER

- DEQ recommends verifying that there is adequate water to serve this project prior to approval. Please contact the water provider for a capacity statement, declining balance report, and willingness to serve this project.
- IDAPA 58.01.08 is the section of Idaho rules regarding public drinking water systems. Please review these rules to determine whether this or future projects will require DEQ approval.
- All projects for construction or modification of public drinking water systems require preconstruction approval.
- DEQ recommends verifying if the current and/or proposed drinking water system is a regulated public drinking water system (refer to the DEQ website at: <https://www.deq.idaho.gov/water-quality/drinking-water/>). For non-regulated systems, DEQ recommends annual testing for total coliform bacteria, nitrate, and nitrite.
- If any private wells will be included in this project, we recommend that they be tested for total coliform bacteria, nitrate, and nitrite prior to use and retested annually thereafter.
- DEQ recommends using an existing drinking water system whenever possible or construction of a new community drinking water system. Please contact DEQ to discuss this project and to explore options to both best serve the future residents of this development and provide for protection of ground water resources.
- DEQ recommends cities and counties develop and use a comprehensive land use management plan which addresses the present and future needs of this area for adequate, safe, and sustainable drinking water. Please schedule a meeting with DEQ for further discussion and recommendations for plan development and implementation.

For questions, contact Valerie Greear, Water Quality Engineering Manager at (208) 373-0550.

4. SURFACE WATER

- Please contact DEQ to determine whether this project will require an Idaho Pollutant Discharge Elimination System (IPDES) Permit. A Construction General Permit from DEQ may be required if this project will disturb one or more acres of land, or will disturb less than one acre of land but are part of a common plan of development or sale that will ultimately disturb one or more acres of land.
- For questions, contact James Craft, IPDES Compliance Supervisor, at (208) 373-0144.
- If this project is near a source of surface water, DEQ requests that projects incorporate construction best management practices (BMPs) to assist in the protection of Idaho's water resources. Additionally, please contact DEQ to identify BMP alternatives and to determine whether this project is in an area with Total Maximum Daily Load stormwater permit conditions.
- The Idaho Stream Channel Protection Act requires a permit for most stream channel alterations. Please contact the Idaho Department of Water Resources (IDWR), Western Regional Office, at 2735 Airport Way, Boise, or call (208) 334-2190 for more information. Information is also available on the IDWR website at:
<https://idwr.idaho.gov/streams/stream-channel-alteration-permits.html>
- The Federal Clean Water Act requires a permit for filling or dredging in waters of the United States. Please contact the US Army Corps of Engineers, Boise Field Office, at 10095 Emerald Street, Boise, or call 208-345-2155 for more information regarding permits.

For questions, contact Lance Holloway, Surface Water Manager, at (208) 373-0550.

5. SOLID WASTE, HAZARDOUS WASTE AND GROUND WATER CONTAMINATION

- **Solid Waste.** No trash or other solid waste shall be buried, burned, or otherwise disposed of at the project site. These disposal methods are regulated by various state regulations including Idaho's Solid Waste Management Regulations and Standards (IDAPA 58.01.06), Rules and Regulations for Hazardous Waste (IDAPA 58.01.05), and Rules and Regulations for the Prevention of Air Pollution (IDAPA 58.01.01). Inert and other approved materials are also defined in the Solid Waste Management Regulations and Standards
- **Hazardous Waste.** The types and number of requirements that must be complied with under the federal Resource Conservation and Recovery Act (RCRA) and the Idaho Rules and Standards for Hazardous Waste (IDAPA 58.01.05) are based on the quantity and type of waste generated. Every business in Idaho is required to track the volume of waste generated, determine whether each type of waste is hazardous, and ensure that all wastes are properly disposed of according to federal, state, and local requirements.

