TABLE OF CONTENTS

1.0 INTRODUCTION

The Grand Water & Sewer Service Agency (GWSSA or Agency) consists of three separate entities, which include the Spanish Valley Water & Sewer Improvement District, the Grand County Water Conservancy District and the Grand County Special Service Water District. The current service boundary for the Agency generally falls between the boundaries of Moab City and San Juan County in Spanish Valley, Utah (see Appendix B Exhibit 1 - Location Map).

Sunrise Engineering, Inc. has prepared for the Agency the Impact Fee Methodology and Written Analysis for the Culinary Water and Wastewater systems pursuant to Title 11, Chapter 36 *Impact Fees Act of the Utah Code Annotated (1953*, as amended).

In 2007, the Agency had prepared an Impact Fee Analysis for the both the culinary and wastewater systems. The purpose of this report is to update those analyses, and bring them into compliance with recent changes in the impact fee law.

This study will review the impact fees previously set for the culinary and wastewater systems and determine if these fees are generating the required funds to sustain future growth. It is recommended that the impact fees be reviewed every 5 years to ensure that proper fees are being assessed.

Local political subdivisions with a population, or serving a population of less than 5000 as of the last federal census, as is the case with the Agency, therefore they need not comply with the impact fee facilities plan (previously referred to as the capital facilities plan) requirements of the Impact Fees Act. However, the Agency will be required to ensure that the impact fees imposed by them are based on reasonable plans. It is, therefore, the purpose of this report to provide a reasonable plan on which to base the impact fees.

In order to determine impact fees on development activities that are fair and equitable to both the existing users and future users, separate analyses have been prepared for the culinary and wastewater systems. Each analysis will break down the cost associated with maintaining an adequate level of service throughout the system as new development enters onto the system. These costs will be implemented into the budget for each utility to determine the impact fees associated with each system.

Throughout this report, references will be made to Equivalent Residential Connections (ERCs), an ERC is defined as a connection with the equivalent amount of water used or wastewater discharged to the system by an average single family residential connection. ERCs can then be used to equate the water used and wastewater produced by commercial, industrial, and other large water using entities and wastewater producing entities to a single residential connection. ERCs are used in the determination of system demands as well as fair and equitable impact fees and usage rates, and are factored into other analyses as required for design purposes.

1.1 General Information

1.1.1 Culinary Water System

In 1997, the Agency completed a Culinary Water System Master Plan that contained information similar to the impact fee facilities plan requirements of the Impact Fee Act. This study resulted in the construction of culinary water system improvements including distribution line upgrades, a new

storage tank, and a new well. This major culinary water system improvements project was funded through a grant, two 20 year low interest loans that are anticipated to be paid off in 2021 and 2022, and one 40 year loan that is anticipated to be paid off in 2038. The majority of this project was constructed to accommodate growth. This project was designed to meet the needs of 3282 ERCs. Table 1.1.1 below indicates how that funding was received.

Table 1.1.1 - Water Project Funding - 2000

	Bonds	Grants	SVW&SID	Totals
Original Funding - 10/20/00				
Self Participation			420,000.00	420,000.00
Self Part - State Lands			330,000.00	330,000.00
RD	400,000.00	400,000.00		800,000.00
Div Drinking Wtr (SRF)	2,400,000.00	600,000.00		3,000,000.00
CIB		350,000.00		350,000.00
Add'l funding - wells 4/8/02			**bal to reduce Loan & Grant**	
Div Drinking Wtr (SRF)	268,000.00	67,000.00	112,000.00	447,000.00
Sub-Totals	3,068,000.00	1,417,000.00	862,000.00	
			Grand Total	**5,347,000.00**

1.1.2 Wastewater System

The Spanish Valley Water & Sewer Improvement District installed Phase I and II of their sewer system in the early 1980's. The sewer collection system was designed to serve the central part of the valley as far south as White Lane on Spanish Valley Drive. Nearly the entire sewer collection system put in at this time was 8" PVC pipe with concrete manholes.

Growth in the Valley was relatively slow during the 1980's and picked up significantly during the early 1990's. It was at this time that the Agency realized expanding the sewer collection system to homes outside of their current service area was needed. This brought about the 1996 Sewer Collection Expansion Project. The 1996 project included installing a 12 inch main outfall line to handle the increased flows of the Agency, installing several miles of new collection piping to non-sewered areas and installing 3 metering manhole stations to meter the flow entering Moab City's wastewater system. This project was completed to provide capacity for growth. Several funding agencies provided bonding for this project, which is still being repaid. This included a 20 year, 25 year, and a 40 year loan. The final payments for which will be made in 2017, 2022, and 2036 respectively. This project was designed to meet the needs of 2941 ERCs. Table 1.1.2 below indicates how that funding was received.

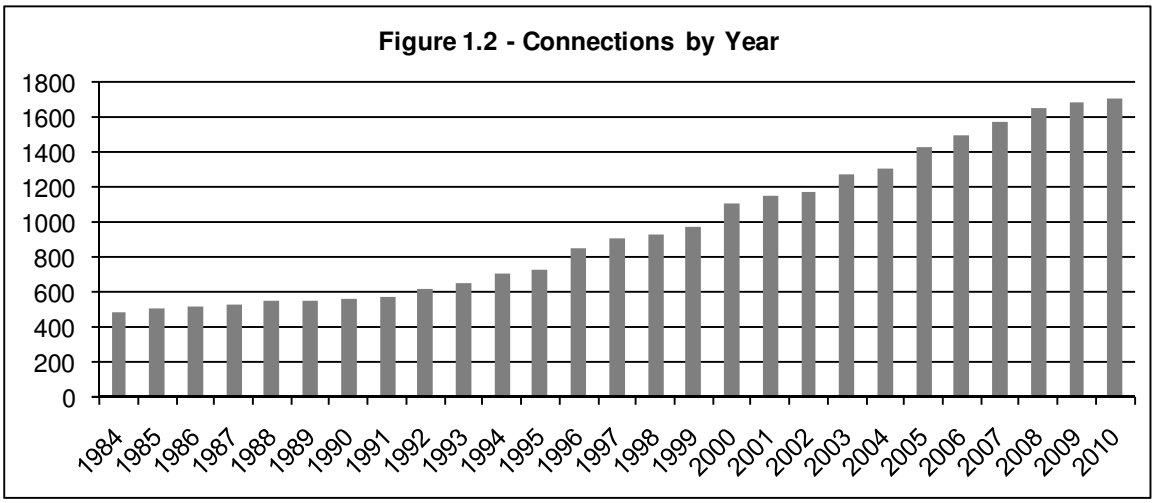
Table 1.1.2 - Sewer Project Funding - 1996

	Bonds	Grants	Self Participation	Totals
DWQ	835,000.00	400,000.00		1,235,000.00
CIB	225,000.00	225,000.00		450,000.00
RD	400,000.00	550,000.00		950,000.00
RD	189,000.00			189,000.00
SVW&SID			420,000.00	420,000.00
Sub-Totals	1,649,000.00	1,175,000.00	420,000.00	
		Grand Total		**3,244,000.00**

1.2 Population Projection

One element in developing an impact fee is predicting the Agency's population growth rate. The population growth rate gives the planner foresight the demands that will be placed on the system and the capacity needed to accommodate the Agency with an adequate level of service. It should be noted that if the projected population growth rate is incorrect, the impact fee should still be valid. For example, if the actual growth rate is higher than predicted, the impact fee funds will grow at a much higher rate, but the system improvements will need to be installed sooner than expected also. The scenario would be just the opposite if the growth rate were smaller than anticipated. Either way, the impact fee funds and system improvements should balance each other out.

As this area does not have separate census data, one way to access growth rate is by the number of connections on the system. Based on system connections the constant annual growth rate (CAGR) is calculated to be 5% between 1984 and 2010 see figure 1.2 below. Tables 1.2.1, and 1.2.2 below, apply the 5% growth rate to the existing ERCs for the water and wastewater systems, respectively, in order to determine the number of ERCs throughout the planning period.



