

Alpine WW Rate Study Summary

Background Information

- The rate study is as accurate as the figures that were given to MAP.
- There are a total of 683 accounts used for the rate study – 16 commercial rates and 667 residential rates.
- The current rates are residential rate at \$54.00.
- Usage was used from July 2022 through June 2023.
- Financial information came from the 2021, 2022, and 2023 actuals, and FY2024 actuals from July through May.

Rate Study

- With the agreement, the city will collect \$144,000 annually from Melvin Brewing.

Rate Analysis

- The 2021, 2022, and 2023 actuals are showing a balanced budget.
- Melvin Brewing accounts for 11.4% of the daily water consumption in the entire Alpine water system.
- Based on MAP's projection, the wastewater revenue collected from Melvin Brewing should be a minimum of the total pretreatment costs (\$32,743 FY24)
- 80% of the sludge hauling costs = (\$36808 in FY24),
- the cost of debt service for the pretreatment facility
- and a minimum of 20% expenses = (\$ 111200FY24) of the total WWTP expenses annually.
- Residential Rates
 - The single family residential ERU of \$54 appears to be adequate currently.
- Commercial Rates
 - The commercial and business sewer rates in the structure seem to be adequate currently.
- The average operating ratio for the last three years is 0.99.
 - Operation ratio should be at least 1.2.

Recommendations/Suggestions

- Based on MAP's projection, the wastewater revenue collected from Melvin Brewing should be a minimum of the total pretreatment costs (\$32,743 FY24)
- 80% of the sludge hauling costs = (\$36808 in FY24),
- the cost of debt service for the pretreatment facility
- and a minimum of 20% expenses = (\$ 111200FY24) of the total WWTP expenses annually.
- Maximize revenue and minimize expenses.
 - Maintain a 1.2 debt coverage ratio.
- Other Recommendations:
 - Asset Management Plan
 - Adjust rates periodically to keep up with inflation and costs

Melvin Brewing Impact WW Evaluation Memo JVA 06.12.23

The following are points noted and copied from the WW Memo by MAP staff during the review of the WW Evaluation Memo

It was JVA's impression that the Brewery staff have administered best management practices and employed measures that have separated the waste streams to minimize the strength and quantity of wastewater discharged to the WWTP.

Table 1 – Resources for Review

Item	Reference	Format	Description
1	Melvin Brewing Effluent Study Memo - from Modification	Word	Study commissioned by Melvin regarding impact to WWTP
2	Alpine MBR Permeate Volumes 2014-2022	PDF	List of permeate volumes for Alpine
3	Melvin Brewing BOD TSS FLOW 2020-2022	PDF	List of BOD, TSS, weekly flow for Melvin wastewater
4	Melvin WW Evaluation Memo 2018 - from TO Engineers	PDF	Study commissioned by Melvin regarding impact to WWTP
5	Melvin WW Evaluation Memo 2018 - from Rendezvous	PDF	Study commissioned by Alpine regarding impact to WWTP List of Alpine BOD, TSS, flow List of Melvin BOD, TSS, flow
6	Melvin Payments	PDF	Flow and payments from Melvin to Alpine
7	Melvin WW Evaluation Memo 2022 - from Rendezvous	PDF	Study commissioned by Alpine regarding impact to WWTP List of sludge hauling volumes
8	Discharge Permit	PDF	Alpine discharge permit
9	Approximate Sludge Volume Wasted 2011-2022	Excel	List of sludge hauling volumes
10	Alpine and Melvin composite sampling	Excel	List of composite samples from Alpine Melvin of COD, TKN, BOD

Prior to Melvin coming on-line in 2016, the membranes required clean in place (CIP) once per year; since then, the frequency of CIP has steadily increased to four times per year.

As discussed in the previous reports, the Town use to land apply the digested solids prior to the Brewery coming online, however, now that the WAS loadings are so much greater it is not possible to land apply anymore due to much reduced sludge holding times and less volatile solids destruction. Since then, solids have had to be hauled to other treatment facilities that can receive the solids for final disposal.

The thickened solids concentration inside the digester is maintained at approximately 2 to 2.5 percent and consequently are hauled for disposal at that concentration. **There has been a steady increase of 10-fold in Waste Activated Sludge (WAS) production since 2016.** At the time of the visit, the operation staff were in the process of starting up MBR train #2 being the first time since the plant became operational of using both trains for treatment. The MSW vault discharges in increments of 500 gallons three to four times a day and may discharge up to 800 gallons during high-flow scenarios.

