

# Technical Memorandum

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**Date:** October 24, 2016

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**To:** Eric Hansen, City of Stevenson

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**Cc:** File

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**Project:** General Sewer Plan Update

**Project Number:** 135-48600-16001

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**Subject:** Residential and Non-Residential Growth Projections

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The purpose of this memorandum is to provide a summary of the residential and non-residential growth estimates made for the City of Stevenson's (the City's) General Sewer Plan Update. These estimates are the result of an iterative collaboration between the City's Planning Department and Tetra Tech.

## **Residential Population Growth**

A projection of future population growth was provided by the City of Stevenson Planning Department, based on historic growth rates for the City and Skamania County. This projection shows population increasing from 1,530 in 2016 to 1,901 in 2040. This equates to a growth rate of approximately 0.87% per year. The City's estimates on population per household vary based on the source, we have assumed it to be approximately 2.21 at the current density.

## **Equivalent Residential Units (ERUs)**

Wastewater flows are contributed by residential and commercial/industrial/public sources, and therefore are affected by planning area population as well as planning area non-residential development. To simplify wastewater planning and ensure consistency, non-residential sources are often estimated as a comparable residential source, using the concept of the equivalent residential unit (ERU). An ERU represents the amount of wastewater contributed by an average residential household in the planning area.

Based on winter water usage records provided by the City, we have calculated that average water use in the City is 55 gallons per capita per day (gpcd), and have assumed that wastewater generation is roughly equal to water use. Using the average household size of 2.21 persons per household, this means that one ERU is equivalent to about 122 gallons per day of wastewater. It is currently estimated that the City has 489 residential sewer ERUs and 506 non-residential sewer ERUs.

## **Residential ERU growth**

Residential ERUs will typically grow at a faster rate than overall population because new development can be assumed to occur in sewered areas of the City. As a result, using the population projections discussed above and the average household size of 2.21, the number of residential ERUs will increase by 168 by 2040, an average annual growth rate of approximately 1.19%. For sewer modeling purposes, we have made the assumption that this

increase in residential ERUs will be faster in the years 2017 – 2020, due to the 83-lot Chinidere residential development currently being built.

In addition to new growth, there are two sewer basins in the City that will receive sewer service as a result of planned sewer extensions (Loop Road and Iman Cemetery Road). Within these basins, we assumed that all parcels will convert to sewer from septic over a period of 5 years after each sewer extension is constructed. The Loop Road sewer extension is assumed to be constructed in 2021 and result in a total of 54 new sewer ERUs, while the Iman Cemetery Road sewer extension is assumed to be constructed in 2026 and result in 32 new sewer ERUs.

**Future non-residential ERU growth**

Non-residential sewer ERUs in the City include commercial, industrial, and public sewer users. In general, growth in the City is assumed to be approximately proportional to residential growth. However, the City has recently experienced significant growth in the beverage industry (breweries, distilleries, etc.). While beverage sector users are currently estimated to represent only 88 of the 506 non-residential ERUs, these user’s high growth potential and often high-strength wastewater mean that these ERUs have been broken out as a subset of non-residential ERUs when considering future growth.

Beverage ERUs are assumed to grow at a rate twice that of the residential ERUs, or an average of 2.38% each year. This results in an additional 71 ERUs by 2040. In addition to this steady growth, Backwoods Brewing Company, new to the City in 2016, has stated that they intend to expand significantly in the next six years. Based on current estimates of Backwoods wastewater flow and an assumption of steady growth, Backwoods will add an additional 276 ERUs by 2040. Combining Backwoods and other beverage ERUs, a total of 347 new beverage ERUs will be added by 2040.

All other non-residential ERUs are assumed to grow at a rate equal to that of residential ERUs, or an average of 1.19% each year. This will result in an additional 144 ERUs by 2040.

**Residential and Non-Residential Growth – Summary**

The table and chart below summarize the growth of residential and non-residential ERUs in Stevenson.

Year	City Population	Residential Sewer ERUs			Non-Residential Sewer ERUs					Total ERUs
		New ERUs from septic conversion	New ERUs from dev't	Total	New Beverage ERUs	Total Beverage ERUs	New Non-Beverage ERUs	Total Non-Beverage ERUs	Total	
<b>Current</b>	1,530	0	0	489	0	88	0	418	506	<b>995</b>
<b>2016</b>	1,543	0	3	492	48	136	5	423	559	<b>1,052</b>
<b>2017</b>	1,557	0	21	513	48	184	5	428	612	<b>1,126</b>
<b>2018</b>	1,570	0	21	534	48	233	5	433	666	<b>1,200</b>
<b>2019</b>	1,584	0	21	555	48	281	5	438	719	<b>1,275</b>
<b>2020</b>	1,598	0	20	575	48	329	5	443	773	<b>1,348</b>
<b>2021</b>	1,612	11	3	590	48	378	5	449	827	<b>1,416</b>
<b>2022</b>	1,626	11	3	604	2	380	5	454	834	<b>1,439</b>
<b>2023</b>	1,640	11	4	619	2	383	5	459	842	<b>1,461</b>
<b>2024</b>	1,655	11	4	634	3	385	5	465	850	<b>1,484</b>
<b>2025</b>	1,669	10	4	647	3	388	6	470	858	<b>1,506</b>

