

# Memorandum

Date: November 2, 2021  
To: Lilith Vespier, City of Leavenworth  
From: Kara Hall and Michael Adamson, Fehr & Peers  
Subject: **Land Capacity Supplemental Analysis for the Comprehensive Plan Update**

SE20-0747

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The City of Leavenworth is considering an update to the Comprehensive Plan Land Use Designations that would combine the current Residential Low Density 12,000 District (RL 12) and Residential Low Density 10,000 District (RL 10) and designate the districts as Residential Low Density 8,000 (RL 8).

To supplement this Comprehensive Plan update and address questions raised by the community regarding how changes in residential density might increase traffic congestion, a traffic analysis based on work completed for the Transportation Element (TE) update in 2020 has been completed.

The traffic analysis to supplement the zoning change to RL 8 was based on a land capacity analysis completed by the City and 2040 traffic forecasts developed for the TE update. Data from the land capacity analysis and 2040 traffic forecasts was used to develop new traffic forecasts that reflect the development potential within the City and regional growth expected to occur over the next 20 years. Updated traffic forecasts were then used to analyze how key intersections within the City will operate in 2040.

This memorandum includes a summary of the land capacity analysis completed by the City, which was used to estimate the number of new vehicle trips that might be generated during the weekday PM peak hour, defined as the hour with the highest traffic volumes between 4PM and 6PM, and the weekend peak hour, defined as the hour with the highest traffic volumes on a summer Sunday between 11AM and 3PM. This is followed by the changes in delay and Level of Service (LOS) at key intersections with the addition of new trips from the increase in housing.

## Land Capacity Analysis

The City completed a land capacity analysis to understand the availability of land to accommodate the projected population over the next 20 years. The analysis was based on



existing and under-utilized parcels within the existing City limits. While the results of the analysis will be impacted by external influences such as fluctuating market factors, regional economy, and landowner choice, it provides a basis for the City to plan and prepare for future growth. This includes understanding the ability of the transportation system to accommodate this potential growth.

To estimate residential land capacity, net developable land within the City and Urban Growth Area (UGA), vacant and under-utilized land was identified based on information available from the County Assessor's office. A factor of 0.70 was applied to land within the City to account for right-of-way (ROW), market factors, and an environmental factor. Within the UGA a factor of 0.9 was applied. The net developable land was then multiplied by the maximum density in each land use designation to determine the potential number of residential units that may be added. The results of the City's analysis are shown in **Table 1**. As shown, it was assumed that 25% of new developments would include an accessory dwelling unit (ADU) based on changes to the City's ordinances to allow for a more streamlined process when constructing ADUs. The analysis found that a total of 1,330 new housing units could be constructed within the City and UGA.

**Table 1. Land Capacity Analysis Summary**

Zoning	Total Acres	ROW 10%	Market 50%	Environment 10%	Net Developable	Density <sup>2</sup>	Potential Units
RL6 Vacant	45.21	4.52	22.61	4.52	13.56	7.26	98
RL6 Underutilized	155.43	15.54	77.72	15.54	46.63	7.26	339
MF Vacant	66.93	6.69	33.47	6.69	20.08	21.78	437
MF Underutilized	11.1	1.11	5.55	1.11	3.33	21.78	73
UGA <sup>1</sup>	Total Acres	ROW 20%	Market 50%	Environment 20%	Net Developable	Density <sup>2</sup>	Potential Units
RL8 Vacant land	108.07	21.61	54.04	21.61	10.81	5.45	59
RL8 Underutilized	107.72	21.54	53.86	21.54	10.77	5.45	59
<b>TOTAL:</b>					<b>105.18</b>		<b>1,064</b>
<b>Total with 25% ADUs:</b>							<b>1,330</b>

<sup>1</sup>Approximately ten acres within the City on undeveloped land

<sup>2</sup>Density is defined as dwelling units (lot size) per acre: RL 6 = (43560/6000); RL 8 = (43560/8000); MF = (43560/2000)

Source: City of Leavenworth



## Estimated 2040 Traffic Conditions with Rezoning

### *Developing Updated Forecast*

To adjust the 2040 forecasts developed for the TE update, the growth caused by rezoning was compared to growth expected between 2020 and 2040 at key intersections. Intersections evaluated as part of this assessment include:

- US 2 and Ski Hill Drive
- US 2 and 9th Street
- US 2 and Chumstick Highway
- Ski Hill Drive and Pine Street

Traffic forecasts for the TE update were based on anticipated population growth within Chelan County and Leavenworth. An annual growth rate of 1% per year was applied on regional routes (US 2 and Chumstick Highway) and 0.5% per year was assumed for all City streets.

