Impact Fee Facilities Plan

for Culinary Water

March 2018

Prepared by:

BOWEN COLLINS & ASSOCIATES
Celebrating 20 Years

Prepared for:

LEHI CITY

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EXECUTIVE SUMMARY

INTRODUCTION

Lehi City has retained Bowen Collins & Associates (BC&A) and Zions Bank Public Finance (ZBPF) to prepare impact fee facility plans (IFFPs) for eight different services provided by the City. The subject of this IFFP document is culinary water. The purpose of an IFFP 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 will address the future infrastructure needed to serve the City with regard to current land use planning. 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 future infrastructure needs, it is first necessary to project how demand for culinary water will increase in the future. An equivalent residential unit (ERU) of culinary water demand for different development types was developed based on information provided by the Lehi City Planning and Water Departments. Projected 10-year growth in single family residential, multi-family, and non-residential ERUs were developed based on projected 2026 development conditions as summarized in Table ES-1.

Table ES-1
Projected 10-Year Growth (ERUs)

Year	Single Family Units	Multifamily Units	Non-Residential Area (ksf)	Total ERUs[1]
2016	13,230	3,536	12,486	17,849
2020	14,912	3,986	14,074	20,119
2026	17,436	4,660	16,455	23,523
2030	19,108	5,107	18,033	25,779
2040	23,288	6,224	21,978	31,419
2050	27,469	7,342	25,924	37,059
2060	31,649	8,459	29,869	42,699
Build-Out	32,902	8,922	78,318	51,269

[1] Utah Governor's Office of Management and Budget, Lehi City Planning Department

Total annual and peak day demands can be estimated by multiplying the projected ERUs by the peak day demands per ERU. Projected culinary water demands for Lehi City are summarized in Table ES-2.

Table ES-2
Projections of Future Culinary Water Demand

Year	Peak Day Demand (mgd)	Peak Day Production Requirement with Redundancy (mgd)	Annual Demand (acre-ft)
2016	7.2	9.6	5,094
2020	8.1	10.9	5,742
2026	9.5	12.7	6,714
2030	10.4	13.9	7,358
2040	12.7	17.0	8,967
2050	15.0	20.0	10,577
2060	17.3	23.0	12,187
Build-Out	20.9	27.9	14,770

The basis of an ERU for historical flow rates is summarized in Table ES-3.

Table ES-3
Service Area Historic Flows

Item	Value for Existing Conditions
Population	60,049
Equivalent Residential Units (ERUs)	17,849
Average Day Demand (mgd)	4.55
Peak Day Demand (mgd)	7.24
Peak Hour Demand (mgd)	14.48
Flows per ERU	
Average Day Demand (gpd/ERU)	254.8
Peak Day Demand (gpd/ERU)	405.7
Peak Hour Demand (gpm/ERU)	811.4

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-4.

Table ES-4
Performance Standards and Level of Service
for Various System Requirements

	Performance Standard	Existing Level of Service[1]	Proposed Level of Service[1]
Production Capacity			
Production Capacity (gpd/ERU)	540	838	540
Pumping Capacity			
Pumping Capacity (gpd/ERU)	406	585[2]	406
Storage			
Storage (gallons/ERU)[3]	400[4]	500	400
Transmission and Distribution			
Peak Day Demand Pressure(psi)	40	35[2]	40
Peak Hour Demand Pressure (psi)	30	29[2]	30
Minimum Available Fire Flow at 50 psi during Peak Day Demand (gpm)	550[5]	146[2]	550

[1] Existing level of service represents level available, not necessarily level used. For example, the storage being used per ERU will be 400 gallons even though the amount available is 500 gallons.
[2] Because there are many pump stations and thousands of 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.
[3] Does not include fire storage volumes in calculation.
[4] Required storage based on the capital facility plan is 406 gallons/ERU. This value is rounded down to 400 gallons/ERU to simplify design requirements for developers.
[5] Because fire hydrants are supplied via the City's pressurized irrigation system, the fire flow requirement for the culinary water system provides fire protection primarily for sprinkler systems at non-residential connections. As a result, the fire flow requirement for the culinary system are much lower than the 1,500 gpm typically required for residential areas (or compared to other cities).

