CityofKuna
Planning& Zoning
Department
P.O. Box 13
Kuna, Idaho 83634
208.922.5274
Fax: 208.922.5989
Website: www.kunacity.id.gov

Commission & Council Review Application

Note: Engineering fees shall be paid by the applicant if required.

*Please submit the appropriate checklist (s) with application

For Office Use Only	
File Number (s)	
Project name	
Date Received	
Date Accepted/ Complete	
Cross Reference Files	
Commission Hearing Date	
City Council Hearing Date	

Type of Review (check all that apply):

- ☑ Annexation
- ☐ Appeal
- ☐ Comprehensive Plan Amendment
- ☐ Design Review
- ☐ Development Agreement
- ☐ Final Planned Unit Development
- ☐ Final Plat
- ☐ Lot Line Adjustment
- ☐ Lot Split
- ☐ Planned Unit Development
- ☑ Preliminary Plat
- ☑ Rezone
- ☐ Special Use
- ☐ Temporary Business
- ☐ Vacation
- ☐ Variance

Contact/Applicant Information

Owners of Record: TJ Johnson / HTPM
Address: 2425 N. Locust Grove Road
City, State, Zip: Kuna, ID 83634
Phone Number:
E-Mail:
Fax #:

Applicant (Developer): Trilogy Development, Inc
Address: 9839 W. Cable Car St., Suite 101
City, State, Zip: Boise, ID 83709
Phone Number: 208-895-8858
E-Mail:
Fax #:

Engineer/Representative: Gem State Planning / Jane Suggs
Address: 9840 W. Overland Road, Suite 120
City, State, Zip: Boise, ID 83709
Phone Number: 208-602-6941
E-Mail: jane@gemstateplanning.com
Fax #:

Subject Property Information

Site Address: 2425 N. Locust Grove Road and surrounding parcels
Site Location (Cross Streets): Ardell Street extension, Stroebel Road extension, Locust Grove Road
Parcel Number (s): S1418123460, S1418123485, S1418427800, S1418417200
Section, Township, Range: 18, 2N, 1E
Property size : approximately 97 acres
Current land use: agriculture
Proposed land use: SF residential
Current zoning district: RR
Proposed zoning district: R-6 / R-8

Project Description

Project / subdivision name: Ledgestone South

General description of proposed project / request: annex, rezone and preliminary plat for single family subdivision for 393 buildable lots, plus substantial open space

Type of use proposed (check all that apply):

- [x] Residential
- [ ] Commercial
- [ ] Office
- [ ] Industrial
- [ ] Other

Amenities provided with this development (if applicable): swimming pool w/changing room, picnic shelter playgound equipment, open space/park, connecting pathways

Residential Project Summary (if applicable)

Are there existing buildings? [x] Yes [ ] No

Please describe the existing buildings: SF home to be annexed and zoned, but not part of plat

Any existing buildings to remain? [x] Yes [ ] No

Number of residential units: 393 Number of building lots: 393

Number of common and/or other lots: 44

Type of dwellings proposed:

- [x] Single-Family
- [ ] Townhouses
- [ ] Duplexes
- [ ] Multi-Family
- [ ] Other

Minimum Square footage of structure (s):

Gross density (DU/acre-total property): 4.07 Net density (DU/acre-excluding roads): 5.65

Percentage of open space provided: 15.2%/11.6% * Acreage of open space: 14.68 / 11.18*

Type of open space provided (i.e. landscaping, public, common, etc.): common, landscaping, park,

* = qualified open space

Non-Residential Project Summary (if applicable)

Number of building lots: Other lots:

Gross floor area square footage: Existing (if applicable):

Hours of operation (days & hours): Building height:

Total number of employees: Max. number of employees at one time:

Number and ages of students/children: Seating capacity:

Fencing type, size & location (proposed or existing to remain):

Proposed Parking:

a. Handicapped spaces: Dimensions:
b. Total Parking spaces: Dimensions:
c. Width of driveway aisle:

Proposed Lighting:

Proposed Landscaping (berms, buffers, entrances, parking areas, common areas, etc.):

Applicant's Signature: Jane Suggs Date: 04-07-20

Gem State Planning, LLC

April 29, 2020

Ms. Wendy Howell, Planning Director
751 W. 4th Street
Kuna, ID 83634

Subject: Ledgestone South Subdivision
Applications for Annexation, Rezone, Preliminary Plat and Design Review

Dear Ms. Howell:

Please accept the attached applications and support materials for a new residential community in Kuna. Ledgestone South is the natural extension of the Ledgestone Subdivision that is currently under construction. This new subdivision is 96.6 acres and located south of the Ledgestone Subdivision, between Stroebel Road and Locust Grove Road (2N, 1W, 22). The extension of Ardell Road, an east-west mid-mile collector between Locust Grove and Stroebel Road, will be constructed as part of this new development. The community will include 393 single family home lots, along with substantial open space, a neighborhood swimming pool, play structure, picnic shelter and pathway connections throughout the community.

Annexation and Zone

Like Ledgestone Subdivision, we respectfully request annexation into the City of Kuna with Medium Density Residential Zoning designations, R-6 and R-8. Both zones are supported by the Kuna Comprehensive Plan that designates this property as Medium Density Residential. Kuna Zoning Code 5-5-5-B describes the R-6 zone as a district to promote the development of medium density living area, not to exceed six (6) dwelling units per net acre. The majority of Ledgestone South is developed with standard R-6 lots. Similarly, the R-8 zone promotes medium to high residential density at 8 dwelling units per acre. The R-8 zone is proposed for just those blocks that are alley loaded. The R-8 dimensional standards allow for narrower lots, since garages are located behind the homes and accessed via a public alleyway. The gross density of Ledgestone South is 4.07 dwelling units/acre.

We are requesting that the lot on Locus Grove Road, labeled as “not a part” on the preliminary plat, also be annexed and zoned R-6. This lot is the old homeplace of the original property owners, TJ and Eileen Johnson. The Johnsons did not wish to be included in the Ledgestone South subdivision; however, they wanted to keep a smaller acreage. This remaining homeplace lot does not meeting the minimum lot size for the County’s RR zone of 10 acres. We have included a copy of the Record of Survey that separates this homeplace lot from the Johnson farmland.

The legal descriptions for the 2 zoning designations are included in our application package.

Preliminary Plat

Ledgestone South is planned for 393 single family home lots and 44 common lots and is characterized by a traditional block layout and a large central open space. There are landscaped open areas in each quadrant of the community, providing passive recreation areas close to all homes. Each buildable lot meets the R-6 dimensional standards, except for the homes on 4 alley loaded blocks. Those blocks will be zoned R-8. As with our previous Ledgestone application, we request a director's allowance for a front setback of 15', instead of 20', and a lot coverage of 55%. This reduced front setback creates a nice streetscape and the lot coverage still allows 5' sideyard setbacks and a 20' rear setback. The standard 20' rear setback allows parking on the garage apron.

Open Space and Connectivity

A key feature of Ledgestone South is the large central park. As shown in the attached Landscape Plan and especially on the Landscape Plan rendering, this 3.9 acre park will include a neighborhood swimming pool that will serve both Ledgestone and Ledgestone South residents. The park will also include a play structure and a covered picnic shelter, along with a few off-street parking spaces.

The shared boundary between Ledgestone and Ledgestone South is a common lot that includes a 5'-wide pathway. This pathway is over ½ mile long and connects to other sidewalks and pathways in both Ledgestone and Ledgestone South. Pathways are considered one of the most used amenities in residential development. As noted previously, there are also landscaped open spaces close to all homes that serve as passive recreation and convenient gathering spots.

A substantial portion of Ledgestone South is open space. Over 14.6 acres of the 96.6 acre site, or 14.68%, is common/open space. The usable open space, which does not include our landscaped buffers and end caps, totals 11.18 acres or 11.6% of the site. This usable open space in Ledgestone South exceeds the 10.5% requirement in Kuna Code 5-12-12-D approved in January of this year.

We have included a Design Review application for approval of our extensive landscaping.

Streets and Utilities

A new mid-mile collector road, Ardell Road, runs east-west through the property. Construction of this collector, plus the extension of Stroebel Road to Ardell Road, will improve the traffic circulation in this area. Residents will be able to use these collectors to travel between neighborhoods instead of travelling on the arterial streets.

All local streets are public streets and constructed to ACHD and Kuna street standards: 36' back of curb to back of curb, with attached sidewalks, in a 50' right-of-way. There are two street connections to Ledgestone: at N. Moonshadow Avenue and N. Coosa Avenue, which connects to E. Rio Vallegas Street; and additional stub streets to properties to the south.

As described previously we have designed 4 blocks with attractive homes that face a public street, but with vehicle access from a 20' wide public alley in the rear of the homes.

A Traffic Impact Study has been completed and reviewed by both ACHD and ITD.

All necessary utilities will be available to the site, including pressurized irrigation that will be provided to each lot. The preliminary phasing of construction is shown on page 6 in the preliminary plat set.

Neighborhood Meeting

Our first neighborhood meeting was held on Thursday, November 14, 2019, at Kuna High School Library. The attendance sheet is attached. Neighbors who attended were concerned with maintaining property irrigation and drainage.

After our neighborhood meeting our plat was revised to include the Ardell Road extension and we held a 2nd neighborhood meeting. This meeting was held on Wednesday, February 19, 2020, also at Kuna High School. That attendance sheet is attached.

Summary

Ledgestone South will be a real asset to the City of Kuna; with multiple lot sizes, innovative alley loaded homes, a large park with swimming pool and amenities, extensive pathways and the construction of 2 collector streets.

We look forward to working with you and your staff throughout the approval process. Please contact me if you have any questions or comments.

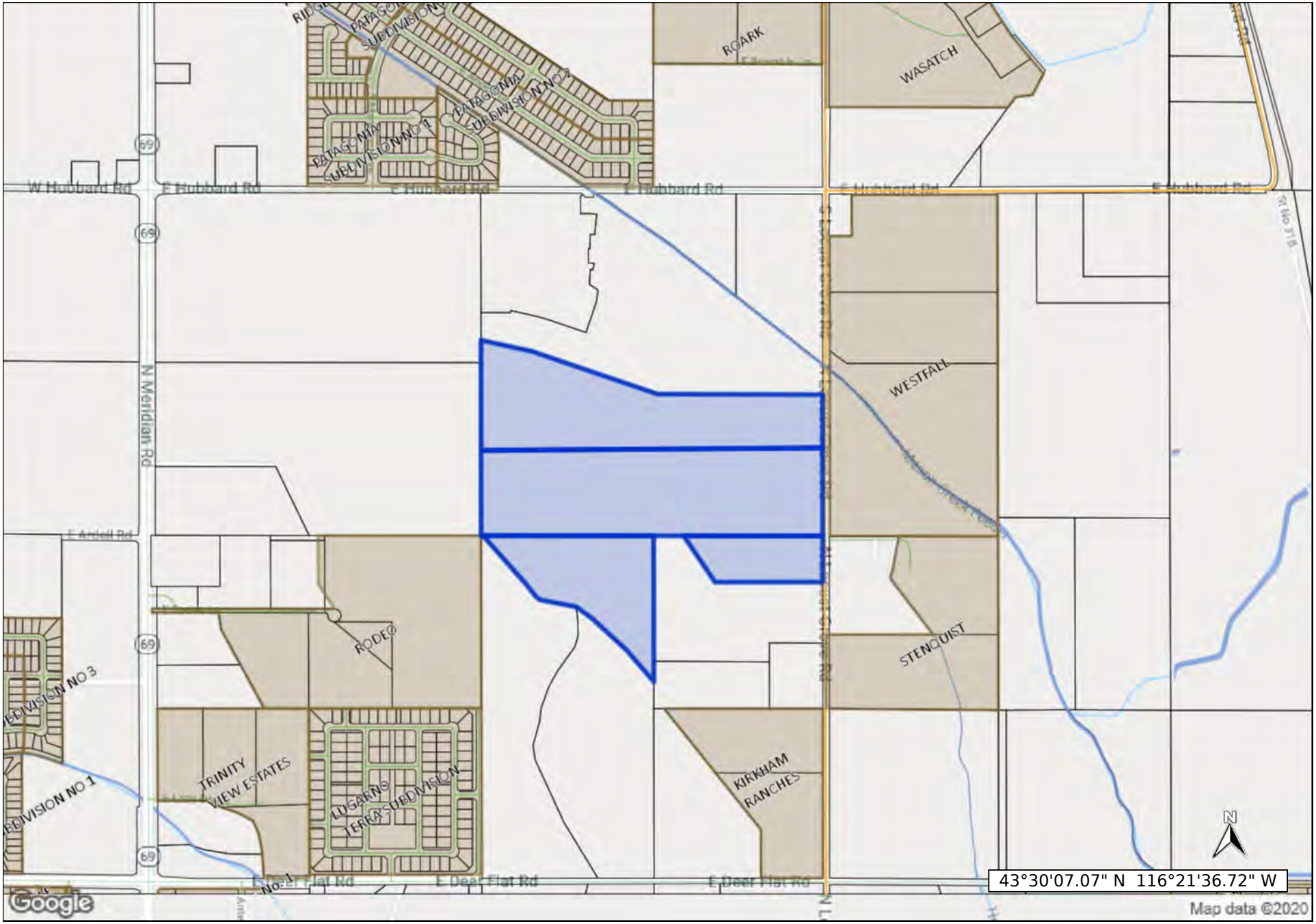
Sincerely,

Jane Suggs

Jane Suggs

Ledgestone South

Vicinity Map



Apr 28, 2020 - landproDATA.com
Scale: 1 inch approx 1000 feet

The materials available at this website are for informational purposes only and do not constitute a legal document.

Jane Suggs

From: Sub Name Mail <subnamemail@adacounty.id.gov>
Sent: Friday, January 31, 2020 1:44 PM
To: Jane Suggs
Cc: 'Gregory Carter (gcarter@idahosurvey.com)'
Subject: RE: Ledgestone South Subdivision Name Reservation

January 31, 2020

Greg Carter, Idaho Survey Group
Jane Suggs, Gem State Planning

RE: Subdivision Name Reservation: **LEDGESTONE SOUTH SUBDIVISION**

At your request, I will reserve the name **Ledgestone South Subdivision** for your project. I can honor this reservation only as long as your project is in the approval process. Final approval can only take place when the final plat is recorded.

This reservation is available for the project as long as it is in the approval process unless the project is terminated by the client, the jurisdiction or the conditions of approval have not been met, in which case the name can be re-used by someone else.

Sincerely,

Glen Smallwood
Surveying Technician
Ada County Development Services
200 W. Front St., Boise, ID 83702
(208) 287-7926 *office*
(208) 287-7909 *fax*

From: Jane Suggs <jane@gemstateplanning.com>
Sent: Thursday, January 30, 2020 4:02 PM
To: Sub Name Mail <subnamemail@adacounty.id.gov>
Cc: Danielle Couchman <danielle@trilogyidaho.com>
Subject: [EXTERNAL] New Subdivision name - Ledgestone South Subdivision

CAUTION: This email originated from outside Ada County email servers. Do not click on links or open attachments unless you recognize the sender and know the content is safe. Verify the sender by mouse-hovering over their display name in order to see the sender's full email address and confirm it is not suspicious. If you are unsure an email is safe, please report the email by using the 'Phish Alert' button in Outlook.

Hi Subnamemail,
I would like to request a new subdivision name: **Ledgestone South Subdivision.**
This subdivision is directly south of the approved and under construction Ledgestone Subdivision. See the attached map showing the parcels that make up Ledgestone South.

DESCRIPTION FOR
LEDGESTONE SOUTH SUBDIVISION

A portion of the NE1/4 and NW1/4 of the SE 1/4 of Section 18, T.2N., R.1E., B.M., Ada County, Idaho, more particularly described as follows:

BEGINNING at the C1/4 corner of said Section 18 from which the N1/4 corner of said Section 18 bears North 00°23'35" East, 2,647.91 feet;

thence along North-South centerline of said Section 18 North 00°23'35" East, 1,496.20 feet;

thence leaving said North-South centerline South 77°18'25" East, 398.64 feet;

thence South 70°52'25" East, 990.00 feet;

thence North 85°22'35" East, 1,329.94 feet to a point on the East boundary line of said Section 18;

thence along said East boundary line South 00°22'30" West, 1044.77 feet;

thence leaving said East boundary line North 83°48'49" West, 254.83 feet;

thence South 01°28'13" East, 193.82 feet to point on the East-West centerline of said Section 18;

thence along said East-West centerline South 89°31'55" East, 247.28 feet to the E1/4 of said Section 18;

thence along said East boundary line South 00°23'29" West, 352.66 feet;

thence leaving said East boundary line North 89°36'45" West, 853.65 feet;

thence North 33°44'39" West, 427.90 feet to point on the East-West centerline of said Section 18;

thence along said East-West centerline North 89°31'55" West, 232.34 feet to the C-E 1/16 corner of said Section 18;

thence along the East boundary line of the NW1/4 of the SE 1/4 of said Section 18 South 00°19'01" West, 1,115.69 feet;

thence leaving said East boundary line North 40°42'16" West, 320.50 feet;

thence North 47°01'16" West, 354.00 feet;

thence North 53°29'46" West, 154.82 feet;

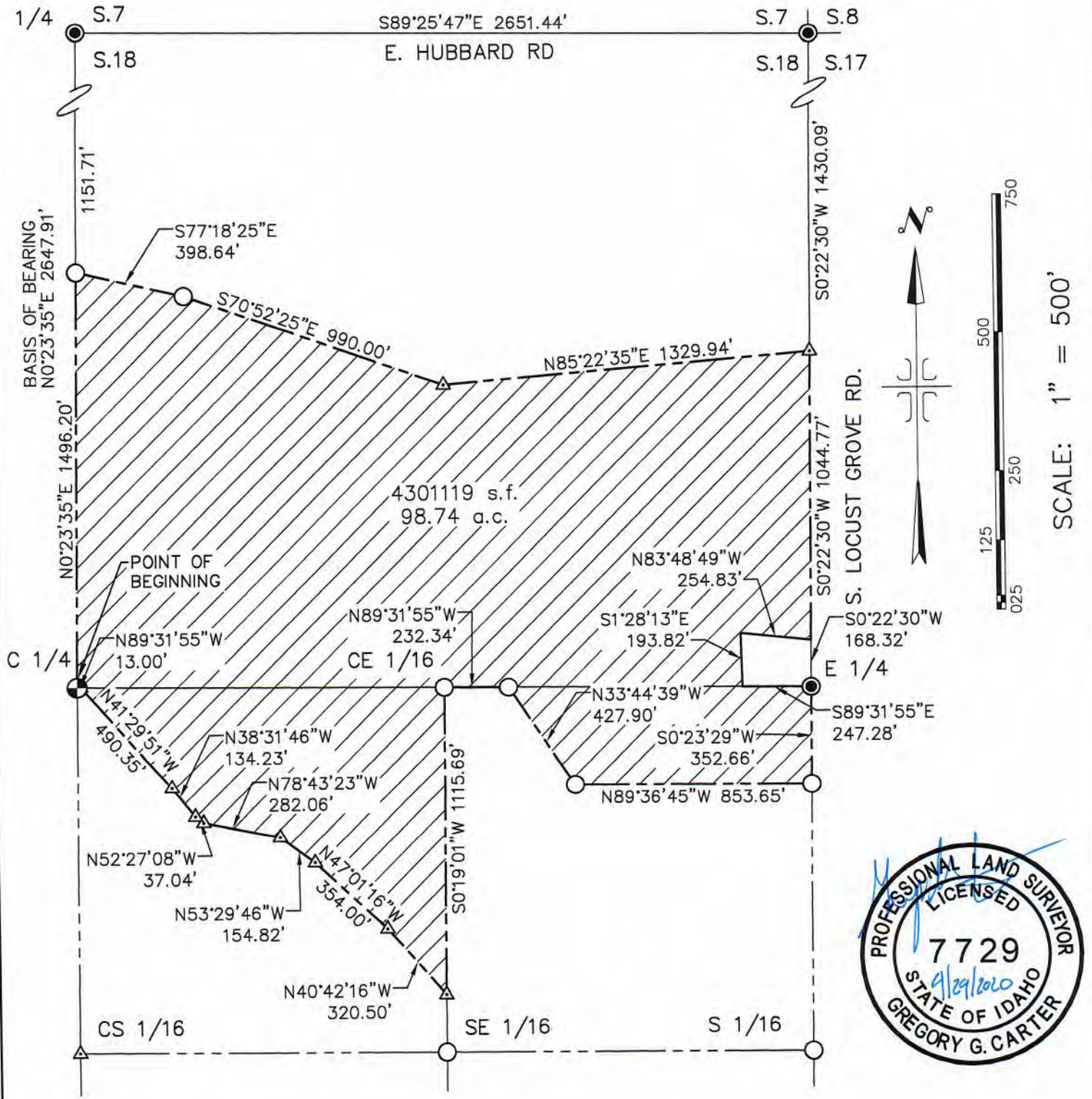
thence North 78°43'23" West, 282.06 feet;

thence North 52°27'08" West, 37.04 feet;

thence North 38°31'46" West, 134.23 feet;

thence North 41°29'51" West, 490.35 feet to a point on the North boundary line of said Northwest 1/4 of the Southeast 1/4;

thence along said North boundary line North 89°31'55" West, 13.00 feet to the **POINT OF BEGINNING**. Containing 98.74 acres, more or less.



PROFESSIONAL LAND SURVEYOR LICENSED 7729 STATE OF IDAHO GREGORY G. CARTER 9/29/2020

P:\Johnson 96 acre Topo 19-104\dwg\Ledgestone South Annexation exhibit.dwg 4/29/2020 2:18:54 PM

IDAHO SURVEY GROUP, LLC
9955 W. EMERALD ST.
BOISE, IDAHO 83704
(208) 846-8570

EXHIBIT___ DRAWING FOR
LEDGESTONE SOUTH SUBDIVISION

LOCATED IN THE NE ¼ AND THE SE ¼ OF SECTION 18, T.2N., R.1E., B.M., ADA COUNTY, IDAHO

JOB NO. 19-104
SHEET NO. 1
DWG. DATE 4/29/2020

DESCRIPTION FOR
LEDGESTONE SOUTH ANNEXATION PARCEL
R-6 ZONE

A portion of the NE1/4 and NW1/4 of the SE 1/4 of Section 18, Township 2 North, Range 1 East, Boise Meridian, Ada County, Idaho, more particularly described as follows:

BEGINNING at the C1/4 corner of said Section 18 from which the N1/4 corner of said Section 18 bears North 00°23'35" East, 2,647.91 feet;

thence along North-South centerline of said Section 18 North 00°23'35" East, 1,496.20 feet;

thence leaving said North-South centerline South 77°18'25" East, 398.64 feet;

thence South 70°52'25" East, 990.00 feet;

thence North 85°22'35" East, 1,329.94 feet to a point on the East boundary line of said Section 18;

thence along said East boundary line South 00°22'30" West, 1,213.09 feet to the E1/4 of said Section 18;

thence continuing along said East boundary line South 00°23'29" West, 352.66 feet;

thence leaving said East boundary line North 89°36'45" West, 853.65 feet;

thence North 33°44'39" West, 427.90 feet to point on the East-West centerline of said Section 18;

thence along said East-West centerline North 89°31'55" West, 232.34 feet to the C-E 1/16 corner of said Section 18;

thence along the East boundary line of the NW1/4 of the SE 1/4 of said Section 18 South 00°19'01" West, 1,115.69 feet;

thence leaving said East boundary line North 40°42'16" West, 320.50 feet;

thence North 47°01'16" West, 354.00 feet;

thence North 53°29'46" West, 154.82 feet;

thence North 78°43'23" West, 282.06 feet;

thence North 52°27'08" West, 37.04 feet;

thence North 38°31'46" West, 134.23 feet;

thence North 41°29'51" West, 490.35 feet to a point on the North boundary line of said Northwest 1/4 of the Southeast 1/4;

thence along said North boundary line North 89°31'55" West, 13.00 feet to the **POINT OF BEGINNING**. Containing 99.78 acres, more or less.

EXCEPTING THEREOF:

A portion of the NE1/4 and the NW1/4 of the SE1/4 of Section 18, Township 2 North, Range 1 East, Boise Meridian, Ada County, Idaho, more particularly described as follows:

PARCEL P1:

Commencing at the C1/4 corner of said Section 18 from which the N1/4 corner of said Section 18 bears North 00°23'35" East, 2,647.91 feet;

thence North 74°14'02" East, 772.52 feet to the **REAL POINT OF BEGINNING**;

thence North 00°23'35" East, 537.54 feet;

thence 32.70 feet along the arc of curve to the right, said curve having a radius of 100.00 feet, a central angle of 18°44'01" and a long chord which bears North 09°45'36" East, 32.55 feet;

thence North 19°07'36" East, 53.50 feet;

thence South 70°52'24" East, 210.80 feet;

thence 124.38 feet along the arc of curve to the right, said curve having a radius of 100.00 feet, a central angle of 71°15'59" and a long chord which bears South 35°14'24" East, 116.52 feet;

thence South 00°23'35" West, 457.92 feet;

thence North 89°36'25" West, 290.00 feet to the **REAL POINT OF BEGINNING**. Containing 3.81 acres, more or less.

PARCEL P2:

Commencing at the C1/4 corner of said Section 18 from which the N1/4 corner of said Section 18 bears North 00°23'35" East, 2,647.91 feet;

thence North 81°26'47" East, 1434.89 feet to the **REAL POINT OF BEGINNING**;

thence North 00°35'53" East, 654.74 feet;

thence 78.54 feet along the arc of curve to the right, said curve having a radius of 50.00 feet, a central angle of 90°00'00" and a long chord which bears North 45°35'53" East, 70.71 feet;

thence South 89°24'11" East, 240.00 feet;

thence South 00°35'53" West, 414.08 feet;

thence South 89°32'30" East, 270.00 feet;

thence South 89°31'35" East, 476.64 feet;

thence South 00°22'30" West, 189.84 feet;

thence 157.24 feet along the arc of curve to the right, said curve having a radius of 100.00 feet, a central angle of 90°05'35" and a long chord which bears South 45°25'17" West, 141.54 feet;

thence North 89°31'55" West, 937.61 feet to the **REAL POINT OF BEGINNING**. Containing 9.60 acres, more or less.

PARCEL P3:

Commencing at the C 1/4 corner of said Section 18 from which the N1/4 corner of said Section 18 bears North 00°23'35" East, 2,647.91 feet;

thence South 79°13'58" East, 916.28 feet to the **REAL POINT OF BEGINNING**;

thence South 89°36'25" East, 290.07 feet;

thence South 00°19'01" West, 216.21 feet;

thence South 00°39'57" West, 93.53 feet;

thence South 00°06'39" East, 76.32 feet;

thence 43.69 feet along the arc of a non-tangent curve to the right, said curve having a radius of 300.00 feet, a central angle of 08°20'36" and a long chord which bears South 04°29'19" West, 43.65 feet;

thence South 08°39'37" West, 51.48 feet;

thence 108.49 feet along the arc of curve to the right, said curve having a radius of 50.00 feet, a central angle of 124°19'07" and a long chord which bears South 70°49'10" West, 88.42 feet;

thence North 47°01'16" West, 325.55 feet;

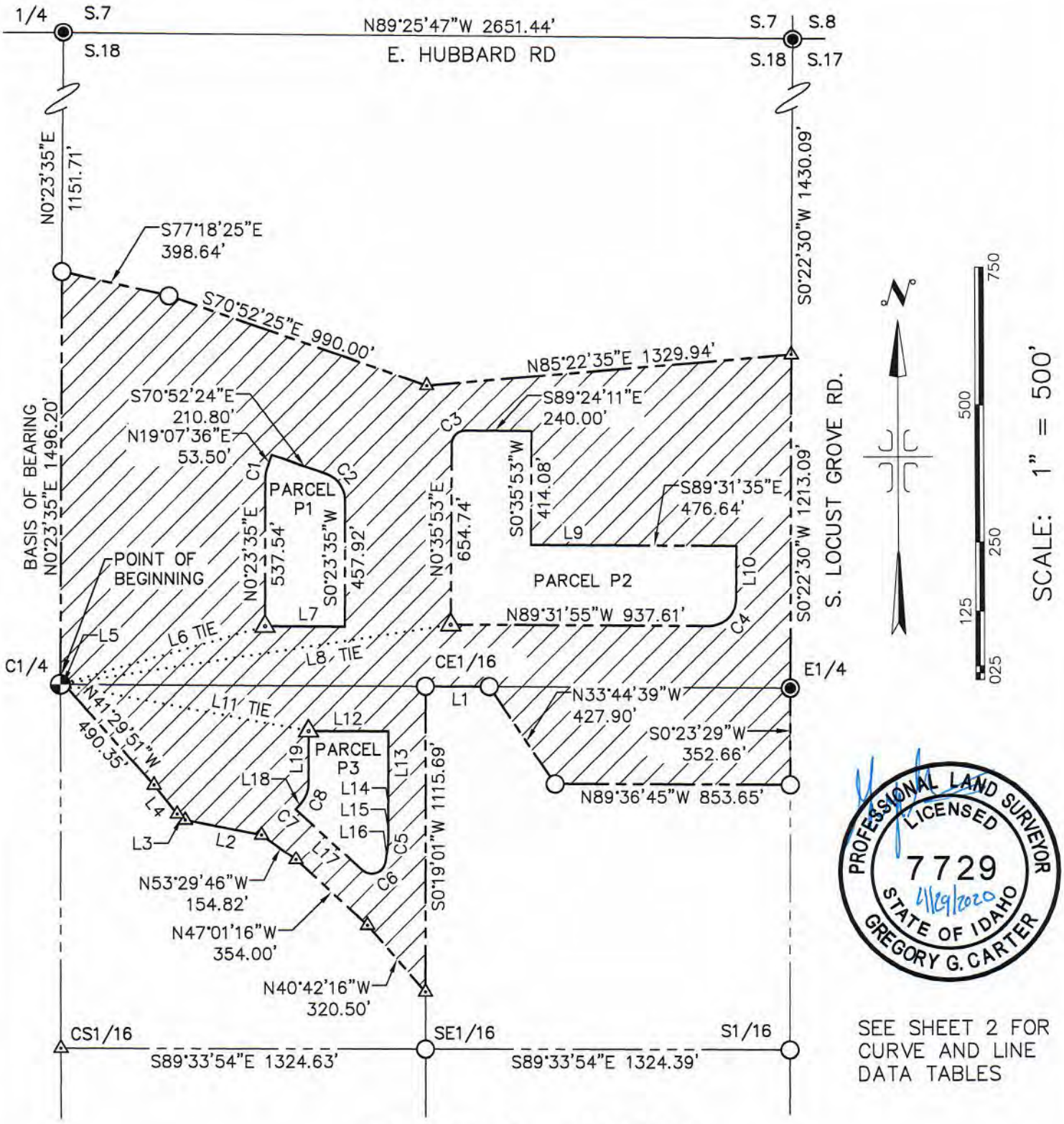
thence 5.11 feet along the arc of curve to the left, said curve having a radius of 150.00 feet, a central angle of 01°57'13" and a long chord which bears North 47°59'53" West, 5.11 feet;

thence North 41°01'31" East, 35.00 feet;

thence 70.99 feet along the arc of curve to the left, said curve having a radius of 100.00 feet, a central angle of 40°40'23" and a long chord which bears North 20°41'19" East, 69.51 feet;

thence North 00°21'08" East, 194.71 feet to the **REAL POINT OF BEGINNING**. Containing 3.04 acres, more or less.

Net Area of R-6 Annexation and Re-Zone is 83.33 acres.



PROFESSIONAL LAND SURVEYOR LICENSED 7729 4/29/2020 STATE OF IDAHO GREGORY G. CARTER

SEE SHEET 2 FOR CURVE AND LINE DATA TABLES

NET R-6 AREA = 83.33 ACRES

P:\Johnson 96 acre Topo 19-104\dwg\Ledgestone South R-6.dwg 4/29/2020 1:34:09 PM

IDAHO SURVEY GROUP, LLC
9955 W. EMERALD ST.
BOISE, IDAHO 83704
(208) 846-8570

EXHIBIT__ DRAWING FOR

ANNEXATION & R-6 RE-ZONE

LEDGESTONE SOUTH SUBDIVISION

LOCATED IN THE NE 1/4 AND THE NW 1/4 OF THE SE 1/4 OF SECTION 18 T.2N., R.1E., B.M., ADA COUNTY, IDAHO

JOB NO. 19-104
SHEET NO. 1of2
DWG. DATE 4/29/2020

DESCRIPTION FOR

LEDGESTONE SOUTH
ANNEXATION AND R-8 REZONE

A portion of the NE1/4 and the NW1/4 of the SE1/4 of Section 18, Township 2 North, Range 1 East, Boise Meridian, Ada County, Idaho, more particularly described as follows:

PARCEL P1:

Commencing at the C1/4 corner of said Section 18 from which the N1/4 corner of said Section 18 bears North 00°23'35" East, 2,647.91 feet;

thence North 74°14'02" East, 772.52 feet to the **REAL POINT OF BEGINNING**;

thence North 00°23'35" East, 537.54 feet;

thence 32.70 feet along the arc of curve to the right, said curve having a radius of 100.00 feet, a central angle of 18°44'01" and a long chord which bears North 09°45'36" East, 32.55 feet;

thence North 19°07'36" East, 53.50 feet;

thence South 70°52'24" East, 210.80 feet;

thence 124.38 feet along the arc of curve to the right, said curve having a radius of 100.00 feet, a central angle of 71°15'59" and a long chord which bears South 35°14'24" East, 116.52 feet;

thence South 00°23'35" West, 457.92 feet;

thence North 89°36'25" West, 290.00 feet to the **REAL POINT OF BEGINNING**. Containing 3.81 acres, more or less.

PARCEL P2:

Commencing at the C1/4 corner of said Section 18 from which the N1/4 corner of said Section 18 bears North 00°23'35" East, 2,647.91 feet;

thence North 81°26'47" East, 1434.89 feet to the **REAL POINT OF BEGINNING**;

thence North 00°35'53" East, 654.74 feet;

thence 78.54 feet along the arc of curve to the right, said curve having a radius of 50.00 feet, a central angle of 90°00'00" and a long chord which bears North 45°35'53" East, 70.71 feet;

thence South 89°24'11" East, 240.00 feet;

thence South 00°35'53" West, 414.08 feet;

thence South 89°32'30" East, 270.00 feet;

thence South 89°31'35" East, 476.64 feet;

thence South 00°22'30" West, 189.84 feet;

thence 157.24 feet along the arc of curve to the right, said curve having a radius of 100.00 feet, a central angle of 90°05'35" and a long chord which bears South 45°25'17" West, 141.54 feet;

thence North 89°31'55" West, 937.61 feet to the **REAL POINT OF BEGINNING**. Containing 9.60 acres, more or less.

PARCEL P3:

Commencing at the C 1/4 corner of said Section 18 from which the N1/4 corner of said Section 18 bears North 00°23'35" East, 2,647.91 feet;

thence South 79°13'58" East, 916.28 feet to the **REAL POINT OF BEGINNING**;

thence South 89°36'25" East, 290.07 feet;

thence South 00°19'01" West, 216.21 feet;

thence South 00°39'57" West, 93.53 feet;

thence South 00°06'39" East, 76.32 feet;

thence 43.69 feet along the arc of a non-tangent curve to the right, said curve having a radius of 300.00 feet, a central angle of 08°20'36" and a long chord which bears South 04°29'19" West, 43.65 feet;

thence South 08°39'37" West, 51.48 feet;

thence 108.49 feet along the arc of curve to the right, said curve having a radius of 50.00 feet, a central angle of 124°19'07" and a long chord which bears South 70°49'10" West, 88.42 feet;

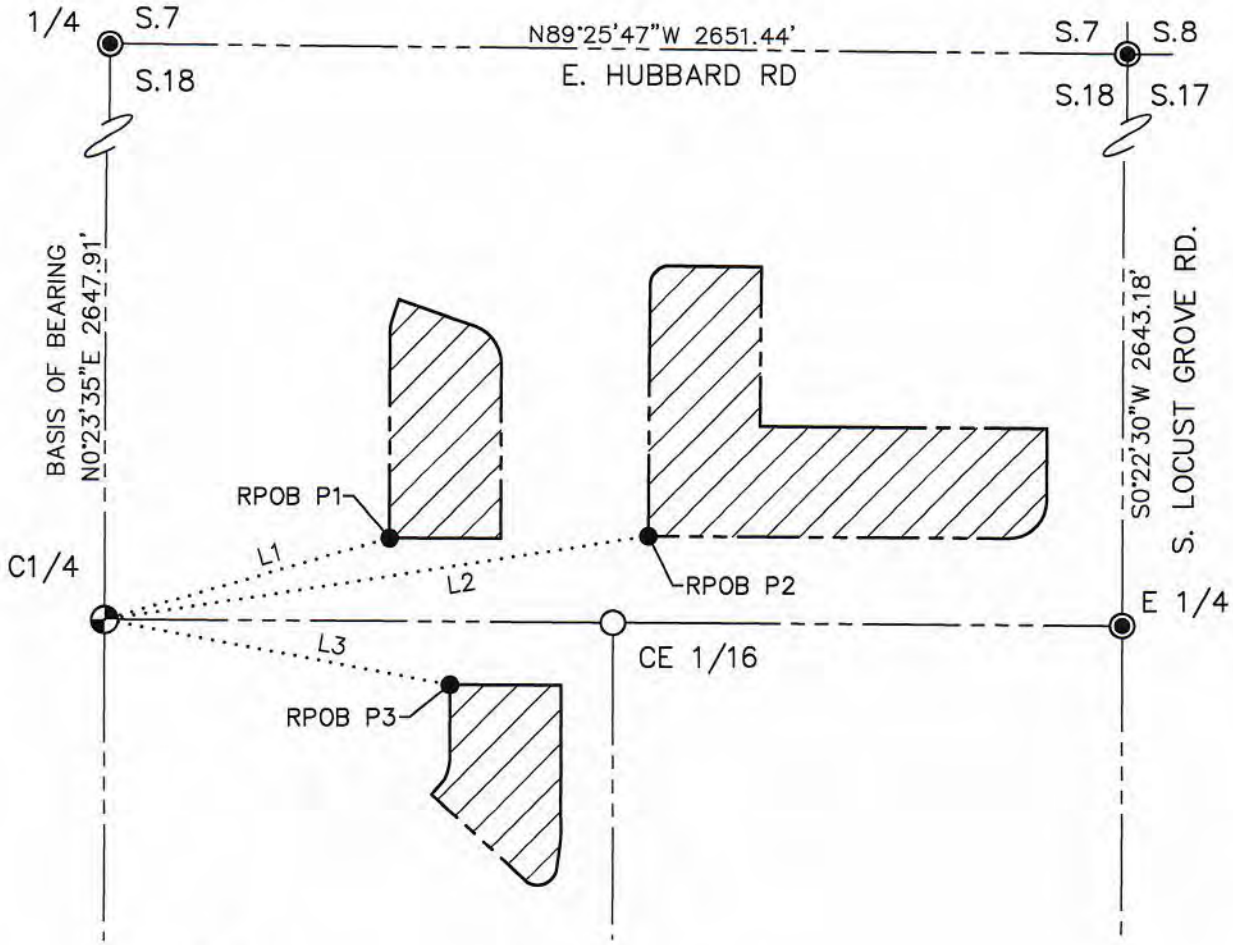
thence North 47°01'16" West, 325.55 feet;

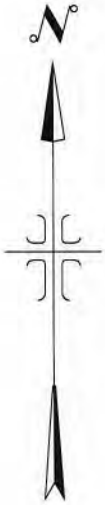
thence 5.11 feet along the arc of curve to the left, said curve having a radius of 150.00 feet, a central angle of 01°57'13" and a long chord which bears North 47°59'53" West, 5.11 feet;

thence North 41°01'31" East, 35.00 feet;

thence 70.99 feet along the arc of curve to the left, said curve having a radius of 100.00 feet, a central angle of 40°40'23" and a long chord which bears North 20°41'19" East, 69.51 feet;

thence North 00°21'08" East, 194.71 feet to the **REAL POINT OF BEGINNING**. Containing 3.04 acres, more or less.





LINE TABLE		
LINE	LENGTH	BEARING
L1	772.52	N74°14'02"E
L2	1434.89	N81°26'47"E
L3	916.28	S79°13'58"E

SCALE: 1" = 500'

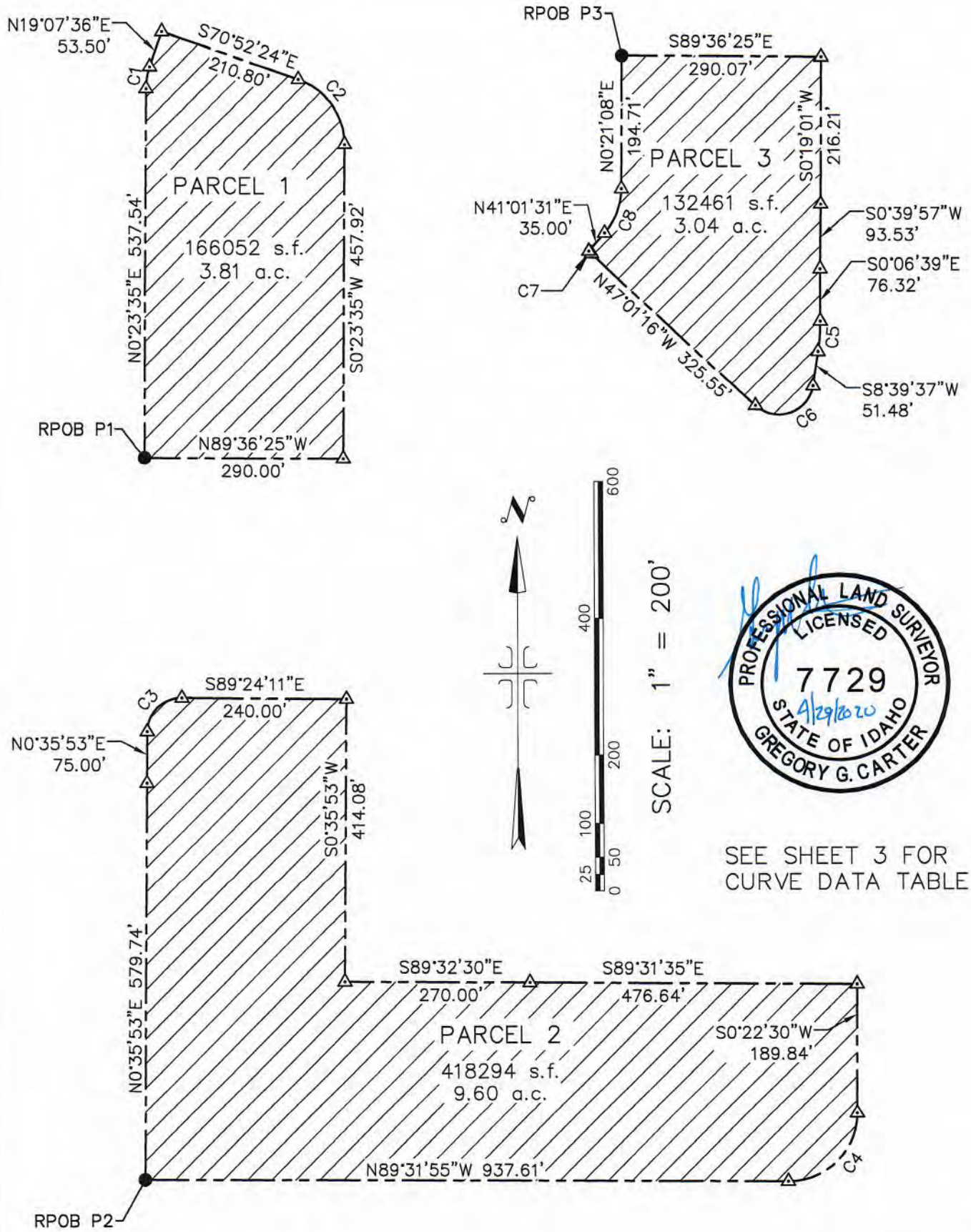
P:\Johnson 96 acre Topo 19-104\dwg\Ledgestone South R-8.dwg 4/29/2020 12:53:41 PM

IDAHO SURVEY GROUP, LLC
9955 W. EMERALD ST.
BOISE, IDAHO 83704
(208) 846-8570

EXHIBIT__ DRAWING FOR
ANNEXATION & R-8 RE-ZONE
LEDGESTONE SOUTH SUBDIVISION

LOCATED IN THE NE 1/4 AND THE NW 1/4 OF THE SE 1/4 OF SECTION 18 T.2N., R.1E., B.M., ADA COUNTY, IDAHO

JOB NO. 19-104
SHEET NO. 1of3
DWG. DATE 4/29/2020



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IDAHO SURVEY GROUP, LLC
9955 W. EMERALD ST.
BOISE, IDAHO 83704
(208) 846-8570

EXHIBIT___ DRAWING FOR
ANNEXATION & R-8 RE-ZONE
LEDGESTONE SOUTH SUBDIVISION

LOCATED IN THE NE 1/4 AND THE NW 1/4 OF THE SE 1/4 OF SECTION 18
T.2N., R.1E., B.M., ADA COUNTY, IDAHO

JOB NO. 19-104
SHEET NO. 2of3
DWG. DATE 4/29/2020

PRELIMINARY PLAT
LEDGESTONE SOUTH SUBDIVISION

A PORTION OF THE NE 1/4 AND THE SE 1/4 OF SECTION 18
TOWNSHIP 2 NORTH RANGE 1 EAST
B.M., KUNA, ADA COUNTY, IDAHO
2020

PLAN SHEET INDEX

SHEET	DESCRIPTION
PP-1	COVER SHEET, VICINITY MAP, NOTES & COMMON LOT TABLE
PP-2	SUBDIVISION LAYOUT, & DIMENSIONS
PP-3	CONCEPTUAL ENGINEERING PLAN & CURVE TABLE
PP-4	CONCEPTUAL SEWER PROFILES
PP-5	CONCEPTUAL SEWER PROFILES & LOT TABLE

DEVELOPMENT FEATURES

ACREAGE

ZONING

SEWAGE DISPOSAL

WATER SUPPLY

CITY

SCHOOL DISTRICT

FIRE DISTRICT

IRRIGATION DISTRICT

OWNERS

DEVELOPER

ENGINEER

PLANNER/CONTACT

NOTES:

1. ALL LOT LINES COMMON TO A PUBLIC RIGHT OF WAY HAVE A 10' UTILITY EASEMENT.
2. A 10' UTILITY EASEMENT IS LOCATED ADJACENT TO THE EXTERIOR BOUNDARY.
3. ALL SIDE YARD LOT LINES HAVE A 5' DRAINAGE & IRRIGATION EASEMENT ON EACH SIDE OF THE LOT LINE UNLESS OTHERWISE SHOWN.
4. MUNICIPAL SEWER AND WATER SERVICES SHALL BE PROVIDED TO EACH LOT.
5. DRAINAGE FOR THE PUBLIC STREETS WILL BE COLLECTED IN STORM DRAIN CATCH BASINS AND ROUTED THROUGH SAND AND GREASE TRAPS TO SEEPAGE BEDS OR STORM DRAINAGE PONDS.
6. ALL LOTS WITHIN THIS SUBDIVISION ARE SINGLE FAMILY RESIDENTIAL LOTS, WITH THE EXCEPTION OF COMMON LOTS AS SHOWN WHICH ARE COMMON AREA LOTS ALL OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION. ALL SAID COMMON LOTS SHALL HAVE A BLANKET UTILITY AND DRAINAGE EASEMENT.
7. THIS SUBDIVISION IS SUBJECT TO COMPLIANCE WITH IDAHO CODE SECTION 31-3805(1)(b) CONCERNING IRRIGATION WATER. PRESSURE IRRIGATION WILL BE SUPPLIED TO ALL LOTS IN THIS SUBDIVISION FROM CITY OF KUNA MUNICIPAL IRRIGATION SYSTEM. EXISTING SHARES AND WATER RIGHTS SHALL BE TRANSFERRED TO THE CITY OF KUNA.
8. ALL EXISTING BUILDINGS ON SITE TO BE REMOVED.
9. THE SUBJECT PROPERTY DOES NOT FALL WITHIN A FEMA FLOOD HAZARD ZONE. REFERENCE FIRM PANEL [illegible] EFFECTIVE OCTOBER 2nd, 2003.

LEGEND

LOT NUMBER
LOT AREA
BLOCK NUMBER
FIRE HYDRANT
CATCH BASIN
STREET NAME

SURVEY LEGEND

SCALE IN FEET
1"=100'

Common Lot Table

Lot	Area	Perimeter	Type
BLOCK 1 Lot 1 OPEN	[illegible]	[illegible]	BUFFER
BLOCK 1 Lot 19 OPEN	[illegible]	[illegible]	PATHWAY
BLOCK 2 Lot 1 OPEN	[illegible]	[illegible]	PATHWAY
BLOCK 2 Lot 13 OPEN	[illegible]	[illegible]	PARK/OPEN
BLOCK 3 Lot 1 OPEN	[illegible]	[illegible]	PATHWAY PARTIAL
BLOCK 3 Lot 21 OPEN	[illegible]	[illegible]	PARK OPEN
BLOCK 3 Lot 27 OPEN	[illegible]	[illegible]	PARK/ OPEN
BLOCK 4 Lot 11 OPEN	[illegible]	[illegible]	PARK/OPEN
BLOCK 7 Lot 1 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 7 Lot 8 OPEN	[illegible]	[illegible]	PATHWAY
BLOCK 7 Lot 13 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 8 Lot 1 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 8 Lot 7 OPEN	[illegible]	[illegible]	PATHWAY
BLOCK 8 Lot 14 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 9 Lot 9 OPEN	[illegible]	[illegible]	PARK/OPEN

Common Lot Table

Lot	Area	Perimeter	Type
BLOCK 10 Lot 1 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 10 Lot 11 OPEN	[illegible]	[illegible]	PATHWAY
BLOCK 10 Lot 18 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 11 Lot 1 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 11 Lot 11 OPEN	[illegible]	[illegible]	PATHWAY
BLOCK 11 Lot 18 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 13 Lot 10 OPEN	[illegible]	[illegible]	PARK/ OPEN
BLOCK 14 Lot 1 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 14 Lot 10 OPEN	[illegible]	[illegible]	PATHWAY
BLOCK 14 Lot 18 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 15 Lot 1 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 15 Lot 10 OPEN	[illegible]	[illegible]	PATHWAY
BLOCK 15 Lot 18 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 16 Lot 1 OPEN	[illegible]	[illegible]	BUFFER
BLOCK 17 Lot 1 OPEN	[illegible]	[illegible]	BUFFER

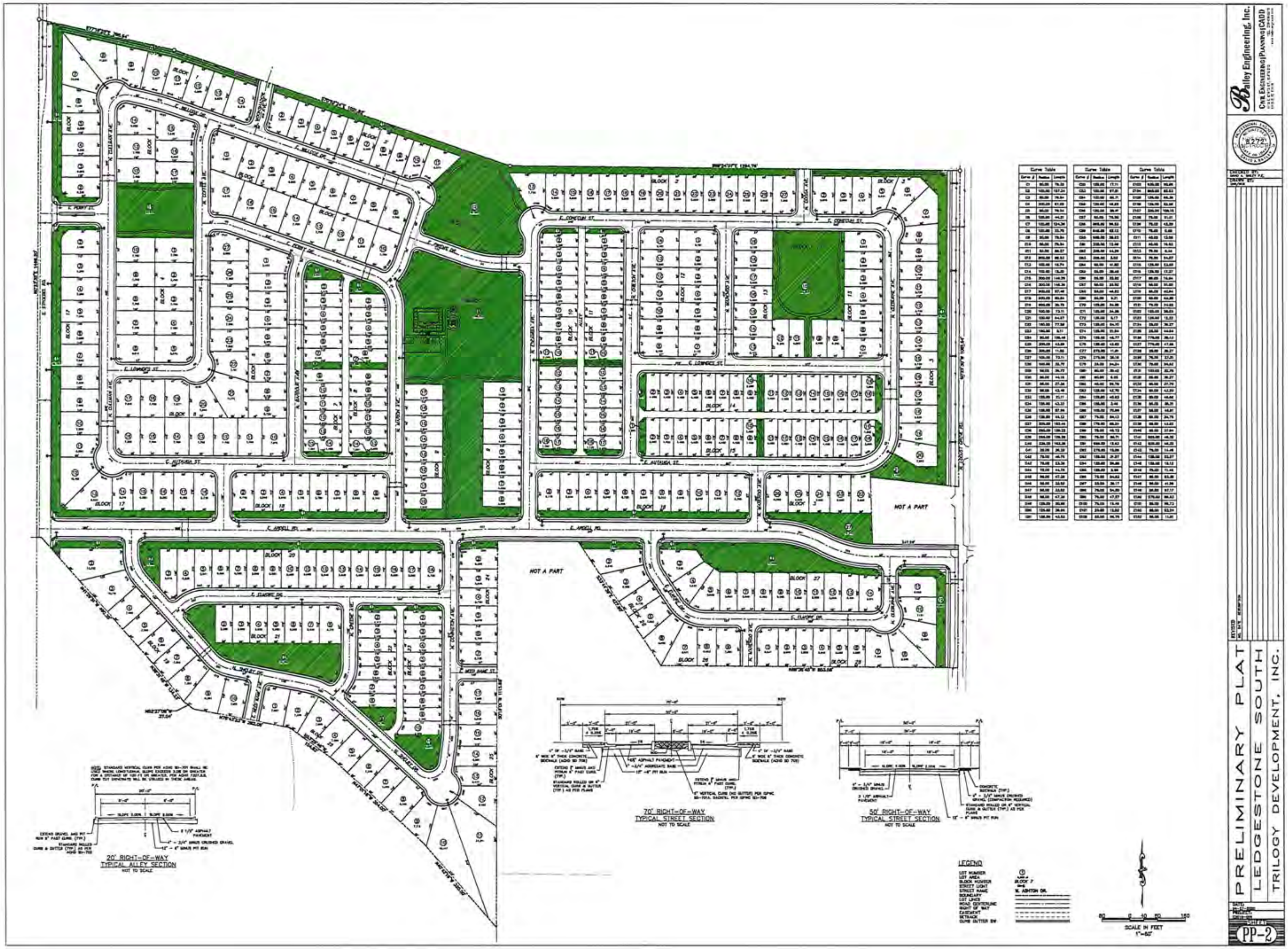
Common Lot Table

Lot	Area	Perimeter	Type
BLOCK 18 Lot 1 OPEN	[illegible]	[illegible]	BUFFER
BLOCK 19 Lot 1 OPEN	[illegible]	[illegible]	BUFFER
BLOCK 20 Lot 1 OPEN	[illegible]	[illegible]	BUFFER
BLOCK 20 Lot 8 OPEN	[illegible]	[illegible]	PARK/OPEN
BLOCK 21 Lot 1 OPEN	[illegible]	[illegible]	PARK/OPEN
BLOCK 22 Lot 1 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 22 Lot 8 OPEN	[illegible]	[illegible]	PARK/ OPEN
BLOCK 23 Lot 1 OPEN	[illegible]	[illegible]	ENDCAP
BLOCK 23 Lot 11 OPEN	[illegible]	[illegible]	PARK/ OPEN
BLOCK 24 Lot 1 OPEN	[illegible]	[illegible]	BUFFER
BLOCK 26 Lot 1 OPEN	[illegible]	[illegible]	BUFFER
BLOCK 27 Lot 1 OPEN	[illegible]	[illegible]	BUFFER
BLOCK 27 Lot 8 OPEN	[illegible]	[illegible]	PARK/OPEN
BLOCK 28 Lot 12 OPEN	[illegible]	[illegible]	BUFFER

Bailey Engineering, Inc.

PRELIMINARY PLAT
LEDGESTONE SOUTH
TRILOGY DEVELOPMENT, INC.

PP-1


NOT A PART
NOT A PART
NOT A PART
Curve Table
Curve Table
Curve Table
70' RIGHT-OF-WAY
TYPICAL STREET SECTION
50' RIGHT-OF-WAY
TYPICAL STREET SECTION
20' RIGHT-OF-WAY
TYPICAL ALLEY SECTION
LEGEND
SCALE IN FEET
Bailey Engineering, Inc.
PRELIMINARY PLAT
LEDGESTONE SOUTH
TRILOGY DEVELOPMENT, INC.
PP-2

PRELIMINARY PLAT
LEDGESTONE SOUTH SUBDIVISION

A PORTION OF THE NE 1/4 AND THE SE 1/4 OF SECTION 18
TOWNSHIP 2 NORTH RANGE 1 EAST
B.M., KUNA, ADA COUNTY, IDAHO
2020

VICINITY MAP
1"=500'

DEVELOPMENT FEATURES

ACREAGE
[illegible]

ZONING
[illegible]

SEWAGE DISPOSAL
[illegible]

WATER SUPPLY
[illegible]

CITY
[illegible]

SCHOOL DISTRICT
[illegible]

FIRE DISTRICT
[illegible]

IRRIGATION DISTRICT
[illegible]

OWNERS
[illegible]

DEVELOPER
[illegible]

ENGINEER
DAVID A. BAILEY, P.E.
BAILEY ENGINEERING, INC.
[illegible]

PLANNER/CONTACT
[illegible]

NOTES:
1. ALL LOT LINES COMMON TO A PUBLIC RIGHT OF WAY HAVE A 10' UTILITY EASEMENT.
2. A 10' UTILITY EASEMENT IS LOCATED ADJACENT TO THE EXTERIOR BOUNDARY.
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8. ALL EXISTING BUILDINGS ON SITE TO BE REMOVED.
9. THE SUBJECT PROPERTY DOES NOT FALL WITHIN A FEMA FLOOD HAZARD ZONE. REFERENCE FIRM PANEL 16001C0280J EFFECTIVE OCTOBER 2nd, 2013.

Common Lot Table

Lot	Area	Perimeter	Type
BLOCK 1 Lot 1 OPEN	14112	1268	BUFFER
BLOCK 1 Lot 18 OPEN	11772	1272	PATHWAY
BLOCK 2 Lot 1 OPEN	20798	2115	PATHWAY
BLOCK 2 Lot 15 OPEN	84583	868	PARK/OPEN
BLOCK 3 Lot 1 OPEN	31057	2548	PATHWAY PARTIAL
BLOCK 3 Lot 12 OPEN	9428	482	PARK OPEN
BLOCK 3 Lot 27 OPEN	15340	752	PARK/ OPEN
BLOCK 4 Lot 11 OPEN	24631	788	PARK/OPEN
BLOCK 7 Lot 1 OPEN	2834	279	ENDCAP
BLOCK 7 Lot 4 OPEN	[illegible]	385	PATHWAY
BLOCK 7 Lot 18 OPEN	1291	221	ENDCAP
BLOCK 8 Lot 1 OPEN	3888	248	ENDCAP
BLOCK 8 Lot 7 OPEN	2200	280	PATHWAY
BLOCK 8 Lot 14 OPEN	1291	221	ENDCAP
BLOCK 9 Lot 9 OPEN	166532	2570	PARK/OPEN

Common Lot Table

Lot	Area	Perimeter	Type
BLOCK 10 Lot 1 OPEN	1322	224	ENDCAP
BLOCK 10 Lot 11 OPEN	2284	280	PATHWAY
BLOCK 10 Lot 18 OPEN	1782	240	ENDCAP
BLOCK 11 Lot 1 OPEN	1961	231	ENDCAP
BLOCK 11 Lot 11 OPEN	2220	280	PATHWAY
BLOCK 11 Lot 19 OPEN	1728	239	ENDCAP
BLOCK 12 Lot 10 OPEN	84207	1137	PARK/ OPEN
BLOCK 14 Lot 1 OPEN	1983	242	ENDCAP
BLOCK 14 Lot 10 OPEN	2320	280	PATHWAY
BLOCK 14 Lot 19 OPEN	1882	242	ENDCAP
BLOCK 15 Lot 1 OPEN	1881	242	ENDCAP
BLOCK 15 Lot 10 OPEN	2320	280	PATHWAY
BLOCK 15 Lot 19 OPEN	1322	188	ENDCAP
BLOCK 16 Lot 1 OPEN	11671	1029	BUFFER
BLOCK 17 Lot 1 OPEN	36760	2779	BUFFER

Common Lot Table

Lot	Area	Perimeter	Type
BLOCK 18 Lot 1 OPEN	8873	913	BUFFER
BLOCK 19 Lot 1 OPEN	4248	477	BUFFER
BLOCK 20 Lot 1 OPEN	17738	1740	BUFFER
BLOCK 20 Lot 8 OPEN	4288	297	PARK/OPEN
BLOCK 21 Lot 1 OPEN	23240	1173	PARK/OPEN
BLOCK 22 Lot 1 OPEN	1263	231	ENDCAP
BLOCK 22 Lot 9 OPEN	4791	308	PARK/ OPEN
BLOCK 23 Lot 1 OPEN	1391	231	ENDCAP
BLOCK 23 Lot 11 OPEN	8047	287	PARK/ OPEN
BLOCK 24 Lot 1 OPEN	2142	233	BUFFER
BLOCK 26 Lot 1 OPEN	2400	281	BUFFER
BLOCK 27 Lot 1 OPEN	7854	638	BUFFER
BLOCK 27 Lot 8 OPEN	21046	1163	PARK/OPEN
BLOCK 28 Lot 12 OPEN	8863	409	BUFFER

LEGEND

LOT NUMBER
LOT AREA
BLOCK NUMBER
FIRE HYDRANT
CATCH BASIN
STREET NAME
BOUNDARY
LOT LINES
ROAD CENTERLINE
RIGHT OF WAY
EASEMENT
CURB GUTTER SW
SEWER LINE
WATER LINE
STORM DRAIN LINE
PRESSURE IRRIGATION
GRAVITY IRRIGATION

SURVEY LEGEND

FOUND 5/8" IRON PIN
FOUND BRASS CAP MONUMENT
FOUND ALUMINUM CAP MONUMENT
BENCHMARK
CALCULATED POINT

SCALE IN FEET
1"=100'

Bailey Engineering, Inc.
CIVIL ENGINEERING | PLANNING | CADD

PRELIMINARY PLAT
LEDGESTONE SOUTH
TRILOGY DEVELOPMENT, INC.

PHASE

Traffic Impact Study
Ledgestone South Subdivision

Addendum #1
April 2020

Prepared For:

Trilogy Development, Inc.
9839 W. Cable Car Street
Ste. 101
Boise, ID 83709

Prepared By:

WHPacific, an NV5 Company
690 S Industry Way
Ste. 10
Meridian, ID 83642

TRILOGY DEVELOPMENT

WHPacific
AN NV5 COMPANY

1.0 ADDENDUM 1

This Addendum #1 addresses comments received by ACHD dated March 3, 2020 on the Ledgestone South Subdivision Traffic Impact Study. Original comments and subsequent responses are provided as follows:

1.1 COMMENT #1

ACHD staff does not agree with the background growth rate used to complete the study. This was consistent with Patagonia Subdivision and assumed 10% growth on ACHD facilities and 4% growth on SH-69. ACHD has asked for a revision using ACHD approved growth rates which are identified as follows:

- *Hubbard Rd: 63.5%*
- *Deer Flat Rd: 18.5%*
- *Columbia Rd: 13%*
- *Lake Hazel Rd: 9%*
- *Locust Grove Rd: 19%*
- *SH-69: 4%*

These individual rates will lead to volume balancing discrepancies between intersections which ACHD indicated could be ignored These new growth rates will affect 2025 background and 2025 site plus background volumes. ITD further requested that site generate traffic from Ledgestone and Patagonia Subdivisions be included in the 2025 background traffic volumes at SH-69 and Hubbard Road. Revised roadway and intersection LOS results are provided in the following tables. 2025 background and 2025 site plus background figures are also included herein.

Table 6R – Roadway Segment LOS – 2025 Background Traffic (replaces original Table 6)

Roadway Segment	Functional Class	No. of Thru Lanes	Left-Turn Treatment	Threshold Volume		AM Peak Hour Major Direction		PM Peak Hour Major Direction	
				LOS D	LOS E	Vol (vph)	LOS	Vol (vph)	LOS
Hubbard Rd, SH69 to Locust Grove Rd	Minor Arterial	1	No LT Lane	540	575	1091/75 583*	> E	468/116 301*	< D
Hubbard Rd, SH69 to Locust Grove Rd	***Minor Arterial***	***1***	***Continuous LT Lane***	***675***	***720***	***1091/75 583****	***< D***	***468/106 287****	***< D***
Hubbard Rd, Locust Grove to Eagle	Minor Arterial	1	No LT Lane	540	575	536	< D	593	> E

Hubbard Rd, Locust Grove to Eagle	***Minor Arterial***	***1***	***Continuous LT Lane***	***675***	***720***	***536***	***< D***	***593***	***< D***
Locust Grove Rd, Deer Flat to Hubbard	Minor Arterial	1	No LT Lane	540	575	132	< D	343	< D
Locust Grove Rd, Hubbard to Columbia	Minor Arterial	1	No LT Lane	540	575	177	< D	242	< D
Locust Grove Rd, Columbia to Lake Hazel	Minor Arterial	1	No LT Lane	540	575	394	< D	482	< D
Locust Grove Rd, Lake Hazel to Amity	Minor Arterial	1	No LT Lane	540	575	469	< D	863	> E
Locust Grove Rd, Lake Hazel to Amity	***Minor Arterial***	***2***	***Continuous LT Lane***	***1395***	***1540***	***469***	***<D***	***863***	***<D***

*Large volume discrepancy between intersections due to inconsistent growth rates. Average value used.

Per ACHD Policy, the target LOS threshold for roadway segments is LOS E for Principal and Minor Arterial. Three of the six roadway segments do not meet this desired operational threshold under 2025 background conditions. These locations include Hubbard Road, SH69 to Locust Grove Road; Hubbard Road, Locust Grove to Eagle Road; and Locust Grove Road, Lake Hazel to Amity. Incorporating an unrestricted median/continuous left-turn lane will mitigate these conditions. Additional lane capacity is also needed on Locust Grove, Lake Hazel Road to Amity Road. These modifications will be assumed under subsequent roadway segment analyses.

Table 7R – Intersection Traffic Operations – 2025 Background Traffic (replaces original Table 7)

Intersection	Traffic Control Lane Group	AM LOS/Delay/v/c	PM LOS/Delay/v/c
Hubbard Rd/ SH69	Traffic Signal	C/25.5	C/33.3
	Eastbound	C/29.1/0.59	D/35.5/0.22
	Westbound	C/30.0/0.37	D/41.6/0.22
	Northbound	C/29.1/0.89	C/26.9/0.44
	Southbound	B/14.9/0.38	C/35.1/0.91
Deer Flat/ Locust Grove	TWSC	NR	NR
	Eastbound	A/7.8/0.07	A/9.4/0.09
	Westbound	A/8.5/0.00	A/7.5/0.00
	Northbound	C/23.8/0.27	C/22.7/0.13
	Southbound	C/16.8/0.21	E/145.4/1.18
Deer Flat/ Locust Grove	***Traffic Signal***	***B/14.0***	***C/27.3***

Intersection	Traffic Control Lane Group	AM LOS/Delay/v/c	PM LOS/Delay/v/c
	Eastbound	***A/4.2/0.23***	***C/20.5/0.45***
	Westbound	***A/9.3/0.18***	***C/21.8/0.69***
	Northbound	***D/39.1/0.66***	***D/40.0/0.11***
	Southbound	***D/41.7/0.79***	***D/43.8/0.92***
Hubbard/ Locust Grove	TWSC	NR	NR
	Eastbound	B/10.2/0.41	A/8.2/0.06
	Westbound	A/9.1/0.00	A/9.2/0.24
	Northbound	Out of range	Out of range
	Southbound	Out of range	F/974.4/2.94
Hubbard/Locust Grove	***Traffic Signal***	***B/11.1***	***C/23.0***
	Eastbound	***A/5.3/0.36***	***B/14.0/0.71***
	Westbound	***A/6.9/0.26***	***B/19.8/0.73***
	Northbound	***D/37.7/0.78***	***D/35.5/0.16***
	Southbound	***C/25.6/0.16***	***D/52.5/0.89***
Columbia Rd/ Locust Grove	AWSC	F/66.2	F/124.5
	Eastbound	F/110.9/NR	C/20.7/NR
	Westbound	B/13.7/NR	F/223.7/NR
	Northbound	B/13.8/NR	B/12.9/NR
	Southbound	B/13.5/NR	F/54.7/NR
Columbia Rd/Locust Grove	***Traffic Signal***	***B/19.2***	***C/26.8***
	Eastbound	***B/13.5/0.70***	***C/22.0/0.73***
	Westbound	***B/11.9/0.24***	***B/16.9/0.70***
	Northbound	***D/36.1/0.82***	***C/32.6/0.13***
	Southbound	***C/31.8/0.54***	***D/42.7/0.94***
Lake Hazel/ Locust Grove	AWSC	F/141.2	F/386.3
	Eastbound	F/242.7/NR	F/79.8/NR
	Westbound	F/120.4/NR	F/370.7/NR
	Northbound	F/95.1/NR	E/38.9/NR
	Southbound	E/39.2/NR	F/638.3/NR
Lake Hazel/ Locust Grove	***Traffic Signal***	***D/36.3***	***C/32.6***
	Eastbound	***D/49.0/0.94***	***C/31.3/0.61***
	Westbound	***B/16.9/0.40***	***C/32.0/0.92***
	Northbound	***C/30.7/0.90***	***C/32.7/0.55***
	Southbound	***C/34.5/0.79***	***C/33.8/0.93***

For the 2025 background conditions, all intersections except Hubbard Road and SH69, fail to meet ACHD operational thresholds under existing traffic control. Where the projected overall LOS is D or worse, a signal warrant analysis was completed. This analysis indicates that one or more signal warrants would be met at each of these intersection locations. As a result, a traffic signal analysis was further performed at these locations and resulted in acceptable LOS conditions. A roundabout is assumed to be an acceptable improvement alternative in these cases. It should be further noted that

an interim AWSC condition at Deer Flat Road and Locust Grove Road, and Hubbard Road and Locust Grove Road does not achieve acceptable traffic conditions.

