



SARATOGA  
SPRINGS

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## SARATOGA SPRINGS

### DRINKING WATER IMPACT FEE FACILITY PLAN

(HAL Project No.: 360.07.500)

October 2022

# CITY OF SARATOGA SPRINGS

## DRINKING WATER IMPACT FEE FACILITY PLAN

(HAL Project No.: 360.07.500)



Kai Krieger, P.E.

Project Engineer



OCTOBER 2022

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## **IMPACT FEE CERTIFICATION**

The Utah Impact Fee Act (Chapter 11-36a of the Utah Code) requires certifications for the Impact Fee Facilities Plan (IFFP). Hansen, Allen & Luce provides these certifications with the understanding that the recommendations in the IFFP are followed by City Staff and elected officials. If all or a portion of the IFFP is modified or amended, or if assumptions presented in this analysis change substantially, this certification is no longer valid. All information provided to Hansen, Allen & Luce is assumed to be correct, complete, and accurate.

### **IFFP Certification**

Hansen, Allen & Luce, Inc. certifies that the Impact Fee Facilities Plan (IFFP) prepared for the drinking water system:

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;
  - 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.

HANSEN, ALLEN & LUCE, INC.

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## IMPACT FEE SUMMARY

The **purpose** of the Impact Fee Facilities Plan (IFFP) is to comply with the requirements of the Utah Impact Fees Act (Chapter 11-36a of the Utah Code) by identifying demands placed on the existing drinking water system by new development and by identifying the means by which the City will meet these new demands. This analysis is an update to the Drinking Water System IFFP prepared in 2020 to address changes in conditions and assumptions that result in an increase in the proposed drinking water impact fee. The Drinking Water System Master Plan and Capital Facility Plan have also been updated to support this analysis.

The most significant **change** in this update is increased project costs. The City has constructed projects costing over \$40 million to increase the capacity of the drinking water system. These projects added capacity to the system which has almost entirely been used by the new growth that has come into the system since 2020. The actual project costs have come in higher than the projected cost for these improvements identified in the previous IFFP. This has resulted in increased projected costs for future projects in this IFFP.

Consistent with the last impact fee update, no remaining capacity of groundwater source is available for future growth. It is assumed all future source will be provided by Central Utah Water Conservancy District (CUWCD). The City could accept new groundwater rights after there is a change application approved by the State Engineer that meets drinking water standards. There are developers with groundwater capacity credit with the City that have not paid impact fees. For this reason, there are two drinking water impact fees. One impact fee is for those with groundwater capacity credit which includes cost for available drinking water well capacity. The other drinking water impact fee does not include cost for drinking water well source capacity.

The impact fee **service area** is the drinking water system service area, which includes the current city boundary. The existing system served about 10,861 connections at the beginning of 2022. Projected **growth** adds 5,500 equivalent connections in the next 10 years for a total of 16,361 connections or equivalent.

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Background**

The City of Saratoga Springs has experienced significant growth since the early 2000's that has transformed the once largely agricultural community into an urbanized region of northern Utah County. Residential and commercial developments are being established at a rapid pace with additional undeveloped land available for future growth. As this growth continues additional drinking water facilities will be required to provide an adequate water system that meets the City's level of service for indoor water use.

The City has recognized the importance to plan for increased demands on its drinking water system from new development as a result of the rapid growth. A Drinking Water Impact Fee Facilities Plan (IFFP) update was required to address changes in conditions and assumptions that result in an increase in the proposed drinking water impact fee.

### **1.2 Purpose**

The purpose of the IFFP is to comply with the requirements of the Utah Impact Fees Act by identifying demands placed on the existing drinking water system by new development and by identifying the means by which the City will meet these new demands. This analysis is an update to the Drinking Water System IFFP prepared in 2020.