- **Water Quality Standards.** Site activities must comply with the Idaho Water Quality Standards (IDAPA 58.01.02) regarding hazardous and deleterious-materials storage, disposal, or accumulation adjacent to or in the immediate vicinity of state waters (IDAPA 58.01.02.800); and the cleanup and reporting of oil-filled electrical equipment (IDAPA 58.01.02.849); hazardous materials (IDAPA 58.01.02.850); and used-oil and petroleum releases (IDAPA 58.01.02.851 and 852). Petroleum releases must be reported to DEQ in accordance with IDAPA 58.01.02.851.01 and 04. Hazardous material releases to state waters, or to land such that there is likelihood that it will enter state waters, must be reported to DEQ in accordance with IDAPA 58.01.02.850.
- **Ground Water Contamination.** DEQ requests that this project comply with Idaho's Ground Water Quality Rules (IDAPA 58.01.11), which states that "No person shall cause or allow the release, spilling, leaking, emission, discharge, escape, leaching, or disposal of a contaminant into the environment in a manner that causes a ground water quality standard to be exceeded, injures a beneficial use of ground water, or is not in accordance with a permit, consent order or applicable best management practice, best available method or best practical method."

For questions, contact Rebecca Blankenau, Waste & Remediation Manager, at (208) 373-0550.

6. ADDITIONAL NOTES

- If an underground storage tank (UST) or an aboveground storage tank (AST) is identified at the site, the site should be evaluated to determine whether the UST is regulated by DEQ. EPA regulates ASTs. UST and AST sites should be assessed to determine whether there is potential soil and ground water contamination. Please call DEQ at (208) 373-0550, or visit the DEQ website <https://www.deq.idaho.gov/waste-management-and-remediation/storage-tanks/leaking-underground-storage-tanks-in-idaho/> for assistance.
- If applicable to this project, DEQ recommends that BMPs be implemented for any of the following conditions: wash water from cleaning vehicles, fertilizers and pesticides, animal facilities, composted waste, and ponds. Please contact DEQ for more information on any of these conditions.

We look forward to working with you in a proactive manner to address potential environmental impacts that may be within our regulatory authority. If you have any questions, please contact me, or any of our technical staff at (208) 373-0550.

Sincerely,

Aaron Scheff
Regional Administrator

C:

2021AEK

CANYON SOIL CONSERVATION DISTRICT



2208 E. Chicago, Suite A
Caldwell, ID 83605
Phone 208-779-3443
Fax 1-877-504-6752

SUPERVISORS: Mike Swartz, Chairman; Rex Runkle, Vice Chairman; Robert McKellip, Secretary/Treasurer;
Chris Gross, Supervisor, Brad McIntyre, Supervisor & Clay Erskine, Supervisor

ASSOCIATE SUPERVISORS: Tom Johnston, Rich Sims & Matt Livengood

SOIL CONSERVATION DISTRICT STAFF: Lori Kent; Administrative Assistant & Stan Haye, Soil Conservation Technician

April 29, 2023

**To: Dan Lister Planner of Record
Canyon County Development Services**
From: Canyon Soil Conservation District (Canyon SCD)
Subject: P & Z Agency Notice

Thank you for sending Canyon Soil Conservation District (SCD) zoning requests.

They are: RZ2022-0012/SD2022-0044 Penelope Constantikes, SD2022-0053 Daniel Caldwell, OR2022-0005/CR2022-0011/SD2022-0019 Steve Law, CU2023-0004 Jeff Bower/Kristen McNeill.

Comments from Canyon SCD:

The acreage amounts on the maps are an estimate. Percentages of soils are rounded to a whole number.

RZ2022-0012/SD2022-0044 Penelope Constantikes is 97% Class 3 and 3% Class 4. Class III have moderate limitations and appropriate management practices can make any irrigated soil productive. We do NOT recommend a land use change.

SD2022-0053 Daniel Caldwell is 5 acres or less. Canyon SCD has no comments, no map included.

OR2022-0005/CR2022-0011/SD2022-0019 Steve Law is 50% Class 4 and 50% was not rated (slope range is 12 to 25%). Canyon SCD has no comments.