Table 9R - Roadway Segment LOS – 2025 Site Plus Background Traffic (replaces original Table 9)

Roadway Segment	Functional Class	No. of Thru Lanes	Left-Turn Treatment	Threshold Volume		AM Peak Hour Major Direction		PM Peak Hour Major Direction	
				LOS D	LOS E	Vol (vph)	LOS	Vol (vph)	LOS
Hubbard Rd, SH69 to Locust Grove Rd	Minor Arterial	1	Continuous LT Lane	675	720	1123/113 618*	< D	575/222 398*	< D
Hubbard Rd, Locust Grove to Eagle	Minor Arterial	1	Continuous LT Lane	675	720	572	< D	634	< D
Locust Grove Rd, Deer Flat to Hubbard	Minor Arterial	1	No LT Lane	540	575	240	< D	351	< D
Locust Grove Rd, Hubbard to Columbia	Minor Arterial	1	No LT Lane	540	575	273	< D	349	< D
Locust Grove Rd, Columbia to Lake Hazel	Minor Arterial	1	No LT Lane	540	575	490	< D	589	> E
Locust Grove Rd, Columbia to Lake Hazel	***Minor Arterial***	***1***	***Continuous LT Lane***	***675***	***720***	***490***	***< D***	***589***	***< D***
Locust Grove Rd, Lake Hazel to Amity	Minor Arterial	1	Continuous LT Lane	675	720	565	< D	970	>E
Locust Grove Rd, Lake Hazel to Amity	***Minor Arterial***	***2***	***Continuous LT Lane***	***1395***	***1540***	***565***	***<D***	***970***	***<D***

*Large volume discrepancy between intersections due to inconsistent growth rates. Average value used.

Two of six roadway segments do not meet desired operational thresholds under 2025 site plus background conditions. These locations include Locust Grove Road, Columbia Road to Lake Hazel Road; and Locust Grove Road, Lake Hazel Road to Amity Road. Incorporating an unrestricted median/continuous left-turn lane will mitigate conditions at Locust Grove Road, Columbia Road to Lake Hazel Road while additional lane capacity will be needed on Locust Grove Road, Lake Hazel Road to Amity Road.

Table 10R – Intersection Traffic Operations – 2025 Site Plus Background Traffic (replaces original Table 10)

Intersection	Traffic Control Lane Group	AM LOS/Delay/v/c	PM LOS/Delay/v/c
Hubbard Rd/ SH69	Traffic Signal	D/38.8	C/33.7
	Eastbound	C/30.9/0.49	D/37.1/0.32
	Westbound	D/43.1/0.39	D/46.6/0.39
	Northbound	D/43.8/0.92	C/25.9/0.43
	Southbound	C/30.7/0.51	D/35.2/0.91
Deer Flat/ Locust Grove	TWSC	NR	NR
	Eastbound	A/7.8/0.07	A/9.3/0.09
	Westbound	A/8.4/0.00	A/7.5/0.00
	Northbound	C/23.8/0.28	C/24.0/0.19
	Southbound	C/18.1/0.26	F/140.9/1.17
Deer Flat/ Locust Grove	***Traffic Signal***	***B/16.4***	***C/29.0***
	Eastbound	***A/6.9/0.24***	***B/18.3/0.44***
	Westbound	***A/9.0/0.17***	***C/21.7/0.66***
	Northbound	***D/42.2/0.60***	***D/45.9/0.15***
	Southbound	***D/44.8/0.78***	***D/51.6/0.93***
Hubbard/ Locust Grove	TWSC	NR	NR
	Eastbound	B/10.2/0.41	A/8.3/0.07
	Westbound	A/9.2/0.01	A/9.5/0.27
	Northbound	OUT OF RANGE	OUT OF RANGE
	Southbound	OUT OF RANGE	OUT OF RANGE
Hubbard/Locust Grove	***Traffic Signal***	***C/25.7***	***C/32.1***
	Eastbound	***C/21.0/0.52***	***C/25.9/0.78***
	Westbound	***C/24.3/0.32***	***C/27.1/0.88***
	Northbound	***D/39.1/0.87***	***D/36.2/0.30***
	Southbound	***C/24.8/0.20***	***D/52.8/0.93***
Columbia/ Locust Grove	AWSC	F/89.5	F/166.8
	Eastbound	F/163.9/NR	C/23.9/NR
	Westbound	C/15.9/NR	F/261.5/NR
	Northbound	C/19.1/NR	C/15.8/NR
	Southbound	C/16.0/NR	F/153.4/NR
Columbia/Locust Grove	***Traffic Signal***	***C/24.7***	***D/36.4***
	Eastbound	***C/22.2/0.71***	***D/40.8/0.90***
	Westbound	***A/6.7/0.25***	***C/25.6/0.85***
	Northbound	***D/37.5/0.86***	***C/28.5/0.21***
	Southbound	***C/32.0/0.49***	***D/42.9/0.95***
Lake Hazel/ Locust Grove	Traffic Signal	D/36.6	D/44.7
	Eastbound	D/48.8/0.92	D/42.4/0.63
	Westbound	C/25.9/0.29	D/50.5/0.96
	Northbound	C/32.6/0.92	D/37.2/0.52
	Southbound	C/28.7/0.71	D/44.0/0.96

Intersection	Traffic Control Lane Group	AM LOS/Delay/v/c	PM LOS/Delay/v/c
Stroebel/ Hubbard	TWSC	NR	NR
	Eastbound	NR	NR
	Westbound	B/11.4/0.02	A/8.9/0.03
	Northbound	E/49.3/0.62	C/16.0/0.19
Locust Grove/ East Access (South of Rio Vallegas)	TWSC	NR	NR
	Eastbound	B/10.8/0.17	B/13.7/0.17
	Northbound	A/7.5/0.00	A/8.5/0.01
	Southbound	NR	NR

All intersection locations under 2025 site plus background traffic conditions perform at an acceptable LOS and overall v/c ratio under the mitigation measures proposed under 2025 background conditions.

1.2 COMMENT #2

The background volumes appear to have been calculated based on 5 years of growth. The counts were collected in 2018 and the analysis is 2025, so 7 years of growth should have been added. This should be revised and resubmitted to staff for review.

Traffic counts were recorded in both 2018 and 2019, however 7 years of growth will be assumed at all locations to remain conservative.

1.3 COMMENT #3

The TIS states signal warrants are met under 2025 background conditions at Lake Hazel/Locust Grove. A roundabout is proposed in accordance with the ACHD CIP, however this intersection is not included in IFYWP, and therefore should be analyzed as a temporary signal and without improvements for 2025 total traffic conditions.

Acknowledged, will revise as requested. 2025 background conditions at Lake Hazel Road and Locust Grove Road under all-way-stop-control are at LOS F overall. This condition further deteriorates under 2025 site plus background conditions.

1.4 COMMENT #4

The signalized intersection analysis performed did not reflect ACHD Policy 7106. The base saturation flow should be 1800 vphpl, the cycle length should be 150 seconds, the yellow times need to be 5 seconds for approaches with posted speed above 40 mph, and red times need to be 1 second for all phases. The signalized intersection analysis should be revised and resubmitted.

Acknowledged, will revise as requested. 150 seconds assumed to mean maximum cycle length which was confirmed with ACHD.

1.5 COMMENT #5

The traffic impact study does not identify when the southbound right turn lane at the Locust Grove Rd/East Access will be needed to serve the site. Please provide this information to staff for review.

At Locust Grove Road and East Access – 2025 site plus background right turn volume is 121 vph in PM peak hour and meets right turn lane guidelines. This lane is needed at 27 vph, or approximately 22% of Buildout and development adjacent to Locust Grove Road (anticipated to occur in last phase).

At Hubbard Road and Stroebel – 2025 site plus background right turn volume is 107 vph in PM peak hour and meets right turn lane guidelines. This lane is needed at 30 vph, or approximately 28% of Buildout.

Left turn lanes are not warranted at either location.

1.6 ADDITIONAL INFORMATION

Revised figures are attached for 2025 background, 2025 site plus background, and site traffic percent increases vs. 2025 background volumes.

2.0 ATTACHMENTS:

ACHD review letter, Ledgestone South Traffic Impact Study, March 3, 2020

Revised Figure 4, Figure 6 and Figure 7

Associated HCS output reports, signal warrant review, and turn lane analysis

Mary May, President
Kent Goldthorpe, Vice-President
Rebecca W. Arnold, Commissioner
Sara M. Baker, Commissioner
Jim D. Hansen, Commissioner

March 3, 2020

Robert Beckman
WH Pacific
2141 W. Airport Way, #104
Boise, ID 83705

Subject: Ledgestone South Traffic Impact Study

The Ada County Highway District staff has completed an initial review of the submitted traffic impact study (TIS) for the proposed Ledgestone South Subdivision. Comments/recommendations provided by District Traffic Services and Planning Review staff are listed below:

1. The TIS states that the same growth rates were used as the growths rates approved for the Patagonia Subdivision TIS completed by Thompson Engineers in 2018 rather than the rates shown in the COMPASS model. ACHD accepted those rates (10% growth on ACHD facilities, 4% on SH-69) specifically for the Patagonia Subdivision TIS and not for this TIS.

   Staff is concerned with the use of this approach. The model run reviewed when the aforementioned rates were accepted would not have included substantial volumes from Patagonia Subdivision and from the initial Ledgestone Subdivision, which would have been included as part of model run for Ledgestone South.

   Additionally, the use of this methodology to determine the growth rates was not approved by ACHD. You had corresponded with ACHD staff regarding the growth rates and were directed to use the growth rates derived from the COMPASS model and to apply them to existing counts (see attached emails). The study should be revised using the grow rates from the COMPASS model and resubmitted to staff for review.

2. The background volumes appear to have been calculated based on 5 years of growth. The counts were collected in 2018 and the analysis year is 2025, so 7 years of growth should have been added. This should be revised and resubmitted to staff for review.

3. The traffic impact study states that additional intersection control is needed at the Lake Hazel/Locust Grove intersection under 2025 background conditions and that the 4 hour signal warrant would be met at that time. It states that a roundabout is ultimately planned at this intersection and that it would work well as a roundabout, so a roundabout is assumed for future analysis.

   This intersection is not included in the IFYWP and therefore is not scheduled for improvements within the next 5 years. A roundabout at this intersection is listed in the 2016 CIP for construction between 2026 and 2030, but this is subject to change. There is currently very limited right of way at the intersection. ACHD does not plan to construct a roundabout at this intersection before 2025 and one should not be assumed. The intersection should be analyzed

as a temporary traffic signal and without improvements for 2025 total traffic conditions. This revised analysis should be submitted to staff for review.

4. The signalized intersection analysis performed for all intersections included in the traffic impact study was not completed correctly. The analysis needs to be completed in accordance with ACHD Policy Section 7106. The base saturation flow rate should be 1800 vphpl, the cycle length should be 150 seconds, the yellow times need to be 5 second for approaches with a posted speed above 40 mph, and the red times need to be 1 second for all phases. The signalized intersection analysis should be revised and resubmitted to staff for review.

5. The traffic impact study does not identify when the southbound right turn lane at the Locust Grove Rd/East Access will be needed to serve the site. Please provide this information to staff for review.

Please let me know if you have any questions.

Sincerely,

Mindy Wallace, AICP
Planning Review Supervisor
Development Services

CC: Gem State Planning - Jane Suggs
Trilogy Development - Shawn Brownlee

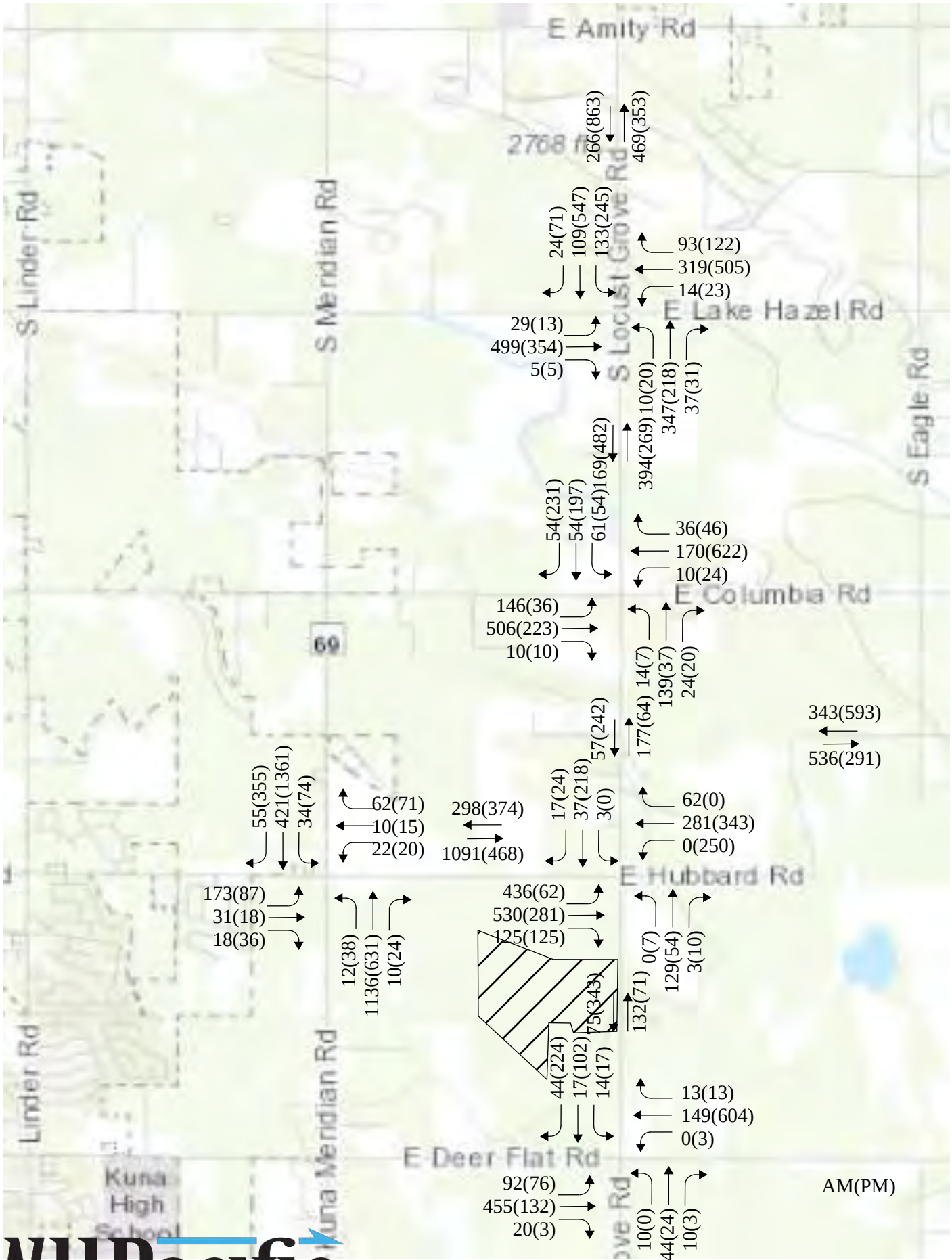

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Figure 4
2025 Background Peak
Hour Traffic Volumes

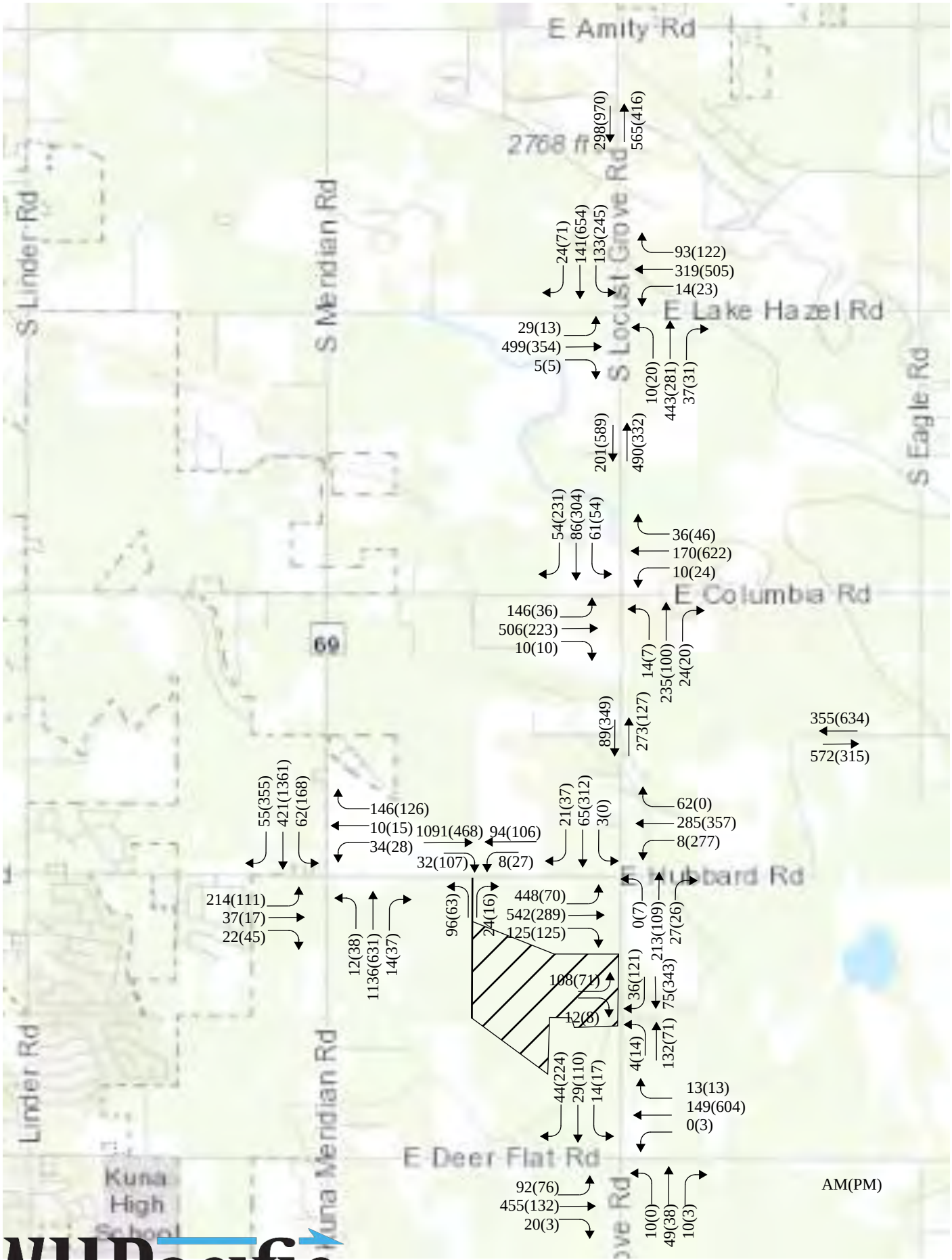

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Figure 6
2025 Site Plus Background
Peak Hour Traffic Volumes

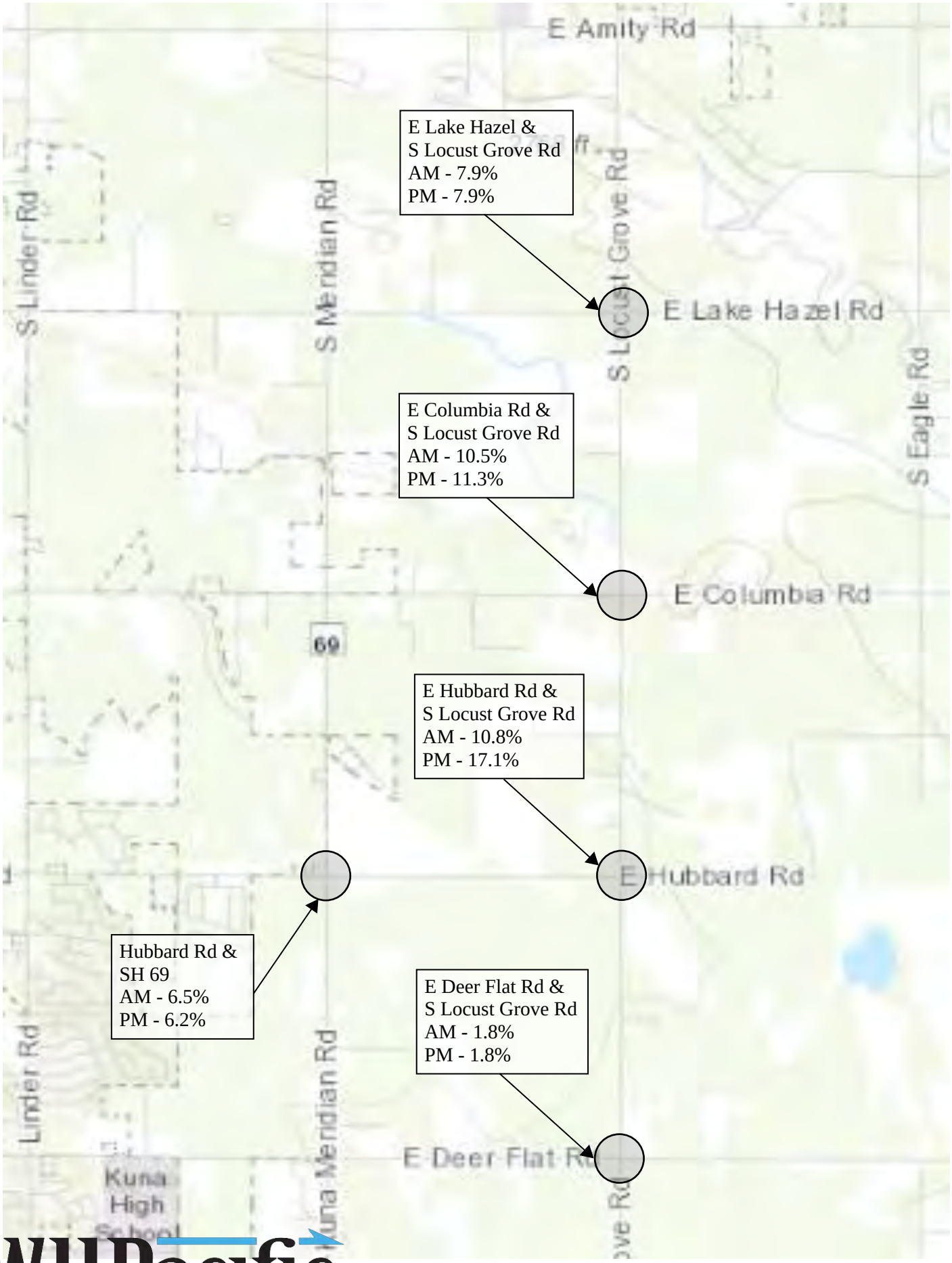

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Figure 7
Projected Total Percent Increase
(from 2025 Background Volume)

HCS7 Two-Way Stop-Control Report

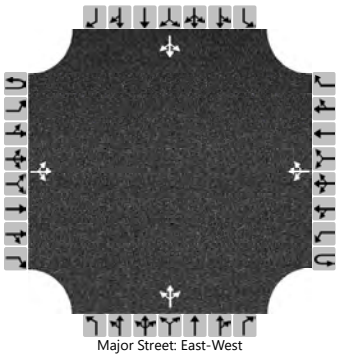
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	2025 AM Peak Hour Bkgrd
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Deer Fla
Jurisdiction	
East/West Street	Deer Flat
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		92	455	20		0	149	13		10	44	10		14	17	44
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		102				0					71				83	
Capacity, c (veh/h)		1389				1034					261				389	
v/c Ratio		0.07				0.00					0.27				0.21	
95% Queue Length, Q_{95} (veh)		0.2				0.0					1.1				0.8	
Control Delay (s/veh)		7.8				8.5					23.8				16.8	
Level of Service (LOS)		A				A					C				C	
Approach Delay (s/veh)		1.9				0.0				23.8				16.8		
Approach LOS										C				C		

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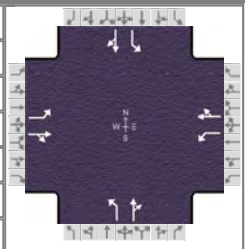
HCS7 Signalized Intersection Results Summary

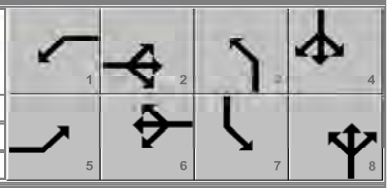
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Deer Flat	File Name	LocustSignals-AM-2025Bkgrd.xus		
Project Description	2025 AM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	92	455	20	0	149	13	10	44	10	14	17	44

Signal Information			
Cycle, s	80.0	Reference Phase	6
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	44.3	4.0	3.4	4.3	0.0	0.0
Yellow	5.0	5.0	5.0	5.0	0.0	0.0
Red	1.0	1.0	1.0	1.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.3	4.0	1.2	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	60.3	0.0	50.3	9.4	10.2	9.5	10.3
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	0.0	0.0	3.1	3.2	3.1	3.2
Queue Clearance Time (g_s), s	2.0				2.5	4.7	2.7	5.4
Green Extension Time (g_e), s	0.6	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Phase Call Probability	1.00				0.85	0.73	0.87	0.77
Max Out Probability	0.00				1.00	0.00	0.62	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	52	269		0	176		11	59		15	66	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1744		1674	1733		1674	1698		1674	1556	
Queue Service Time (g_s), s	0.0	2.9		0.0	4.0		0.5	2.7		0.7	3.4	
Cycle Queue Clearance Time (g_c), s	0.0	2.9		0.0	4.0		0.5	2.7		0.7	3.4	
Green Ratio (*g/C*)	0.58	0.68		0.50	0.55		0.09	0.05		0.10	0.05	
Capacity (*c*), veh/h	747	1184		661	960		161	89		188	84	
Volume-to-Capacity Ratio (*X*)	0.070	0.227		0.000	0.183		0.067	0.658		0.081	0.793	
Back of Queue (*Q*), ft/ln (95 th percentile)	18.1	39.9		0	66.5		8.7	53.8		12.1	63.9	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.7	1.6		0.0	2.6		0.3	2.1		0.5	2.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.18	0.00		0.00	0.00		0.03	0.00		0.04	0.00	
Uniform Delay (d_1), s/veh	9.1	2.8		0.0	8.9		33.1	37.2		33.0	37.4	
Incremental Delay (d_2), s/veh	0.0	0.4		0.0	0.4		0.1	3.1		0.1	6.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.1	3.2		0.0	9.3		33.2	40.3		33.1	43.6	
Level of Service (LOS)	A	A			A		C	D		C	D	
Approach Delay, s/veh / LOS	4.2	A		9.3	A		39.1	D		41.7	D	
Intersection Delay, s/veh / LOS	14.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.85	B	1.94	B	1.94	B	1.94	B
Bicycle LOS Score / LOS	1.50	B	0.78	A	0.60	A	0.62	A

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HCS7 Two-Way Stop-Control Report

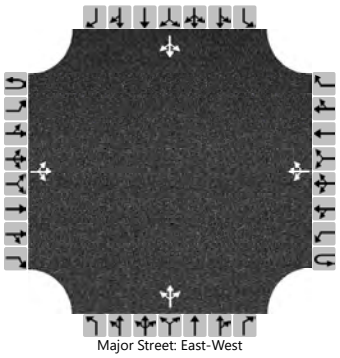
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	2025 PM Peak Hour Bkgrd
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Deer Fla
Jurisdiction	
East/West Street	Deer Flat
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		76	132	3		3	604	13		0	24	3		17	102	224
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		84				3					30				381	
Capacity, c (veh/h)		903				1425					234				322	
v/c Ratio		0.09				0.00					0.13				1.18	
95% Queue Length, Q_{95} (veh)		0.3				0.0					0.4				16.2	
Control Delay (s/veh)		9.4				7.5					22.7				145.4	
Level of Service (LOS)		A				A					C				F	
Approach Delay (s/veh)		4.0				0.1				22.7				145.4		
Approach LOS										C				F		

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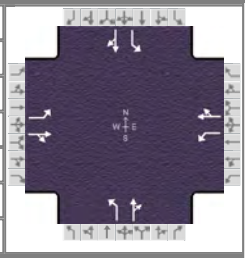
HCS7 Signalized Intersection Results Summary

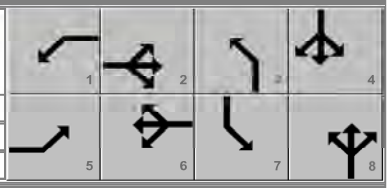
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	PM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Deer Flat	File Name	LocustSignals-PM-2025Bkgrd.xus		
Project Description	2025 PM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	76	132	3	3	604	13	0	24	3	17	102	224

Signal Information			
Cycle, s	110.0	Reference Phase	6
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	4.0	50.9	4.0	4.0	17.1	0.0
Yellow	5.0	5.0	5.0	5.0	5.0	0.0
Red	1.0	1.0	1.0	1.0	1.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.3	4.0	1.2	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	66.9	10.0	66.9	0.0	23.1	10.0	33.1
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	0.0	3.3	3.1	3.3
Queue Clearance Time (g_s), s	2.0		2.1			3.6	3.0	26.3
Green Extension Time (g_e), s	0.3	0.0	0.0	0.0	0.0	0.8	0.0	0.8
Phase Call Probability	1.00		1.00			1.00	1.00	1.00
Max Out Probability	0.54		0.00			0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	144	256		3	671		0	29		18	354	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1751		1674	1751		1674	1723		1674	1564	
Queue Service Time (g_s), s	0.0	8.8		0.1	30.5		0.0	1.6		1.0	24.3	
Cycle Queue Clearance Time (g_c), s	0.0	8.8		0.1	30.5		0.0	1.6		1.0	24.3	
Green Ratio (*g/C*)	0.48	0.55		0.52	0.55		0.10	0.16		0.21	0.25	
Capacity (*c*), veh/h	323	969		553	970		75	268		319	385	
Volume-to-Capacity Ratio (*X*)	0.446	0.264		0.006	0.692		0.000	0.110		0.058	0.920	
Back of Queue (*Q*), ft/ln (95 th percentile)	134.6	145.3		1.8	469.3		0	31.5		18.2	374.2	
Back of Queue (*Q*), veh/ln (95 th percentile)	5.3	5.7		0.1	18.3		0.0	1.2		0.7	14.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	1.35	0.00		0.02	0.00		0.00	0.00		0.06	0.00	
Uniform Delay (d_1), s/veh	31.9	13.5		13.4	17.8		0.0	39.9		34.8	40.4	
Incremental Delay (d_2), s/veh	0.2	0.4		0.0	4.0		0.0	0.1		0.0	3.9	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	32.1	13.9		13.4	21.8		0.0	40.0		34.8	44.3	
Level of Service (LOS)	C	B		B	C			D		C	D	
Approach Delay, s/veh / LOS	20.5	C		21.8	C		40.0	D		43.8	D	
Intersection Delay, s/veh / LOS	27.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.89	B	1.96	B	1.94	B	1.94	B
Bicycle LOS Score / LOS	0.87	A	1.60	B	0.54	A	1.10	A

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HCS7 Two-Way Stop-Control Report

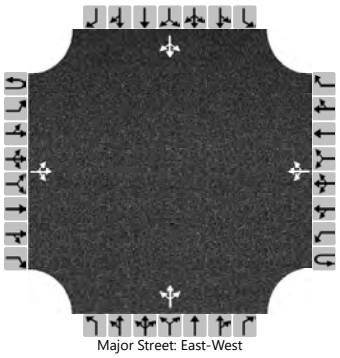
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	2025 AM Peak Hour Bkgrd
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Hubbard
Jurisdiction	
East/West Street	Hubbard Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		436	530	125		0	281	62		0	129	3		3	37	17
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		484				0					147				63	
Capacity, c (veh/h)		1172				871										
v/c Ratio		0.41				0.00										
95% Queue Length, Q_{95} (veh)		2.1				0.0										
Control Delay (s/veh)		10.2				9.1										
Level of Service (LOS)		B				A										
Approach Delay (s/veh)		8.5				0.0										
Approach LOS																

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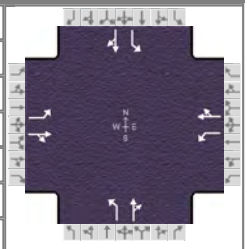
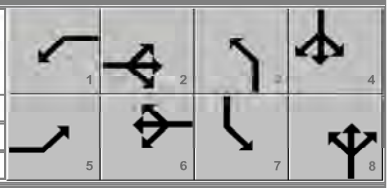
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Hubbard	File Name	LocustSignals-AM-2025Bkgrd.xus		
Project Description	2025 AM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	436	530	125	0	281	62	0	129	3	3	37	17

Signal Information					EB			WB			NB			SB		
Cycle, s	80.0	Reference Phase	6													
Offset, s	0	Reference Point	End	Green	5.0	39.6		3.0	8.4		0.0	0.0				
Uncoordinated	No	Simult. Gap E/W	On	Yellow	5.0	5.0		5.0	5.0		0.0	0.0				
Force Mode	Float	Simult. Gap N/S	On	Red	1.0	1.0		1.0	1.0		0.0	0.0				



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	11.0	56.6	0.0	45.6	0.0	14.4	9.0	23.4
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	0.0	0.0	0.0	3.1	3.1	3.1
Queue Clearance Time (g_s), s	7.0					8.4	2.1	4.3
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
Phase Call Probability	1.00					0.96	0.75	0.73
Max Out Probability	1.00					0.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	259	389		0	221		0	143		3	59	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1698		1674	1702		1674	1750		1674	1664	
Queue Service Time (g_s), s	5.0	3.4		0.0	3.6		0.0	6.4		0.1	2.3	
Cycle Queue Clearance Time (g_c), s	5.0	3.4		0.0	3.6		0.0	6.4		0.1	2.3	
Green Ratio (*g/C*)	0.58	0.63		0.42	0.50		0.03	0.10		0.17	0.22	
Capacity (*c*), veh/h	713	1075		581	843		232	183		183	361	
Volume-to-Capacity Ratio (*X*)	0.363	0.362		0.000	0.262		0.000	0.783		0.018	0.163	
Back of Queue (*Q*), ft/ln (95 th percentile)	83.7	44.2		0	57.6		0	127.5		2.3	40.4	
Back of Queue (*Q*), veh/ln (95 th percentile)	3.3	1.7		0.0	2.2		0.0	5.0		0.1	1.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.84	0.00		0.00	0.00		0.00	0.00		0.01	0.00	
Uniform Delay (d_1), s/veh	9.0	2.1		0.0	6.2		0.0	34.9		28.2	25.4	
Incremental Delay (d_2), s/veh	0.1	0.7		0.0	0.7		0.0	2.8		0.0	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.1	2.8		0.0	6.9		0.0	37.7		28.3	25.5	
Level of Service (LOS)	A	A			A			D		C	C	
Approach Delay, s/veh / LOS	5.3	A		6.9	A		37.7	D		25.6	C	
Intersection Delay, s/veh / LOS	11.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.87	B	1.89	B	1.94	B	1.93	B
Bicycle LOS Score / LOS	2.44	B	1.10	A	0.72	A	0.59	A

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HCS7 Two-Way Stop-Control Report

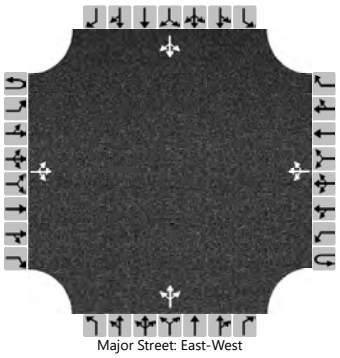
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	2025 PM Peak Hour Bkgrd
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Hubbard
Jurisdiction	
East/West Street	Hubbard Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		62	281	125		250	343	0		7	54	10		0	218	24
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		67				269					76				260	
Capacity, c (veh/h)		1184				1118									89	
v/c Ratio		0.06				0.24									2.94	
95% Queue Length, Q_{95} (veh)		0.2				0.9									25.3	
Control Delay (s/veh)		8.2				9.2									974.4	
Level of Service (LOS)		A				A									F	
Approach Delay (s/veh)		1.6				5.5								974.4		
Approach LOS														F		

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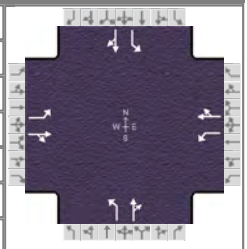
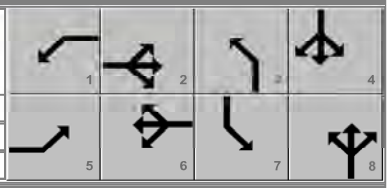
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	PM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Hubbard	File Name	LocustSignals-PM-2025Bkgrd.xus		
Project Description	2025 PM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	62	281	125	250	343	0	7	54	10	0	218	24

Signal Information												
Cycle, s	120.0	Reference Phase	6									
Offset, s	8	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On	Green	5.2	3.8	56.8	3.7	20.5	0.0		
Force Mode	Float	Simult. Gap N/S	On	Yellow	5.0	5.0	5.0	5.0	5.0	0.0		
				Red	1.0	1.0	1.0	1.0	1.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	11.2	62.8	21.0	72.6	9.7	36.2	0.0	26.5
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	0.0	3.1
Queue Clearance Time (g_s), s	5.1		15.7		2.4	5.8		19.9
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.0	0.6	0.0	0.6
Phase Call Probability	1.00		1.00		0.92	0.90		1.00
Max Out Probability	0.00		1.00		0.00	0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	86	562		379	0		8	70		0	263	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1663		1674	0		1674	1709		1674	1727	
Queue Service Time (g_s), s	3.1	20.7		13.7	0.0		0.4	3.8		0.0	17.9	
Cycle Queue Clearance Time (g_c), s	3.1	20.7		13.7	0.0		0.4	3.8		0.0	17.9	
Green Ratio (*g/C*)	0.52	0.47		0.62			0.22	0.25		0.12	0.17	
Capacity (*c*), veh/h	424	787		523			136	430		287	295	
Volume-to-Capacity Ratio (*X*)	0.202	0.714		0.726	0.000		0.056	0.162		0.000	0.893	
Back of Queue (*Q*), ft/ln (95 th percentile)	56.7	207.3		202.6	0		8.2	73.4		0	321	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.2	8.1		7.9	0.0		0.3	2.9		0.0	12.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.28	0.00		1.01	0.00		0.03	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	16.7	9.6		15.2			38.5	35.1		0.0	48.7	
Incremental Delay (d_2), s/veh	0.1	3.9		2.6	0.0		0.1	0.1		0.0	3.8	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	16.8	13.6		17.9			38.6	35.1		0.0	52.5	
Level of Service (LOS)	B	B		B			D	D			D	
Approach Delay, s/veh / LOS	14.0	B		19.8	B		35.5	D		52.5	D	
Intersection Delay, s/veh / LOS	23.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.91	B	1.90	B	1.94	B	1.95	B
Bicycle LOS Score / LOS	1.33	A	1.55	B	0.61	A	0.92	A

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HCS7 All-Way Stop Control Report

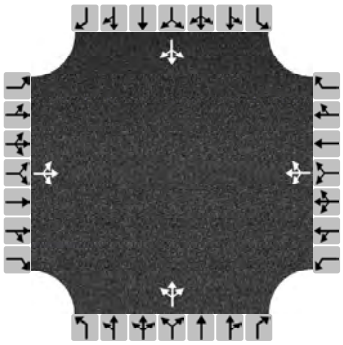
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Analysis Time Period (hrs)	0.25
Time Analyzed	2025 AM Peak Hour Bkgrd
Project Description	Ledgestone South

Site Information

Intersection	Locust_Columbia
Jurisdiction	
East/West Street	Columbia Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.92

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	146	506	10	10	170	36	14	139	24	61	54	54
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	720			235			192			184		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.640			0.209			0.171			0.163		
Final Departure Headway, hd (s)	5.81			6.33			6.87			6.85		
Final Degree of Utilization, x	1.161			0.413			0.367			0.350		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	3.81			4.33			4.87			4.85		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	720			235			192			184		
Capacity	620			568			524			526		
95% Queue Length, Q_{95} (veh)	23.8			2.0			1.7			1.6		
Control Delay (s/veh)	110.9			13.7			13.8			13.5		
Level of Service, LOS	F			B			B			B		
Approach Delay (s/veh)	110.9			13.7			13.8			13.5		
Approach LOS	F			B			B			B		
Intersection Delay, s/veh | LOS	66.2						F					

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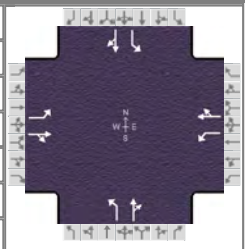
HCS7 Signalized Intersection Results Summary

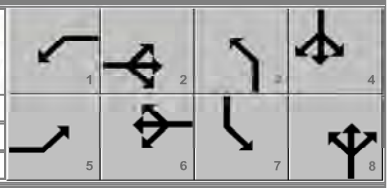
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Columbia	File Name	LocustSignals-AM-2025Bkgrd.xus		
Project Description	2025 AM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	146	506	10	10	170	36	14	139	24	61	54	54

Signal Information			
Cycle, s	80.0	Reference Phase	6
Offset, s	39	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	4.0	27.2	4.0	4.0	0.6	10.2
Yellow	5.0	5.0	5.0	5.0	0.0	5.0
Red	1.0	1.0	1.0	1.0	0.0	1.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.3	4.0	1.2	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	43.2	10.0	43.2	10.0	16.2	10.6	16.8
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	2.0		2.2		2.6	10.1	4.7	7.4
Green Extension Time (g_e), s	1.4	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Phase Call Probability	1.00		1.00		1.00	0.98	0.99	0.93
Max Out Probability	0.01		0.00		0.00	0.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	160	567		9	190		15	177		66	117	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1752		1674	1704		1674	1711		1674	1613	
Queue Service Time (g_s), s	0.0	15.9		0.2	4.8		0.6	8.1		2.7	5.4	
Cycle Queue Clearance Time (g_c), s	0.0	15.9		0.2	4.8		0.6	8.1		2.7	5.4	
Green Ratio (*g/C*)	0.37	0.47		0.41	0.46		0.18	0.13		0.19	0.14	
Capacity (*c*), veh/h	546	814		292	792		227	217		218	218	
Volume-to-Capacity Ratio (*X*)	0.293	0.696		0.032	0.240		0.067	0.815		0.304	0.539	
Back of Queue (*Q*), ft/ln (95 th percentile)	95.2	170.8		4.1	81.3		10.9	156.2		48.4	98	
Back of Queue (*Q*), veh/ln (95 th percentile)	3.7	6.7		0.2	3.2		0.4	6.1		1.9	3.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.95	0.00		0.04	0.00		0.04	0.00		0.16	0.00	
Uniform Delay (d_1), s/veh	18.9	9.6		15.0	11.1		27.6	34.0		28.1	32.3	
Incremental Delay (d_2), s/veh	0.1	2.4		0.0	0.7		0.0	2.8		0.3	1.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	19.0	12.0		15.0	11.8		27.7	36.8		28.4	33.7	
Level of Service (LOS)	B	B		B	B		C	D		C	C	
Approach Delay, s/veh / LOS	13.5	B		11.9	B		36.1	D		31.8	C	
Intersection Delay, s/veh / LOS	19.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.90	B	1.94	B	1.93	B	1.93	B
Bicycle LOS Score / LOS	1.67	B	0.87	A	0.81	A	0.79	A

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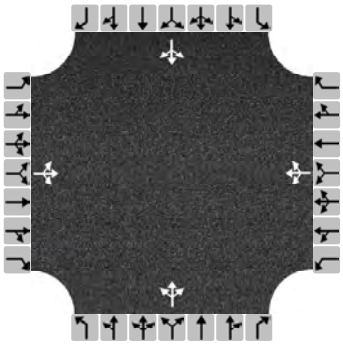
HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	RAB	Intersection	Locust_Columbia
Agency/Co.	WHPacific	Jurisdiction	
Date Performed	03/31/2020	East/West Street	Columbia Rd
Analysis Year	2025	North/South Street	Locust Grove Rd
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	2025 PM Peak Hour Bkgrd		
Project Description	Ledgestone South		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	36	223	10	24	622	46	7	37	20	54	197	231
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	292			752			70			524		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.260			0.669			0.062			0.466		
Final Departure Headway, hd (s)	7.36			6.84			8.30			6.60		
Final Degree of Utilization, x	0.598			1.430			0.160			0.960		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	5.36			4.84			6.30			4.60		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	292			752			70			524		
Capacity	489			526			434			546		
95% Queue Length, Q_{95} (veh)	3.9			36.1			0.6			12.7		
Control Delay (s/veh)	20.7			223.7			12.9			54.7		
Level of Service, LOS	C			F			B			F		
Approach Delay (s/veh)	20.7			223.7			12.9			54.7		
Approach LOS	C			F			B			F		
Intersection Delay, s/veh | LOS	124.5						F					

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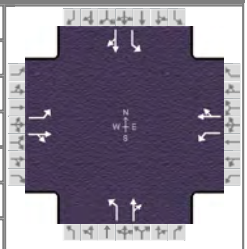
HCS7 Signalized Intersection Results Summary

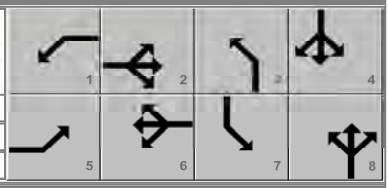
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	PM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Columbia	File Name	LocustSignals-PM-2025Bkgrd.xus		
Project Description	2025 PM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	36	223	10	24	622	46	7	37	20	54	197	231

Signal Information			
Cycle, s	120.0	Reference Phase	6
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	1.9	3.5	52.7	0.9	3.4	33.7	
Yellow	5.0	0.0	5.0	5.0	0.0	5.0	
Red	1.0	0.0	1.0	1.0	0.0	1.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	11.3	62.1	7.9	58.7	6.9	39.7	10.3	43.1
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.2	3.1	3.2
Queue Clearance Time (g_s), s	5.6		2.8		2.4	5.4	5.0	35.9
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	1.1	0.0	1.1
Phase Call Probability	0.95		0.47		0.22	1.00	0.86	1.00
Max Out Probability	0.17		0.79		0.29	0.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	92	593		19	535		8	62		59	465	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1744		1674	1736		1674	1652		1674	1602	
Queue Service Time (g_s), s	3.6	28.6		0.8	20.9		0.4	3.4		3.0	33.9	
Cycle Queue Clearance Time (g_c), s	3.6	28.6		0.8	20.9		0.4	3.4		3.0	33.9	
Green Ratio (*g/C*)	0.48	0.47		0.45	0.44		0.29	0.28		0.32	0.31	
Capacity (*c*), veh/h	363	816		260	762		81	464		456	495	
Volume-to-Capacity Ratio (*X*)	0.253	0.727		0.074	0.702		0.094	0.134		0.129	0.940	
Back of Queue (*Q*), ft/ln (95 th percentile)	64.9	388.6		13.8	242.3		7.4	62.2		55.3	503.4	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.5	15.2		0.5	9.5		0.3	2.4		2.2	19.7	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.65	0.00		0.14	0.00		0.02	0.00		0.18	0.00	
Uniform Delay (d_1), s/veh	19.4	18.1		21.5	12.4		35.0	32.2		29.1	40.4	
Incremental Delay (d_2), s/veh	0.1	4.3		0.0	4.4		0.2	0.0		0.0	4.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	19.5	22.4		21.5	16.8		35.2	32.3		29.2	44.4	
Level of Service (LOS)	B	C		C	B		D	C		C	D	
Approach Delay, s/veh / LOS	22.0	C		16.9	B		32.6	C		42.7	D	
Intersection Delay, s/veh / LOS	26.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.91	B	1.92	B	1.94	B	1.93	B
Bicycle LOS Score / LOS	0.97	A	1.73	B	0.60	A	1.35	A

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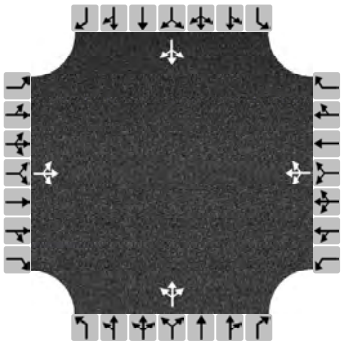
HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	RAB	Intersection	Locust_Lake Hazel
Agency/Co.	WHPacific	Jurisdiction	
Date Performed	03/31/2020	East/West Street	Lake Hazel Rd
Analysis Year	2025	North/South Street	Locust Grove Rd
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	2025 AM Peak Hour Bkgrd		
Project Description	Ledgestone South		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	499	5	14	319	93	10	347	37	133	109	24
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	579			463			428			289		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.515			0.412			0.381			0.257		
Final Departure Headway, hd (s)	9.04			8.92			8.99			9.66		
Final Degree of Utilization, x	1.456			1.147			1.069			0.776		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	7.04			6.92			6.99			7.66		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	579			463			428			289		
Capacity	398			404			401			373		
95% Queue Length, Q_{95} (veh)	29.9			17.4			14.5			6.4		
Control Delay (s/veh)	242.7			120.4			95.1			39.2		
Level of Service, LOS	F			F			F			E		
Approach Delay (s/veh)	242.7			120.4			95.1			39.2		
Approach LOS	F			F			F			E		
Intersection Delay, s/veh | LOS	141.2						F					

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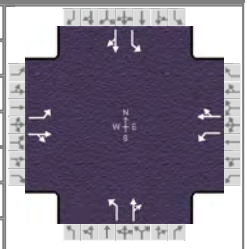
HCS7 Signalized Intersection Results Summary

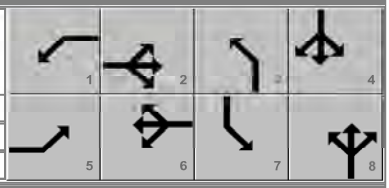
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Lake Hazel	File Name	LocustSignals-AM-2025Bkgrd.xus		
Project Description	2025 AM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	29	499	5	14	319	93	10	347	37	133	109	24

Signal Information			
Cycle, s	80.0	Reference Phase	6
Offset, s	18	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	4.0	26.6	4.0	21.4	0.0	0.0
Yellow	5.0	5.0	5.0	5.0	0.0	0.0
Red	1.0	1.0	1.0	1.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	32.6	10.0	32.6	10.0	27.4	10.0	27.4
Change Period, (*Y+R c*), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (*g s*), s	2.9		2.2		2.4	20.7	6.0	7.4
Green Extension Time (*g e*), s	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.1
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	0.96
Max Out Probability	0.03		0.01		0.00	0.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	32	548		8	223		11	417		145	145	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1755		1674	1689		1674	1728		1674	1703	
Queue Service Time (*g s*), s	0.9	24.2		0.2	6.5		0.4	18.7		4.0	5.4	
Cycle Queue Clearance Time (*g c*), s	0.9	24.2		0.2	6.5		0.4	18.7		4.0	5.4	
Green Ratio (*g/C*)	0.38	0.33		0.38	0.33		0.32	0.27		0.32	0.27	
Capacity (*c*), veh/h	461	583		177	561		420	463		183	456	
Volume-to-Capacity Ratio (*X*)	0.068	0.940		0.043	0.398		0.026	0.902		0.790	0.317	
Back of Queue (*Q*), ft/ln (95 th percentile)	15.8	497		4	113.2		6.1	310.1		86.1	96.5	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	19.4		0.2	4.4		0.2	12.1		3.4	3.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.16	0.00		0.04	0.00		0.02	0.00		0.29	0.00	
Uniform Delay (*d 1*), s/veh	15.8	25.9		20.5	14.8		18.9	28.3		26.4	23.4	
Incremental Delay (*d 2*), s/veh	0.0	25.0		0.0	2.0		0.0	2.7		18.9	0.1	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	15.9	50.9		20.6	16.8		18.9	31.0		45.4	23.6	
Level of Service (LOS)	B	D		C	B		B	C		D	C	
Approach Delay, s/veh / LOS	49.0	D		16.9	B		30.7	C		34.5	C	
Intersection Delay, s/veh / LOS	36.3						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.91	B	1.91	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	1.44	A	1.25	A	1.19	A	0.96	A

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HCS7 All-Way Stop Control Report

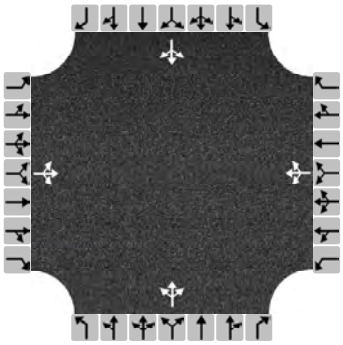
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Analysis Time Period (hrs)	0.25
Time Analyzed	2025 PM Peak Hour Bkgrd
Project Description	Ledgestone South

Site Information

Intersection	Locust_Lake Hazel
Jurisdiction	
East/West Street	Lake Hazel Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.92

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	13	354	5	23	505	122	20	218	31	245	547	71
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	404			707			292			938		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.359			0.628			0.260			0.834		
Final Departure Headway, hd (s)	9.04			8.94			9.56			9.05		
Final Degree of Utilization, x	1.015			1.754			0.777			2.358		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	7.04			6.94			7.56			7.05		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	404			707			292			938		
Capacity	398			403			377			398		
95% Queue Length, Q_{95} (veh)	12.7			44.0			6.5			72.4		
Control Delay (s/veh)	79.8			370.7			38.9			638.3		
Level of Service, LOS	F			F			E			F		
Approach Delay (s/veh)	79.8			370.7			38.9			638.3		
Approach LOS	F			F			E			F		
Intersection Delay, s/veh | LOS	386.3						F					

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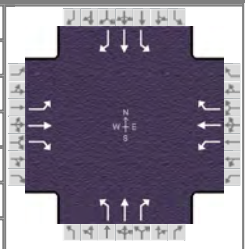
HCS7 Signalized Intersection Results Summary

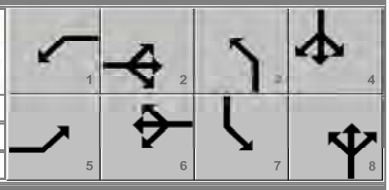
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	PM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Lake Hazel	File Name	LocustSignals-PM-2025Bkgrd.xus		
Project Description	2025 PM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	13	354	5	23	505	122	20	218	31	245	547	71

Signal Information			
Cycle, s	100.0	Reference Phase	6
Offset, s	3	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	2.1	28.4	1.3	1.8	5.9	24.4
Yellow	5.0	5.0	5.0	5.0	5.0	5.0
Red	1.0	1.0	1.0	1.0	1.0	1.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.3	3.0	1.2	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	7.3	41.7	8.1	42.5	7.8	30.4	19.8	42.4
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	2.0		3.1		3.0	13.8	13.3	34.5
Green Extension Time (g_e), s	0.4	0.0	0.0	0.0	0.0	1.8	0.4	1.8
Phase Call Probability	0.32		0.52		0.45	1.00	1.00	1.00
Max Out Probability	0.28		1.00		0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	14	385	5	27	588	142	22	237	34	266	595	77
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1758	1515	1674	1758	1490	1674	1758	1522	1674	1758	1373
Queue Service Time (g_s), s	0.0	18.0	0.2	1.1	31.4	8.3	1.0	11.8	1.7	11.3	32.5	3.8
Cycle Queue Clearance Time (g_c), s	0.0	18.0	0.2	1.1	31.4	8.3	1.0	11.8	1.7	11.3	32.5	3.8
Green Ratio (*g/C*)	0.28	0.36	0.36	0.33	0.37	0.37	0.26	0.24	0.24	0.40	0.36	0.36
Capacity (*c*), veh/h	119	628	541	210	642	544	117	429	372	446	639	499
Volume-to-Capacity Ratio (*X*)	0.119	0.613	0.010	0.127	0.916	0.261	0.185	0.552	0.091	0.597	0.930	0.155
Back of Queue (*Q*), ft/ln (95 th percentile)	15.8	324.5	3.8	19.7	453.4	114.4	18	220	27.9	197.9	534.9	54.4
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	12.7	0.2	0.8	17.7	4.5	0.7	8.6	1.1	7.7	20.9	2.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.16	0.00	0.00	0.20	0.00	0.46	0.06	0.00	0.00	0.66	0.00	0.00
Uniform Delay (d_1), s/veh	46.5	26.4	20.7	25.1	27.0	9.5	30.2	33.0	29.2	22.5	30.6	29.0
Incremental Delay (d_2), s/veh	0.2	4.4	0.0	0.0	10.6	0.5	0.3	0.4	0.0	0.5	8.6	0.1
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	46.7	30.9	20.8	25.2	37.6	10.1	30.5	33.4	29.2	23.0	39.2	29.1
Level of Service (LOS)	D	C	C	C	D	B	C	C	C	C	D	C
Approach Delay, s/veh / LOS	31.3	C		32.0	C		32.7	C		33.8	C	
Intersection Delay, s/veh / LOS	32.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.11	B	2.14	B	2.12	B	2.11	B
Bicycle LOS Score / LOS	1.15	A	1.65	B	0.97	A	2.04	B

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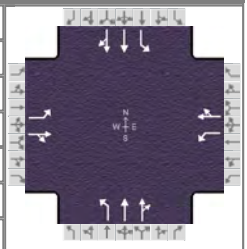
HCS7 Signalized Intersection Results Summary

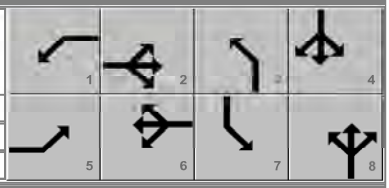
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	8/23/2019	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.91
Urban Street	Meridian Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Meridian and Hubbard	File Name	Meridian&Hubbard-AM-2025Bkgrd.xus		
Project Description	2025 AM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	173	31	18	22	10	62	12	1136	10	34	421	55

Signal Information			
Cycle, s	70.0	Reference Phase	6
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	4.0	9.8	4.0	28.2	0.0	0.0
Yellow	5.0	5.0	5.0	5.0	0.0	0.0
Red	1.0	1.0	1.0	1.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	15.8	10.0	15.8	10.0	34.2	10.0	34.2
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	6.0		2.8		2.3	25.4	2.9	9.5
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	2.8	0.0	3.9
Phase Call Probability	0.99		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		1.00	0.46	1.00	0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	190	54		24	79		13	631	629	37	266	257
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1642		1674	1522		1674	1758	1752	1674	1758	1687
Queue Service Time (g_s), s	4.0	2.0		0.8	3.3		0.3	23.4	23.4	0.9	7.5	7.5
Cycle Queue Clearance Time (g_c), s	4.0	2.0		0.8	3.3		0.3	23.4	23.4	0.9	7.5	7.5
Green Ratio (*g/C*)	0.20	0.14		0.20	0.14		0.46	0.40	0.40	0.46	0.40	0.40
Capacity (*c*), veh/h	321	231		309	214		431	707	705	228	707	679
Volume-to-Capacity Ratio (*X*)	0.593	0.233		0.078	0.370		0.031	0.892	0.892	0.164	0.376	0.379
Back of Queue (*Q*), ft/ln (95 th percentile)	57.1	41.8		14.2	65.6		4.6	398.2	388.2	13.3	123.9	117.5
Back of Queue (*Q*), veh/ln (95 th percentile)	2.2	1.6		0.6	2.6		0.2	15.6	15.5	0.5	4.8	4.7
Queue Storage Ratio (*RQ*) (95 th percentile)	0.57	0.00		0.14	0.00		0.02	0.00	0.00	0.04	0.00	0.00
Uniform Delay (d_1), s/veh	27.1	26.7		23.0	27.3		11.0	19.5	19.5	14.7	14.7	14.8
Incremental Delay (d_2), s/veh	2.0	2.4		0.0	4.9		0.0	9.8	9.8	0.1	0.1	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	29.1	29.1		23.0	32.1		11.0	29.3	29.3	14.9	14.9	14.9
Level of Service (LOS)	C	C		C	C		B	C	C	B	B	B
Approach Delay, s/veh / LOS	29.1	C		30.0	C		29.1	C		14.9	B	
Intersection Delay, s/veh / LOS	25.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.90	B	1.90	B
Bicycle LOS Score / LOS	0.89	A	0.66	A	1.54	B	0.95	A

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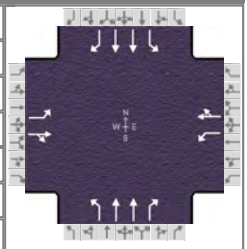
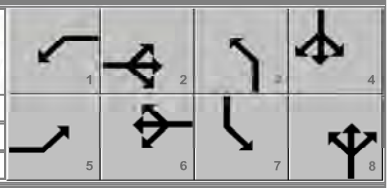
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	PM	PHF	0.92
Urban Street	Meridian Rd	Analysis Year	2025	Analysis Period	1> 5:00
Intersection	Meridian and Hubbard	File Name	Meridian&Hubbard-PM-2025Bkgrd.xus		
Project Description	2025 PM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	87	18	36	20	15	71	38	631	24	74	1361	355

Signal Information												
Cycle, s	150.0	Reference Phase	2									
Offset, s	0	Reference Point	Begin									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
				Green	2.4	5.5	42.1	3.3	2.4	70.3		
				Yellow	5.0	0.0	5.0	5.0	0.0	5.0		
				Red	1.0	0.0	1.0	1.0	0.0	1.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	3.0
Phase Duration, s	13.9	53.6	8.4	48.1	9.3	76.3	11.7	78.7
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	7.9		3.4		3.9	22.5	5.7	63.2
Green Extension Time (g_e), s	0.2	0.0	0.0	0.0	0.1	9.6	0.1	9.5
Phase Call Probability	0.98		0.60		0.82	1.00	0.96	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	95	59		22	93		41	686	26	80	1479	386
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1564		1674	1530		1674	1674	1524	1674	1674	1525
Queue Service Time (g_s), s	5.9	4.0		1.4	7.0		1.9	20.5	1.4	3.7	61.2	26.2
Cycle Queue Clearance Time (g_c), s	5.9	4.0		1.4	7.0		1.9	20.5	1.4	3.7	61.2	26.2
Green Ratio (*g/C*)	0.34	0.32		0.30	0.28		0.49	0.47	0.47	0.51	0.48	0.48
Capacity (*c*), veh/h	438	496		444	429		107	1569	715	360	1623	740
Volume-to-Capacity Ratio (*X*)	0.216	0.118		0.049	0.218		0.385	0.437	0.037	0.223	0.912	0.522
Back of Queue (*Q*), ft/ln (95 th percentile)	112.2	74.2		26.7	129.6		36.4	330.7	22.7	68.3	846.1	364.4
Back of Queue (*Q*), veh/ln (95 th percentile)	4.4	2.9		1.0	5.1		1.4	12.9	0.9	2.7	33.0	14.6
Queue Storage Ratio (*RQ*) (95 th percentile)	1.12	0.00		0.27	0.00		0.12	0.00	0.00	0.23	0.00	0.00
Uniform Delay (d_1), s/veh	34.5	36.3		37.6	41.3		33.9	26.6	21.5	20.7	35.7	26.6
Incremental Delay (d_2), s/veh	0.1	0.5		0.0	1.2		0.8	0.1	0.0	0.1	2.4	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	34.6	36.8		37.6	42.5		34.7	26.7	21.5	20.9	38.1	26.9
Level of Service (LOS)	C	D		D	D		C	C	C	C	D	C
Approach Delay, s/veh / LOS	35.5	D		41.6	D		26.9	C		35.1	D	
Intersection Delay, s/veh / LOS	33.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.45	B	2.46	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	0.74	A	0.68	A	1.11	A	2.09	B

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HCS7 Two-Way Stop-Control Report

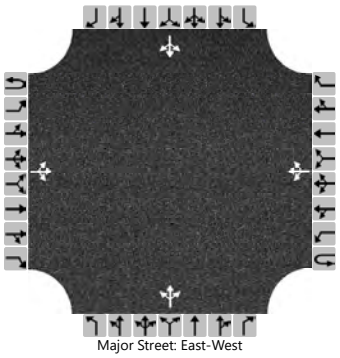
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	3/31/2020
Analysis Year	2025
Time Analyzed	2025 AM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Deer Fla
Jurisdiction	
East/West Street	Deer Flat
North/South Street	Locust Grove Rd
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		92	455	20		0	149	13		10	49	10		14	29	44
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		100				0					75				95	
Capacity, c (veh/h)		1394				1044					266				368	
v/c Ratio		0.07				0.00					0.28				0.26	
95% Queue Length, Q_{95} (veh)		0.2				0.0					1.1				1.0	
Control Delay (s/veh)		7.8				8.4					23.8				18.1	
Level of Service (LOS)		A				A					C				C	
Approach Delay (s/veh)	1.9				0.0				23.8				18.1			
Approach LOS									C				C			

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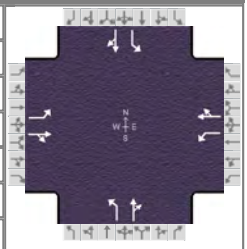
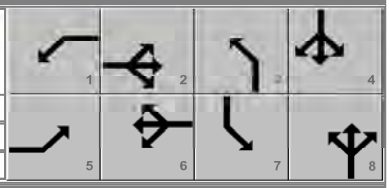
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Deer Flat	File Name	LocustSignals-AM-2025Total.xus		
Project Description	2025 AM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	92	455	20	0	149	13	10	49	10	14	29	44

Signal Information												
Cycle, s	90.0	Reference Phase	6									
Offset, s	0	Reference Point	End	Green	52.7	4.0	3.6	0.1	5.6	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	5.0	5.0	5.0	0.0	5.0	0.0		
Force Mode	Float	Simult. Gap N/S	On	Red	1.0	1.0	1.0	0.0	1.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.3	4.0	1.2	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	68.7	0.0	58.7	9.6	11.6	9.7	11.8
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	0.0	0.0	3.1	3.2	3.1	3.2
Queue Clearance Time (g_s), s	2.0				2.5	5.3	2.7	6.4
Green Extension Time (g_e), s	0.6	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Phase Call Probability	1.00				0.90	0.80	0.93	0.86
Max Out Probability	0.00				0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	56	291		0	176		11	64		15	79	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1744		1674	1733		1674	1703		1674	1586	
Queue Service Time (g_s), s	0.0	6.3		0.0	4.2		0.5	3.3		0.7	4.4	
Cycle Queue Clearance Time (g_c), s	0.0	6.3		0.0	4.2		0.5	3.3		0.7	4.4	
Green Ratio (*g/C*)	0.61	0.70		0.54	0.59		0.10	0.06		0.10	0.06	
Capacity (*c*), veh/h	773	1215		637	1014		147	106		183	101	
Volume-to-Capacity Ratio (*X*)	0.073	0.240		0.000	0.174		0.074	0.603		0.083	0.783	
Back of Queue (*Q*), ft/ln (95 th percentile)	22.6	93.9		0	70.4		9.9	65.2		13.8	84.4	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.9	3.7		0.0	2.8		0.4	2.5		0.5	3.3	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.23	0.00		0.00	0.00		0.03	0.00		0.05	0.00	
Uniform Delay (d_1), s/veh	9.6	6.0		0.0	8.6		36.7	41.1		36.5	41.5	
Incremental Delay (d_2), s/veh	0.0	0.4		0.0	0.4		0.1	2.0		0.1	4.9	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.6	6.4		0.0	9.0		36.8	43.1		36.6	46.4	
Level of Service (LOS)	A	A			A		D	D		D	D	
Approach Delay, s/veh / LOS	6.9	A		9.0	A		42.2	D		44.8	D	
Intersection Delay, s/veh / LOS	16.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.85	B	1.95	B	1.94	B	1.94	B
Bicycle LOS Score / LOS	1.50	B	0.78	A	0.61	A	0.64	A

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HCS7 Two-Way Stop-Control Report

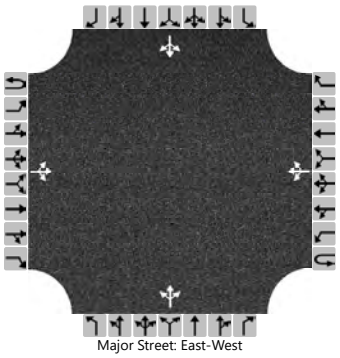
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	2025 PM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Deer Fla
Jurisdiction	
East/West Street	Deer Flat
North/South Street	Locust Grove Rd
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		76	132	3		3	604	13		0	38	3		17	110	224
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		83				3					45				382	
Capacity, c (veh/h)		915				1429					234				325	
v/c Ratio		0.09				0.00					0.19				1.17	
95% Queue Length, Q_{95} (veh)		0.3				0.0					0.7				16.0	
Control Delay (s/veh)		9.3				7.5					24.0				140.9	
Level of Service (LOS)		A				A					C				F	
Approach Delay (s/veh)		3.9				0.1				24.0				140.9		
Approach LOS										C				F		

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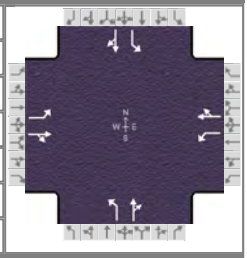
HCS7 Signalized Intersection Results Summary

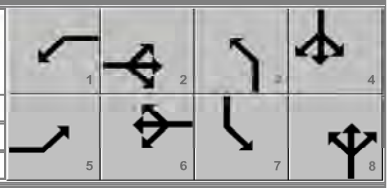
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	PM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Deer Flat	File Name	LocustSignals-PM-2025Total.xus		
Project Description	2025 PM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	76	132	3	3	604	13	0	38	3	17	110	224

Signal Information			
Cycle, s	130.0	Reference Phase	6
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	4.0	65.7	4.0	4.0	22.3	0.0	
Yellow	5.0	5.0	5.0	5.0	5.0	0.0	
Red	1.0	1.0	1.0	1.0	1.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.3	4.0	1.2	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	81.7	10.0	81.7	0.0	28.3	10.0	38.3
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	0.0	3.2	3.1	3.2
Queue Clearance Time (g_s), s	2.0		2.1			4.8	3.1	31.4
Green Extension Time (g_e), s	0.6	0.0	0.0	0.0	0.0	0.9	0.0	0.9
Phase Call Probability	1.00		1.00			1.00	1.00	1.00
Max Out Probability	0.01		1.00			0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	150	266		3	671		0	45		18	363	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1751		1674	1751		1674	1735		1674	1569	
Queue Service Time (g_s), s	0.0	7.2		0.1	33.7		0.0	2.8		1.1	29.4	
Cycle Queue Clearance Time (g_c), s	0.0	7.2		0.1	33.7		0.0	2.8		1.1	29.4	
Green Ratio (*g/C*)	0.52	0.58		0.55	0.58		0.13	0.17		0.22	0.25	
Capacity (*c*), veh/h	341	1019		604	1020		64	297		309	390	
Volume-to-Capacity Ratio (*X*)	0.439	0.261		0.005	0.658		0.000	0.150		0.060	0.932	
Back of Queue (*Q*), ft/ln (95 th percentile)	156.3	119.9		2	513.7		0	56.9		21.7	447.4	
Back of Queue (*Q*), veh/ln (95 th percentile)	6.1	4.7		0.1	20.1		0.0	2.2		0.8	17.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	1.56	0.00		0.02	0.00		0.00	0.00		0.07	0.00	
Uniform Delay (d_1), s/veh	33.8	9.2		13.4	18.4		0.0	45.8		40.3	47.8	
Incremental Delay (d_2), s/veh	0.2	0.4		0.0	3.3		0.0	0.1		0.0	4.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	33.9	9.6		13.4	21.7		0.0	45.9		40.3	52.2	
Level of Service (LOS)	C	A		B	C			D		D	D	
Approach Delay, s/veh / LOS	18.3	B		21.7	C		45.9	D		51.6	D	
Intersection Delay, s/veh / LOS	29.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.89	B	1.96	B	1.95	B	1.94	B
Bicycle LOS Score / LOS	0.87	A	1.60	B	0.56	A	1.12	A