The constant annual growth rate (CAGR) is calculated by dividing the ending population by the beginning population, which is then taken to the power of one (1) divided by the number of years from which one(1) is subtracted or:

CAGR%=100%×((Ending Population/Beginning Population)^(1/(Year Ending-Year Beginning)))-1
CAGR%=100%×((1,703/475)^(1/ (2010-1984)))-1
CAGR%=100%×0.05
CAGR%=5%

Table 1.2.1 - Population Projection Water System				
Fiscal Year	*Est. Res. Conn.	*Est. Com. & County Conn.	*Est. Total Conn.	*Est. ERC's
2010	1,588	115	1,703	1,858
# 2011	1,667	121	1,788	1,951
2012	1,750	127	1,877	2,048
2013	1,838	133	1,971	2,151
2014	1,930	140	2,070	2,258
2015	2,027	147	2,174	2,372
## 2016	2,128	154	2,282	2,490
2017	2,234	162	2,396	2,614
2018	2,346	170	2,516	2,745
2019	2,463	178	2,641	2,882
2020	2,586	187	2,773	3,026
2021	2,715	197	2,912	3,177
2022	2,851	207	3,058	3,336
2023	2,994	217	3,211	3,504
2024	3,144	228	3,372	3,679
2025	3,301	239	3,540	3,863
2026	3,466	251	3,717	4,056
2027	3,639	264	3,903	4,258
2028	3,821	277	4,098	4,471
2029	4,012	291	4,303	4,695
2030	4,213	305	4,518	4,930
2031	4,424	320	4,744	5,177

* Figures are rounded to the nearest whole number at projected annual rate of growth

Current Year

Impact Fee Period

Table 1.2.2 - Population Projection Wastewater System				
Fiscal Year	*Est. Res. Conn.	*Est. Com. & County Conn.	*Est. Total Conn.	*Est. ERC's
2010	1,651	120	1,771	1,933
# 2011	1,734	126	1,860	2,030
2012	1,821	132	1,953	2,132
2013	1,912	139	2,051	2,238
2014	2,008	146	2,154	2,351
2015	2,108	153	2,261	2,468
2016	2,213	161	2,374	2,591
## 2017	2,324	169	2,493	2,721
2018	2,440	177	2,617	2,857
2019	2,562	186	2,748	2,999
2020	2,690	195	2,885	3,149
2021	2,825	205	3,030	3,307
2022	2,966	216	3,182	3,472
2023	3,114	226	3,340	3,646
2024	3,270	238	3,508	3,828
2025	3,434	249	3,683	4,020
2026	3,606	262	3,868	4,222
2027	3,786	275	4,061	4,432
2028	3,975	289	4,264	4,654
2029	4,174	303	4,477	4,887
2030	4,383	318	4,701	5,131
2031	4,602	334	4,936	5,388

* Figures are rounded to the nearest whole number at projected annual rate of growth

\# Current Year

Impact Fee Period

Per the Culinary Water System Master Plan prepared in 1997 by Sunrise Engineering, Inc. the average commercial user in Spanish Valley had a winter water-use equivalent to that of 2.35 residential connections. Therefore, for projecting ERCs, 1 commercial connection will be considered to be, on average, 2.35 ERCs.

1.3 Design Period

The impact fee calculation will include projects, if any are needed, which are anticipated to be constructed within the next six (6) years. However, the upgrades will be designed for greater than six years, as it is fiscally irresponsible to design improvements for only the near future.

For the water system, the 20-year design period will be checked to determine which projects need to be completed for the source, water rights, storage, and treatment portions of the system. However, for the distribution portion of the system a water model is constantly updated and checked as individual demands (such as subdivisions) are submitted for review. It is recommended that the Agency continue to require that new additions to the system be modeled to ensure sufficient capacity. The water improvements project that was designed in the year 2000 was designed around

3,282 ERCs, which corresponds to a little over 10 years of growth. Therefore, there are no planned improvements to the distribution system within the next six years. As it is not known where loads will be added to the distribution system, loads placed on certain parts of the system may affect the system differently, therefore, it is recommended that those loads continue to be modeled as the Agency becomes aware of them. This will ensure that necessary improvements are made on an ongoing basis; it is also recommended that they these improvements be added as amendments to the impact fee study as they arise so that impact fees may be applied to those projects.

For the sewer collection system the design ERCs for the 1999 project was 2,941 ERCs, the design period however, will be based on the existing sewer model, which included the anticipated future subdivisions. The addition of the future subdivisions accounts for 3,480 ERCs, or for a little over 10 years of growth.

1.4 Prepaid Impact Fees

The Agency has collected prepaid impact fees for both the water and wastewater systems over the years. These fees may have been paid in cash or other in lieu of methods such as the construction of facilities needed for growth. For the water system, the Agency has collected 396 ERCs of prepaid impact fees of which 270 ERCs are from the School Institutional Trust Lands Administration (SITLA). For the wastewater system, they have collected around 175 ERCs worth of prepaid impact fees. These funds were then applied to facilities needed for growth or to make bond payments on bonds from past projects that were needed for growth.

The effect this has on the current system is essentially to increase the current ERCs by the number of impact fees that have been prepaid, as for current facilities it is as if the capacity is already allocated. However, this will not affect the timeline for future expansion as these ERCs will come on to the system as part of the projected growth rate, and are therefore not included in growth rate projections. These prepaid impact fees will be included in the calculation of the number of ERCs served by the existing project bonds, as they will be subtracted from the related ERCs served by each system's improvements, in the same way existing ERCs are subtracted from that number.

2.0 CULINARY WATER SYSTEM

2.1 Background Information

In 2007, the Agency completed a culinary-water impact fee study. At that time, no projects were identified that would expand the system to serve more users.

Residents of Grand County, as of the date of this report, are charged a monthly base rate of 18.50 per ERC per month, while residents of San Juan County are currently charged $19.50 per month. They then have a tiered fee schedule for usage. As the fee schedule is subject to change, please refer to the current version of the fee schedule for updated values. The fee schedule is available at http://grandwater.org/Billing.aspx, or by contacting their office. Their current fee schedule also includes the current impact and connection fees. The current impact fee total $4,712.32, and the current connection fee is $705 for a ¾" connection and $919 for a 1" connection.

The source for all culinary water for the Agency is groundwater withdrawn from the underlying aquifer through wells. Water is then collected at two (2) storage sites and supplied to residents through the culinary distribution system. A summary of the system was provided in the 2007 study, and was used as a source for the information provided below.

The Agency's culinary water system consists of five primary components including water rights, source, water treatment, storage and distribution. For the purpose of this report, these system components will be referred to as sub-systems. In 2000, the Agency expanded and upgraded its culinary water system. These upgrades were constructed primarily for growth; however, according to the master plan completed prior to that project, about 10% of the costs of these system improvements were to fix existing problems with the system.

The present components within the three subsystems owned and operated by the Agency are itemized in Table 2.1 below.

Table 2.1 -- GWSSA Culinary Water System

Storage Tanks		**Wells/ Springs**	
Name	Capacity (gal)	Name	Rate (gpm)
South Concrete Tank	3,000,000.00	Chapman Well	1,350
Steel Tank	1,000,000.00	Spanish Valley Well	220
		George White Well #4	1,000
		George White Well#5	575
Total	4,000,000.00	Total	3,145
Piping		**Pressure Reducing Valve Stations**	
Name	Length(ft)	Zone	Number
2"	292	1	0
4"	11,478	2	1
6"	146,853	3	2
8"	30,506	4	1
10"	5,798	5	3
12"	33,047	6	3
14"	24,362	7	3
16"	10,763		
Total	251,329	Total	13

The primary purpose of revisiting the culinary water impact fees is to bring the impact fees into compliance with current impact fee law, as the law has been modified since the previous impact fee study was completed. An additional purpose is to determine if the Agency is generating sufficient funds to pay for past improvement projects related to growth, and to save for future improvement needs that will be required as growth continues.

As part of this analysis, the existing system will be analyzed to determine the future needs throughout the next 10 years based on a projected growth rate of 5%.

2.1.1 Service Areas

The service area includes the geographic area served by the water system as shown in Appendix B Exhibit 2 - Water System Map, and areas in close proximity to the existing water system. This service area may be extended into San Juan County as additional parts of Spanish Valley are added to the system.

2.2 Existing System Analysis

The Agency's culinary water system will be evaluated to determine the future needs of the system. The cost of these future needs is expected to, primarily, be borne by future growth through the application of impact fees.

ERCs will be used in calculating the deficiencies of the system in relation to the expected population at the end of the planning period. One ERC is equivalent to one average household water connection. The amount of water that is used by one ERC is equal to the water that the average household connection uses. In order to equate commercial users to ERCs, a usage must be determined. This usage will be the amount of water the average household uses in one month.

Table 2.2 below contains a little over a year's worth of flow data. From this data, it can be seen that residences in the Agency use on average 206 gpd/ERC indoors and 377 gpd/ERC outdoors.