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 (production/treatment, storage, and transmission/pumping). Excess capacity in each component of the system is as follows:

Production/Treatment

Table ES-5 summarizes the excess capacity of the two sources with available capacity to be used by 10-year growth.

Table ES-5
Excess Production Capacity for Sources Supplying 10-Year Growth

Sources for 10-Year Growth	Capacity (gpm)	Existing Use (gpm)	10-Year Use (gpm)	Buildout Use (gpm)	Percent to Existing	Percent to 10-Year Growth	Percent to Buildout
Sandpit Well	1,300	1,288	5	7	99.1%	0.39%	0.5%
CWP Gardner/Holbrook	2,355	0	831	1524	0.0%	35.28%	64.7%
CWP	930	0	554	376	0.0%	59.56%	40.4%

Storage

The City owns and operates a large number of storage reservoirs. The calculated percentage of existing capacity currently in use by existing development is 80.0 percent. Growth during the next 10 years is calculated to use an additional 5.5 percent, with the remaining 14.4 percent of existing storage to be used by growth beyond the 10-year planning window.

Transmission/Pumping

Use of transmission and pumping capacity was evaluated using the updated computer model of the City's conveyance system. The calculated percentage of existing capacity currently in use by existing development is 57.0 percent. Growth during the next 10 years is calculated to use an additional 6.1 percent, with the remaining 36.9 percent of existing capacity to be used by growth beyond the 10-year planning window.

REQUIRED SYSTEM IMPROVEMENTS

Beyond available existing capacity, additional improvements required to serve new growth are summarized in Table ES-6. To satisfy the requirements of state law, Table ES-6 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
Impact Fee Facilities Plan - Costs Required for Future Growth

Project Identifier	Estimated Project Year	Estimated Total City Cost (2018 Dollars)	Percent to Existing	Percent to 10-Year	Percent to Buildout	Cost to Existing	Cost to 10-Year Growth	Cost to Growth Beyond 10-Years
CC-03	2021	$1,195,000	0.0%	40.6%	59.4%	$0	$485,170	$709,830
CC-07	2018	$207,000	41.8%	5.5%	52.7%	$86,526	$11,385	$109,089
CC-09	2022	$153,000	0.0%	40.6%	59.4%	$0	$62,118	$90,882
CC-10	2019	$1,553,000	41.8%	3.6%	54.6%	$649,154	$55,908	$847,938
CC-11	2024	$6,000	3.8%	1.8%	94.4%	$228	$108	$5,664
CC-17	2018	$3,706,000	0.0%	5.5%	94.5%	$0	$202,672	$3,503,328
CC-23	2022	$188,000	41.8%	2.1%	56.1%	$78,584	$3,948	$105,468
CC-27	2018	$18,000	41.8%	5.5%	52.7%	$7,524	$990	$9,486
CC-28	2023	$5,000	41.8%	1.5%	56.7%	$2,090	$75	$2,835
CC-34	2022	$26,000	41.8%	2.1%	56.1%	$10,868	$546	$14,586
CC-39	2022	$237,000	41.8%	2.1%	56.1%	$99,066	$4,977	$132,957
CC-42	2024	$3,000	41.8%	1.0%	57.2%	$1,254	$30	$1,716
CC-44	2022	$202,000	0.0%	18.4%	81.6%	$0	$37,168	$164,832
CC-52	2019	$45,000	41.8%	3.6%	54.6%	$18,810	$1,620	$24,570
CST-1	2017	$2,271,000	0.0%	32.1%	67.9%	$0	$728,991	$1,542,009
CST-2	2018	$3,124,000	34.8%	27.7%	37.5%	$1,087,152	$865,348	$1,171,500
CST-4	2022	$2,012,000	0.0%	18.4%	81.6%	$0	$370,208	$1,641,792
CST-5	2019	$3,015,000	0.0%	27.7%	72.3%	$0	$835,155	$2,179,845
CS-1	2017	$2,369,000	0.0%	42.2%	57.8%	$0	$999,718	$1,369,282
CB-1	2019	$415,000	34.8%	1.0%	64.2%	$144,420	$4,150	$266,430
CB-2	2025	$355,000	0.0%	18.4%	81.6%	$0	$65,320	$289,680
CB-3	2020	$237,000	0.0%	42.2%	57.8%	$0	$100,014	$136,986
	TOTAL	**$21,342,000**				**$2,185,676**	**$4,835,619**	**$14,320,705**