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HCS7 Two-Way Stop-Control Report

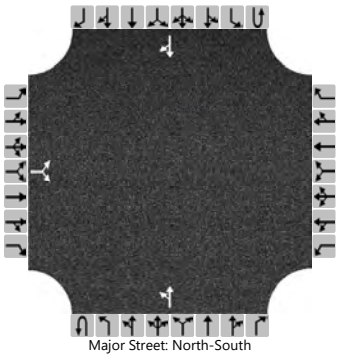
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	AM Peak Hour Total
Intersection Orientation	North-South
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and E Access
Jurisdiction	
East/West Street	E Access
North/South Street	Locust Grove
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		108		12						4	132				75	36
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			130							4						
Capacity, c (veh/h)			748							1461						
v/c Ratio			0.17							0.00						
95% Queue Length, Q_{95} (veh)			0.6							0.0						
Control Delay (s/veh)			10.8							7.5						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		10.8								0.2						
Approach LOS		B														

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HCS7 Two-Way Stop-Control Report

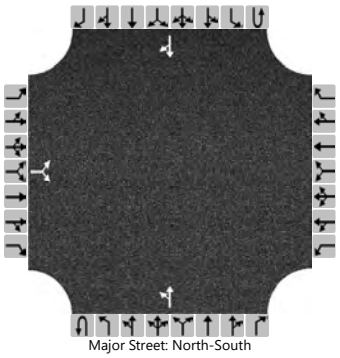
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	PM Peak Hour Total
Intersection Orientation	North-South
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and E Access
Jurisdiction	
East/West Street	E Access
North/South Street	Locust Grove
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		71		8						14	71				343	121
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			86							15						
Capacity, c (veh/h)			500							1055						
v/c Ratio			0.17							0.01						
95% Queue Length, Q_{95} (veh)			0.6							0.0						
Control Delay (s/veh)			13.7							8.5						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		13.7								1.5						
Approach LOS		B														

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HCS7 Two-Way Stop-Control Report

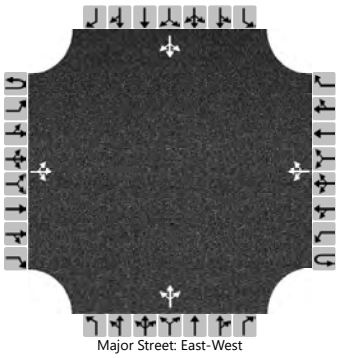
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	2025 AM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Hubbard
Jurisdiction	
East/West Street	Hubbard Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		448	542	125		8	285	62		0	213	27		3	65	21
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		487				9					261				97	
Capacity, c (veh/h)		1176				873										
v/c Ratio		0.41				0.01										
95% Queue Length, Q_{95} (veh)		2.1				0.0										
Control Delay (s/veh)		10.2				9.2										
Level of Service (LOS)		B				A										
Approach Delay (s/veh)		8.4				0.3										
Approach LOS																

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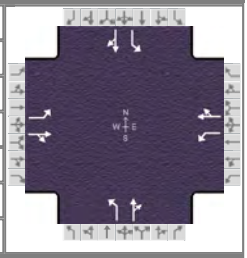
HCS7 Signalized Intersection Results Summary

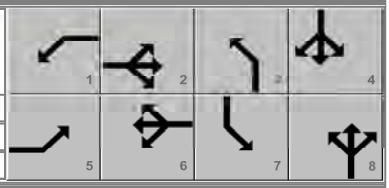
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Hubbard	File Name	LocustSignals-AM-2025Total.xus		
Project Description	2025 AM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	448	542	125	8	285	62	0	213	27	3	65	21

Signal Information			
Cycle, s	90.0	Reference Phase	6
Offset, s	45	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	11.5	25.1	4.0	3.6	15.7	0.0	
Yellow	5.0	5.0	5.0	5.0	5.0	0.0	
Red	1.0	1.0	1.0	1.0	1.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.2	4.0	1.3	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	17.5	48.6	10.0	41.1	0.0	21.7	9.6	31.4
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	0.0	3.1	3.1	3.1
Queue Clearance Time (g_s), s	11.2		2.0			15.3	2.1	5.8
Green Extension Time (g_e), s	0.3	0.0	0.2	0.0	0.0	0.5	0.0	0.6
Phase Call Probability	1.00		1.00			1.00	0.91	1.00
Max Out Probability	0.04		0.02			0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	260	388		5	216		0	261		3	93	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1699		1674	1703		1674	1722		1674	1684	
Queue Service Time (g_s), s	9.2	15.7		0.0	9.0		0.0	13.3		0.1	3.8	
Cycle Queue Clearance Time (g_c), s	9.2	15.7		0.0	9.0		0.0	13.3		0.1	3.8	
Green Ratio (*g/C*)	0.43	0.47		0.30	0.39		0.11	0.17		0.24	0.28	
Capacity (*c*), veh/h	501	805		408	665		307	301		178	474	
Volume-to-Capacity Ratio (*X*)	0.520	0.482		0.012	0.324		0.000	0.868		0.018	0.197	
Back of Queue (*Q*), ft/ln (95 th percentile)	170.9	261.7		3.4	178.7		0	243.9		2.4	68.2	
Back of Queue (*Q*), veh/ln (95 th percentile)	6.7	10.2		0.1	7.0		0.0	9.5		0.1	2.7	
Queue Storage Ratio (*RQ*) (95 th percentile)	1.71	0.00		0.03	0.00		0.00	0.00		0.01	0.00	
Uniform Delay (d_1), s/veh	20.2	19.8		22.3	23.1		0.0	36.1		27.5	24.6	
Incremental Delay (d_2), s/veh	0.2	1.5		0.0	1.2		0.0	3.0		0.0	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	20.4	21.3		22.3	24.3		0.0	39.1		27.5	24.7	
Level of Service (LOS)	C	C		C	C			D		C	C	
Approach Delay, s/veh / LOS	21.0	C		24.3	C		39.1	D		24.8	C	
Intersection Delay, s/veh / LOS	25.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.95	B	1.91	B	1.93	B	1.92	B
Bicycle LOS Score / LOS	2.49	B	1.12	A	0.92	A	0.65	A

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HCS7 Two-Way Stop-Control Report

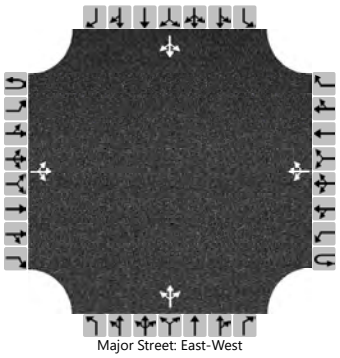
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	2025 PM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Hubbard
Jurisdiction	
East/West Street	Hubbard Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		70	289	125		277	357	0		7	109	26		0	312	37
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		76				301					154				379	
Capacity, c (veh/h)		1165				1105										
v/c Ratio		0.07				0.27										
95% Queue Length, Q_{95} (veh)		0.2				1.1										
Control Delay (s/veh)		8.3				9.5										
Level of Service (LOS)		A				A										
Approach Delay (s/veh)		1.8				6.0										
Approach LOS																

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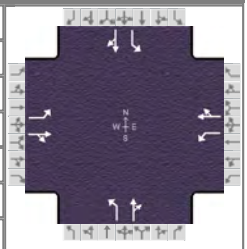
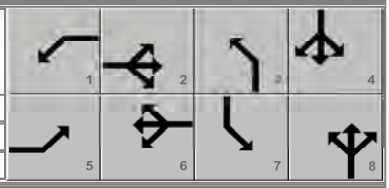
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	PM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Hubbard	File Name	LocustSignals-PM-2025Total.xus		
Project Description	2025 PM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	70	289	125	277	357	0	7	109	26	0	312	37

Signal Information												
Cycle, s	130.0	Reference Phase	6									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On	Green	6.0	7.1	55.3	1.0	30.7	0.0		
Force Mode	Float	Simult. Gap N/S	On	Yellow	5.0	5.0	5.0	5.0	5.0	0.0		
				Red	1.0	1.0	1.0	1.0	1.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	12.0	61.3	25.1	74.4	7.0	43.7	0.0	36.7
Change Period, (*Y+R c*), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	0.0	3.1
Queue Clearance Time (*g s*), s	6.0		18.5		2.4	10.7		30.0
Green Extension Time (*g e*), s	0.1	0.0	0.6	0.0	0.0	0.8	0.0	0.7
Phase Call Probability	0.97		1.00		0.24	1.00		1.00
Max Out Probability	0.00		0.01		0.00	0.01		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	94	554		393	0		8	147		0	379	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1664		1674	0		1674	1698		1674	1725	
Queue Service Time (*g s*), s	4.0	32.7		16.5	0.0		0.4	8.7		0.0	28.0	
Cycle Queue Clearance Time (*g c*), s	4.0	32.7		16.5	0.0		0.4	8.7		0.0	28.0	
Green Ratio (*g/C*)	0.47	0.43		0.59			0.26	0.29		0.19	0.24	
Capacity (*c*), veh/h	400	707		449			89	492		312	407	
Volume-to-Capacity Ratio (*X*)	0.234	0.784		0.877	0.000		0.086	0.298		0.000	0.931	
Back of Queue (*Q*), ft/ln (95 th percentile)	76.7	405.7		261.2	0		8.5	167.6		0	464.4	
Back of Queue (*Q*), veh/ln (95 th percentile)	3.0	15.8		10.2	0.0		0.3	6.5		0.0	18.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.77	0.00		2.61	0.00		0.03	0.00		0.00	0.00	
Uniform Delay (*d 1*), s/veh	21.2	21.4		22.9			39.3	35.9		0.0	48.6	
Incremental Delay (*d 2*), s/veh	0.1	5.3		6.4	0.0		0.2	0.1		0.0	4.2	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	21.3	26.7		29.3			39.5	36.0		0.0	52.8	
Level of Service (LOS)	C	C		C			D	D			D	
Approach Delay, s/veh / LOS	25.9	C		27.1	C		36.2	D		52.8	D	
Intersection Delay, s/veh / LOS	32.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	1.91	B	1.94	B	1.94	B
Bicycle LOS Score / LOS	1.36	A	1.62	B	0.74	A	1.11	A

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HCS7 Two-Way Stop-Control Report

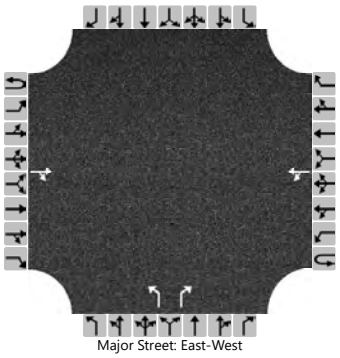
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	AM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Hubbard and Stroebel
Jurisdiction	
East/West Street	Hubbard
North/South Street	Stroebel
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		1	0	1		0	0	0
Configuration				TR		LT				L		R				
Volume (veh/h)			1091	32		8	94			96		24				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						9				104		26				
Capacity, c (veh/h)						568				169		223				
v/c Ratio						0.02				0.62		0.12				
95% Queue Length, Q_{95} (veh)						0.0				3.4		0.4				
Control Delay (s/veh)						11.4				55.9		23.2				
Level of Service (LOS)						B				F		C				
Approach Delay (s/veh)					1.1				49.3							
Approach LOS									E							

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HCS7 Two-Way Stop-Control Report

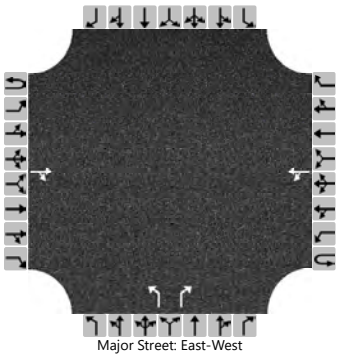
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Time Analyzed	PM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Hubbard and Stroebel
Jurisdiction	
East/West Street	Hubbard
North/South Street	Stroebel
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		1	0	1		0	0	0
Configuration				TR		LT				L		R				
Volume (veh/h)			468	107		27	106			63		16				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						29				68		17				
Capacity, c (veh/h)						952				370		521				
v/c Ratio						0.03				0.19		0.03				
95% Queue Length, Q_{95} (veh)						0.1				0.7		0.1				
Control Delay (s/veh)						8.9				16.9		12.1				
Level of Service (LOS)						A				C		B				
Approach Delay (s/veh)					2.0				16.0							
Approach LOS									C							

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HCS7 All-Way Stop Control Report

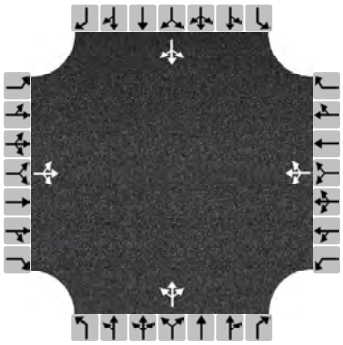
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	03/31/2020
Analysis Year	2025
Analysis Time Period (hrs)	0.25
Time Analyzed	2025 AM Peak Hour Total
Project Description	Ledgestone South

Site Information

Intersection	Locust_Columbia
Jurisdiction	
East/West Street	Columbia Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.92

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	146	506	10	10	170	36	14	235	14	61	86	54
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	720			235			286			218		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.640			0.209			0.254			0.194		
Final Departure Headway, hd (s)	6.45			7.03			7.15			7.30		
Final Degree of Utilization, x	1.289			0.459			0.568			0.443		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	4.45			5.03			5.15			5.30		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	720			235			286			218		
Capacity	558			512			503			493		
95% Queue Length, Q_{95} (veh)	29.4			2.4			3.5			2.2		
Control Delay (s/veh)	163.9			15.9			19.1			16.0		
Level of Service, LOS	F			C			C			C		
Approach Delay (s/veh)	163.9			15.9			19.1			16.0		
Approach LOS	F			C			C			C		
Intersection Delay, s/veh | LOS	89.5						F					

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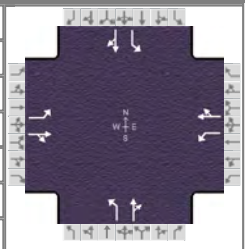
HCS7 Signalized Intersection Results Summary

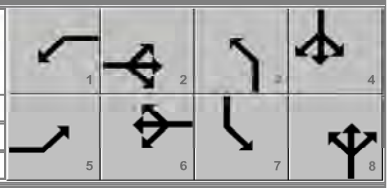
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Columbia	File Name	LocustSignals-AM-2025Total.xus		
Project Description	2025 AM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	146	506	10	10	170	36	14	235	24	61	86	54

Signal Information			
Cycle, s	90.0	Reference Phase	6
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	4.0	31.0	4.0	4.0	17.0	0.0	
Yellow	5.0	5.0	5.0	5.0	5.0	0.0	
Red	1.0	1.0	1.0	1.0	1.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.3	4.0	1.2	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	47.0	10.0	47.0	10.0	23.0	10.0	23.0
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	2.0		2.3		2.6	16.2	4.8	9.4
Green Extension Time (g_e), s	1.5	0.0	0.0	0.0	0.0	0.8	0.0	0.8
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	160	567		9	191		15	282		66	152	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1752		1674	1704		1674	1729		1674	1644	
Queue Service Time (g_s), s	0.0	23.9		0.3	2.6		0.6	14.2		2.8	7.4	
Cycle Queue Clearance Time (g_c), s	0.0	23.9		0.3	2.6		0.6	14.2		2.8	7.4	
Green Ratio (*g/C*)	0.37	0.46		0.41	0.46		0.23	0.19		0.23	0.19	
Capacity (*c*), veh/h	536	798		221	777		271	326		176	310	
Volume-to-Capacity Ratio (*X*)	0.299	0.710		0.042	0.246		0.056	0.863		0.377	0.491	
Back of Queue (*Q*), ft/ln (95 th percentile)	95.2	336.8		4.8	44.1		11.5	257.2		52	134.6	
Back of Queue (*Q*), veh/ln (95 th percentile)	3.7	13.2		0.2	1.7		0.4	10.0		2.0	5.3	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.95	0.00		0.05	0.00		0.04	0.00		0.17	0.00	
Uniform Delay (d_1), s/veh	18.8	20.7		18.5	5.4		27.1	35.4		28.9	32.6	
Incremental Delay (d_2), s/veh	0.1	2.4		0.0	0.7		0.0	2.7		0.5	0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	18.8	23.1		18.5	6.1		27.1	38.1		29.4	33.1	
Level of Service (LOS)	B	C		B	A		C	D		C	C	
Approach Delay, s/veh / LOS	22.2	C		6.7	A		37.5	D		32.0	C	
Intersection Delay, s/veh / LOS	24.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.90	B	1.95	B	1.93	B	1.93	B
Bicycle LOS Score / LOS	1.67	B	0.87	A	0.98	A	0.85	A

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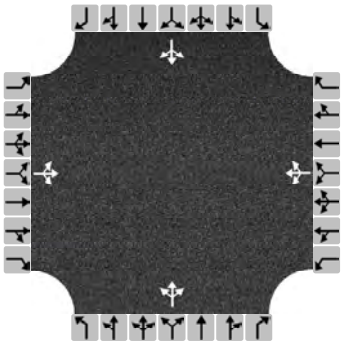
HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	RAB	Intersection	Locust_Columbia
Agency/Co.	WHPacific	Jurisdiction	
Date Performed	03/31/2020	East/West Street	Columbia Rd
Analysis Year	2025	North/South Street	Locust Grove Rd
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.92
Time Analyzed	2025 PM Peak Hour Total		
Project Description	Ledgestone South		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	36	223	10	24	622	46	7	100	20	54	304	231
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	292			752			138			640		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.260			0.669			0.123			0.569		
Final Departure Headway, hd (s)	7.89			7.25			8.60			7.07		
Final Degree of Utilization, x	0.641			1.515			0.330			1.257		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	5.89			5.25			6.60			5.07		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	292			752			138			640		
Capacity	456			497			419			509		
95% Queue Length, Q_{95} (veh)	4.4			39.2			1.4			25.7		
Control Delay (s/veh)	23.9			261.5			15.8			153.4		
Level of Service, LOS	C			F			C			F		
Approach Delay (s/veh)	23.9			261.5			15.8			153.4		
Approach LOS	C			F			C			F		
Intersection Delay, s/veh | LOS	166.8						F					

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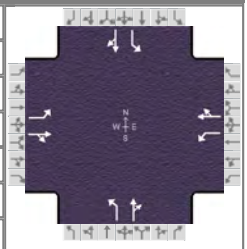
HCS7 Signalized Intersection Results Summary

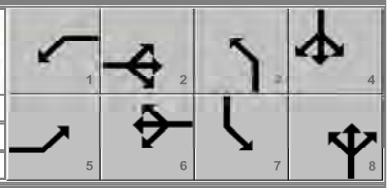
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	PM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Columbia	File Name	LocustSignals-PM-2025Total.xus		
Project Description	2025 PM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	36	223	10	24	622	46	7	100	20	54	304	231

Signal Information			
Cycle, s	130.0	Reference Phase	6
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	6.0	37.4	4.0	4.0	0.9	47.7
Yellow	5.0	5.0	5.0	5.0	0.0	5.0
Red	1.0	1.0	1.0	1.0	0.0	1.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.2	4.0	1.3	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	12.0	55.4	10.0	53.4	10.0	53.7	10.9	54.6
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.2	3.1	3.2
Queue Clearance Time (g_s), s	6.9		2.0		2.4	8.8	4.8	47.1
Green Extension Time (g_e), s	0.0	0.0	0.3	0.0	0.0	1.6	0.1	1.5
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		0.26	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	92	593		19	535		8	130		59	582	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1744		1674	1736		1674	1706		1674	1631	
Queue Service Time (g_s), s	4.9	39.7		0.0	27.4		0.4	6.8		2.8	45.1	
Cycle Queue Clearance Time (g_c), s	4.9	39.7		0.0	27.4		0.4	6.8		2.8	45.1	
Green Ratio (*g/C*)	0.35	0.38		0.30	0.36		0.40	0.37		0.40	0.37	
Capacity (*c*), veh/h	199	662		155	633		117	626		512	610	
Volume-to-Capacity Ratio (*X*)	0.461	0.896		0.124	0.846		0.065	0.208		0.115	0.953	
Back of Queue (*Q*), ft/ln (95 th percentile)	93	578.6		27.3	266.5		6.7	128.9		51.7	653.7	
Back of Queue (*Q*), veh/ln (95 th percentile)	3.6	22.6		1.1	10.4		0.3	5.0		2.0	25.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.93	0.00		0.27	0.00		0.02	0.00		0.17	0.00	
Uniform Delay (d_1), s/veh	33.2	28.8		55.4	13.7		31.9	28.2		24.0	39.6	
Incremental Delay (d_2), s/veh	0.4	13.1		0.1	10.8		0.1	0.1		0.0	5.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	33.6	41.9		55.5	24.5		32.0	28.2		24.1	44.8	
Level of Service (LOS)	C	D		E	C		C	C		C	D	
Approach Delay, s/veh / LOS	40.8	D		25.6	C		28.5	C		42.9	D	
Intersection Delay, s/veh / LOS	36.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.96	B	1.93	B	1.93	B	1.93	B
Bicycle LOS Score / LOS	0.97	A	1.73	B	0.72	A	1.54	B

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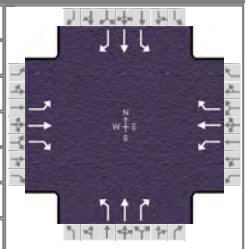
HCS7 Signalized Intersection Results Summary

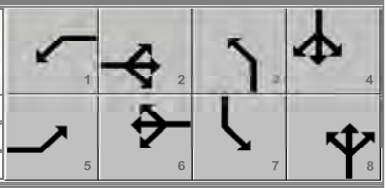
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Lake Hazel	File Name	LocustSignals-AM-2025Total.xus		
Project Description	2025 AM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	29	499	5	14	319	93	10	443	37	133	141	24

Signal Information			
Cycle, s	90.0	Reference Phase	6
Offset, s	16	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	4.0	20.2	4.0	4.0	1.0	26.8
Yellow	5.0	5.0	5.0	5.0	0.0	5.0
Red	1.0	1.0	1.0	1.0	0.0	1.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.2	3.0	1.3	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	10.0	36.2	10.0	36.2	10.0	32.8	11.0	33.8
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	3.2		2.0		2.4	25.8	7.0	7.9
Green Extension Time (g_e), s	0.0	0.0	0.2	0.0	0.0	1.0	0.0	1.2
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	0.99
Max Out Probability	0.29		0.44		0.00	0.00	1.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	32	542	5	8	173	50	11	482	40	145	153	26
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1758	1514	1674	1758	1490	1674	1758	1523	1674	1758	1525
Queue Service Time (g_s), s	1.2	26.7	0.2	0.0	7.3	2.0	0.4	23.8	1.7	5.0	5.9	1.1
Cycle Queue Clearance Time (g_c), s	1.2	26.7	0.2	0.0	7.3	2.0	0.4	23.8	1.7	5.0	5.9	1.1
Green Ratio (*g/C*)	0.29	0.34	0.34	0.25	0.34	0.34	0.34	0.30	0.30	0.35	0.31	0.31
Capacity (*c*), veh/h	326	589	508	168	589	499	425	524	454	203	543	472
Volume-to-Capacity Ratio (*X*)	0.097	0.920	0.011	0.045	0.294	0.101	0.026	0.919	0.089	0.712	0.282	0.055
Back of Queue (*Q*), ft/ln (95 th percentile)	21.8	521.4	3.6	7.1	149.7	34.1	6.7	388.7	27	119.6	110.2	17
Back of Queue (*Q*), veh/ln (95 th percentile)	0.9	20.4	0.1	0.3	5.8	1.3	0.3	15.2	1.1	4.7	4.3	0.7
Queue Storage Ratio (*RQ*) (95 th percentile)	0.22	0.00	0.00	0.07	0.00	0.14	0.02	0.00	0.00	0.40	0.00	0.00
Uniform Delay (d_1), s/veh	23.6	28.8	16.3	39.2	25.7	20.0	19.8	30.5	26.4	25.8	23.5	21.8
Incremental Delay (d_2), s/veh	0.0	21.9	0.0	0.0	1.2	0.4	0.0	2.9	0.0	9.6	0.1	0.0
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	23.6	50.6	16.3	39.2	27.0	20.4	19.9	33.4	26.4	35.4	23.6	21.9
Level of Service (LOS)	C	D	B	D	C	C	B	C	C	D	C	C
Approach Delay, s/veh / LOS	48.8	D		25.9	C		32.6	C		28.7	C	
Intersection Delay, s/veh / LOS	36.6						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.14	B	2.11	B	2.11	B	2.11	B
Bicycle LOS Score / LOS	1.44	A	1.25	A	1.37	A	1.02	A

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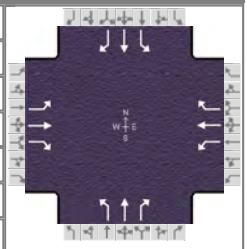
HCS7 Signalized Intersection Results Summary

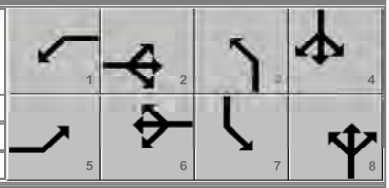
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	Apr 3, 2020	Area Type	Other
Jurisdiction	ACHD	Time Period	PM Peak	PHF	0.92
Urban Street	LocustGrove Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Locust and Lake Hazel	File Name	LocustSignals-PM-2025Total.xus		
Project Description	2025 PM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	13	354	5	23	505	122	20	281	31	245	654	71

Signal Information			
Cycle, s	140.0	Reference Phase	6
Offset, s	20	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	4.0	48.8	4.0	6.5	46.7	0.0	
Yellow	5.0	5.0	5.0	5.0	5.0	0.0	
Red	1.0	1.0	1.0	1.0	1.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	10.0	54.8	10.0	54.8	10.0	52.7	22.5	65.2
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	2.7		3.4		3.2	21.6	16.1	56.9
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	2.4	0.3	2.3
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.02	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	14	385	5	27	588	142	22	305	34	266	711	77
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1758	1514	1674	1758	1490	1674	1758	1523	1674	1758	1525
Queue Service Time (g_s), s	0.7	25.6	0.3	1.4	45.4	12.1	1.2	19.6	2.1	14.1	54.9	4.3
Cycle Queue Clearance Time (g_c), s	0.7	25.6	0.3	1.4	45.4	12.1	1.2	19.6	2.1	14.1	54.9	4.3
Green Ratio (*g/C*)	0.38	0.35	0.35	0.38	0.35	0.35	0.36	0.33	0.33	0.47	0.42	0.42
Capacity (*c*), veh/h	119	613	528	249	613	519	112	587	508	455	743	645
Volume-to-Capacity Ratio (*X*)	0.118	0.628	0.010	0.107	0.960	0.274	0.195	0.521	0.066	0.585	0.956	0.120
Back of Queue (*Q*), ft/ln (95 th percentile)	14.1	445.5	5.7	27.3	646.1	184.1	22.4	339	35.4	244.1	875.4	70.9
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	17.4	0.2	1.1	25.2	7.2	0.9	13.2	1.4	9.5	34.2	2.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.14	0.00	0.00	0.27	0.00	0.74	0.07	0.00	0.00	0.81	0.00	0.00
Uniform Delay (d_1), s/veh	34.9	38.0	29.8	31.2	37.4	45.0	36.1	37.6	31.8	26.0	39.1	24.6
Incremental Delay (d_2), s/veh	0.2	4.8	0.0	0.0	15.2	0.5	0.3	0.3	0.0	0.4	13.5	0.0
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	35.0	42.9	29.8	31.3	52.6	45.5	36.4	37.9	31.8	26.4	52.7	24.6
Level of Service (LOS)	D	D	C	C	D	D	D	D	C	C	D	C
Approach Delay, s/veh / LOS	42.4	D		50.5	D		37.2	D		44.0	D	
Intersection Delay, s/veh / LOS	44.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.12	B	2.12	B	2.13	B	2.11	B
Bicycle LOS Score / LOS	1.15	A	1.65	B	1.08	A	2.23	B

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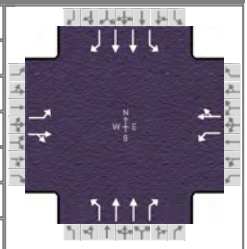
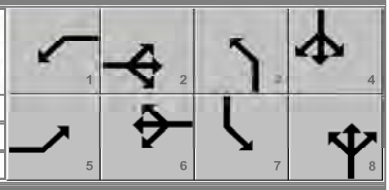
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	8/23/2019	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.92
Urban Street	Meridian Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Meridian and Hubbard	File Name	Meridian&Hubbard-AM-2025Total.xus		
Project Description	2025 AM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	214	37	22	34	10	146	12	1136	14	62	421	55

Signal Information					EB			WB			NB			SB		
Cycle, s	150.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	4.4	6.2		43.9	4.0	1.7	59.9					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	5.0	5.0		5.0	5.0	0.0	5.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0		1.0	1.0	0.0	1.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	3.0
Phase Duration, s	22.5	62.1	10.4	49.9	10.0	65.9	11.7	67.6
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	16.1		4.3		2.7	54.7	5.5	16.0
Green Extension Time (g_e), s	0.4	0.0	0.1	0.0	0.0	5.2	0.1	5.2
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	233	64		37	170		13	1235	15	67	458	60
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1645		1674	1504		1674	1674	1524	1674	1674	1525
Queue Service Time (g_s), s	14.1	3.8		2.3	13.5		0.7	52.7	0.9	3.5	14.0	3.6
Cycle Queue Clearance Time (g_c), s	14.1	3.8		2.3	13.5		0.7	52.7	0.9	3.5	14.0	3.6
Green Ratio (*g/C*)	0.42	0.37		0.32	0.29		0.43	0.40	0.40	0.44	0.41	0.41
Capacity (*c*), veh/h	478	615		485	440		374	1337	608	133	1374	626
Volume-to-Capacity Ratio (*X*)	0.487	0.104		0.076	0.385		0.035	0.924	0.025	0.508	0.333	0.095
Back of Queue (*Q*), ft/ln (95 th percentile)	248.3	73.4		43.9	234.1		12.6	750.5	15.2	67.5	246.1	60.2
Back of Queue (*Q*), veh/ln (95 th percentile)	9.7	2.9		1.7	9.1		0.5	29.3	0.6	2.6	9.6	2.4
Queue Storage Ratio (*RQ*) (95 th percentile)	2.48	0.00		0.44	0.00		0.04	0.00	0.00	0.23	0.00	0.00
Uniform Delay (d_1), s/veh	30.7	30.6		35.3	42.3		25.6	42.9	27.3	35.6	30.2	27.1
Incremental Delay (d_2), s/veh	0.3	0.3		0.0	2.5		0.0	1.3	0.0	1.1	0.1	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	30.9	30.9		35.3	44.8		25.6	44.2	27.3	36.7	30.3	27.2
Level of Service (LOS)	C	C		D	D		C	D	C	D	C	C
Approach Delay, s/veh / LOS	30.9	C		43.1	D		43.8	D		30.7	C	
Intersection Delay, s/veh / LOS	38.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.45	B	2.46	B	1.93	B	1.93	B
Bicycle LOS Score / LOS	0.98	A	0.83	A	1.53	B	0.97	A

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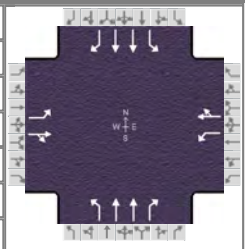
HCS7 Signalized Intersection Results Summary

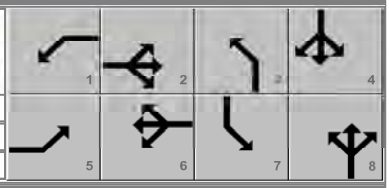
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	8/23/2019	Area Type	Other
Jurisdiction	ACHD	Time Period	PM Peak	PHF	0.92
Urban Street	Meridian Rd	Analysis Year	2025	Analysis Period	1> 5:00
Intersection	Meridian and Hubbard	File Name	Meridian&Hubbard-PM-2025Total.xus		
Project Description	2025 PM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	111	17	45	28	15	126	38	631	37	168	1361	355

Signal Information			
Cycle, s	150.0	Reference Phase	2
Offset, s	0	Reference Point	Begin
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.0	5.9	39.3	4.0	1.0	71.8	
Yellow	5.0	0.0	5.0	5.0	0.0	5.0	
Red	1.0	0.0	1.0	1.0	0.0	1.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	3.0
Phase Duration, s	15.9	51.2	10.0	45.3	10.0	77.8	11.0	78.8
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	9.7		4.0		3.9	22.2	7.0	63.2
Green Extension Time (g_e), s	0.2	0.0	0.0	0.0	0.1	9.7	0.0	9.6
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.00	1.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	121	67		30	153		41	686	40	183	1479	386
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1674	1549		1674	1514		1674	1674	1524	1674	1674	1525
Queue Service Time (g_s), s	7.7	4.8		2.0	12.5		1.9	20.2	2.1	5.0	61.2	26.2
Cycle Queue Clearance Time (g_c), s	7.7	4.8		2.0	12.5		1.9	20.2	2.1	5.0	61.2	26.2
Green Ratio (*g/C*)	0.34	0.30		0.29	0.26		0.51	0.48	0.48	0.51	0.49	0.49
Capacity (*c*), veh/h	380	467		434	397		115	1602	729	360	1624	740
Volume-to-Capacity Ratio (*X*)	0.317	0.144		0.070	0.386		0.360	0.428	0.055	0.507	0.911	0.521
Back of Queue (*Q*), ft/ln (95 th percentile)	146.6	88.2		37.9	222.7		35.1	325	34.7	130.9	846.4	364.2
Back of Queue (*Q*), veh/ln (95 th percentile)	5.7	3.4		1.5	8.7		1.4	12.7	1.4	5.1	33.1	14.6
Queue Storage Ratio (*RQ*) (95 th percentile)	1.47	0.00		0.38	0.00		0.12	0.00	0.00	0.44	0.00	0.00
Uniform Delay (d_1), s/veh	35.9	38.3		38.6	45.4		33.5	25.7	20.9	28.5	35.6	26.6
Incremental Delay (d_2), s/veh	0.2	0.6		0.0	2.8		0.7	0.1	0.0	0.5	2.5	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	36.0	38.9		38.6	48.2		34.2	25.7	21.0	28.9	38.1	26.8
Level of Service (LOS)	D	D		D	D		C	C	C	C	D	C
Approach Delay, s/veh / LOS	37.1	D		46.6	D		25.9	C		35.2	D	
Intersection Delay, s/veh / LOS	33.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.45	B	2.46	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	0.80	A	0.79	A	1.12	A	2.18	B

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TRAFFIC SIGNAL WARRANTS

City/Town:	Kuna, ID	Analysis Performed By:	RB
County:	ADA County	Date Analysis Performed:	4/9/2020
Division:		Project Number if Applicable:	
Data Date:		Weather Conditions:	

Major Route:	Deer Flat	Appr. Lanes:	1	Critical Approach Speed (mph):	50
Minor Route:	Locust Grove	Appr. Lanes:	1		

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? [X] Yes [ ] No
2. Is the intersection in a built-up area or isolated community of <10,000 population? [ ] Yes [ ] No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level [X] 70% [ ] 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied. Satisfied: [ ] Yes [X] No

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied, given adequate trials of other remedial measures have been tried.

Adequate trial(s) of other remedial measures tried: [ ] Yes [X] No

List Remedial Measures Tried (Required for 80% Combination of A & B)

Condition A - Minimum Vehicular Volume & Condition B - Interruption of Continuous Traffic

100% Satisfied: [ ] Yes [X] No

(Used if neither Condition A or B is satisfied) 80% Satisfied: [ ] Yes [X] No

	(volumes in veh/hr)	Minimum Requirements				Eight Highest Hours							
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM
W - 1A 100%	Both Approaches on Major Street	500	350	600	420	375	331	463	581	780	721	493	331
	Highest Approach on Minor Street	150	105	200	140	158	140	196	245	329	304	208	140
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 100%	Both Approaches on Major Street	750	525	900	630	375	331	463	581	780	721	493	331
	Highest Approach on Minor Street	75	53	100	70	158	140	196	245	329	304	208	140
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1A 80%	Both Approaches on Major Street	400	280	480	336	375	331	463	581	780	721	493	331
	Highest Approach on Minor Street	120	84	160	112	158	140	196	245	329	304	208	140
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 80%	Both Approaches on Major Street	600	420	720	504	375	331	463	581	780	721	493	331
	Highest Approach	60	42	80	56	158	140	196	245	329	304	208	140

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

2	on Minor Street	60	42	60	50	150	140	190	240	329	364	200	140	

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

TRAFFIC SIGNAL WARRANTS

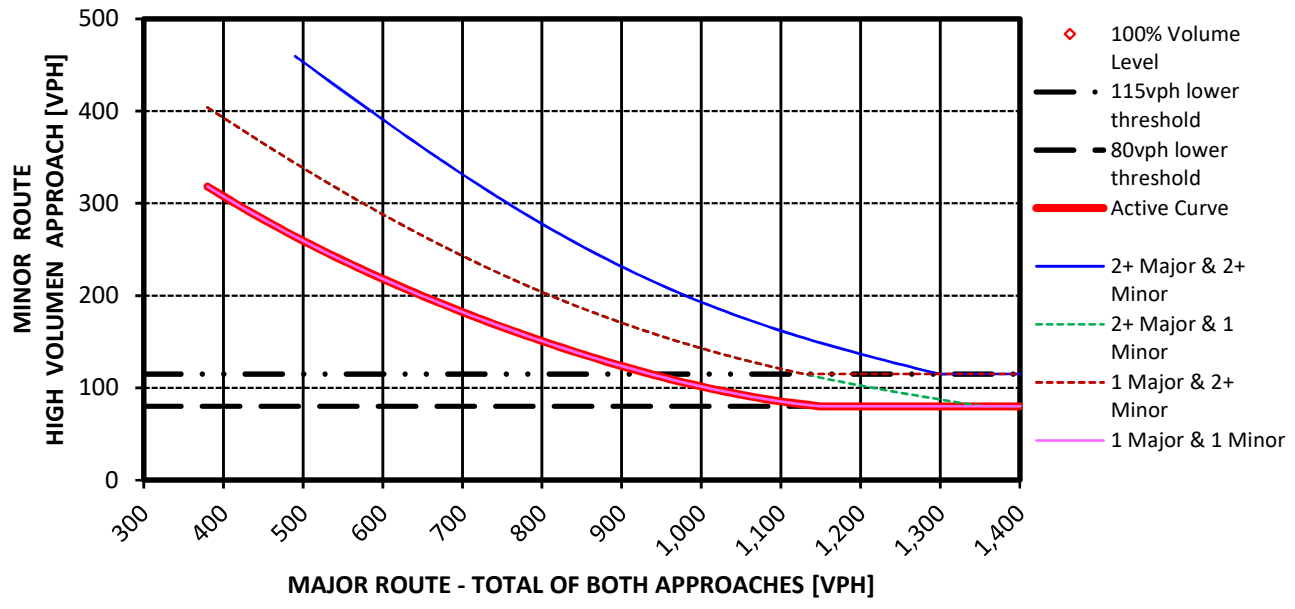
WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Satisfied: [X] Yes [ ] No

If all four points lie above the appropriate line, then this warrant is satisfied.

(Volumes in veh/hr)	Four Highest Hours			
	3 PM	4 PM	5 PM	6 PM
SUM of Both Approaches on Major Street	581	780	721	493
Highest Minor Street Approach	245	329	304	208

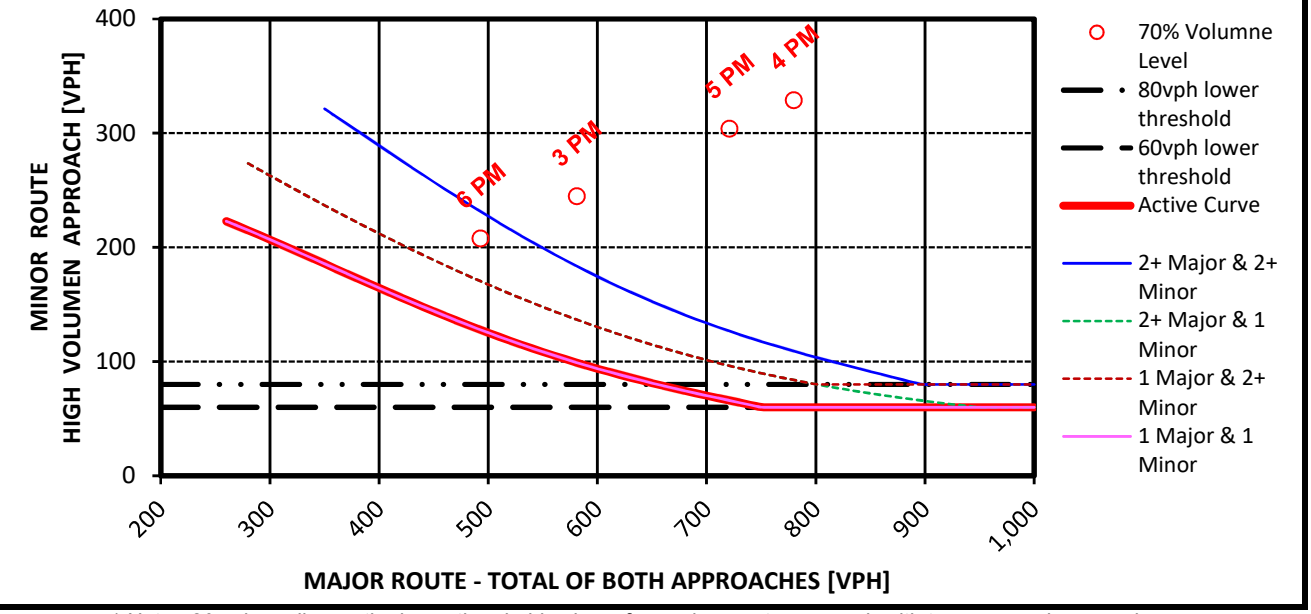
FIGURE W-2: Criteria for "100%" Volume Level



** Note: 115 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

FIGURE W-2: Criteria for "70%" Volume Level

(Community less-than 10,000 population or speeds greater-than 70 km/hr [40 mph] on Major Street)



** Note: 80 vph applies as the lower threshold volume for a minor route approach with two or more lanes and*

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

60 vph applies as the lower threshold volume threshold for a minor route approach with one lane.

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANT SUMMARY

City/Town: Kuna, ID
County: ADA County
Division:
Data Date: 2025 Background

Analysis Performed By: RB
Date Analysis Performed: 4/9/2020
Project Number if Applicable:
Weather Conditions:

Major Route: Deer Flat — Appr. Lanes: 1
Minor Route: Locust Grove — Appr. Lanes: 1
Critical Approach Speed (mph): 50

	SATISFIED		80% Satisfied		100% Satisfied	
Warrant #1: Eight-Hour Vehicular Volume		X No				
1A - Minimum Vehicular Volume:			X Yes	No	Yes	X No
1B - Interruption of Continuous Traffic:			Yes	X No	Yes	X No

Any Remedial Measures Tried and their Outcome.

Warrant #2: Four-Hour Vehicular Volume — X Yes

Warrant #3: Peak Hour — X No

The Unusual Case(s) that Justifies the use of this Warrant.

Warrant #4: Pedestrian Volume — X No

Warrant #5: School Crossing — X No

Any Remedial Measures Implemented to improve the Safety of the Students.

Warrant #6: Coordinated Signal System — X No

Warrant #7: Crash Experience — X No

Other Alternatives that have failed to reduce crashes.

Warrant #8: Roadway Network — X No

Warrant #9: Intersection Near a Grade Crossing — X No

CONCLUSIONS

Warrants Satisfied: 2

Remarks:

Based on MUTCD 2009 Summary Page

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

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TRAFFIC SIGNAL WARRANTS

City/Town:	Kuna, ID	Analysis Performed By:	RB
County:	ADA County	Date Analysis Performed:	4/9/2020
Division:		Project Number if Applicable:	
Data Date:		Weather Conditions:	

Major Route:	Hubbard	Appr. Lanes:	1	Critical Approach Speed (mph):	50
Minor Route:	Locust Grove	Appr. Lanes:	1		

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? [X] Yes [ ] No
2. Is the intersection in a built-up area or isolated community of <10,000 population? [ ] Yes [ ] No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level [X] 70% [ ] 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied. Satisfied: [ ] Yes [X] No

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied, given adequate trials of other remedial measures have been tried.

Adequate trial(s) of other remedial measures tried: [ ] Yes [X] No

List Remedial Measures Tried (Required for 80% Combination of A & B)

Condition A - Minimum Vehicular Volume & Condition B - Interruption of Continuous Traffic

100% Satisfied: [ ] Yes [X] No

(Used if neither Condition A or B is satisfied) 80% Satisfied: [ ] Yes [X] No

	(volumes in veh/hr)	Minimum Requirements				Eight Highest Hours							
	Approach Lanes	1		2 or more		12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM
	Volume Level	100%	70%	100%	70%								
W - 1A 100%	Both Approaches on Major Street	500	350	600	420	479	423	592	742	995	920	629	423
	Highest Approach on Minor Street	150	105	200	140	109	96	135	169	227	210	143	96
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 100%	Both Approaches on Major Street	750	525	900	630	479	423	592	742	995	920	629	423
	Highest Approach on Minor Street	75	53	100	70	109	96	135	169	227	210	143	96
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1A 80%	Both Approaches on Major Street	400	280	480	336	479	423	592	742	995	920	629	423
	Highest Approach on Minor Street	120	84	160	112	109	96	135	169	227	210	143	96
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 80%	Both Approaches on Major Street	600	420	720	504	479	423	592	742	995	920	629	423
	Highest Approach	60	42	80	56	109	96	135	169	227	210	143	96

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

3	on Minor Street	60	42	60	50	109	90	135	109	227	210	145	90	

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

TRAFFIC SIGNAL WARRANTS

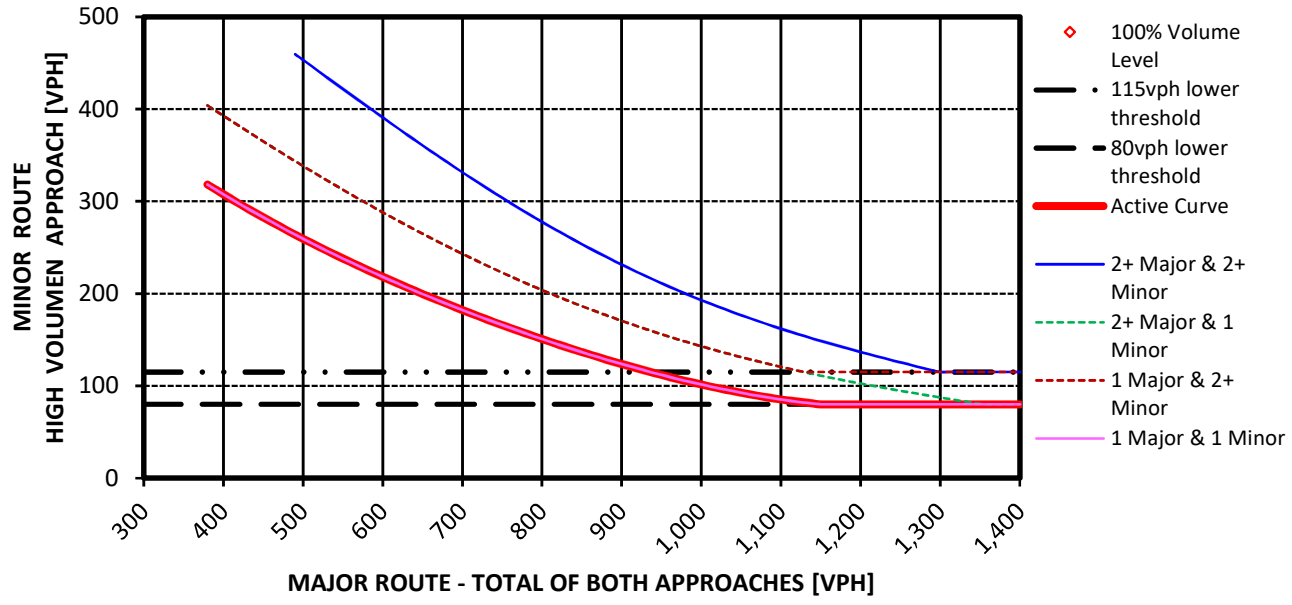
WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Satisfied: [X] Yes [ ] No

If all four points lie above the appropriate line, then this warrant is satisfied.

(Volumes in veh/hr)	Four Highest Hours			
	3 PM	4 PM	5 PM	6 PM
SUM of Both Approaches on Major Street	742	995	920	629
Highest Minor Street Approach	169	227	210	143

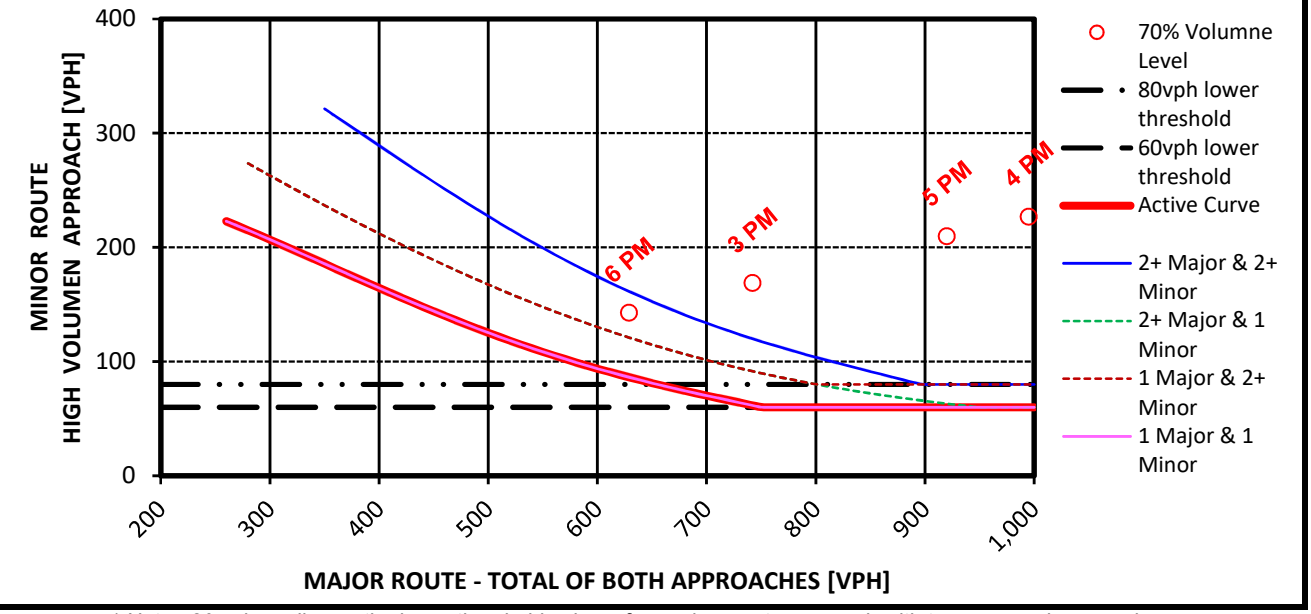
FIGURE W-2: Criteria for "100%" Volume Level



** Note: 115 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

FIGURE W-2: Criteria for "70%" Volume Level

(Community less-than 10,000 population or speeds greater-than 70 km/hr [40 mph] on Major Street)



** Note: 80 vph applies as the lower threshold volume for a minor route approach with two or more lanes and*

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

60 vph applies as the lower threshold volume threshold for a minor route approach with one lane.

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANT SUMMARY

City/Town: Kuna, ID
County: ADA County
Division:
Data Date: 2025 Background

Analysis Performed By: RB
Date Analysis Performed: 4/9/2020
Project Number if Applicable:
Weather Conditions:

Major Route: Hubbard
Minor Route: Locust Grove

Appr. Lanes: 1
Appr. Lanes: 1

Critical Approach Speed (mph): 50

	SATISFIED		80% Satisfied		100% Satisfied	
Warrant #1: Eight-Hour Vehicular Volume		X Yes				
1A - Minimum Vehicular Volume:			X Yes	No	Yes	X No
1B - Interruption of Continuous Traffic:			X Yes	No	Yes	X No

Any Remedial Measures Tried and their Outcome.

Warrant #2: Four-Hour Vehicular Volume — X Yes / No

Warrant #3: Peak Hour — Yes / X No

The Unusual Case(s) that Justifies the use of this Warrant.

Warrant #4: Pedestrian Volume — Yes / X No

Warrant #5: School Crossing — Yes / X No

Any Remedial Measures Implemented to improve the Safety of the Students.

Warrant #6: Coordinated Signal System — Yes / X No

Warrant #7: Crash Experience — Yes / X No

Other Alternatives that have failed to reduce crashes.

Warrant #8: Roadway Network — Yes / X No

Warrant #9: Intersection Near a Grade Crossing — Yes / X No

CONCLUSIONS

Warrants Satisfied: 2

Remarks:

Based on MUTCD 2009 Summary Page

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

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TRAFFIC SIGNAL WARRANTS

City/Town:	Kuna, ID	Analysis Performed By:	RB
County:	ADA County	Date Analysis Performed:	4/3/2020
Division:		Project Number if Applicable:	
Data Date:		Weather Conditions:	

Major Route:	Columbia	Appr. Lanes:	1	Critical Approach Speed (mph):	50
Minor Route:	Locust Grove	Appr. Lanes:	1		

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? [X] Yes [ ] No
2. Is the intersection in a built-up area or isolated community of <10,000 population? [ ] Yes [ ] No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level [X] 70% [ ] 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied. Satisfied: [X] Yes [ ] No

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied, given adequate trials of other remedial measures have been tried.

Adequate trial(s) of other remedial measures tried: [ ] Yes [X] No

List Remedial Measures Tried (Required for 80% Combination of A & B)

Condition A - Minimum Vehicular Volume & Condition B - Interruption of Continuous Traffic

100% Satisfied: [X] Yes [ ] No

(Used if neither Condition A or B is satisfied) 80% Satisfied: [ ] Yes [ ] No

	(volumes in veh/hr)	Minimum Requirements				Eight Highest Hours							
	Approach Lanes	1		2 or more		12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM
	Volume Level	100%	70%	100%	70%								
W - 1A 100%	Both Approaches on Major Street	500	350	600	420	434	383	536	672	901	833	570	383
	Highest Approach on Minor Street	150	105	200	140	218	192	269	337	452	418	286	192
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 100%	Both Approaches on Major Street	750	525	900	630	434	383	536	672	901	833	570	383
	Highest Approach on Minor Street	75	53	100	70	218	192	269	337	452	418	286	192
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1A 80%	Both Approaches on Major Street	400	280	480	336	434	383	536	671	901	833	570	383
	Highest Approach on Minor Street	120	84	160	112	218	192	269	337	452	418	286	192
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 80%	Both Approaches on Major Street	600	420	720	504	434	383	536	671	904	833	570	383
	Highest Approach	60	42	80	56	218	192	269	337	452	418	286	192

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

3	on Minor Street	60	42	60	50	210	192	269	307	432	418	288	192	

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

TRAFFIC SIGNAL WARRANTS

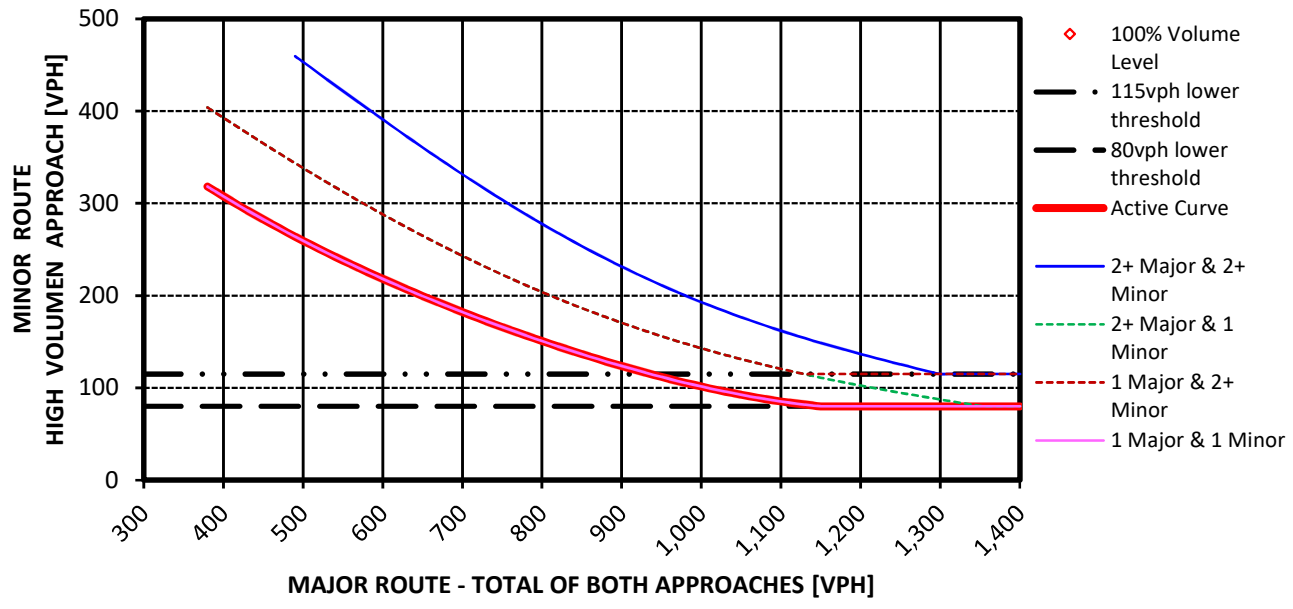
WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Satisfied: [X] Yes [ ] No

If all four points lie above the appropriate line, then this warrant is satisfied.

(Volumes in veh/hr)	Four Highest Hours			
	3 PM	4 PM	5 PM	6 PM
SUM of Both Approaches on Major Street	672	901	833	570
Highest Minor Street Approach	337	452	418	286

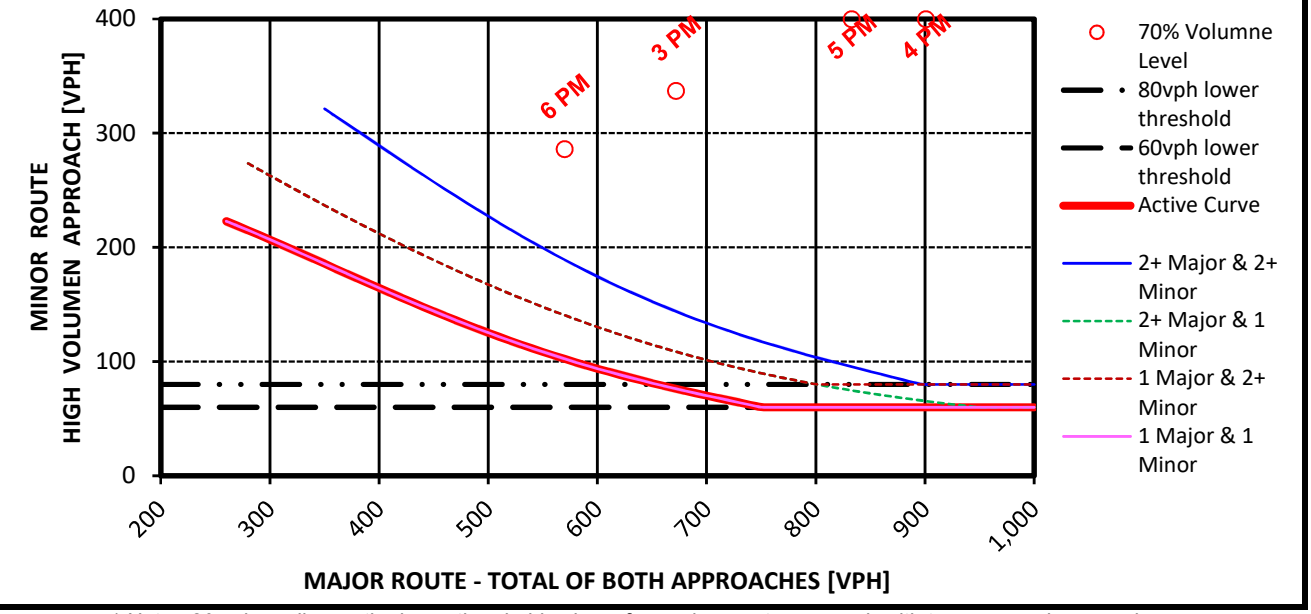
FIGURE W-2: Criteria for "100%" Volume Level



** Note: 115 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

FIGURE W-2: Criteria for "70%" Volume Level

(Community less-than 10,000 population or speeds greater-than 70 km/hr [40 mph] on Major Street)



** Note: 80 vph applies as the lower threshold volume for a minor route approach with two or more lanes and*

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

60 vph applies as the lower threshold volume threshold for a minor route approach with one lane.

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANT SUMMARY

City/Town: Kuna, ID
County: ADA County
Division:
Data Date: 2025 Background

Analysis Performed By: RB
Date Analysis Performed: 4/3/2020
Project Number if Applicable:
Weather Conditions:

Major Route: Columbia — Appr. Lanes: 1
Minor Route: Locust Grove — Appr. Lanes: 1
Critical Approach Speed (mph): 50

	SATISFIED		80% Satisfied		100% Satisfied	
Warrant #1: Eight-Hour Vehicular Volume	[X] Yes	[ ] No				
1A - Minimum Vehicular Volume:			[X] Yes	[ ] No	[X] Yes	[ ] No
1B - Interruption of Continuous Traffic:			[ ] Yes	[X] No	[ ] Yes	[X] No

Any Remedial Measures Tried and their Outcome.

Warrant #2: Four-Hour Vehicular Volume [X] Yes [ ] No

Warrant #3: Peak Hour [ ] Yes [X] No

The Unusual Case(s) that Justifies the use of this Warrant.

Warrant #4: Pedestrian Volume [ ] Yes [X] No

Warrant #5: School Crossing [ ] Yes [X] No

Any Remedial Measures Implemented to improve the Safety of the Students.

Warrant #6: Coordinated Signal System [ ] Yes [X] No

Warrant #7: Crash Experience [ ] Yes [X] No

Other Alternatives that have failed to reduce crashes.

Warrant #8: Roadway Network [ ] Yes [X] No

Warrant #9: Intersection Near a Grade Crossing [ ] Yes [X] No

CONCLUSIONS

Warrants Satisfied: 1 2

Remarks:

Based on MUTCD 2009 Summary Page

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

rev. 05/2011

TRAFFIC SIGNAL WARRANTS

City/Town:	Kuna, ID	Analysis Performed By:	RB
County:	ADA County	Date Analysis Performed:	4/3/2020
Division:		Project Number if Applicable:	
Data Date:		Weather Conditions:	

Major Route:	Lake Hazel	Appr. Lanes:	1	Critical Approach Speed (mph):	50
Minor Route:	Locust Grove	Appr. Lanes:	1		

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? [X] Yes [ ] No
2. Is the intersection in a built-up area or isolated community of <10,000 population? [ ] Yes [ ] No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level [X] 70% [ ] 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied. Satisfied: [ ] Yes [X] No

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied, given adequate trials of other remedial measures have been tried.

Adequate trial(s) of other remedial measures tried: [ ] Yes [X] No

List Remedial Measures Tried (Required for 80% Combination of A & B)

Condition A - Minimum Vehicular Volume & Condition B - Interruption of Continuous Traffic

100% Satisfied: [ ] Yes [X] No

(Used if neither Condition A or B is satisfied) 80% Satisfied: [ ] Yes [X] No

	(volumes in veh/hr)	Minimum Requirements				Eight Highest Hours							
	Approach Lanes	1		2 or more		12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM
	Volume Level	100%	70%	100%	70%								
W - 1A 100%	Both Approaches on Major Street	500	350	600	420	391	407	338	568	740	1,024	648	380
	Highest Approach on Minor Street	150	105	200	140	198	201	180	323	499	650	409	251
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 100%	Both Approaches on Major Street	750	525	900	630	391	407	338	568	740	1,024	648	380
	Highest Approach on Minor Street	75	53	100	70	198	201	180	323	499	650	409	251
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1A 80%	Both Approaches on Major Street	400	280	480	336	391	407	338	568	740	1,024	648	380
	Highest Approach on Minor Street	120	84	160	112	198	201	180	323	499	650	409	251
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 80%	Both Approaches on Major Street	600	420	720	504	391	407	338	568	740	1,024	648	380
	Highest Approach	60	42	80	56	198	201	180	323	499	650	409	251

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

2	on Minor Street	60	42	60	50	190	267	760	920	490	650	469	267	

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

TRAFFIC SIGNAL WARRANTS

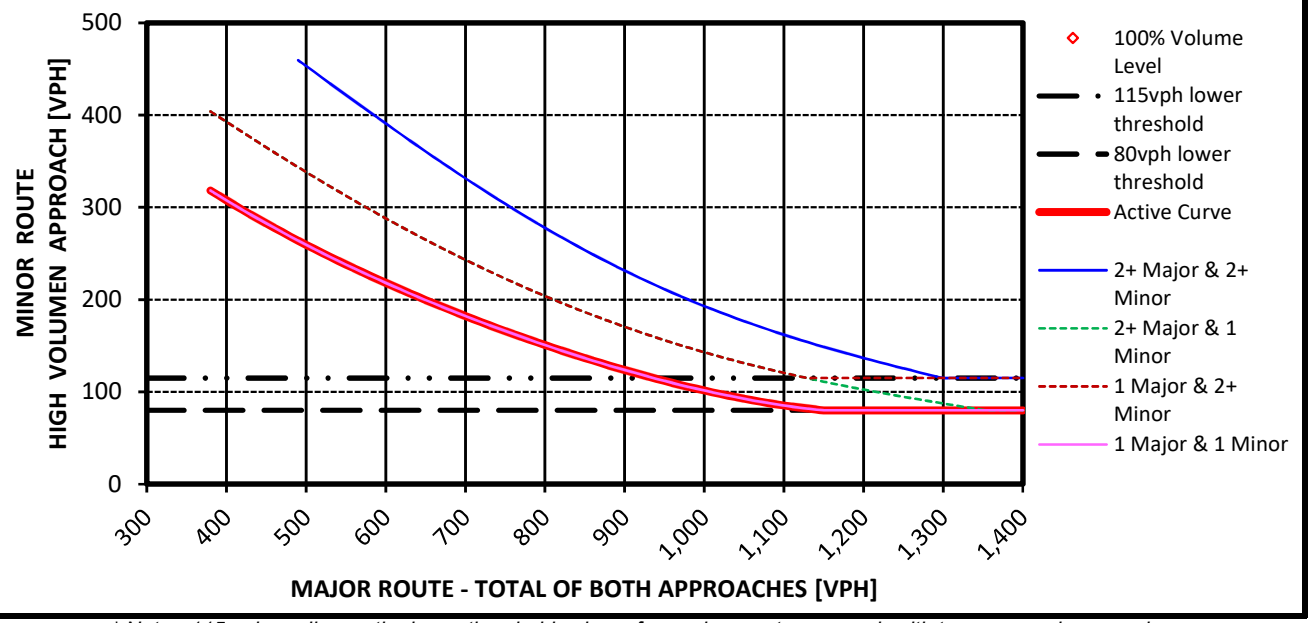
WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Satisfied: [X] Yes [ ] No

If all four points lie above the appropriate line, then this warrant is satisfied.

(Volumes in veh/hr)	Four Highest Hours			
	3 PM	4 PM	5 PM	6 PM
SUM of Both Approaches on Major Street	568	740	1,024	648
Highest Minor Street Approach	323	499	650	409

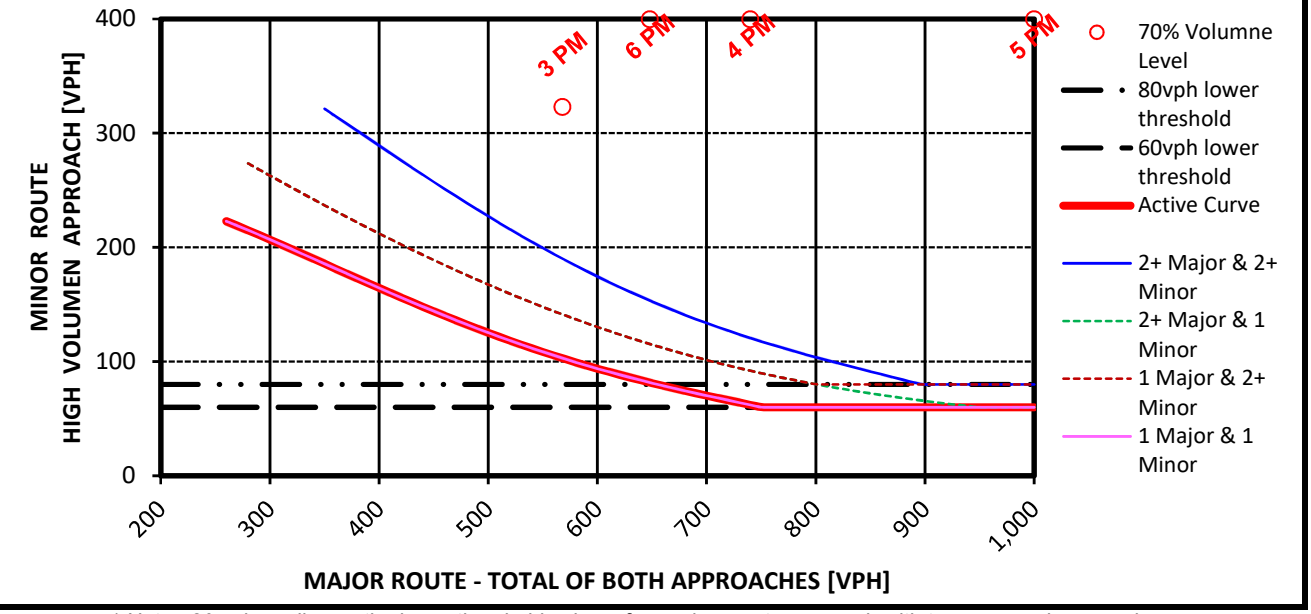
FIGURE W-2: Criteria for "100%" Volume Level



** Note: 115 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

FIGURE W-2: Criteria for "70%" Volume Level

(Community less-than 10,000 population or speeds greater-than 70 km/hr [40 mph] on Major Street)



** Note: 80 vph applies as the lower threshold volume for a minor route approach with two or more lanes and*

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

60 vph applies as the lower threshold volume threshold for a minor route approach with one lane.

