Water (Culinary and Irrigation) Impact Fee Facilities Plan

DRAFT

January 2019

Prepared for:

IVINS CITY, UTAH

Prepared by:

BOWEN COLLINS & ASSOCIATES

WATER (CULINARY AND IRRIGATION) IMPACT FEE FACILITIES PLAN

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Project No. 235-17-02

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EXECUTIVE SUMMARY

The purpose of an impact fee facilities plan is to identify demands placed upon City facilities by future development and evaluate how these demands will be met by the City. The IFFP is also intended to outline the improvements which may be funded through impact fees.

WHY IS AN IFFP NEEDED?

The IFFP provides a technical basis for assessing updated impact fees throughout the City. This document addresses the future infrastructure needed to serve the City. The existing and future capital projects documented in this IFFP will ensure that level of service standards are maintained for all existing and future residents who reside within the service area. Local governments must pay strict attention to the required elements of the Impact Fee Facilities Plan which are enumerated in the Impact Fees Act.

PROJECTED FUTURE GROWTH

To evaluate the use of existing capacity and the need for future capacity, it is first necessary to calculate the demand associated with existing development and projected growth. Using available information for existing development and growth projections from the City's Water Master Plan, projected growth in system demand is summarized in Table ES-1.

Table ES-1
Projected Peak Day Demand

Year	Total ERUs	Peak Day Demand (gpm)
2017	3,629	3,528
2020	4,017	3,905
2025	4,663	4,533
2027	4,921	4,784
2030	5,309	5,161
2035	5,955	5,789
2040	6,601	6,417
2045	7,247	7,045
2050	7,893	7,673
2055	8,539	8,301
2057	8,797	8,553

Demands are projected in terms of Equivalent Residential Units (ERUs). An ERU represents the demand that a typical single family residence places on the system. The basis of an ERU for historical flow rates is summarized in Table ES-2.

Table ES-2
Ivins Service Area Historic Flows for Planning

Item	Value for Existing Conditions
Estimated Population	9,225
Equivalent Residential Units (ERUs)	3,629
Average Day Flow (mgd)	2.43
Average Day, Indoor Flow (mgd)	1.09
Peak Day Flow (mgd)	5.08
Peak Hour Flow (mgd)	7.88
Flows per ERU	
Average Day Flow (gpd/ERU)	670
Average Day, Indoor Flow (gpd/ERU)	302
Peak Day Flow (gpd/ERU)	1,400
Peak Hour Flow (gpm/ERU)	1.51

LEVEL OF SERVICE

Level of service is defined in the Impact Fees Act as "the defined performance standard or unit of demand for each capital component of a public facility within a service area." Performance standards are those standards that are used to design and evaluate the performance of facilities. While the Impact Fees Act includes "defined performance standard" as part of the level of service definition, this report will make a subtle distinction between performance standard and level of service. The performance standard will be considered the desired minimum level of performance for each component, while the existing level of service will be the actual current performance of the component and the proposed level of service will be the proposed actual performance of the component in the future. Summary values for each of these categories are contained in Table ES-3.

Table ES-3
Performance Standards and Level of Service
for Various System Requirements

	Existing Performance Standard	Existing Level of Service[1]
Production Capacity		
Production Capacity (gpd/ERU)[1]	1,400	1,400
Storage		
Storage (gallons/ERU)[2]	1,094	1,170[4]
Transmission and Distribution		
Peak Day Demand Pressure(psi)	40	32[3]
Peak Hour Demand Pressure (psi)	30	22[3]
Minimum Available Fire Flow at 20 psi during Peak Day Demand (psi)	1500[5]	850[3]
Maximum Pipe Velocity Peak Hour (feet per second)	10	13.7[3]
Buildings[6]		
Maintenance and Construction Shop	-	-
Administration Building	-	-

[1] Source capacity value shown for information only. The impact fee for source capacity is paid to the WCWCD through a separate impact fee.
[2]Does not include fire flow storage, only equalization storage.
[3] Because there are many transmission and distribution components, the value given is for the worst case only. All other components have a higher level of service with the vast majority meeting the desired performance standard
[4] Provided for storage in the system as a whole.
[5] Required fire flow indicated is for a typical residential unit.
[6] A qualitative performance standard or level of service has not been identified for buildings. However, new building facilities will have the same performance standard and level of service for existing and future users.

EXISTING CAPACITY AVAILABLE TO SERVE FUTURE GROWTH

Projected future growth will be met through a combination of available excess capacity in existing facilities and construction of additional capacity in new facilities. Defining existing system capacity in terms of a single number is difficult. To improve the accuracy of the analysis, the system was divided into three different components (conveyance, storage, administrative & shop buildings). Excess capacity in each component of the system is as follows:

Conveyance (Transmission & Pumping)

Use of transmission and pumping capacity in the existing culinary water system was evaluated using a hydraulic computer model of the City's conveyance system. The calculated percentage of existing capacity currently in use by existing development is 78.0 percent. Growth during the next 10 years is calculated to use an additional 10.8 percent, with the remaining 11.2 percent of existing capacity to be used by growth beyond the 10-year planning window.

Storage

The City owns and operates a number of storage reservoirs and also shares some storage facilities with the City of St. George and Santa Clara City. Table ES-4 summarizes the storage volume in the City's existing tanks. The existing and projected future use of existing storage capacity is summarized in Table ES-5. For the purpose of this calculation, only equalization storage is shown. Since both existing and future users will benefit from fire flow storage, using the percentages shown in the table divides these components proportionally based on demand.