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2026	1,684	7	4	658	3	390	6	476	866	1,525
2027	1,698	7	4	669	3	393	6	482	875	1,544
2028	1,713	6	4	679	3	396	6	487	883	1,563
2029	1,728	6	4	689	3	399	6	493	892	1,581
2030	1,743	6	4	700	3	402	6	499	901	1,600
2031	1,758	0	4	704	3	405	6	505	910	1,614
2032	1,774	0	4	708	3	408	6	511	919	1,627
2033	1,789	0	4	712	3	411	6	517	928	1,640
2034	1,805	0	4	717	3	414	6	523	937	1,654
2035	1,821	0	4	721	3	417	6	530	947	1,668
2036	1,836	0	4	726	3	421	6	536	957	1,682
2037	1,852	0	4	730	3	424	6	542	966	1,696
2038	1,869	0	4	734	4	428	6	549	976	1,711
2039	1,885	0	4	739	4	431	7	555	986	1,725
2040	1,901	0	5	743	4	435	7	562	997	1,740
Increase	371	n/a	n/a	254	n/a	347	n/a	144	491	745

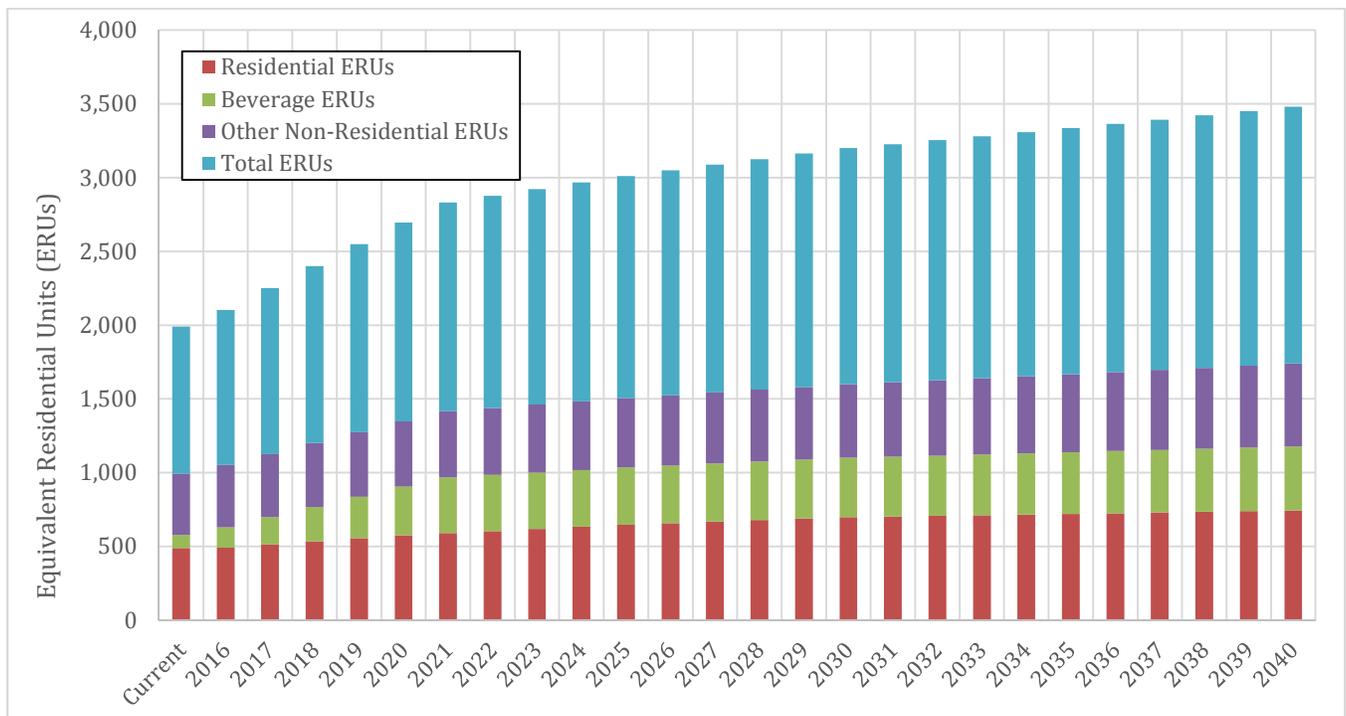


Figure 1. ERU Growth Chart