SECTION 1
INTRODUCTION

Lehi City has retained Bowen Collins & Associates (BC&A) and Zions Bank Public Finance (ZBPF) to prepare impact fee facility plans (IFFPs) for eight different services provided by the City. The subject of this IFFP document is culinary water. The purpose of an IFFP 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.

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
4. Identify demands of 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.

SECTION 2
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

It is necessary to define a unit of demand to evaluate the capacity used by both existing and future development. The unit of demand for culinary water is being defined as an equivalent residential unit (ERU) of water demand. Single-family homes represent a single equivalent residential unit. Equivalent residential units for multifamily homes and non-residential building space were developed based on input from Lehi City personnel and historical water use from single family, multifamily, and non-residential development types. Table 2-1 shows the demand estimated for each ERU in the City.

Table 2-1
Existing Demand per Equivalent Residential Unit

Item	Value for Existing Conditions
Population	60,049
Equivalent Residential Units (ERUs)	17,849
Average Day Demand (mgd)	4.55
Peak Day Demand (mgd)	7.24
Peak Hour Demand (mgd)	14.48
Flows per ERU	
Average Day Demand (gpd/ERU)	254.8
Peak Day Demand (gpd/ERU)	405.7
Peak Hour Demand (gpm/ERU)	811.4

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 four different components (production capacity, pumping capacity, storage, and transmission). Each of these components has its own set of performance standards:

Production Capacity

Water production must be adequate to satisfy demands on both an annual and peak day basis. Production of supplies must take into account seasonal limitations in supply availability and reductions in yield because of dry year conditions. For peak day demands, the City requires 33 percent source redundancy to account for mechanical failures amongst its water sources.

Pumping Capacity

Some areas of the City require pumps to deliver water from lower pressure zones to higher pressure zones. For each pressure zone relying on pumped water, the system should be capable of pumping peak day demands with the largest single pump at any on the pump stations serving the zone out of service. Because there are multiple pressure zones, this level of service will vary by individual zone.

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.

1. **Operational/Equalization Storage:** Operational/equalization storage is the storage required to satisfy the difference between the maximum rate of supply and the rate of demand during peak conditions. Sources, major transmission pipelines, and pump stations are usually sized to convey peak day demands to optimize the capital costs of infrastructure. During peak hour demands, storage is needed to meet the difference in source/conveyance capacity and the increased peak instantaneous demands. Based on the historic usage, the equalization storage for culinary demands in the City was calculated to be 50 percent of average peak day demands (202.84 gallons/ERU for culinary).
2. **Fire Flow Storage*:*** Fire flow storage is the amount of water needed to combat fires occurring in the distribution system. For Lehi City, nearly all City hydrants are supported by the pressure irrigation system. However, all commercial fire suppression systems are supported using the culinary water system. Required fire flow storage is calculated based on the fire flow rate for structures in each area of the system multiplied by a specified

duration as required by the fire authority or a fire suppression system engineer. Storage requirements vary between 33,000 gallons and 180,000 gallons depending on the facility.

3. **Emergency Storage:** Emergency or standby storage is the storage needed to meet demands in the event of an unexpected emergency situation such as a line break, treatment plant failure, or other unexpected event. For the City, the critical scenario appears to be providing water during a power outage during the peak day. The level of service established for existing customers is to provide 12 hours of peak day demand of emergency storage.