For the supplemental analysis, the potential growth based on rezoning was compared to 2040 forecasts developed for the TE update. In instances where the growth forecast was lower than the calculated growth caused by rezoning the forecast was adjusted upward to reflect development conditions under the proposed rezoning.

The number of new trips expected to occur from the potential increase in residential units was calculated using trip generations for single-family homes and multi-family homes in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 10<sup>th</sup> Edition*. As shown in **Table 2**, a total of 983 new trips could be expected from the increase in density.

**Table 2. Trip Generation Summary**

Land use	Units	Trip Generation Rates			Trips Generated			
		Trips per unit	Percent Entering	Percent Exiting	Total	Enter	Exit	
Single-Family Homes	555	0.99	63%	37%	549	346	203	
Multi-Family Homes (Includes ADUs)	775	0.56	63%	37%	434	273	161	
					<b>Total</b>	<b>983</b>	<b>619</b>	<b>364</b>



*2040 Rezoning Conditions*

Using the updated 2040 forecasts, traffic conditions were evaluated at the intersections identified as the primary locations that would be impacted by rezoning. **Table 3** shows the results of this analysis compared with the results of the baseline 2040 forecast from the TE update. Any areas where delay and LOS differs from the baseline are bolded and italicized. As shown, with the increase in residential units, delay would increase substantially at two intersections, US 2 and Ski Hill Drive, where delay experienced by vehicles on Ski Hill Drive would increase, and US 2 and 9<sup>th</sup> Street. While delay would increase slightly at the US 2 and Chumstick Highway intersection, the analysis indicates that the local intersection of Pine Street and Ski Hill has sufficient capacity to accommodate the potential growth. It should be noted that as part of the TE update, the City identified a project to install traffic control at the US 2 and Ski Hill Drive intersection and restriping and traffic signal upgrades at US 2 and Chumstick Highway intersection. When constructed, these improvements would decrease delay and improve operations at these intersections under both the Baseline and Rezoning conditions.

**Table 3. 2040 LOS Results Comparison**

Intersection	Baseline Forecast (TE Update)		With Rezoning Forecast	
	Delay (seconds)	LOS	Delay (seconds)	LOS
<b>Summer Sunday Peak</b>				
US 2 and Ski Hill Drive <sup>1</sup>	> 180	F	<b>&gt;180</b>	<b>F</b>
US 2 and 9th Street	67	E	<b>103</b>	<b>F</b>
US 2 and Chumstick Highway	138	F	<b>139</b>	<b>F</b>
Ski Hill Drive and Pine Street	10	B	10	B
<b>Weekday Peak</b>				
US 2 and Ski Hill Drive	23	C	<b>37</b>	<b>E</b>
US 2 and 9th Street	22	C	<b>54</b>	<b>D</b>
US 2 and Chumstick Highway	33	C	<b>36</b>	<b>D</b>
Ski Hill Drive and Pine Street	9	A	<b>10</b>	<b>B</b>

<sup>1</sup>Intersection is expected to experience high-levels of delay due to the side-street stop control. With an increase in vehicles using the side-street, delay is expected to increase under the rezoned scenario.

**Summary**

Findings from the rezoning analysis indicate that an increase in density would result in higher delay at the primary US 2 intersections within the City of Leavenworth, while capacity at the Ski



Hill Drive and Pine Street intersection could accommodate an increase in development with minimal changes in delay or LOS. Intersection improvements identified in the TE Update would decrease delay and improve operations at two intersections on US 2 under the Rezoning scenario. While this analysis considers growth within the City based on the land capacity analysis, as development occurs a Traffic Impact Analysis should be completed to understand the direct impacts that may result from specific developments.