Table 2.2 - Water flows March 2010 - March 2011								
	George White			Spanish Valley			Combined	
Flow	Total K Gallons	Peak GPM	Average GPM	Total K Gallons	Peak GPM	Average GPM	Total K Gallons	Average GPM
3/16/10 totalizer	417,568			677,359				
4/20/10 totalizer	425,684			687,132				
useage	8,116	379	160.97	9,773	1,243	193.83	17,889	354.80
5/20/10 totalizer	435,150			703,243				
useage	9,466	541	219.12	16,111	849	372.94	25,577	592.06
6/22/10 totalizer	447,837			730,776				
useage	12,687	475	284.46	27,533	1,285	617.33	40,220	901.79
7/23/10 totalizer	459,854			762,592				
useage	12,017	513	269.44	31,816	1,325	713.36	43,833	982.80
8/19/10 totalizer	469,390			788,872				
useage	9,536	400	245.14	26,280	1,382	675.58	35,816	920.72
9/22/10 totalizer	479,687			817,555				
useage	10,297	532	216.78	28,683	1,182	603.85	38,980	820.63
10/20/10 totalizer	487,491			833,934				
useage	7,804	449	193.65	16,379	980	406.43	24,183	600.07
11/18/10 totalizer	493,295			840,766				
useage	5,804	421	138.85	6,832	349	163.44	12,636	302.30
12/20/10 totalizer	498,703			846,266				
useage	5,408	402	117.31	5,500	420	119.31	10,908	236.62
1/20/11 totalizer	504,052			852,034				
useage	5,349	290	119.93	5,768	354	129.33	11,117	249.26
2/18/11 totalizer	509,028			857,603				
useage	4,976	279	119.04	5,569	366	133.23	10,545	252.27
3/21/11 totalizer	514,621			864,481				
useage	5,593	223	125.40	6,878	403	154.22	12,471	279.62
Total	97,053			187,122			284,175	
Total Annual Flow	284,175 K Gallons						current ERC	1951
Total Annual Flow	872 Acre-Feet							
average winter use/ERC							206	GPD/ERC
average summer use/ERC							583	GPD/ERC
average indoor(in.) = average winter use							206	GPD/ERC
average outdoor(out.)= averge summer- average winter=							377	GPD/ERC

2.2.1 Water Rights

The current production sources for the Agency's culinary water system include four culinary wells. This includes the Chapman Well, Spanish Valley Well, and George White Wells number 4 and 5. As was shown in table 2.1, the combined source capacity is 3,145 gpm. The Agency currently owns approved water rights totaling 1,488.8 Acre-Feet associated with the existing culinary wells. There is much more paper water right associated with these wells, however additional water right work would be necessary to get the additional paper water right approved.

Table 2.2.1 shows the approved water right that is attached to the points of diversion that are connected to the culinary water system. This value is based on the Water Rights 40 Year Plan completed by Sunrise Engineering in 2007. There are two elements to water rights:

(1) – the rate of diversion allowed expressed as flow in cfs or gpm
(2) – quantity of diversion allowed expressed in volume in Acre-Feet per year (AF).

As the rate of diversion is not defined for all of the water rights in table 2.2.1, it will be assumed that the rate of diversion is sufficient to supply the source capacity as discussed in the Water Source Analysis section of this document.

Table 2.2.1 - Existing Usable Culinary Water Right

Source	right #	AF	use	Status
George White Well #4 &5	a33475	92.3	M	approved
	05-3343	395.17	I,S	approved
	05-3344	36.33	I	approved
Chapman and SV wells	05-906	936.65	M	approved
	a26151	28.35	M	approved
Total Irr./Stock W.R. (should apply to outdoor use only)		=		**432** AF
Total Municipal Water Right (used for any municipal use)		=		**1057** AF
Total Water Right		=		**1488.8** AF

note: there is much more water right than this, but it is either unapproved, or is attached to wells not currently connected to the culinary system or is surface water.

A portion of outdoor watering is now accomplished by a secondary watering system, and by individual wells with separate water rights. Therefore, a portion of the total connections will not be applied to the outdoor water rights. The water rights not associated with the culinary system will not be evaluated in this report.

2.2.3 Water Source

The Agency maintains and operates four culinary wells; including the Chapman Well, the Spanish Valley Well, George White Well #4 and George White Well #5. These four wells provide a combined pumping capacity of 3145 gpm.

2.2.4 Water Storage

The Agency currently has two storage tanks: a 3,000,000-gallon reinforced concrete tank and a 1,000,000-gallon steel tank, for a total storage capacity of 4,000,000 gallons.

2.2.5 Distribution System

The culinary distribution system is constantly expanding due to growth. Distribution lines range in pipe diameters from 2" to 16". There is currently in excess of 251,000 feet of distribution line. The breakdown of pipe size and quantity is shown in table 2.1, with the majority of the pipe being 12" and smaller. The upgrades to the system that were completed around the year 2000 were intended to serve approximately 3,282 ERCs.

2.3 Water System Requirements and Recommendations

2.3.1 Water Rights Requirements and Recommendations

2.3.1.1 Water Rights Requirements

In accordance with Section R309-510 of the Utah State Administrative Codes for Public Drinking Water Systems, the indoor water right requirement is 146,000 gallons per year per ERC. The annual indoor water right requirement is calculated as follows:.

$$ERC \times (146{,}000 \text{ gal/year}) \times (1 \text{ ft}^3/7.48\text{gal}) \times (1 \text{ AF}/43{,}560 \text{ ft}^3) = \text{Indoor Required (AF)}$$

The annual Outdoor Water Right Requirement is calculated by multiplying the number of ERCs by 2.69 Acre-ft per year per irrigated acre, and then multiplying it by an estimated irrigated acreage per ERC of 1 irrigated acre per 10 ERCs. This is based on the current average outdoor water use divided by the estimated number of current ERCs that use the culinary system for outdoor use. As a portion of the outdoor requirement is now supplied by the secondary pressurized irrigation system and private wells, for the purpose of this report it is estimated that approximately 95% the total ERCs connected to the culinary system do and will continue to use culinary water for outdoor use. There are also about 150 current connections to the secondary system, which will not be included in ERCs associated with outdoor water requirements. This same assumption will also be used for projected future water requirements.

$$ERC \times 2.69 \text{ AF/ERC/Irr. Acre} \times 1 \text{ Irr. Acre}/10 \text{ ERC} = \text{Outdoor Required (AF)}$$

The Required water right for current and future use is therefore:

Existing Water Right Requirements

Indoor Use:

$$1{,}951 \text{ ERC} \times \frac{146000 \text{ gal.}}{\text{ERC year}} \times \frac{1 \text{ ft}^3}{7.48 \text{ gal}} \times \frac{1 \text{ AF}}{43560 \text{ ft}^3} = 874 \text{ AF}$$

Outdoor Use: (assuming outdoor connections are 95% of indoor connections and 150 ERC use some form of secondary irrigation)

$$1{,}703 \text{ ERC} \times \frac{1 \text{ acre}}{10 \text{ ERC's}} \times \frac{2.69 \text{ AF}}{\text{Irrigated acre}} = 458 \text{ AF}$$

Total Existing Required Culinary Water Right	**1,332** AF
Existing Culinary System Water Right Surplus= 1488.8 AF -1332 AF =	**156 AF**

Future Water Right Requirements for Projected 6-year growth

Indoor Use:

$$2{,}614 \text{ ERC} \times \frac{146000 \text{ gal.}}{\text{ERC year}} \times \frac{1 \text{ ft}^3}{7.48 \text{ gal}} \times \frac{1 \text{ AF}}{43560 \text{ ft}^3} = 1{,}171 \text{ AF}$$

Outdoor Use: (assuming outdoor connections are 95% of indoor connections and 150 ERC use some form of secondary irrigation)

$$2{,}333 \text{ ERC} \times \frac{1 \text{ acre}}{10 \text{ ERC's}} \times \frac{2.69 \text{ AF}}{\text{Irrigated acre}} = 628 \text{ AF}$$

Total Projected Required Culinary Water Right **1,799** AF

Projected Culinary System Water Right Deficit= 1488.8 AF -1799 AF = **(310) AF**

Future Water Right Requirements for Projected 20-year growth

Indoor Use:

$$5{,}177 \text{ ERC} \times \frac{146000 \text{ gal.}}{\text{ERC year}} \times \frac{1 \text{ ft}^3}{7.48 \text{ gal}} \times \frac{1 \text{ AF}}{43560 \text{ ft}^3} = 2{,}320 \text{ AF}$$

Outdoor Use: (assuming outdoor connections are 95% of indoor connections and 150 ERC use some form of secondary irrigation)

$$4{,}768 \text{ ERC} \times \frac{1 \text{ acre}}{10 \text{ ERC's}} \times \frac{2.69 \text{ AF}}{\text{Irrigated acre}} = 1{,}283 \text{ AF}$$

Total Projected Required Culinary Water Right **3,603** AF

Projected Culinary System Water Right Deficit= 1488.8 AF -3603 AF = **(2,270) AF**

2.3.1.2 Water Right Recommendations

Section 2.2.1 demonstrated that the Agency currently owns an approved water right of 1,488.8 Acre-Feet attached to the existing culinary water system. The current water right requirement is 1,332 Acre-Feet. In 2017, it is projected that, the Agency will require 1,799 Acre-Feet of water. Moreover, in 2031, it is projected that, the Agency will require 3,603 Acre-Feet of water for the culinary water system. Based on this, the Agency does not have sufficient approved water right to meet the culinary needs throughout the planning period.

It is recommended that the Agency immediately begin the change application process to convert water right that has not yet been approved, or is not approved for municipal use to usable approved water right. It is anticipated that the most economical option would be to gain approval of up to the remaining portion of water right 05-906 for use in the culinary water system. This water right has been historically approved. However, in a previous change application, only a portion of the original water right was approved. That water right was approved with a note, which in essence, stated that the remainder of the water right may be approved upon indication of need and a lack of, significant, detrimental impact on other wells in the area. Both this report and the 40-year plan that is on record with the division of

water rights demonstrate the need for this additional water, and the existing wells did not have a significant drawdown during test pumping.