Since all new users will be connected to the proposed secondary irrigation system, new users will only occupy the "indoor water use" portion of storage in the City's culinary water storage tanks. Storage for "outdoor water use" will be provided by a new secondary irrigation storage tank. This has been accounted for in the percentages shown in Table ES-5 in order to avoid double charging new users for the capacity in the existing and future facilities.

Table ES-4
Existing Storage Facilities

Tank Service Area	Tanks	Available Storage (gallons)	Fire Storage (gallons)	Equalization Storage
3290/3312 Zones	Cliff Rose 2MG	1,946,000		
3165 PRV Zone	Cliff Rose 2MG	1,946,000	585,000	3,782,000
3140 PRV Zone	Snow Canyon	475,000		
		4,367,000		
3460 Taviawk 3390 PRV Zone	Taviawk	486,000	240,000	246,000
3350 Tuacahn	Tuacahn	460,000	240,000	220,000
	Total	**5,313,000**	**1,065,000**	**4,248,000**

Table ES-5
Existing and Projected Future Utilization of Existing Storage Capacity

	Equalization Storage Requirement (gallons)	Use of Existing Facilities (gallons)	Percent Use of Existing Facilities
Existing	3,416,000	3,416,000	80.41%
End of 10-yr Planning Window (2027)	3,933,200	517,200	12.18%
Buildout	8,250,440	314,800	7.41%
Total	**8,250,440**	**4,248,000**	**100.00%**

Administrative and Shop Buildings

Ivins City's public works yard and City Office/City Hall are at full capacity, and these facilities have no excess capacity that will be charged to future users.

REQUIRED SYSTEM IMPROVEMENTS

Beyond available existing capacity, additional improvements required to serve new growth are summarized in Table ES-5. To satisfy the requirements of state law, Table ES-5 provides a breakdown of the percentage of the project costs attributed to existing and future users. For future use, capacity has been divided between capacity to be used by growth within the 10-year planning window of this IFFP and capacity that will be available for growth beyond the 10-year window.

Table ES-6
Water Project Costs Allocated to Projected Development, 10-year Planning Window

Project Identifier	Project Description	Estimated Total Cost	Percent to Existing	Percent to 10-Year Growth	Percent to Beyond 10-Year	Cost to Existing	Cost to 10-yr Growth	Cost to Beyond 10-Year
P1-01	Install approximately 12,000 feet of 18-inch pipe from Gunlock Pipeline to proposed storage tank site	$1,800,000	0%	25.0%	75.0%	$0	$450,000	$1,350,000
P1-02	Construct new 2 MG irrigation water storage facility	$2,000,000	0%	44.8%	55.2%	$0	$896,648	$1,103,352
P1-03	Install 1,100 feet of 24-inch pipe from new storage facility to 450 N	$192,500	0%	25.0%	75.0%	$0	$48,125	$144,375
P1-04	Install New PRV/Vault at connection point to Gunlock Pipeline	$60,000	0%	25.0%	75.0%	$0	$15,000	$45,000
P1-05	Install 2,720 feet of 16-inch pipe along 200 W from 450 N to Center Street	$448,800	0%	25.0%	75.0%	$0	$112,200	$336,600
P1-06	Install 225 feet of 6-inch near intersection of 300 W and 200 N	$22,500	0%	25.0%	75.0%	$0	$5,625	$16,875
P1-07	Install 550 feet of 8-inch pipe along Center St. from 400 W to 495 W	$60,500	0%	25.0%	75.0%	$0	$15,125	$45,375
P1-08	Install 1,350 feet of 8-inch pipe along 400 W from 200 S to 400 S	$148,500	0%	25.0%	75.0%	$0	$37,125	$111,375
P1-09	Install 840 feet of 6-inch pipe along 400 S from 400 W to 300 W	$84,000	0%	25.0%	75.0%	$0	$21,000	$63,000
P1-10	Install 2,900 feet of 16-inch along Center St. from 200 W to 200 E	$478,500	0%	25.0%	75.0%	$0	$119,625	$358,875
P1-11	Install 1,250 feet of 6-inch pipe along 200 E from Center St. to 200 S	$125,000	0%	25.0%	75.0%	$0	$31,250	$93,750
P1-12	Install 1,450 feet of 6-inch pipe along 200 S from 200 E to 400 E	$145,000	0%	25.0%	75.0%	$0	$36,250	$108,750
P1-13	Install 2,100 feet of 8-inch along 400 E from Center St. to 300 S and 250 feet of 4-inch pipe to connect to existing piping	$231,000	0%	25.0%	75.0%	$0	$57,750	$173,250
P1-14	Install PRV on Puerto Dr.	$60,000	0%	25.0%	75.0%	$0	$15,000	$45,000
M-1	Phase 1 Meter Installation/Connection Cost	$639,000	0%	25.0%	75.0%	$0	$159,750	$479,250
P2-01	Install 2,700 feet of 12-inch pipe along 350 N from 200 W to 200 E	$351,000	0%	25.0%	75.0%	$0	$87,750	$263,250
P2-02	Install 700 feet of 8-inch pipe from 350 N & 200 E to 400 N & 250 E	$82,500	0%	25.0%	75.0%	$0	$20,625	$61,875
P2-03	Install 1,000 feet of 6-inch pipe along 200 E from 200 N to 400 N	$100,000	0%	25.0%	75.0%	$0	$25,000	$75,000
P2-04	Install 1,450 feet of 12-inch pipe along Center St. from Painted Hills Dr. to the intersection of Tuacahn Dr. and Snow Canyon Dr.	$217,500	0%	25.0%	75.0%	$0	$54,375	$163,125
P2-05	Install 50 feet of 2-inch pipe to loop existing piping on Tuachan Dr.	$3,000	0%	25.0%	75.0%	$0	$750	$2,250
P2-06	Install 150 feet of 6-inch pipe to connect existing piping in The Springs subdivision	$15,000	0%	25.0%	75.0%	$0	$3,750	$11,250
P2-07	Install PRV at 200 W and 400 S	$60,000	0%	25.0%	75.0%	$0	$15,000	$45,000
M-2	Phase 2 Meter Installation/Connection Cost	$855,000	0%	25.0%	75.0%	$0	$213,750	$641,250
F1	New Public Works Yard (40% of total cost to water)	$3,120,000	41.3%	14.7%	44.1%	$1,287,084	$458,229	$1,374,687
F2	New City Office/City Hall (40% of 40% of cost to water)	$560,000	41.3%	14.7%	44.1%	$231,015	$82,246	$246,739
	Total	**$11,859,300**				**$1,518,099**	**$2,981,948**	**$7,359,252**