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANT SUMMARY

City/Town: Kuna, ID
County: ADA County
Division:
Data Date: 2025 Background

Analysis Performed By: RB
Date Analysis Performed: 4/3/2020
Project Number if Applicable:
Weather Conditions:

Major Route: Lake Hazel — Appr. Lanes: 1
Minor Route: Locust Grove — Appr. Lanes: 1
Critical Approach Speed (mph): 50

	SATISFIED	80% Satisfied		100% Satisfied	
Warrant #1: Eight-Hour Vehicular Volume	☐ Yes ☒ No				
1A - Minimum Vehicular Volume:		☒ Yes	☐ No	☐ Yes	☒ No
1B - Interruption of Continuous Traffic:		☐ Yes	☒ No	☐ Yes	☒ No

Any Remedial Measures Tried and their Outcome.

Warrant #2: Four-Hour Vehicular Volume ☒ Yes ☐ No

Warrant #3: Peak Hour ☐ Yes ☒ No

The Unusual Case(s) that Justifies the use of this Warrant.

Warrant #4: Pedestrian Volume ☐ Yes ☒ No

Warrant #5: School Crossing ☐ Yes ☒ No

Any Remedial Measures Implemented to improve the Safety of the Students.

Warrant #6: Coordinated Signal System ☐ Yes ☒ No

Warrant #7: Crash Experience ☐ Yes ☒ No

Other Alternatives that have failed to reduce crashes.

Warrant #8: Roadway Network ☐ Yes ☒ No

Warrant #9: Intersection Near a Grade Crossing ☐ Yes ☒ No

CONCLUSIONS

Warrants Satisfied: 2

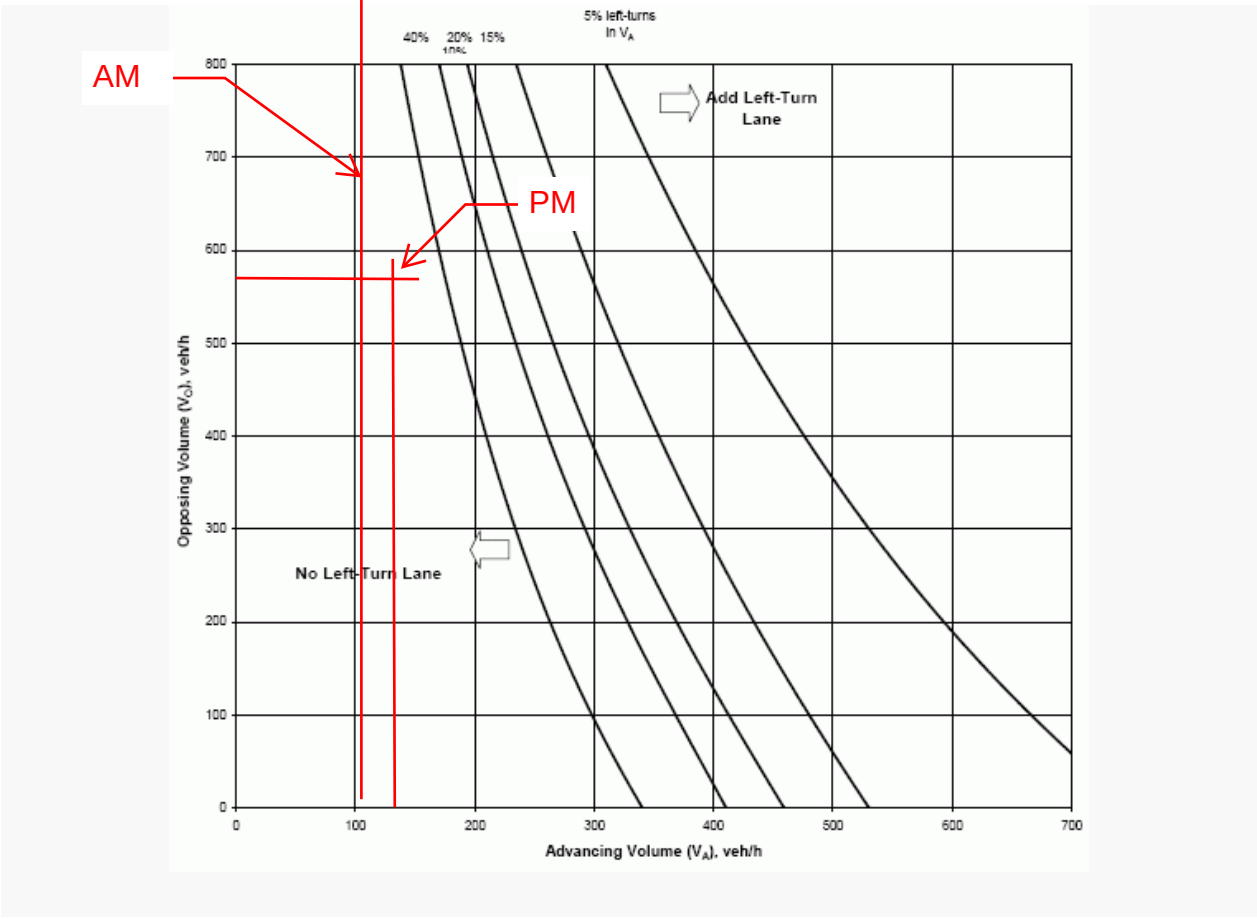
Remarks:

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

Hubbard and Stroebel

LT lane not warranted.

Figure 2 – Left-Turn Lane Guidelines for Two-Lane Roads, 45 mph



The following data are required:

1. Opposing Volume (veh/hr) - VO - The opposing volume is to include only the right-turn and through movements in the opposite direction of the left turning vehicle.

2. Advancing Volume (veh/hr) - VA - The advancing volume is to include the right-turn, left-turn and through movements in the same direction as the left turning vehicle.

3. Operating Speed (mph) - The greatest of anticipated operating speed, measured 85th percentile speed or posted speed.

4. Percentage of left turns in VA

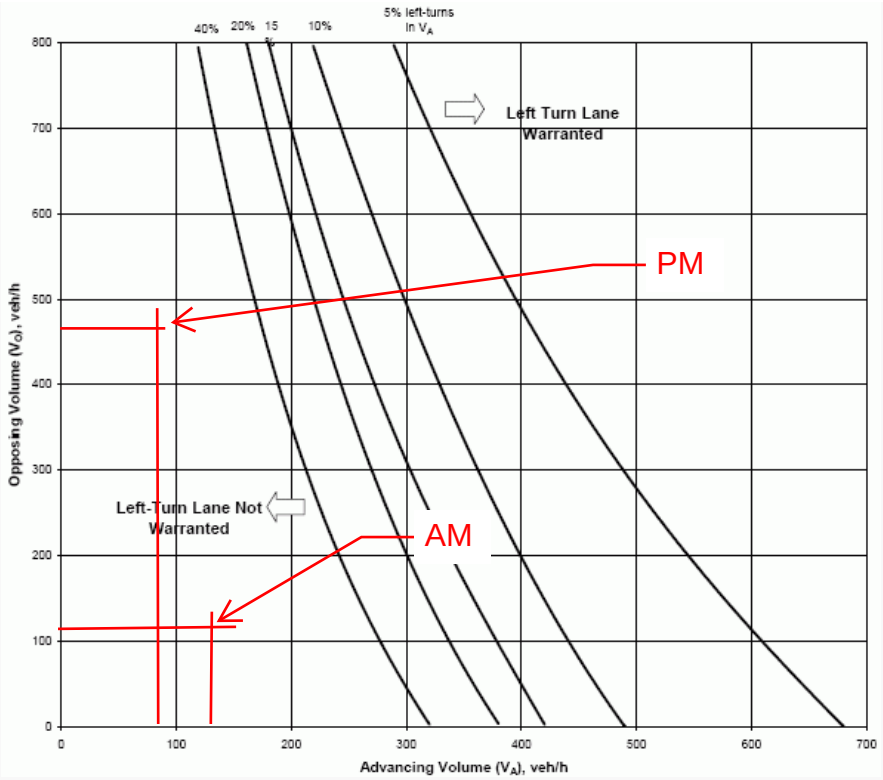
Left-turn lane is not needed for left-turn volume less than 10 vph. However, criteria other than volume, such as crash experience, may be used to justify a left-turn lane.

The appropriate trend line is identified on the basis of the percentage of left-turns in the advancing volume, rounded up to the nearest percentage trend line. If the advancing and opposing volume combination intersects above or to the right of this trend line, a left-turn lane is appropriate.

Source: NCHRP Report 279 and 457

Locust Grove and East Access

Figure 3 – Left-Turn Lane Guidelines for Two-Lane Roads, 50 mph



The following data are required:

1. Opposing Volume (veh/hr) - VO - The opposing volume is to include only the right-turn and through movements in the opposite direction of the left-turning vehicle.

2. Advancing Volume (veh/hr) - VA - The advancing volume is to include the right-turn, left-turn and through movements in the same direction as the left-turning vehicle.

3. Operating Speed (mph) - The greatest of anticipated operating speed, measured 85th percentile speed or posted speed.

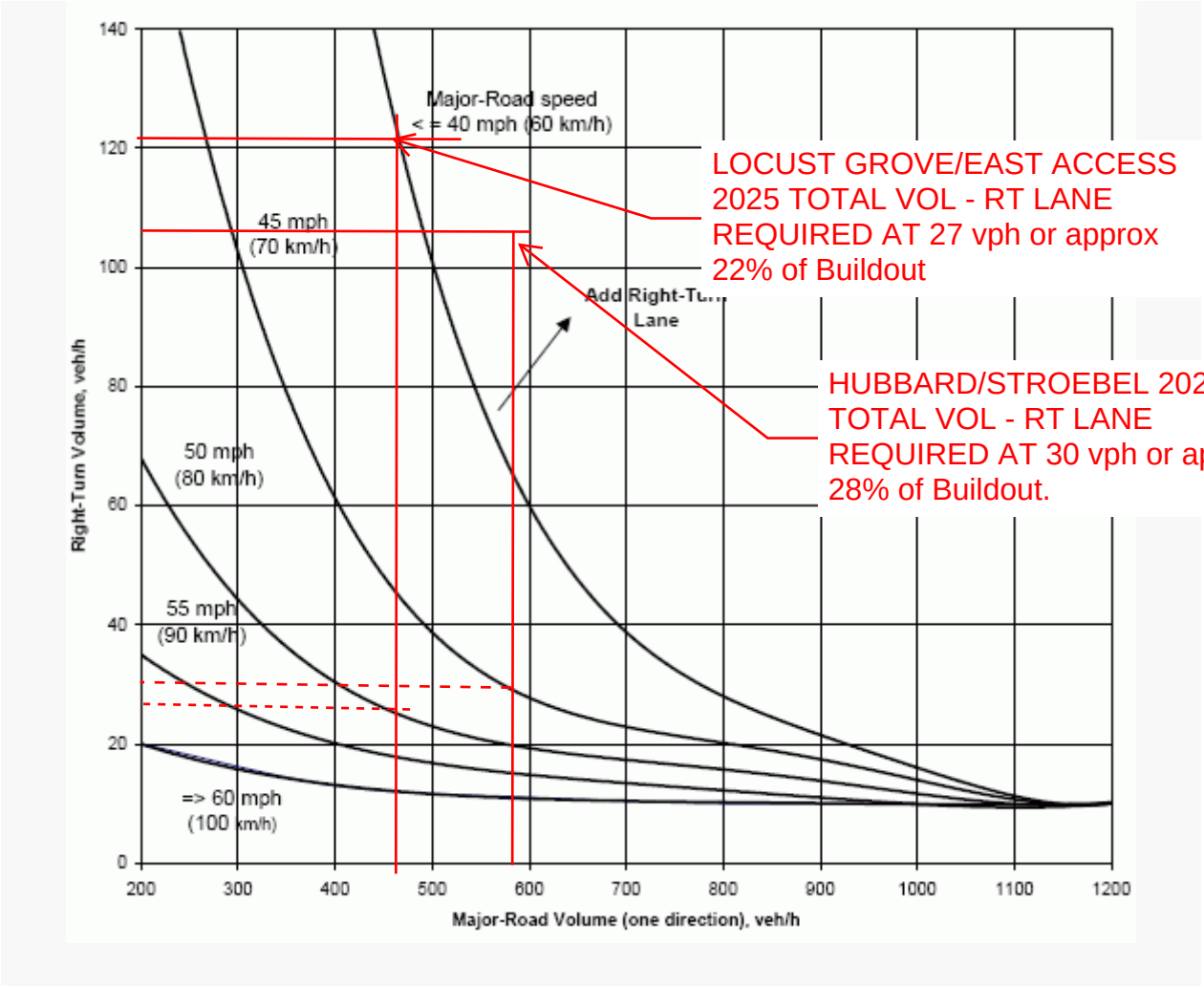
4. Percentage of left-turns in VA

Left-turn lane is not needed for left-turn volume less than 10 vph. However, criteria other than volume, such as crash experience, may be used to justify a left-turn lane.

The appropriate trend line is identified on the basis of the percentage of left-turns in the advancing volume, rounded up to the nearest percentage trend line. If the advancing and opposing volume combination intersects above or to the right of this trend line, a left-turn lane is appropriate.

Source: NCHRP Report 279 and 457

Figure 6 – Right-Turn Lane Guidelines for Two-Lane Roadways



The following data are required:

1. Advancing Volume (veh/hr) - The advancing volume is to include the right-turn, left-turn and through movements in the same direction as the right-turning vehicle.

2. Right-Turning Volume (veh/hr) - The right-turning volume is the number of advancing vehicles turning right.

3. Operating Speed (mph) - The greatest of anticipated operating speed, measured 85th percentile speed or posted speed.

Note: Right-turn lane is not needed for right-turn volume less than 10 vph. However, criteria other than volume, e.g. crash experience, may be used to justify a right-turn lane.

If the combination of major road approach volume and right-turn volume intersects above or to the right of the speed trend line corresponding to the major road operating speed, then a right-turn lane is appropriate.

Source: NCHRP Report 279 and 457

TRAFFIC IMPACT STUDY
FOR
LEDGESTONE SOUTH SUBDIVISION
ADA COUNTY, ID

Prepared for:
TRILOGY DEVELOPMENT, INC.
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October 23, 2019

EXECUTIVE SUMMARY

This study was prepared in accordance with the ADA County Highway District's (ACHD's) requirements for a Traffic Impact Study listed in Section 7106 of the current *ACHD Policy Manual.* It evaluates the traffic impacts associated with the Ledgestone South Subdivision in Kuna, ID. The study area, scope and specific analysis parameters and requirements are the result of an Area of Influence Review performed by the Community Planning Association of Southwest Idaho (COMPASS) and discussion with ACHD. The study's principal findings and recommendations are summarized below.

Proposed Development

1.0 Ledgestone Subdivision is a proposed development consisting of 431 single-family dwelling units on a 95.95 acre parcel located south of Hubbard Road, between Meridian Road (SH 69) and Locust Grove Road located in Ada County, Idaho.

2.0 The development is planned to be constructed over a period of approximately six years, or to the year 2025. Due to the short duration of buildout, an interim evaluation was not required by ACHD.

3.0 The proposed development is expected to generate 4,069 daily trips, 319 AM peak hour trips and 427 PM peak hour trips.

4.0 The primary roadway network serving this proposed subdivision includes the following roadway segments and intersections:

Intersections:

- Hubbard Road and SH69 (Meridian Road)
- Locust Grove Road and Deer Flat Road
- Locust Grove Road and Hubbard Road
- Locust Grove Road and Columbia Road
- Locust Grove Road and Lake Hazel Road
- All site access points

Segments:

- Hubbard Rd between SH69 and Locust Grove Rd
- Hubbard Rd between Locust Grove Rd and Eagle Rd
- Locust Grove Rd between Deer Flat Rd and Hubbard Rd
- Locust Grove Rd between Hubbard Rd and Columbia Rd
- Locust Grove Rd between Columbia Rd and Lake Hazel Rd
- Locust Grove Rd between Lake Hazel Rd and Amity Rd
- All internal collectors

Primary access to the site will be provided via S. Stroebel Road, constructed along the ½ mile alignment, between Meridian Road and Locust Grove Road and an easterly access on Locust Grove Road.

Proposed Mitigation for Existing Traffic

5.0 For the existing traffic conditions analyzed with the existing roadway lane configuration, all study area roadways meet ACHD's minimum operational thresholds. No roadway improvements are needed to mitigate existing traffic.

6.0 For the existing traffic conditions analyzed with the existing intersection control and lane configuration, all study area intersections meet ACHD's minimum operational thresholds. No intersection improvements are needed to mitigate the existing traffic.

Proposed Mitigation for 2025 Background Traffic

7.0 For the 2025 Background traffic conditions analyzed with the existing roadway lane configuration, all study area roadways meet ACHD's minimum operational thresholds. No roadway improvements are needed to mitigate 2025 Background traffic.

8.0 For the 2025 Background traffic conditions analyzed with the existing intersection control and lane configuration, one of the study area intersections does not meet ACHD's minimum operational thresholds. The intersection of Lake Hazel Road and Locust Grove performs poorly in the PM peak hour under AWSC and is expected to meet at least one traffic signal warrant under 2025 Background conditions. While installation of a traffic signal may be a viable option, ACHD's CIP has programmed a single-lane roundabout at this location. Under this scenario, traffic operations are improved to LOS B or better.

Proposed Mitigation for 2025 Site Plus Background Traffic

9.0 For the 2025 Site Plus Background traffic conditions analyzed with the existing roadway lane configuration, all study area roadways meet ACHD's minimum operational thresholds. No roadway improvements are needed to mitigate 2025 Site Plus Background traffic.

10.0 For the 2025 Site Plus Background traffic conditions analyzed with the existing (and 2025 Background improvements) intersection control and lane configuration, all study area intersections meet ACHD's minimum operation thresholds. Therefore, no intersection improvements are needed to mitigate 2025 Site Plus Background traffic.

PROPOSED DEVELOPMENT

Project Description

The Ledgestone Subdivision is a proposed development consisting of 431 single-family dwelling units on a 95.95 acre parcel located south of Hubbard Road, between Meridian Road (SH 69) and Locust Grove Road. Primary access to the site will be provided via S. Stroebel Road, constructed along the ½ mile alignment, between Meridian Road and Locust Grove Road and south of the Mason Creek Ditch on Locust Grove Road. The existing site is currently undeveloped farm land and is zoned Rural Residential (RR). The project proposes to rezone to Medium Density Residential (R6). The proposed site plan is illustrated in Figure 1.

Buildout of the Ledgestone Subdivision is expected to occur over an approximate six-year period, or by 2025. Due to the short duration of buildout an interim phasing is not anticipated.

STUDY APPROACH

This Traffic Impact Study is required by ACHD as part of the development approval process and follows the requirements for Traffic Impact Studies listed in Section 7106 of the current ACHD Policy Manual.

Initial Meeting

Upon discussion with ACHD staff, an initial meeting for purposes of the TIS was deemed unnecessary as ACHD previously met with the developer (Trilogy) to discuss the context of the project. Subsequent to this discussion, the Community Planning Association of Southwest Idaho (COMPASS) performed an Area of Influence model run from which ACHD developed the review limits for the TIS. The proposed development falls within TAZ 1181. The current COMPASS model assumes 6 households (HH) and 0 jobs within this TAZ. Under the proposed development of 431 single-family homes, the total HH equals 437. Using the 2025 forecast year, COMPASS ran the model with and without the proposed development to confirm likely trip impacts. The review concluded that the following intersections and roadway segments be include in the TIS evaluation:

Intersections:

- Hubbard Road and SH69 (Meridian Road)
- Locust Grove Road and Deer Flat Road
- Locust Grove Road and Hubbard Road
- Locust Grove Road and Columbia Road
- Locust Grove Road and Lake Hazel Road
- All site access points

Segments:

- Hubbard Rd between Meridian Rd and Locust Grove Rd
- Hubbard Rd between Locust Grove Rd and Eagle Rd
- Locust Grove Rd between Deer Flat Rd and Hubbard Rd
- Locust Grove Rd between Hubbard Rd and Columbia Rd
- Locust Grove Rd between Columbia Rd and Lake Hazel Rd
- Locust Grove Rd between Lake Hazel Rd and Amity Rd
- All internal collectors

This Area of Influence analysis as provided to ACHD is included in the Appendix.

Figure 1 Proposed Site Plan

Study Area

In accordance with the Area of Influence review performed by COMPASS the following intersections and roadway segments will be reviewed:

Intersections:

- Hubbard Road and SH69 (Meridian Road)
- Locust Grove Road and Deer Flat Road
- Locust Grove Road and Hubbard Road
- Locust Grove Road and Columbia Road
- Locust Grove Road and Lake Hazel Road
- All site access points

Segments:

- Hubbard Rd between Meridian Rd and Locust Grove Rd
- Hubbard Rd between Locust Grove Rd and Eagle Rd
- Locust Grove Rd between Deer Flat Rd and Hubbard Rd
- Locust Grove Rd between Hubbard Rd and Columbia Rd
- Locust Grove Rd between Columbia Rd and Lake Hazel Rd
- Locust Grove Rd between Lake Hazel Rd and Amity Rd
- All internal collectors

Study Period

The study periods will include:

- Existing (2019)
- 2025 Background
- 2025 Site Plus Background (Total)

The following time intervals will be evaluated:

- Weekday AM Peak Hour
- Weekday PM Peak Hour

As this development is comprised entirely of single-family homes, a weekend peak hour review was not deemed necessary.

ANALYSIS OF EXISTING (2019) CONDITIONS

Roadway Network

Table 1 summarizes the characteristics of the roadway network within the study area.

Table 1 – Study Area Roadways

Roadway	Functional Classification	Posted Speed (mph)	Lanes (total)
SH69	Principal Arterial	55	5 (includes TWLTL)
Columbia Road	Minor Arterial	50	2
Hubbard Road	Minor Arterial	45	2
Locust Grove Road	Minor Arterial	50	2

Functional Classification noted in accordance with 2040 Functional Classification Map, COMPASS
TWLTL = Two-Way-Left Turn Lane

All but one of the intersections within the study area are stop-controlled (unsignalized). A four-way stop exists at Locust Grove Road and Columbia Road and Locust Grove and Lake Hazel Road. A two-way stop in the northbound and southbound directions is present at Locust Grove Road and Hubbard Road and Locust Grove and Deer Flat Road. At SH69 and Hubbard Road, a traffic signal is present. Figure 2 illustrates existing lane configuration and traffic control conditions.

Transit Service

Due to the rural nature of the study area no existing transit routes in the vicinity exist. The closest available transit routes are located along Overland Road to the north, with stops in the vicinity of Eagle Road and SH69.

Bicycle and Pedestrian Facilities

No bicycle or pedestrian facilities exist within the study area.

Traffic Volumes

Existing 24-hour counts and intersection turn movement counts were previously collected on Tuesday, August 7, 2018 for the Ledgestone Subdivision TIS (dated October 10, 2018). 24-hour counts were recorded at 1) Hubbard Road, between SH69 and Locust Grove Road and 2) Locust Grove Road, between Hubbard Road and Columbia Road. Intersection turn movement counts were recorded between 7:00 AM – 9:00 AM and 4:00 PM to 6:00 PM in order to isolate the AM and PM peak hour conditions. Intersection count locations included 1) Hubbard Road and Meridian Road, 2) Hubbard Road and Locust Grove Road and 3) Locust Grove Road and Columbia Road. To augment this data additional 24-hour counts were recorded on September 10, 2019 at 1a) Locust Grove Road, between Hubbard Rd and Deer Flat Road and 2b) Locust Grove Road, between Columbia Road and Lake Hazel Road. Additional intersection turn movement counts were recorded at 1a) Locust Grove Road Lake Hazel Road and 2b) Locust Grove Road and Deer Flat Road. Figure 3 illustrates existing 24-hour and intersection turn movement counts. Detailed count summaries are also included in the Appendix.

Intersection Crash Data

The most current crash data (2012–2017) as documented by the Local Highway Technical Assistance Council (LHTAC) website (http://gis.lhtac.org/safety/) was reviewed. Table 2 summarizes crash records at each of the study area intersections.

Table 2 – Intersection Crash Data (2012-2017)

Intersection	Total Crashes	PDO/Injury/Fatal
SH69 and Hubbard Rd	23	11/12/0
Locust Grove Rd and Deer Flat Rd	5	3/2/0
Locust Grove Rd and Hubbard Rd	3	1/2/0
Locust Grove Rd and Columbia Rd	8	3/5/0
Locust Grove Rd and Lake Hazel Rd	3	2/1/0

Crash frequencies are relatively low at each of the study area intersections. Also, it should be noted that crash data at SH69 and Hubbard Road includes years prior to installation of a traffic signal at that location. According to the Crash Modifications Factors Clearinghouse

Figure 2 Existing Lane Configuration and Traffic Control

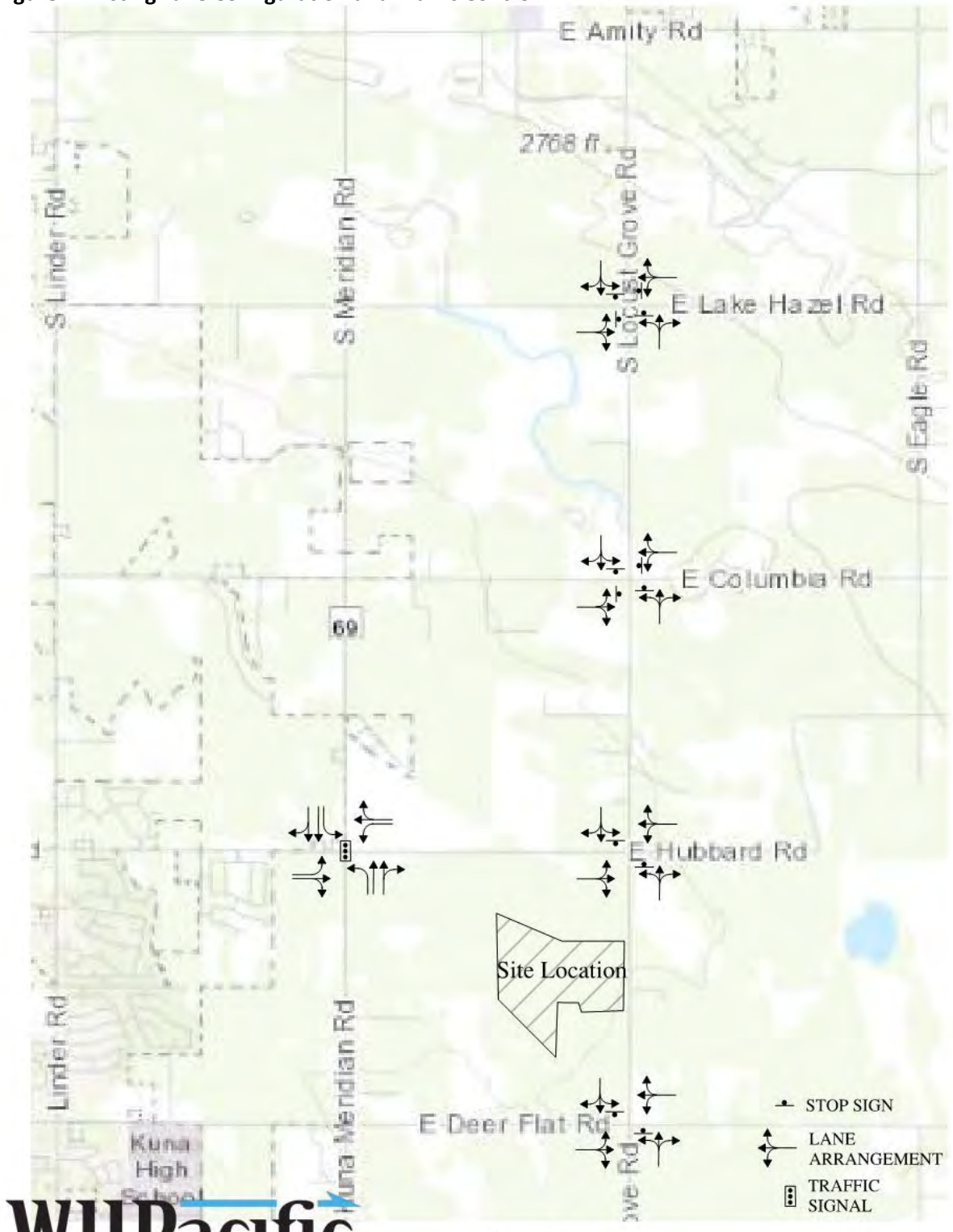

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Figure 2
Existing Lane Configuration and Traffic Control

Figure 3 Existing Traffic Volumes

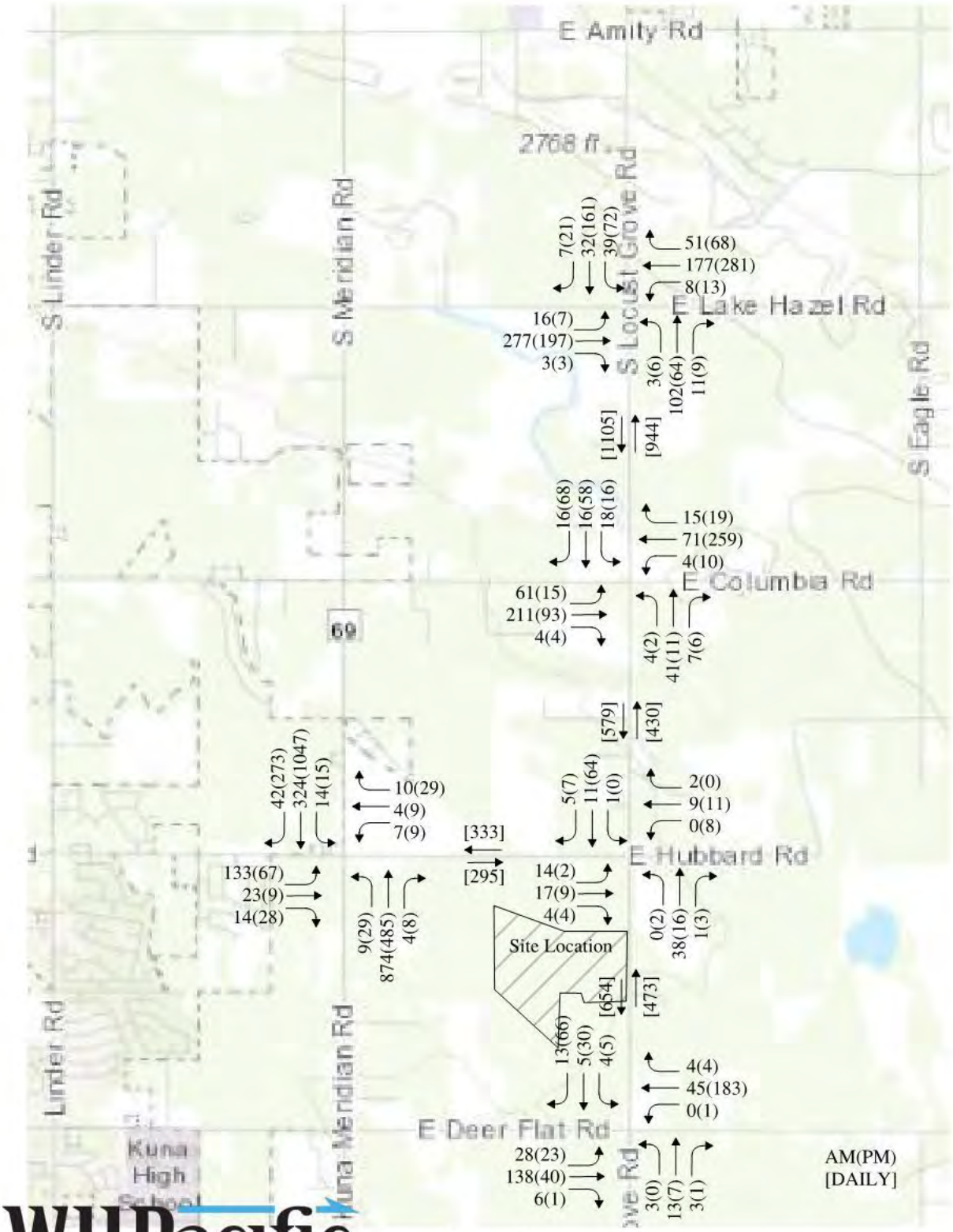

Figure 3
Existing Traffic Volumes

(http://www.cmfclearinghouse.org), installation of a traffic signal has the potential to reduce crashes up to 77%, although data is highly variable.

Level-of-Service Roadway Segments

ACHD has developed level-of-service (LOS) thresholds for roadway segments based on directional peak hour volumes for various roadway functional classifications, number of lanes and left-turn treatments. Based on the current *ACHD Policy Manual*, the minimum acceptable LOS for a roadway segment is LOS E for principal arterials and minor arterials, and LOS D for collectors. Table 3 summarizes ACHD's LOS thresholds for roadway segments.

Table 3 – ACHD LOS Thresholds for Roadway Segments

Functional Classification	Lanes	LOS D	LOS E
Principal Arterials			
No Left-Turn Lanes			
	1	600	690
Continuous Center Left-Turn Lane			
	1	770	880
	2	1680	1780
	3	2560	2720
Median-Control, Channelized Left-Turn Lanes @ Major Intersections			
	1	850	920
	2	1860	1960
	3	2800	3000
Minor Arterials			
No Left-Turn Lane			
	1	540	575
Unrestricted Median, Continuous Left-Turn Lane			
	1	675	720
	2	1395	1540
	3	2155	2370
Median-Control, Channelized Left-Turn Lanes @ Major Intersections			
	1	710	770
	2	1465	1670
	3	2270	2530
Collectors			
No Left-Turn Lanes			
	1	425	525
Unrestricted Median, Continuous Left-Turn Lane			
	1	530	660
	2	1080	1250

Table 4 summarizes the existing LOS for the roadway segments in the study area. As noted, all roadway segments currently operate at LOS D or better under the current lane configuration and traffic volumes. No roadway improvements are needed to mitigate existing traffic conditions.

Table 4 – Roadway Segment LOS – Existing (2019) Traffic

Roadway Segment	Functional Class	No. of Thru Lanes	Left-Turn Treatment	Threshold Volume		AM Peak Hour Major Direction		PM Peak Hour Major Direction	
				LOS D	LOS E	Vol (vph)	LOS	Vol (vph)	LOS
Hubbard Rd, SH69 to Locust Grove Rd	Minor Arterial	1	No LT Lane	540	575	35	< D	47	< D
Hubbard Rd, Locust Grove to Eagle	Minor Arterial	1	No LT Lane	540	575	19	< D	19	< D
Locust Grove Rd, Deer Flat to Hubbard	Minor Arterial	1	No LT Lane	540	575	39	< D	101	< D
Locust Grove Rd, Hubbard to Columbia	Minor Arterial	1	No LT Lane	540	575	52	< D	71	< D
Locust Grove Rd, Columbia to Lake Hazel	Minor Arterial	1	No LT Lane	540	575	116	< D	142	< D
Locust Grove Rd, Lake Hazel to Amity	Minor Arterial	1	No LT Lane	540	575	169	< D	254	< D

Level-of-Service Intersections

Intersection LOS was evaluated using *Highway Capacity Software (HCS7)*. In accordance with the *ACHD Policy Manual*, the maximum overall v/c ratio is 0.90 for signalized intersection. For unsignalized intersections, the intersection v/c ratio is undefined. The maximum lane group v/c ratio for signalized and unsignalized intersections is 1.0. Each of the intersections within the study area was evaluated under existing traffic control, lane configuration and peak hour volumes. *HCS7* Reports are included in the Appendix and results are summarized in Table 5.

Table 5 – Intersection Traffic Operations – Existing (2019) Traffic

Intersection	Traffic Control Lane Group	AM LOS/Delay/v/c	PM LOS/Delay/v/c
Hubbard Rd/ SH69	Traffic Signal	C/27.1	C/24.3
	Eastbound	B/12.2/0.05	C/20.5/0.07
	Westbound	B/14.5/0.02	C/23.2/0.08
	Northbound	C/31.6/0.87	B/19.5/0.18
	Southbound	C/24.6/0.36	C/28.6/0.90

Deer Flat/ Locust Grove	TWSC	NR	NR
	Eastbound	A/7.4/0.02	A/7.7/0.9/0.02
	Westbound	A/7.6/0.00	A/7.3/0.00
	Northbound	B/10.8/0.03	B/10.9/0.01
	Southbound	A/9.6/0.03	A/10.9/0.16
Hubbard/ Locust Grove	TWSC	NR	NR
	Eastbound	A/7.3/0.01	A/7.3/0.00
	Westbound	A/7.3/0.00	A/7.3/0.01
	Northbound	A/9.7/0.06	A/9.3/0.03
	Southbound	A/9.2/0.02	A/9.6/0.09
Columbia/ Locust Grove	AWSC	A/9.8	A/9.5
	Eastbound	B/10.7/NR	A/8.6/NR
	West bound	A/8.3/NR	B/10.2/NR
	Northbound	A/8.5/NR	A/8.1/NR
	Southbound	A/8.5/NR	A/8.8/NR
Lake Hazel/ Locust Grove	AWSC	B/10.5	B/14.2
	Eastbound	B/11.4/NR	B/12.1/NR
	Westbound	B/10.3/NR	C/16.3/NR
	Northbound	A/9.7/NR	B/10.4/NR
	Southbound	A/9.4/NR	B/13.9/NR

Worst movement LOS reported at each approach
NR = not reported
TWSC = Two-way stop control
AWSC = All-way stop control

All study area intersections currently operate at acceptable, LOS D or better, conditions. Reported v/c ratios are also under 1.0. No intersection improvements are needed to mitigate existing traffic conditions.

ANALYSIS OF 2025 BACKGROUND TRAFFIC CONDITIONS

Roadway Network

Both the ACHD *Five-Year Work Plan (FYWP)* and the *ACHD Capital Improvements Plan (CIP)* were reviewed for purposes of the study. The currently adopted *FYWP* identifies projects programmed from 2020 to 2024 while the *CIP* is a long-range (20 years) transportation plan identifying existing transportation facilities, existing deficiencies, and future improvement needs. The are no projects noted in the *FYWP* for the specific TIS review area. Long-term projects are planned at the intersections of Deer Flat and SH69, and Hubbard and SH69, and Lake Hazel Road and Locust Grove Road. At both SH69 locations, this includes traffic signal improvements and reconstruction/widening of approaches, between the years 2031 and 2035. At Lake Hazel Road and Locust Grove Road, a roundabout is planned between the years 2026 and 2030. As this work is programmed beyond the TIS review period, these projects will not be included, unless needed to achieve acceptable traffic operations in 2025.

Transit Service

Valley Regional Transit (VRT) has recently adopted (April 2018) *ValleyConnect 2.0* which is a plan for long-range transit service and related capital projects. Scenarios considered in this plan include linking Kuna to Meridian via SH69. As of now the plan is dependent on securing various funding sources and actual projects or programmed improvements are not defined. As such, no further improvements beyond the existing transit network are assumed for the project study area.

Bicycle and Pedestrian Facilities

ACHD's current *FYWP* and *CIP* do not include bicycle or pedestrian improvement projects designated for the study roadways.

Traffic Volumes

The COMPASS Area of Influence review was considered to estimate a growth rate between the years 2019 and 2025. Along Locust Grove Road, the COMPASS projected annual growth ranges from 13.2% to 28.4% between Deer Flat Road and Lake Hazel Road. This annual growth rate is even more dramatic along Hubbard Road ranging from 55.6% to 67.3%. Under the previous Ledgestone TIS review, ACHD staff recognized that growth rates this high should not be applied to existing volumes. As a secondary option and to remain consistent with other developments in the area, the *Patagonia Subdivision TIS, Thompson Engineers, Revised November 30, 2018* was reviewed. This TIS considered very similar traffic COMPASS growth projections along Locust Grove Road and Hubbard Road and ultimately settled on annual growth rates of 4% per year on SH69, and 10% per year on all ACHD roadways, in concurrence with ACHD. These growth rates were replicated for purposes of this TIS.

In order to forecast future 2025 AM and PM peak hour background conditions, the existing traffic counts were factored by these respective growth rates. Additionally, as traffic counts were recorded during different periods in 2018 and 2019 some minor volume imbalances were noted between intersections. Therefore, after applying the growth rates to the existing traffic counts, balancing was also completed using standard iterative methods. Resultant 2025 background volumes are depicted in Figure 4.

Off-Site Development

As indicated previously, other development is planned in the vicinity between Hubbard Road and Columbia Road. This entitled development is reflected in the COMPASS demographic data for 2025 background conditions.

Level-of-Service Roadway Segments

Table 6 summarizes the 2025 background LOS for the roadway segments in the study area. As noted, all roadway segments are projected to operate at LOS D or better under the current lane configuration and 2025 background traffic volumes. Therefore, no roadway improvements are needed to mitigate 2025 background traffic conditions.

Figure 4 2025 Background Peak Hour Traffic Volumes

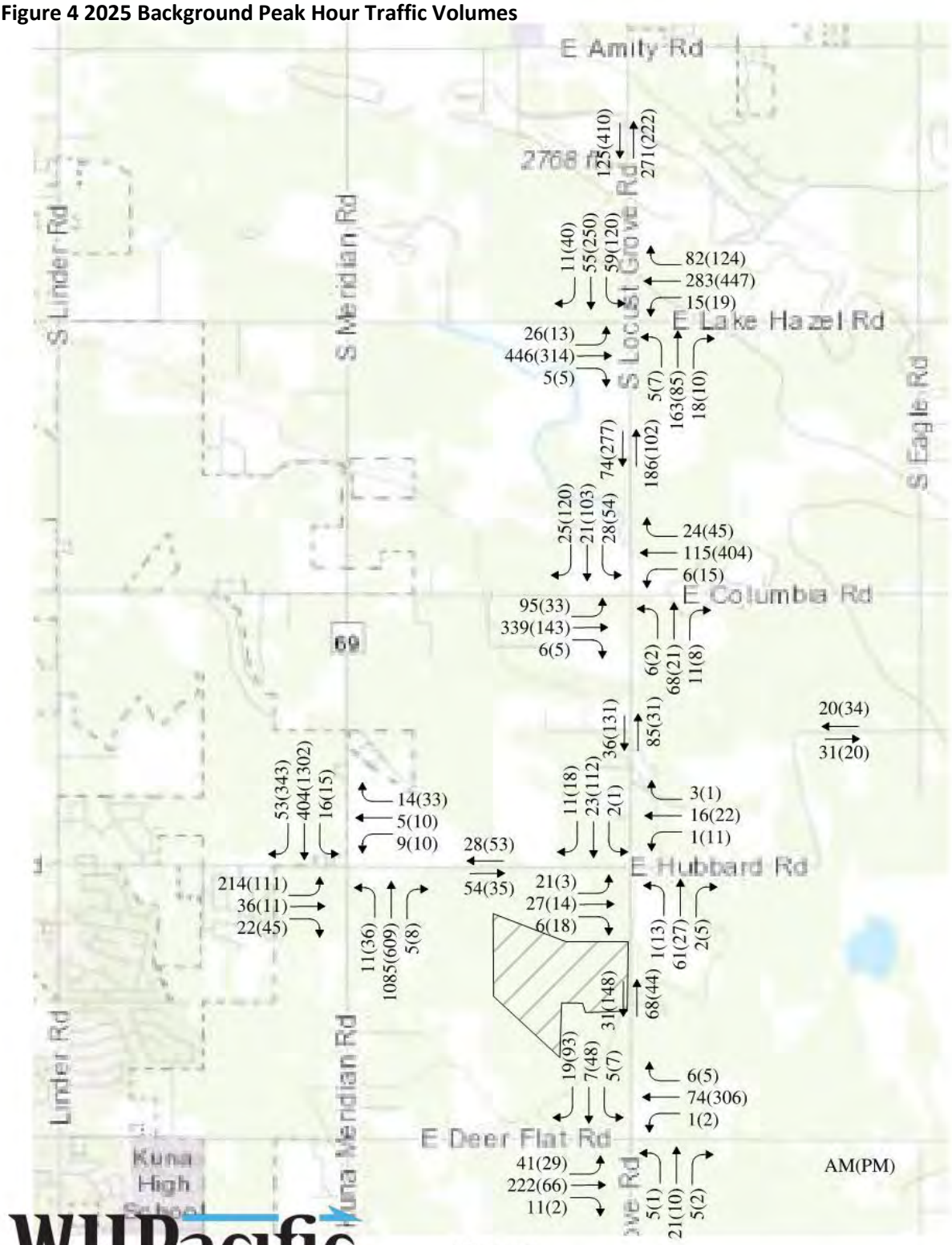

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Figure 4
2025 Background Peak
Hour Traffic Volumes

Table 6 – Roadway Segment LOS – 2025 Background Traffic

Roadway Segment	Functional Class	No. of Thru Lanes	Left-Turn Treatment	Threshold Volume		AM Peak Hour Major Direction		PM Peak Hour Major Direction	
				LOS D	LOS E	Vol (vph)	LOS	Vol (vph)	LOS
Hubbard Rd, SH69 to Locust Grove Rd	Minor Arterial	1	No LT Lane	540	575	54	< D	53	< D
Hubbard Rd, Locust Grove to Eagle	Minor Arterial	1	No LT Lane	540	575	31	< D	34	< D
Locust Grove Rd, Deer Flat to Hubbard	Minor Arterial	1	No LT Lane	540	575	68	< D	148	< D
Locust Grove Rd, Hubbard to Columbia	Minor Arterial	1	No LT Lane	540	575	85	< D	131	< D
Locust Grove Rd, Columbia to Lake Hazel	Minor Arterial	1	No LT Lane	540	575	186	< D	277	< D
Locust Grove Rd, Lake Hazel to Amity	Minor Arterial	1	No LT Lane	540	575	271	< D	410	< D

Level-of-Service Intersections

Each of the intersections within the study area was evaluated under existing traffic control, lane configuration and 2025 background peak hour volumes. *HCS7* Reports are included in the Appendix and results are summarized in Table 7.

Table 7 – Intersection Traffic Operations – 2025 Background Traffic

Intersection	Traffic Control Lane Group	AM LOS/Delay/v/c	PM LOS/Delay/v/c
Hubbard Rd/ SH69	Traffic Signal	C/24.4	C/22.7
	Eastbound	B/16.0/0.09	C/28.7/0.16
	Westbound	C/21.0/0.04	C/32.8/0.16
	Northbound	C/28.3/0.88	B/19.0/0.22
	Southbound	C/21.4/0.12	C/28.8/0.92

Intersection	Traffic Control Lane Group	AM LOS/Delay/v/c	PM LOS/Delay/v/c
Deer Flat/ Locust Grove	TWSC	NR	NR
	Eastbound	A/7.5/0.03	A/8.1/0.03
	Westbound	A/7.8/0.00	A/7.4/0.00
	Northbound	B/12.3/0.07	B/12.6/0.03
	Southbound	B/10.4/0.05	B/13.5/0.28
Hubbard/ Locust Grove	TWSC	NR	NR
	Eastbound	A/7.3/0.01	A/7.3/0.01
	Westbound	A/7.3/0.00	A/7.3/0.01
	Northbound	B/10.1/0.09	A/9.9/0.06
	Southbound	A/9.5/0.05	B/10.3/0.17
Columbia Rd/ Locust Grove	AWSC	B/13.1	B/14.4
	Eastbound	C/15.7/NR	B/10.6/NR
	Westbound	A/9.4/NR	C/17.5/NR
	Northbound	A/9.6/NR	A/9.4/NR
	Southbound	A/9.4/NR	B/11.7/NR
Lake Hazel/ Locust Grove	AWSC	C/23.7	F/98.0
	Eastbound	D/32.6/NR	D/32.6/NR
	Westbound	C/20.8/NR	F/180.0/NR
	Northbound	B/14.3/NR	C/15.2/NR
	Southbound	B/13.0/NR	F/53.4/NR
Lake Hazel/ Locust Grove	***Roundabout***	A/7.7	B/10.2
	Eastbound	A/7.9/0.45	A/9.3/0.42
	Westbound	A/8.0/0.43	A/9.2/0.54
	Northbound	A/8.2/0.28	A/5.9/0.14
	Southbound	A/5.2/0.14	B/13.4/0.57

Worst movement LOS reported at each approach
NR = not reported
TWSC = Two-way stop control
AWSC = All-way stop control

The all-way stop at Lake Hazel Road and Locust Grove operates poorly under 2025 PM Peak Hour (Background traffic) conditions. ACHD Policy requires that intersections operating at LOS D or worse be evaluated for signalized control in accordance with the *Manual on Uniform Traffic Control Devices (MUTCD)* procedures. In accordance with these procedures, hourly traffic conditions were estimated based on projected 2025 peak hour volumes and the hourly distribution of daily traffic volumes, as recorded by the existing 24-hour counts (on Locust Grove, between Columbia Road and Lake Hazel Road). Under this scenario, it appears that this intersection would meet at least one warrant (Warrant 2, Four-Hour Vehicular Volume) for a traffic signal. For further review, the detailed signal warrant analysis is provided in the Appendix. While a traffic signal may be a viable option for this intersection, the long-term plan (2026 – 2030) for this intersection is a single lane roundabout. Desirably the maximum lane group v/c ratio for roundabouts is 0.85. Evaluation of this intersection with a single-lane roundabout yields very favorable traffic operations. As such, the subsequent intersection capacity analysis (2025 Site Plus Background) at this location will be completed assuming roundabout control.

ANALYSIS OF 2025 TOTAL (SITE PLUS BACKGROUND) TRAFFIC CONDITIONS

Trip Generation

The number of trips generated by the proposed development was estimated using rates provide in the *ITE Trip Generation Manual, 10th Edition.* Table 8 provides a summary of these results for Daily, AM Peak Hour and PM Peak hour conditions.

Table 8 – 2025 Trip Generation Summary

Land Use Category	ITE Code	Size	Period	Trip Rate	Total Trips	Enter		Exit	
Single Family Detached Housing	210	431 DU	Weekday (vpd)	9.44	4069	50%	2034	50%	2035
			AM Peak Hr(vph)	0.74	319	25%	80	75%	239
			PM Peak Hr(vph)	0.99	427	63%	269	37%	158

Trip Distribution and Assignment

Site traffic was distributed in consideration of existing travel patterns, site layout and the generalized development within this area. These preliminary assumptions were also reviewed with ACHD for concurrence and are summarized as follows:

- SH69 (North) 35%
- SH69 (South) 5%
- Locust Grove Rd (North) 40%
- Locust Grove Rd (South) 5%
- Hubbard Rd (East) to Eagle Rd 15%

Generally, this distribution assumes that 90% of traffic origins and destinations are to the north and east and 10% are to the south. Figure 5 illustrates the resultant site traffic distribution.

Site Plus Background Traffic

Site traffic was added to the 2025 Background traffic in order to produce the 2025 Site Plus Background (Total) traffic conditions with the proposed development. Figure 6 illustrates the resultant traffic volumes for AM and PM peak hour conditions. Figure 7 depicts the percent increase realized by site generated traffic at each intersection (as compared to 2025 background volumes).

Level-of-Service Roadway Segments

Table 9 summarizes the 2025 Site Plus Background (Total) LOS for the roadway segments in the study area. As noted, all roadway segments are projected to operate at LOS D or better under the current or previously improved lane configuration and 2025 Site Plus Background volumes. No roadway improvements are needed to mitigate these conditions.

Figure 5 Estimated Peak Hour Site Traffic Volumes

Figure 5
Estimated Peak Hour
Site Traffic Volumes

Figure 6 2025 Site Plus Background Traffic Volumes

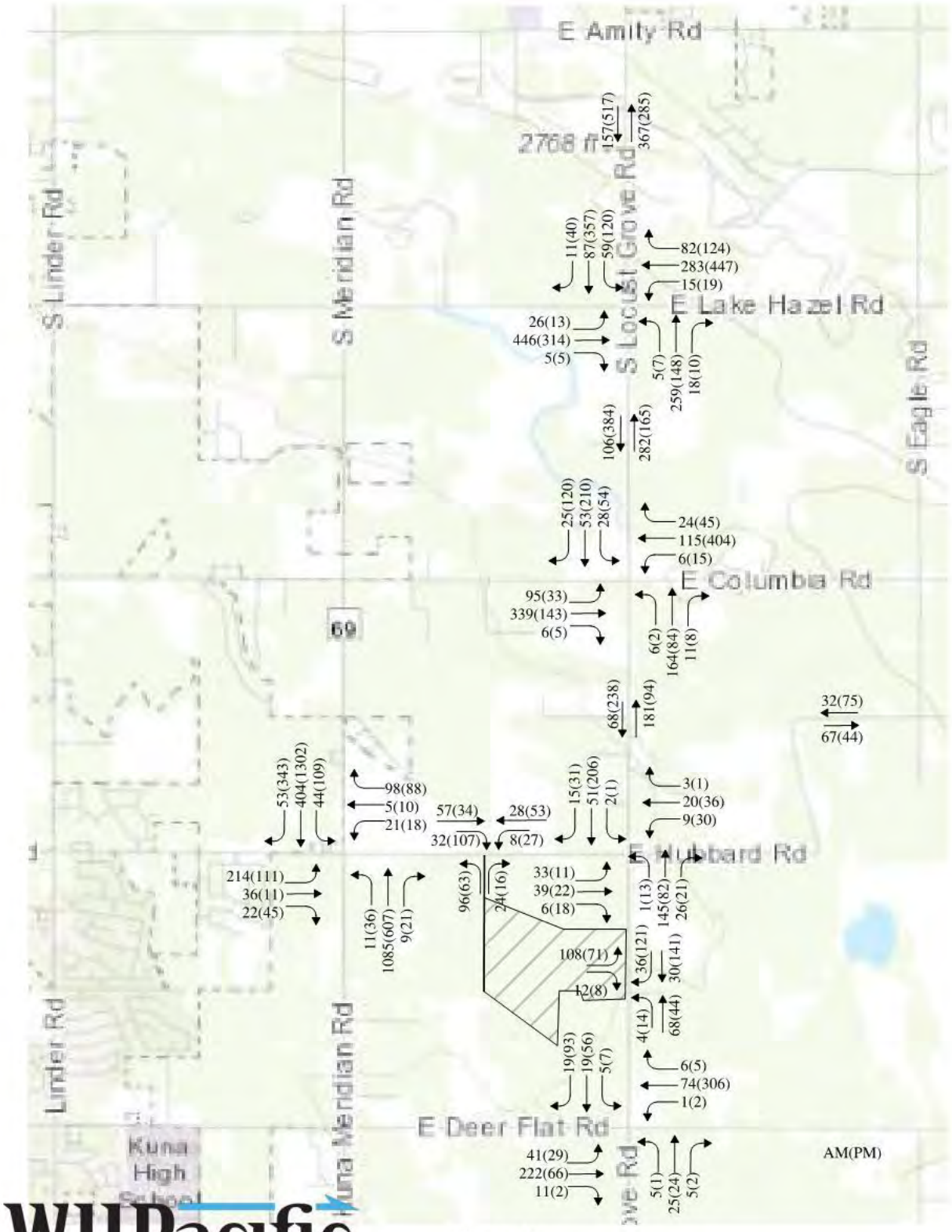

Figure 6
2025 Site Plus Background
Peak Hour Traffic Volumes

Figure 7 Projected Percent Increase

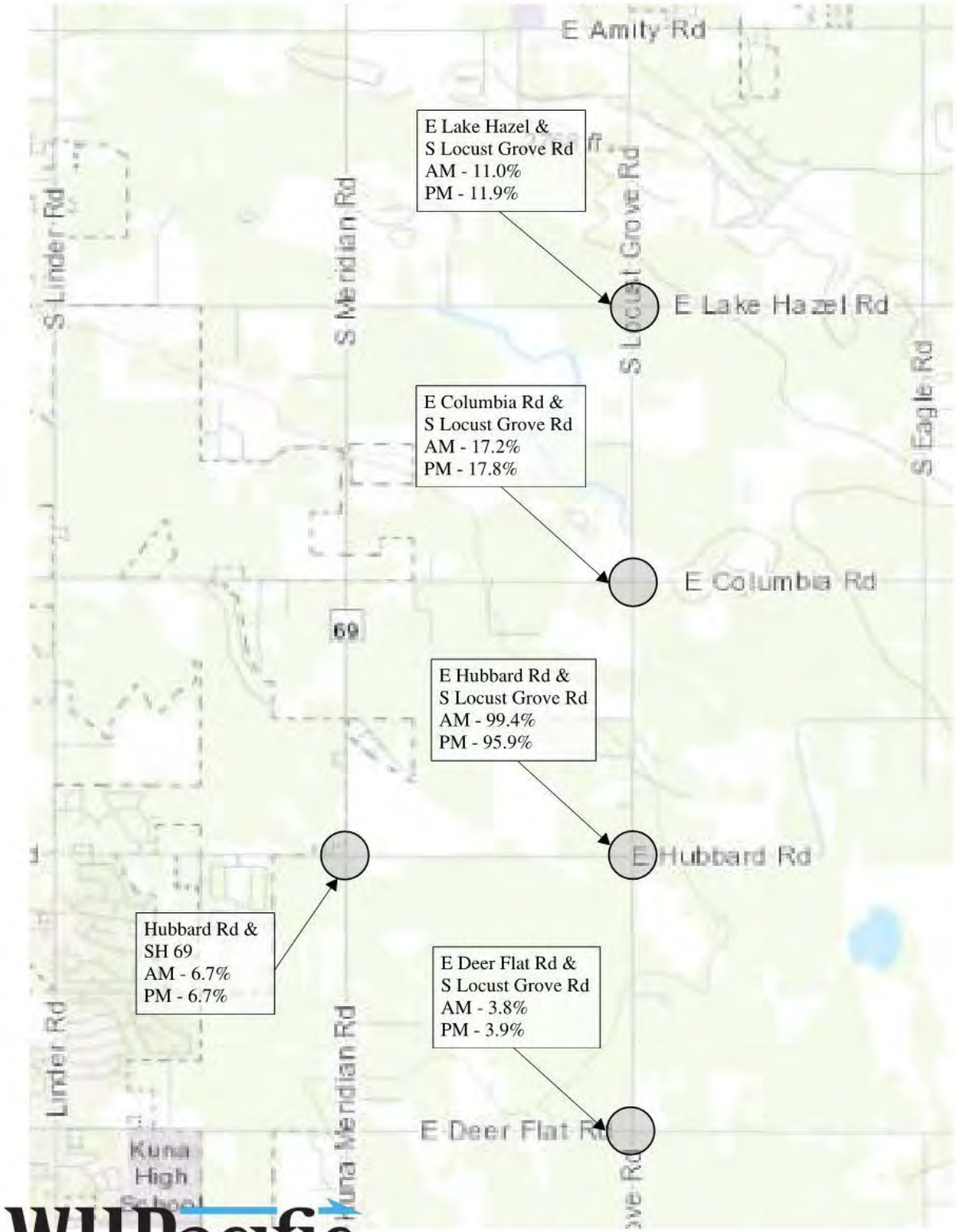

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Figure 7
Projected Total Percent Increase
(from 2025 Background Volume)

Table 9 – Roadway Segment LOS – 2025 Site Plus Background Traffic

Roadway Segment	Functional Class	No. of Thru Lanes	Left-Turn Treatment	Threshold Volume		AM Peak Hour Major Direction		PM Peak Hour Major Direction	
				LOS D	LOS E	Vol (vph)	LOS	Vol (vph)	LOS
Hubbard Rd, SH69 to Locust Grove Rd	Minor Arterial	1	No LT Lane	540	575	124	< D	141	< D
Hubbard Rd, Locust Grove to Eagle	Minor Arterial	1	No LT Lane	540	575	67	< D	75	< D
Locust Grove Rd, Deer Flat to Hubbard	Minor Arterial	1	No LT Lane	540	575	172	< D	262	< D
Locust Grove Rd, Hubbard to Columbia	Minor Arterial	1	No LT Lane	540	575	181	< D	238	< D
Locust Grove Rd, Columbia to Lake Hazel	Minor Arterial	1	No LT Lane	540	575	282	< D	384	< D
Locust Grove Rd, Lake Hazel to Amity	Minor Arterial	1	No LT Lane	540	575	367	< D	517	< D

Level-of-Service Intersections

Each of the intersections within the study area was evaluated under existing (or previously mitigated) traffic control, lane configuration and 2025 site plus background peak hour volumes. *HCS7* Reports are included in the Appendix and results are summarized in Table 10.

Table 10 – Intersection Traffic Operations – 2025 Site Plus Background Traffic

Intersection	Traffic Control Lane Group	AM LOS/Delay/v/c	PM LOS/Delay/v/c
Hubbard Rd/ SH69	Traffic Signal	C/24.4	C/23.0
	Eastbound	B/18.3/0.10	C/29.6/0.17
	Westbound	C/25.3/0.24	D/36.9/0.38
	Northbound	C/28.5/0.88	B/19.9/0.22
	Southbound	C/20.6/0.25	C/28.8/0.92
Deer Flat/ Locust Grove	TWSC	NR	NR
	Eastbound	A/7.5/0.03	A/8.1/0.03
	Westbound	A/7.8/0.00	A/7.4/0.00
	Northbound	B/12.5/0.08	B/13.1/0.06
	Southbound	B/11.2/0.08	B/13.9/0.30

Intersection	Traffic Control Lane Group	AM LOS/Delay/v/c	PM LOS/Delay/v/c
Hubbard/ Locust Grove	TWSC	NR	NR
	Eastbound	A/7.3/0.02	A/7.3/0.01
	Westbound	A/7.3/0.01	A/7.4/0.03
	Northbound	B/11.6/0.26	B/11.4/0.18
	Southbound	B/10.3/0.10	B/12.9/0.36
Columbia/ Locust Grove	AWSC	C/15.6	C/22.9
	Eastbound	C/20.1/NR	B/13.3/NR
	Westbound	B/10.5/NR	D/29.8/NR
	Northbound	B/11.9/NR	B/11.8/NR
	Southbound	B/10.6/NR	C/21.9/NR
Lake Hazel/ Locust Grove	***Roundabout***	A/8.6	B/13.1
	Eastbound	A/8.3/0.46	B/11.4/0.48
	Westbound	A/8.7/0.43	B/10.6/0.58
	Northbound	B/10.5/0.42	A/6.9/0.22
	Southbound	A/5.5/0.18	C/19.2/0.72
Stroebel/ Hubbard	TWSC	NR	NR
	Eastbound	NR	NR
	Westbound	A/7.4/0.01	A/7.6/0.02
	Northbound	A/9.8/0.15	B/10.1/0.11
Locust Grove/ East Access (South of Rio Vallegas)	TWSC	NR	NR
	Eastbound	A/9.9/0.15	B/10.9/0.12
	Northbound	A/7.4/0.00	A/7.9/0.01
	Southbound	NR	NR

Bold, italics indicates changed condition from existing
Worst movement LOS reported at each approach
NR = not reported
TWSC = Two-way stop control
AWSC = All-way stop control

All intersections operate favorably under the existing with improved traffic control conditions (roundabout at Lake Hazel Road and Locust Grove Road) and 2025 Site Plus Background traffic conditions. The only location showing signs of nearing capacity under this scenario is the southbound right turn at SH69 and Hubbard Road which operates at a v/c ratio of 0.92.

Turn Lane Analysis

As indicated by the proposed site plan, two new full access approaches are planned for the Ledgestone South development. One is located at the one-half mile point between SH69 and Locust Grove, known as Stroebel Road, and the other is off Locust Grove, south of Mason Creek Ditch. Each site access approach forms a T-intersection with the existing roadway and is proposed to be stop-controlled. As noted in the above stop-controlled analysis both locations are expected to operate under favorable LOS and v/c conditions.

A turn lane analysis was further conducted at each of the locations using the turn lane threshold graphs provided in the ACHD Policy. While neither location appears to warrant a left turn lane, and a right turn lane is not warranted at Stroebel Road; a right turn lane appears to be warranted in the southbound direction at the Locust Grove Road access south of E. Rio Vallegas Street.

SUMMARY OF RESULTS

The study's key findings are summarized below.

Existing Traffic Conditions

1. For the existing traffic conditions analyzed with the existing roadway lane configuration, all study area roadway segments meet ACHD's minimum operational thresholds. Therefore, no roadway improvements are needed to mitigate the existing traffic.
2. For the existing traffic conditions analyzed with the existing intersection control and lane configuration, all study area intersections meet ACHD's minimum operational thresholds. Therefore, no intersection improvements are needed to mitigate the existing traffic.

2025 Background Traffic Conditions

3. There are no planned improvements to the study roadways or intersections by 2025 according to ACHD's current *FYWP* and *CIP*.
4. For the 2025 Background traffic conditions analyzed with the existing roadway lane configuration, all study area roadway segments meet ACHD's minimum operational thresholds. Therefore, no roadway improvements are needed to mitigate 2025 Background traffic.
5. For the 2025 Background traffic conditions analyzed with the existing intersection control and lane configuration, one of the study area intersections does not meet ACHD's minimum operational thresholds. The intersection of Lake Hazel Road and Locust Grove performs poorly in the PM peak hour under AWSC and is expected to meet at least one traffic signal warrant under 2025 Background conditions. While installation of a traffic signal may be a viable option, ACHD's CIP has programmed a single-lane roundabout at this location. Under this scenario, traffic operations are improved to LOS B or better.

2025 Site Plus Background Traffic Conditions

6. This scenario reflects the full buildout of 431 single family dwelling units which is expected to generate 4,069 daily trips, 319 AM peak hour trips, and 427 PM peak hour trips.
7. Site traffic is anticipated to have the following general distribution pattern:
    - SH69 (North) 35%
    - SH69 (South) 5%
    - Locust Grove Rd (North) 40%
    - Locust Grove Rd (South) 5%
    - Hubbard Rd (East) to Eagle Rd 15%
8. For the 2025 Site Plus Background traffic conditions analyzed with the existing roadway lane configuration, all study area roadway segments meet ACHD's minimum operation thresholds. Therefore, no roadway improvements are needed to mitigate the 2025 Site Plus Background traffic.
9. For the 2025 Site Plus Background traffic conditions analyzed with the existing (and 2025 Background improvements) intersection control and lane configuration, all study area intersections meet ACHD's minimum operational thresholds. Therefore, no further intersection improvements are needed to mitigate the 2025 Site Plus Background traffic.
10. Two full access (T-intersection approaches) at Hubbard Road and S. Stroebel Road, and Locust Grove Road and East Access will serve primary access to the subdivision. With the 2025 Site Plus

Background traffic conditions, stop control and the proposed lane configuration, the critical minor movements at the proposed site access intersections are expected to operate at LOS B or better.

11. With the 2025 Site Plus Background traffic conditions, turn lane warrants are satisfied as follows:
    - Locust Grove and E. Access – southbound right turn lane

APPENDIX

Ledgestone South Proposed Development

The following summarizes the results of an area of influence model run for a proposed development located southwest of Hubbard and Locust Grove Roads. The proposed development will consist of 431 residential units. The anticipate build out is 2025. See figure 1.

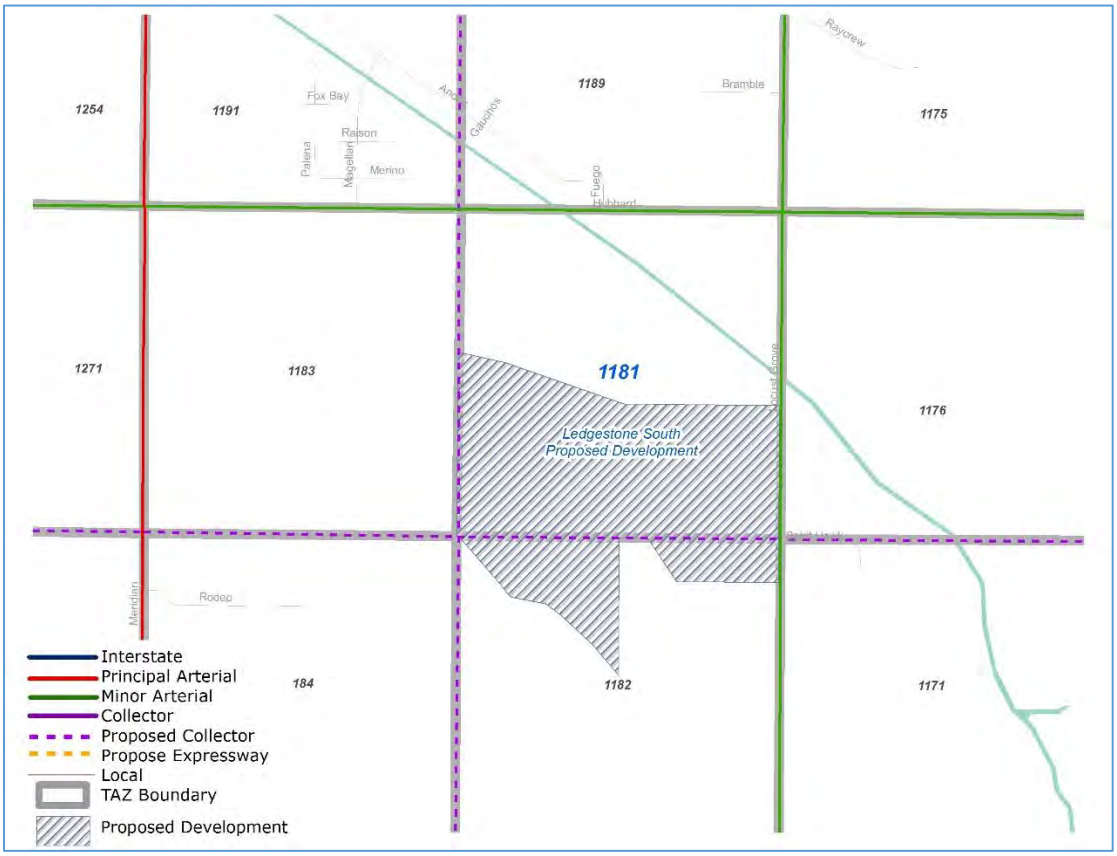


Figure 1

Table 1 provides the existing demographics for TAZ 1181 and the proposed development's demographics used for the area of influence model run.