This additional water right could provide sufficient municipal water right for at least the next six years. Beyond that point, it would eventually be necessary to seek additional methods of providing water right for indoor and outdoor use. The next step would be to submit a change application to convert the water right tied to the culinary water system under water right numbers 05-3343 and 05-3344 from irrigation and stock to municipal use, in order to provide sufficient water right for future indoor use. It is estimated that the cost to research, and to take the water right through the change application process will be about $15,000. This amount should also account for legal fees associated with the process. This would provide the culinary water system with up to an additional 1,235 acre-feet of water right.

As the existing wells have the ability to pump 3,145 gpm, (3,145 gpm × 1.613 AF/year/gpm=5,073 AF/year). The existing wells have the ability to pump more than the additional water right plus the existing water right (1,488.8 AF+1,235 AF = 2,723.8 AF), and it is therefore reasonable to use full amount of the additional water right. This demonstrates the need, the ability to use, and the lack of detrimental impact, as there is not significant draw down during the pumping process.

Therefore, for planning purposes a 1,235 AF increase in capacity will be used to determine the additional ERCs that can be served by the new well.

$$\text{ERCs Served} = \frac{\text{Additional Water Right}}{\text{(Indoor requirement /ERC+ Outdoor requirement/ERC)}}$$

Indoor requirement per ERC = (146,000 gal/year)×(1 ft^3/7.48gal)×(1 AF/43,560 ft^3) =0.448 AF

Outdoor requirement/ERC 2.69 AF/ERC/Irr. Acre × 1 Irr. Acre/10 ERC = 0.269 AF/ERC

$$\text{ERCs Served} = \frac{\text{1,235 AF}}{\text{((0.448 AF) + (0.269 AF))/ERC}} = \text{1,722 ERCs}$$

Therefore, it is projected that this water right will be able to provide an additional 1,722 ERCs worth of usable water right capacity in addition to the ERCs that can be served by the exiting water right. The combination of this and existing water right capacity represents sufficient capacity for beyond 10 years of projected growth.

In the long term, it is recommended that the secondary irrigation system be expanded so that water right from sources other than culinary grade water sources may be used to offset the outdoor water right requirements.

2.3.2 Water Source Requirements and Recommendations

2.3.2.1 Water Source Requirements

Utah State Administrative Codes of Public Drinking Water Systems R309-510-7 requires that the minimum indoor use per connection per day used for source sizing be 800 gallons.

$$\text{ERC} \times 800 \text{ gpd /ERC} \times 1 \text{ day}/1440 \text{ min} = \text{Indoor required (gpm)}$$

The outdoor water source requirement for this area is 4.52 gpm per irrigated-acre. Therefore, the daily Outdoor Water Source Requirement is calculated by multiplying the number of ERCs by 4.52 gpm per irrigated acre, and then multiplying it by an estimated irrigated acreage per ERC of 1 Irrigated Acres per 6.25 ERCs. As a portion of the outdoor requirement is now supplied by the secondary pressurized irrigation system and private wells, it was estimated that approximately 95% of the total ERCs less 150 current connections to the secondary system would continue to use culinary water for outdoor use. This same assumption will also be used for projected water source requirements.

ERC × 1 Irr. Acre/6.25 ERC × 4.52 gpm/Irr. Acre = Outdoor Required (gpm)

The required water source for current and future use is therefore:

Existing Required Source Capacity

Indoor Use:

$$1{,}951 \text{ ERC} \times \frac{800 \text{ gpd}}{\text{ERC}} \times \frac{1 \text{ day}}{1440 \text{ min}} = 1{,}084 \text{ gpm}$$

Outdoor Use: (assuming outdoor connections are 95% of indoor connections and 150 ERC use some form of secondary irrigation)

$$1{,}703 \text{ ERC} \times \frac{1 \text{ acre}}{10 \text{ conn.}} \times \frac{4.52 \text{ gpm}}{\text{irrigated acre}} = 770 \text{ gpm}$$

Total Existing Required Culinary Water Source 1,854 gpm

Existing Source Surplus= 3145 gpm -1854 gpm = 1,291 gpm

Future Required Source Capacity for 6 Year Growth

Indoor Use:

$$2{,}614 \text{ ERC} \times \frac{800 \text{ gpd}}{\text{ERC}} \times \frac{1 \text{ day}}{1440 \text{ min}} = 1{,}452 \text{ gpm}$$

Outdoor Use: (assuming outdoor connections are 95% of indoor connections and 150 ERC use some form of secondary irrigation)

$$2{,}333 \text{ ERC} \times \frac{1 \text{ acre}}{10 \text{ conn.}} \times \frac{4.52 \text{ gpm}}{\text{irrigated acre}} = 1{,}055 \text{ gpm}$$

Total Projected Required Culinary Water Source 2,507 gpm

Projected Culinary Water Source Surplus= 3145 gpm -2507 gpm = 638 gpm

Future Required Source Capacity for 20 Year Growth

Indoor Use:

$$5{,}177 \text{ ERC} \times \frac{800 \text{ gpd}}{\text{ERC}} \times \frac{1 \text{ day}}{1440 \text{ min}} = 2{,}876 \text{ gpm}$$

Outdoor Use: (assuming outdoor connections are 95% of indoor connections and 150 ERC use some form of secondary irrigation)

$$4{,}768 \text{ ERC} \times \frac{1 \text{ acre}}{10 \text{ conn.}} \times \frac{4.52 \text{ gpm}}{\text{irrigated acre}} = 2{,}155 \text{ gpm}$$

Total Projected Required Culinary Water Source 5,031 gpm

Projected Culinary Water Source Deficit= 3145 gpm -5031 gpm = (1,886) gpm

2.3.2.2 Water Source Recommendations

As previously stated, the total water source capacity for the Agency is 3,145 gpm. This leaves a current excess of 1,291 gpm, an excess of 638 gpm at 6 years of growth and a shortage of 1,886 gpm at 20 years of growth. Therefore, no additional source capacity is required within the impact fee planning period.

2.3.3 Water Storage Requirements and Recommendations

2.3.3.1 Water Storage Requirements

Communities in Utah are required to provide adequate water storage capacity to satisfy both indoor and outdoor average day water demands. Additionally, fire suppression storage must be provided in accordance with R309-510 of the Utah Administrative Codes for Public Drinking Water Systems. The indoor use requirement is 400 gallons per ERC per day.

$$\text{ERC} \times 400 \text{ gpd /ERC} \times 1 \text{ day}/1440 \text{ min} = \text{Indoor required (gpm)}$$

The outdoor requirement is 4081 gallons per irrigated acre.

$$\text{ERC} \times 1 \text{ Irr. Acre}/6.25 \text{ ERC} \times 4081 \text{ gal/Irr. Acre} = \text{Outdoor Required (gallons)}$$

The Agency also requires a fire flow of 1,500 gpm for 2 hours (120 minutes). The required water storage for current and future use is calculated below.

Existing Required Water Storage Capacity

Indoor Use:

$$1{,}951 \text{ ERC} \times \frac{400 \text{ gal.}}{\text{conn}} = 780{,}400 \text{ gal.}$$

Outdoor Use: (assuming outdoor connections are 95% of indoor connections and 150 ERC use some form of secondary irrigation)

$$1{,}703 \text{ ERC} \times \frac{4081 \text{ gal}}{1 \text{ Irr. acre}} \times \frac{1 \text{ Irr. ac.}}{10 \text{ conn.}} = 694{,}994 \text{ gal.}$$

Fire Protection:

1500 gpm x 120 min = 180,000 gal.

Total Existing Required Culinary Water Storage **1,655,394 gal.**

Existing Storage Surplus= 4000000 gal -1655394 gal = **2,344,606 gal.**

Future Required Water Storage Capacity for 6 Year Projected Growth

Indoor Use:

$$2{,}614 \text{ ERC} \times \frac{400 \text{ gal.}}{\text{conn}} = 1{,}045{,}600 \text{ gal.}$$

Outdoor Use: (assuming outdoor connections are 95% of indoor connections and 150 ERC use some form of secondary irrigation)

$$2{,}333 \text{ ERC} \times \frac{4081 \text{ gal}}{1 \text{ Irr. acre}} \times \frac{1 \text{ Irr. ac.}}{10 \text{ conn.}} = 952{,}097 \text{ gal.}$$

Fire Protection:

1500 gpm x 120 min = 180,000 gal.