CU2023-0004 Jeff Bower/Kristen McNeill is 1% Class 2, 30% Class 3, 54% Class 4, 11% Class 5 and 4% not rated. Canyon SCD has no comments.

Continued Partnership and Conservation.

Sincerely,

Rich Sims acting for:

Mike Swartz, Canyon SCD Chairman

All programs and services of the Canyon Soil Conservation District are offered on a nondiscriminatory basis without regard to race, color, national origin, religion, sex, age, disability, marital or familial status, and political beliefs.



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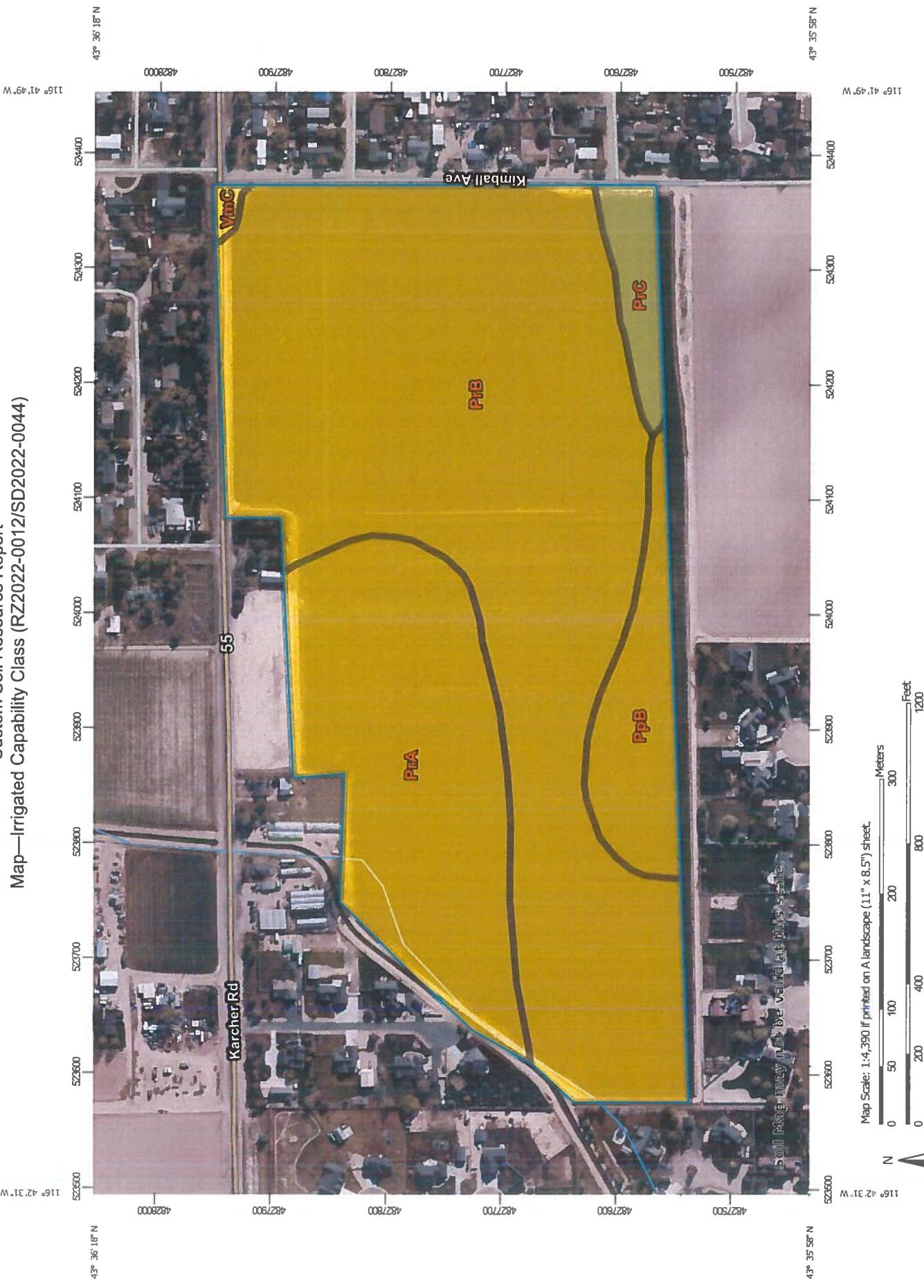
A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Canyon Area, Idaho

RZ2022-0012/SD2022-0044
Penelope Constantikes



Custom Soil Resource Report
Map—Irrigated Capability Class (RZ2022-0012/SD2022-0044)



Map Scale: 1:4,390 if printed on A Landscape (11" x 8.5") sheet.