IMPACT FEE FACILITIES PLAN

INTRODUCTION

Ivins City (City) has retained Bowen Collins & Associates (BC&A) to prepare an impact fee facilities plan (IFFP) for water supply and distribution provided by the City. The purpose of an IFFP is to determine the public facilities required to service development resulting from new development activity. The IFFP is also intended to outline the improvements which may be funded through impact fees.

Much of the analysis forming the basis of this IFFP has been taken from the City's updated culinary water and secondary irrigation master plans prepared by BC&A. For the purposes of this report, subsequent references to the master plans will simply be identified as the "Culinary Water Master Plan" or "Secondary Irrigation Master Plan", respectively. The reader should refer to the master plan studies for additional discussion of planning and evaluation methodology beyond what is contained here. Ivins City intends to use its culinary water and secondary irrigation systems as equally important parts of its overall water delivery system. Because the proposed secondary irrigation system will offset demands on the City's culinary water system components (pipes, storage tanks, pumps, etc.), all culinary water or secondary irrigation projects will be included in a "water impact fee" assessed by Ivins City.

It should be noted that this evaluation only includes the service areas of the Ivins Culinary Water System and Proposed Ivins Secondary Irrigation System as defined in each respective master plan. The Kayenta Water Users (KWU) service area has not been included in this evaluation. If and when the KWU system is joined together with the Ivins City Culinary Water System, this IFFP will need to be revised and updated.

Requirements for the preparation of an IFFP are outlined in Title 11, Chapter 36a of the Utah Code (the Impact Fees Act). Under these requirements, an IFFP shall accomplish the following for each facility:

1. Identify the existing level of service
2. Establish a proposed level of service
3. Identify excess capacity to accommodate future growth at the proposed level of service
4. Identify demands placed upon existing public facilities by new development
5. Identify the means by which demands from new development will be met
6. Consider the following additional issues
    a. revenue sources to finance required system improvements
    b. necessity of improvements to maintain the proposed level of service
    c. need for facilities relative to planned locations of schools

The following sections of this report have been organized to address each of these requirements.

EXISTING LEVEL OF SERVICE - 11-36a-302(1)(a)(i)

Level of service is defined in the Impact Fees Act as "the defined performance standard or unit of demand for each capital component of a public facility within a service area." This section discusses the level of service being currently provided to existing users.

Unit of Demand

The projected flow used to design and evaluate system components will vary depending on the nature of each component. For example, water rights are often evaluated based on average annual yields. Conversely, transmission pipelines must be designed based on peak hour flow. For the purposes of this analysis, it is useful to define these various demands in terms of Equivalent Residential Units (ERUs). An ERU represents the demand that a typical single family residence places on the system. The basis of an ERU using historical flow rates is summarized in Table 1. Additional detail regarding the calculation of values used in the definition of an ERU are contained in the City's Culinary Water Master Plan.

Table 1
Ivins City Service Area Historic Flows for Planning

Item	Value for Existing Conditions
Estimated Population	9,225
Equivalent Residential Units (ERUs)	3,629
Average Day Flow (mgd)	2.43
Average Day, Indoor Flow (mgd)	1.09
Peak Day Flow (mgd)	5.08
Peak Hour Flow (mgd)	7.88
Flows per ERU	
Average Day Flow (gpd/ERU)	670
Average Day, Indoor Flow (gpd/ERU)	302
Peak Day Flow (gpd/ERU)	1,400
Peak Hour Flow (gpm/ERU)	1.51

Performance Standard

Performance standards are those standards that are used to design and evaluate the performance of facilities. While the Impact Fees Act includes "defined performance standard" as part of the level of service definition, this report will make a subtle distinction between performance standard and level of service. The performance standard will be considered the desired minimum level of performance for each component, while the existing level of service will be the actual current performance of the component. Thus, if the existing level of service is less than the performance standard it is a deficiency. If it is greater than the performance standard it may indicate excess

capacity. This section discusses the existing performance standards for the City. A subsequent section will consider existing level of service relative to these standards.