Total Projected Required Culinary Water Storage **2,177,697 gal.**

Projected Storage Surplus= 4000000 gal -2177697 gal = **1,822,303 gal.**

Future Required Water Storage Capacity for 20 Year Projected Growth

Indoor Use:

$$5{,}177 \text{ ERC} \times \frac{400 \text{ gal.}}{\text{conn}} = 2{,}070{,}800 \text{ gal.}$$

Outdoor Use: (assuming outdoor connections are 95% of indoor connections and 150 ERC use some form of secondary irrigation)

$$4{,}768 \text{ ERC} \times \frac{4081 \text{ gal}}{1 \text{ Irr. acre}} \times \frac{1 \text{ Irr. ac.}}{10 \text{ conn.}} = 1{,}945{,}821 \text{ gal.}$$

Fire Protection:

$$1500 \text{ gpm} \times 120 \text{ min} = 180{,}000 \text{ gal.}$$

Total Projected Required Culinary Water Storage	**4,196,621 gal.**
Projected Storage Deficit= 4000000 gal -4196621 gal =	**(196,621) gal.**

As previously stated the total water storage capacity for the Agency is 4,000,000 gallons. This leaves a current excess of 2,344,606 gallons, and an excess of 1,822,303 gallons at the end of the 6-year planning period. However, there is a projected shortage of 196,621 gallons at the end of the 20-year planning period. Therefore, the storage capacity is adequate for the impact fee, planning period, but should be reevaluated as capacity is neared.

2.3.3.2 Water Storage Recommendations

It is recommended that the water storage requirements be re-evaluated in about 10 years at which point the need for the installation of a new storage tank should be assessed.

2.3.4 Water Distribution Requirements and Recommendations

The Agency currently has requirements that all new developments model their impact on the current system and ensure that the requirements for pressure are met. The Agency's Engineer then reviews these impacts. It is recommended that this practice continue.

The latest water improvements project was designed in the year 2000. It was designed for 3,282 ERCs, which corresponds to a little over 10 years of growth from the 2011 estimated population at the projected growth rate. Therefore, there are no planned improvements to the distribution system within the next six years. However, as it is not known where loads will be added to the distribution system. As loads are placed on certain parts of the system the effect may be different as it is localized, therefore, it is recommended that those loads continue to be modeled as the Agency becomes aware of them. This should be done in order to ensure that the necessary improvements are made on an ongoing basis. It is also recommended that these improvements be added as amendments to the impact fee study as they arise so that impact fees may be applied to those projects.

2.3.5 Water Treatment Requirements and Recommendations

2.3.5.1 Water Treatment Requirements

The year 2000 water improvements project was designed was designed for 3,282 ERCs, which corresponds to a little over 10 years of growth. Therefore, there are no planned improvements to the treatment system within the next six years, other than those associated with the additional recommended source. At the time of any future water sources coming on line, the Agency shall also treat the water to meet the State specifications for culinary water. Determining a need for future treatment will be based upon the future water sources, and for calculation purposes will not be broken out separately. The costs associated with treatment should be evaluated in the cost estimates for acquiring new water sources.

2.3.5.1 Water Treatment Recommendations

It is recommended that the Agency continue to treat existing water sources. It is also recommended that all future water sources be equipped with facilities to treat that source.

2.4 Culinary Water Impact Fee Summary

2.4.1 Impact Fee Calculation

2.4.1.1 Impact Fee Associated ERCs

The impact fee period is for six (6) years and the study period is for ten (10) years. The improvements recommended in the study are anticipated to serve the Agency for 10 years or more. Therefore, for the purpose of calculating the impact fee the related ERCs served by each of the projects is based on the remaining additional ERCs anticipated to be served by the project, less the current ERCs and the ERCs for which impact fees have been prepaid, as was discussed in section 1.4.

During the next 6 years, it is estimated that the Agency will grow at an average rate of 5%. This growth cannot be sustained without a corresponding increase in the Agency's ability to obtain, store, and deliver additional culinary water. The improvements required to sustain this growth along with the costs estimated for these improvements are listed in the preceding sections of this study.

The previously completed projects and the recommended projects are primarily necessary for system growth. The previously completed project was designed to serve 3,282 ERCs. This is an additional 935 ERCs over the current 1,951 ERCs and the 396 ERCs associated with prepaid impact fees (3,282-1,951-396=935). As was mentioned in section 2.3.1.2, the water right work has an associated 1,722 ERCs. The portion of the impact fee related to this study has an associated 267 ERCs, which is the increase in ERCs over the impact fee study period less the prepaid impact fee related ERCs.

2.4.1.2 Calculated Impact Fee

Table 2.4.1.2 accounts for any recommended improvements, current debt services, and professional expenses associated with growth; from the information in that table a $2,093.10 impact fee per ERC is calculated. Moreover, this is a reasonable culinary water system impact fee for an Agency of the Agency's size. The Agency has the discretion to adjust the fee up to the maximum allowable impact fee. It is recommended that the Agency review the existing culinary water impact fee and determine

to what extent the fee should be adjusted based on the information provided in this report. Impact fees should be reviewed every 3 to 5 years.

Table 2.4.1.2 -- GWSSA Culinary Water Impact Fee Cost Per ERC

Description	Total Costs for projects in IF Period	% Attributable to Growth	Costs Attributable to Growth	Related ERCs Served	Cost per New ERC	Percent of Total IF
Existing Bond / Debt Payments						
2000 DDW Bond (20 year)	$1,362,372.00	90%	$ 1,226,134.80	935	$1,311.37	62.7%
2001 DDW Bond 2 (20 year)	$ 167,617.50	90%	$ 150,855.75	935	$ 161.34	7.7%
1998 RD Bond (40 year)	$ 610,176.00	90%	$ 549,158.40	935	$ 587.34	28.1%
Total Debt/Bond Payments:	$2,140,165.50		$ 1,926,148.95		$2,060.05	98.4%
Miscellaneous Fees						
Professional Expenses (Water Right Work	$ 15,000.00	100%	$ 15,000.00	1,722	$ 8.71	0.4%
Professional Expenses (impact fee study)	$ 6,500.00	100%	$ 6,500.00	267	$ 24.34	1.2%
Total Miscellaneous Fee	$ 6,500.00		$ 6,500.00		$ 33.05	1.6%
				Total Impact Fee Cost per New ERC:		$2,093.10

The impact fee (IF) associated with each project or the cost per new ERC is calculated by dividing the cost attributed to growth by the related ERCs served.

(Costs Attributed to Growth) / (Related ERCs Served) = (Cost per New ERC)

For example, the cost per new ERC associated with the 2000 DDW Bond is 1,311.37. ($1,362,372/935=$1,311.37)

It is recommended that the Agency continue to account for impact fees separately for the improvements that will be required to sustain the projected growth rate. This will allow the Agency to pay for these improvements with the least amount of debt. As growth continues, the amount of ERCs vs. the cash on hand should be carefully monitored. The impact fee should be reevaluated from time to time to ensure that it continues to meet the Agency's needs. The recommended impact fee is the amount that is justified by the planned and existing improvements. However, the Agency will have the final say in the actual impact fee amount, and the Agency may choose to set the impact fee lower than what is justified by this report as a lower impact fee encourages growth. However, a lower impact fee will cause a greater portion of the financial burden to be borne by the existing customers, as user rates may need to be increased or projects postponed in order to ensure that the overall water system budget is balanced.

Additionally, it is recommended that if insufficient impact fee funds are available to make bond payments, for the portion of the bond pertaining to growth, that funds used from other sources, be treated as if it were a loan to the impact fee fund. Proper accounting of this "loan" according to generally accepted accounting principles will provide the mechanism necessary to have the loan repaid. By doing this, when funds are available from impact fees, the loan from the other sources would be shown to be impact fee eligible and can be paid back from the impact fee funds. This will provide a means for growth to pay for growth, even if growth slows.

2.4.2 Culinary Water Impact Fee Cash Flows

2.4.2.1 Existing Bond/Debt Payments

A loan and Bond Payment Summary is shown in Table 2.4.2.1 below for the Agency. These bonds are for projects, which were primarily constructed for future growth.

Table 2.4.2.1 --GWSSA Existing Bond/Debt Payments				
Fiscal Year	2000 DDW Bond (20 year) Annual Liability	2001 DDW Bond 2 (20 year) Annual Liability	1998 RD Bond (40 year) Annual	Total Expenses
2011	$ 127,062.00	$ 14,866.70	$ 21,792.00	$ 163,720.70
2012	$ 126,420.00	$ 13,791.80	$ 21,792.00	$ 162,003.80
2013	$ 125,778.00	$ 14,722.25	$ 21,792.00	$ 162,292.25
2014	$ 125,136.00	$ 13,647.35	$ 21,792.00	$ 160,575.35
2015	$ 124,494.00	$ 14,577.80	$ 21,792.00	$ 160,863.80
2016	$ 123,852.00	$ 13,502.90	$ 21,792.00	$ 159,146.90
2017	$ 123,210.00	$ 14,433.35	$ 21,792.00	$ 159,435.35
2018	$ 122,568.00	$ 13,358.45	$ 21,792.00	$ 157,718.45
2019	$ 121,926.00	$ 14,288.90	$ 21,792.00	$ 158,006.90
2020	$ 121,284.00	$ 13,214.00	$ 21,792.00	$ 156,290.00
2021	$ 120,642.00	$ 14,144.45	$ 21,792.00	$ 156,578.45
Totals	$ 1,362,372.00	$ 154,547.95	$ 239,712.00	$ 1,756,631.95

Table 2.4.2.2 shows the impact fee account balance and anticipated cash flow for the ten-year study period. The table includes the capital project costs placed at the suggested project year, the bond/debt payments, professional expenses, and anticipated impact fee revenues, along with a totalized expense column for the given year. Table 2.4.2.3 shows the anticipated impact fee fund, annual ending balance, along with associated revenues, expenses, excesses and shortfalls.