Table 1

	2019		2025 with proposal		2040	
	HH	Jobs	HH	Jobs	HH	Jobs
TAZ 1181	6	0	437	0	6	1
Surrounding TAZs	*134*	*55*	*456*	*202*	*1001*	*565*
Total	140	55	893	202	1007	566

Figure 2: area of influence results for the proposed development
Figures 3 and 4: peak hour results
Figure 5: surrounding TAZs and demographics
Figures 6, 7 and 8: compounded annual growth rates
Figures 9 and 10: Cumulative Impact Analysis

Figure 2: Area of Influence, Peak hour demand contribution to the total peak hour demand

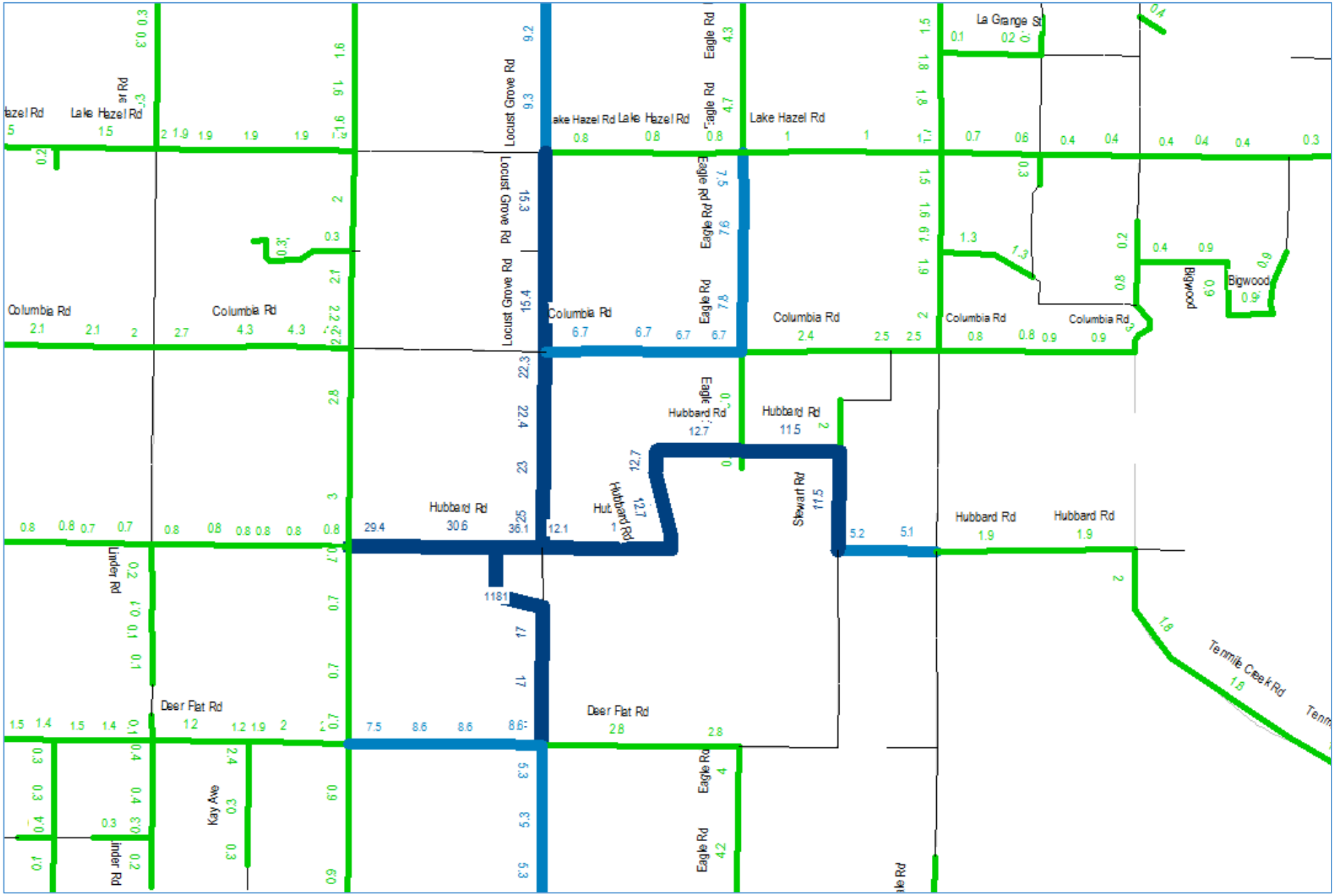


Figure 3: Peak Hour Demand with Proposed Development

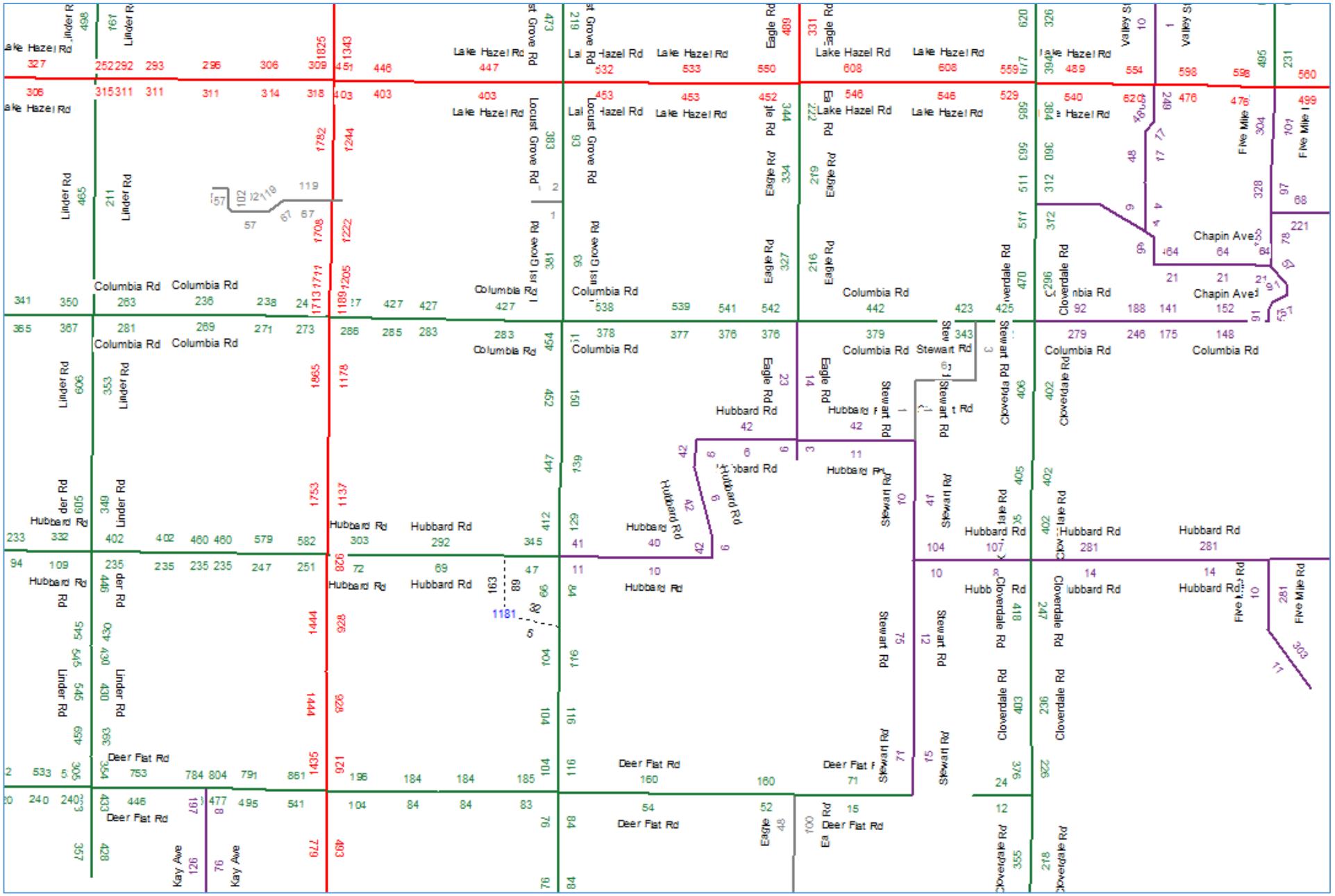


Figure 4: Peak Hour Demand without Proposed Development

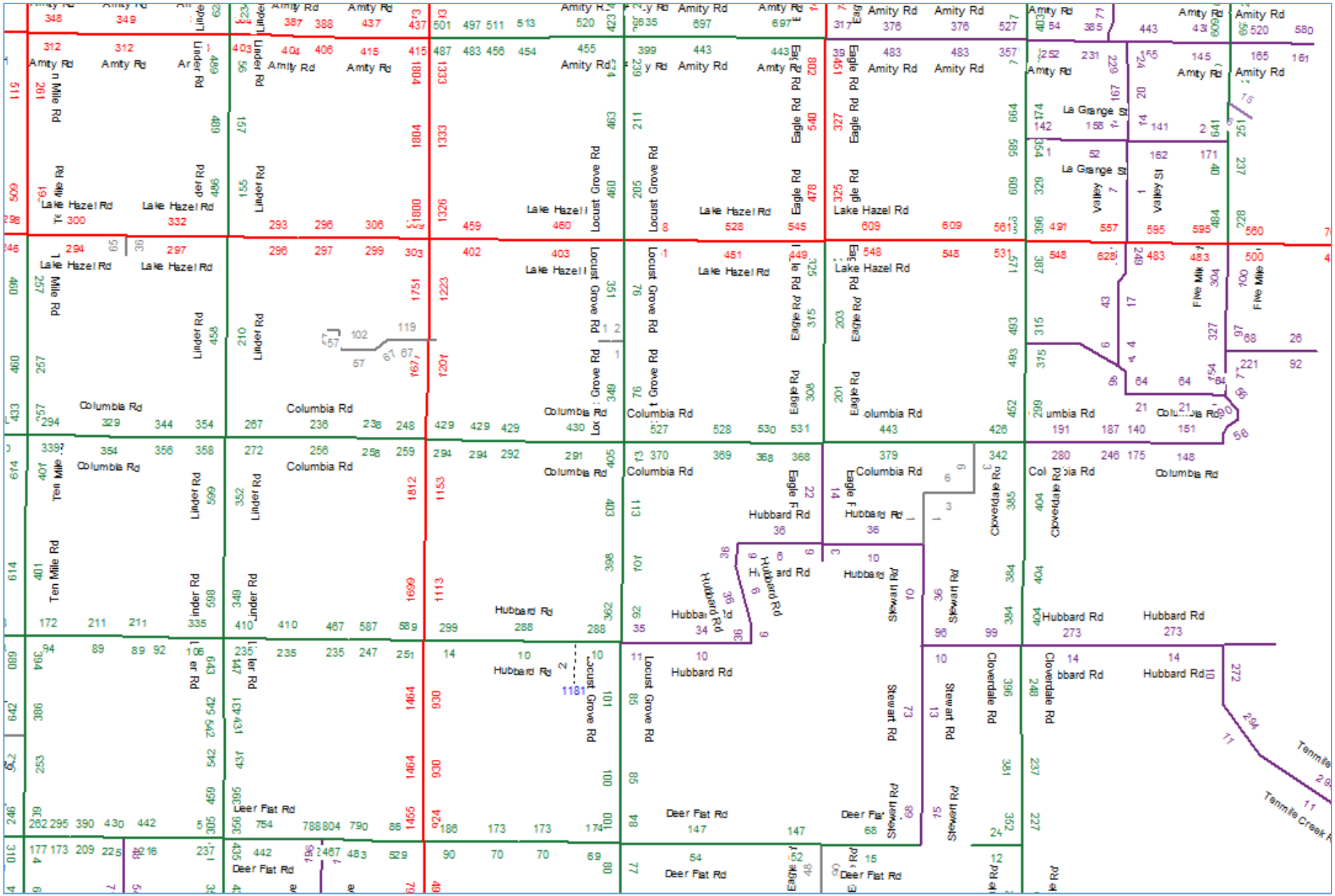
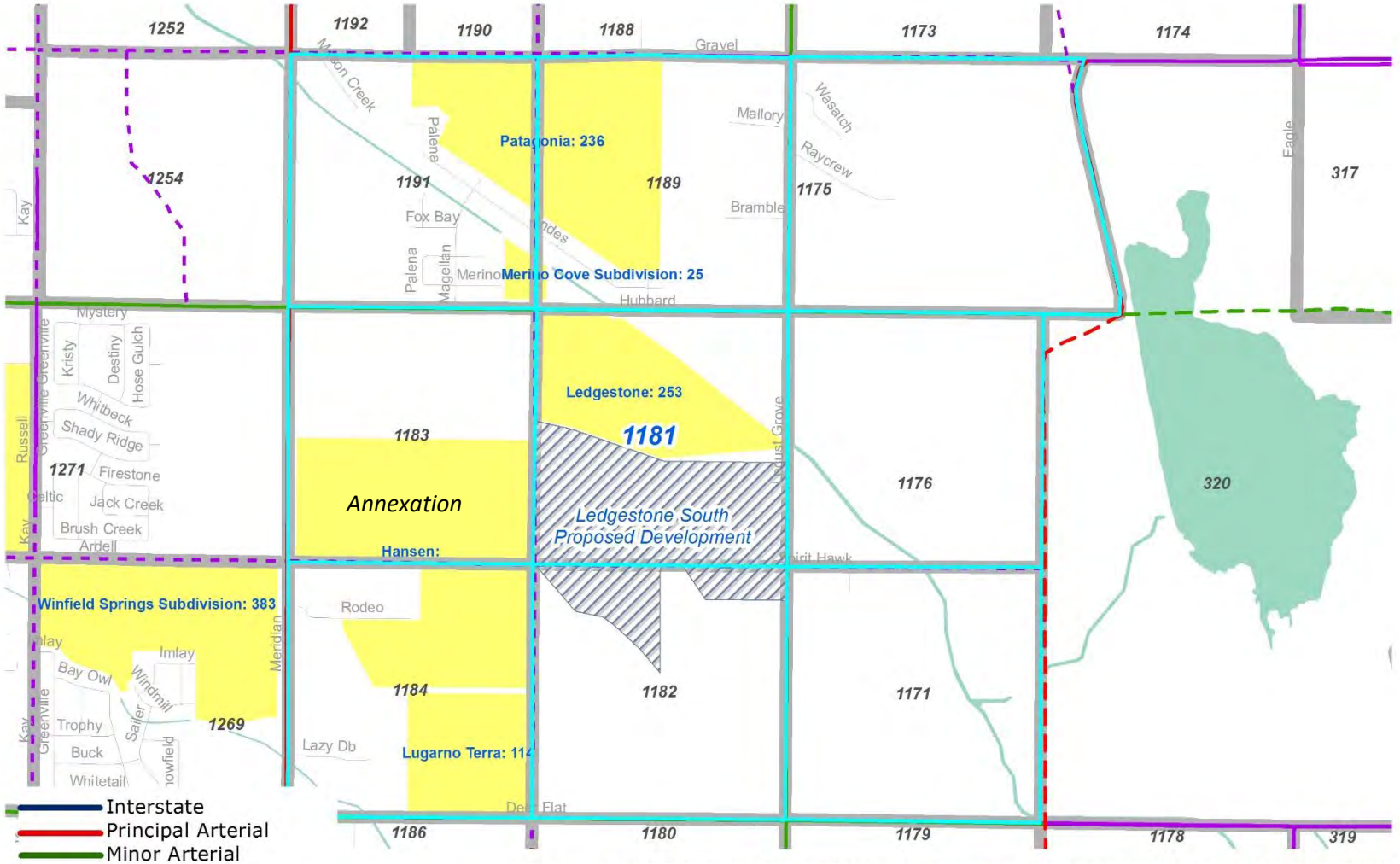


Figure 5: Surrounding Area TAZs



TZONES08 *	COUNTY	TPOP19	HH19	TPOP25	HH25	JOBS25	TPOP30	HH30	JOBS30	TPOP40	HH40	JOBS40
1171	Ada	6	3	6	3	0	6	3	0	6	3	0
1175	Ada	24	10	87	37	10	144	62	19	226	100	33
1176	Ada	6	3	6	3	12	6	3	13	6	3	15
1182	Ada	13	5	13	5	7	13	5	9	12	5	12
1183	Ada	12	5	12	5	46	12	5	83	11	5	140
1184	Ada	12	5	90	38	36	160	69	66	262	116	110
1189	Ada	107	33	300	94	17	474	151	20	722	237	25
1191	Ada	230	70	875	271	74	862	271	136	1643	532	230

Figure 6: 2019 to 2025 Compounded Annual Growth Rate

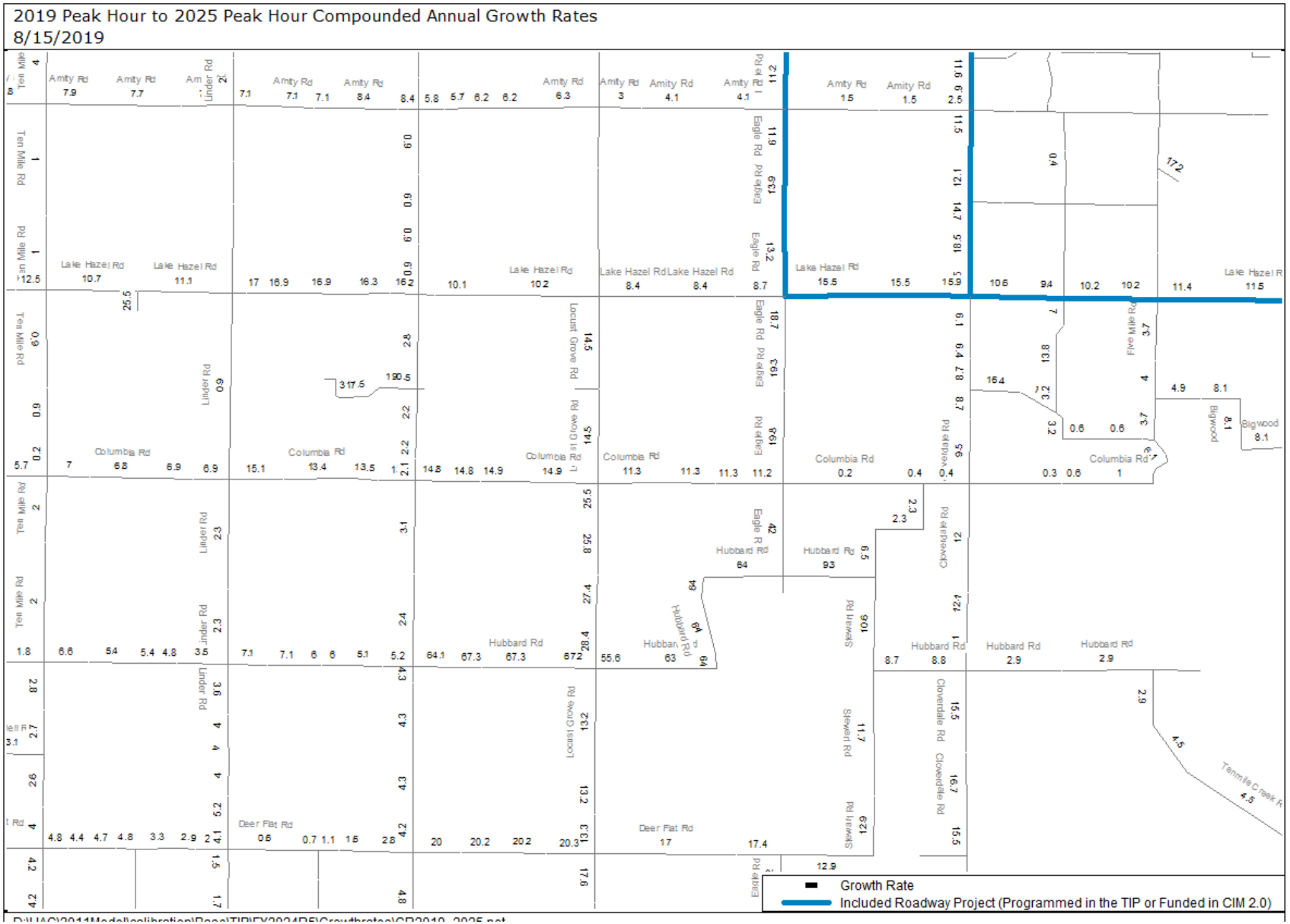


Figure 7: 2025 to 2030 Compounded Annual Growth Rate

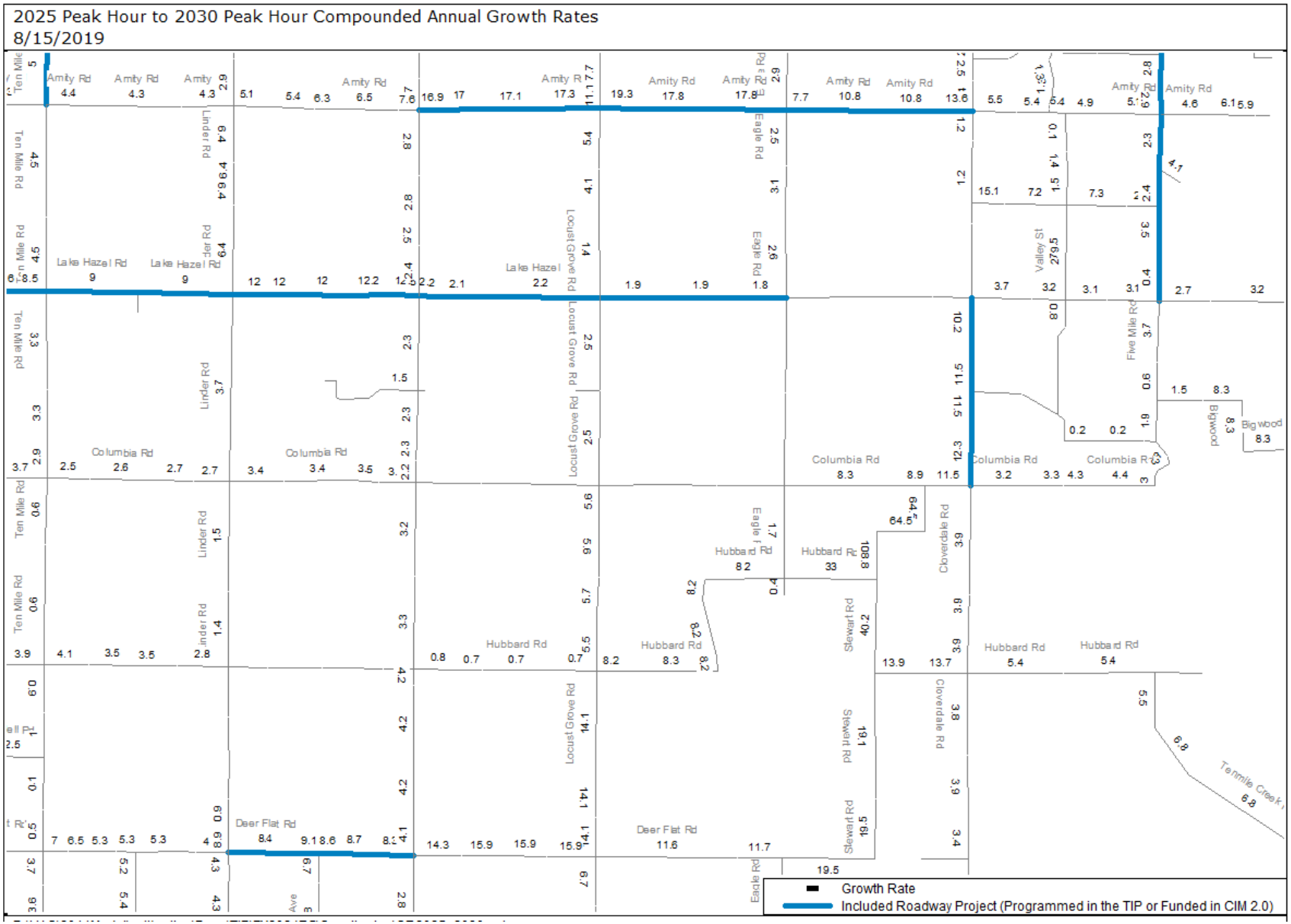


Figure 8: 2030 to 2040 Compounded Annual Growth Rate

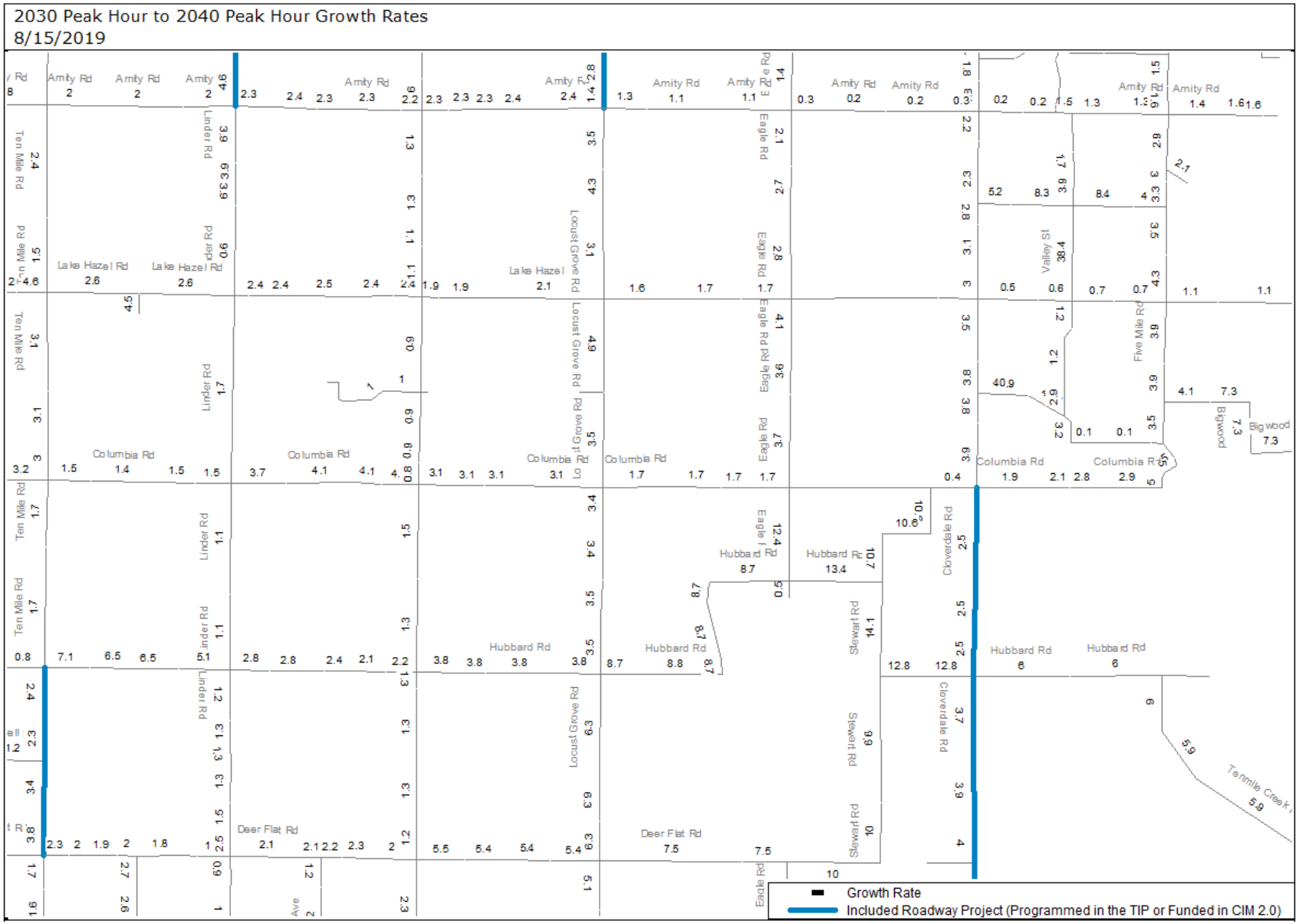


Figure 9: Cumulative Area of Influence, Peak hour demand contribution to the total peak hour demand

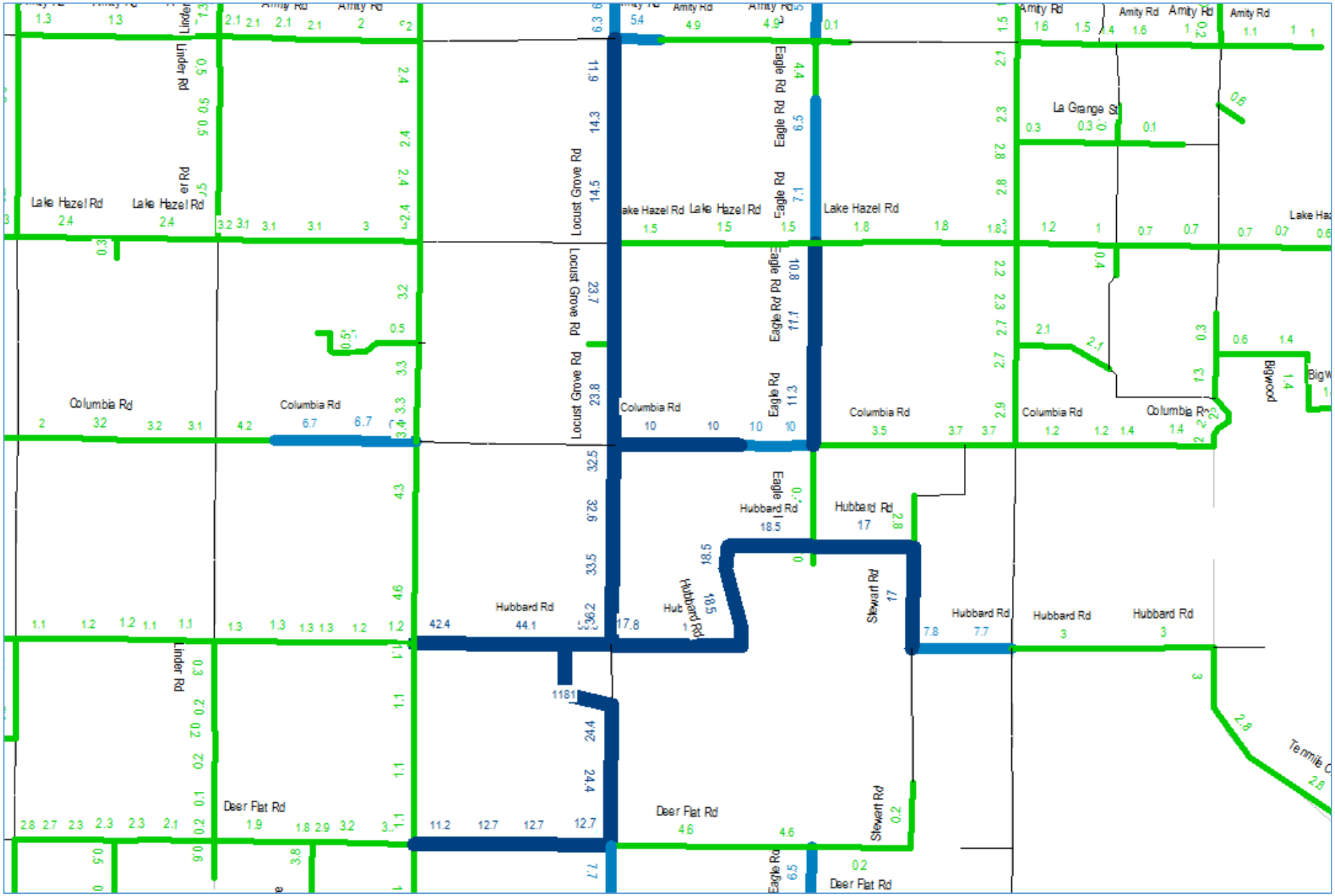
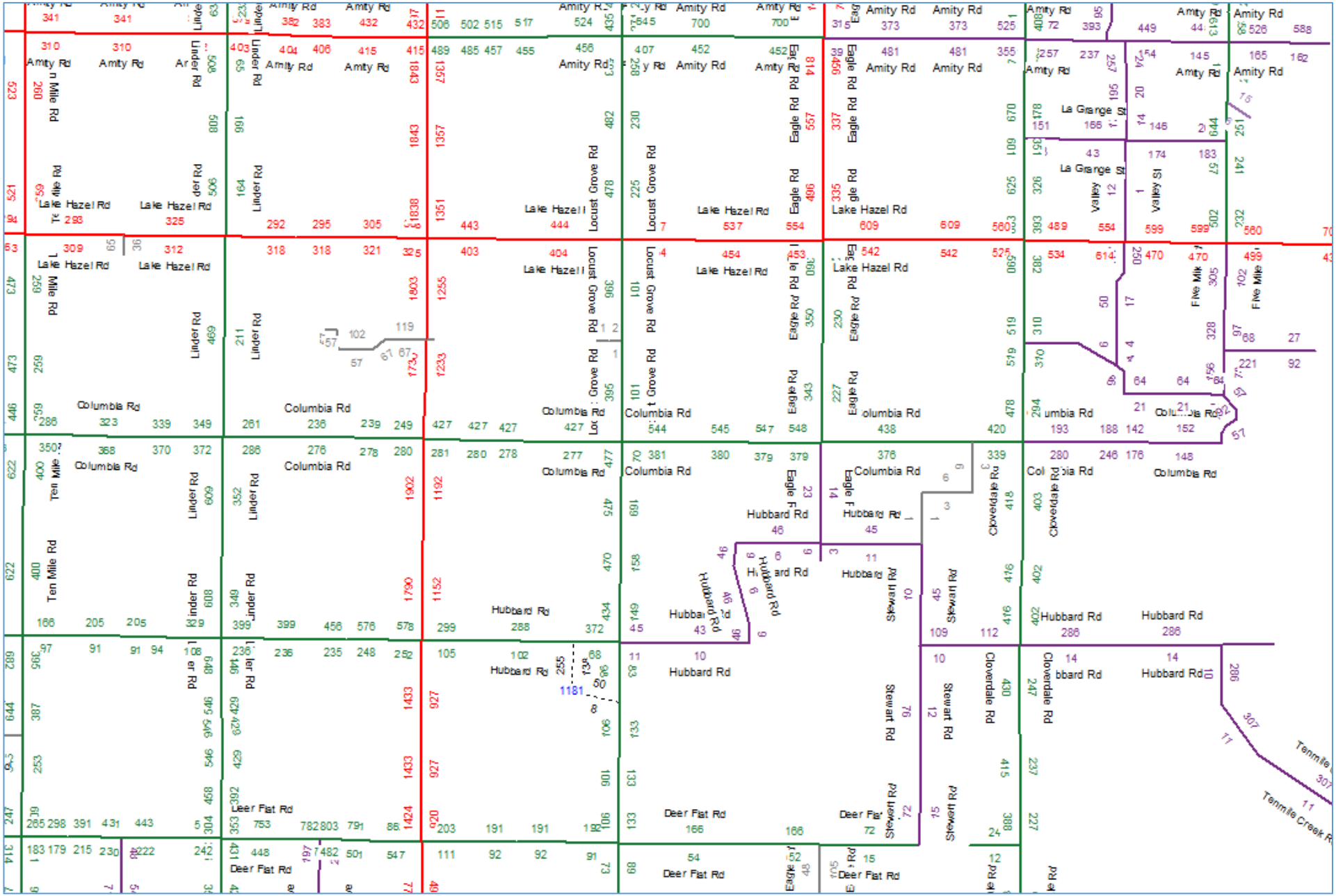


Figure 10: PM Peak Hour Demand with Entitled and Proposed



L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Meridian Rd / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Meridian Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 1

Groups Printed- General Traffic

	Meridian Raod From North					Hubbard Road From East					SH-69 (Meridian Road) From South					Hubbard Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	8	52	0	0	60	1	0	3	0	4	0	229	3	0	232	1	6	36	0	43	339
07:15 AM	5	72	5	0	82	2	1	2	0	5	1	254	2	0	257	2	8	46	0	56	400
07:30 AM	10	75	5	0	90	4	1	0	0	5	1	226	2	0	229	5	7	39	0	51	375
07:45 AM	19	125	4	0	148	3	2	2	0	7	2	165	2	0	169	6	2	12	1	21	345
Total	42	324	14	0	380	10	4	7	0	21	4	874	9	0	887	14	23	133	1	171	1459
08:00 AM	7	89	5	0	101	2	0	1	0	3	1	184	4	0	189	5	0	28	0	33	326
08:15 AM	10	70	3	0	83	1	0	2	0	3	2	176	3	0	181	4	1	26	1	32	299
08:30 AM	17	85	5	1	108	8	2	4	0	14	1	193	4	0	198	5	4	29	0	38	358
08:45 AM	13	81	2	0	96	3	0	0	0	3	2	143	4	0	149	4	1	30	0	35	283
Total	47	325	15	1	388	14	2	7	0	23	6	696	15	0	717	18	6	113	1	138	1266

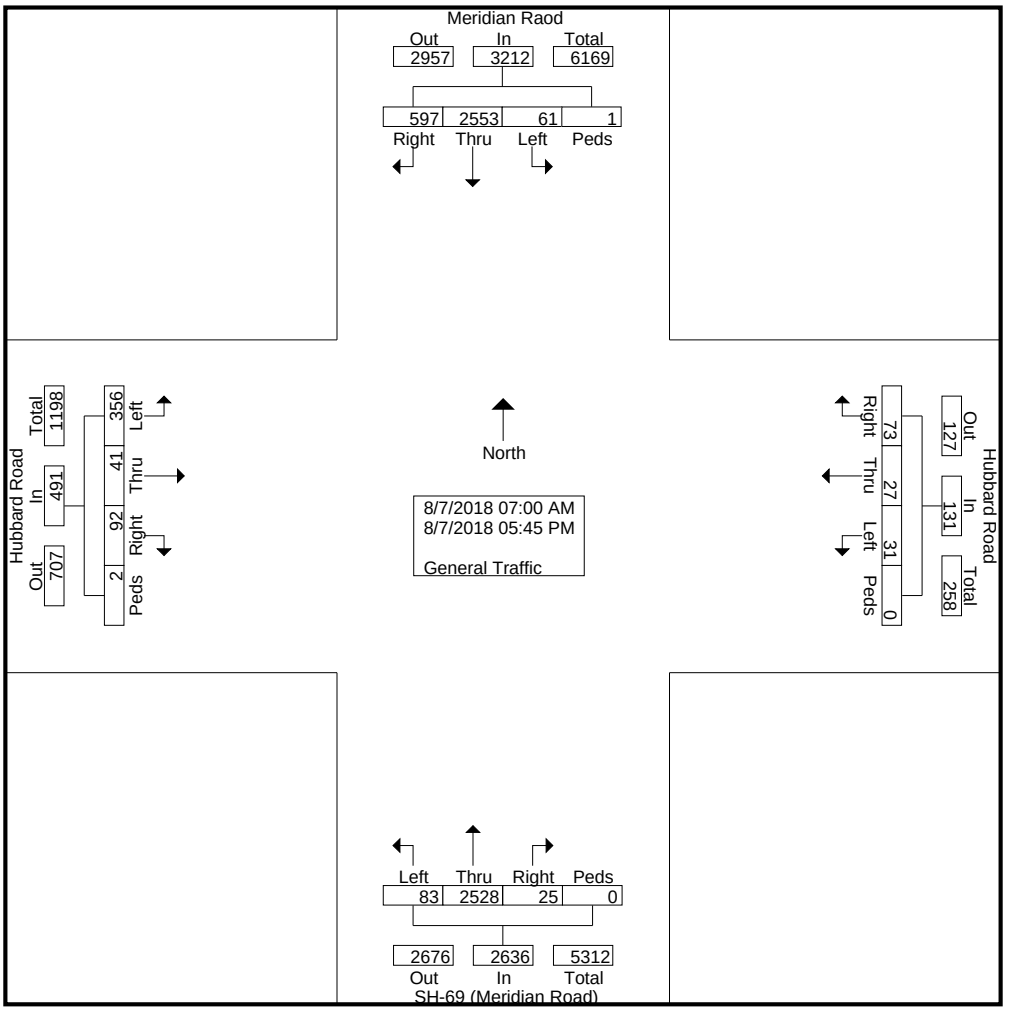
04:00 PM	46	182	6	0	234	3	4	1	0	8	4	115	6	0	125	8	1	13	0	22	389
04:15 PM	70	239	3	0	312	1	1	1	0	3	1	122	6	0	129	8	0	10	0	18	462
04:30 PM	60	209	4	0	273	8	4	2	0	14	1	117	10	0	128	9	1	8	0	18	433
04:45 PM	59	227	4	0	290	8	3	4	0	15	1	119	8	0	128	7	1	12	0	20	453
Total	235	857	17	0	1109	20	12	8	0	40	7	473	30	0	510	32	3	43	0	78	1737
05:00 PM	70	251	4	0	325	9	2	3	0	14	4	117	6	0	127	9	4	18	0	31	497
05:15 PM	71	266	4	0	341	12	3	2	0	17	3	134	9	0	146	7	2	17	0	26	530
05:30 PM	65	249	2	0	316	6	3	2	0	11	0	126	9	0	135	7	1	14	0	22	484
05:45 PM	67	281	5	0	353	2	1	2	0	5	1	108	5	0	114	5	2	18	0	25	497
Total	273	1047	15	0	1335	29	9	9	0	47	8	485	29	0	522	28	9	67	0	104	2008
Grand Total	597	2553	61	1	3212	73	27	31	0	131	25	2528	83	0	2636	92	41	356	2	491	6470
Apprch %	18.6	79.5	1.9	0		55.7	20.6	23.7	0		0.9	95.9	3.1	0		18.7	8.4	72.5	0.4		
Total %	9.2	39.5	0.9	0	49.6	1.1	0.4	0.5	0	2	0.4	39.1	1.3	0	40.7	1.4	0.6	5.5	0	7.6	

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Meridian Rd / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Meridian Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 2



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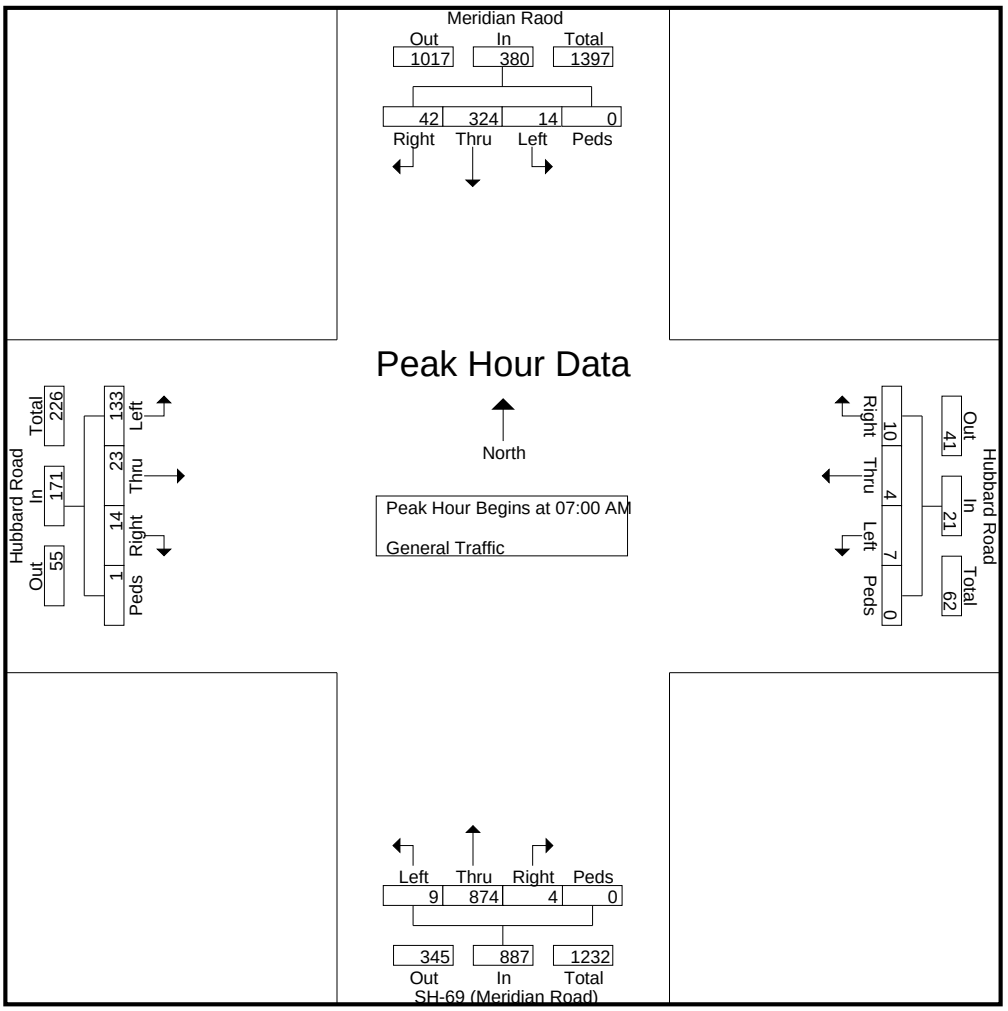
Intersection: Meridian Rd / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Meridian Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 3

	Meridian Raod From North					Hubbard Road From East					SH-69 (Meridian Road) From South					Hubbard Road From West					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	8	52	0	0	60	1	0	**3**	0	4	0	229	**3**	0	232	1	6	36	0	43	339
07:15 AM	5	72	**5**	0	82	2	1	2	0	5	1	**254**	2	0	**257**	2	**8**	**46**	0	**56**	**400**
07:30 AM	10	75	5	0	90	**4**	1	0	0	5	1	226	2	0	229	5	7	39	0	51	375
07:45 AM	**19**	**125**	4	0	**148**	3	**2**	2	0	**7**	**2**	165	2	0	169	**6**	2	12	**1**	21	345
Total Volume	42	324	14	0	380	10	4	7	0	21	4	874	9	0	887	14	23	133	1	171	1459
% App. Total	11.1	85.3	3.7	0		47.6	19	33.3	0		0.5	98.5	1	0		8.2	13.5	77.8	0.6		
PHF	.553	.648	.700	.000	.642	.625	.500	.583	.000	.750	.500	.860	.750	.000	.863	.583	.719	.723	.250	.763	.912



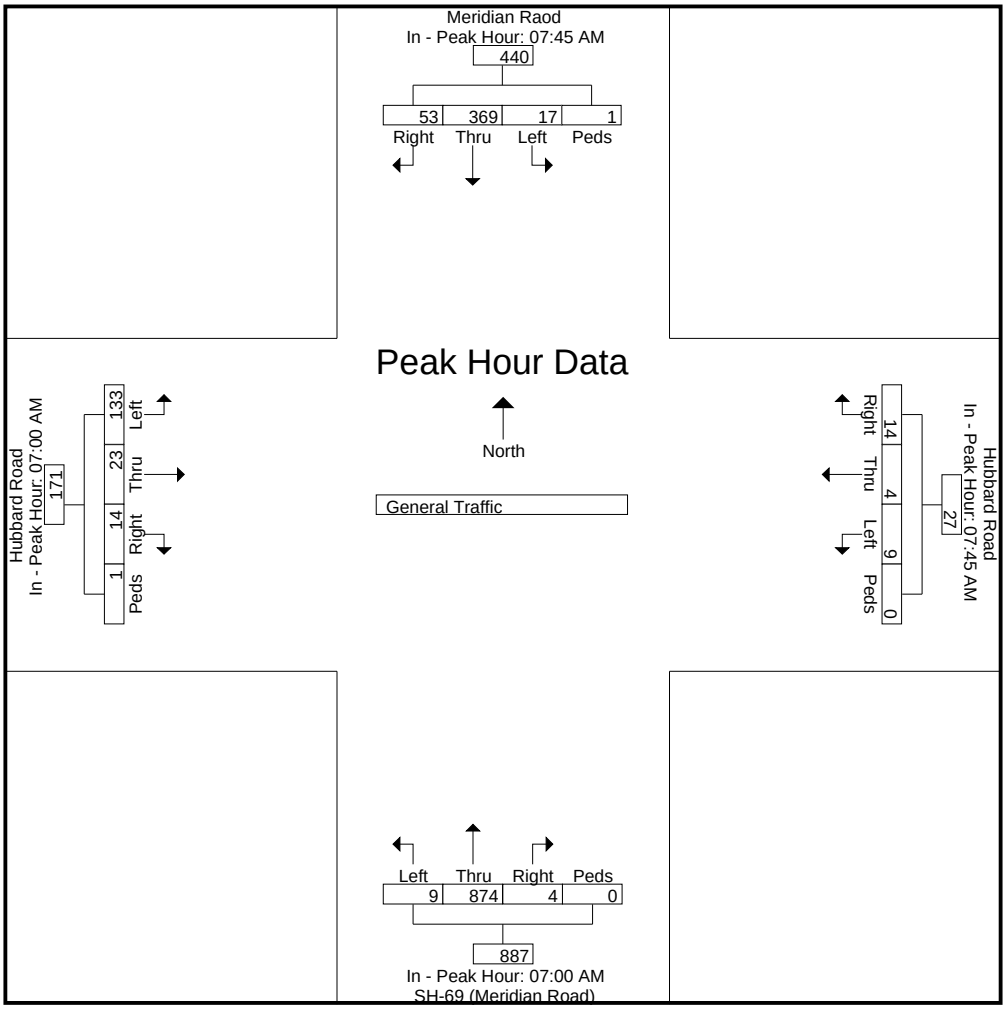
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Meridian Rd / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Meridian Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 4

	Meridian Raod From North					Hubbard Road From East					SH-69 (Meridian Road) From South					Hubbard Road From West					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:45 AM					07:45 AM					07:00 AM					07:00 AM					
+0 mins.	**19**	**125**	4	0	**148**	3	**2**	2	0	7	0	229	**3**	0	232	1	6	36	0	43	
+15 mins.	7	89	**5**	0	101	2	0	1	0	3	1	**254**	2	0	**257**	2	**8**	**46**	0	**56**	
+30 mins.	10	70	3	0	83	1	0	2	0	3	1	226	2	0	229	5	7	39	0	51	
+45 mins.	17	85	5	**1**	108	**8**	2	**4**	0	**14**	**2**	165	2	0	169	**6**	2	12	**1**	21	
Total Volume	53	369	17	1	440	14	4	9	0	27	4	874	9	0	887	14	23	133	1	171	
% App. Total	12	83.9	3.9	0.2		51.9	14.8	33.3	0		0.5	98.5	1	0		8.2	13.5	77.8	0.6		
PHF	.697	.738	.850	.250	.743	.438	.500	.563	.000	.482	.500	.860	.750	.000	.863	.583	.719	.723	.250	.763	



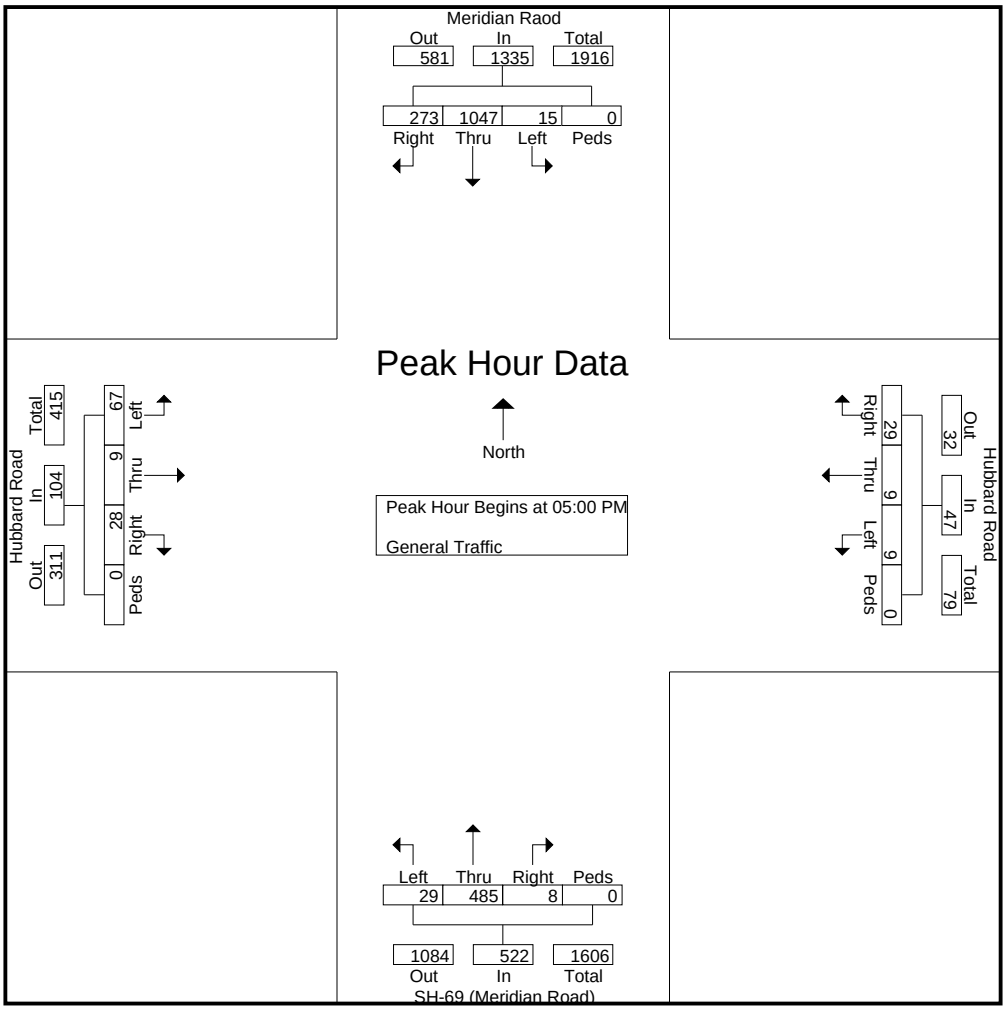
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Meridian Rd / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Meridian Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 5

	Meridian Raod From North					Hubbard Road From East					SH-69 (Meridian Road) From South					Hubbard Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	70	251	4	0	325	9	2	**3**	0	14	**4**	117	6	0	127	**9**	**4**	**18**	0	**31**	497
05:15 PM	**71**	266	4	0	341	**12**	**3**	2	0	**17**	3	**134**	**9**	0	**146**	7	2	17	0	26	**530**
05:30 PM	65	249	2	0	316	6	3	2	0	11	0	126	9	0	135	7	1	14	0	22	484
05:45 PM	67	**281**	**5**	0	**353**	2	1	2	0	5	1	108	5	0	114	5	2	18	0	25	497
Total Volume	273	1047	15	0	1335	29	9	9	0	47	8	485	29	0	522	28	9	67	0	104	2008
% App. Total	20.4	78.4	1.1	0		61.7	19.1	19.1	0		1.5	92.9	5.6	0		26.9	8.7	64.4	0		
PHF	.961	.931	.750	.000	.945	.604	.750	.750	.000	.691	.500	.905	.806	.000	.894	.778	.563	.931	.000	.839	.947



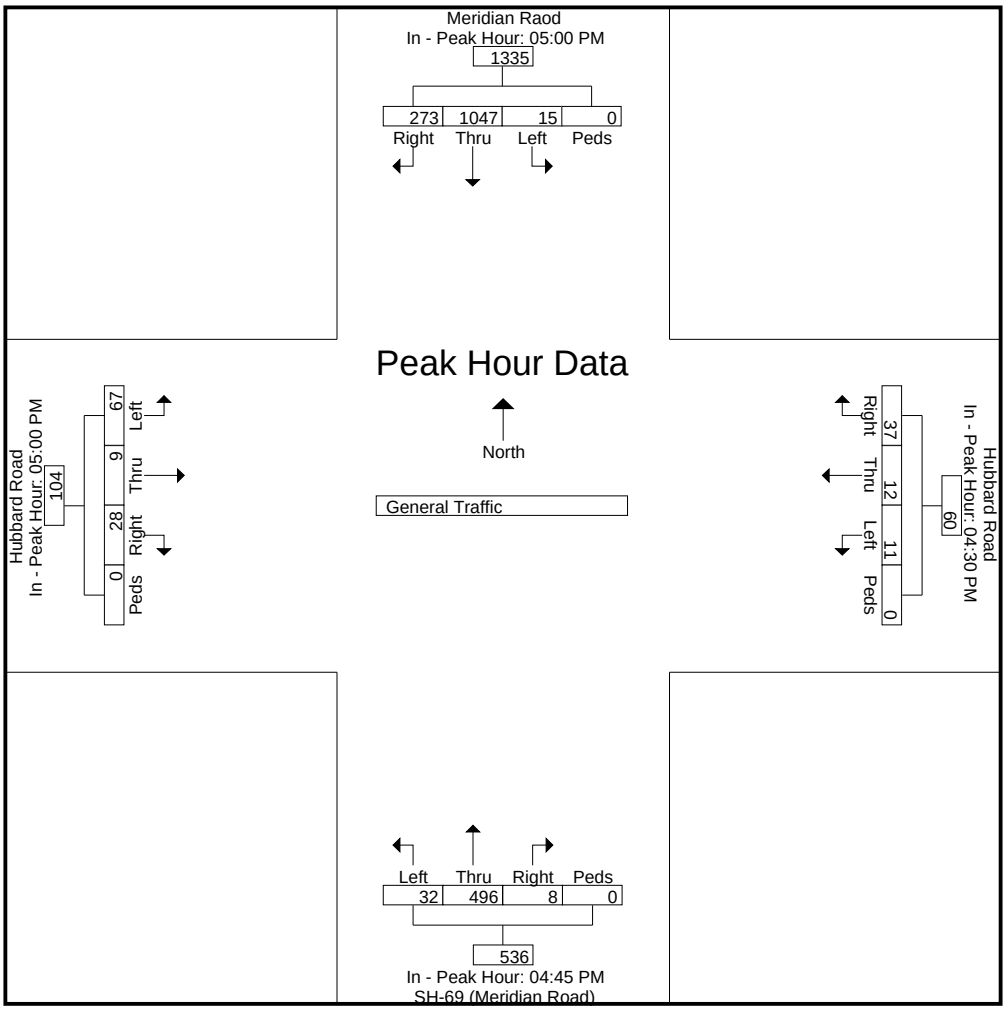
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Meridian Rd / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Meridian Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 6

	Meridian Raod From North					Hubbard Road From East					SH-69 (Meridian Road) From South					Hubbard Road From West					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	05:00 PM					04:30 PM					04:45 PM					05:00 PM					
+0 mins.	70	251	4	0	325	8	**4**	2	0	14	1	119	8	0	128	**9**	**4**	**18**	0	**31**	
+15 mins.	**71**	266	4	0	341	8	3	**4**	0	15	**4**	117	6	0	127	7	2	17	0	26	
+30 mins.	65	249	2	0	316	9	2	3	0	14	3	**134**	**9**	0	**146**	7	1	14	0	22	
+45 mins.	67	**281**	**5**	0	**353**	**12**	3	2	0	**17**	0	126	9	0	135	5	2	18	0	25	
Total Volume	273	1047	15	0	1335	37	12	11	0	60	8	496	32	0	536	28	9	67	0	104	
% App. Total	20.4	78.4	1.1	0		61.7	20	18.3	0		1.5	92.5	6	0		26.9	8.7	64.4	0		
PHF	.961	.931	.750	.000	.945	.771	.750	.688	.000	.882	.500	.925	.889	.000	.918	.778	.563	.931	.000	.839	



L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Meridian Rd / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Meridian Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 7

Image 1

L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Deer Flat
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Deer Flat Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 1

Groups Printed- General Traffic

	Locust Grove Road From North					Deer Flat Road From East					Locust Grove Road From South					Deer Flat Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	3	1	1	0	5	2	7	0	0	9	2	4	1	0	7	0	39	8	0	47	68
07:15 AM	5	2	1	0	8	1	19	0	0	20	0	4	1	0	5	1	38	3	0	42	75
07:30 AM	4	1	1	0	6	1	15	0	0	16	1	4	0	0	5	4	32	8	0	44	71
07:45 AM	1	1	1	0	3	0	4	0	0	4	0	1	1	0	2	1	29	9	0	39	48
Total	13	5	4	0	22	4	45	0	0	49	3	13	3	0	19	6	138	28	0	172	262
08:00 AM	2	2	0	0	4	1	9	0	0	10	1	7	1	0	9	0	24	6	0	30	53
08:15 AM	3	2	1	0	6	0	7	2	0	9	0	4	1	0	5	0	12	2	0	14	34
08:30 AM	5	1	2	0	8	3	9	0	0	12	1	1	0	0	2	1	14	4	0	19	41
08:45 AM	3	2	0	0	5	0	11	1	0	12	1	1	0	0	2	0	15	7	0	22	41
Total	13	7	3	0	23	4	36	3	0	43	3	13	2	0	18	1	65	19	0	85	169

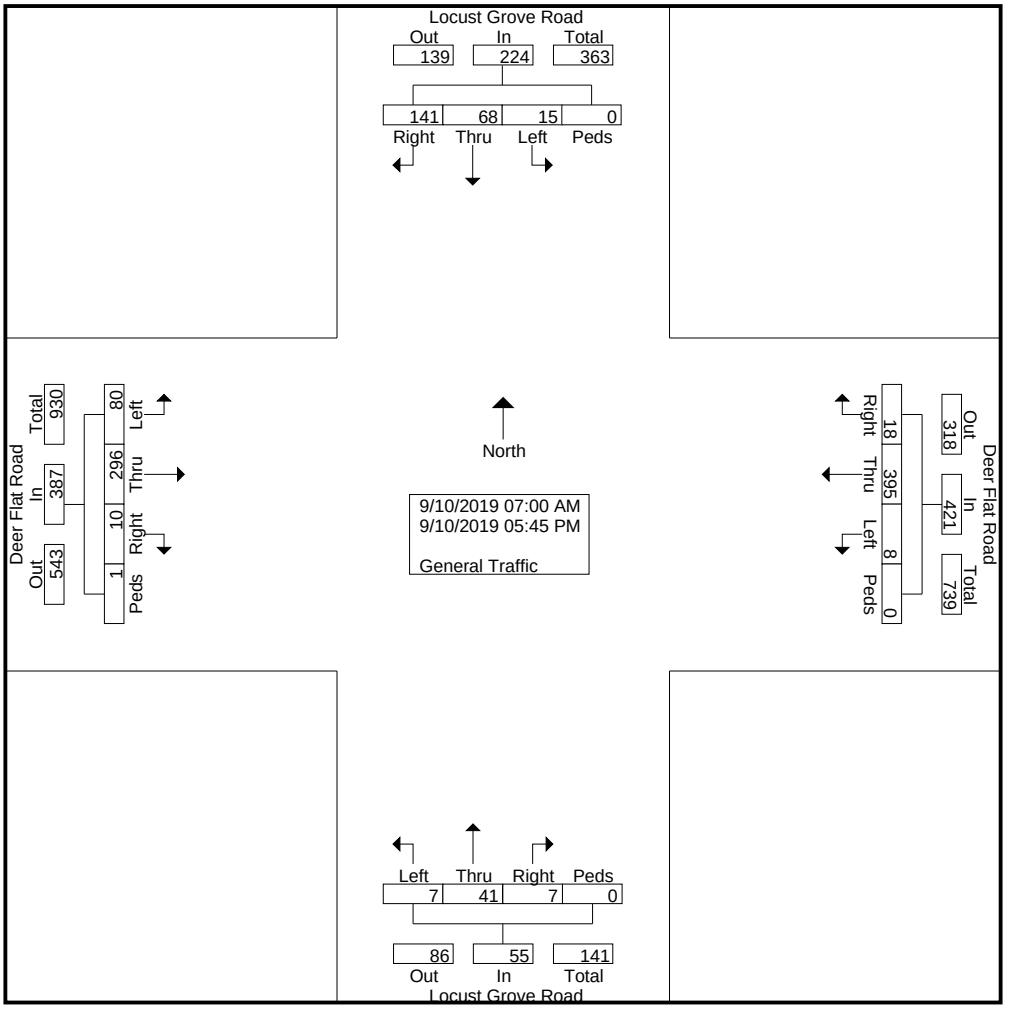
04:00 PM	9	3	0	0	12	2	26	2	0	30	0	4	1	0	5	2	18	2	0	22	69
04:15 PM	12	9	3	0	24	1	29	1	0	31	0	3	1	0	4	0	12	4	0	16	75
04:30 PM	16	6	0	0	22	1	34	0	0	35	0	0	0	0	0	0	16	2	0	18	75
04:45 PM	12	8	0	0	20	2	42	1	0	45	0	1	0	0	1	0	7	2	0	9	75
Total	49	26	3	0	78	6	131	4	0	141	0	8	2	0	10	2	53	10	0	65	294
05:00 PM	15	6	1	0	22	2	49	0	0	51	0	1	0	0	1	1	13	5	0	19	93
05:15 PM	15	12	1	0	28	1	41	0	0	42	0	3	0	0	3	0	11	3	0	14	87
05:30 PM	23	7	1	0	31	1	52	0	0	53	0	1	0	0	1	0	8	9	1	18	103
05:45 PM	13	5	2	0	20	0	41	1	0	42	1	2	0	0	3	0	8	6	0	14	79
Total	66	30	5	0	101	4	183	1	0	188	1	7	0	0	8	1	40	23	1	65	362
Grand Total	141	68	15	0	224	18	395	8	0	421	7	41	7	0	55	10	296	80	1	387	1087
Apprch %	62.9	30.4	6.7	0		4.3	93.8	1.9	0		12.7	74.5	12.7	0		2.6	76.5	20.7	0.3		
Total %	13	6.3	1.4	0	20.6	1.7	36.3	0.7	0	38.7	0.6	3.8	0.6	0	5.1	0.9	27.2	7.4	0.1	35.6	

L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Deer Flat
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Deer Flat Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 2



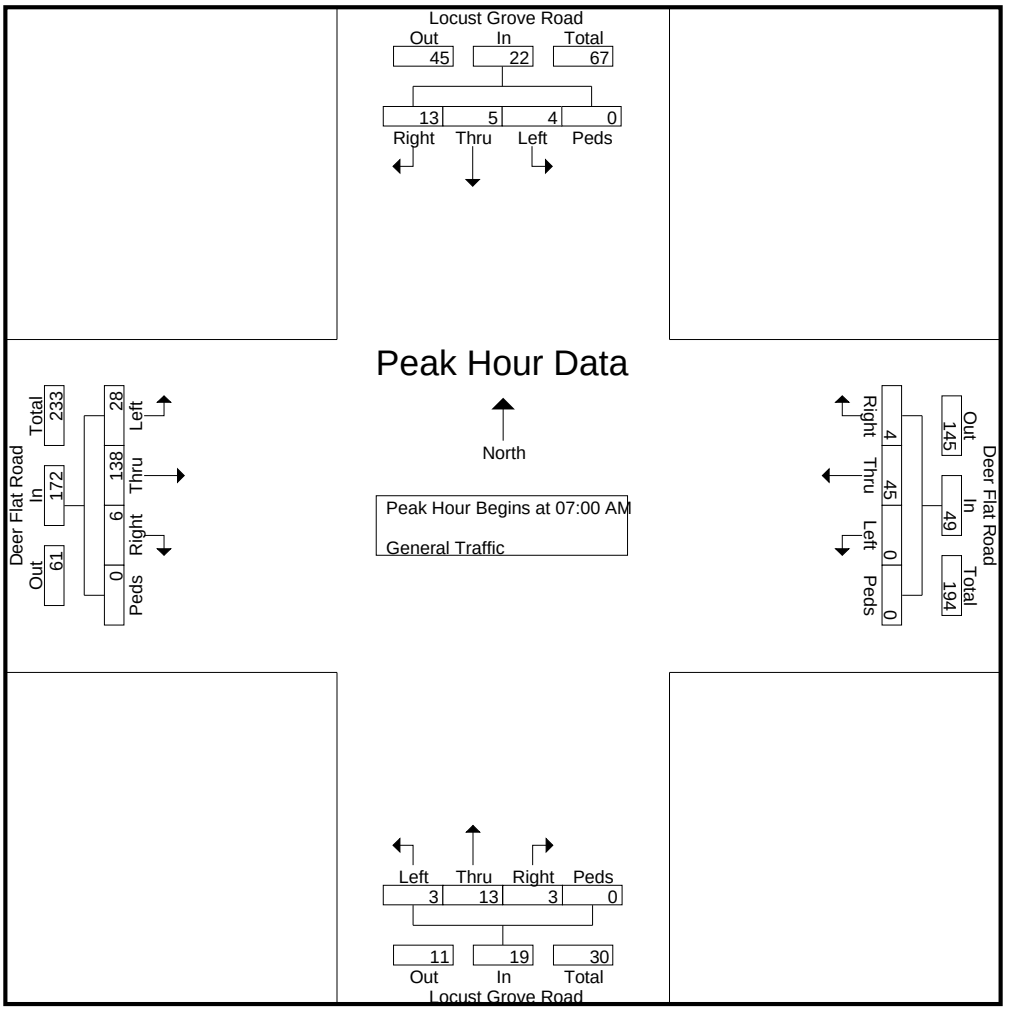
L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Deer Flat
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Deer Flat Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 3

	Locust Grove Road From North					Deer Flat Road From East					Locust Grove Road From South					Deer Flat Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	3	1	**1**	0	5	**2**	7	0	0	9	**2**	**4**	**1**	0	**7**	0	**39**	8	0	**47**	68
07:15 AM	**5**	**2**	1	0	**8**	1	**19**	0	0	**20**	0	4	1	0	5	1	38	3	0	42	**75**
07:30 AM	4	1	1	0	6	1	15	0	0	16	1	4	0	0	5	**4**	32	8	0	44	71
07:45 AM	1	1	1	0	3	0	4	0	0	4	0	1	1	0	2	1	29	**9**	0	39	48
Total Volume	13	5	4	0	22	4	45	0	0	49	3	13	3	0	19	6	138	28	0	172	262
% App. Total	59.1	22.7	18.2	0		8.2	91.8	0	0		15.8	68.4	15.8	0		3.5	80.2	16.3	0		
PHF	.650	.625	1.00	.000	.688	.500	.592	.000	.000	.613	.375	.813	.750	.000	.679	.375	.885	.778	.000	.915	.873