0 50 100 200 300
Meters
0 200 400 600 800 1200
Feet

Map projection: Web Mercator Corner coordinates: WCS84 Edge tiles: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)		Capability Class - III		Capability Class - IV
Soils		Capability Class - V		Capability Class - VI
Soil Rating Polygons		Capability Class - I		Capability Class - II
		Capability Class - II		Capability Class - III
		Capability Class - IV		Capability Class - V
		Not rated or not available		Water Features
		Capability Class - VI		Streams and Canals
		Capability Class - VII		Transportation
		Capability Class - VIII		Rails
		Not rated or not available		Interstate Highways
Soil Rating Lines		Major Roads		US Routes
		Major Roads		Local Roads
		Major Roads		Background
		Major Roads		Aerial Photography
Background		Major Roads		
Soil Rating Points		Capability Class - I		
		Capability Class - II		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Canyon Area, Idaho
Survey Area Data: Version 19, Sep 2, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 19, 2021—Apr 21, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Custom Soil Resource Report

Table—Irrigated Capability Class (RZ2022-0012/SD2022-0044)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
PpB	Power-Purdam silt loams, 1 to 3 percent slopes	3	4.4	7.0%
PrA	Purdam silt loam, 0 to 1 percent slopes	3	15.3	24.2%
PrB	Purdam silt loam, 1 to 3 percent slopes	3	41.2	65.4%
PrC	Purdam silt loam, 3 to 7 percent slopes	4	1.9	3.0%
VmC	Vickery-Marsing silt loams, 3 to 7 percent slopes	3	0.2	0.4%
Totals for Area of Interest			63.1	100.0%

Rating Options—Irrigated Capability Class (RZ2022-0012/SD2022-0044)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



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A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Canyon Area, Idaho

**OR2022-0005 CR2022-0011
SD2022-0019 Steve Law**



Custom Soil Resource Report

Map—Irrigated Capability Class (OR2022-0005 CR2022-0011 SD2022-0019 Steve Law)



Map Scale: 1:1,490 if printed on A portrait (8.5" x 11") sheet.

0 20 40 60 80 100 120
Meters

0 50 100 150 200 250 300
Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge ticks: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)		Capability Class - III
Area of Interest (AOI)		Capability Class - IV
		Capability Class - V
		Capability Class - VI
		Capability Class - VII
		Capability Class - VIII
		Not rated or not available
Soils		
Soil Rating Polygons		
Capability Class - I		Capability Class - I
Capability Class - II		Capability Class - II
Capability Class - III		Capability Class - III
Capability Class - IV		Capability Class - IV
Capability Class - V		Capability Class - V
Capability Class - VI		Capability Class - VI
Capability Class - VII		Capability Class - VII
Capability Class - VIII		Capability Class - VIII
Not rated or not available		Not rated or not available
Water Features		Streams and Canals
Transportation		Rails
		Interstate Highways
		US Routes
Soil Rating Lines		
Major Roads		Major Roads
Local Roads		Local Roads
Background		Aerial Photography
Aerial Photography		Aerial Photography
Soil Rating Points		
Capability Class - I		Capability Class - I
Capability Class - II		Capability Class - II

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 19, 2021—Apr 21, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Custom Soil Resource Report