Storage requirements are calculated for the system as a whole and for each individual zone.

Transmission and Distribution

Based on input from City staff, 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. Under peak day demand, the system must be capable of maintaining constant levels at all system tanks and reservoirs.
3. The City tries to maintain pressure between 60 psi and 120 psi for the full range of demands (peak hour and to static conditions). Where topography would require a large number of pressure reducing valves (terrain slopes greater than 5 percent) to maintain pressures in that range, the City should be capable of maintaining 40 psi during peak day demand and 30 psi during peak hour demand, which is consistent with State standards (State of Utah Administrative Rule R309-105-9).
4. Fire flow demands on the culinary system may range between 550 gpm and 1,900 gpm depending on specific fire suppression requirements as specified by the City's Fire Marshal. Residual pressure requirements in the Lehi City culinary system is 50 psi during peak day demand to account for sprinkler systems in some of the City's taller buildings. Lehi City staff may allow exceptions to the 50 psi requirement where terrain topography limits available pressure and building height is limited. In no case does the City allow residual fire flow pressure to drop below State of Utah minimum requirements during peak day demand (20 psi).

The performance standard defines the level of service the City has established to satisfy City and/or State performance requirements. For culinary water, this standard has been based on current Lehi City Code and requirements of the State of Utah Division of Drinking Water.

EXISTING LEVEL OF SERVICE SUMMARY

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

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

	Performance Standard	Existing Level of Service[1]
Production Capacity		
Production Capacity (gpd/ERU)	540	838
Pumping Capacity		
Pumping Capacity (gpd/ERU)	406	585[2]
Storage		
Storage (gallons/ERU)[3]	400[4]	500
Transmission and Distribution		
Peak Day Demand Pressure(psi)	40	36[2]
Peak Hour Demand Pressure (psi)	30	29[2]
Minimum Available Fire Flow at 50 psi during Peak Day Demand (gpm)	550[5]	146[2]

[1] Existing level of service represents level available, not necessarily level used. For example, the storage being used per ERU will be 400 gallons even though the amount available is 500 gallons.
[2] Because there are many pump stations and thousands of 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.
[3] Does not include fire storage volumes in calculation.
[4] Required storage based on the capital facility plan is 406 gallons/ERU. This value is rounded down to 400 gallons/ERU to simplify design requirements for developers.
[5] Because fire hydrants are supplied via the City's pressurized irrigation system, the fire flow requirement for the culinary water system provides fire protection primarily for sprinkler systems at non-residential connections. As a result, the fire flow requirement for the culinary system are much lower than the 1,500 gpm typically required for residential areas (or compared to other cities).

In a few 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.

SECTION 3
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 Fee 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, proposed future level of service will be equal to the performance standard. Table 3-1 summarizes the proposed performance standards and level of service.

Table 3-1
Performance Standards and Proposed Level of Service
for Various System Requirements

	Performance Standard	Proposed Level of Service
Production Capacity		
Production Capacity (gpd/ERU)	540	540
Pumping Capacity		
Pumping Capacity (gpd/ERU)	406	406
Storage		
Storage (gallons/ERU)[1]	400	400
Transmission and Distribution		
Peak Day Demand Pressure(psi)	40	40
Peak Hour Demand Pressure (psi)	30	30
Minimum Available Fire Flow at 50 psi during Peak Day Demand (psi)	550	550

[1] Required storage based on the capital facilities plan is 406 gallons/ERU. This value is rounded down to 400 gallons/ERU to simplify design requirements.