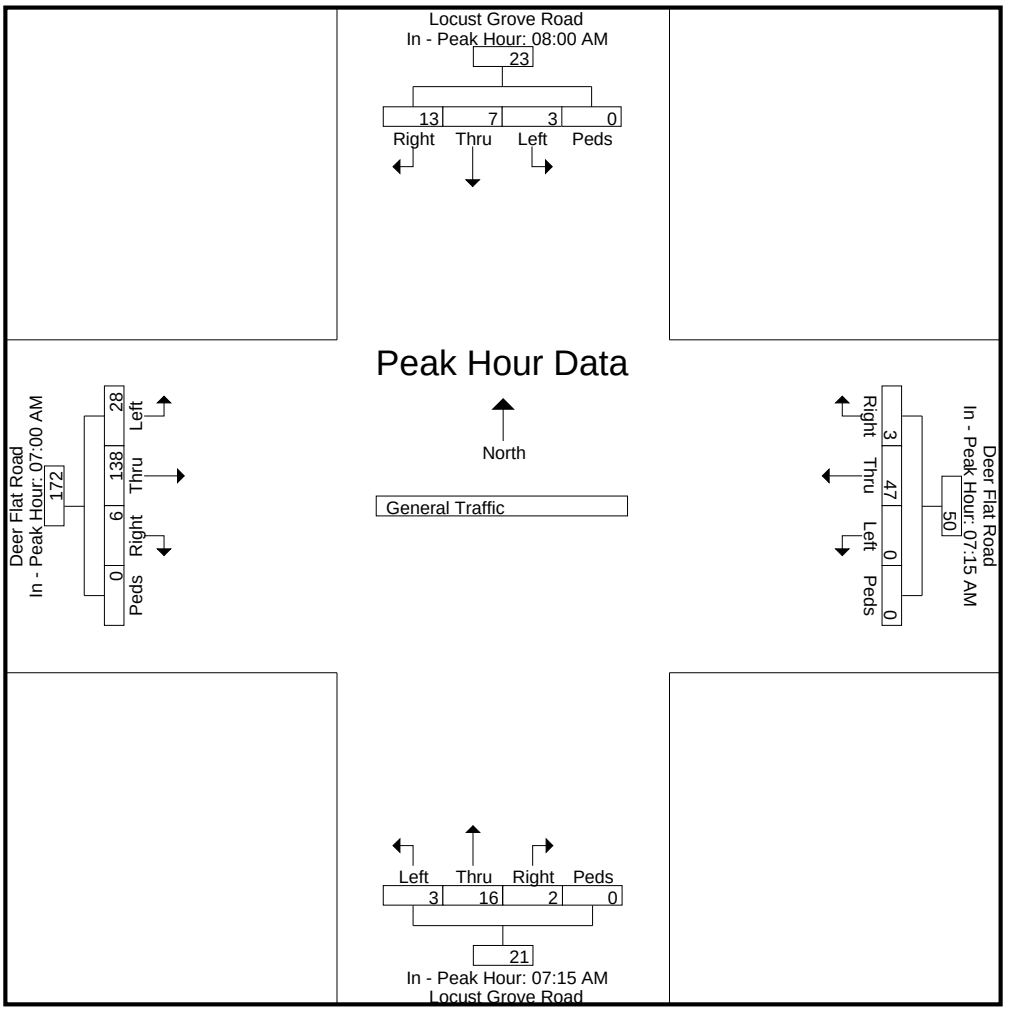
L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Deer Flat
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Deer Flat Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 4

	Locust Grove Road From North					Deer Flat Road From East					Locust Grove Road From South					Deer Flat Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	08:00 AM					07:15 AM					07:15 AM					07:00 AM					
+0 mins.	2	**2**	0	0	4	**1**	**19**	0	0	**20**	0	4	**1**	0	5	0	**39**	8	0	**47**	
+15 mins.	3	2	1	0	6	1	15	0	0	16	**1**	4	0	0	5	1	38	3	0	42	
+30 mins.	**5**	1	**2**	0	**8**	0	4	0	0	4	0	1	1	0	2	**4**	32	8	0	44	
+45 mins.	3	2	0	0	5	1	9	0	0	10	1	**7**	1	0	**9**	1	29	**9**	0	39	
Total Volume	13	7	3	0	23	3	47	0	0	50	2	16	3	0	21	6	138	28	0	172	
% App. Total	56.5	30.4	13	0		6	94	0	0		9.5	76.2	14.3	0		3.5	80.2	16.3	0		
PHF	.650	.875	.375	.000	.719	.750	.618	.000	.000	.625	.500	.571	.750	.000	.583	.375	.885	.778	.000	.915	



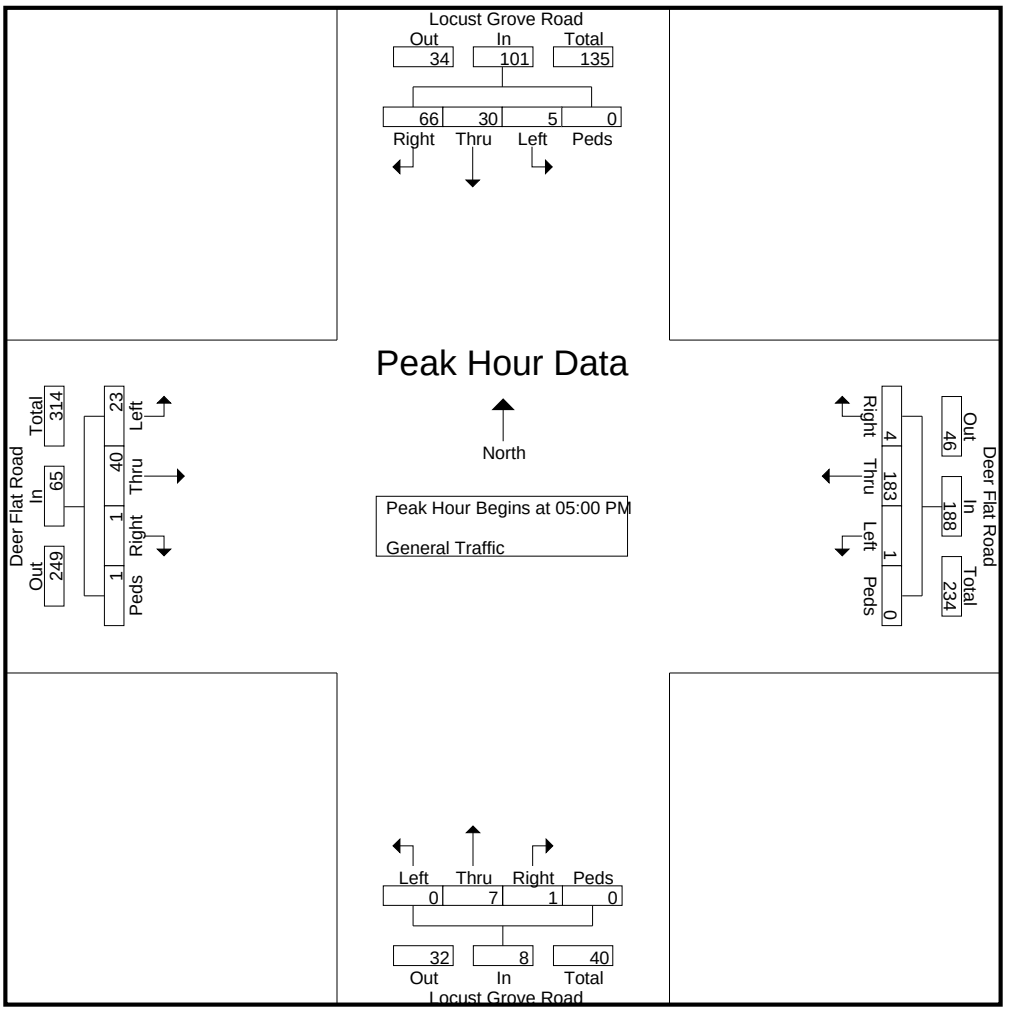
L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Deer Flat
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Deer Flat Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 5

	Locust Grove Road From North					Deer Flat Road From East					Locust Grove Road From South					Deer Flat Road From West					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	15	6	1	0	22	**2**	49	0	0	51	0	1	0	0	1	**1**	**13**	5	0	**19**	93
05:15 PM	15	**12**	1	0	28	1	41	0	0	42	0	**3**	0	0	**3**	0	11	3	0	14	87
05:30 PM	**23**	7	1	0	**31**	1	**52**	0	0	**53**	0	1	0	0	1	0	8	**9**	**1**	18	**103**
05:45 PM	13	5	**2**	0	20	0	41	**1**	0	42	**1**	2	0	0	3	0	8	6	0	14	79
Total Volume	66	30	5	0	101	4	183	1	0	188	1	7	0	0	8	1	40	23	1	65	362
% App. Total	65.3	29.7	5	0		2.1	97.3	0.5	0		12.5	87.5	0	0		1.5	61.5	35.4	1.5		
PHF	.717	.625	.625	.000	.815	.500	.880	.250	.000	.887	.250	.583	.000	.000	.667	.250	.769	.639	.250	.855	.879



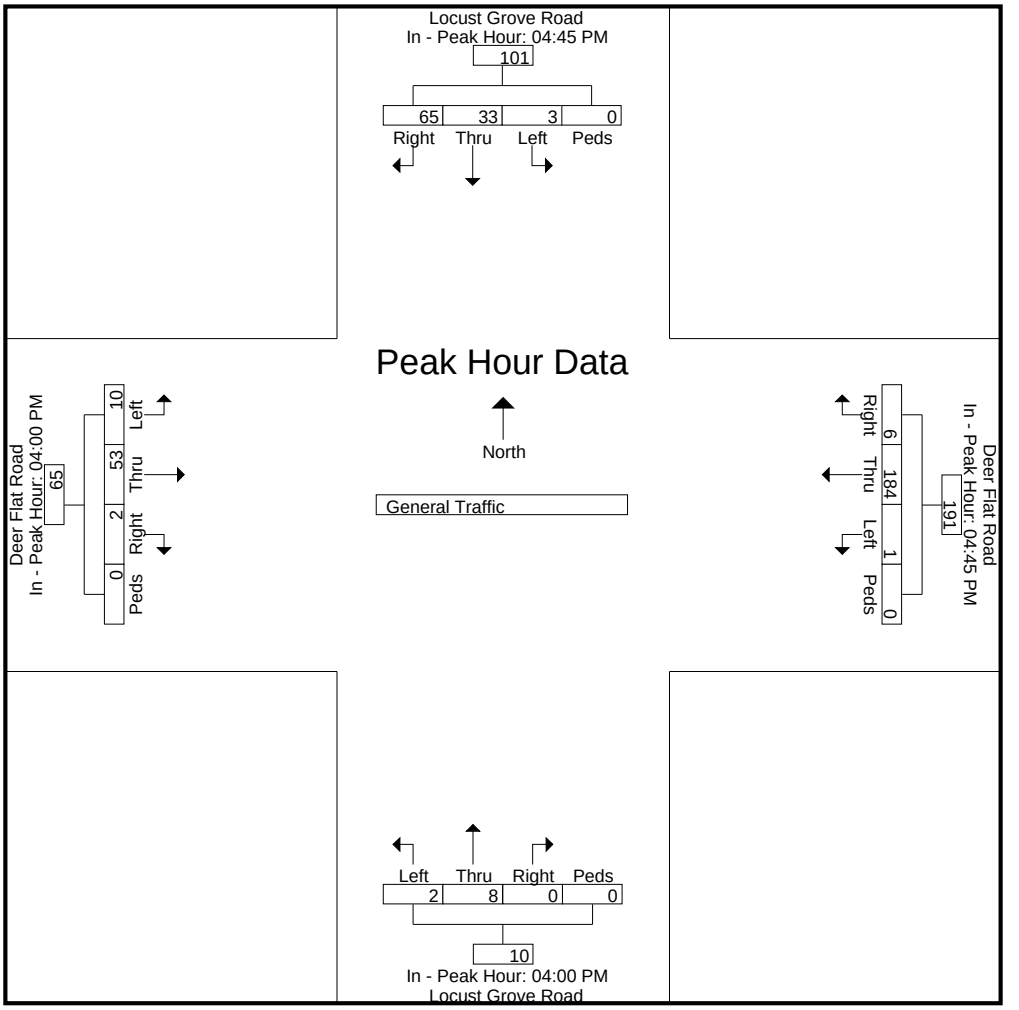
L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Deer Flat
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Deer Flat Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 6

	Locust Grove Road From North					Deer Flat Road From East					Locust Grove Road From South					Deer Flat Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:45 PM					04:45 PM					04:00 PM					04:00 PM					
+0 mins.	12	8	0	0	20	**2**	42	**1**	0	45	0	**4**	**1**	0	**5**	**2**	**18**	2	0	**22**	
+15 mins.	15	6	**1**	0	22	2	49	0	0	51	0	3	1	0	4	0	12	**4**	0	16	
+30 mins.	15	**12**	1	0	28	1	41	0	0	42	0	0	0	0	0	0	16	2	0	18	
+45 mins.	**23**	7	1	0	**31**	1	**52**	0	0	**53**	0	1	0	0	1	0	7	2	0	9	
Total Volume	65	33	3	0	101	6	184	1	0	191	0	8	2	0	10	2	53	10	0	65	
% App. Total	64.4	32.7	3	0		3.1	96.3	0.5	0		0	80	20	0		3.1	81.5	15.4	0		
PHF	.707	.688	.750	.000	.815	.750	.885	.250	.000	.901	.000	.500	.500	.000	.500	.250	.736	.625	.000	.739	



L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Deer Flat
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Deer Flat Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 7

Image 1

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 1

Groups Printed- General Traffic

	Locust Grove Road From North					Hubbard Road From East					Locust Grove Road From South					Hubbard Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	1	0	0	1	0	3	0	0	3	0	10	0	0	10	0	3	4	0	7	21
07:15 AM	0	1	1	0	2	0	3	0	0	3	1	14	0	0	15	1	6	4	0	11	31
07:30 AM	4	5	0	0	9	0	2	0	0	2	0	8	0	0	8	1	5	3	0	9	28
07:45 AM	1	4	0	0	5	2	1	0	0	3	0	6	0	0	6	2	3	3	0	8	22
Total	5	11	1	0	17	2	9	0	0	11	1	38	0	0	39	4	17	14	0	35	102
08:00 AM	0	4	0	0	4	1	3	0	0	4	1	4	0	0	5	2	1	3	0	6	19
08:15 AM	0	6	1	0	7	0	2	0	0	2	0	10	0	0	10	0	1	1	0	2	21
08:30 AM	3	4	0	0	7	0	3	1	0	4	0	7	2	0	9	0	5	1	0	6	26
08:45 AM	1	4	0	0	5	0	0	0	0	0	1	2	0	0	3	0	1	0	0	1	9
Total	4	18	1	0	23	1	8	1	0	10	2	23	2	0	27	2	8	5	0	15	75

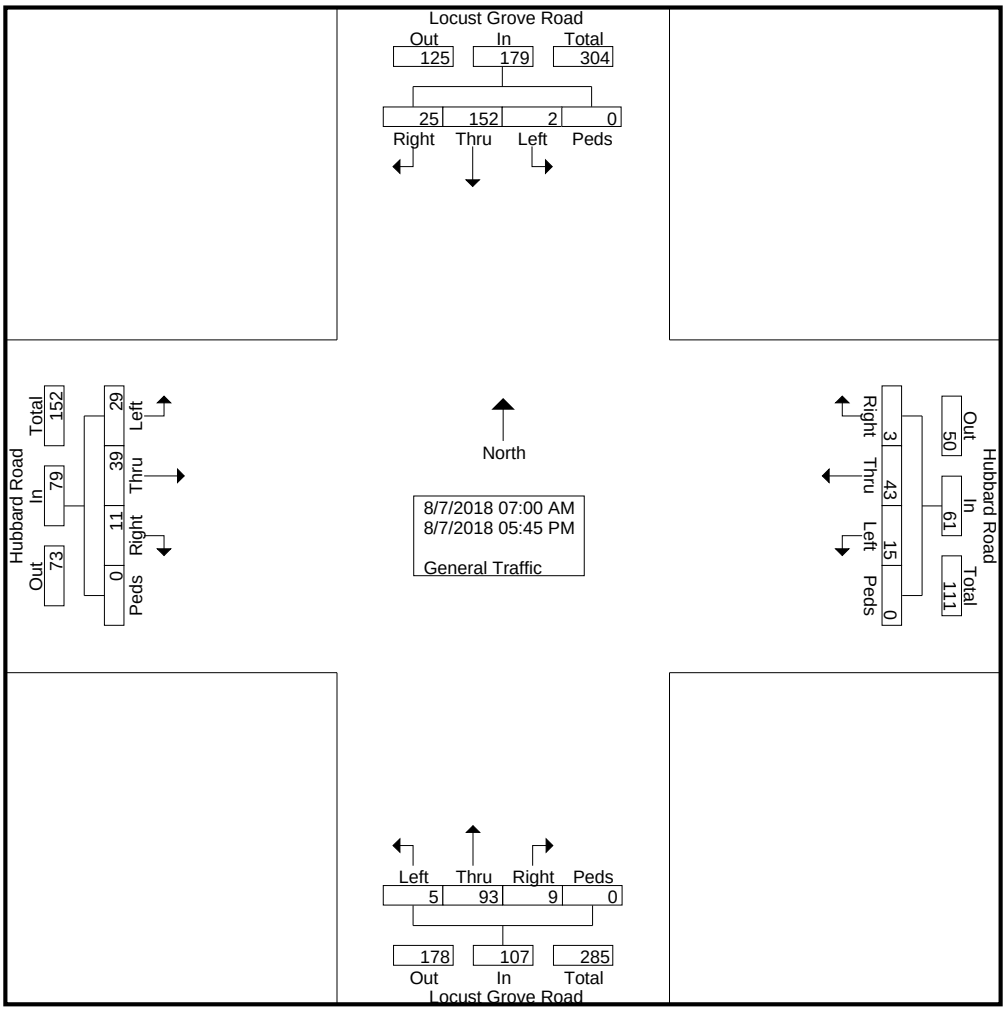
04:00 PM	2	16	0	0	18	0	3	4	0	7	1	2	0	0	3	0	2	0	0	2	30
04:15 PM	2	16	0	0	18	0	1	1	0	2	1	9	0	0	10	0	2	5	0	7	37
04:30 PM	0	12	0	0	12	0	5	1	0	6	1	3	0	0	4	1	0	1	0	2	24
04:45 PM	5	15	0	0	20	0	6	0	0	6	0	2	1	0	3	0	1	2	0	3	32
Total	9	59	0	0	68	0	15	6	0	21	3	16	1	0	20	1	5	8	0	14	123
05:00 PM	1	16	0	0	17	0	1	1	0	2	1	7	2	0	10	0	1	1	0	2	31
05:15 PM	1	14	0	0	15	0	2	3	0	5	0	2	0	0	2	1	3	1	0	5	27
05:30 PM	2	19	0	0	21	0	5	1	0	6	1	4	0	0	5	1	1	0	0	2	34
05:45 PM	3	15	0	0	18	0	3	3	0	6	1	3	0	0	4	2	4	0	0	6	34
Total	7	64	0	0	71	0	11	8	0	19	3	16	2	0	21	4	9	2	0	15	126
Grand Total	25	152	2	0	179	3	43	15	0	61	9	93	5	0	107	11	39	29	0	79	426
Apprch %	14	84.9	1.1	0		4.9	70.5	24.6	0		8.4	86.9	4.7	0		13.9	49.4	36.7	0		
Total %	5.9	35.7	0.5	0	42	0.7	10.1	3.5	0	14.3	2.1	21.8	1.2	0	25.1	2.6	9.2	6.8	0	18.5	

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 2



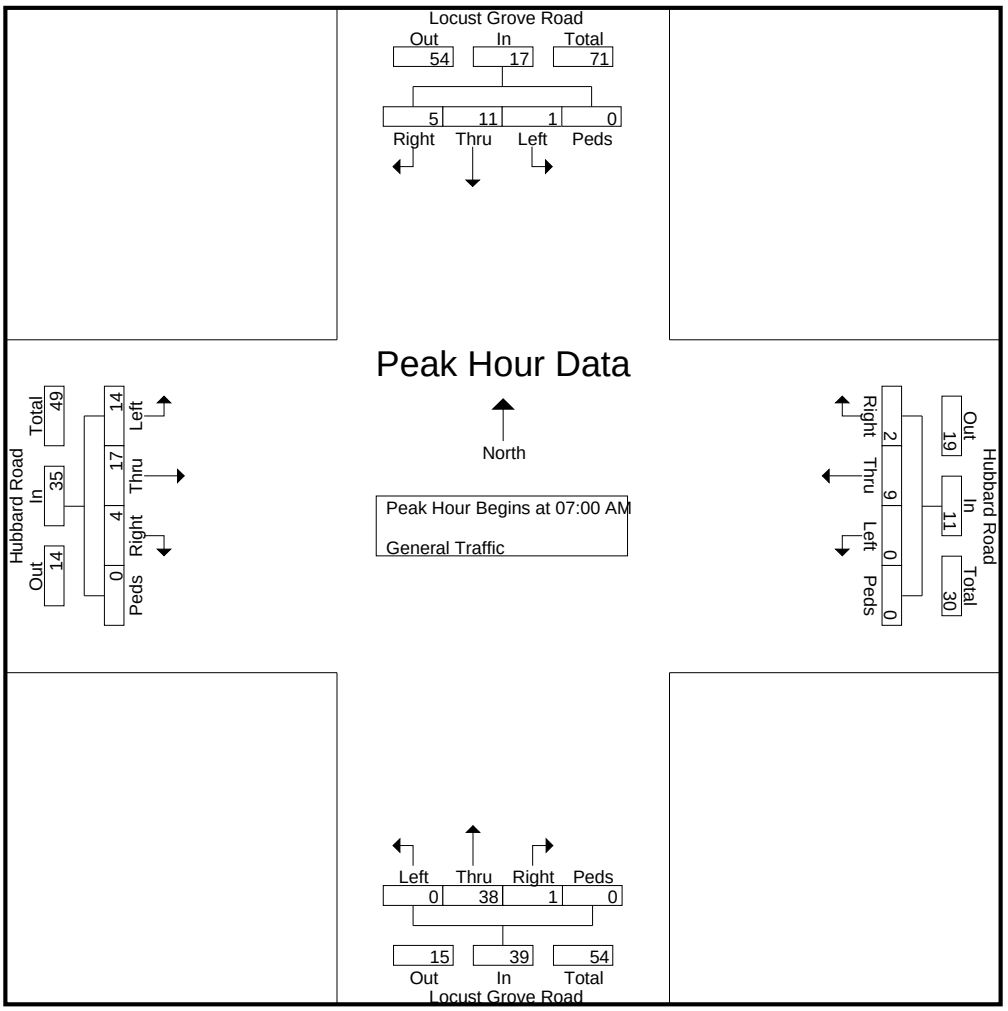
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 3

	Locust Grove Road From North					Hubbard Road From East					Locust Grove Road From South					Hubbard Road From West					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	1	0	0	1	0	**3**	0	0	**3**	0	10	0	0	10	0	3	**4**	0	7	21
07:15 AM	0	1	**1**	0	2	0	3	0	0	3	**1**	**14**	0	0	**15**	1	**6**	4	0	**11**	**31**
07:30 AM	**4**	**5**	0	0	**9**	0	2	0	0	2	0	8	0	0	8	1	5	3	0	9	28
07:45 AM	1	4	0	0	5	**2**	1	0	0	3	0	6	0	0	6	**2**	3	3	0	8	22
Total Volume	5	11	1	0	17	2	9	0	0	11	1	38	0	0	39	4	17	14	0	35	102
% App. Total	29.4	64.7	5.9	0		18.2	81.8	0	0		2.6	97.4	0	0		11.4	48.6	40	0		
PHF	.313	.550	.250	.000	.472	.250	.750	.000	.000	.917	.250	.679	.000	.000	.650	.500	.708	.875	.000	.795	.823



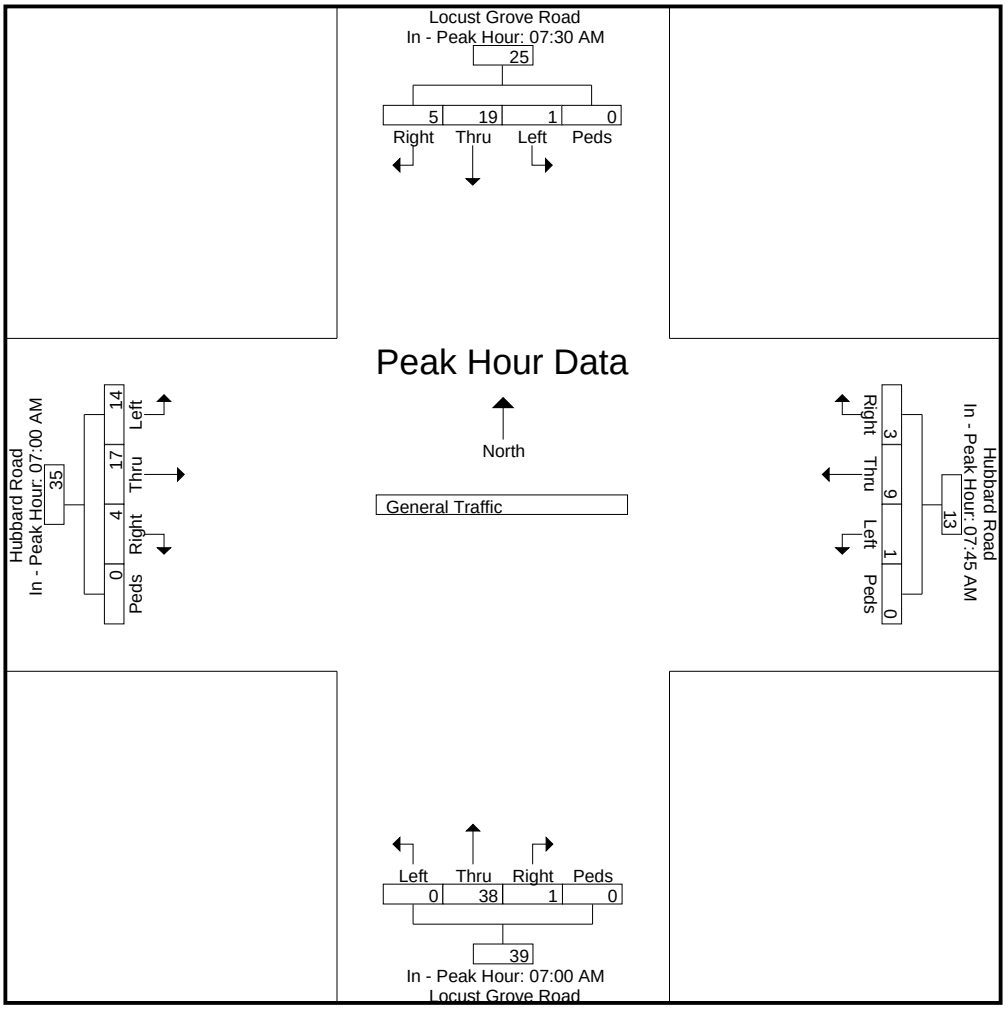
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 4

	Locust Grove Road From North					Hubbard Road From East					Locust Grove Road From South					Hubbard Road From West					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:30 AM					07:45 AM					07:00 AM					07:00 AM					
+0 mins.	**4**	5	0	0	**9**	**2**	1	0	0	3	0	10	0	0	10	0	3	**4**	0	7	
+15 mins.	1	4	0	0	5	1	**3**	0	0	**4**	**1**	**14**	0	0	**15**	1	**6**	4	0	**11**	
+30 mins.	0	4	0	0	4	0	2	0	0	2	0	8	0	0	8	1	5	3	0	9	
+45 mins.	0	**6**	**1**	0	7	0	3	**1**	0	4	0	6	0	0	6	**2**	3	3	0	8	
Total Volume	5	19	1	0	25	3	9	1	0	13	1	38	0	0	39	4	17	14	0	35	
% App. Total	20	76	4	0		23.1	69.2	7.7	0		2.6	97.4	0	0		11.4	48.6	40	0		
PHF	.313	.792	.250	.000	.694	.375	.750	.250	.000	.813	.250	.679	.000	.000	.650	.500	.708	.875	.000	.795	



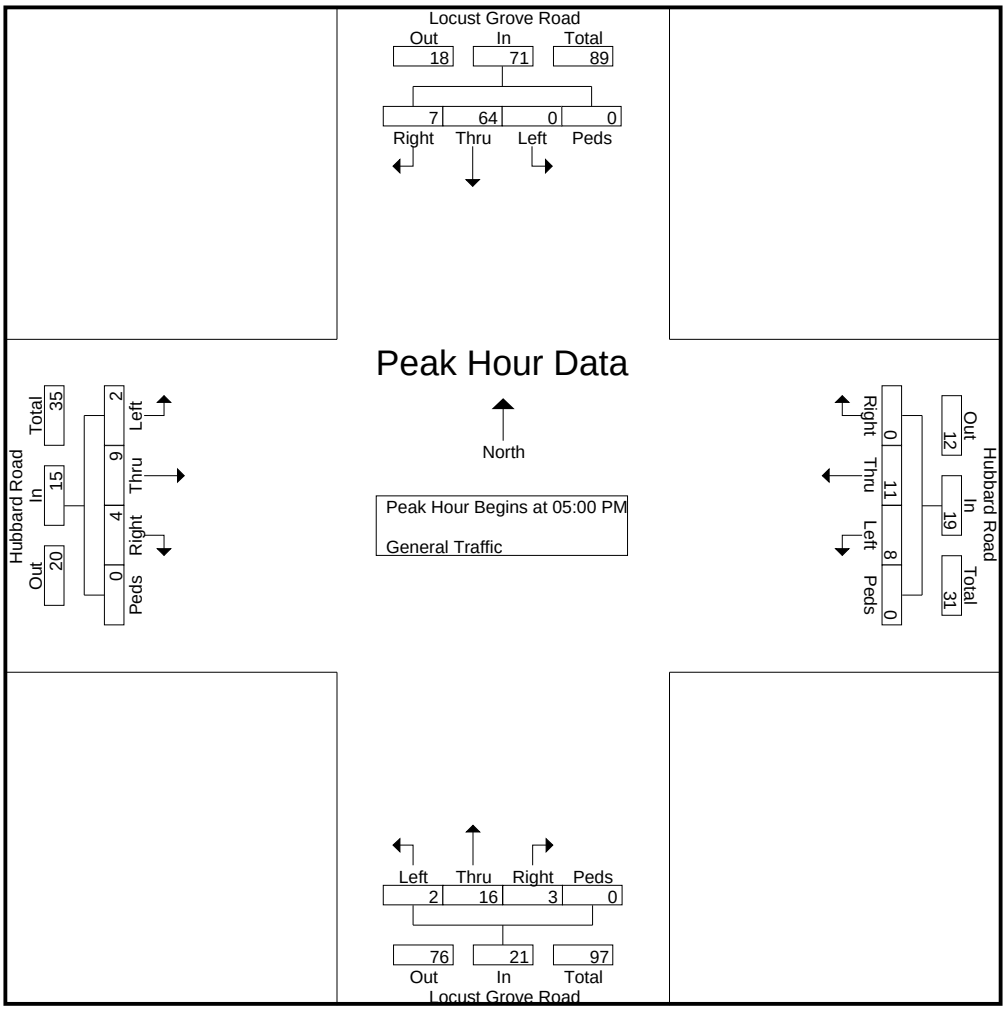
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 5

	Locust Grove Road From North					Hubbard Road From East					Locust Grove Road From South					Hubbard Road From West					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	16	0	0	17	0	1	1	0	2	**1**	**7**	**2**	0	**10**	0	1	**1**	0	2	31
05:15 PM	1	14	0	0	15	0	2	**3**	0	5	0	2	0	0	2	1	3	1	0	5	27
05:30 PM	2	**19**	0	0	**21**	0	**5**	1	0	**6**	1	4	0	0	5	1	1	0	0	2	**34**
05:45 PM	**3**	15	0	0	18	0	3	3	0	6	1	3	0	0	4	**2**	**4**	0	0	**6**	34
Total Volume	7	64	0	0	71	0	11	8	0	19	3	16	2	0	21	4	9	2	0	15	126
% App. Total	9.9	90.1	0	0		0	57.9	42.1	0		14.3	76.2	9.5	0		26.7	60	13.3	0		
PHF	.583	.842	.000	.000	.845	.000	.550	.667	.000	.792	.750	.571	.250	.000	.525	.500	.563	.500	.000	.625	.926



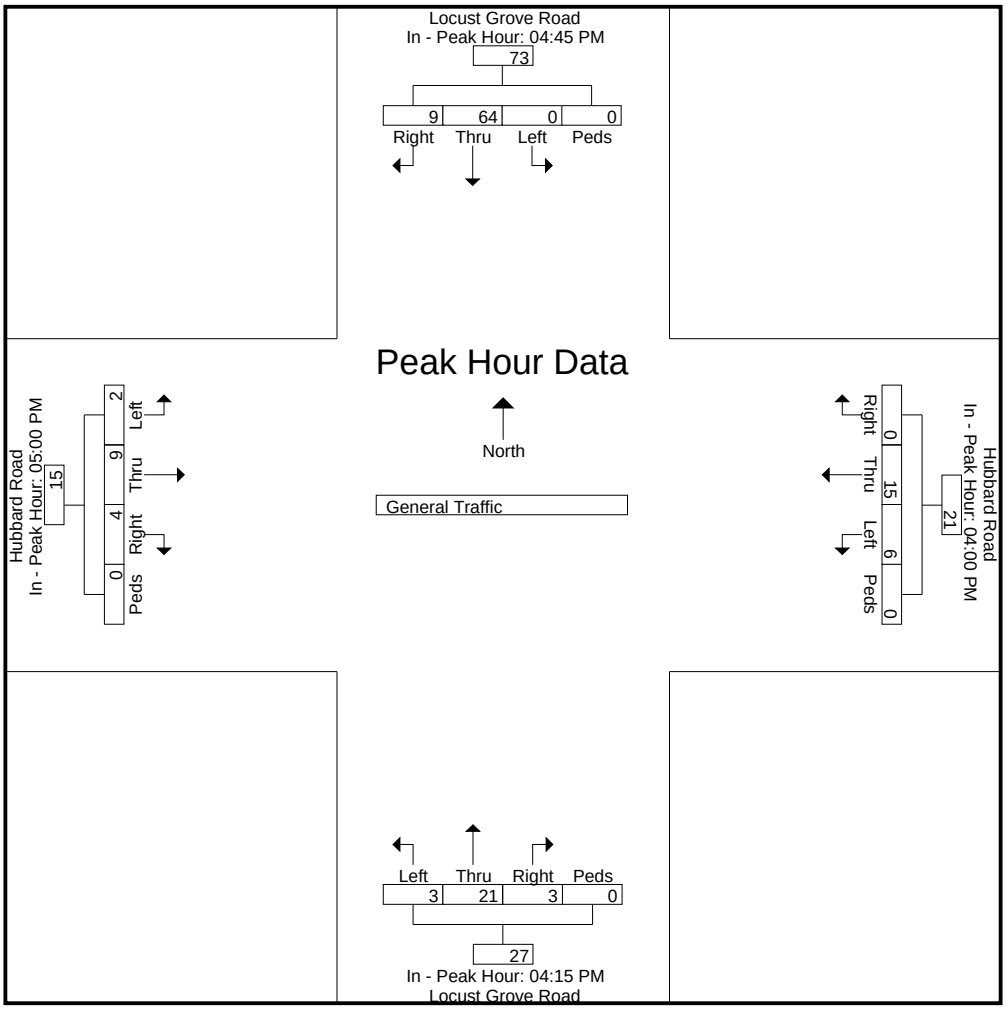
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 6

	Locust Grove Road From North					Hubbard Road From East					Locust Grove Road From South					Hubbard Road From West					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:45 PM					04:00 PM					04:15 PM					05:00 PM					
+0 mins.	**5**	15	0	0	20	0	3	**4**	0	**7**	**1**	**9**	0	0	**10**	0	1	**1**	0	2	
+15 mins.	1	16	0	0	17	0	1	1	0	2	1	3	0	0	4	1	3	1	0	5	
+30 mins.	1	14	0	0	15	0	5	1	0	6	0	2	1	0	3	1	1	0	0	2	
+45 mins.	2	**19**	0	0	**21**	0	**6**	0	0	6	1	7	**2**	0	10	**2**	**4**	0	0	**6**	
Total Volume	9	64	0	0	73	0	15	6	0	21	3	21	3	0	27	4	9	2	0	15	
% App. Total	12.3	87.7	0	0		0	71.4	28.6	0		11.1	77.8	11.1	0		26.7	60	13.3	0		
PHF	.450	.842	.000	.000	.869	.000	.625	.375	.000	.750	.750	.583	.375	.000	.675	.500	.563	.500	.000	.625	



L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Hubbard Rd
City, State: Ada County, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Hubbard Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 7

Image 1

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Columbia Rd
City, State: Ada County, Idaho
Control: All Stop

File Name : Locust Grove Rd & Columbia Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 1

Groups Printed- General Traffic

	Locust Grove Road From North					Hubbard Road From East					Locust Grove Road From South					Columbia Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	1	2	0	4	1	12	0	0	13	2	11	0	0	13	0	41	15	0	56	86
07:15 AM	4	1	6	0	11	3	19	1	0	23	0	17	2	0	19	1	51	20	0	72	125
07:30 AM	8	7	7	0	22	4	21	2	0	27	3	9	0	0	12	3	69	14	0	86	147
07:45 AM	3	7	3	0	13	7	19	1	0	27	2	4	2	0	8	0	50	12	0	62	110
Total	16	16	18	0	50	15	71	4	0	90	7	41	4	0	52	4	211	61	0	276	468
08:00 AM	4	2	2	0	8	1	12	1	0	14	0	11	1	0	12	0	33	6	0	39	73
08:15 AM	1	3	1	0	5	5	10	0	0	15	4	10	1	0	15	2	19	8	0	29	64
08:30 AM	1	1	4	0	6	3	20	5	0	28	1	7	0	0	8	2	29	4	0	35	77
08:45 AM	0	2	3	0	5	5	11	1	0	17	1	5	1	0	7	2	25	4	0	31	60
Total	6	8	10	0	24	14	53	7	0	74	6	33	3	0	42	6	106	22	0	134	274

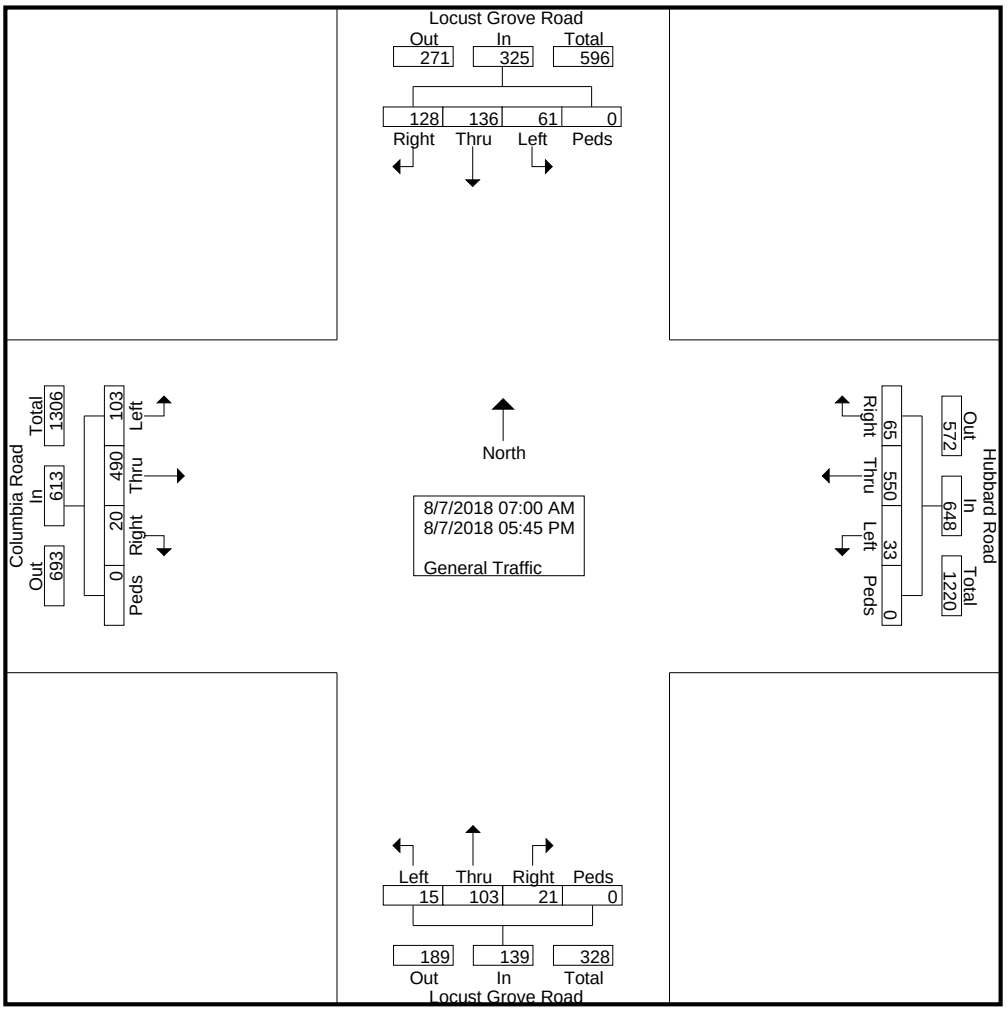
04:00 PM	6	14	6	0	26	7	41	2	0	50	1	0	1	0	2	2	13	0	0	15	93
04:15 PM	4	15	2	0	21	4	39	2	0	45	1	6	4	0	11	1	21	1	0	23	100
04:30 PM	12	12	5	0	29	1	44	2	0	47	0	8	0	0	8	1	18	2	0	21	105
04:45 PM	20	15	4	0	39	6	64	4	0	74	1	2	0	0	3	0	14	5	0	19	135
Total	42	56	17	0	115	18	188	10	0	216	3	16	5	0	24	4	66	8	0	78	433
05:00 PM	18	15	1	0	34	4	66	0	0	70	3	5	2	0	10	1	22	3	0	26	140
05:15 PM	16	12	6	0	34	7	68	3	0	78	1	2	0	0	3	1	29	3	0	33	148
05:30 PM	14	16	5	0	35	2	61	3	0	66	1	2	0	0	3	2	28	4	0	34	138
05:45 PM	16	13	4	0	33	5	43	6	0	54	0	4	1	0	5	2	28	2	0	32	124
Total	64	56	16	0	136	18	238	12	0	268	5	13	3	0	21	6	107	12	0	125	550
Grand Total	128	136	61	0	325	65	550	33	0	648	21	103	15	0	139	20	490	103	0	613	1725
Apprch %	39.4	41.8	18.8	0		10	84.9	5.1	0		15.1	74.1	10.8	0		3.3	79.9	16.8	0		
Total %	7.4	7.9	3.5	0	18.8	3.8	31.9	1.9	0	37.6	1.2	6	0.9	0	8.1	1.2	28.4	6	0	35.5	

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Columbia Rd
City, State: Ada County, Idaho
Control: All Stop

File Name : Locust Grove Rd & Columbia Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 2



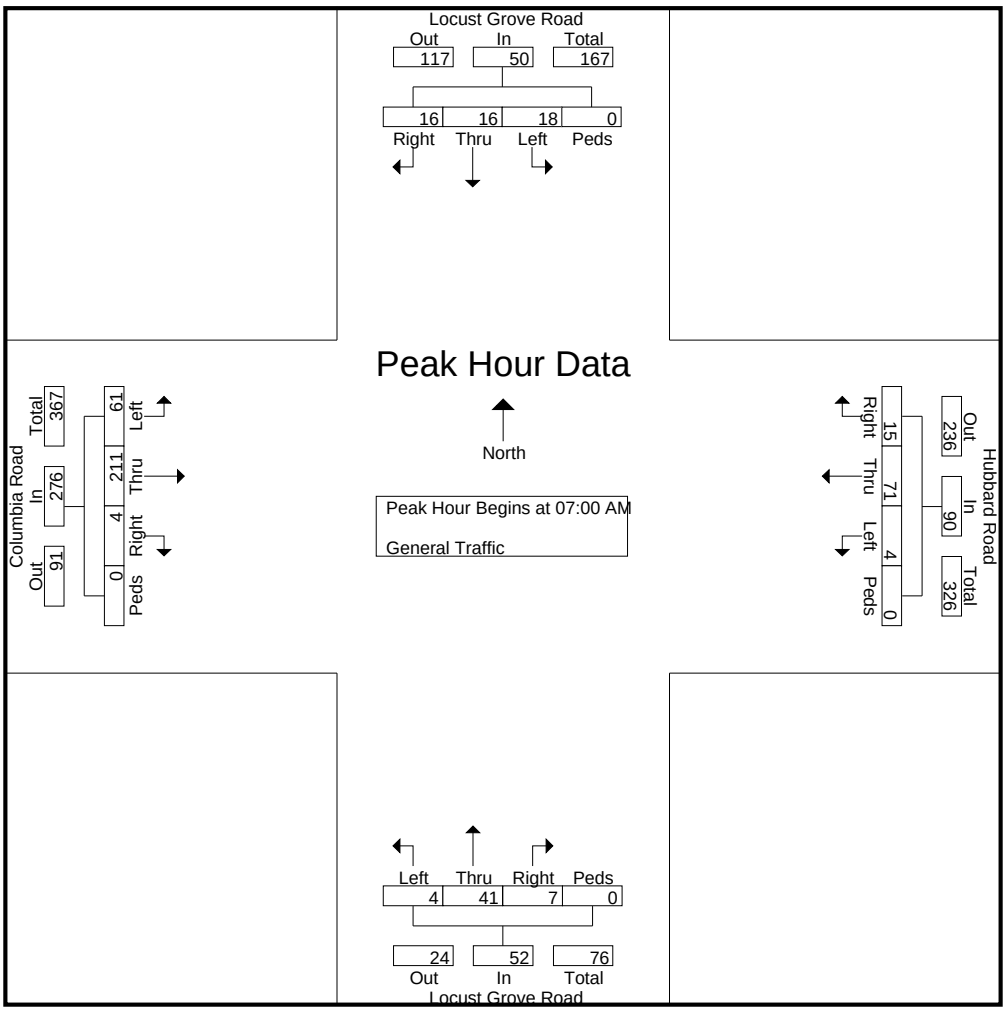
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Columbia Rd
City, State: Ada County, Idaho
Control: All Stop

File Name : Locust Grove Rd & Columbia Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 3

	Locust Grove Road From North					Hubbard Road From East					Locust Grove Road From South					Columbia Road From West					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	1	1	2	0	4	1	12	0	0	13	2	11	0	0	13	0	41	15	0	56	86
07:15 AM	4	1	6	0	11	3	19	1	0	23	0	**17**	**2**	0	**19**	1	51	**20**	0	72	125
07:30 AM	**8**	**7**	**7**	0	**22**	4	**21**	**2**	0	**27**	**3**	9	0	0	12	**3**	**69**	14	0	**86**	**147**
07:45 AM	3	7	3	0	13	**7**	19	1	0	27	2	4	2	0	8	0	50	12	0	62	110
Total Volume	16	16	18	0	50	15	71	4	0	90	7	41	4	0	52	4	211	61	0	276	468
% App. Total	32	32	36	0		16.7	78.9	4.4	0		13.5	78.8	7.7	0		1.4	76.4	22.1	0		
PHF	.500	.571	.643	.000	.568	.536	.845	.500	.000	.833	.583	.603	.500	.000	.684	.333	.764	.763	.000	.802	.796



L2 Data Collection

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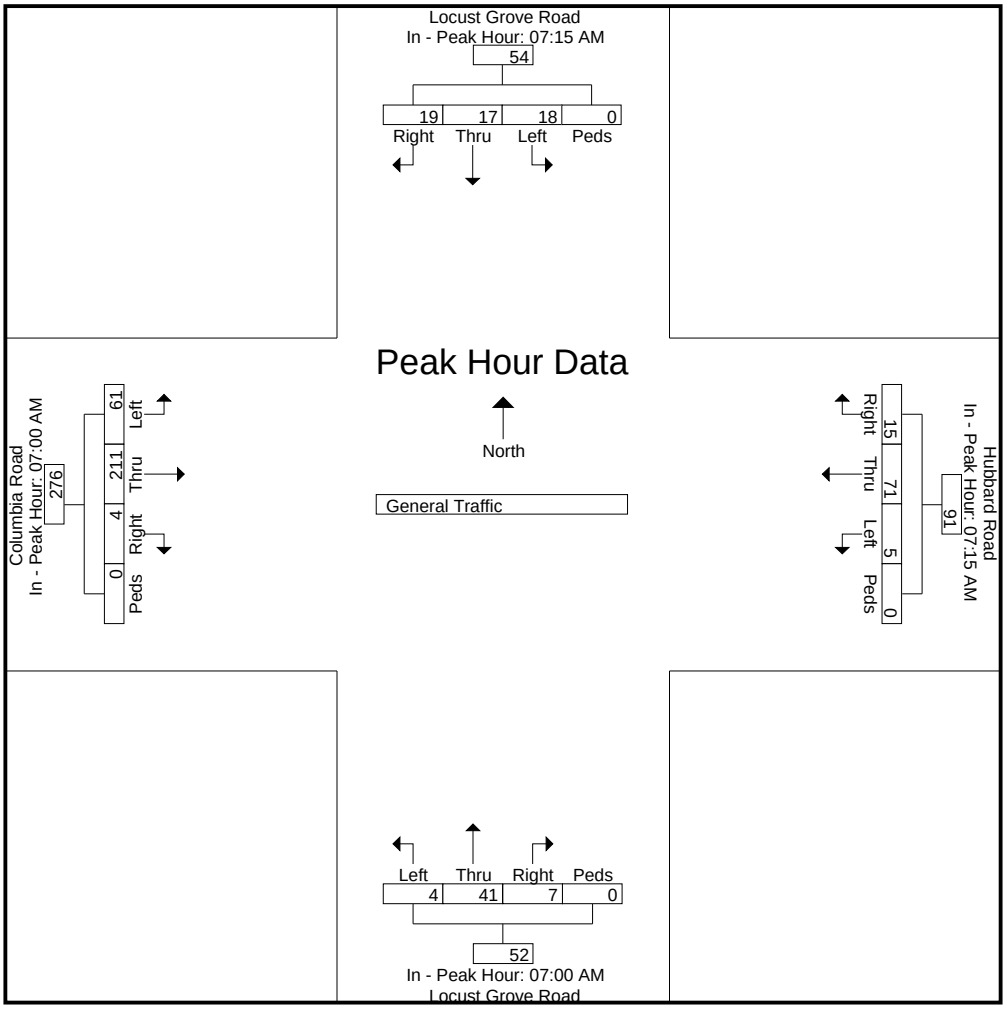
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Columbia Rd
City, State: Ada County, Idaho
Control: All Stop

File Name : Locust Grove Rd & Columbia Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 4

	Locust Grove Road From North					Hubbard Road From East					Locust Grove Road From South					Columbia Road From West					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:15 AM					07:15 AM					07:00 AM					07:00 AM					
+0 mins.	4	1	6	0	11	3	19	1	0	23	2	11	0	0	13	0	41	15	0	56	
+15 mins.	**8**	**7**	**7**	0	**22**	4	**21**	**2**	0	**27**	0	**17**	**2**	0	**19**	1	51	**20**	0	72	
+30 mins.	3	7	3	0	13	**7**	19	1	0	27	**3**	9	0	0	12	**3**	**69**	14	0	**86**	
+45 mins.	4	2	2	0	8	1	12	1	0	14	2	4	2	0	8	0	50	12	0	62	
Total Volume	19	17	18	0	54	15	71	5	0	91	7	41	4	0	52	4	211	61	0	276	
% App. Total	35.2	31.5	33.3	0		16.5	78	5.5	0		13.5	78.8	7.7	0		1.4	76.4	22.1	0		
PHF	.594	.607	.643	.000	.614	.536	.845	.625	.000	.843	.583	.603	.500	.000	.684	.333	.764	.763	.000	.802	



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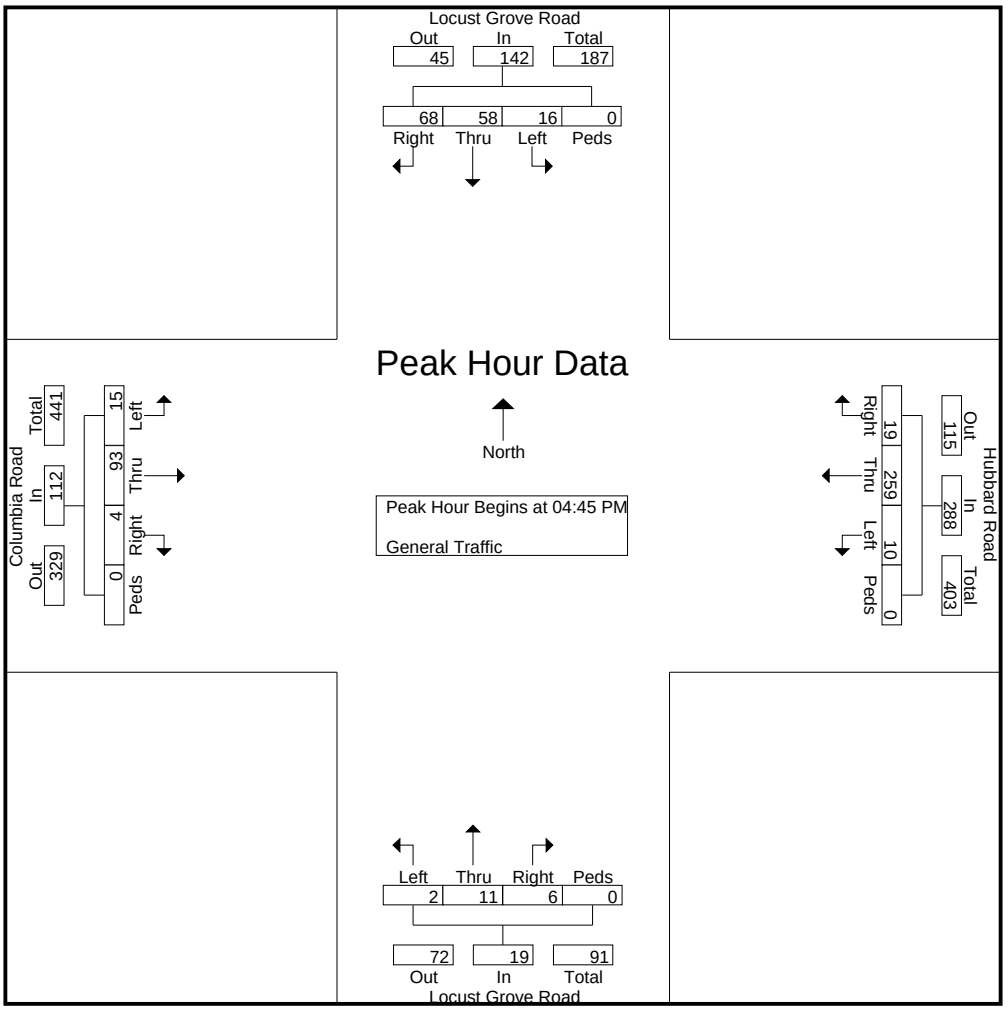
Page No : 5

	Locust Grove Road From North					Hubbard Road From East					Locust Grove Road From South					Columbia Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	**20**	15	4	0	**39**	6	64	**4**	0	74	1	2	0	0	3	0	14	**5**	0	19	135
05:00 PM	18	15	1	0	34	4	66	0	0	70	**3**	**5**	**2**	0	**10**	1	22	3	0	26	140
05:15 PM	16	12	**6**	0	34	**7**	**68**	3	0	**78**	1	2	0	0	3	1	**29**	3	0	33	**148**
05:30 PM	14	**16**	5	0	35	2	61	3	0	66	1	2	0	0	3	**2**	28	4	0	**34**	138
Total Volume	68	58	16	0	142	19	259	10	0	288	6	11	2	0	19	4	93	15	0	112	561
% App. Total	47.9	40.8	11.3	0		6.6	89.9	3.5	0		31.6	57.9	10.5	0		3.6	83	13.4	0		
PHF	.850	.906	.667	.000	.910	.679	.952	.625	.000	.923	.500	.550	.250	.000	.475	.500	.802	.750	.000	.824	.948



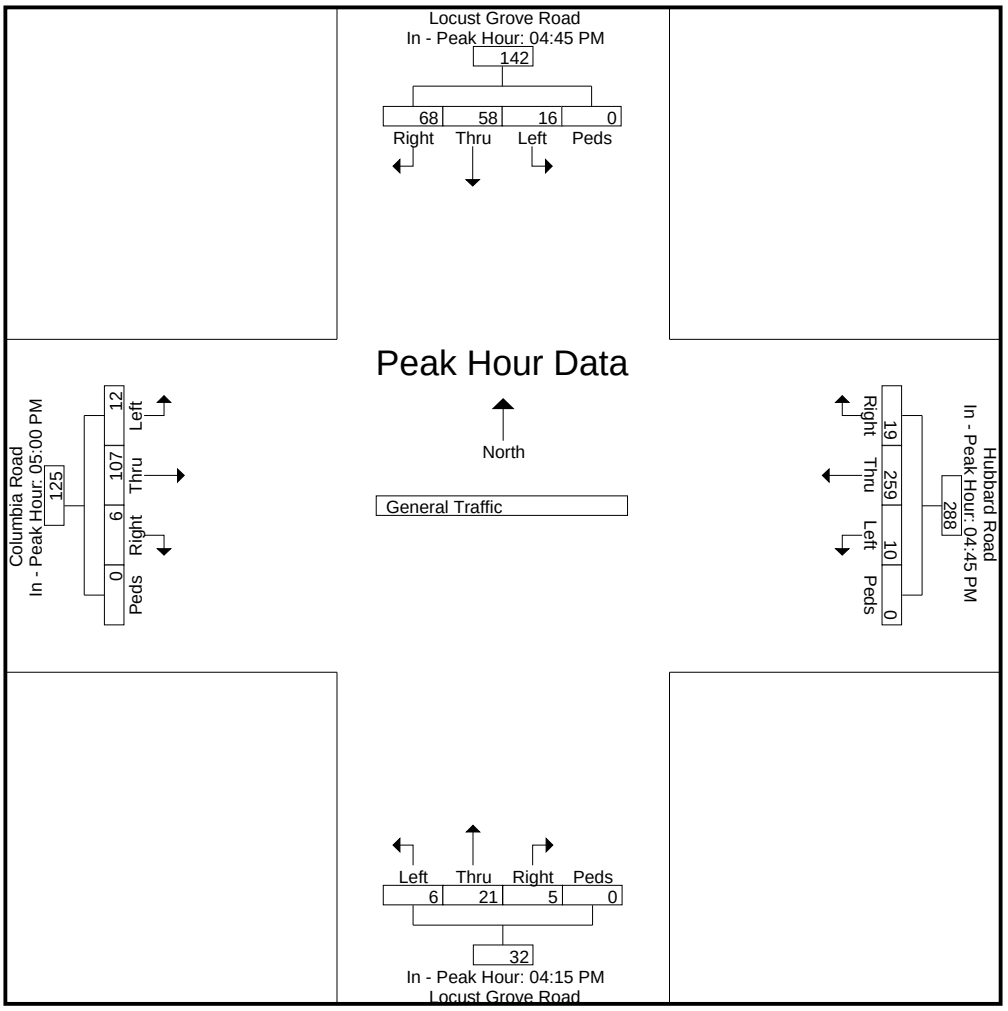
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Columbia Rd
City, State: Ada County, Idaho
Control: All Stop

File Name : Locust Grove Rd & Columbia Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 6

	Locust Grove Road From North					Hubbard Road From East					Locust Grove Road From South					Columbia Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:45 PM					04:45 PM					04:15 PM					05:00 PM					
+0 mins.	**20**	15	4	0	**39**	6	64	**4**	0	74	1	6	**4**	0	**11**	1	22	3	0	26	
+15 mins.	18	15	1	0	34	4	66	0	0	70	0	**8**	0	0	8	1	**29**	3	0	33	
+30 mins.	16	12	**6**	0	34	**7**	**68**	3	0	**78**	1	2	0	0	3	**2**	28	**4**	0	**34**	
+45 mins.	14	**16**	5	0	35	2	61	3	0	66	**3**	5	2	0	10	2	28	2	0	32	
Total Volume	68	58	16	0	142	19	259	10	0	288	5	21	6	0	32	6	107	12	0	125	
% App. Total	47.9	40.8	11.3	0		6.6	89.9	3.5	0		15.6	65.6	18.8	0		4.8	85.6	9.6	0		
PHF	.850	.906	.667	.000	.910	.679	.952	.625	.000	.923	.417	.656	.375	.000	.727	.750	.922	.750	.000	.919	



L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Intersection: Locust Grove / Columbia Rd
City, State: Ada County, Idaho
Control: All Stop

File Name : Locust Grove Rd & Columbia Rd
Site Code : 00000000
Start Date : 8/7/2018
Page No : 7

Image 1

L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Lake Hazel
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Lake Hazel Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 1

Groups Printed- General Traffic

	Locust Grove Road From North					Lake Hazel Road From East					Locust Grove Road From South					Lake Hazel Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	4	5	6	0	15	21	41	1	0	63	3	30	0	0	33	0	39	6	0	45	156
07:15 AM	0	10	7	0	17	20	56	4	0	80	4	23	1	0	28	2	65	2	1	70	195
07:30 AM	2	5	8	0	15	11	53	1	0	65	3	18	2	0	23	0	73	6	0	79	182
07:45 AM	2	9	10	0	21	12	34	2	0	48	1	35	0	0	36	0	71	6	0	77	182
Total	8	29	31	0	68	64	184	8	0	256	11	106	3	0	120	2	248	20	1	271	715
08:00 AM	3	8	14	0	25	8	34	1	1	44	3	26	0	0	29	1	68	2	1	72	170
08:15 AM	1	5	6	0	12	12	39	1	0	52	3	20	1	0	24	1	50	7	0	58	146
08:30 AM	3	8	8	0	19	16	28	3	0	47	2	23	0	0	25	0	36	1	0	37	128
08:45 AM	1	13	8	0	22	10	36	0	0	46	3	28	0	0	31	1	38	6	0	45	144
Total	8	34	36	0	78	46	137	5	1	189	11	97	1	0	109	3	192	16	1	212	588

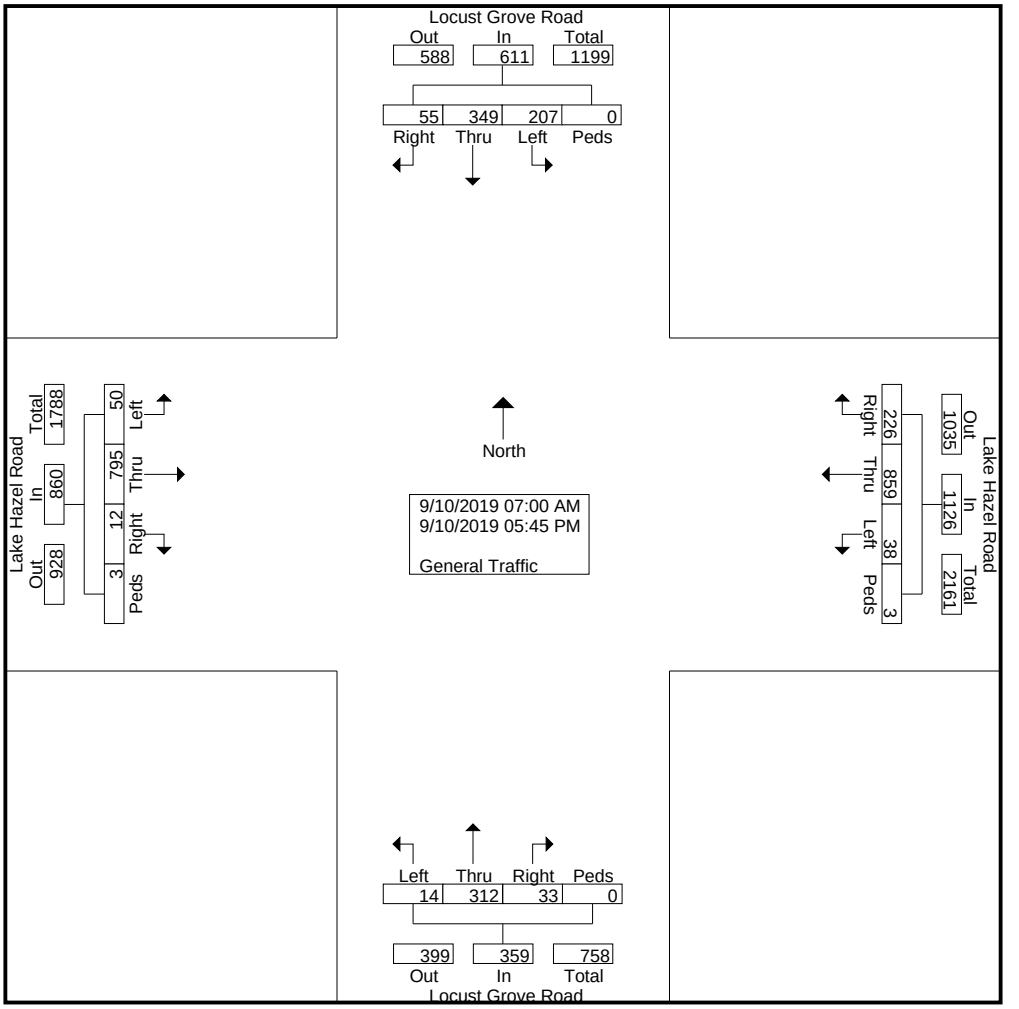
04:00 PM	4	28	13	0	45	14	45	4	0	63	0	10	1	0	11	1	36	2	0	39	158
04:15 PM	4	22	17	0	43	11	74	4	0	89	0	13	2	0	15	0	37	3	1	41	188
04:30 PM	3	33	18	0	54	12	70	3	0	85	1	13	0	0	14	2	46	2	0	50	203
04:45 PM	7	42	20	0	69	11	68	1	2	82	1	9	1	0	11	1	39	0	0	40	202
Total	18	125	68	0	211	48	257	12	2	319	2	45	4	0	51	4	158	7	1	170	751
05:00 PM	6	37	19	0	62	18	78	1	0	97	2	14	4	0	20	0	57	1	0	58	237
05:15 PM	3	47	26	0	76	22	70	4	0	96	3	15	1	0	19	2	56	1	0	59	250
05:30 PM	8	31	18	0	57	16	73	5	0	94	2	19	0	0	21	0	37	3	0	40	212
05:45 PM	4	46	9	0	59	12	60	3	0	75	2	16	1	0	19	1	47	2	0	50	203
Total	21	161	72	0	254	68	281	13	0	362	9	64	6	0	79	3	197	7	0	207	902
Grand Total	55	349	207	0	611	226	859	38	3	1126	33	312	14	0	359	12	795	50	3	860	2956
Apprch %	9	57.1	33.9	0		20.1	76.3	3.4	0.3		9.2	86.9	3.9	0		1.4	92.4	5.8	0.3		
Total %	1.9	11.8	7	0	20.7	7.6	29.1	1.3	0.1	38.1	1.1	10.6	0.5	0	12.1	0.4	26.9	1.7	0.1	29.1	

L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Lake Hazel
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Lake Hazel Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 2



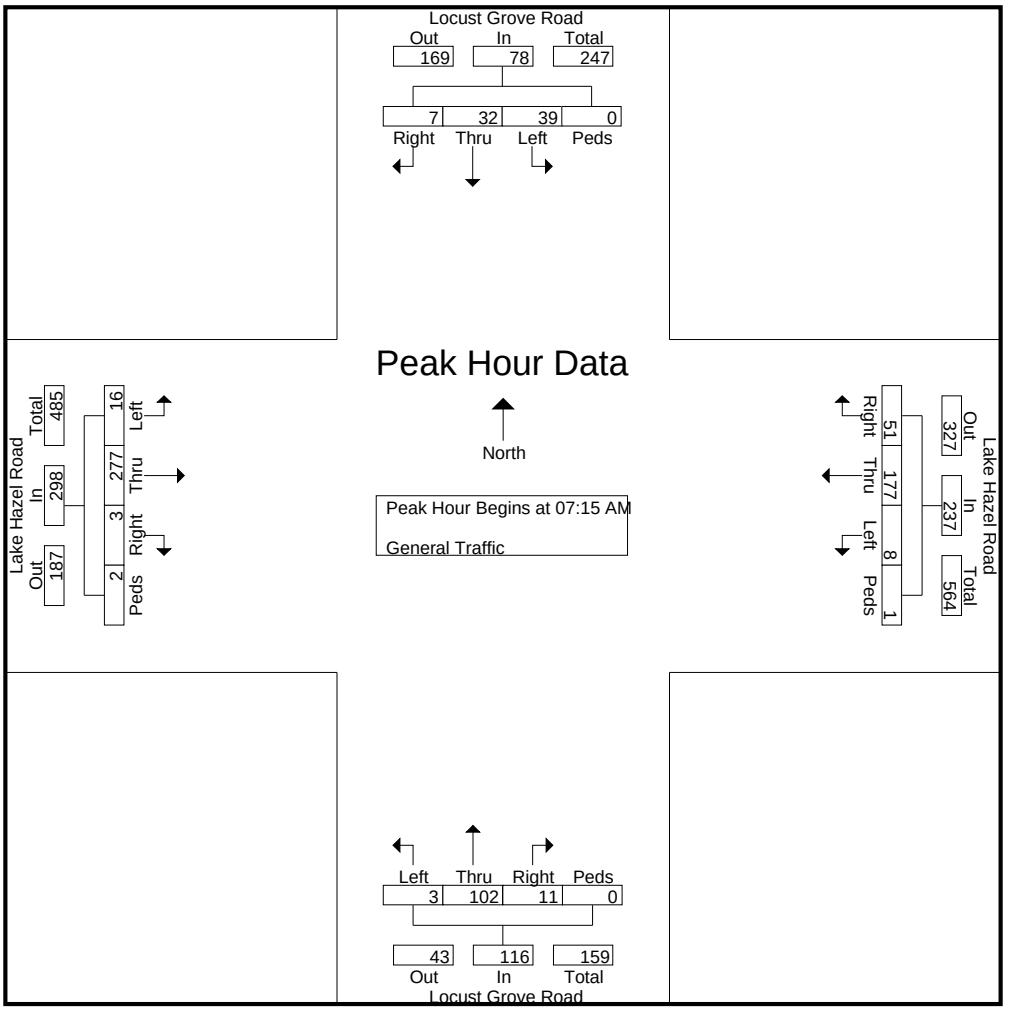
L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Lake Hazel
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Lake Hazel Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 3