**Table—Irrigated Capability Class (OR2022-0005 CR2022-0011
SD2022-0019 Steve Law)**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
FeC	Feltham loamy fine sand, 3 to 7 percent slopes	4	2.9	28.7%
FeD	Feltham loamy fine sand, 7 to 12 percent slopes	4	0.7	7.2%
FeE	Feltham loamy fine sand, 12 to 25 percent slopes		5.4	53.6%
JaB	Jacquith loamy fine sand, 1 to 3 percent slopes	4	1.0	10.5%
Totals for Area of Interest			10.0	100.0%

**Rating Options—Irrigated Capability Class (OR2022-0005
CR2022-0011 SD2022-0019 Steve Law)**

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



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A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Canyon Area, Idaho

CU2023-0004 Jeff Bower Kristen McNeill



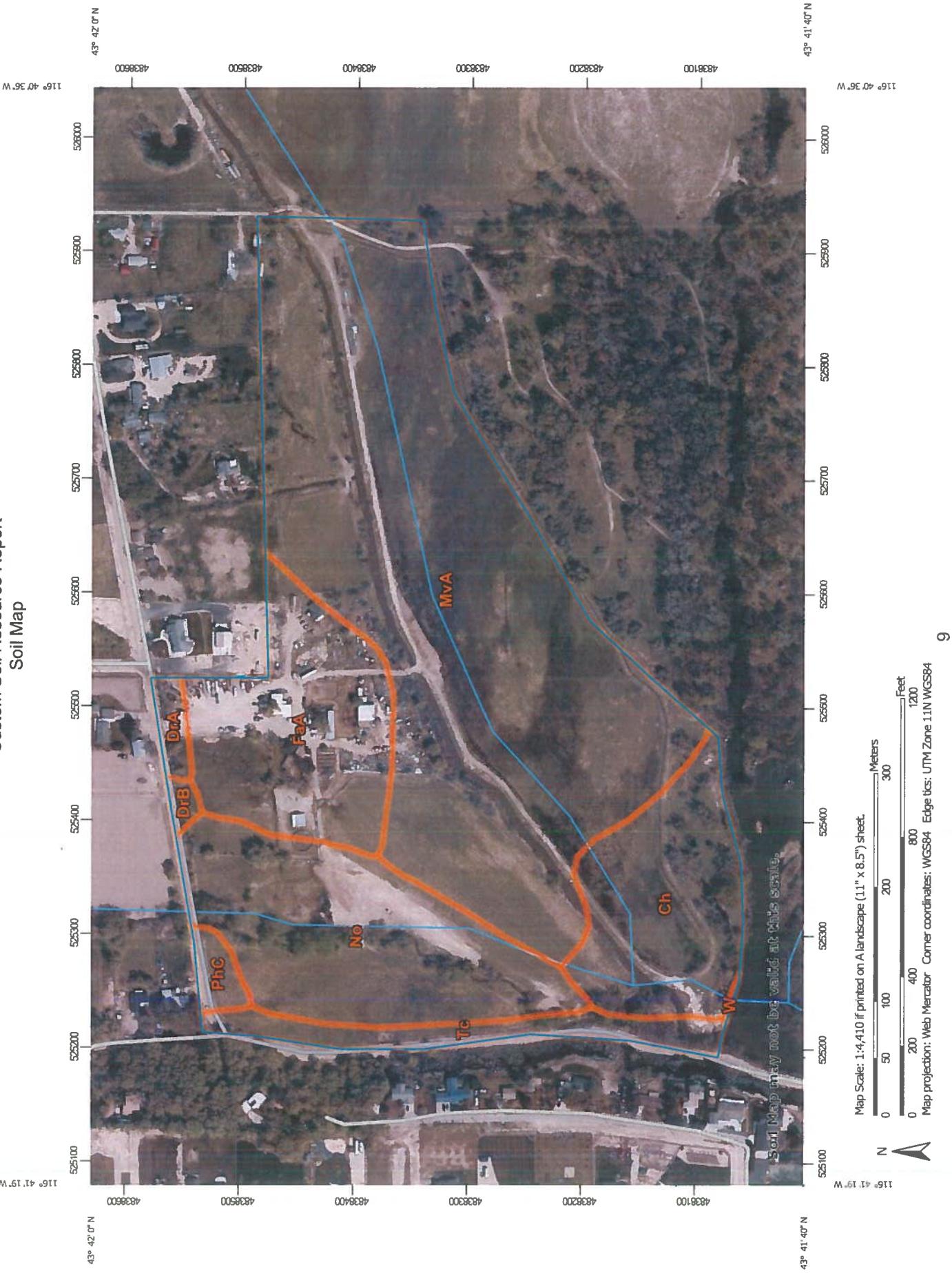
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map