SECTION 4
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, we have broken down excess capacity into the same four categories as defined for level of service (production, pumping, storage, and transmission) but have grouped transmission and pumping to facilitate evaluation. 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:

Production

The City's Capital Facility Plan includes an analysis of available supply to service existing and projected demands. This analysis includes consideration of annual supply and peak production capacity. Existing sources within the City, which includes groundwater wells, springs, and connections to the Central Water Project (CWP) have more capacity than is needed for existing use. The newest sources in the City's culinary water system include the Sandpit Well and the CWP connections. Table 4-1 summarizes the excess capacity of these two sources that will be used by 10-year growth.

Table 4-1
Excess Production Capacity for Sources Supplying 10-Year Growth

Sources for 10-Year Growth	Capacity (gpm)	Existing Use (gpm)	10-Year Use (gpm)	Buildout Use (gpm)	Percent to Existing	Percent to 10-Year Growth	Percent to Buildout
Sandpit Well	1,300	1,288	5	7	99.1%	0.39%	0.5%
CWP Gardner/Holbrook	2,355	0	831	1524	0.0%	35.28%	64.7%
CWP	930	0	554	376	0.0%	59.56%	40.4%

Storage

The City owns and operates a large number of storage reservoirs. Available storage in the City's water system exceeds existing storage requirements. All of these storage reservoirs act in unison to serve the water system. Table 4-2 summarizes the excess capacity available to serve future growth from the existing storage facilities.

Table 4-2
Excess Storage Capacity for 10-Year Growth

Storage for 10-Year Growth	Capacity (gallons)	Existing Use (gallons)	10-Year Use (gallons)	Buildout Use (gallons)	Percent to Existing	Percent to 10-Year Growth	Percent to Buildout
Existing Storage	8,920,000[1]	7,139,520	493,995	1,286,485	80.04%	5.54%	14.42%

[1] Does not include fire storage

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 system 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:

- **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 to less than 7 ft/sec. This has been used as the definition for maximum capacity of pipelines in this analysis.
- **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.
- **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 future flow exceeded the capacity of the facility, the available excess capacity is zero. By definition, this corresponds to those facilities with deficiencies that are identified in the facilities plan. By assigning a capacity of zero, this eliminated double counting those facilities against new users.
- **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).
- **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 relative 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.

Based on the method described above, the amount of excess capacity in existing facilities available to accommodate future growth and the demands placed on the existing facilities by new development activity has been calculated for elements in the transmission/pumping system by BC&A. The calculated percentages are summarized in Table 4-3.

Table 4-3
Percentage Use of Transmission/Pumping System by Existing and Future Users

Facility	Percent Use By Existing	Percent Available to 10-Year Growth	Percent Available to Growth Beyond 10-Years
Existing Culinary Conveyance System	57.0%	6.1%	36.9%

SECTION 5
DEMANDS PLACED ON FACILITIES BY NEW DEVELOPMENT (11-36a-302(1)(a)(iv))

Growth and new development in Lehi City is discussed in detail in the City's Water Capital Facilities Plan. A summary of the projections for future residential and non-residential growth is contained in the table below. Non-residential growth includes all non-residential uses such as business, churches, offices, retail, medical facilities, etc. For the purpose of the IFFP, projections in Table 5-1 start with 2016 permitted ERUs and grow based on input from Lehi City planning and with information from the Governor's Office of Management and Budget.

Table 5-1
Projections of Future Growth

Year	Single Family Units	Multifamily Units	Non-Residential Area (ksf)	Total ERUs[1]
2016	13,230	3,536	12,486	17,849
2020	14,912	3,986	14,074	20,119
2026	17,436	4,660	16,455	23,523
2030	19,108	5,107	18,033	25,779
2040	23,288	6,224	21,978	31,419
2050	27,469	7,342	25,924	37,059
2060	31,649	8,459	29,869	42,699
Build-Out	32,902	8,922	78,318	51,269

[1] Utah Governor's Office of Management and Budget, Lehi City Planning Department

Total annual and peak day demands can be estimated by multiplying the projected ERUs by the peak day demands per ERU. Projected culinary water demands for Lehi City are summarized in Table 5-2.