	Locust Grove Road From North					Lake Hazel Road From East					Locust Grove Road From South					Lake Hazel Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	**10**	7	0	17	**20**	**56**	**4**	0	**80**	**4**	23	1	0	28	**2**	65	2	**1**	70	**195**
07:30 AM	2	5	8	0	15	11	53	1	0	65	3	18	**2**	0	23	0	**73**	**6**	0	**79**	182
07:45 AM	2	9	10	0	21	12	34	2	0	48	1	**35**	0	0	**36**	0	71	6	0	77	182
08:00 AM	**3**	8	**14**	0	**25**	8	34	1	**1**	44	3	26	0	0	29	1	68	2	1	72	170
Total Volume	7	32	39	0	78	51	177	8	1	237	11	102	3	0	116	3	277	16	2	298	729
% App. Total	9	41	50	0		21.5	74.7	3.4	0.4		9.5	87.9	2.6	0		1	93	5.4	0.7		
PHF	.583	.800	.696	.000	.780	.638	.790	.500	.250	.741	.688	.729	.375	.000	.806	.375	.949	.667	.500	.943	.935



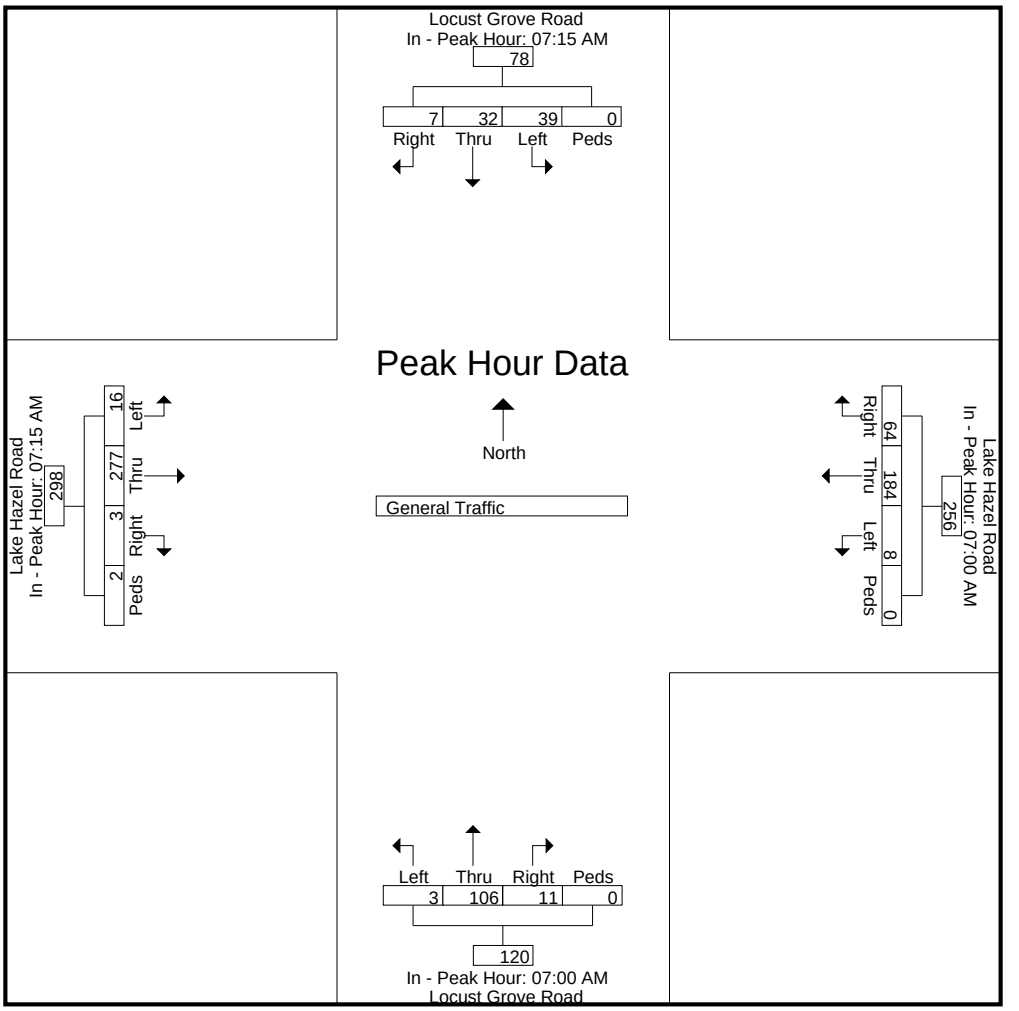
L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Lake Hazel
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Lake Hazel Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 4

	Locust Grove Road From North					Lake Hazel Road From East					Locust Grove Road From South					Lake Hazel Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:15 AM					07:00 AM					07:00 AM					07:15 AM					
+0 mins.	0	**10**	7	0	17	**21**	41	1	0	63	3	30	0	0	33	**2**	65	2	**1**	70	
+15 mins.	2	5	8	0	15	20	**56**	**4**	0	**80**	**4**	23	1	0	28	0	**73**	**6**	0	**79**	
+30 mins.	2	9	10	0	21	11	53	1	0	65	3	18	**2**	0	23	0	71	6	0	77	
+45 mins.	**3**	8	**14**	0	**25**	12	34	2	0	48	1	**35**	0	0	**36**	1	68	2	1	72	
Total Volume	7	32	39	0	78	64	184	8	0	256	11	106	3	0	120	3	277	16	2	298	
% App. Total	9	41	50	0		25	71.9	3.1	0		9.2	88.3	2.5	0		1	93	5.4	0.7		
PHF	.583	.800	.696	.000	.780	.762	.821	.500	.000	.800	.688	.757	.375	.000	.833	.375	.949	.667	.500	.943	



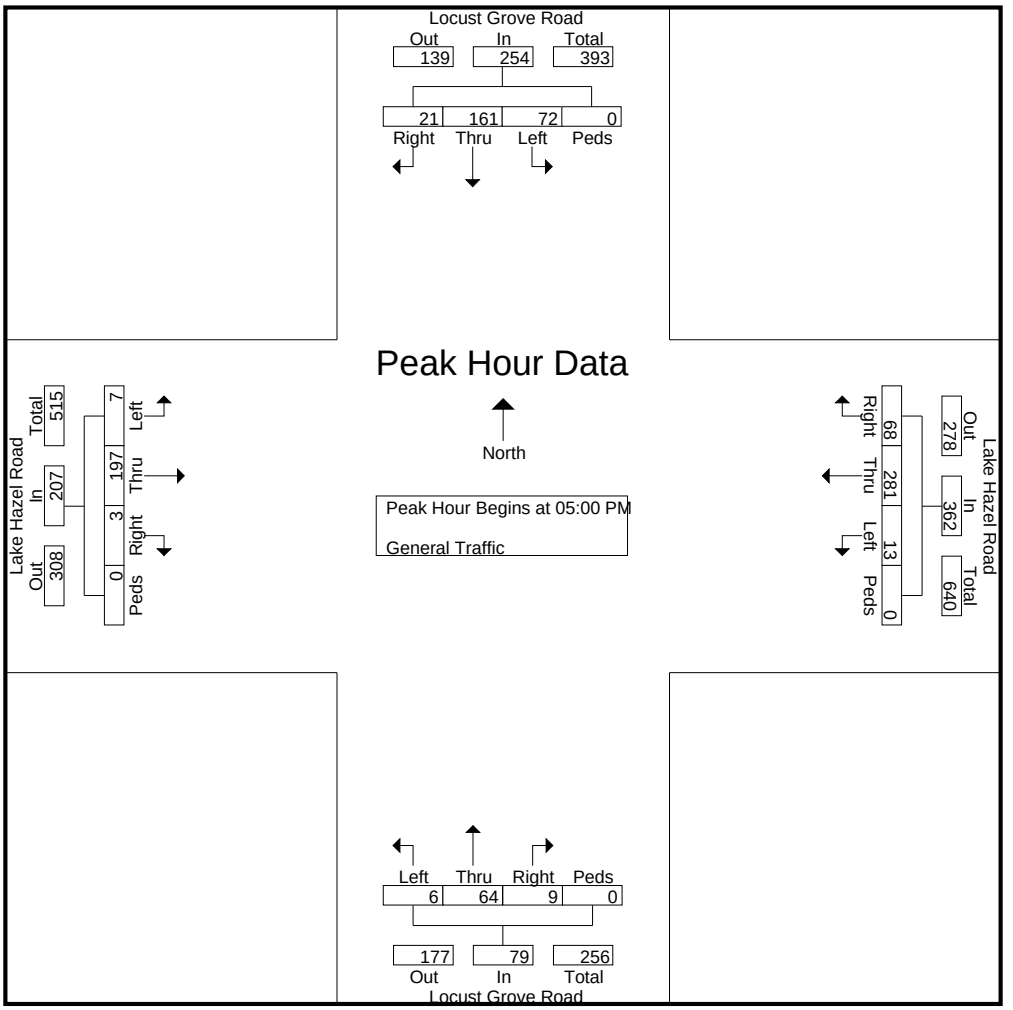
L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Lake Hazel
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Lake Hazel Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 5

	Locust Grove Road From North					Lake Hazel Road From East					Locust Grove Road From South					Lake Hazel Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	6	37	19	0	62	18	**78**	1	0	**97**	2	14	**4**	0	20	0	**57**	1	0	58	237
05:15 PM	3	**47**	**26**	0	**76**	**22**	70	4	0	96	**3**	15	1	0	19	**2**	56	1	0	**59**	**250**
05:30 PM	**8**	31	18	0	57	16	73	**5**	0	94	2	**19**	0	0	**21**	0	37	**3**	0	40	212
05:45 PM	4	46	9	0	59	12	60	3	0	75	2	16	1	0	19	1	47	2	0	50	203
Total Volume	21	161	72	0	254	68	281	13	0	362	9	64	6	0	79	3	197	7	0	207	902
% App. Total	8.3	63.4	28.3	0		18.8	77.6	3.6	0		11.4	81	7.6	0		1.4	95.2	3.4	0		
PHF	.656	.856	.692	.000	.836	.773	.901	.650	.000	.933	.750	.842	.375	.000	.940	.375	.864	.583	.000	.877	.902



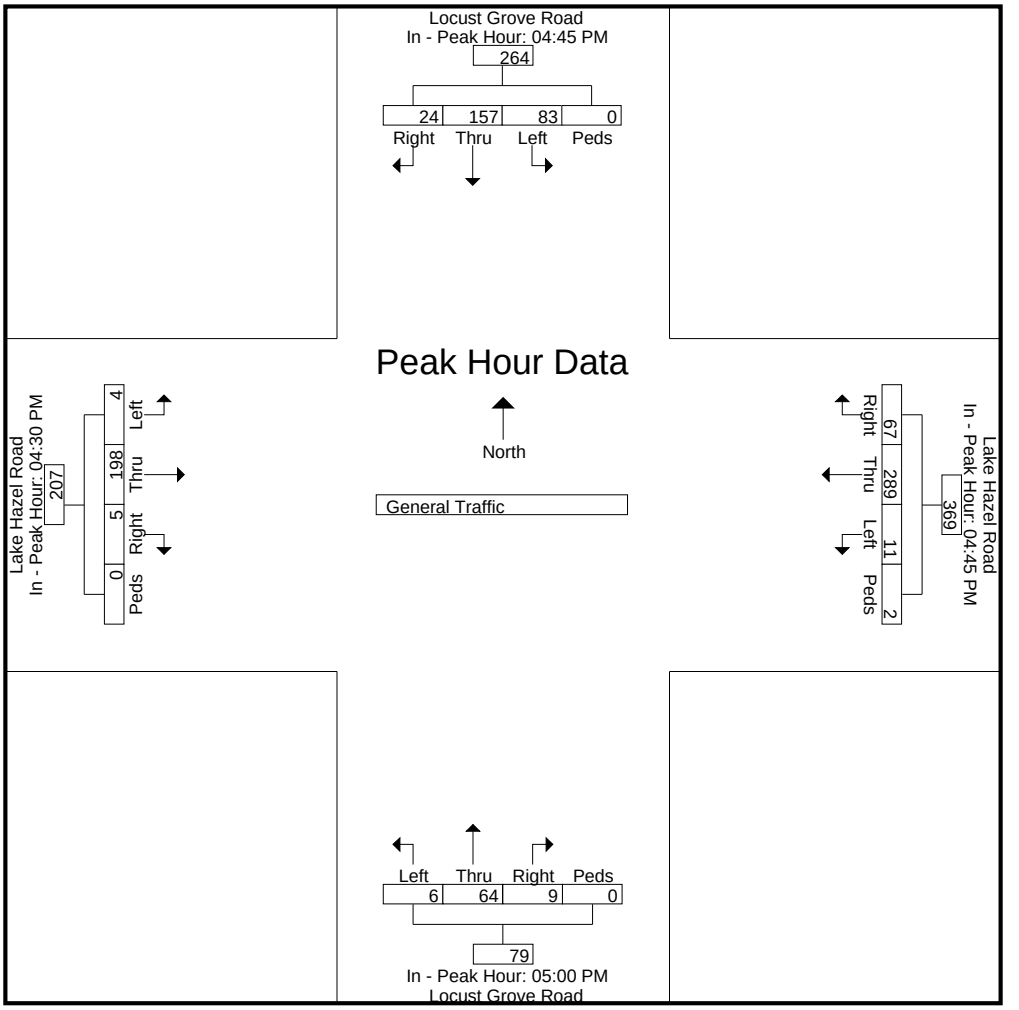
L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Lake Hazel
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Lake Hazel Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 6

	Locust Grove Road From North					Lake Hazel Road From East					Locust Grove Road From South					Lake Hazel Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:45 PM					04:45 PM					05:00 PM					04:30 PM					
+0 mins.	7	42	20	0	69	11	68	1	**2**	82	2	14	**4**	0	20	**2**	46	**2**	0	50	
+15 mins.	6	37	19	0	62	18	**78**	1	0	**97**	**3**	15	1	0	19	1	39	0	0	40	
+30 mins.	3	**47**	**26**	0	**76**	**22**	70	4	0	96	2	**19**	0	0	**21**	0	**57**	1	0	58	
+45 mins.	**8**	31	18	0	57	16	73	**5**	0	94	2	16	1	0	19	2	56	1	0	**59**	
Total Volume	24	157	83	0	264	67	289	11	2	369	9	64	6	0	79	5	198	4	0	207	
% App. Total	9.1	59.5	31.4	0		18.2	78.3	3	0.5		11.4	81	7.6	0		2.4	95.7	1.9	0		
PHF	.750	.835	.798	.000	.868	.761	.926	.550	.250	.951	.750	.842	.375	.000	.940	.625	.868	.500	.000	.877	



L2 Data Collection

L2DataColletion.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Intersection: Locust Grove / Lake Hazel
City, State: Kuna, Idaho
Control: Stop Sign

File Name : Locust Grove Rd & Lake Hazel Rd
Site Code : 00000000
Start Date : 9/10/2019
Page No : 7

Image 1

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Type: Volume / Direction
Tech: Judd / Klaren
Count: Axle Hits /2

Hubbard Rd b Meridian Rd & Hubbard Rd VOL
Date Start: 07-Aug-18
Date End: 08-Aug-18
Hubbard Rd between Meridian Rd & Locust
Ada County, Idaho

Start Time	07-Aug-18 Tue	WB	EB							Total
12:00 AM		*	*							*
12:15		*	*							*
12:30		*	*							*
12:45		*	*							*
01:00		*	*							*
01:15		*	*							*
01:30		*	*							*
01:45		*	*							*
02:00		*	*							*
02:15		*	*							*
02:30		*	*							*
02:45		*	*							*
03:00		0	0							0
03:15		0	0							0
03:30		0	0							0
03:45		0	0							0
04:00		0	1							1
04:15		0	0							0
04:30		0	0							0
04:45		0	0							0
05:00		0	4							4
05:15		0	0							0
05:30		1	0							1
05:45		0	0							0
06:00		0	2							2
06:15		0	3							3
06:30		1	**10**							11
06:45		2	**9**							11
07:00		2	**7**							9
07:15		3	**10**							13
07:30		6	9							15
07:45		3	8							11
08:00		2	8							10
08:15		2	0							2
08:30		12	6							18
08:45		1	1							2
09:00		4	6							10
09:15		**4**	10							14
09:30		**6**	6							**12**
09:45		**11**	2							**13**
10:00		**8**	3							**11**
10:15		4	14							**18**
10:30		6	2							8
10:45		8	6							14
11:00		7	5							12
11:15		4	6							10
11:30		6	3							9
11:45		8	4							12
Total		111	145							256
Percent		43.4%	56.6%							
Peak	-	09:15	06:30	-	-	-	-	-	-	09:30
Vol.	-	29	36	-	-	-	-	-	-	54
P.H.F.		0.659	0.900							0.750

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Type: Volume / Direction
Tech: Judd / Klaren
Count: Axle Hits /2

Hubbard Rd b Meridian Rd & Hubbard Rd VOL
Date Start: 07-Aug-18
Date End: 08-Aug-18
Hubbard Rd between Meridian Rd & Locust
Ada County, Idaho

Start Time	07-Aug-18 Tue	WB	EB							Total
12:00 PM		10	3							13
12:15		2	4							6
12:30		6	5							11
12:45		6	3							9
01:00		6	**6**							12
01:15		5	**10**							**15**
01:30		3	**8**							**11**
01:45		10	**4**							**14**
02:00		7	6							**13**
02:15		9	3							12
02:30		6	3							9
02:45		4	1							5
03:00		12	10							22
03:15		3	1							4
03:30		7	7							14
03:45		8	3							11
04:00		**5**	2							7
04:15		**5**	6							11
04:30		**10**	2							12
04:45		**16**	2							18
05:00		3	2							5
05:15		5	4							9
05:30		10	1							11
05:45		6	8							14
06:00		6	1							7
06:15		4	4							8
06:30		6	3							9
06:45		4	4							8
07:00		3	4							7
07:15		2	5							7
07:30		2	4							6
07:45		6	1							7
08:00		1	2							3
08:15		4	3							7
08:30		1	2							3
08:45		1	1							2
09:00		0	2							2
09:15		2	1							3
09:30		4	0							4
09:45		1	1							2
10:00		3	2							5
10:15		0	0							0
10:30		1	1							2
10:45		0	0							0
11:00		2	0							2
11:15		1	1							2
11:30		1	1							2
11:45		0	0							0
Total		219	147							366
Percent		59.8%	40.2%							
Peak	-	16:00	13:00	-	-	-	-	-	-	13:15
Vol.	-	36	28	-	-	-	-	-	-	53
P.H.F.		0.563	0.700							0.883

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Type: Volume / Direction
Tech: Judd / Klaren
Count: Axle Hits /2

Hubbard Rd b Meridian Rd & Hubbard Rd VOL
Date Start: 07-Aug-18
Date End: 08-Aug-18
Hubbard Rd between Meridian Rd & Locust
Ada County, Idaho

Start Time	08-Aug-18 Wed	WB	EB	Total
12:00 AM		**0**	0	**0**
12:15		**1**	0	**1**
12:30		**1**	**0**	**1**
12:45		**0**	**1**	**1**
01:00		0	**0**	0
01:15		0	**1**	1
01:30		0	0	0
01:45		0	1	1
02:00		1	0	1
02:15		0	0	0
02:30		0	0	0
02:45		0	0	0
03:00		*	*	*
03:15		*	*	*
03:30		*	*	*
03:45		*	*	*
04:00		*	*	*
04:15		*	*	*
04:30		*	*	*
04:45		*	*	*
05:00		*	*	*
05:15		*	*	*
05:30		*	*	*
05:45		*	*	*
06:00		*	*	*
06:15		*	*	*
06:30		*	*	*
06:45		*	*	*
07:00		*	*	*
07:15		*	*	*
07:30		*	*	*
07:45		*	*	*
08:00		*	*	*
08:15		*	*	*
08:30		*	*	*
08:45		*	*	*
09:00		*	*	*
09:15		*	*	*
09:30		*	*	*
09:45		*	*	*
10:00		*	*	*
10:15		*	*	*
10:30		*	*	*
10:45		*	*	*
11:00		*	*	*
11:15		*	*	*
11:30		*	*	*
11:45		*	*	*
Total		3	3	6
Percent		50.0%	50.0%	
Peak	-	12:00	00:30	12:00
Vol.	-	2	2	3
P.H.F.		0.500	0.500	0.750
Total		333	295	628
Percent		53.0%	47.0%	

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Type: Volume / Direction / Class
Tech: Judd / Klaren
Count: Axle Hits / 2

Locust Grove Rd b Deer Flat Rd & Hubbard Rd VOL
Date Start: 10-Sep-19
Date End: 10-Sep-19
Locust Grove between Deer Flat & Hubbard
Kuna, Idaho

Start Time	10-Sep-19 Tue	SB	NB							Total
12:00 AM		3	0							3
12:15		0	0							0
12:30		0	0							0
12:45		0	0							0
01:00		0	0							0
01:15		0	0							0
01:30		0	0							0
01:45		0	0							0
02:00		0	1							1
02:15		0	0							0
02:30		0	0							0
02:45		0	0							0
03:00		0	0							0
03:15		0	0							0
03:30		1	0							1
03:45		1	2							3
04:00		0	0							0
04:15		0	0							0
04:30		0	3							3
04:45		0	0							0
05:00		2	1							3
05:15		1	0							1
05:30		1	5							6
05:45		0	4							4
06:00		2	4							6
06:15		1	5							6
06:30		3	10							13
06:45		4	8							12
07:00		5	**14**							**19**
07:15		8	**7**							**15**
07:30		7	**14**							**21**
07:45		3	**11**							**14**
08:00		4	14							18
08:15		7	6							13
08:30		10	6							16
08:45		6	12							18
09:00		4	6							10
09:15		8	9							17
09:30		4	8							12
09:45		7	8							15
10:00		10	6							16
10:15		5	8							13
10:30		5	10							15
10:45		**15**	5							20
11:00		**8**	5							13
11:15		**8**	6							14
11:30		**6**	7							13
11:45		8	8							16
Total		157	213							370
Percent		42.4%	57.6%							
Peak	-	10:45	07:00	-	-	-	-	-	-	07:00
Vol.	-	37	46	-	-	-	-	-	-	69
P.H.F.		0.617	0.821							0.821

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: WHPA0005
Type: Volume / Direction / Class
Tech: Judd / Klaren
Count: Axle Hits / 2

Locust Grove Rd b Deer Flat Rd & Hubbard Rd VOL
Date Start: 10-Sep-19
Date End: 10-Sep-19
Locust Grove between Deer Flat & Hubbard
Kuna, Idaho

Start Time	10-Sep-19 Tue	SB	NB							Total
12:00 PM		9	7							16
12:15		8	14							22
12:30		14	8							22
12:45		5	2							7
01:00		10	4							14
01:15		9	10							19
01:30		8	6							14
01:45		8	5							13
02:00		10	10							20
02:15		8	7							15
02:30		8	4							12
02:45		10	4							14
03:00		12	**16**							28
03:15		15	**5**							20
03:30		18	**5**							23
03:45		12	**12**							24
04:00		12	8							20
04:15		24	8							32
04:30		25	4							29
04:45		19	5							24
05:00		**22**	10							**32**
05:15		**30**	7							**37**
05:30		**33**	11							**44**
05:45		**22**	10							**32**
06:00		20	7							27
06:15		17	8							25
06:30		16	11							27
06:45		11	4							15
07:00		10	2							12
07:15		12	2							14
07:30		10	5							15
07:45		12	10							22
08:00		4	4							8
08:15		4	2							6
08:30		7	4							11
08:45		3	3							6
09:00		1	2							3
09:15		4	3							7
09:30		3	2							5
09:45		2	1							3
10:00		0	1							1
10:15		2	1							3
10:30		1	0							1
10:45		1	3							4
11:00		1	2							3
11:15		3	0							3
11:30		1	1							2
11:45		1	0							1
Total		497	260							757
Percent		65.7%	34.3%							
Peak	-	17:00	15:00	-	-	-	-	-	-	17:00
Vol.	-	107	38	-	-	-	-	-	-	145
P.H.F.		0.811	0.594							0.824
Grand Total		654	473							1127
Percent		58.0%	42.0%							

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Type: Volume / Direction
Tech: Judd / Klaren
Count: Axle Hits / 2

Locust Grove Rd between Columbia & Hubbard VOL
Date Start: 07-Aug-18
Date End: 08-Aug-18
Locust Grove between Columbia & Hubbard
Ada County, Idaho

Start Time	07-Aug-18 Tue	SB	NB							Total
12:00 AM		*	*							*
12:15		*	*							*
12:30		*	*							*
12:45		*	*							*
01:00		*	*							*
01:15		*	*							*
01:30		*	*							*
01:45		*	*							*
02:00		*	*							*
02:15		*	*							*
02:30		*	*							*
02:45		*	*							*
03:00		0	0							0
03:15		1	0							1
03:30		0	0							0
03:45		0	0							0
04:00		0	1							1
04:15		0	0							0
04:30		0	0							0
04:45		0	0							0
05:00		0	3							3
05:15		2	0							2
05:30		1	5							6
05:45		0	4							4
06:00		0	1							1
06:15		2	0							2
06:30		0	9							9
06:45		6	**15**							21
07:00		1	**13**							14
07:15		4	**19**							**23**
07:30		**12**	**12**							**24**
07:45		**10**	8							**18**
08:00		**6**	12							**18**
08:15		**6**	16							22
08:30		8	9							17
08:45		4	6							10
09:00		5	6							11
09:15		5	9							14
09:30		7	8							15
09:45		9	6							15
10:00		10	4							14
10:15		4	10							14
10:30		10	8							18
10:45		7	9							16
11:00		3	3							6
11:15		6	9							15
11:30		6	6							12
11:45		10	8							18
Total		145	219							364
Percent		39.8%	60.2%							
Peak	-	07:30	06:45	-	-	-	-	-	-	07:15
Vol.	-	34	59	-	-	-	-	-	-	83
P.H.F.		0.708	0.776							0.865

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Type: Volume / Direction
Tech: Judd / Klaren
Count: Axle Hits / 2

Locust Grove Rd between Columbia & Hubbard VOL
Date Start: 07-Aug-18
Date End: 08-Aug-18
Locust Grove between Columbia & Hubbard
Ada County, Idaho

Start Time	07-Aug-18 Tue	SB	NB							Total
12:00 PM		5	5							10
12:15		10	4							14
12:30		5	8							13
12:45		8	6							14
01:00		11	4							15
01:15		6	4							10
01:30		5	5							10
01:45		8	2							10
02:00		13	6							19
02:15		8	5							13
02:30		14	4							18
02:45		9	4							13
03:00		12	10							22
03:15		7	6							13
03:30		12	10							22
03:45		14	8							22
04:00		21	2							23
04:15		16	**14**							**30**
04:30		16	**12**							**28**
04:45		**20**	**5**							**25**
05:00		**18**	**12**							**30**
05:15		**17**	4							21
05:30		**19**	5							24
05:45		19	4							23
06:00		15	8							23
06:15		9	4							13
06:30		14	4							18
06:45		7	6							13
07:00		6	5							11
07:15		10	4							14
07:30		9	5							14
07:45		4	2							6
08:00		1	3							4
08:15		6	0							6
08:30		6	2							8
08:45		5	3							8
09:00		8	3							11
09:15		8	2							10
09:30		4	1							5
09:45		6	1							7
10:00		4	5							9
10:15		3	0							3
10:30		0	2							2
10:45		4	0							4
11:00		2	0							2
11:15		1	0							1
11:30		2	0							2
11:45		0	1							1
Total		427	210							637
Percent		67.0%	33.0%							
Peak	-	16:45	16:15	-	-	-	-	-	-	16:15
Vol.	-	74	43	-	-	-	-	-	-	113
P.H.F.		0.925	0.768							0.942

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 431-2993

Study: WHPA0002
Type: Volume / Direction
Tech: Judd / Klaren
Count: Axle Hits / 2

Locust Grove Rd between Columbia & Hubbard VOL
Date Start: 07-Aug-18
Date End: 08-Aug-18
Locust Grove between Columbia & Hubbard
Ada County, Idaho

Start Time	08-Aug-18 Wed	SB	NB							Total
12:00 AM		1	0							1
12:15		**2**	0							**2**
12:30		**1**	0							**1**
12:45		**0**	**0**							**0**
01:00		**2**	**0**							**2**
01:15		0	**0**							0
01:30		0	**1**							1
01:45		0	0							0
02:00		0	0							0
02:15		1	0							1
02:30		0	0							0
02:45		0	0							0
03:00		*	*							*
03:15		*	*							*
03:30		*	*							*
03:45		*	*							*
04:00		*	*							*
04:15		*	*							*
04:30		*	*							*
04:45		*	*							*
05:00		*	*							*
05:15		*	*							*
05:30		*	*							*
05:45		*	*							*
06:00		*	*							*
06:15		*	*							*
06:30		*	*							*
06:45		*	*							*
07:00		*	*							*
07:15		*	*							*
07:30		*	*							*
07:45		*	*							*
08:00		*	*							*
08:15		*	*							*
08:30		*	*							*
08:45		*	*							*
09:00		*	*							*
09:15		*	*							*
09:30		*	*							*
09:45		*	*							*
10:00		*	*							*
10:15		*	*							*
10:30		*	*							*
10:45		*	*							*
11:00		*	*							*
11:15		*	*							*
11:30		*	*							*
11:45		*	*							*
Total		7	1							8
Percent		87.5%	12.5%							
Peak	-	00:15	00:45	-	-	-	-	-	-	00:15
Vol.	-	5	1	-	-	-	-	-	-	5
P.H.F.		0.625	0.250							0.625
Total		579	430							1009
Percent		57.4%	42.6%							

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2903

Study: WHPA0005
Type: Volume / Direction / Class
Tech: Judd / Klaren
Count: Axle Hits / 2

Locust Grove Rd b Columbia Rd & Lake Hazel Rd VOL
Date Start: 10-Sep-19
Date End: 10-Sep-19
Locust Grove betw Columbia & Lake Hazel
Kuna, Idaho

Start Time	10-Sep-19 Tue	SB	NB							Total
12:00 AM		0	1							1
12:15		0	0							0
12:30		0	0							0
12:45		0	0							0
01:00		1	0							1
01:15		0	0							0
01:30		0	0							0
01:45		0	0							0
02:00		0	0							0
02:15		0	0							0
02:30		0	0							0
02:45		0	1							1
03:00		0	0							0
03:15		0	0							0
03:30		1	0							1
03:45		1	1							2
04:00		0	0							0
04:15		0	2							2
04:30		0	2							2
04:45		0	3							3
05:00		1	0							1
05:15		2	1							3
05:30		3	10							13
05:45		3	10							13
06:00		5	7							12
06:15		2	7							9
06:30		5	20							25
06:45		7	30							37
07:00		5	**32**							**37**
07:15		14	**28**							**42**
07:30		10	**25**							**35**
07:45		10	**40**							**50**
08:00		10	27							37
08:15		7	24							31
08:30		12	26							38
08:45		18	35							53
09:00		10	16							26
09:15		14	8							22
09:30		6	17							23
09:45		9	16							25
10:00		**18**	6							24
10:15		**12**	12							24
10:30		**8**	10							18
10:45		**21**	16							37
11:00		13	12							25
11:15		8	6							14
11:30		12	16							28
11:45		15	12							27
Total		263	479							742
Percent		35.4%	64.6%							
Peak	-	10:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	59	125	-	-	-	-	-	-	164
P.H.F.		0.702	0.781							0.820

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2903

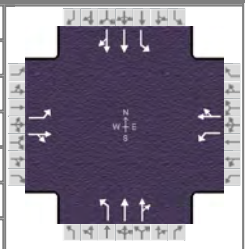
Study: WHPA0005
Type: Volume / Direction / Class
Tech: Judd / Klaren
Count: Axle Hits / 2

Locust Grove Rd b Columbia Rd & Lake Hazel Rd VOL
Date Start: 10-Sep-19
Date End: 10-Sep-19
Locust Grove betw Columbia & Lake Hazel
Kuna, Idaho

Start Time	10-Sep-19 Tue	SB	NB							Total
12:00 PM		18	14							32
12:15		11	14							25
12:30		10	8							18
12:45		16	11							27
01:00		12	8							20
01:15		16	16							32
01:30		14	12							26
01:45		14	14							28
02:00		14	8							22
02:15		16	12							28
02:30		10	13							23
02:45		10	5							15
03:00		22	18							40
03:15		20	12							32
03:30		18	6							24
03:45		30	22							52
04:00		30	9							39
04:15		30	15							45
04:30		36	16							52
04:45		43	14							57
05:00		**39**	**22**							**61**
05:15		**55**	**20**							**75**
05:30		**39**	**24**							**63**
05:45		**48**	**20**							**68**
06:00		38	16							54
06:15		32	12							44
06:30		26	11							37
06:45		18	16							34
07:00		20	6							26
07:15		22	9							31
07:30		15	8							23
07:45		13	6							19
08:00		9	8							17
08:15		12	7							19
08:30		14	9							23
08:45		8	6							14
09:00		4	2							6
09:15		6	5							11
09:30		8	2							10
09:45		3	2							5
10:00		7	1							8
10:15		6	0							6
10:30		1	2							3
10:45		4	2							6
11:00		1	2							3
11:15		1	0							1
11:30		1	0							1
11:45		2	0							2
Total		842	465							1307
Percent		64.4%	35.6%							
Peak	-	17:00	17:00	-	-	-	-	-	-	17:00
Vol.	-	181	86	-	-	-	-	-	-	267
P.H.F.		0.823	0.896							0.890
Grand Total		1105	944							2049
Percent		53.9%	46.1%							

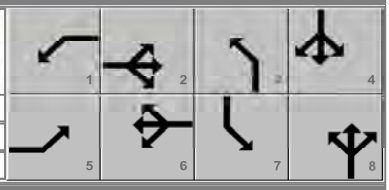
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	8/23/2019	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.91
Urban Street	Meridian Rd	Analysis Year	2019	Analysis Period	1> 7:00
Intersection	Meridian and Hubbard	File Name	Meridian&Hubbard-AM-Exst2019.xus		
Project Description	Exst AM Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	133	23	14	7	4	10	9	874	4	14	324	42

Signal Information					EB			WB			NB			SB		
Cycle, s	90.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	1.0	0.9		39.2	1.3	0.6	26.9					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0		4.0	4.0	0.0	4.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0		0.0	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	48.1	5.0	43.2	5.3	30.9	5.9	31.5
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	5.9		2.2		2.3	24.2	2.5	9.8
Green Extension Time (g_e), s	0.3	0.0	0.0	0.0	0.0	2.7	0.0	2.7
Phase Call Probability	0.97		0.17		0.22	1.00	0.32	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	146	41		8	15		10	483	482	15	204	198
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1767	1735		1767	1644		1767	1856	1852	1767	1856	1781
Queue Service Time (g_s), s	3.9	1.1		0.2	0.5		0.3	22.2	22.2	0.5	7.7	7.8
Cycle Queue Clearance Time (g_c), s	3.9	1.1		0.2	0.5		0.3	22.2	22.2	0.5	7.7	7.8
Green Ratio (*g/C*)	0.52	0.49		0.45	0.44		0.31	0.30	0.30	0.32	0.31	0.31
Capacity (*c*), veh/h	794	851		691	716		297	555	554	148	567	544
Volume-to-Capacity Ratio (*X*)	0.184	0.048		0.011	0.021		0.033	0.870	0.870	0.104	0.359	0.364
Back of Queue (*Q*), ft/ln (95 th percentile)	64.6	19.6		3.8	8.4		6.5	377.9	368.5	10.1	151.3	144.1
Back of Queue (*Q*), veh/ln (95 th percentile)	2.5	0.8		0.1	0.3		0.3	14.8	14.7	0.4	5.9	5.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.65	0.00		0.04	0.00		0.02	0.00	0.00	0.03	0.00	0.00
Uniform Delay (d_1), s/veh	11.1	12.0		13.8	14.5		21.8	29.9	29.9	23.8	24.4	24.4
Incremental Delay (d_2), s/veh	0.0	0.1		0.0	0.1		0.0	1.7	1.7	0.1	0.1	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	11.2	12.1		13.8	14.5		21.8	31.6	31.6	23.9	24.5	24.6
Level of Service (LOS)	B	B		B	B		C	C	C	C	C	C
Approach Delay, s/veh / LOS	11.4	B		14.3	B		31.5	C		24.5	C	
Intersection Delay, s/veh / LOS	27.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.26	B	2.26	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	0.80	A	0.53	A	1.29	A	0.83	A

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HCS7 All-Way Stop Control Report

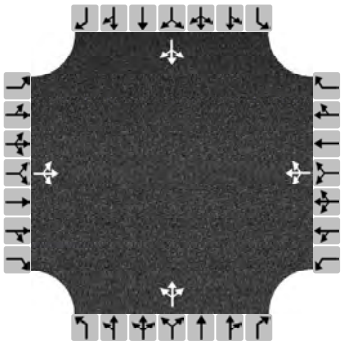
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	09/16/2019
Analysis Year	2019
Analysis Time Period (hrs)	0.25
Time Analyzed	EXISTING AM Peak Hour
Project Description	Ledgestone South

Site Information

Intersection	Locust_Lake Hazel
Jurisdiction	
East/West Street	Lake Hazel Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.94

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	16	277	3	8	177	51	3	102	11	39	32	7
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	315			251			123			83		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.280			0.223			0.110			0.074		
Final Departure Headway, hd (s)	4.87			4.83			5.43			5.60		
Final Degree of Utilization, x	0.426			0.337			0.186			0.129		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	2.87			2.83			3.43			3.60		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	315			251			123			83		
Capacity	740			746			663			643		
95% Queue Length, Q_{95} (veh)	2.1			1.5			0.7			0.4		
Control Delay (s/veh)	11.4			10.3			9.7			9.4		
Level of Service, LOS	B			B			A			A		
Approach Delay (s/veh)	11.4			10.3			9.7			9.4		
Approach LOS	B			B			A			A		
Intersection Delay, s/veh | LOS	10.5						B					

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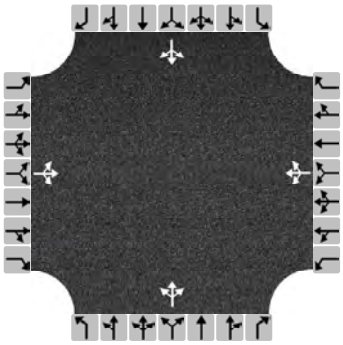
HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	RAB	Intersection	Locust_Columbia
Agency/Co.	WHPacific	Jurisdiction	
Date Performed	09/16/2019	East/West Street	Columbia Rd
Analysis Year	2019	North/South Street	Locust Grove Rd
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.80
Time Analyzed	EXISTING AM Peak Hour		
Project Description	Ledgestone South		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	61	211	4	4	71	15	4	41	7	18	16	16
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	345			113			65			63		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.307			0.100			0.058			0.056		
Final Departure Headway, hd (s)	4.45			4.58			5.04			4.99		
Final Degree of Utilization, x	0.427			0.143			0.091			0.087		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	2.45			2.58			3.04			2.99		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	345			113			65			63		
Capacity	809			786			714			721		
95% Queue Length, Q_{95} (veh)	2.2			0.5			0.3			0.3		
Control Delay (s/veh)	10.7			8.3			8.5			8.5		
Level of Service, LOS	B			A			A			A		
Approach Delay (s/veh)	10.7			8.3			8.5			8.5		
Approach LOS	B			A			A			A		
Intersection Delay, s/veh | LOS	9.8						A					

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HCS7 Two-Way Stop-Control Report

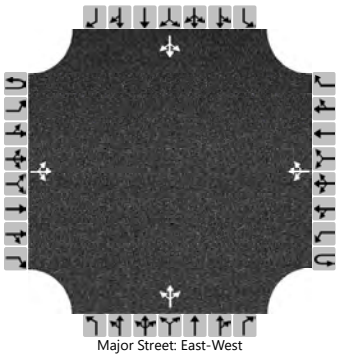
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2019
Time Analyzed	Existing AM
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Hubbard
Jurisdiction	
East/West Street	Hubbard Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.82
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		14	17	4		0	9	2		0	38	1		1	11	5
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		17				0					48				21	
Capacity, c (veh/h)		1598				1582					814				872	
v/c Ratio		0.01				0.00					0.06				0.02	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.2				0.1	
Control Delay (s/veh)		7.3				7.3					9.7				9.2	
Level of Service (LOS)		A				A					A				A	
Approach Delay (s/veh)		3.0				0.0				9.7				9.2		
Approach LOS										A				A		

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HCS7 Two-Way Stop-Control Report

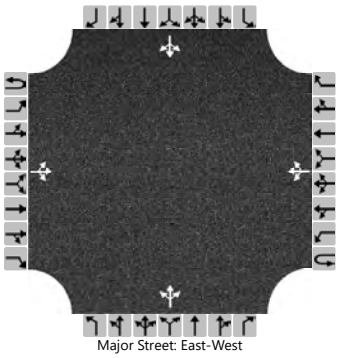
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2019
Time Analyzed	Existing AM Peak Hour
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Deer Fla
Jurisdiction	
East/West Street	Deer Flat
North/South Street	Locust Grove Rd
Peak Hour Factor	0.87
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		28	138	6		0	45	4		3	13	3		4	5	13
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		32				0					22				25	
Capacity, c (veh/h)		1542				1407					645				803	
v/c Ratio		0.02				0.00					0.03				0.03	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.1				0.1	
Control Delay (s/veh)		7.4				7.6					10.8				9.6	
Level of Service (LOS)		A				A					B				A	
Approach Delay (s/veh)		1.3				0.0				10.8				9.6		
Approach LOS										B				A		

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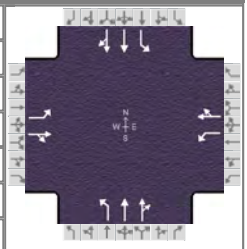
HCS7 Signalized Intersection Results Summary

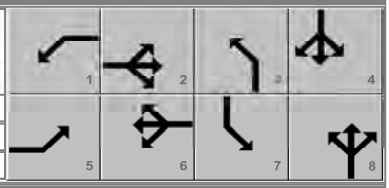
General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	8/23/2019	Area Type	Other
Jurisdiction	ACHD	Time Period	PM Peak	PHF	0.95
Urban Street	Meridian Rd	Analysis Year	2019	Analysis Period	1> 5:00
Intersection	Meridian and Hubbard	File Name	Meridian&Hubbard-PM-Exst2019.xus		
Project Description	Exst PM Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	67	9	28	9	9	29	29	485	8	15	1047	273

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	Begin
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	1.3	3.7	26.7	2.0	1.2	39.1	
Yellow	4.0	0.0	4.0	4.0	0.0	4.0	
Red	0.0	0.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	9.0	34.4	5.3	30.7	7.2	44.4	6.0	43.1
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	4.4		2.3		2.8	10.1	2.4	34.6
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.0	4.6	0.0	4.5
Phase Call Probability	0.83		0.21		0.53	1.00	0.33	1.00
Max Out Probability	0.00		0.00		0.93	0.00	0.38	0.04

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	71	39		9	40		31	260	259	16	716	674
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1767	1627		1767	1631		1767	1856	1845	1767	1856	1723
Queue Service Time (g_s), s	2.4	1.5		0.3	1.6		0.8	8.1	8.1	0.4	32.0	32.6
Cycle Queue Clearance Time (g_c), s	2.4	1.5		0.3	1.6		0.8	8.1	8.1	0.4	32.0	32.6
Green Ratio (*g/C*)	0.37	0.34		0.31	0.30		0.47	0.45	0.45	0.46	0.43	0.43
Capacity (*c*), veh/h	556	550		508	484		171	832	828	413	807	749
Volume-to-Capacity Ratio (*X*)	0.127	0.071		0.019	0.083		0.179	0.312	0.313	0.038	0.887	0.899
Back of Queue (*Q*), ft/ln (95 th percentile)	42.8	26.4		6.2	29.5		14.8	149.6	145.5	7.7	507.6	479.8
Back of Queue (*Q*), veh/ln (95 th percentile)	1.7	1.0		0.2	1.2		0.6	5.8	5.8	0.3	19.8	19.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.43	0.00		0.06	0.00		0.05	0.00	0.00	0.03	0.00	0.00
Uniform Delay (d_1), s/veh	18.6	20.2		21.5	22.8		19.3	15.9	15.9	13.9	23.4	23.6
Incremental Delay (d_2), s/veh	0.0	0.2		0.0	0.3		0.2	0.1	0.1	0.0	4.0	5.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	18.7	20.5		21.5	23.2		19.5	16.0	16.0	13.9	27.4	28.6
Level of Service (LOS)	B	C		C	C		B	B	B	B	C	C
Approach Delay, s/veh / LOS	19.3	B		22.8	C		16.2	B		27.9	C	
Intersection Delay, s/veh / LOS	24.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	2.28	B	1.90	B	1.90	B
Bicycle LOS Score / LOS	0.67	A	0.57	A	0.94	A	1.65	B

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HCS7 All-Way Stop Control Report

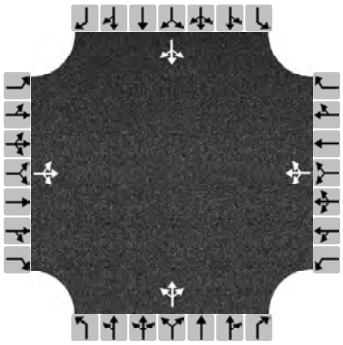
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	09/16/2019
Analysis Year	2019
Analysis Time Period (hrs)	0.25
Time Analyzed	EXIST PM Peak Hour
Project Description	Ledgestone South

Site Information

Intersection	Locust_Lake Hazel
Jurisdiction	
East/West Street	Lake Hazel Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	7	197	3	13	281	68	6	64	9	72	161	21
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	230			402			88			282		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.204			0.358			0.078			0.251		
Final Departure Headway, hd (s)	5.78			5.41			6.29			5.90		
Final Degree of Utilization, x	0.369			0.604			0.153			0.463		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	3.78			3.41			4.29			3.90		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	230			402			88			282		
Capacity	622			666			572			610		
95% Queue Length, Q_{95} (veh)	1.7			4.1			0.5			2.4		
Control Delay (s/veh)	12.1			16.3			10.4			13.9		
Level of Service, LOS	B			C			B			B		
Approach Delay (s/veh)	12.1			16.3			10.4			13.9		
Approach LOS	B			C			B			B		
Intersection Delay, s/veh | LOS	14.2						B					

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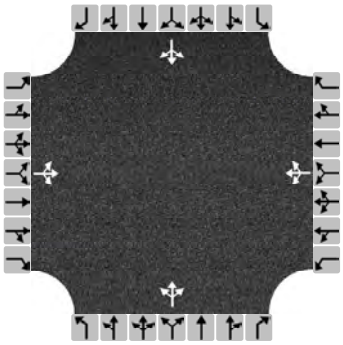
HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	RAB	Intersection	Locust_Columbia
Agency/Co.	WHPacific	Jurisdiction	
Date Performed	09/16/2019	East/West Street	Columbia Rd
Analysis Year	2019	North/South Street	Locust Grove Rd
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.95
Time Analyzed	EXISTING PM Peak Hour		
Project Description	Ledgestone South		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	15	93	4	10	259	19	2	11	6	16	58	68
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	118			303			20			149		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.105			0.269			0.018			0.133		
Final Departure Headway, hd (s)	4.73			4.49			4.98			4.70		
Final Degree of Utilization, x	0.155			0.378			0.028			0.195		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	2.73			2.49			2.98			2.70		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	118			303			20			149		
Capacity	761			803			722			766		
95% Queue Length, Q_{95} (veh)	0.5			1.8			0.1			0.7		
Control Delay (s/veh)	8.6			10.2			8.1			8.8		
Level of Service, LOS	A			B			A			A		
Approach Delay (s/veh)	8.6			10.2			8.1			8.8		
Approach LOS	A			B			A			A		
Intersection Delay, s/veh | LOS	9.5						A					

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HCS7 Two-Way Stop-Control Report

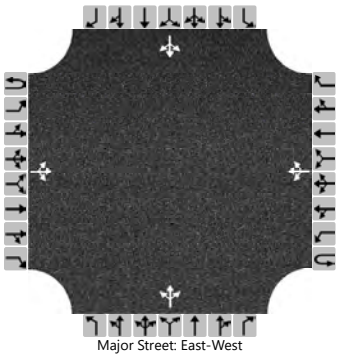
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2019
Time Analyzed	Existing PM
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Hubbard
Jurisdiction	
East/West Street	Hubbard Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	9	4		8	11	0		2	16	3		0	64	7
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		2				9					23				76	
Capacity, c (veh/h)		1601				1598					865				855	
v/c Ratio		0.00				0.01					0.03				0.09	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.3	
Control Delay (s/veh)		7.3				7.3					9.3				9.6	
Level of Service (LOS)		A				A					A				A	
Approach Delay (s/veh)		1.0				3.1				9.3				9.6		
Approach LOS										A				A		

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HCS7 Two-Way Stop-Control Report

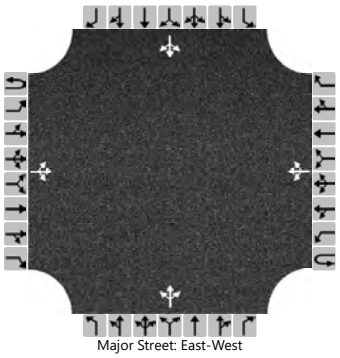
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2019
Time Analyzed	Existing PM Peak Hour
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Deer Fla
Jurisdiction	
East/West Street	Deer Flat
North/South Street	Locust Grove Rd
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		23	40	1		1	183	4		0	7	1		5	30	66
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		26				1					9				115	
Capacity, c (veh/h)		1352				1555					621				728	
v/c Ratio		0.02				0.00					0.01				0.16	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.0				0.6	
Control Delay (s/veh)		7.7				7.3					10.9				10.9	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)		2.9				0.0				10.9				10.9		
Approach LOS										B				B		

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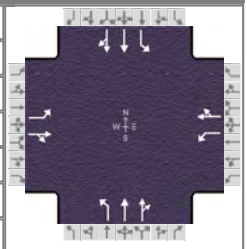
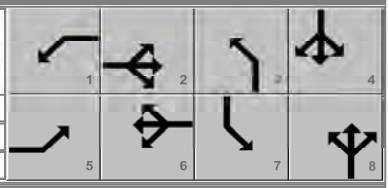
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	8/23/2019	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.91
Urban Street	Meridian Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Meridian and Hubbard	File Name	Meridian&Hubbard-AM-2025Bkgrd.xus		
Project Description	2025 AM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	214	36	22	9	5	14	11	1085	5	16	404	52

Signal Information					EB			WB			NB			SB		
Cycle, s	90.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	1.3	4.6		29.1	1.6	0.6		32.9				
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0		4.0	4.0	0.0		4.0				
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0		0.0	0.0	0.0		0.0				



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	13.9	41.7	5.3	33.1	5.6	36.9	6.1	37.5
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	9.5		2.3		2.4	29.2	2.6	11.1
Green Extension Time (g_e), s	0.4	0.0	0.0	0.0	0.0	3.6	0.0	3.7
Phase Call Probability	1.00		0.22		0.26	1.00	0.36	1.00
Max Out Probability	0.00		0.00		0.03	0.01	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	235	64		10	21		12	599	598	18	254	247
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1767	1734		1767	1638		1767	1856	1852	1767	1856	1781
Queue Service Time (g_s), s	7.5	2.0		0.3	0.8		0.4	27.2	27.2	0.6	9.0	9.1
Cycle Queue Clearance Time (g_c), s	7.5	2.0		0.3	0.8		0.4	27.2	27.2	0.6	9.0	9.1
Green Ratio (*g/C*)	0.46	0.42		0.34	0.32		0.38	0.37	0.37	0.39	0.37	0.37
Capacity (*c*), veh/h	708	726		534	529		332	678	677	151	690	662
Volume-to-Capacity Ratio (*X*)	0.332	0.088		0.019	0.039		0.036	0.884	0.884	0.116	0.369	0.372
Back of Queue (*Q*), ft/ln (95 th percentile)	131.6	37.1		6.2	14.4		7	440	429.1	10.2	172.4	163.2
Back of Queue (*Q*), veh/ln (95 th percentile)	5.1	1.4		0.2	0.6		0.3	17.2	17.2	0.4	6.7	6.5
Queue Storage Ratio (*RQ*) (95 th percentile)	1.32	0.00		0.06	0.00		0.02	0.00	0.00	0.03	0.00	0.00
Uniform Delay (d_1), s/veh	15.5	15.8		19.9	20.9		17.9	26.8	26.8	21.2	20.6	20.6
Incremental Delay (d_2), s/veh	0.1	0.2		0.0	0.1		0.0	1.6	1.6	0.1	0.1	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	15.6	16.0		19.9	21.0		17.9	28.3	28.3	21.4	20.7	20.7
Level of Service (LOS)	B	B		B	C		B	C	C	C	C	C
Approach Delay, s/veh / LOS	15.7	B		20.7	C		28.2	C		20.7	C	
Intersection Delay, s/veh / LOS	24.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.28	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	0.98	A	0.54	A	1.49	A	0.92	A

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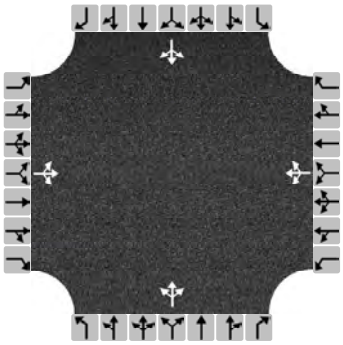
HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	RAB	Intersection	Locust_Lake Hazel
Agency/Co.	WHPacific	Jurisdiction	
Date Performed	09/16/2019	East/West Street	Lake Hazel Rd
Analysis Year	2025	North/South Street	Locust Grove Rd
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.94
Time Analyzed	2025 AM Peak Hour Bkgrd		
Project Description	Ledgestone South		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	26	446	5	15	283	82	5	163	18	59	55	11
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	507			404			198			133		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.451			0.359			0.176			0.118		
Final Departure Headway, hd (s)	5.96			6.03			6.99			7.32		
Final Degree of Utilization, x	0.841			0.677			0.384			0.271		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	3.96			4.03			4.99			5.32		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	507			404			198			133		
Capacity	604			597			515			492		
95% Queue Length, Q_{95} (veh)	9.0			5.2			1.8			1.1		
Control Delay (s/veh)	32.6			20.8			14.3			13.0		
Level of Service, LOS	D			C			B			B		
Approach Delay (s/veh)	32.6			20.8			14.3			13.0		
Approach LOS	D			C			B			B		
Intersection Delay, s/veh | LOS	23.7						C					

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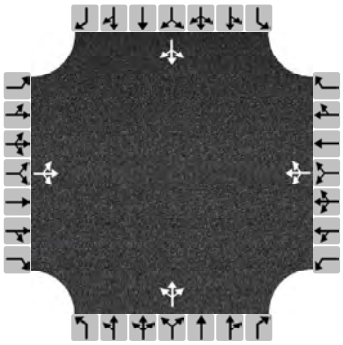
HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	RAB	Intersection	Locust_Columbia
Agency/Co.	WHPacific	Jurisdiction	
Date Performed	09/16/2019	East/West Street	Columbia Rd
Analysis Year	2025	North/South Street	Locust Grove Rd
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90
Time Analyzed	2025 AM Peak Hour Bkgrd		
Project Description	Ledgestone South		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	95	339	6	6	115	24	6	68	11	28	21	25
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	489			161			94			82		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.435			0.143			0.084			0.073		
Final Departure Headway, hd (s)	4.71			4.98			5.61			5.57		
Final Degree of Utilization, x	0.639			0.223			0.147			0.127		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	2.71			2.98			3.61			3.57		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	489			161			94			82		
Capacity	765			723			642			646		
95% Queue Length, Q_{95} (veh)	4.7			0.8			0.5			0.4		
Control Delay (s/veh)	15.7			9.4			9.6			9.4		
Level of Service, LOS	C			A			A			A		
Approach Delay (s/veh)	15.7			9.4			9.6			9.4		
Approach LOS	C			A			A			A		
Intersection Delay, s/veh | LOS	13.1						B					

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HCS7 Two-Way Stop-Control Report

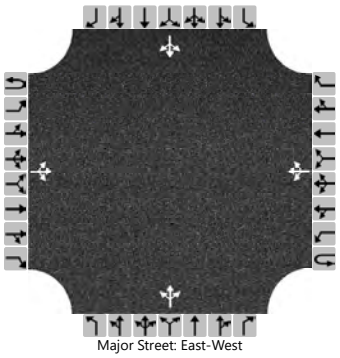
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2025
Time Analyzed	2025 AM Peak Hour Bkgrd
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Hubbard
Jurisdiction	
East/West Street	Hubbard Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		21	27	6		1	16	3		1	61	2		2	23	11
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				1					71				40	
Capacity, c (veh/h)		1588				1568					779				840	
v/c Ratio		0.01				0.00					0.09				0.05	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.3				0.1	
Control Delay (s/veh)		7.3				7.3					10.1				9.5	
Level of Service (LOS)		A				A					B				A	
Approach Delay (s/veh)	2.9				0.4				10.1				9.5			
Approach LOS									B				A			

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HCS7 Two-Way Stop-Control Report

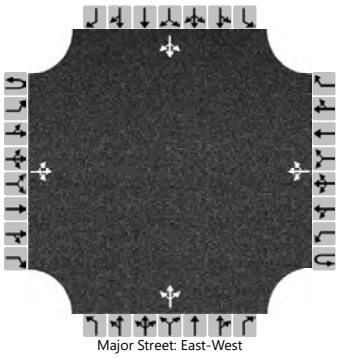
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2025
Time Analyzed	2025 AM Peak Hour Bkgrd
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Deer Fla
Jurisdiction	
East/West Street	Deer Flat
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		41	222	11		1	74	6		5	21	5		5	7	19
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		46				1					34				34	
Capacity, c (veh/h)		1500				1300					525				703	
v/c Ratio		0.03				0.00					0.07				0.05	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.2				0.2	
Control Delay (s/veh)		7.5				7.8					12.3				10.4	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)	1.3				0.1				12.3				10.4			
Approach LOS									B				B			

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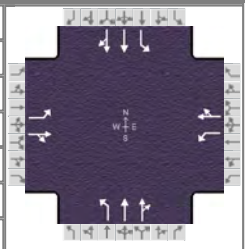
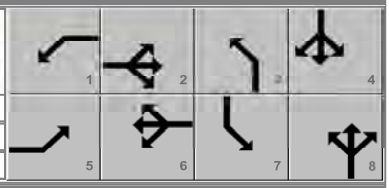
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	8/23/2019	Area Type	Other
Jurisdiction	ACHD	Time Period	PM	PHF	0.95
Urban Street	Meridian Rd	Analysis Year	2025	Analysis Period	1> 5:00
Intersection	Meridian and Hubbard	File Name	Meridian&Hubbard-PM-2025Bkgrd.xus		
Project Description	2025 PM Peak Bkgrd				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	111	11	45	10	10	33	36	607	8	15	1302	339

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	Begin									
Uncoordinated	No	Simult. Gap E/W	On	Green	1.4	1.0	15.6	2.0	1.7	48.3		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	4.0	0.0	4.0		
				Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.4	24.7	5.4	19.6	7.7	54.0	6.0	52.3
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	6.7		2.4		2.8	10.5	2.4	42.6
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.0	6.8	0.0	5.7
Phase Call Probability	0.95		0.23		0.61	1.00	0.33	1.00
Max Out Probability	0.00		0.00		0.92	0.01	0.31	0.30

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	117	59		11	45		38	324	323	16	876	851
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1767	1612		1767	1630		1767	1856	1847	1767	1856	1725
Queue Service Time (g_s), s	4.7	2.6		0.4	2.1		0.8	8.5	8.5	0.4	37.3	40.6
Cycle Queue Clearance Time (g_c), s	4.7	2.6		0.4	2.1		0.8	8.5	8.5	0.4	37.3	40.6
Green Ratio (*g/C*)	0.27	0.23		0.19	0.17		0.58	0.56	0.56	0.56	0.54	0.54
Capacity (*c*), veh/h	408	370		339	283		176	1031	1026	460	996	926
Volume-to-Capacity Ratio (*X*)	0.286	0.159		0.031	0.160		0.215	0.315	0.315	0.034	0.880	0.919
Back of Queue (*Q*), ft/ln (95 th percentile)	88.1	49.9		8.4	42		17	145.7	141.7	5.9	570	587
Back of Queue (*Q*), veh/ln (95 th percentile)	3.4	2.0		0.3	1.6		0.7	5.7	5.7	0.2	22.3	23.5
Queue Storage Ratio (*RQ*) (95 th percentile)	0.88	0.00		0.08	0.00		0.06	0.00	0.00	0.02	0.00	0.00
Uniform Delay (d_1), s/veh	26.0	27.7		29.8	31.6		18.8	10.8	10.8	9.3	18.3	19.1
Incremental Delay (d_2), s/veh	0.1	0.9		0.0	1.2		0.2	0.1	0.1	0.0	6.0	9.8
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	26.1	28.7		29.8	32.8		19.0	10.8	10.8	9.3	24.3	28.8
Level of Service (LOS)	C	C		C	C		B	B	B	A	C	C
Approach Delay, s/veh / LOS	27.0	C		32.2	C		11.3	B		26.4	C	
Intersection Delay, s/veh / LOS	22.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.78	A	0.58	A	1.05	A	1.93	B

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HCS7 All-Way Stop Control Report

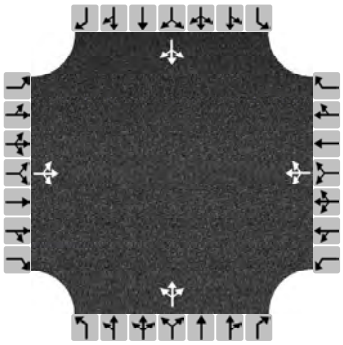
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	09/16/2019
Analysis Year	2025
Analysis Time Period (hrs)	0.25
Time Analyzed	2025 PM Peak Hour Bkgrd
Project Description	Ledgestone South

Site Information

Intersection	Locust_Lake Hazel
Jurisdiction	
East/West Street	Lake Hazel Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	13	314	5	19	447	124	7	85	10	120	250	40
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	369			656			113			456		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.328			0.583			0.101			0.405		
Final Departure Headway, hd (s)	7.61			7.25			8.84			7.39		
Final Degree of Utilization, x	0.779			1.321			0.278			0.935		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	5.61			5.25			6.84			5.39		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	369			656			113			456		
Capacity	473			496			407			487		
95% Queue Length, Q_{95} (veh)	6.9			28.5			1.1			11.2		
Control Delay (s/veh)	32.6			180.0			15.2			53.4		
Level of Service, LOS	D			F			C			F		
Approach Delay (s/veh)	32.6			180.0			15.2			53.4		
Approach LOS	D			F			C			F		
Intersection Delay, s/veh | LOS	98.0						F					

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HCS7 All-Way Stop Control Report

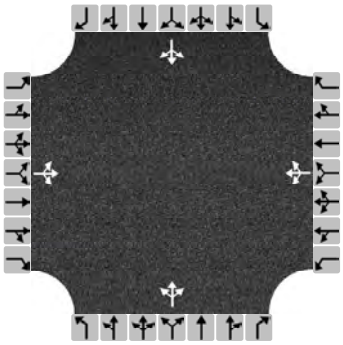
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	09/16/2019
Analysis Year	2025
Analysis Time Period (hrs)	0.25
Time Analyzed	2025 PM Peak Hour Bkgrd
Project Description	Ledgestone South

Site Information

Intersection	Locust_Columbia
Jurisdiction	
East/West Street	Columbia Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.95

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	33	143	5	15	404	45	2	21	8	54	103	54
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	191			488			33			222		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.169			0.434			0.029			0.197		
Final Departure Headway, hd (s)	5.42			4.95			6.04			5.65		
Final Degree of Utilization, x	0.287			0.672			0.055			0.349		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	3.42			2.95			4.04			3.65		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	191			488			33			222		
Capacity	664			727			596			637		
95% Queue Length, Q_{95} (veh)	1.2			5.2			0.2			1.6		
Control Delay (s/veh)	10.6			17.5			9.4			11.7		
Level of Service, LOS	B			C			A			B		
Approach Delay (s/veh)	10.6			17.5			9.4			11.7		
Approach LOS	B			C			A			B		
Intersection Delay, s/veh | LOS	14.4						B					

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HCS7 Two-Way Stop-Control Report

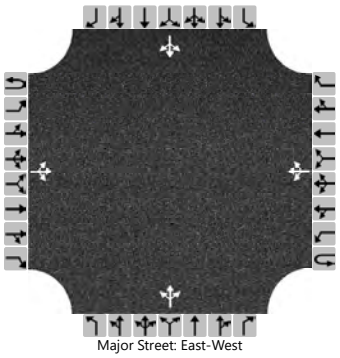
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2025
Time Analyzed	2025 PM Peak Hour Bkgrd
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Hubbard
Jurisdiction	
East/West Street	Hubbard Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		3	14	18		11	22	1		13	27	5		1	112	18
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		3				12					48				141	
Capacity, c (veh/h)		1583				1571					790				820	
v/c Ratio		0.00				0.01					0.06				0.17	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.2				0.6	
Control Delay (s/veh)		7.3				7.3					9.9				10.3	
Level of Service (LOS)		A				A					A				B	
Approach Delay (s/veh)	0.6				2.4				9.9				10.3			
Approach LOS									A				B			

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HCS7 Two-Way Stop-Control Report

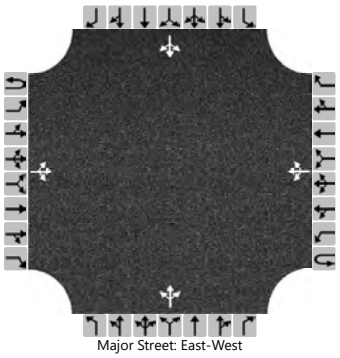
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2025
Time Analyzed	2025 PM Peak Hour Bkgrd
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Deer Fla
Jurisdiction	
East/West Street	Deer Flat
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		29	66	2		2	306	5		1	10	2		7	48	93
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		32				2					14				164	
Capacity, c (veh/h)		1208				1517					488				588	
v/c Ratio		0.03				0.00					0.03				0.28	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.1				1.1	
Control Delay (s/veh)		8.1				7.4					12.6				13.5	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)	2.6				0.1				12.6				13.5			
Approach LOS									B				B			

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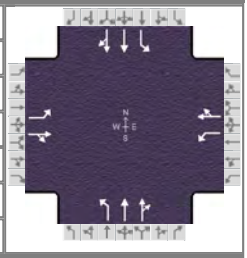
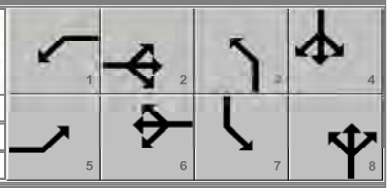
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	8/23/2019	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.91
Urban Street	Meridian Rd	Analysis Year	2025	Analysis Period	1> 7:00
Intersection	Meridian and Hubbard	File Name	Meridian&Hubbard-AM-2025Total.xus		
Project Description	2025 AM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	214	36	22	21	5	98	11	1085	9	44	404	53

Signal Information					EB			WB			NB			SB		
Cycle, s	90.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	2.6	3.6		26.5	1.6	2.6	33.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0		4.0	4.0	0.0	4.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0		0.0	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	14.2	38.1	6.6	30.5	5.6	37.0	8.2	39.7
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	9.9		2.8		2.4	29.4	3.5	10.8
Green Extension Time (g_e), s	0.4	0.0	0.0	0.0	0.0	3.7	0.0	3.7
Phase Call Probability	1.00		0.44		0.26	1.00	0.70	1.00
Max Out Probability	0.00		0.00		0.03	0.01	0.50	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	235	64		23	113		12	602	600	48	255	247
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1767	1734		1767	1584		1767	1856	1850	1767	1856	1780
Queue Service Time (g_s), s	7.9	2.1		0.8	4.9		0.4	27.4	27.4	1.5	8.7	8.8
Cycle Queue Clearance Time (g_c), s	7.9	2.1		0.8	4.9		0.4	27.4	27.4	1.5	8.7	8.8
Green Ratio (*g/C*)	0.43	0.38		0.32	0.29		0.38	0.37	0.37	0.42	0.40	0.40
Capacity (*c*), veh/h	586	658		523	467		357	681	679	192	735	705
Volume-to-Capacity Ratio (*X*)	0.401	0.097		0.044	0.242		0.034	0.884	0.884	0.252	0.347	0.350
Back of Queue (*Q*), ft/ln (95 th percentile)	139.7	40.3		14.9	88.9		6.9	441.6	430.3	26.6	164.3	155.7
Back of Queue (*Q*), veh/ln (95 th percentile)	5.5	1.6		0.6	3.5		0.3	17.2	17.2	1.0	6.4	6.2
Queue Storage Ratio (*RQ*) (95 th percentile)	1.40	0.00		0.15	0.00		0.02	0.00	0.00	0.09	0.00	0.00
Uniform Delay (d_1), s/veh	17.1	18.0		20.8	24.1		17.5	26.7	26.7	20.4	19.0	19.0
Incremental Delay (d_2), s/veh	0.2	0.3		0.0	1.2		0.0	1.8	1.8	0.3	0.1	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	17.3	18.3		20.9	25.3		17.6	28.4	28.5	20.6	19.1	19.2
Level of Service (LOS)	B	B		C	C		B	C	C	C	B	B
Approach Delay, s/veh / LOS	17.5	B		24.6	C		28.3	C		19.3	B	
Intersection Delay, s/veh / LOS	24.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.28	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	0.98	A	0.71	A	1.49	A	0.94	A

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HCS7 All-Way Stop Control Report

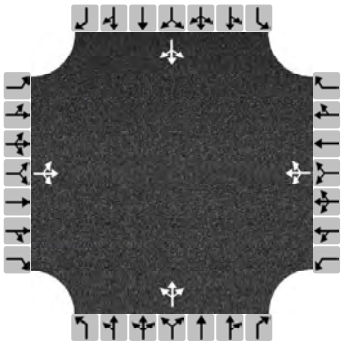
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	09/16/2019
Analysis Year	2025
Analysis Time Period (hrs)	0.25
Time Analyzed	2025 AM Peak Hour Total
Project Description	Ledgestone South

Site Information

Intersection	Locust_Lake Hazel
Jurisdiction	
East/West Street	Lake Hazel Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.94