Table 2.4.2.2 -- GWSSA Impact Fee Cash flows & Calculations					
Fiscal Year	Growth Rate	Total ERCs	Annual ERC's	Culinary Water Impact	Annual Impact Fee
2011	5.00%	1,951.00	93	$ 2,093.10	$ 194,658.30
2012	5.00%	2,048.00	97	$ 2,093.10	$ 203,030.70
2013	5.00%	2,151.00	103	$ 2,093.10	$ 215,589.30
2014	5.00%	2,258.00	107	$ 2,093.10	$ 223,961.70
2015	5.00%	2,372.00	114	$ 2,093.10	$ 238,613.40
2016	5.00%	2,490.00	118	$ 2,093.10	$ 246,985.80
2017	5.00%	2,614.00	124	$ 2,093.10	$ 259,544.40
2018	5.00%	2,745.00	131	$ 2,093.10	$ 274,196.10
2019	5.00%	2,882.00	137	$ 2,093.10	$ 286,754.70
2020	5.00%	3,026.00	144	$ 2,093.10	$ 301,406.40
2021	5.00%	3,177.00	151	$ 2,093.10	$ 316,058.10
Totals			1,319		$ 2,760,798.90
Fiscal Year	**Growth Rate**	**Capital Project Costs**	**Bond/Debt Payments**	**Professional Expenses**	**Total Expenses**
2011	5.00%	$ -	$ 163,720.70	$ 6,500.00	$ 170,220.70
2012	5.00%	$ -	$ 162,003.80	$ 15,000.00	$ 177,003.80
2013	5.00%	$ -	$ 162,292.25	$ -	$ 162,292.25
2014	5.00%	$ -	$ 160,575.35	$ -	$ 160,575.35
2015	5.00%	$ -	$ 160,863.80	$ -	$ 160,863.80
2016	5.00%	$ -	$ 159,146.90	$ 6,500.00	$ 165,646.90
2017	5.00%	$ -	$ 159,435.35	$ -	$ 159,435.35
2018	5.00%	$ -	$ 157,718.45	$ -	$ 157,718.45
2019	5.00%	$ -	$ 158,006.90	$ -	$ 158,006.90
2020	5.00%	$ -	$ 156,290.00	$ -	$ 156,290.00
2021	5.00%	$ -	$ 156,578.45	$ 6,500.00	$ 163,078.45
Totals		$ -	$ 1,756,631.95	$ 34,500.00	$ 1,791,131.95

Table 2.4.2.3 -- GWSSA Impact Fee Summary				
Fiscal Year	Annual Impact Fee	Total Expenses	Excesses/ (Shortfalls)	Annual Ending
2011	$ 194,658.30	$ 170,220.70	$ 24,437.60	$ 24,437.60
2012	$ 203,030.70	$ 177,003.80	$ 26,026.90	$ 50,464.50
2013	$ 215,589.30	$ 162,292.25	$ 53,297.05	$ 103,761.55
2014	$ 223,961.70	$ 160,575.35	$ 63,386.35	$ 167,147.90
2015	$ 238,613.40	$ 160,863.80	$ 77,749.60	$ 244,897.50
2016	$ 246,985.80	$ 165,646.90	$ 81,338.90	$ 326,236.40
2017	$ 259,544.40	$ 159,435.35	$ 100,109.05	$ 426,345.45
2018	$ 274,196.10	$ 157,718.45	$ 116,477.65	$ 542,823.10
2019	$ 286,754.70	$ 158,006.90	$ 128,747.80	$ 671,570.90
2020	$ 301,406.40	$ 156,290.00	$ 145,116.40	$ 816,687.30
2021	$ 316,058.10	$ 163,078.45	$ 152,979.65	$ 969,666.95
Totals	$ 2,760,798.90	$ 1,791,131.95	$ 969,666.95	

The ending balance when capacity is reached should be applied toward the remaining debt service.

2.4.3 Impact Fee Assessment

Impact fee charges will be assessed on a equivalent residential connection (ERC) basis, or the number of ERCs to which a commercial connection is equivalent. In general, ERCs will be calculated based on the water meter size that is installed as required by the building code or requested by the customer. ERCs will be based on a multiplier calculated by the maximum flow that a given size of meter is rated at compared to a standard 3/4" by 5/8" meter, per the table below.

Water Meter Size VS # of ERCs		
Meter Size	**AWWA Max Flow (gpm)**	**ERC's**
3/4 X 5/8 inch	20	1
3/4 inch	30	1.5
1 inch	50	2.5
1-1/2 inch	100	5
2 inch	160	8
3 inch	300	15
4 inch	500	25
6 inch	1000	50
8 inch	1600	80

For example if the Impact fee for 1 ERC were $100 then the impact fee for a commercial or residential connection for which a 1 inch meter is installed would be $250 as a 1 inch meter has a max flow of 2.5 times that of a 3/4 by 5/8 inch meter. This provides the Agency with a simple method of calculating the number of ERCs of a given commercial or residential connection.

3.0 WASTEWATER SYSTEM

3.1 Introduction

The wastewater system consists of two primary components. The first component is the collection system, which consists of all sewer interceptor lines, collector lines, service laterals, and transmission lines. The second primary component is the treatment system. The treatment system presently used by the Grand Water and Sewer Service Agency (GWSSA or Agency) is currently owned and operated by Moab City, which leases a portion of the treatment capacity to the Agency. As the treatment portion of the system is not operated by the Agency, the portion of the impact fee related to the treatment system will not be discussed in this document, and will therefore not affect the impact fees associated with the system under Moab City's jurisdiction. The Agency asked that only the collection system be evaluated due to the current situation with the treatment and transmission lines within Moab City.

As was discussed earlier, the Spanish Valley Water & Sewer Improvement District installed Phase I and II of their sewer system in the early 1980's. The sewer collection system was designed to serve the central part of the valley as far south as White Lane on Spanish Valley Drive. Nearly the entire sewer collection system put in at this time was 8" PVC pipe with concrete manholes.

Growth in the Valley was relatively slow during the 1980's and picked up significantly during the early 1990's. It was at this time that the District realized expanding the sewer collection system to homes outside of their current service area was needed. This brought about the 1996 Sewer Collection, Expansion Project. The 1996 project included installing a 12" main outfall line to handle the increased flows of the District, installing several miles of new collection piping to non-sewered areas and installing 3 metering manhole stations to meter the flow entering Moab City's wastewater system. This project was completed to provide capacity for growth. Several funding agencies provided bonding for this project, which is still being repaid. A 20 year, 25 year, and a 40 year loan are still being repaid and the final payments are anticipated to be made in 2017, 2022, and 2036 respectively.

The purpose of this report is to update the Impact Fee Analysis and Recommendations prepared in 2007 by Sunrise Engineering, Inc. Information used to prepare this document will be taken from other reports and models previously prepared by Sunrise Engineering, Inc.

3.1.1 Service Areas

The service area includes the geographic area served by the wastewater system as shown in Appendix B Exhibit 3 - Sewer System Map, and areas in close proximity to the existing sewer system. This service area may be extended into San Juan County as additional parts of Spanish Valley are added to the system.

3.1.2 Population Projections

The population projection for the collection system is anticipated to be very similar to that of the culinary water system. Therefore, the anticipated growth rate is 5% as shown in table 1.2.2 above.

3.1.3 Average Daily Flows

Sewer flow is recorded by three meters that record the flow from the Agency to Moab. Please refer to the record of the flow for 2010 in table 3.1.3.