This report identifies those items that the Utah Impact Fees Act specifically requires including demands placed upon existing facilities by new development activity and the proposed means by which the municipality will meet those demands. In preparing this report a systematic approach was utilized to evaluate the existing and planned drinking water facilities identified in the City's master planning efforts. Each facility's capacity was evaluated in accordance with the new level of service to determine the appropriate share between existing demand and future demands. This approach was used to determine the "proportional share" of improvement costs between existing users and future development users. The basis for this report was to provide proposed project costs and the fractional cost associated with future development. The following analyses were performed to meet the study's objectives:

- 1) Identify the existing and proposed City drinking water facilities;
- 2) Identify the existing level of service for the system;
- 3) Identify a proposed level of service for the system;
- 4) Identify if any deficiencies are present in the existing system utilizing the proposed level of service;
- 5) Identify any excess capacity in the existing system facilities using the proposed level of service;
- 6) Identify the phasing of new development and the appropriate facilities needed to support the development;

- 7) Identify public facilities for which an impact fee may be charged or required for a school district or charter school if the local political subdivision is aware of the planned location of the school district facility or charter school;
- 8) Project growth in water demands attributable to new development within the existing system;
- 9) Determine projects required by the new water demands to provide the proposed level of service to future development without compromising the existing system;
- 10) Establish construction phasing of proposed capital facilities;
- 11) Prepare detailed cost estimates for each proposed project;
- 12) Determine if proposed projects will provide capacity for growth beyond the IFFP planning period;
- 13) Separate and identify infrastructure costs to maintain the proposed level of service for existing residents versus infrastructure costs to provide capacity at the proposed level of service for future development, and then identify and subtract the proportionate cost of any excess capacity for growth that is projected to occur beyond the 10-year planning window for the IFFP.

### **1.3 Impact Fee Collection**

An impact fee is a one-time charge on new development to pay for that portion of a public facility that is required to support that new development. Impact fees enable local governments to finance public facility improvements necessary to service new developments without burdening existing development with capital facilities construction costs that are exclusively attributable to growth.

To determine the appropriate impact fee, the cost of the facilities associated with future development must be proportionately distributed. As a guideline in determining the “proportionate share,” the fee must be found to be roughly proportionate and reasonably related to the impact caused by the new development.

### **1.4 Master Planning**

This analysis is an update to the Drinking Water System IFFP prepared in 2020 to address changes in conditions and assumptions that result in an increase in the proposed drinking water impact fee. The IFFP identifies all Capital Facilities required of the Drinking Water System for the 10-year planning range including maintenance, repair, replacement, as well as growth related project recommendations. The recommendations made within the IFFP report comply with current City policies and standard engineering practices.

A hydraulic model of the drinking water system was prepared to aid in the analyses performed to complete the Drinking Water IFFP and IFA. The model was used to assess existing performance and level of service, to establish a proposed level of service, and to confirm the effectiveness of the proposed capital facility projects to maintain the proposed level of service over the next 10 years.

## **CHAPTER 2 EXISTING DRINKING WATER SYSTEM**

### **2.1 General**

The purpose of this section is to provide information regarding the existing drinking water system, identify the current and proposed level of service, and analyze the remaining capacity of the existing system's facilities. Public facilities including existing and future school districts and charter school developments were also identified. Specific impact fees for these public facilities have been included in the impact fee analysis.

Saratoga Springs' existing drinking water system is comprised of a pipe network, water storage facilities, and water sources. These facilities are found within three separate pressure zones. Figure 2-1 is located at the end of this section and illustrates the existing water system that services the entire City.

### **2.2 Pressure Zones**

Currently, the drinking water distribution system serving Saratoga Springs has three pressure zones. Zones 2 and 3 are split north and south as they are not interconnected. The pressure zones were designed to provide pressures between 40 and 120 psi.

### **2.3 Existing City Pressurized Irrigation System**

To preserve drinking water sources, the City has a pressurized irrigation (PI) system that provides outdoor irrigation. The PI system is master planned to be an independent system, however, the system can be supplemented by excess capacity in the drinking water system. Separate drinking water and PI water pipelines exist in all developments. There are a few isolated developments that currently rely on the drinking water system to provide storage and source water to the PI system. As the excess capacity in the drinking water system is needed for future growth, PI facilities will be constructed to increase the capacity of the PI system. A Secondary Water System Master Plan was prepared in conjunction with the Drinking Water System Master Plan. Both the Drinking Water System Master Plan and the Secondary Water System Master Plan were analyzed with no sharing of capacity for future projections. It was assumed for all calculations that no PI facilities are being supplemented by drinking water system capacity. Additional information regarding the PI system may be found in the Secondary Water System Master Plan and Pressurized Irrigation System IFFP.