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	26	446	5	15	283	82	5	259	18	59	87	11
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	507			404			300			167		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.451			0.359			0.267			0.148		
Final Departure Headway, hd (s)	7.00			7.15			7.75			8.41		
Final Degree of Utilization, x	0.986			0.803			0.646			0.390		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	5.00			5.15			5.75			6.41		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	507			404			300			167		
Capacity	514			504			464			428		
95% Queue Length, Q_{95} (veh)	13.4			7.6			4.5			1.8		
Control Delay (s/veh)	62.7			33.2			23.8			16.7		
Level of Service, LOS	F			D			C			C		
Approach Delay (s/veh)	62.7			33.2			23.8			16.7		
Approach LOS	F			D			C			C		
Intersection Delay, s/veh | LOS	40.0						E					

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HCS7 All-Way Stop Control Report

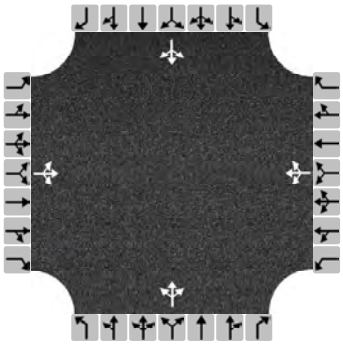
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	09/16/2019
Analysis Year	2025
Analysis Time Period (hrs)	0.25
Time Analyzed	2025 AM Peak Hour Total
Project Description	Ledgestone South

Site Information

Intersection	Locust_Columbia
Jurisdiction	
East/West Street	Columbia Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	95	339	6	6	115	24	6	164	11	28	53	25
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	489			161			201			118		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.435			0.143			0.179			0.105		
Final Departure Headway, hd (s)	5.24			5.63			5.94			6.07		
Final Degree of Utilization, x	0.712			0.252			0.332			0.198		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	3.24			3.63			3.94			4.07		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	489			161			201			118		
Capacity	687			640			606			593		
95% Queue Length, Q_{95} (veh)	6.0			1.0			1.4			0.7		
Control Delay (s/veh)	20.1			10.5			11.9			10.6		
Level of Service, LOS	C			B			B			B		
Approach Delay (s/veh)	20.1			10.5			11.9			10.6		
Approach LOS	C			B			B			B		
Intersection Delay, s/veh | LOS	15.6						C					

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HCS7 Two-Way Stop-Control Report

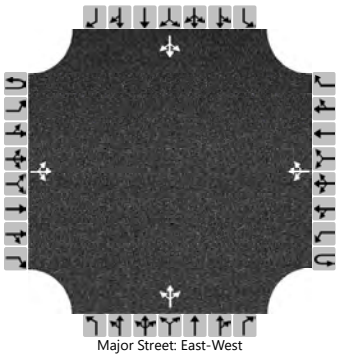
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2025
Time Analyzed	2025 AM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Hubbard
Jurisdiction	
East/West Street	Hubbard Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		33	39	6		9	20	3		1	145	26		2	51	15
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		37				10					191				76	
Capacity, c (veh/h)		1582				1550					738				750	
v/c Ratio		0.02				0.01					0.26				0.10	
95% Queue Length, Q_{95} (veh)		0.1				0.0					1.0				0.3	
Control Delay (s/veh)		7.3				7.3					11.6				10.3	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)	3.2				2.1				11.6				10.3			
Approach LOS									B				B			

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HCS7 Two-Way Stop-Control Report

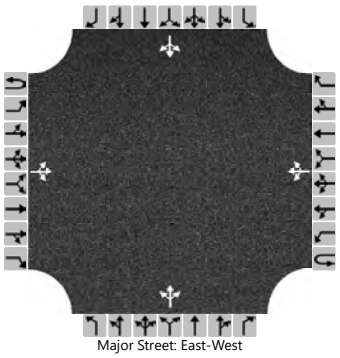
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2025
Time Analyzed	2025 AM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Deer Fla
Jurisdiction	
East/West Street	Deer Flat
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		41	222	11		1	74	6		5	25	5		5	19	19
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		46				1					39				48	
Capacity, c (veh/h)		1500				1300					518				627	
v/c Ratio		0.03				0.00					0.08				0.08	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.2				0.2	
Control Delay (s/veh)		7.5				7.8					12.5				11.2	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)		1.3				0.1				12.5				11.2		
Approach LOS										B				B		

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HCS7 Two-Way Stop-Control Report

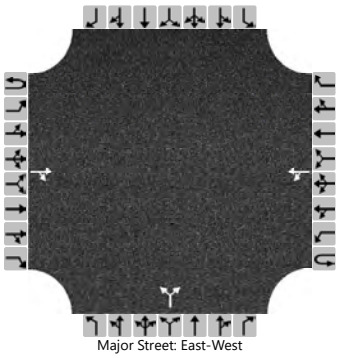
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	10/16/2019
Analysis Year	2025
Time Analyzed	AM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Hubbard and Stroebel
Jurisdiction	
East/West Street	Hubbard
North/South Street	Stroebel
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			57	32		8	28			96		24				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						9					130					
Capacity, c (veh/h)						1490					881					
v/c Ratio						0.01					0.15					
95% Queue Length, Q_{95} (veh)						0.0					0.5					
Control Delay (s/veh)						7.4					9.8					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)						1.7				9.8						
Approach LOS										A						

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HCS7 Two-Way Stop-Control Report

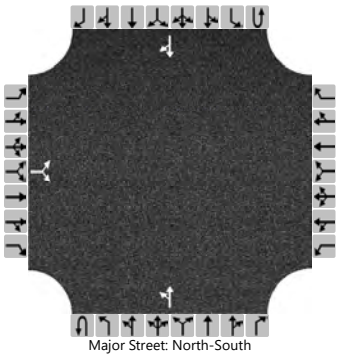
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	10/16/2019
Analysis Year	2025
Time Analyzed	AM Peak Hour Total
Intersection Orientation	North-South
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and E Access
Jurisdiction	
East/West Street	E Access
North/South Street	Locust Grove
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		108		12						4	68				30	36
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			130							4						
Capacity, c (veh/h)			868							1522						
v/c Ratio			0.15							0.00						
95% Queue Length, Q_{95} (veh)			0.5							0.0						
Control Delay (s/veh)			9.9							7.4						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)		9.9								0.4						
Approach LOS		A														

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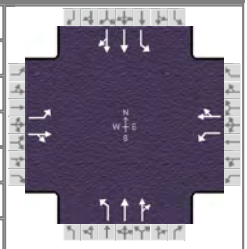
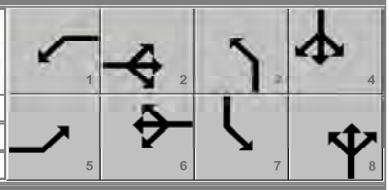
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	WHPacific			Duration, h	0.25
Analyst	K Baker	Analysis Date	8/23/2019	Area Type	Other
Jurisdiction	ACHD	Time Period	AM Peak	PHF	0.95
Urban Street	Meridian Rd	Analysis Year	2025	Analysis Period	1> 5:00
Intersection	Meridian and Hubbard	File Name	Meridian&Hubbard-PM-2025Total.xus		
Project Description	2025 PM Peak Total				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	111	11	45	18	10	88	36	607	21	109	1302	343

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	Begin									
Uncoordinated	No	Simult. Gap E/W	On	Green	2.3	0.2	15.5	3.7	2.0	46.5		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	4.0	0.0	4.0		
				Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.4	23.6	6.3	19.5	7.7	50.5	9.7	52.4
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	6.7		2.8		2.9	11.5	4.6	42.7
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.0	6.9	0.0	5.7
Phase Call Probability	0.95		0.38		0.61	1.00	0.94	1.00
Max Out Probability	0.00		0.00		0.99	0.02	1.00	0.31

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	117	59		19	103		38	332	329	115	879	853
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1767	1612		1767	1597		1767	1856	1833	1767	1856	1724
Queue Service Time (g_s), s	4.7	2.7		0.8	5.1		0.9	9.5	9.5	2.6	37.4	40.7
Cycle Queue Clearance Time (g_c), s	4.7	2.7		0.8	5.1		0.9	9.5	9.5	2.6	37.4	40.7
Green Ratio (*g/C*)	0.27	0.22		0.20	0.17		0.56	0.52	0.52	0.58	0.54	0.54
Capacity (*c*), veh/h	353	351		346	274		170	958	946	506	999	928
Volume-to-Capacity Ratio (*X*)	0.331	0.168		0.055	0.376		0.223	0.347	0.347	0.227	0.880	0.919
Back of Queue (*Q*), ft/ln (95 th percentile)	88.6	51		15	103.1		17.1	168.6	162.9	42.3	569.5	587.2
Back of Queue (*Q*), veh/ln (95 th percentile)	3.5	2.0		0.6	4.0		0.7	6.6	6.5	1.7	22.2	23.5
Queue Storage Ratio (*RQ*) (95 th percentile)	0.89	0.00		0.15	0.00		0.06	0.00	0.00	0.14	0.00	0.00
Uniform Delay (d_1), s/veh	26.3	28.6		29.3	33.0		19.7	12.8	12.8	9.1	18.2	19.0
Incremental Delay (d_2), s/veh	0.2	1.0		0.0	3.9		0.2	0.1	0.1	0.1	6.0	9.8
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	26.5	29.6		29.4	36.9		19.9	12.9	12.9	9.2	24.2	28.8
Level of Service (LOS)	C	C		C	D		B	B	B	A	C	C
Approach Delay, s/veh / LOS	27.5	C		35.7	D		13.3	B		25.4	C	
Intersection Delay, s/veh / LOS	23.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.78	A	0.69	A	1.06	A	2.01	B

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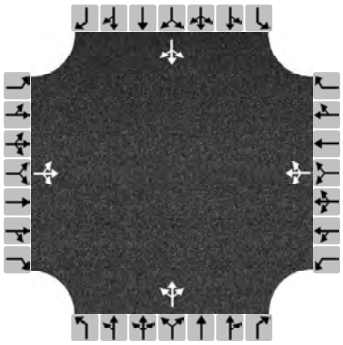
HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	RAB	Intersection	Locust_Lake Hazel
Agency/Co.	WHPacific	Jurisdiction	
Date Performed	09/16/2019	East/West Street	Lake Hazel Rd
Analysis Year	2025	North/South Street	Locust Grove Rd
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90
Time Analyzed	2025 PM Peak Hour Total		
Project Description	Ledgestone South		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	13	314	5	19	447	124	7	148	10	120	357	40
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	369			656			183			574		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.328			0.583			0.163			0.511		
Final Departure Headway, hd (s)	8.23			7.82			9.17			7.93		
Final Degree of Utilization, x	0.843			1.423			0.467			1.266		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	6.23			5.82			7.17			5.93		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	369			656			183			574		
Capacity	437			461			393			454		
95% Queue Length, Q_{95} (veh)	8.2			32.0			2.4			24.0		
Control Delay (s/veh)	42.0			224.6			19.9			160.8		
Level of Service, LOS	E			F			C			F		
Approach Delay (s/veh)	42.0			224.6			19.9			160.8		
Approach LOS	E			F			C			F		
Intersection Delay, s/veh | LOS	145.2						F					

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HCS7 All-Way Stop Control Report

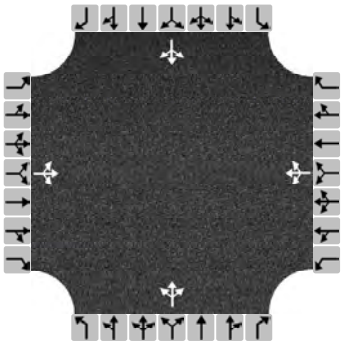
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	09/16/2019
Analysis Year	2025
Analysis Time Period (hrs)	0.25
Time Analyzed	2025 PM Peak Hour Total
Project Description	Ledgestone South

Site Information

Intersection	Locust_Columbia
Jurisdiction	
East/West Street	Columbia Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.95

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	33	143	5	15	404	45	2	84	8	54	210	120
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	191			488			99			404		
Percent Heavy Vehicles	3			3			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.169			0.434			0.088			0.359		
Final Departure Headway, hd (s)	6.69			5.99			7.09			6.17		
Final Degree of Utilization, x	0.354			0.812			0.195			0.693		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	4.69			3.99			5.09			4.17		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	191			488			99			404		
Capacity	538			601			508			584		
95% Queue Length, Q_{95} (veh)	1.6			8.2			0.7			5.4		
Control Delay (s/veh)	13.3			29.8			11.8			21.9		
Level of Service, LOS	B			D			B			C		
Approach Delay (s/veh)	13.3			29.8			11.8			21.9		
Approach LOS	B			D			B			C		
Intersection Delay, s/veh | LOS	22.9						C					

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HCS7 Two-Way Stop-Control Report

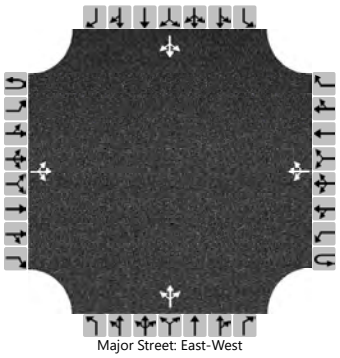
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2025
Time Analyzed	2025 PM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Hubbard
Jurisdiction	
East/West Street	Hubbard Rd
North/South Street	Locust Grove Rd
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		11	22	18		38	36	1		13	82	21		1	206	31
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		12				41					125				256	
Capacity, c (veh/h)		1563				1559					691				712	
v/c Ratio		0.01				0.03					0.18				0.36	
95% Queue Length, Q_{95} (veh)		0.0				0.1					0.7				1.6	
Control Delay (s/veh)		7.3				7.4					11.4				12.9	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)	1.6				3.8				11.4				12.9			
Approach LOS									B				B			

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HCS7 Two-Way Stop-Control Report

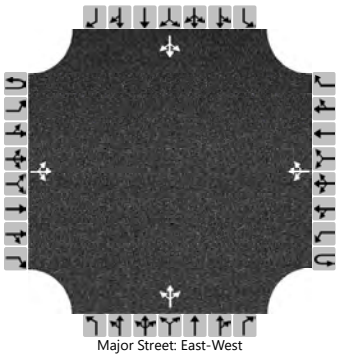
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	9/16/2019
Analysis Year	2025
Time Analyzed	2025 PM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and Deer Fla
Jurisdiction	
East/West Street	Deer Flat
North/South Street	Locust Grove Rd
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		29	66	2		2	306	5		1	24	2		7	56	93
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		32				2					30				173	
Capacity, c (veh/h)		1208				1517					475				579	
v/c Ratio		0.03				0.00					0.06				0.30	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.2				1.3	
Control Delay (s/veh)		8.1				7.4					13.1				13.9	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)	2.6				0.1				13.1				13.9			
Approach LOS									B				B			

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HCS7 Two-Way Stop-Control Report

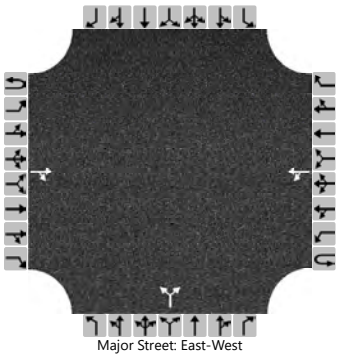
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	10/16/2019
Analysis Year	2025
Time Analyzed	PM Peak Hour Total
Intersection Orientation	East-West
Project Description	Ledgestone South

Site Information

Intersection	Hubbard and Stroebel
Jurisdiction	
East/West Street	Hubbard
North/South Street	Stroebel
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			34	107		27	53			63		16				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						29					86					
Capacity, c (veh/h)						1421					792					
v/c Ratio						0.02					0.11					
95% Queue Length, Q_{95} (veh)						0.1					0.4					
Control Delay (s/veh)						7.6					10.1					
Level of Service (LOS)						A					B					
Approach Delay (s/veh)						2.7				10.1						
Approach LOS										B						

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HCS7 Two-Way Stop-Control Report

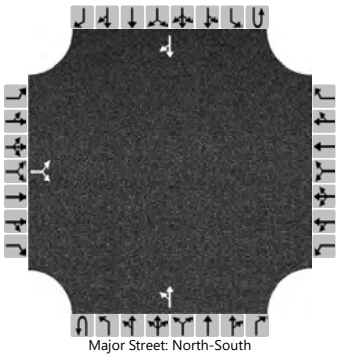
General Information

Analyst	RAB
Agency/Co.	WHPacific
Date Performed	10/16/2019
Analysis Year	2025
Time Analyzed	PM Peak Hour Total
Intersection Orientation	North-South
Project Description	Ledgestone South

Site Information

Intersection	Locust Grove and E Access
Jurisdiction	
East/West Street	E Access
North/South Street	Locust Grove
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		71		8						14	44				141	121
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			86							15						
Capacity, c (veh/h)			695							1272						
v/c Ratio			0.12							0.01						
95% Queue Length, Q_{95} (veh)			0.4							0.0						
Control Delay (s/veh)			10.9							7.9						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		10.9								2.0						
Approach LOS		B														

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TRAFFIC SIGNAL WARRANTS

City/Town:	Kuna, ID	Analysis Performed By:	RB
County:	ADA County	Date Analysis Performed:	10/15/2019
Division:		Project Number if Applicable:	
Data Date:		Weather Conditions:	
Major Route:	Lake Hazel	Appr. Lanes: 1	Critical Approach Speed (mph): 50
Minor Route:	Locust Grove	Appr. Lanes: 1	

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? [X] Yes [ ] No
2. Is the intersection in a built-up area or isolated community of <10,000 population? [ ] Yes [ ] No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level [X] 70% [ ] 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied, given adequate trials of other remedial measures have been tried.

Satisfied: [ ] Yes [X] No

Adequate trial(s) of other remedial measures tried: [ ] Yes [X] No

List Remedial Measures Tried (Required for 80% Combination of A & B)

Condition A - Minimum Vehicular Volume & Condition B - Interruption of Continuous Traffic

100% Satisfied: [ ] Yes [X] No

(Used if neither Condition A or B is satisfied) 80% Satisfied: [ ] Yes [X] No

	(volumes in veh/hr)	Minimum Requirements				Eight Highest Hours							
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM
W - 1A 100%	Both Approaches on Major Street	500	350	600	420	353	367	305	512	668	924	585	343
	Highest Approach on Minor Street	150	105	200	140	125	127	113	204	315	410	258	159
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 100%	Both Approaches on Major Street	750	525	900	630	353	367	305	512	668	924	585	343
	Highest Approach on Minor Street	75	53	100	70	125	127	113	204	315	410	258	159
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1A 80%	Both Approaches on Major Street	400	280	480	336	353	367	305	512	668	924	585	343
	Highest Approach on Minor Street	120	84	160	112	125	127	113	204	315	410	258	159
	(volumes in veh/hr)	Minimum Requirements											
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 80%	Both Approaches on Major Street	600	420	720	504	353	367	305	512	668	924	585	343
	Highest Approach on Minor Street	60	42	80	56	125	127	113	204	315	410	258	159

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

TRAFFIC SIGNAL WARRANTS

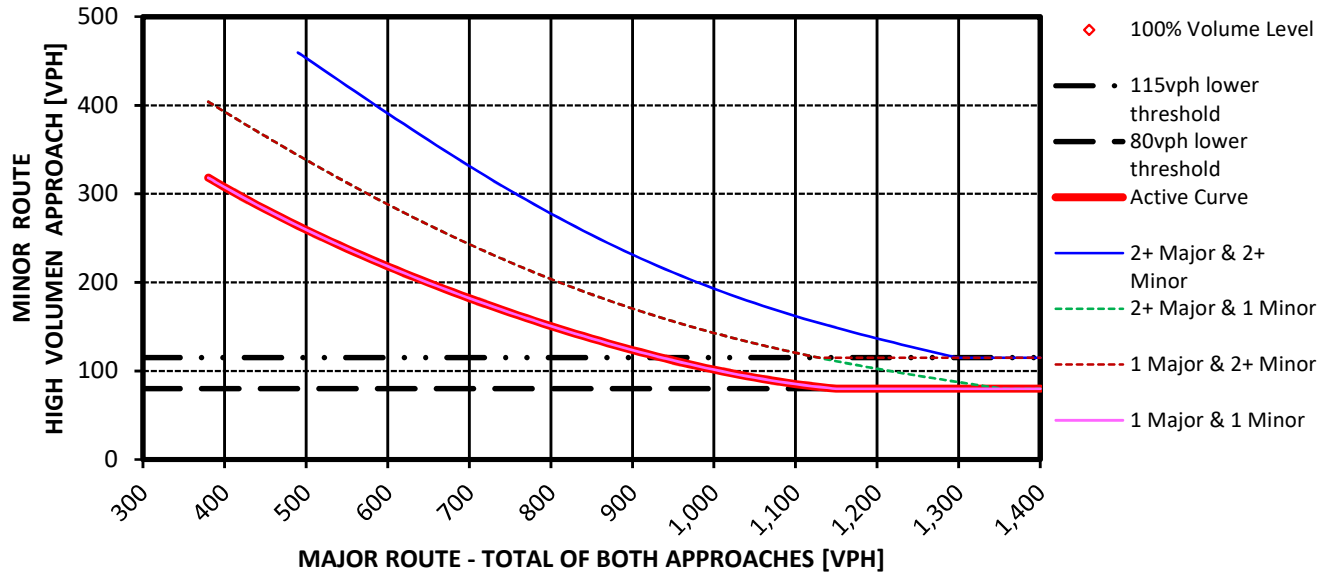
WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Satisfied: [X] Yes [ ] No

If all four points lie above the appropriate line, then this warrant is satisfied.

(Volumes in veh/hr)	Four Highest Hours			
	3 PM	4 PM	5 PM	6 PM
SUM of Both Approaches on Major Street	512	668	924	585
Highest Minor Street Approach	204	315	410	258

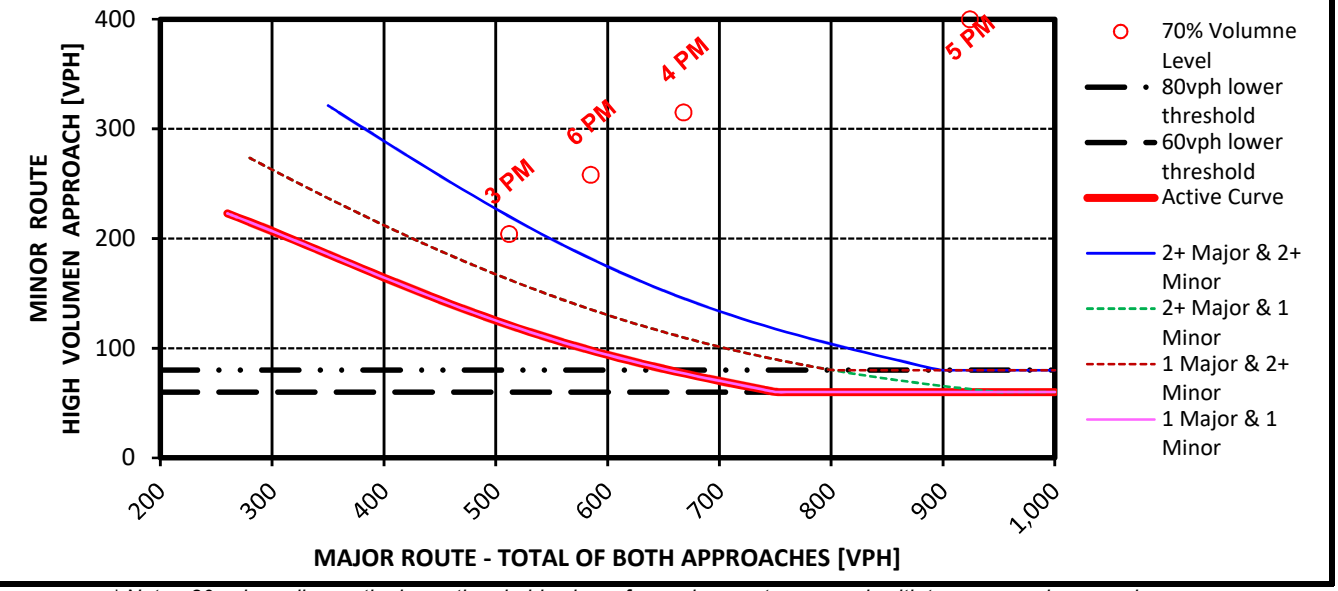
FIGURE W-2: Criteria for "100%" Volume Level



** Note: 115 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

FIGURE W-2: Criteria for "70%" Volume Level

(Community less-than 10,000 population or speeds greater-than 70 km/hr [40 mph] on Major Street)



** Note: 80 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 60 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANTS

WARRANT 3 - PEAK HOUR VEHICULAR VOLUME

Applicable: [ ] Yes [X] No

Satisfied: [ ] Yes [X] No

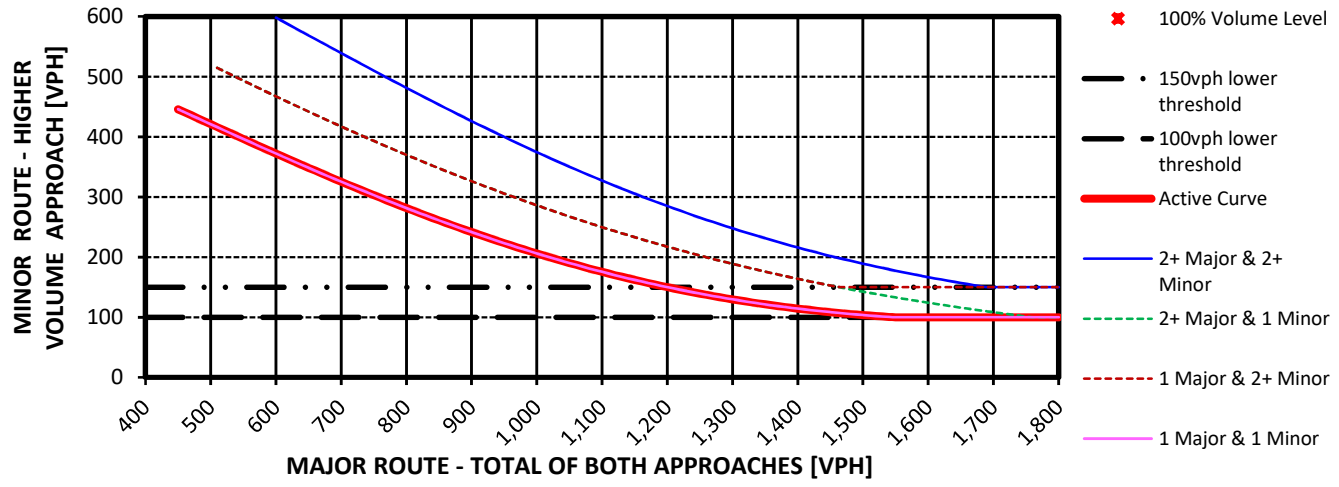
This signal warrant sahll be applied only in unsual cases, such as office complexes, manufacturing plants, industrial complexes, or high-ocupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time period.

Signalization shall be considered if a point lies above the appropriate line or the Delay criteria is met.

Unusual case(s) justifying this Warrant:

Peak Hour Data		
Peak Hour	Major Route	Minor Route
5 PM	924	410

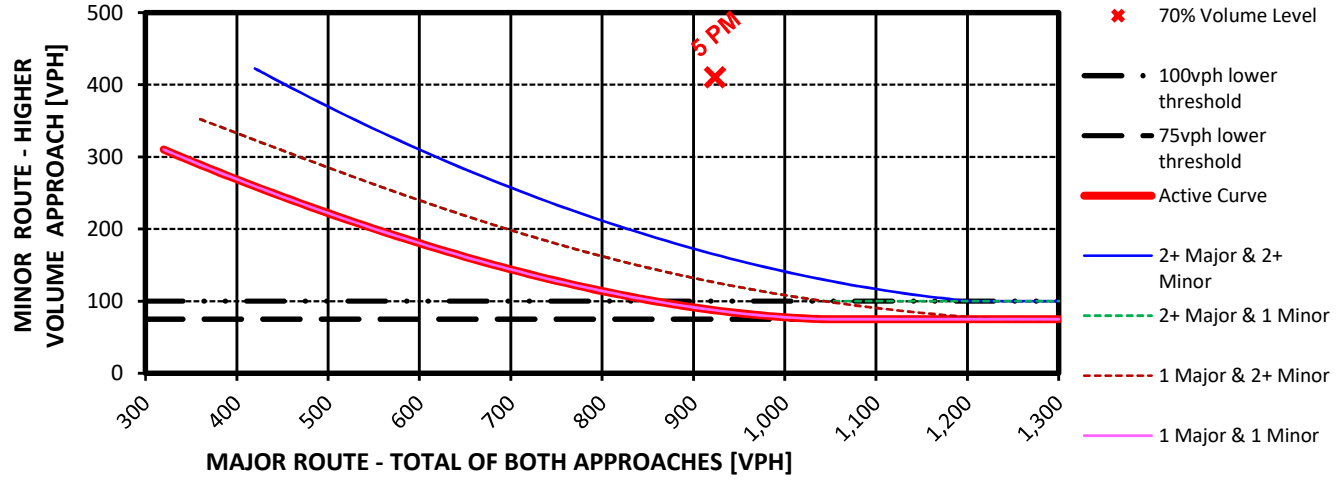
FIGURE W-3: Criteria for "100%" Volume Level



** Note: 150 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

FIGURE W-3: Criteria for "70%" Volume Level

(Community less-than 10,000 population or speeds greater-than 70 km/hr [40 mph] on Major Street)



** Note: 100 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 75 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

DELAY CRITERIA

1. Delay on Minor Approach (vehicle-hours)		
Approaches Lanes:	1	2
Delay Criteria:	4.0	5.0
Delay:		
Fullfilled? [ ] Yes [X] NO		

2. Volume on Minor Approach (veh/hr)		
Approaches Lanes	1	2
Volume Criteria	100	150
Volume :		
Fullfilled? [ ] Yes [X] NO		

3. Total Entering Volume (veh/hr)		
Number of Approaches: [ ] 3 [X] 4 or more		
No. of Approaches	3	4
Volume Criteria	650	800
Volume :		
Fullfilled? [ ] Yes [X] NO		

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

TRAFFIC SIGNAL WARRANTS

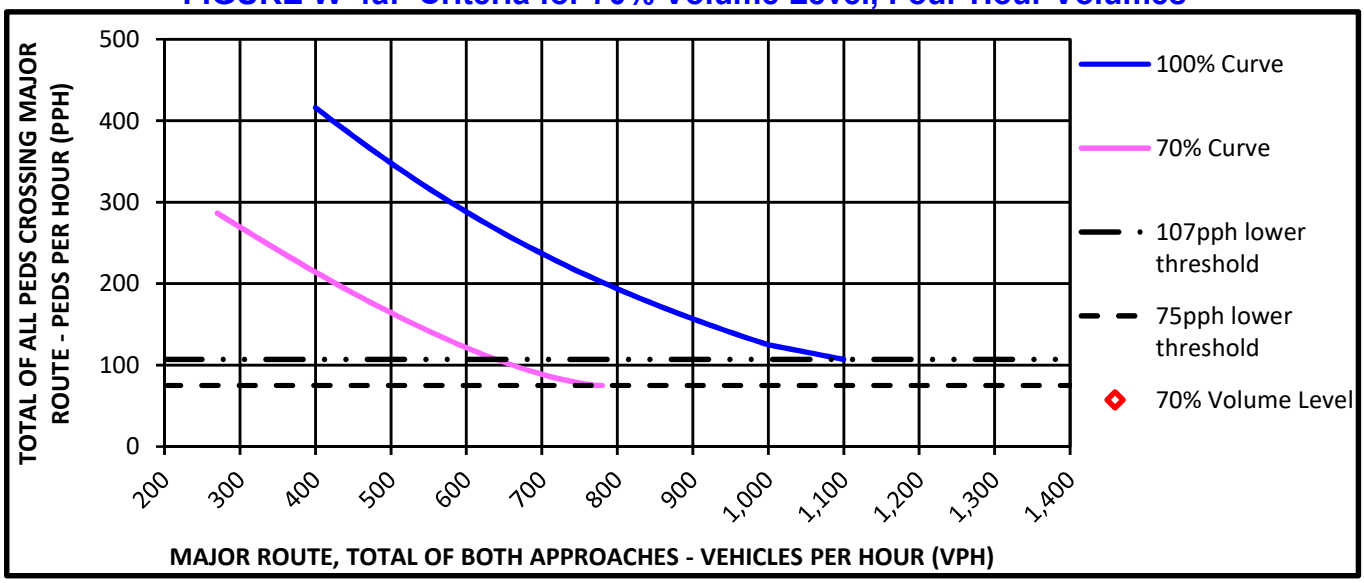
WARRANT 4 - PEDESTRIAN VOLUME

Satisfied: [ ] Yes [X] No

Pedestrian Signal Location Criteria			Fulfilled? Yes	Fulfilled? No
The nearest traffic control device (signal or STOP sign) controlling traffic on the major route is more than 90m (300 ft) away:	[ ] Yes	[X] No		X
If no above, will this proposed signal restrict the progrssive movement of traffic?	[X] Yes	[ ] No		

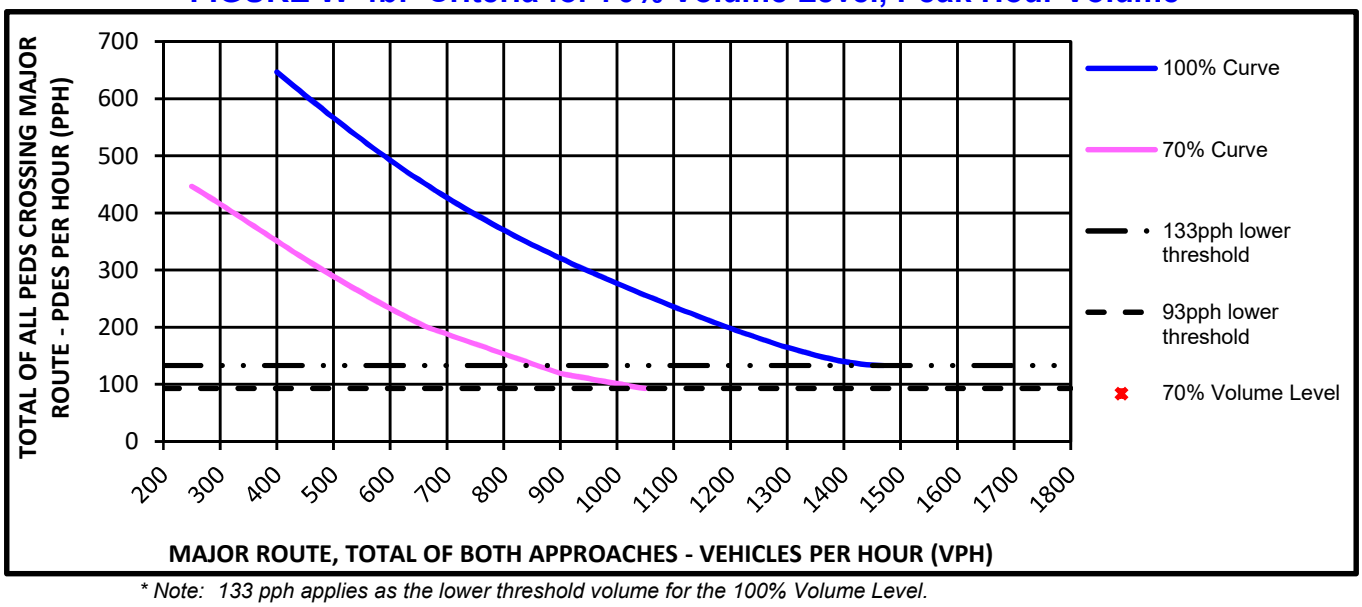
Vehicle volumes in veh/hr and Pedestrian volumnes in ped/hr	*Four Greatest Hours*				Peak Hour
SUM of Both Approaches on Major Route					
Pedestrians crossing the Major Route					

FIGURE W-4a: Criteria for 70% Volume Level, Four-Hour Volumes



** Note: 107 pph applies as the lower threshold volume for the 100% Volume Level.*
75 pph applies as the lower threshold volume for the 70% Volume Level.

FIGURE W-4b: Criteria for 70% Volume Level, Peak Hour Volume



** Note: 133 pph applies as the lower threshold volume for the 100% Volume Level.*
93 pph applies as the lower threshold volume for the 70% Volume Level.

NOTE: *The Satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANTS

WARRANT 5 - SCHOOL CROSSING

Satisfied: ☐ Yes ☒ No

This warrant is intended for application where the fact that schoolchildren crossing the major route is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word "schoolchildren" includes elementary through high school students. This warrant is satisfied if all three of the criteria below are fulfilled after remedial measures have been considered.

Any remedial measures implemented in or around the intersection to improve the safety of the students as noted in Section **4C.06 Warrant 5, School Crossing** in the MUTCD:

Criteria			Fulfilled? Yes	Fulfilled? No
1. *Enter the number of schoolchildren crossing the major route along with the hour this occurs. The hour can be any 60 minute interval (ex 2:15 PM - 3:15 PM enter 2:15 - 3:15). Requires a minimum of 20 schoolchildren durning the any hour.*	*Num. of Students*	*Highest Crossing Hour Period*		X
		-		
2. *For both the morning (AM) and afternoon (PM) periods of operation, enter the number of adequate gaps observed for each period and the number of minutes each period lasted. Requires one period to operate with fewer gaps than the number of minutes in the period.*		*Period*		X
		Minutes / *Gaps*		
	AM			
	PM			
3. *Is the nearest traffic signal along the major route more than 90m (300 ft) from this crossing?*	☐ Yes	☒ No		X
If the signal is within 90m (300 ft) of an existing signalize intersection, will it restrict progressive movement of traffic?	☒ Yes	☐ No		

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Satisfied: ☐ Yes ☒ No

Progressive movement in a coordinated signal system sometimes necessitates the installtion of traffic control signals at intersections that would not otherwise be considered in order to maintain proper paltooning of vehicles. This warrant is satisfied if the below criteria is satified as follows: criteria 1 is satisfied and either criteria 2 or 3 is satisfied.

Criteria	Fulfilled? Yes	Fulfilled? No
1. *The inclusion of this proposed signal, into the coordinated system, does not result in a signal spacing of less than 305m (1,000 ft)?*		X
2. a. *On a one-way street or a street that has traffic predominantly in one direction, are the adjacent traffic control signals so far apart that they do not provide the necessary degree of vehiclular platooning?*		X
2. b. *On a two-way street, do adjacent traffic control signals **not** provide the necessary degree of platooning and will the proposed and adjacent traffic control signals collectively provide a progressive operation?*		X

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANTS

WARRANT 7 - CRASH EXPERIENCE

Satisfied: [ ] Yes [X] No

This warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider the installation of a traffic control signal. The need for a traffic control signal shall be considered if an engineering study finds that criteria 1, 2, and 3 are met.

Criteria			Fulfilled? Yes	Fulfilled? No
1. *Adequate trial of alternatives with satisfactory observance and enforcement has fialed to reduce the crash frequency as shown below:*				
				X
2. ***How many crashes within the past 12 months?*** *For this criteria to be met, five or more reported crashes, of types suseptible to correction by the installation of a traffic control signal, must have occurred.*				X
3. *If Warrant 1A or Warrant 1B are 80 percent satisfied of the current values or if Warrant 4, 4-hour or peak, is met at the 80 percent values.*	Met? Yes	Met? No		
Warrant 1, Condition A, Minimum Vehicular Volume (80 percent satisfied):		X		X
Warrant 1, Condition B, Interruption of Continuous Traffic (80 percent satisfied):		X		
Warrant 4, Four-Hour Volume (80 percent satisfied):		X		
Warrant 4, Peak Hour Volume (80 percent satisfied):		X		

WARRANT 8 - ROADWAY NETWORK

Satisfied: [ ] Yes [X] No

This warrant is used to encourage the concentration and organization of traffic flow on a roadway network. This warrant is satisfied if one of the following 2 criteria is met and both routes meet at least on of the characteristics of a Major Route below.

Criteria			Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. *Both of the criteria to the right are required in order to be met.*	a. *Please enter the total existing, or immediately projected, entering traffic volume during the peak hour of a typical weekday. Requires a minumum of 1,000 vehicles to be met.*	**Volume**		X		X
	b. *Based on an engineering study, does the 5 year projected traffic volumes, for this location, meet one or more of Warrants 1, 2, or 3 during an average weekday? **			X		
2. *Enter the total existing, or immediately projected, entering volume for each of any 5 hours of a non-normal business day.* ***(Saturday or Sunday).*** *1,000 vph for each hour required.*		← Hour				X
		← Volume				

**** Supporting data required for verification of the projected 5 year traffic Warrants.***

A major route, as used in this signal warrant, shall have at least one of the following characteristics:		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
Characteristics of Major Routes					
1. *Is it a part of the street or highway system that serves as the principal roadway network for through traffic flow?*	*Major Route*		X		X
	** Minor Route*		X		
2. *Does it include rural or suburban highways outside, entering, or traversing a city?*	*Major Route*		X		
	** Minor Route*		X		
3. *Does it appear as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study?*	*Major Route*		X		
	** Minor Route*		X		

**** This is a minor route, but for the purposes of this Warrant, shall be considered as the other major route.***

Note: ***Supporting data shall be required to verify the routes meet one of the characteristics of a major route.***

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANTS

WARRANT 9 - INTERSECTION NEAR A GRADE CROSSING

Applicable ☐ Yes ☐ No

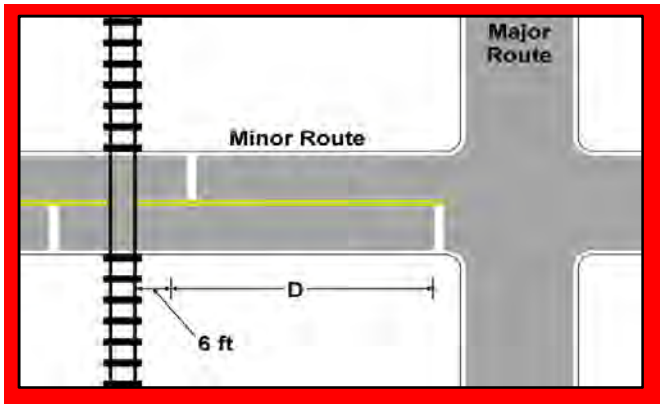
The need for a traffic control signal may be considered if an intersection that is controlled by a STOP or YIELD sign has a rail crossing within 140 feet of the stop/yield line and the highest Equivalent Minor Approach Traffic value lies above the curve represented on the graph below.

Minor Route Adjustment Factors - Enter the following:	
1. The number of occurrances of rail traffic/day:	
2. The percentage of "High-Occupancy Buses" crossing the track/day: (A high-occupancy bus is defined as a bus occupied by at least 20 people)	
3. The percentage of Tractor-trailer Trucks crossing the track/day:	

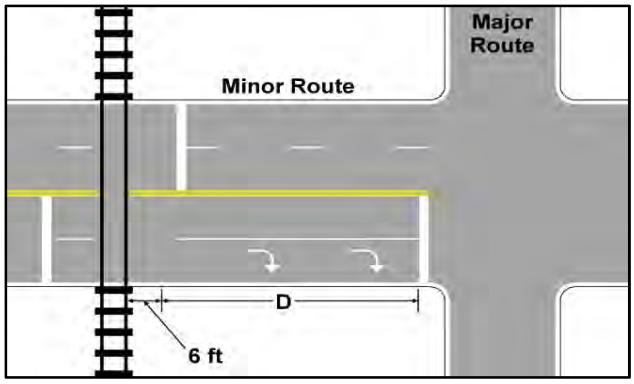
Satisfied: ☐ Yes ☐ No

Peak Hour Data		
Peak Hour	Major Route	Minor Route

Enter the distance value "D" from the STOP/YIELD bar to the track as shown below:

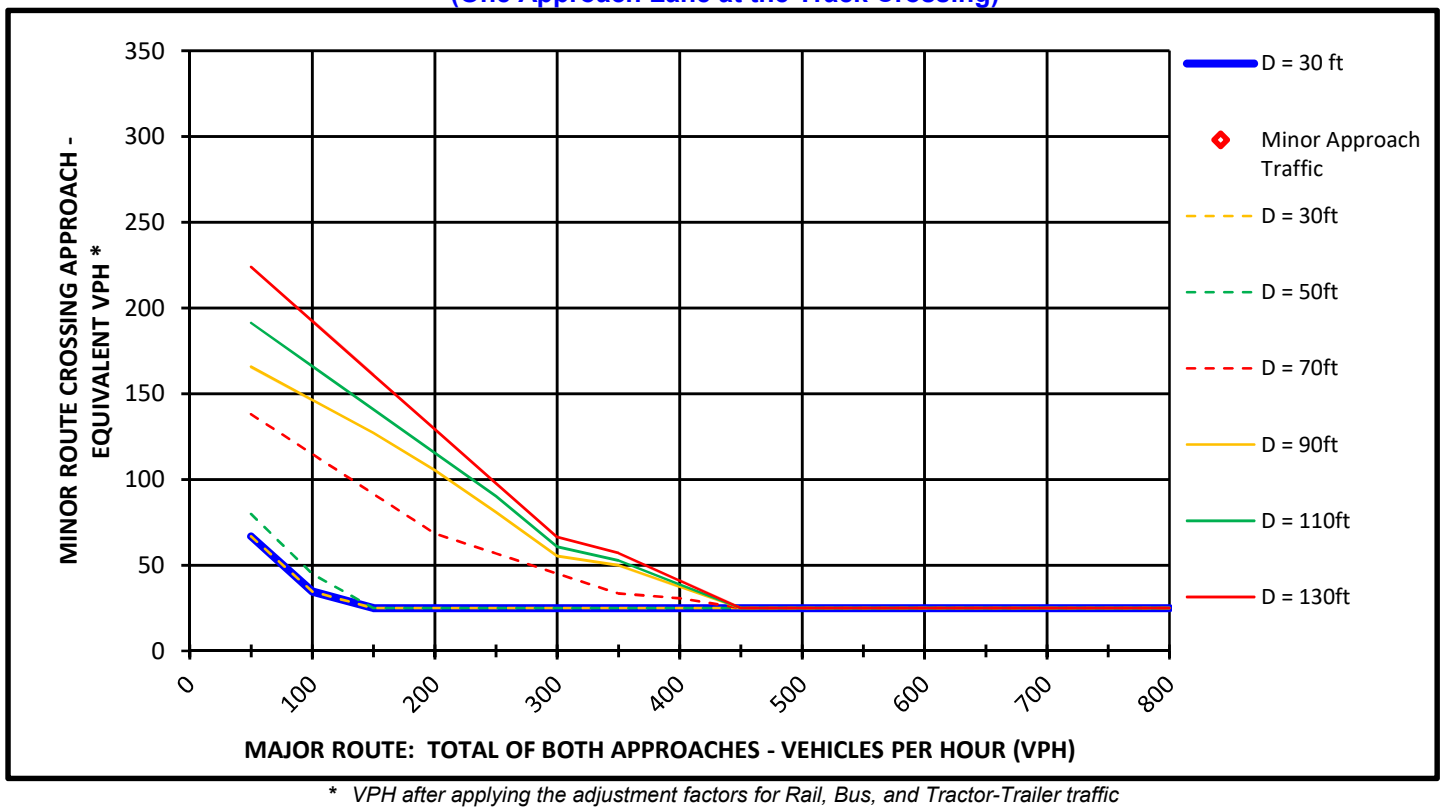


(One Approach Lane at the Track Crossing)



(Two or More Approach Lanes at the Track Crossing)

FIGURE W-9: Intersection Near a Grade Crossing
(One Approach Lane at the Track Crossing)



* *VPH after applying the adjustment factors for Rail, Bus, and Tractor-Trailer traffic*

25 vph applies as the lower threshold volume

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANT SUMMARY

City/Town: Kuna, ID
County: ADA County
Division:
Data Date:

Analysis Performed By: RB
Date Analysis Performed: 10/15/2019
Project Number if Applicable:
Weather Conditions:

Major Route: Lake Hazel — Appr. Lanes: 1
Minor Route: Locust Grove — Appr. Lanes: 1
Critical Approach Speed (mph): 50

	SATISFIED	80% Satisfied		100% Satisfied	
Warrant #1: Eight-Hour Vehicular Volume	☐ Yes ☒ No				
1A - Minimum Vehicular Volume:		☒ Yes	☐ No	☐ Yes	☒ No
1B - Interruption of Continuous Traffic:		☐ Yes	☒ No	☐ Yes	☒ No

Any Remedial Measures Tried and their Outcome.

Warrant #2: Four-Hour Vehicular Volume ☒ Yes ☐ No

Warrant #3: Peak Hour ☐ Yes ☒ No

The Unusual Case(s) that Justifies the use of this Warrant.

Warrant #4: Pedestrian Volume ☐ Yes ☒ No

Warrant #5: School Crossing ☐ Yes ☒ No

Any Remedial Measures Implemented to improve the Safety of the Students.

Warrant #6: Coordinated Signal System ☐ Yes ☒ No

Warrant #7: Crash Experience ☐ Yes ☒ No

Other Alternatives that have failed to reduce crashes.

Warrant #8: Roadway Network ☐ Yes ☒ No

Warrant #9: Intersection Near a Grade Crossing ☐ Yes ☒ No

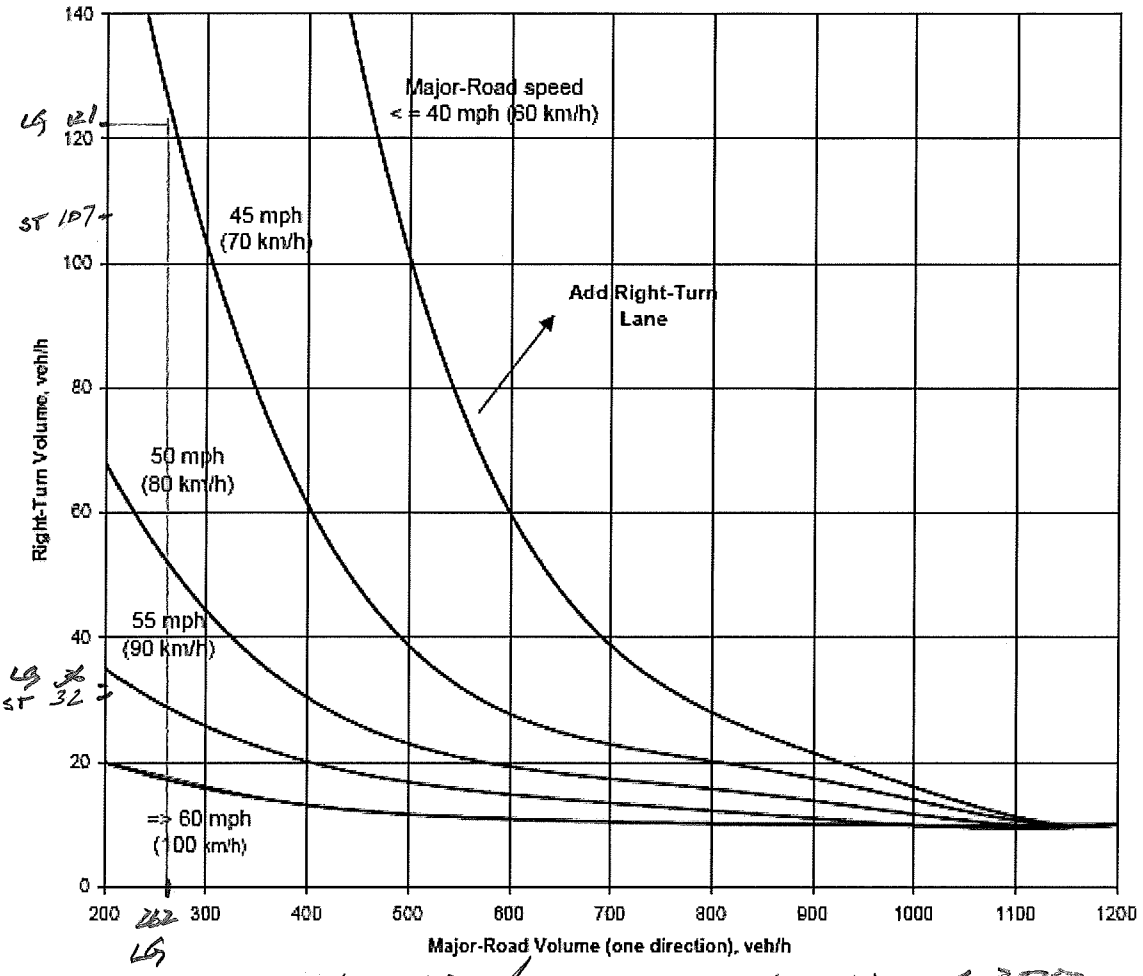
CONCLUSIONS

Warrants Satisfied: 2

Remarks:

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

Figure 6 – Right-Turn Lane Guidelines for Two-Lane Roadways



HVBB 4/2D / STROEBEL ADV VOL < 200

LOCUST GROVE – RT TURN LANE REQUIRED

The following data are required:

1. Advancing Volume (veh/hr) - The advancing volume is to include the right-turn, left-turn and through movements in the same direction as the right-turning vehicle.

2. Right-Turning Volume (veh/hr) - The right-turning volume is the number of advancing vehicles turning right.

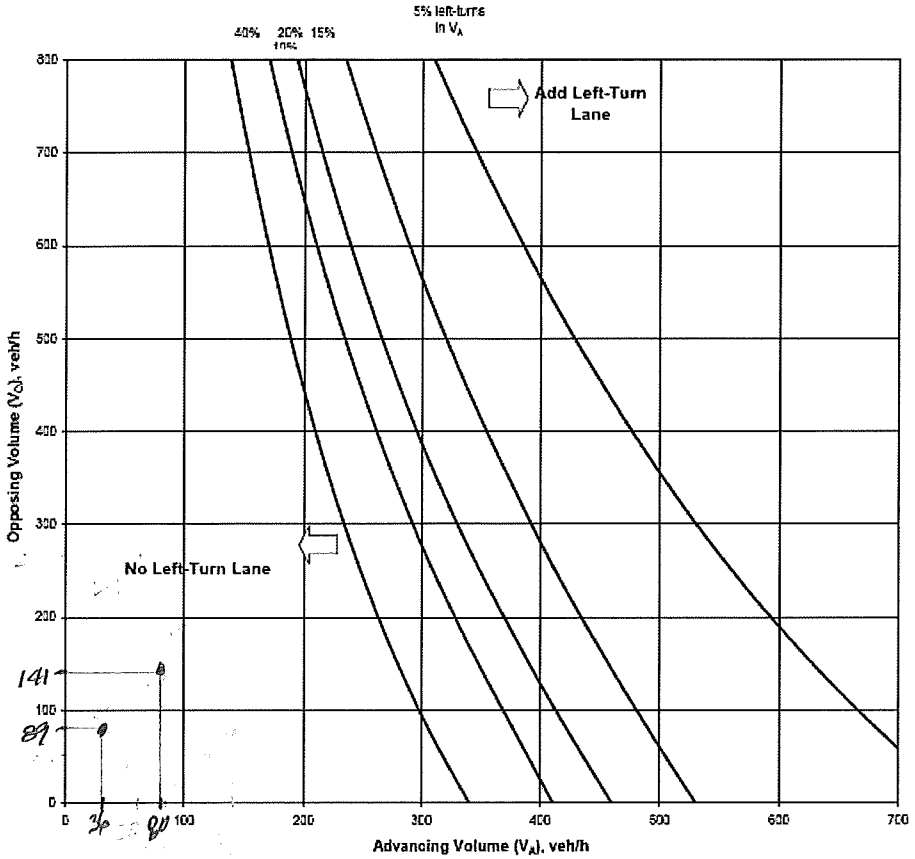
3. Operating Speed (mph) - The greatest of anticipated operating speed, measured 85th percentile speed or posted speed.

Note: Right-turn lane is not needed for right-turn volume less than 10 vph. However, criteria other than volume, e.g. crash experience, may be used to justify a right-turn lane.

If the combination of major road approach volume and right-turn volume intersects above or to the right of the speed trend line corresponding to the major road operating speed, then a right-turn lane is appropriate.

Source: NCHRP Report 279 and 457

Figure 2 – Left-Turn Lane Guidelines for Two-Lane Roads, 45 mph



HUBBARD RD/STROEBEL ACCESS
- NO LEFT TURN REQUIRED

The following data are required:

1. Opposing Volume (veh/hr) - VO - The opposing volume is to include only the right-turn and through movements in the opposite direction of the left turning vehicle.

2. Advancing Volume (veh/hr) - VA - The advancing volume is to include the right-turn, left-turn and through movements in the same direction as the left turning vehicle.

3. Operating Speed (mph) - The greatest of anticipated operating speed, measured 85th percentile speed or posted speed.

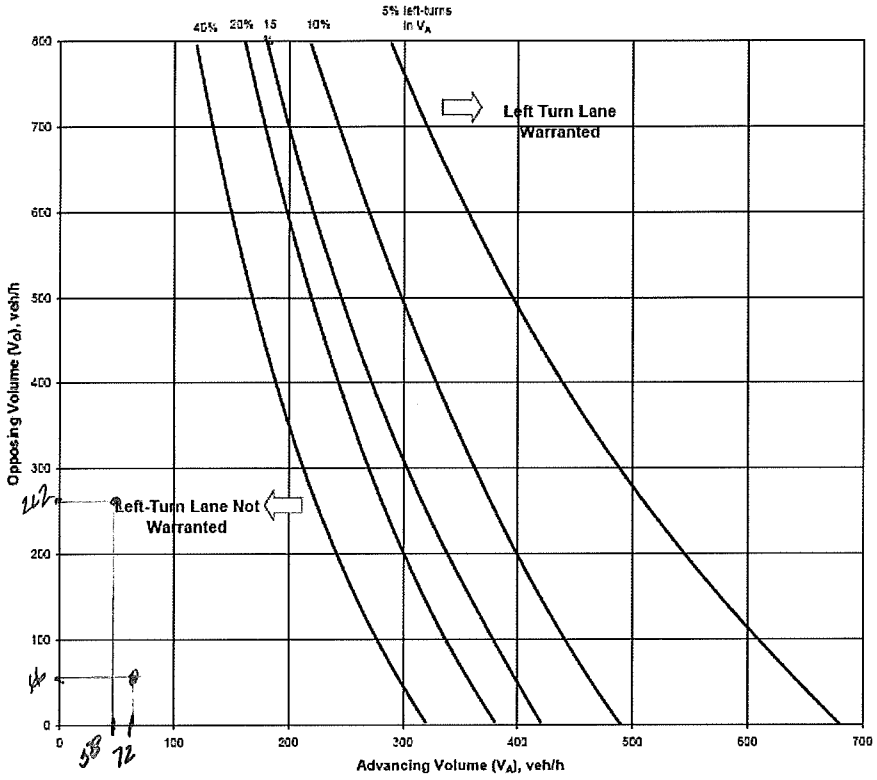
4. Percentage of left turns in VA

Left-turn lane is not needed for left-turn volume less than 10 vph. However, criteria other than volume, such as crash experience, may be used to justify a left-turn lane.

The appropriate trend line is identified on the basis of the percentage of left-turns in the advancing volume, rounded up to the nearest percentage trend line. If the advancing and opposing volume combination intersects above or to the right of this trend line, a left-turn lane is appropriate.

Source: NCHRP Report 279 and 457

Figure 3 – Left-Turn Lane Guidelines for Two-Lane Roads, 50 mph



The following data are required:

LOCUST GROVE ACCESS – NO LEFT TURN REQUIRED

1. Opposing Volume (veh/hr) - VO - The opposing volume is to include only the right-turn and through movements in the opposite direction of the left-turning vehicle.

2. Advancing Volume (veh/hr) - VA - The advancing volume is to include the right-turn, left-turn and through movements in the same direction as the left-turning vehicle.

3. Operating Speed (mph) - The greatest of anticipated operating speed, measured 85th percentile speed or posted speed.

4. Percentage of left-turns in VA

Left-turn lane is not needed for left-turn volume less than 10 vph. However, criteria other than volume, such as crash experience, may be used to justify a left-turn lane.

The appropriate trend line is identified on the basis of the percentage of left-turns in the advancing volume, rounded up to the nearest percentage trend line. If the advancing and opposing volume combination intersects above or to the right of this trend line, a left-turn lane is appropriate.

Source: NCHRP Report 279 and 457

DEVELOPMENT DATA

TOTAL AREA	96.60 ACRES
RESIDENTIAL LOTS	393
COMMON LOTS	44
TOTAL LOTS	437
COMMON AREA	14.68 ACRES (15.2%)
USABLE OPEN SPACE	11.18 ACRES (11.6%)
EXISTING ZONING	RR
PROPOSED ZONING	R-6/R-8

PLANT PALETTE

SYM	COMMON NAME	BOTANICAL NAME	SIZE
	EVERGREEN TREES		
	AUSTRIAN PINE	PINUS NIGRA	6-8' HT B&B
	BLACK HILLS SPRUCE	PICEA GLAUCA 'DENSATA'	6-8' HT B&B
	BLUE SPRUCE	PICEA PUNGENS 'GLAUCA'	6-8' HT B&B
	MOONGLOW JUNIPER	JUNIPERUS SCOPULORUM 'MOONGLOW'	6-8' HT B&B
	NORWAY SPRUCE	PICEA ABIES	6-8' HT B&B
	VANDERWOLF'S PINE	PINUS FLEXILIS 'VANDERWOLF'S'	6-8' HT B&B
	STREET TREES (CLASS III)		
	LONDON PLANETREE	PLATANUS x ACERIFOLIA	2" CAL B&B
	RED OAK	QUERCUS RUBRA	2" CAL B&B
	STREET TREES (CLASS II)		
	AUTUMN PURPLE ASH	FRAXINUS AMERICANA 'AUTUMN PURPLE'	2" CAL B&B
	SKYLINE HONEYLOCUST	GLEDITSIA TRIACANTHOS INERMIS 'SKYCOLE'	2" CAL B&B
	LITTLELEAF LINDEN	TILIA CORDATA	2" CAL B&B
	AMERICAN SWEETGUM	LIQUIDAMBER STYRACIFLUA	2" CAL B&B
	TULIP TREE	LIRODENDRON TULIPIFERA	2" CAL B&B
	ORNAMENTAL TREES (CLASS I)		
	AMUR MAPLE	ACER GINNALA 'FLAME'	2" CAL B&B
	CHANTICLEER PEAR	PYRUS CALLERYANA 'GLEN'S FORM'	2" CAL B&B
	ROYAL RAINDROPS CRABAPPLE	MALUS x 'JFS-KNS'	2" CAL B&B
	SPRINGSNOW CRABAPPLE	MALUS 'SPRINGSNOW'	2" CAL B&B
	SHRUBS/ORNAMENTAL GRASSES/PERENNIALS		
	BLACK EYED SUSAN	RUDBECKIA FULGIDA 'GOLDSTRUM'	1 GAL, 24" O.C.
	BLUE RUG JUNIPER	JUNIPERUS HORIZONTALIS 'WILTONI'	2 GAL
	CREEPING MAHONIA	MAHONIA REPENS	5 GAL
	RED FLOWER CARPET ROSE	ROSA 'FLOWER CARPET- NOARE'	5 GAL
	DWARF FOUNTAIN GRASS	PENNISETUM ALOPECUROIDES 'HAMELN'	5 GAL
	DARTS GOLD NINEBARK	PHYSOCARPUS OPULIFOLIUS 'DARTS GOLD'	1 GAL
	STELLA D'ORO DAYLILY	HEMEROCALLIS 'STELLA D'ORO'	3 GAL
	EMERALD 'N' GOLD EUONYMUS	EUONYMUS FORTUNEI 'EMERALD 'N' GOLD'	5 GAL
	ENDLESS SUMMER HYDRANGEA	HYDRANGEA ARBORESCENS 'HAHN'	5 GAL
	FINE LINE BUCKTHORN	RHAMNUS FRANGULA 'RON WILLIAMS'	5 GAL
	GOLDFLAME SPIREA	SPIRAEA x BUMALDA 'GOLDFLAME	5 GAL
	GRO-LOW SUMAC	RHUS AROMATICA 'GRO-LOW'	5 GAL
	IVORY HALO DOGWOOD	CORNUS ALBA 'BAILHALO'	5 GAL
	KARL FOERSTER REED GRASS	CALAMAGROSTIS ARUNDINACEA 'K.F.'	1 GAL
	LITTLE DEVIL NINEBARK	PHYSOCARPUS OPULIFOLIUS 'DONNA MAY'	5 GAL
	LOYALTY BLUE ENGLISH LAVENDER	LAVANDULA ANGUSTIFOLIA 'MEDGOTE BLUE'	3 GAL
	OTTO LUYKEN LAUREL	PRUNUS LAUROCERASUS 'OTTO LUYKEN'	5 GAL
	P.J.M RHODODENDRON	RHODODENDRON 'P.J.M'	5 GAL
	MAIDEN GRASS	MISCANTHUS SINENSIS 'GRACILLIMUS'	1 GAL
	SUMMERWINE NINEBARK	PHYSOCARPUS OPULIFOLIA 'SEWARD'	5 GAL
	LAWN	6' VINYL LATTICE TOP FENCE ALONG PERIMETER PROPERTY LINES, COMMON LOTS, AND SIDE LOTS (TYP).	

NOTES

1. ALL LANDSCAPE SHALL BE INSTALLED IN ACCORDANCE WITH KUNA CITY ORDINANCE REQUIREMENTS. ALL LOTS WILL COMPLY WITH KUNA CITY ORDINANCE REQUIRING ONE (1) TREE PER LOT (PROVIDED BY BUILDER AND/OR DEVELOPER).
2. ALL PLANTING AREAS TO BE WATERED WITH AN AUTOMATIC UNDERGROUND IRRIGATION SYSTEM.
3. TREES SHALL NOT BE PLANTED WITHIN THE 10-CLEAR ZONE OF ALL ACHD STORM DRAIN PIPE, STRUCTURES, OR FACILITIES. SEEPAGE BEDS MUST BE PROTECTED FROM ANY AND ALL CONTAMINATION DURING THE CONSTRUCTION AND INSTALLATION OF THE LANDSCAPE IRRIGATION SYSTEM. ALL SHRUBS PLANTED OVER OR ADJACENT TO SEEPAGE BEDS TO HAVE A ROOT BALL THAT DOES NOT EXCEED 18" IN DIAMETER. NO LAWN SOD TO BE PLACED OVER DRAINAGE SWALE SAND WINDOWS (IF PRESENT).
4. NO TREES SHALL IMPEDE THE 40' STREET AND DEPARTURE VISION TRIANGLES AT ALL INTERSECTIONS. NO CONIFEROUS TREES OR SHRUBS OVER 3' HIGH AT MATURITY WILL BE LOCATED WITHIN VISION TRIANGLE OR ACHD ROW. AS TREES MATURE, THE OWNER SHALL BE RESPONSIBLE FOR PRUNING TREE CANOPIES TO MEET ACHD REQUIREMENTS FOR MAINTAINING CLEAR VISIBILITY WITHIN 40' STREET AND DEPARTURE VISION TRIANGLE. TREES SHALL BE PLANTED NO CLOSER THAN 50' FROM STOP SIGNS.
5. LANDSCAPE AND TREES IN FRONT OF BUILDING LOTS ON INTERIOR STREETS TO BE COMPLETED DURING CONSTRUCTION OF THESE LOTS. TREE LOCATIONS MAY BE ALTERED TO ACCOMMODATE DRIVEWAYS AND UTILITIES. TREES SHALL NOT BE PLANTED WITHIN 5' OF WATER METERS OR UTILITY LINES.
6. PLANT LIST IS REPRESENTATIVE AND SUBJECT TO SUBSTITUTIONS OF SIMILAR SPECIES BY OWNER, SUBJECT TO CITY FORESTERS PRE-APPROVAL. PLANTING BED DESIGN AND QUANTITIES MAY BE ALTERED DURING FINAL PLAT LANDSCAPE PLAN DESIGN. BURLAP AND WIRE BASKETS TO BE REMOVED FROM ROOT BALL AS MUCH AS POSSIBLE, AT LEAST HALFWAY DOWN THE BALL OF THE TREE. ALL NYLON ROPES TO BE COMPLETELY REMOVED FROM TREES.

LANDSCAPE CALCULATIONS

LANDSCAPE BUFFER ARE REQUIRED TO BE PLANTED WITH THE FOLLOWING PLANTS PER 100 LINEAR FEET: TWO (2) SHADE TREES, THREE (3) EVERGREEN TREES, AND TWELVE (12) SHRUBS. EACH REQUIRED SHADE TREE MAY BE SUBSTITUTED FOR TWO (2) FLOWERING/ORNAMENTAL TREES.

LOCATION	BUFFER WIDTH	LENGTH	REQUIRED	PROVIDED
S. STROEBEL RD.	25'	1380' / 100' =	28 TREES	28 TREES (21 SHADE TREES + 14 ORNAMENTAL TREES)
			42 EVERGREENS	46 EVERGREENS
			165 SHRUBS	165+ SHRUBS
S. LOCUST GROVE RD.	25'	1140' / 100' =	24 TREES	30.5 TREES (25 SHADE TREES + 11 ORNAMENTAL TREES)
			36 EVERGREENS	39 EVERGREENS
			145 SHRUBS	145+ SHRUBS

LANDSCAPE CALCULATIONS (cont.)

LOCATION	BUFFER WIDTH	LENGTH	REQUIRED	PROVIDED
E. BLOUNT ST. (NORTH)	20'	2530' / 100' =	48 TREES	53.5 TREES (44 SHADE TREES + 14 ORNAMENTAL TREES)
			72 EVERGREENS	73 EVERGREENS
			265 SHRUBS	265+ SHRUBS
E. BLOUNT ST. (SOUTH)	20'	2360' / 100' =	48 TREES	50.5 TREES (43 SHADE TREES + 15 ORNAMENTAL TREES)
			71 EVERGREENS	71 EVERGREENS
			264 SHRUBS	264+ SHRUBS
TOTAL NUMBER OF BUFFER TREES:				421 TREES
TOTAL NUMBER OF COMMON AREA TREES:				392 TREES
TOTAL NUMBER OF TREES				813 TREES

JENSENBELTS ASSOCIATES

MARCH 23, 2020

NORTH

SCALE 1" = 120'

OWNER OF RECORD	DEVELOPER	PLANNER/CONTACT
TJ JOHNSON 2425 N. LOCUST GROVE RD. KUNA, IDAHO 83634	TRILOGY DEVELOPMENT, INC. 9838 W. CABLE CAR ST. BOISE, IDAHO 83709	SHAWN BROWNLEE TRILOGY DEVELOPMENT, INC. 9838 W. CABLE CAR ST. BOISE, IDAHO 83709

LEDGESTONE SOUTH SUBDIVISION

KUNA, ID

PRELIMINARY PLAT LANDSCAPE PLAN