Table 5-2
Projections of Future Culinary Water Demand

Year	Peak Day Demand (mgd)	Peak Day Production Requirement (mgd)	Annual Demand (acre-ft)
2016	7.2	9.6	5,094
2020	8.1	10.9	5,742
2026	9.5	12.7	6,714
2030	10.4	13.9	7,358
2040	12.7	17.0	8,967
2050	15.0	20.0	10,577
2060	17.3	23.0	12,187
Build-Out	20.9	27.9	14,770

SECTION 6
INFRASTRUCTURE REQUIRED TO MEET DEMANDS OF NEW DEVELOPMENT (11-36a-302(1)(a)(v))

To satisfy the requirements of state law, demand placed upon existing system facilities by future development was projected using the process outlined below. These steps were completed as part of this plan's development.

1. **Existing Demand** – The demand of existing development was determined by measuring the current peak demands on facilities.
2. **Existing Capacity** – The capacities of the existing water system components were evaluated based on the level of service criteria defined by the City and a hydraulic model simulation of the City's water system.
3. **Existing Deficiencies** – Existing deficiencies in the system were looked for by comparing defined levels of service against calculated levels of service. Some deficiencies were identified in the culinary water system. Per impact fee requirements, projects or costs associated with eliminating existing deficiencies will not be recovered through impact fees.
4. **Future Demand** - The demand that future development will place on the system was estimated based on development projections as discussed in Section 5.
5. **Future Deficiencies** - Future deficiencies in the system were identified using the defined level of service and results from a hydraulic computer model.
6. **Recommended Improvements** – Needed system improvements were identified to meet demands associated with future development.

The steps listed above describe the "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

Only infrastructure to be constructed within a 10-year horizon will be considered in the calculation of these impact fees to avoid uncertainty surrounding improvements further into the future. Table 6-1 summarizes the projects that will need to be constructed within the next 10 years as identified above.

Table 6-1
Summary of Future Culinary Water Impact Fee Facility Improvements

Project type	Project Identifier	Project Description	Estimated Project Year	Estimated Total City Cost (2018 Dollars)
Conveyance	CC-03	West of River, North of 2100 N	2021	$1,195,000
Conveyance	CC-07	Bull River Rd	2018	$207,000
Conveyance	CC-09	West of River, South of 2100 N	2022	$153,000
Conveyance	CC-10	Sandpit Tank Connection	2019	$1,553,000
Conveyance	CC-11	400 E 400 N	2024	$6,000
Conveyance	CC-17	600 East Tank Connection	2018	$3,706,000
Conveyance	CC-23	Lehi Jr High	2022	$188,000
Conveyance	CC-27	900 N 1300 W	2018	$18,000
Conveyance	CC-28	1100 W Woods Dr	2023	$5,000
Conveyance	CC-34	Main St 2000 W	2022	$26,000
Conveyance	CC-39	200 S 1400 E	2022	$237,000
Conveyance	CC-42	1100 W 800 S	2024	$3,000
Conveyance	CC-44	Holbrook Upper	2022	$202,000
Conveyance	CC-52	Pilgrims Tank Booster - Phase 1	2019	$45,000
Storage	CST-1	West Side 1 (2.3 MG)	2017	$2,271,000
Storage	CST-2	600 East (2.3 MG, 1.3 New)	2018	$3,124,000
Storage	CST-4	Holbrook Upper (0.8 MG)	2022	$2,012,000
Storage	CST-5	Sand Pit (2 MG)	2019	$3,015,000
Source	CS-1	Flight Park Well	2017	$2,369,000
Booster	CB-1	To Pilgrims Booster	2019	$415,000
Booster	CB-2	Holbrook Upper	2025	$355,000
Booster	CB-3	CWP Booster to West Side 1 Tank	2020	$237,000
			TOTAL	**$21,342,000**

PROJECT COST ATTRIBUTABLE TO FUTURE GROWTH

To satisfy the requirements of state law, Table 6-2 provides a breakdown of the capital facility projects and the percentage of the project costs attributed to future users. As defined in Section 11-36-304, the impact fee facilities plan should only include "the proportionate share of the costs of public facilities [that] are reasonably related to the new development activity."