To improve the accuracy of the analysis, this impact fee facilities plan has divided the system into different components:

- Source Production Capacity
- Storage
- Conveyance (Transmission, Distribution, and Pumping)
- Administrative and Public Works Buildings

Each of these components has its own set of performance standards:

Production Capacity

As outlined in the Regional Water Supply Agreement, Washington County Water Conservancy District is responsible for the development of new sources to meet the needs of Ivins City. Since new users are required to pay an impact fee to the District, the impact fee assessed by Ivins City will not include a component for source development and is therefore not evaluated as part of this IFFP.

Storage

Three major criteria are generally considered when sizing storage facilities for a water distribution system; operational or equalization storage, fire flow storage, and emergency or standby storage. The following are the City's performance standards for storage facilities:

- **Equalization Storage**
  - Indoor Usage: 400 gallons per ERU.
  - Outdoor: 4,964 gallons per irrigated acre. Assuming an average irrigated acreage of 0.14 acres/ERU, this equates to 694 gallons/ERU.
  - Indoor + Outdoor Storage: 1,094 gallons per ERU.
- **Fire Suppression Storage**
  - Meet individual building requirements per IFC Appendix B
- **Emergency/Standby Storage**
  - None

Conveyance

The following criteria were used as the performance standards for major conveyance facilities:

1. The system was evaluated for existing conditions and projected conditions at buildout. Each demand scenario included model runs at both peak day and peak hour demand.
2. The system should be capable of maintaining 40 psi during peak day demand and 30 psi during peak hour demand, which is consistent with State standards.

3. Per State requirements, the system must be able to meet fire flow demand and still maintain a 20 psi residual pressure in the distribution system under peak day demand conditions.
4. Pipe velocities should be limited to a maximum allowable value of 10 feet per second under all flow scenarios other than fire flow.

Administrative and Shop Buildings

In addition to the water system needs, Ivins City personnel need to be able to provide administrative and service functions for the City to satisfy a level of service for customers as described below:

1. Public Works Yard – An evaluation of available space by Ivins City personnel has determined that the existing public works yard is at capacity. Continuing to operate in this facility may ultimately reduce the serviceable life of some of vehicles and equipment which in turn can increase the overall operation and maintenance costs for the City. The City's current public works yard is composed of a number of different components, including maintenance bays, office space, open storage space, etc., and does not have a specific performance standard. Ivins City's facility plan includes the construction a new public works yard, and because this new facility will replace the existing facility, it is proposed that both existing and future users pay for the new public works yard in proportion to their overall use in the system. Thus, the level of service of the new facility will be the same for existing and future users (i.e. if the level of service is increased by the new facility, that level of service is increased for both existing and future users, and future users are not paying to increase the level of service of existing users).
2. Administration Building (City Hall) – Like the public works yard, the City does not have a specific defined performance standard for its administration building. However, City personnel have expressed dissatisfaction with the current facilities because there is insufficient space for efficient day to day operation. As part of the City's facility plan, a new 10,000 square foot City Office is planned for construction. Similar to the public works yard, it is proposed that both existing and future users pay for the new building in proportion to their overall use in the system. Thus, the level of service provided by the facility will be the same for existing and new users, so impact fees will not go toward an increase in the level of service for existing users.

Existing Level of Service

Existing level of service has been divided into the same components as identified for the system performance standard (production capacity, storage, conveyance, and admin. buildings). Existing level of service values are summarized in Table 2. For comparison purposes, Table 2 also includes a summary of the existing performance standards.

Table 2
Existing Performance Standards and Level of Service
for Various System Requirements

	Existing Performance Standard	Existing Level of Service[1]
Production Capacity		
Production Capacity (gpd/ERU)[1]	1,400	1,400
Storage		
Storage (gallons/ERU)[2]	1,094	1,170[4]
Conveyance (Transmission, Pumping, and Distribution)		
Peak Day Demand Pressure(psi)	40	32[3]
Peak Hour Demand Pressure (psi)	30	22[3]
Minimum Available Fire Flow at 20 psi during Peak Day Demand (psi)	1500[5]	850[3]
Maximum Pipe Velocity Peak Hour (feet per second)	10	13.7[3]
Buildings[6]		
Maintenance and Construction Shop	-	-
Administration Building	-	-

[1] Source capacity value shown for information only. The impact fee for source capacity is paid to the WCWCD through a separate impact fee.
[2]Does not include fire flow storage, only equalization storage.
[3] Because there are many transmission and distribution components, the value given is for the worst case only. All other components have a higher level of service with the vast majority meeting the desired performance standard
[4] Provided for storage in the system as a whole.
[5] Required fire flow indicated is for a typical residential unit.
[6] A qualitative performance standard or level of service has not been identified for buildings. However, new building facilities will have the same performance standard and level of service for existing and future users.

In some cases, the City's performance standard is higher than the existing level of service and indicates there is some deficiency in the existing system. In most cases, this is associated with limited locations in the existing system and excess capacity still may exist in other parts of the system. Excess capacity and curing of deficiencies will be discussed in subsequent sections of this report. Costs for projects to correct deficiencies that do not meet the required level of service will not be included as part of the impact fee as required by the Impact Fee Act (i.e. new users will not be required to pay to remediate existing deficiencies in the system).

PROPOSED LEVEL OF SERVICE - 11-36a-302(1)(a)(ii)

The proposed level of service is the performance standard used to evaluate system needs in the future. The Impact Fees Act indicates that the proposed level of service may:

1. diminish or equal the existing level of service; or
2. exceed the existing level of service if, independent of the use of impact fees, the City implements and maintains the means to increase the level of service for existing demand

within six years of the date on which new growth is charged for the proposed level of service.