Table 3.1.3 Sewer Meter Flow Data April 2010 - March 2011

	JR High Meter			High School meter			Highway 191 Meter			Comb.
Flow	Total Kgals	Peak GPM	Average GPM	Total Kgal	Peak GPM	Average GPM	Total Kgals	Peak GPM	Average GPM	Total Kgals
3/26/10 totalizer	185,102			106,761			36,794			
4/30/10 totalizer	192,610			108,106			37,536			
flow	7,508	306	148.97	1,345	91	26.69	742	42.00	14.72	9,595
5/28/10 totalizer	198,287			109,136			38,136			
flow	5,677	288	140.87	1,030	66	25.56	600	48.00	14.89	7,307
6/30/10 totalizer	204,810			110,419			38,806			
flow	6,523	264	137.33	1,283	56	27.01	670	50.00	14.11	8,476
7/30/10 totalizer	210,695			111,564			39,333			
flow	5,885	269	136.23	1,145	63	26.50	527	45.00	12.20	7,557
8/31/10 totalizer	216,550			112,852			39,914			
flow	5,855	376	127.28	1,288	68	28.00	581	45.00	12.63	7,724
9/30/10 totalizer	221,955			114,047			40,456			
flow	5,405	232	129.31	1,195	57	28.59	542	42.00	12.97	7,142
10/29/10 totalizer	228,162			115,117			40,928			
flow	6,207	376	134.93	1,070	ND	23.26	472	33.00	10.26	7,749
11/30/10 totalizer	233,553			115,682			41,495			
flow	5,391	281	120.87	565	ND	12.67	567	42.00	12.71	6,523
12/30/10 totalizer	237,446			116,618			42,058			
flow	3,893	183	90.12	936	61	21.67	563	50.00	13.03	5,392
1/31/11 totalizer	242,042			117,834			42,518			
flow	4,596	216	99.91	1,216	62	26.43	460	47.00	10.00	6,272
2/28/11 totalizer	246,695			118,866			43,023			
flow	4,653	221	115.46	1,032	69	25.61	505	44.00	12.53	6,190
3/31/11 totalizer	252,021			120,029			43,681			
flow	5,326	259	119.42	1,163	70	26.08	658	40.00	14.75	7,147
Total	66,919			13,268			6,887			87,074
Total Annual Flow	87,074 K Gallons									
Average Flow	165.67 GPM									
Average Daily Flow	0.239 MGD									

3.2 Existing Collection System Analysis

As was discussed in section 3.1 above, the collection system consists of a network of collectors, interceptors, and transmission lines. These pipes consist of 8 inch and 12-inch diameter pipe.

The existing collection system is sufficient for existing connections, and it is estimated that the majority of the main trunk lines have sufficient capacity for the planning period. However, several small sections of pipe will need to be upsized in order to provide service to the growth that is planned to occur within the planned subdivisions throughout the system. These sections are shown in appendix B exhibit 4. This is discussed in more detail in section 3.4, below.

3.3 Wastewater Collection System Analysis and Recommendations

3.3.1 Collection System Recommendations

Currently, the Agency's Wastewater Collection system is supporting household and commercial connections only within Grand County. The existing collection system will support the connections currently attached to the collection system, along with the projected number of connections that will attach to the system in Grand County over the next several years, with the exception of about 815 feet of sewer line that will need to be upsized to accommodate the known areas of growth. These sections of pipe are spread throughout the system and may be best addressed in a stepwise manner by replacing the single sections of pipe as growth occurs in the area upstream of them. However, for the purpose of this report, a cost estimate has been completed for replacing this pipe as a single project in order to establish an impact fee associated with these improvements (See appendix A, Exhibit 1-Engineers Opinion of Probable Costs for Wastewater Improvements). It may also be necessary to change which sections of pipe are upsized, depending on where growth occurs. The system should, therefore, be modeled prior to the actual project to include the actual location of growth, and the actual part of the system that needs upsizing should be added to the impact fee as an amendment.

It is recommended that new development continue to be required to model its impact on the current system. The Agency should reserve the right to require any future development to upgrade and or upsize any existing piping that may impact the overall collection system. It is also recommended that the Agency continue to model upgrades as they are added to the system. This will allow the Agency to see potential issues and correct them as additional development occurs.

The impact fee calculation will include projects, if any are needed, which are anticipated to be constructed within the next six (6) years. However, the upgrades will be designed for greater than six years, as it is fiscally irresponsible to design improvements for only the near future.

For the sewer collection system the design period will be based on the existing sewer model, which included the anticipated future subdivisions. The addition of the future subdivisions accounts for 3,480 ERCs, or for a little over 10 years of growth.

3.3.2 Collection System Upgrades

As was mentioned above with future growth trends there are three sections of pipe totaling just over 800 feet in length that will likely require upgrade. The installation of these sections of pipe should be timed for implementation to both adequately handle new growth and to assist in providing required system capacity as stated in previous sections of this report.

The cost associated with the improvements total about $109,000, of which 100% is attributable to growth, and can therefore be applied to the impact fee calculation.

3.4 Impact Fee Summary

As has been mentioned earlier in this report, the impact fee related to treatment and the transmission lines within Moab Cities jurisdiction is not discussed in this report, and will therefore not be affected by this report.

3.4.1 Impact Fee Calculation

3.4.1.1 Impact Fee Associated ERCs

Although the study period is for ten (10) years, and the impact fee period for six (6) years, the improvements recommended in the study are anticipated to serve the Agency in excess of 10 years.

The previously completed projects and the recommended project are primarily necessary for system growth. The previously completed project was designed to serve 2,941 ERCs. This is an additional 736 ERCs over the current 2,030 ERCs and the 175 ERCs associated with prepaid impact fees (2,941-2,030-175=736). With the minor improvements mentioned above, the collection system will have the capacity to service 3,480 ERCs. This is 539 more ERCs than can be served by the existing system (3,480-2,941=539). This number of ERCs corresponds to the number of ERCs anticipated to be added with proposed subdivisions that were modeled as mentioned earlier in the report. The portion of the impact fee related to this study has an associated 516 ERCs, which is the increase in ERCs over the impact fee study period less the 175 ERCs, for which impact fees have been prepaid.

3.4.1.1 Calculated Impact Fee

Table 3.4.1.2 accounts for the recommended improvements and current debt services and provides a $1,952.67 impact fee. This is a reasonable fee for an Agency of the Agency's Size. The Agency has the discretion to adjust the fee up to the maximum allowable impact fee. It is recommended that the Agency review the existing wastewater impact fee and determine how the fee should be adjusted based on the information provided in this report. Impact fees should be reviewed every 3 to 5 years.

Table 3.4.1.2 -- GWSSA Wastewater Impact Fee Cost Per ERC

Description	Total Costs for projects in IF Period	% Attributable to Growth	Costs Attributable to Growth	Related ERCs Served	Cost per New ERC	Percent of Total IF
Capital Project Fees						
Sewer Collection System Improvements	$ 109,000.00	100%	$ 109,000.00	539	$ 202.23	10.4%
Total Capital Project Fee	$ 109,000.00		$ 109,000.00		$ 202.23	10.4%
Existing Bond / Debt Payments						
1997 CIB Bond (25 year)	$ 154,190.00	100%	$ 154,190.00	736	$ 209.50	10.7%
1996 RD Bond (40 year)	$ 830,856.00	100%	$ 830,856.00	736	$1,128.88	57.8%
DWQ Bond	$ 294,000.00	100%	$ 294,000.00	736	$ 399.46	20.5%
Total Debt/Bond Payments:	$1,279,046.00		$ 1,279,046.00		$1,737.84	89.0%
Miscellaneous Fees						
Professional Expenses (impact fee study)	$ 6,500.00	100%	$ 6,500.00	516	$ 12.60	0.6%
Total Miscellaneous Fee	$ 6,500.00		$ 6,500.00		$ 12.60	0.6%
				Total Impact Fee Cost per New ERC:		$1,952.67

The impact fee (IF) associated with each project or the cost per new ERC is calculated by dividing the cost attributed to growth by the related ERCs served.

(Costs Attributed to Growth) / (Related ERCs Served) = (Cost per New ERC)

For example the cost per new ERC associated with the Sewer Collection System Improvements is $109,000/539 = $202.23

It is recommended that the Agency account for impact fees separately for the improvements that will be required to sustain the projected growth rate. This will allow the Agency to pay for these improvements with the least amount of debt. As growth continues, the amount of ERCs vs. the cash on hand should be carefully monitored to ensure that the recommended improvements have sufficient funds to be built. The projects should be completed on an as needed basis, which may change the time frame of the recommended improvements. The impact fee should be reevaluated from time to time to ensure that it continues to meet the Agency's needs. The recommended impact fee is the amount that is justified by the planned improvements. However, the Agency will have the final say in the actual Impact Fee amount, and the Agency may choose to set the impact fee lower than what is justified by this report, as a lower impact fee encourages growth. However, a lower impact fee will cause a greater portion of the financial burden to be borne by the existing customers, as user rates may need to be increased or projects postponed in order to ensure that the overall wastewater system budget is balanced.

Additionally, it is recommended that if insufficient impact fee funds are available to make bond payments, for the portion of the bond pertaining to growth, that funds used from other sources, be treated as if it were a loan to the impact fee fund. Proper accounting of this "loan" according to generally accepted accounting principles will provide the mechanism necessary to have the loan repaid. By doing this, when funds are available from impact fees, the loan from the other sources would be shown to be impact fee eligible and can be paid back from the impact fee funds. This will provide a means for growth to pay for growth, even if growth slows.

3.4.2 Impact Fee Cash Flows

3.4.2.1 Existing Bond/Debt Payment

A loan and Bond Payment Summary is shown in Table 3.4.2.1 below, for the Agency. These bonds are for projects that were primarily constructed for future growth.