Included in the tables is a breakdown of capacity associated with growth through the next 10 years and for growth beyond 10 years. Some new water infrastructure proposed in the impact fee facility plan will include capacity for growth beyond the 10-year planning window. To most accurately evaluate the cost of providing service for growth during the next 10 years, added consideration must be given to evaluating how much of each project will be used in the next 10 years. Table 6-2 summarizes to the utilization rate of the new water projects by future growth.

For many projects, the division of costs between existing and future users is easy because 100 percent of the project costs can be attributed to one category or the other (e.g. infrastructure needed solely to serve new development can be 100 percent attributed to new growth, while projects related to existing condition or capacity deficiencies can be 100 percent attributed to existing user needs). 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 needs in the facility. A few additional notes regarding specific projects are as follows:

- Looping/Upsize Projects – The City has a number of projects primarily intended to serve future development that also improve looping/redundancy in the distribution system. For simplicity, projects that upsize existing pipes or add looping to serve future growth have been considered level of service upgrades. The percentage assigned to existing users is based on the approximate percentage of capacity used by existing customers. This will overestimate the benefit received by existing users, but makes sure no costs are assigned to impact fees that are not directly growth related.
- CC-52: Pilgrims Tank Booster – Phase 1 – A booster station and some associated piping is needed to provide additional conveyance capacity to the Pilgrims Tank. This resolves some conveyance capacity deficiencies and provides redundancy and looping on a larger scale in the City's water system. The percentage of the project used by existing growth has been assigned proportionate to use.
- CST-2: 600 East Tank Replacement –The existing 600 East storage tank is in poor condition and requires replacement. The new tank will replace the existing storage as well as provide additional capacity for future growth. The percentage assigned to existing growth is based on the approximate percentage of the storage tank in current use.

Table 6-2
Impact Fee Facilities Plan - Costs Required for Future Growth

Project Identifier	Estimated Project Year	Estimated Total City Cost (2017 Dollars)	Percent to Existing	Percent to 10-Year	Percent to Buildout	Cost to Existing	Cost to 10-Year Growth	Cost to Growth Beyond 10-Years
CC-03	2021	$1,195,000	0.0%	40.6%	59.4%	$0	$485,170	$709,830
CC-07	2018	$207,000	41.8%	5.5%	52.7%	$86,526	$11,385	$109,089
CC-09	2022	$153,000	0.0%	40.6%	59.4%	$0	$62,118	$90,882
CC-10	2019	$1,553,000	41.8%	3.6%	54.6%	$649,154	$55,908	$847,938
CC-11	2024	$6,000	3.8%	1.8%	94.4%	$228	$108	$5,664
CC-17	2018	$3,706,000	0.0%	5.5%	94.5%	$0	$202,672	$3,503,328
CC-23	2022	$188,000	41.8%	2.1%	56.1%	$78,584	$3,948	$105,468
CC-27	2018	$18,000	41.8%	5.5%	52.7%	$7,524	$990	$9,486
CC-28	2023	$5,000	41.8%	1.5%	56.7%	$2,090	$75	$2,835
CC-34	2022	$26,000	41.8%	2.1%	56.1%	$10,868	$546	$14,586
CC-39	2022	$237,000	41.8%	2.1%	56.1%	$99,066	$4,977	$132,957
CC-42	2024	$3,000	41.8%	1.0%	57.2%	$1,254	$30	$1,716
CC-44	2022	$202,000	0.0%	18.4%	81.6%	$0	$37,168	$164,832
CC-52	2019	$45,000	41.8%	3.6%	54.6%	$18,810	$1,620	$24,570
CST-1	2017	$2,271,000	0.0%	32.1%	67.9%	$0	$728,991	$1,542,009
CST-2	2018	$3,124,000	34.8%	27.7%	37.5%	$1,087,152	$865,348	$1,171,500
CST-4	2022	$2,012,000	0.0%	18.4%	81.6%	$0	$370,208	$1,641,792
CST-5	2019	$3,015,000	0.0%	27.7%	72.3%	$0	$835,155	$2,179,845
CS-1	2017	$2,369,000	0.0%	42.2%	57.8%	$0	$999,718	$1,369,282
CB-1	2019	$415,000	34.8%	1.0%	64.2%	$144,420	$4,150	$266,430
CB-2	2025	$355,000	0.0%	18.4%	81.6%	$0	$65,320	$289,680
CB-3	2020	$237,000	0.0%	42.2%	57.8%	$0	$100,014	$136,986
	TOTAL	**$21,342,000**				**$2,185,676**	**$4,835,619**	**$14,320,705**