By definition, the proposed future level of service will be equal to the performance standard and will not change for all but the administrative and shop facilities as discussed previously. Since the City's new administrative buildings will completely replace the existing facilities, the new facilities will establish a new level of service, and future users will not pay for an increase in the level of service for existing users. Table 3 summarizes the proposed performance standards and level of service.

Table 3
Proposed Performance Standards and Level of Service
for Various System Requirements

	Proposed Performance Standard	Proposed Level of Service
Production Capacity		
Production Capacity (gpd/ERU)[1]	1,400	1,400
Storage		
Storage (gallons/ERU)	1,094	1,094
Transmission and Distribution		
Peak Day Demand Pressure(psi)	40	40
Peak Hour Demand Pressure (psi)	30	30
Minimum Available Fire Flow at 20 psi during Peak Day Demand (psi)	1500[2]	1500[2]
Maximum Pipe Velocity (feet per second)	7.0	7.0
Buildings[3]		
Maintenance and Construction Shop (bays/ERU)	-	-
Administration Building (sf/ERU)	-	-

[1] Source capacity value shown for information only. The impact fee for source capacity is paid to the WCWCD through a separate impact fee.
[2] Required fire flow indicated is for typical residential neighborhood. Fire flow may be lower or higher based on Fire Authority requirements.
[3] A qualitative performance standard or level of service has not been identified for buildings. However, new building facilities will have the same performance standard and level of service for existing and future users (see explanation in text).

EXCESS CAPACITY TO ACCOMMODATE FUTURE GROWTH (11-36A-302(1)(A)(III)

Projected future growth will be met through a combination of available excess capacity in existing facilities and construction of additional capacity in new facilities. Defining existing system capacity in terms of a single number is difficult. To improve the accuracy of the analysis, the system has been divided into different components (conveyance and storage). The purpose of this breakdown is to consider the available capacity for each component individually. Excess capacity in each component of the system is as follows:

Conveyance (Transmission & Pumping)

To calculate the percentage of existing capacity to be used by future growth in existing facilities, existing and future flows were examined in the system hydraulic computer model. Because pipelines and pump stations are closely related within the operation of the system, these two components were grouped for the purposes of this analysis. The method used to calculate excess capacity available for use by future flows is as follows:

1. **Calculate Flows –** The peak flow in each facility was calculated in the model for both existing and future flows. The maximum capacity of each facility was also calculated. Defining an absolute maximum capacity in water system facility is difficult because capacity is a function of both pipeline size (with corresponding velocity) and required delivery pressure. In water distribution systems, however, a common design guideline is to limit velocities. In the case of Ivins City, the level of service designated has been velocities less than 10 ft/sec. This has been used as the definition for maximum capacity of pipelines in this analysis.
2. **Identify Available Capacity –** Where a facility has capacity in excess of projected flows at buildout, the available capacity in the facility was defined as the difference between existing flows and buildout flows. Where the facility has capacity less than projected flows at buildout, the available capacity in the facility was defined as the difference between existing flows and the facility's maximum capacity.
3. **Eliminate Facilities without Excess Capacity –** For the planning window period (in this case, 10 years), the projected growth in flow during the planning window was compared against the facility's available capacity. Where the 10-year growth flow exceeded the capacity of the facility, the available excess capacity is zero. By assigning a capacity of zero, this eliminated double counting those facilities against new users.
4. **Calculate Percent of Excess Capacity Used in Remaining Facilities –** Where the future flow was less than the capacity of the facility, the percent of excess capacity being used in each facility was calculated by dividing the growth in flow in the facility (future flow less existing flow) by the total capacity (existing flow plus available capacity).
5. **Calculate Excess Capacity for the System as a Whole –** Each pipeline in the system has a different quantity of excess capacity to be used by future growth. To develop an estimate of excess capacity on a system wide basis, the capacities of each of these pipelines and their contribution to the system as a whole must be considered. To do this, each pipeline must first be weighted based on its estimated cost. For this purpose, each pipeline has been weighted based on the product of its diameter and length (which increase linearly with cost). For example, a pipe that is 27 inches in diameter and is 4,000 ft. long will cost proportionally more than a pipe that is 10 inches in diameter and 300 ft. long. The excess capacity in the system as a whole can then be calculated as the sum of the weighted capacity used by future growth divided by the sum of total weighted capacity in the system.

It should be noted that, with the implementation of the secondary irrigation system, it is likely that the demand on the culinary water system will actually decrease over the next 3-5 years as existing and new users are connected to the secondary irrigation system. In essence, the implementation of

the secondary irrigation system will free up capacity in the existing culinary water system. This has been accounted for in the calculation of excess capacity in the system, meaning that future users will only be responsible for paying their proportionate share of the *net* increase in the usage of the given facility.

Based on the method described above, the amount of excess capacity in existing transmission and pumping facilities available to accommodate future growth and the demands placed on the existing facilities by new development activity has been calculated. As a whole, the calculated percentage of capacity in existing system facilities that is currently being used by existing users is 78.0% percent. Demands associated with growth during the 10-year planning window is calculated to use an additional 10.8% percent of the available excess capacity, with the remaining 11.2% percent of existing excess capacity to be used by demands associated with growth beyond the 10-year planning window.