The annual average BOD₅ concentration in 2014 to 2015 was 212 mg/L and increased to 332 mg/L for 2016 to 2022.

Table 2 – Influent BOD₅ Concentrations to Alpine WWTP

Month	BOD ₅ Concentration (mg/L)		BOD ₅ Concentration (mg/L)							Monthly Averages	
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2014-2015	2016-2022
January	262	234	355	458	241	302	456	288	242	248	334
February	188	184	273	587	98	238	298	283	449	186	318
March	196	269	108	283	538	302	234	372	213	233	293
April	146	225	213	251	180	365	215	405	285	186	273
May	202	268	181	334	631	219	346	211	252	235	311
June	169	238	270	590	608	172	370	465	328	203	400
July	386	153	453	336	265	358	329	539	392	269	382
August	219	206	198	132	517	379	552	308	205	212	327
September	103	243	610	339	243	361	434	316	597	173	414
October	139	187	272	223	200	260	365	269	407	163	285
November	235	240	195	311	301	225	205	307	303	238	264
December	175	217	631	404	330	383	357	238	305	196	378
Annual Average	202	222	313	354	346	297	347	332	331	212	332
Annual Max	386	269	631	590	631	383	552	597	597	269	414

The annual average TSS concentration in 2014 to 2015 was 166 mg/L and increased to 227 mg/L for 2016 to 2022.

While higher than typical municipal wastewater, the loading from Melvin represented only an average of 15 percent of the total loading to the WWTP. **The TSS load was an average of 36 percent of the total contribution to the WWTP. However, the average annual organic loading of the WWTP increased 134 percent after the brewery went online. Even if the focus narrows to just the increase from 2015 to 2016, the loading increase was 100 percent.** Looking at Alpine data alone indicates that a significant change to the influent wastewater composition occurred after 2016. The sampling data from Melvin does not support this, which creates a confusing narrative.

In an attempt to explain this discrepancy, chemical oxygen demand (COD) samples were taken. More

samples should continue to be taken to reinforce these findings. Most municipal plants work with BOD as their measure of water quality. BOD measures the amount of oxygen required by microorganisms to breakdown organic materials. COD measures the amount of oxygen required breakdown organic materials by chemical reaction (oxidation). The two values are related, with COD always being the higher value. Typical municipal wastewater has a ratio of between 1.8 to 2.2 of COD:BOD. The two COD/BOD paired samples taken from the Alpine influent show a ratio of 2 and 6. The sample collected 12/15 and 12/16 for the Alpine WWTP was a grab sample meaning that it may not be representative. Based on the composite sample results to date of Melvin COD/BOD paired samples had a COD:BOD ratio range between 7 to 11. Table 5 below summarizes the COD and BOD sampling data.

Table 5 – Alpine WWTP and Melvin Sampling

Date Collected	Parameter	Units	Alpine WWTF (Influent)	Melvin Brewery (Influent)	COD:BOD Alpine	COD:BOD Melvin	Notes
12/15/2022	COD	mg/l	605	6450	6	11	Alpine grab and Melvin composite. Sample days are different
12/16/2022	BOD ₅	mg/l	98	593			
3/14/2023	COD	mg/l	900		2.4		COD composite and BOD ₅ composite. Sample days are different
3/15/2023	BOD ₅	mg/l	376				
5/8/2023	COD	mg/l	620	5000	2*	8*	Alpine composite (3 grabs) and Melvin composite
	BOD ₅	mg/l	-	-			
5/15/2023	COD	mg/l	700	4200	2*	7*	Alpine composite (3 grab) and Melvin composite
	BOD ₅	mg/l	-	-			
5/22/2023	COD	mg/l	1350	4400	4*	7*	Alpine composite (3 grabs) and Melvin composite
	BOD ₅	mg/l	-	-			

* Missing BOD₅ sample data: BOD₅ value set as 337 mg/l for Alpine WWTP Influent (average for 2020 to 2022) and 642 mg/l for Melvin Influent (average for 2020 to 2022)

- Data not yet received

This memo documents that there are two indicators that show that influent waste loads from Melvin have increased WAS quantities produced at the WWTP a minimum of eight times greater than the WAS quantities that would be generated of Alpine only influent wastewater.

For context, if 100,000 gallons of WAS produced; a minimum volume of 80,000 gallons would be produced from Brewery portion of the influent stream and 20,000 gallons produced from Alpine portion of the influent stream.