Date 04/28/2023

Canyon County – Planning and Zoning
Re: Tillman Subdivision

Dear Bonnie Puleo, Hearing Specialist

Case No. RZ2022-0012/SD2022-0044: The applicants, William B. McGuire, and Glen C. Eaton, represented by Penelope Constantikes, are requesting a Rezone of approximately 69.161 acres from an "A" (Agricultural) zone to an "R-1" (Single Family Residential) zone. Also requesting a Preliminary Plat for a 54-lot subdivision. The subject property is located at 15453 Karcher Rd, also referenced as Parcel R32862, R32862010, a portion of the NE ¼ quarter of Section 16, T3N, R3W, BM, Canyon County, Idaho.

The Caldwell Rural Fire Protection District has reviewed and can approve the application subject to compliance with all the following code requirements and conditions of approval. Any deviation from this plan is subject to Fire Department approval. Please note that unless stated otherwise, this memo represents the requirements of the 2018 International Fire Code (IFC) as adopted by the Idaho State Fire Marshal's Office.

Comments:

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).
2. Structures greater than 30-feet in height will require aerial fire access roadways. These roadways shall be a minimum of 26-feet in width and located at least 15-feet but no more than 30-feet from the building. (IFC D105)
3. Roadway serving a fire hydrant shall be a minimum of 26-feet in width. (IFC D103.1)
4. Dead-end fire apparatus access roads exceeding 150 feet (45 720 mm) in length shall be provided with an approved area for turning around fire apparatus. (IFC 503.2.5)
5. Fire apparatus access roads shall extend to within 150 feet of all portions of the exterior walls of the first story of a building measured by an approved route around the exterior of the building or facility. (IFC 503.1.1)
6. Monument signage for addressing will be required at the entrance and at all intersections within the project. (IFC 505.1)



7. Fire apparatus access roads shall have an unobstructed width of not less than 20 feet and an unobstructed vertical clearance of not less than 13 feet 6 inches. (IFC 503.2.1)
8. The minimum outside turning radius of a fire apparatus access road shall be 48 feet. The minimum inside turning radius shall be 28 feet. (IFC 503.2.4)
9. Fire apparatus access roads shall have an approved driving surface of asphalt, concrete or other approved driving surface and can support the imposed load of fire apparatus weighing at least 80,000 pounds. Please provide documentation the road surface meets this standard. (IFC D102.1)
10. Fire apparatus access roads shall not exceed 10 percent in grade. (IFC D103.2)
11. For streets having a width less than 33 feet back of curb to back of curb parking shall be restricted on one side; for streets having a width less than 27 feet back of curb to back of curb parking shall be restricted on both sides. A note on the face of the final plat is required noting the parking restriction prior to signing of the final plat. In addition, No Parking signs shall be installed in accordance with the requirements of the IFC. (IFC 503.8)
12. Shall meet all conditions of the 2018 International Fire Code, Appendix D

General Requirement:

Fire Department required fire hydrants, access, and street identification shall be installed prior to construction or storage of combustible materials on site. Provisions may be made for temporary access and identification measures.

Specific building construction requirements of the International Building Code, International Fire Code and City of Caldwell Code will apply. However, these provisions are best addressed by a licensed Architect at time of building permit application.

Regards,

Alan Perry
Deputy Chief
Fire Marshal
Caldwell Rural Fire Protection District
Aperry@cityofcaldwell.org