Storage

The City owns and operates a number of storage reservoirs and also shares some storage facilities with the City of St. George and Santa Clara City. Table 4 summarizes the storage volume in the City's existing tanks. The existing and projected future use of existing storage capacity is summarized in Table 5. For the purpose of this calculation, only equalization storage is shown. Since both existing and future users will benefit from fire flow storage, using the percentages shown in the table divides these components proportionally based on demand.

Since all new users will be connected to the proposed secondary irrigation system, new users will only occupy the "indoor water use" portion of storage in the City's culinary water storage tanks. Storage for "outdoor water use" will be provided by a new secondary irrigation storage tank. This has been accounted for in the percentages shown in Table 5 in order to avoid double charging new users for the capacity in the existing and future facilities.

Table 4
Existing Storage Facilities

Tank Service Area	Tanks	Available Storage (gallons)	Fire Storage (gallons)	Equalization Storage
3290/3312 Zones	Cliff Rose 2MG	1,946,000		
3165 PRV Zone	Cliff Rose 2MG	1,946,000	585,000	3,782,000
3140 PRV Zone	Snow Canyon	475,000		
		4,367,000		
3460 Taviawk 3390 PRV Zone	Taviawk	486,000	240,000	246,000
3350 Tuacahn	Tuacahn	460,000	240,000	220,000
	Total	**5,313,000**	**1,065,000**	**4,248,000**

Table 5
Existing and Projected Future Utilization of Existing Storage Capacity

	Equalization Storage Requirement (gallons)	Use of Existing Facilities (gallons)	Percent Use of Existing Facilities
Existing	3,416,000	3,416,000	80.41%
End of 10-yr Planning Window (2027)	3,933,200	517,200	12.18%
Buildout	8,250,440	314,800	7.41%
Total	**8,250,440**	**4,248,000**	**100.00%**

Administrative and Shop Buildings

As discussed under the existing and proposed level of service sections, Ivins City's public works yard and City Office/City Hall are at full capacity, and these facilities have no excess capacity that will be charged to future users.

DEMANDS PLACED ON FACILITIES BY NEW DEVELOPMENT - 11-36A-302(1)(A)(IV)

Growth and new development in the City is discussed in the City's Master Plan studies. Growth projections include consideration of developable area, zoning, the nature of surrounding development, designated open space and other factors. Future growth as projected in the City's Culinary Water Master Plan is shown in Table 6.

Table 6
Projected Ivins City Water System Growth

Year	Total ERUs	Peak Day Demand[1] (gpm)
2017	3,629	3,528
2020	4,017	3,905
2025	4,663	4,533
2027	4,921	4,784
2030	5,309	5,161
2035	5,955	5,789
2040	6,601	6,417
2045	7,247	7,045
2050	7,893	7,673
2055	8,539	8,301
2057	8,797	8,553

[1]Total indoor and outdoor system demand

Projected growth in peak day demand is 1,633 gpm over the next 10 years, and 5,025 gpm through buildout.

INFRASTRUCTURE REQUIRED TO MEET DEMANDS OF NEW DEVELOPMENT - 11-36a-302(1)(a)(v)

To satisfy the requirements of state law, the effect of demand placed upon existing system facilities by future development was evaluated using the process outlined below. Each of the steps was completed as part of this plan's development. More description of the methodology used in the process outlined below can be found in the Culinary Water and Secondary Irrigation Master Plans.

1. **Existing Demand** – The demand existing development places on the City's system was estimated based on historic water use and flow records.
2. **Existing Capacity** – The capacities of existing system facilities were estimated using size data provided by the City and a hydraulic computer model.
3. **Existing Deficiencies** – Existing deficiencies in the system were looked for by comparing defined levels of service against calculated capacities.
4. **Future Demand** - The demand future development will place on the system was estimated based on development projections as discussed in a previous section.
5. **Future Deficiencies** - Future deficiencies in the collection system were identified using defined level of service and results from the computer model.
6. **Recommended Improvements** – Needed system improvements were identified to remedy existing deficiencies and meet demands associated with future development.

The steps listed above "identify demands placed upon existing public facilities by new development activity at the proposed level of service; and… the means by which the political subdivision or private entity will meet those growth demands" (Section 11-36a-302(1)(a) of the Utah Code).

10-Year Improvement Plan

In the City's Culinary Water and Secondary Irrigation Master Plans, capital facility projects needed to provide service to various parts of the City at projected ten-year and buildout scenarios were identified. As outlined in the Culinary Water and Secondary Irrigation Master Plans, nearly all future capital improvement projects in Ivins will be focused on the secondary irrigation system. These projects will need to be constructed in phases as development occurs. Only infrastructure to be constructed within a ten-year horizon will be considered in the calculation of these impact fees to avoid uncertainty surrounding improvements further into the future. Table 7 summarizes the components of projects identified in the Culinary Water and Secondary Irrigation Master Plans that will need to be constructed within the next ten years. Details associated with the costs used for each project are contained in each respective Capital Facilities Plan.