Table 3.4.2.1--GWSSA Existing Bond/Debt Payments

Fiscal Year	1997 CIB Bond (25 year) Annual Liability	1996 RD Bond (40 year) Annual Liability	DWQ Bond Annual Liability	Total Annual Liability
2011	$ 12,840.00	$ 31,956.00	$ 42,000.00	$ 86,796.00
2012	$ 12,570.00	$ 31,956.00	$ 42,000.00	$ 86,526.00
2013	$ 13,300.00	$ 31,956.00	$ 42,000.00	$ 87,256.00
2014	$ 13,000.00	$ 31,956.00	$ 42,000.00	$ 86,956.00
2015	$ 12,700.00	$ 31,956.00	$ 42,000.00	$ 86,656.00
2016	$ 13,400.00	$ 31,956.00	$ 42,000.00	$ 87,356.00
2017	$ 13,070.00	$ 31,956.00	$ 42,000.00	$ 87,026.00
2018	$ 12,740.00	$ 31,956.00		$ 44,696.00
2019	$ 12,410.00	$ 31,956.00		$ 44,366.00
2020	$ 13,080.00	$ 31,956.00		$ 45,036.00
2021	$ 12,720.00	$ 31,956.00		$ 44,676.00
Totals	$ 141,830.00	$ 351,516.00	$ 294,000.00	$ 787,346.00

3.4.2.2 Cash Flows

Table 3.4.2.2.1, below, shows the impact fee revenues, and anticipated cash flow projection, for the 10-year design period. The table includes the cost of each of the capital projects for the wastewater system expended at the projected year of construction. The impact fee summary as shown in Table 3.4.2.2.2, gives the projected annual ending fund balance, along with associated revenues, expenses, surpluses and shortfalls.

Table 3.4.2.2.1 -- GWSSA Impact Fee Cash flows & Calculations

Fiscal Year	Growth Rate	Total ERCs	Annual ERC's	Wastewater Impact Fee	Annual Impact Fee
2011	5.00%	2,030.00	93	$ 1,952.67	$ 181,598.31
2012	5.00%	2,132.00	102	$ 1,952.67	$ 199,172.34
2013	5.00%	2,238.00	106	$ 1,952.67	$ 206,983.02
2014	5.00%	2,351.00	113	$ 1,952.67	$ 220,651.71
2015	5.00%	2,468.00	117	$ 1,952.67	$ 228,462.39
2016	5.00%	2,591.00	123	$ 1,952.67	$ 240,178.41
2017	5.00%	2,721.00	130	$ 1,952.67	$ 253,847.10
2018	5.00%	2,857.00	136	$ 1,952.67	$ 265,563.12
2019	5.00%	2,999.00	142	$ 1,952.67	$ 277,279.14
2020	5.00%	3,149.00	150	$ 1,952.67	$ 292,900.50
2021	5.00%	3,307.00	158	$ 1,952.67	$ 308,521.86
Totals			1,370		$ 2,675,157.90
Fiscal Year	**Growth Rate**	**Capital Project Costs**	**Bond/Debt Payments**	**Professional Expenses**	**Total Expenses**
2011	5.00%	$ -	$ 86,796.00	$ 6,500.00	$ 93,296.00
2012	5.00%	$ 109,000.00	$ 86,526.00	$ -	$ 195,526.00
2013	5.00%	$ -	$ 87,256.00	$ -	$ 87,256.00
2014	5.00%	$ -	$ 86,956.00	$ -	$ 86,956.00
2015	5.00%	$ -	$ 86,656.00	$ -	$ 86,656.00
2016	5.00%	$ -	$ 87,356.00	$ 6,500.00	$ 93,856.00
2017	5.00%	$ -	$ 87,026.00	$ -	$ 87,026.00
2018	5.00%	$ -	$ 44,696.00	$ -	$ 44,696.00
2019	5.00%	$ -	$ 44,366.00	$ -	$ 44,366.00
2020	5.00%	$ -	$ 45,036.00	$ -	$ 45,036.00
2021	5.00%	$ -	$ 44,676.00	$ 6,500.00	$ 51,176.00
Totals		$ 109,000.00	$ 787,346.00	$ 19,500.00	$ 915,846.00

Table 3.4.2.2.2 -- GWSSA Impact Fee Summary				
Fiscal Year	Annual Impact Fee	Total Expenses	Excesses/ (Shortfalls)	Annual Ending
2011	$ 181,598.31	$ 93,296.00	$ 88,302.31	$ 88,302.31
2012	$ 199,172.34	$195,526.00	$ 3,646.34	$ 91,948.65
2013	$ 206,983.02	$ 87,256.00	$ 119,727.02	$ 211,675.67
2014	$ 220,651.71	$ 86,956.00	$ 133,695.71	$ 345,371.38
2015	$ 228,462.39	$ 86,656.00	$ 141,806.39	$ 487,177.77
2016	$ 240,178.41	$ 93,856.00	$ 146,322.41	$ 633,500.18
2017	$ 253,847.10	$ 87,026.00	$ 166,821.10	$ 800,321.28
2018	$ 265,563.12	$ 44,696.00	$ 220,867.12	$ 1,021,188.40
2019	$ 277,279.14	$ 44,366.00	$ 232,913.14	$ 1,254,101.54
2020	$ 292,900.50	$ 45,036.00	$ 247,864.50	$ 1,501,966.04
2021	$ 308,521.86	$ 51,176.00	$ 257,345.86	$ 1,759,311.90
Totals	$ 2,675,157.90	$915,846.00	$ 1,759,311.90	

The ending balance when capacity is reached should be applied toward the remaining debt service.

3.4.3 Impact Fee Assessment

As with the culinary water system impact fee charges will be assessed on a equivalent residential connection (ERC) basis, or the number of ERCs to which a commercial connection is equivalent. In general, ERCs will be calculated based on the water meter size that is installed as required by the building code or requested by the customer. ERCs will be based on a multiplier calculated by the maximum flow that a given size of meter is rated at compared to a standard 3/4" by 5/8" meter, per the table below.

Water Meter Size VS # of ERCs		
Meter Size	AWWA Max Flow (gpm)	ERC's
3/4 X 5/8 inch	20	1
3/4 inch	30	1.5
1 inch	50	2.5
1-1/2 inch	100	5
2 inch	160	8
3 inch	300	15
4 inch	500	25
6 inch	1000	50
8 inch	1600	80

For example if the Impact fee for 1 ERC were $100 then the impact fee for a commercial or residential connection for which a 1 inch meter is installed would be $250 as a 1 inch meter has a max flow of 2.5 times that of a 3/4 by 5/8 inch meter. This provides the Agency with a simple method of calculating the number of ERCs of a given commercial or residential connection.

It is also recommended that special consideration be given for the wastewater impact fee to commercial connection that consumes a large percent of the culinary water that they receive.

For example in the event that a commercial connection such as a water bottling plant or ice plant can provided proof that less than 25% of the water that they consume is passed through to the sewer system, then their actual impact on the system should be considered when calculating the wastewater impact fee. This demand should be calculated according to standard practices and the ERCs calculated by this method may be considered for the wastewater system impact fee.

APPENDIX A – COST ESTIMATES

EXHIBIT 1- Engineer's Opinion of Probable Costs For Wastewater Improvements

GWSSA
EXHIBIT 1
Engineer's Opinion of Probable Costs For Wastewater System Improvements

Source Improvements					
1	Mobilization	1	L.S.	$ 3,000.00	$ 3,000.00
2	12" PVC Sewer Pipe & Fittings	800	Ln. Ft.	$ 34.00	$ 27,200.00
3	48" Diameter Pre-Cast Concrete Manhole	6	Each	$ 3,000.00	$ 18,000.00
4	Asphalt Repair and Replacement	4800	SF	$ 3.00	$ 14,400.00
5	Imported Pipe Bedding	815	LnFt	$ 1.50	$ 1,222.50
6	Imported Structural Backfill	6	LnFt	$ 1.50	$ 9.00
				SUBTOTAL Source Improvement Costs:	**$ 63,822.50**
				Contingency (~15%):	**$ 10,177.50**
				TOTAL Construction Costs:	**$ 74,000.00**
Non-Construction Services					
a.	Administration	1	L.S.	$ 6,000.00	$ 6,000.00
b.	Design Engineering	1	L.S.	$ 9,000.00	$ 9,000.00
c.	Quality Control Inspection	1	HOURLY	$ 10,000.00	$ 10,000.00
d.	Legal and Fiscal	1	L.S.	$ 10,000.00	$ 10,000.00
				TOTAL Non-Construction Services:	**$ 35,000.00**
				TOTAL PROJECT COST:	**$ 109,000.00**

In providing opinions of probable construction cost, the Client understands that the Engineer has no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing, and that the opinion of probable construction cost provided herein is made on the basis of the Engineer's qualifications and experience. The Engineer makes no warranty, expressed or implied, as to the accuracy of such opinions compared to bid or actual costs.