### **2.4 Existing Equivalent Residential Connections**

Water demands from non-residential water users such as commercial, industrial, and institutional, have been converted to an Equivalent Residential Connection (ERC) for analytical purposes. The use of ERCs is a common engineering practice to describe the entire system's usage based upon a common unit of measurement. An ERC is equal to the average demand of one single-family

residential connection. Using ERCs for analysis allows the allocation of existing and future demands over non-residential land uses. The City used methodology developed by the Utah Division of Drinking Water (DDW) to determine the total ERCs. Consistent with DDW, the City calculated the average residential water usage per residential customer by dividing the annual residential usage by the total number of residential connections. Residential use is defined by DDW as including drinking, washing, sanitation and lawn watering at a primary residence. Residential connections are defined by DDW as single-family homes, duplexes, fourplexes, condominiums, multi-family homes, apartments, or similar dwelling facilities. Residential connections include all units whether they are privately owned or not.

After calculating an average residential water usage per residential customer, the remaining usage including commercial, industrial, and institutional was divided by the average residential water usage per residential customer to determine an equivalent residential connection value for the remaining usage. The total number of ERCs is then calculated as the sum of the residential connections plus the number of equivalent residential connections calculated using the remaining usage.

## **2.5 School Related Infrastructure**

As part of the noticing and data collection process for this plan, information was gathered regarding existing and 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. Table 2-1 shows the existing schools and the accompanied drinking water usage for 2020. Table 2-2 shows the best available information regarding planned schools. Each table will be updated as additional schools are planned and constructed.

**TABLE 2-1  
EXISTING SCHOOLS**

<b>School Name</b>	<b>Location / Address</b>	<b>Drinking Water Usage 2020 (acre-ft)</b>	<b>Type of School</b>
Harvest Elementary	2105 N Providence Dr	1.37	Elementary School
Riverview Elementary	273 Aspen Hills Blvd	0.81	Elementary School
Thunder Ridge Elementary	264 N 750 W	0.78	Elementary School
Sage Hills Elementary	3033 W Swainson Ave	0.90	Elementary School
Saratoga Shores Elementary	1415 S Parkside Dr	3.13	Elementary School
Springside Elementary	694 S Highpoint Dr	0.10	Elementary School
Lake Mountain Middle School	1058 S Old Farm Rd	2.56	Junior High School
Vista Heights Middle School	484 Pony Express Pkwy	2.34	Junior High School
West Lake High School	99 N 200 W	5.68	High School
Lakeview Academy	527 W 400 N	1.02	Charter
Horizon Special Needs School	682 W 210 N, Marie Way	0.34	Special Purpose
Mountain Sunrise Academy	1802 E 145 N	0.16	Charter

**TABLE 2-2  
PLANNED SCHOOLS**

<b>School Name</b>	<b>Location / Address</b>
Planned Junior High	Parcel 58:023:0274
Planned Charter School	Wildflower Development; Parcel 58:033:0544
Planned Elementary School	Mt Saratoga Development; Parcel 58:034:0737
Planned Elementary School	Jordan Promenade Development; Parcel 58:035:0112
Planned High School	Parcel 58:041:0234
Harbor Point Elementary	Parcel 16:003:0043

Each school will directly result in the need for additional improvements to public facilities. Analysis of the category of school (elementary school, junior high school, high school, charter school, special purpose) and the average past usage for each school determined the appropriate impact fee for schools based on the average lateral size required for each category. Future elementary schools will be charged for a 2-inch lateral, future junior high schools will be charged for a 3-inch lateral, future high schools will be charged for a 6-inch lateral, and future charter and special purpose schools will be charged for a 2-inch lateral.