Table 7
Project Costs Allocated to Projected Development, 10-year Planning Window

Project Identifier	Project Description	Estimated Total Cost	Percent to Existing	Percent to 10-Year Growth	Percent to Beyond 10-Year	Cost to Existing	Cost to 10-yr Growth	Cost to Beyond 10-Year
P1-01	Install approximately 12,000 feet of 18-inch pipe from Gunlock Pipeline to proposed storage tank site	$1,800,000	0%	25.0%	75.0%	$0	$450,000	$1,350,000
P1-02	Construct new 2 MG irrigation water storage facility	$2,000,000	0%	44.8%	55.2%	$0	$896,648	$1,103,352
P1-03	Install 1,100 feet of 24-inch pipe from new storage facility to 450 N	$192,500	0%	25.0%	75.0%	$0	$48,125	$144,375
P1-04	Install New PRV/Vault at connection point to Gunlock Pipeline	$60,000	0%	25.0%	75.0%	$0	$15,000	$45,000
P1-05	Install 2,720 feet of 16-inch pipe along 200 W from 450 N to Center Street	$448,800	0%	25.0%	75.0%	$0	$112,200	$336,600
P1-06	Install 225 feet of 6-inch near intersection of 300 W and 200 N	$22,500	0%	25.0%	75.0%	$0	$5,625	$16,875
P1-07	Install 550 feet of 8-inch pipe along Center St. from 400 W to 495 W	$60,500	0%	25.0%	75.0%	$0	$15,125	$45,375
P1-08	Install 1,350 feet of 8-inch pipe along 400 W from 200 S to 400 S	$148,500	0%	25.0%	75.0%	$0	$37,125	$111,375
P1-09	Install 840 feet of 6-inch pipe along 400 S from 400 W to 300 W	$84,000	0%	25.0%	75.0%	$0	$21,000	$63,000
P1-10	Install 2,900 feet of 16-inch along Center St. from 200 W to 200 E	$478,500	0%	25.0%	75.0%	$0	$119,625	$358,875
P1-11	Install 1,250 feet of 6-inch pipe along 200 E from Center St. to 200 S	$125,000	0%	25.0%	75.0%	$0	$31,250	$93,750
P1-12	Install 1,450 feet of 6-inch pipe along 200 S from 200 E to 400 E	$145,000	0%	25.0%	75.0%	$0	$36,250	$108,750
P1-13	Install 2,100 feet of 8-inch along 400 E from Center St. to 300 S and 250 feet of 4-inch pipe to connect to existing piping	$231,000	0%	25.0%	75.0%	$0	$57,750	$173,250
P1-14	Install PRV on Puerto Dr.	$60,000	0%	25.0%	75.0%	$0	$15,000	$45,000
M-1	Phase 1 Meter Installation/Connection Cost	$639,000	0%	25.0%	75.0%	$0	$159,750	$479,250
P2-01	Install 2,700 feet of 12-inch pipe along 350 N from 200 W to 200 E	$351,000	0%	25.0%	75.0%	$0	$87,750	$263,250
P2-02	Install 700 feet of 8-inch pipe from 350 N & 200 E to 400 N & 250 E	$82,500	0%	25.0%	75.0%	$0	$20,625	$61,875
P2-03	Install 1,000 feet of 6-inch pipe along 200 E from 200 N to 400 N	$100,000	0%	25.0%	75.0%	$0	$25,000	$75,000
P2-04	Install 1,450 feet of 12-inch pipe along Center St. from Painted Hills Dr. to the intersection of Tuacahn Dr. and Snow Canyon Dr.	$217,500	0%	25.0%	75.0%	$0	$54,375	$163,125
P2-05	Install 50 feet of 2-inch pipe to loop existing piping on Tuachan Dr.	$3,000	0%	25.0%	75.0%	$0	$750	$2,250
P2-06	Install 150 feet of 6-inch pipe to connect existing piping in The Springs subdivision	$15,000	0%	25.0%	75.0%	$0	$3,750	$11,250
P2-07	Install PRV at 200 W and 400 S	$60,000	0%	25.0%	75.0%	$0	$15,000	$45,000
M-2	Phase 2 Meter Installation/Connection Cost	$855,000	0%	25.0%	75.0%	$0	$213,750	$641,250
F1	New Public Works Yard (40% of total cost to water utility)	$3,120,000	41.3%	14.7%	44.1%	$1,287,084	$458,229	$1,374,687
F2	New City Office/City Hall (40% of 40% of cost to water utility)	$560,000	41.3%	14.7%	44.1%	$231,015	$82,246	$246,739
	Total	**$11,859,300**				**$1,518,099**	**$2,981,948**	**$7,359,252**

Project Cost Attributable to Future Growth

To satisfy the requirements of state law, Table 7 provides a breakdown of the capital facility projects and the percentage of the project costs attributed to existing and future users. As defined in Section 11-36a-102(15), the impact fee facilities plan should only include the proportionate share of "the cost of public facilities that are roughly proportionate and reasonably related to the service demands and needs of any development activity." While the majority of the projects identified in the table are required solely to meet future growth, some projects also provide a benefit to existing users.