Projects in Table 6-2 with no percentage assigned to existing are 100 percent needed for future growth. It should be noted that Table 6-2 does not include bond costs related to paying for impact fee eligible improvements. These costs, if any, should be added as part of the impact fee analysis.

BASIS OF CONSTRUCTION COST ESTIMATES

The costs of construction for projects to be completed within ten years have been estimated based on past BC&A and/or Lehi City personnel experience with projects of a similar nature. Pipeline project costs are based on average per foot costs for pipes of a similar nature. Costs include consideration of other components of the water distribution system including water services, meters, and surface restoration as appropriate for each project.

SECTION 7
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 removed 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 arises 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. Developer exactions may be considered in the inventory of current and future public safety infrastructure. If a developer constructs a facility or dedicates land within the development, the value of the dedication is credited against that particular developer's impact fee liability.

If the value of the dedication/exaction is less than the development's impact fee liability, the developer will owe the balance of the liability to the City. If the value of the improvements dedicated is worth 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. For project level improvement (i.e. projects not identified in the impact fee facilities plan), developers will be responsible for the construction of the improvements without credit against the impact fee.

No developer dedications have currently been identified for infrastructure associated with this plan.

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 system and must be necessary to maintain the proposed level of service established for all users. Only those projects or portions of projects that are required to maintain the proposed level of service for future growth have been included in this IFFP. This will result in an equitable fee as future users will not be expected to fund any portion of the projects that will benefit existing residents.

SCHOOL RELATED INFRASTRUCTURE (11-36a-302(2))

As part of the noticing and data collection process for this plan, information was gathered regarding future school district and charter school development. Where the City is aware of the planned location of a school, required public facilities to serve the school have been included in the impact fee analysis.

NOTICING AND ADOPTION REQUIREMENTS (11-36a-502)

The Impact Fees Act requires that entities must publish a notice of intent to prepare or modify any IFFP. If an entity prepares an independent IFFP rather than include a capital facilities element in the general plan, the actual IFFP must be adopted by enactment. Before the IFFP can be adopted, a reasonable notice of the public hearing must be published in a local newspaper at least 10 days before the actual hearing. A copy of the proposed IFFP must be made available in each public library within the City during the 10-day noticing period for public review and inspection. Utah Code requires that the City must post a copy of the ordinance in at least three places. These places may include the City offices and the public libraries within the City's jurisdiction. Following the 10-day noticing period, a public hearing will be held, after which the City may adopt, amend and adopt, or reject the proposed IFFP.

SECTION 8
IMPACT FEE CERTIFICATION (11-36a-306(1))

This report has been prepared in accordance with Utah Code Title 11 Chapter 36a (the "Impact Fees Act"), which prescribes the laws pertaining to Utah municipal capital facilities plans and impact fee analyses. The accuracy of this report relies upon the planning, engineering, and other source data, which was provided by the City and their designees.

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

I certify that this impact fee facility plan:

1. Includes only the cost 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. cost of 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;
    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 and every relevant respect with the Impact Fees Act.

Andrew T. McKinnon, P.E.
Dated: April 2, 2018

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