For projects needed to address both existing deficiencies and new growth or where a higher level of service is being proposed, costs have been divided proportionally between existing and future users based on their proportionate utilization of the facility. These percentages have been calculated based on the projected utilization of each facility. A few additional notes regarding specific projects are as follows:

- **Project P1-02 – 2 MG Irrigation Storage Tank**: This 2 MG storage tank will be one of the first projects constructed as part of the proposed secondary irrigation system. Cost distribution for this project was calculated using the City's performance standard for outdoor water storage per ERU. Growth over the next 10 years is projected to utilize 44.8% of this storage tanks capacity, with the remaining 55.2% percent being used by development beyond the 10-year planning window.
- **Project P1-01, P1-03 – P1-14, P2-01 – P2-07, M-1 – M-2 (Multiple Water System Pipelines, PRVs, and Meter Installation**: The majority of the projects contained in Table 7 are transmission and distribution pipes to deliver secondary irrigation water to users. The purpose of the secondary irrigation system is to provide access to sources of water that would otherwise not be useable in a water system (i.e. sources that do not meet drinking water standards or that would be too expensive to treat to drinking water standards). In essence, the expansion of the secondary irrigation system can be treated as a source development project. From this perspective, all of the projects needed to convey water to users can be considered as if they were a single project. This means that, no matter where the secondary irrigation ends up being delivered, it provides a benefit to the City by reducing the demand on the culinary water system and preserving culinary water source capacity for future users. This considered, the cost distribution for these projects was calculated by dividing the number of projected ERUs to be added to the system over the next 10 years by the total number of ERUs to be added through buildout, evenly distributing the cost of the facilities to future users.

Table 7 does not include bond costs related to paying for impact fee eligible improvements. These costs are calculated as part of the impact fee analysis. It should be noted that the maintenance shops and new office building will service multiple utilities other than water (sewer, storm drain, and roads). This being the case, costs for new buildings will be divided between the different utilities at the direction of the City as follows:

- Water: 40%
- Sewer: 25%

- Roads: 25%
- Storm Drain: 10%

Note that 40% of the cost of the new Ivins City Hall will be attributed to Public Works. Hence, the cost of the new City Hall attributed to the water utility is 40% of 40% (net 16%) of the total project cost.

Basis of Construction Cost Estimates

The costs of construction for projects to be completed within ten years have been estimated based on past experience with projects of a similar nature.

ADDITIONAL CONSIDERATIONS

MANNER OF FINANCING - 11-36a-302(2)

The City may fund the infrastructure identified in this IFFP through a combination of different revenue sources.

Federal and State Grants and Donations

Impact fees cannot reimburse costs funded or expected to be funded through federal grants and other funds that the City has received for capital improvements without an obligation to repay. Grants and donations are not currently contemplated in this analysis. If grants become available for constructing facilities, impact fees will need to be recalculated and an appropriate credit given. Any existing infrastructure funded through past grants will be excluded from the system value during the impact fee analysis.

Bonds

None of the costs contained in this IFFP include the cost of bonding. The cost of bonding required to finance impact fee eligible improvements identified in the IFPP may be added to the calculation of the impact fee. This will be considered in the impact fee analysis.

Interfund Loans

Because infrastructure must generally be built ahead of growth, there often arise situations in which projects must be funded ahead of expected impact fee revenues. In some cases, the solution to this issue will be bonding. In others, funds from existing user rate revenue will be loaned to the impact fee fund to complete initial construction of the project and will be reimbursed later as impact fees are received. Consideration of potential interfund loans will be included in the impact fee analysis and should be considered in subsequent accounting of impact fee expenditures.

Impact Fees

It is recommended that impact fees be used to fund growth-related capital projects as they help to maintain the proposed level of service and prevent existing users from subsidizing the capital needs for new growth. Based on this IFFP, an impact fee analysis will be able to calculate a fair and legal fee that new growth should pay to fund the portion of the existing and new facilities that will benefit new development.

Developer Dedications and Exactions

Developer exactions are not the same as grants. If a developer constructs a system improvement or dedicates land for a system improvement identified in this IFFP, or dedicates a public facility that is recognized to reduce or eliminate the need for a system improvement, the developer will be entitled to an appropriate credit against that particular developer's impact fee liability or a proportionate reimbursement.

If the value of the credit is less than the development's impact fee liability, the developer will owe the balance of the liability to the City. If the recognized value of the improvements/land dedicated is more than the development's impact fee liability, the City must reimburse the difference to the developer from impact fee revenues collected from other developments.

It should be emphasized that the concept of impact fee credits pertains to system level improvements only. Developers will be responsible for the construction of project improvements (i.e. improvements not identified in the impact fee facilities plan) without credit against the impact fee.

NECESSITY OF IMPROVEMENTS TO MAINTAIN LEVEL OF SERVICE - 11-36a-302(3)

According to State statute, impact fees cannot be used to correct deficiencies in the City's system and must be necessary to maintain the proposed level of service established for all users. Only those facilities or portions of facilities that are required to maintain the proposed level of service for future growth have been included in this IFFP. Additionally, any portion of projects being used to cure existing deficiencies that will be paid for through future user rates will be accounted for through an impact fee credit to be calculated as part of the impact fee analysis. This will result in an equitable fee as future users will not be expected to fund any portion of the facilities that will benefit existing residents.

IMPACT FEE CERTIFICATION 11-36A-306(1)

This IFFP has been prepared in accordance with Utah Code Title 11 Chapter 36a (the "Impact Fees Act"), which prescribes the laws pertaining to the imposition of impact fees in Utah. The accuracy of this IFFP relies in part upon planning, engineering, and other source data, provided by the City and its designees.

In accordance with Utah Code Annotated, 11-36a-306(1), Bowen Collins & Associates makes the following certification:

I certify that the attached impact fee facilities plan:

1. Includes only the costs of public facilities that are:
    a. allowed under the Impact Fees Act; and
    b. actually incurred; or
    c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;
2. Does not include:
    a. costs of operation and maintenance of public facilities;
    b. costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by existing residents; or
    c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement; and
3. Complies in each relevant respect with the Impact Fees Act.



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