## **2.6 Level of Service**

The level of service provided by the drinking water system has been established by the City to provide a reasonable supply of indoor water, fire suppression capacity, and water rights to assure that the system does not run out of water. This level of service establishes the sizing criteria for the City's distribution network (pipelines), source, storage facilities, and water rights for the drinking water system. Each level of service criteria has been described below:

**Well Source Capacity:** The capacity each well must be able to provide to the drinking water system.

**Pump Station Source Capacity:** The capacity each pump station must be able to provide to the drinking water system.

**Wholesale Indoor Water Source Capacity:** The capacity each wholesale connection must be able to provide to the drinking water system physically and by contracted volume.

**Indoor Water Storage Capacity:** Defined as equalization storage by DDW, indoor water storage capacity is the volume of a storage tank which stores water during periods of low demand and releases the water during periods of high demand.

**Emergency Storage:** Emergency storage as defined by DDW is the storage tank volume which provides water during emergency situations, such as pipeline failures, major trunk main failures, equipment failures, electrical power outages, water treatment facility failures, source water supply contamination, or natural disasters.

**Pipe Capacity:** The capacity pipelines need to sufficiently convey water to the end user without causing low pressures at the user connection during normal operation.

**Minimum Fire Flow:** The minimum allowable fire flow as determined by the local fire marshal.

**Maximum Fire Flow:** The maximum fire flow the system is designed to supply as determined by the local fire marshal.

**Fire Suppression Storage Capacity:** Defined as fire suppression storage by DDW, fire suppression storage capacity is the storage tank volume allocated to fire suppression activities. It is generally determined by the requirements of the local fire marshal, expressed in gallons, and determined by the product of a minimum flowrate in gpm and required time expressed in minutes

**Water Rights Yearly Volume:** The maximum water right annual volume amount allowed.



Since the 2017 Culinary Water System IFFP and IFA, the City has changed the proposed level of service to more accurately match the requirements provided by DDW and the actual demand in the drinking water system. The old and new level of service standards are provided below:

### **Indoor Water Supply**

<b>Level of Service Criteria</b>	<b>Old</b>	<b>New</b>
<b>Well Source Capacity</b>	400 gpd per ERC plus 400 gpd per ERC for redundancy	375 gpd per ERC plus 375 gpd per ERC for redundancy
<b>Pump Station Source Capacity</b>	400 gpd per ERC plus 400 gpd per ERC for redundancy	375 gpd per ERC plus 375 gpd per ERC for redundancy
<b>Wholesale Indoor Water Source Capacity</b>	400 gpd per ERC	375 gpd per ERC
<b>Indoor Water Storage Capacity</b>	400 gal per ERC	367 gal per ERC
<b>Emergency Storage Capacity</b>	100,000 gal per storage tank	100 gal per ERC
<b>Pipe Capacity</b>	40 psi minimum during peak day demand conditions and 30 psi minimum during peak instantaneous conditions	40 psi minimum during peak day demand conditions and 30 psi minimum during peak instantaneous conditions

Well and pump station sources require more capacity than source supplied by a wholesale connection because it cannot be assumed that pumps run 100% of the time. Also, redundant pumps are required to provide source when primary pumps fail. Wholesale connections rely on the redundancy provided by the wholesaler and do not rely on mechanical facilities maintained by the City.

### **Fire Suppression**

- Minimum Fire Flow: 1,500 gpm for 2 hours (180,000 gallons) as directed by the Fire Marshall from the International Fire Code (IFC), issued by the International Code Council.
- Maximum Fire Flow: 4,000 gpm for 4 hours (960,000 gallons) as directed by the Fire Marshall from the IFC.
- Fire Suppression Storage Capacity: As required by the Fire Marshall (see Table 2-4 for a summary of fire suppression storage by pressure zone)
- Minimum Pressure: 20 psi residual during peak day + fire flow event

## Water Rights

Level of Service Criteria	Old	New
Yearly Volume	400 gpd per ERC (0.45 ac-ft per ERC)	367 gpd per ERC (0.3 ac-ft per ERC)

### **2.7 Methodology Used to Determine Existing System Capacity**

The method for determining the remaining capacity in the system for indoor water supply was based on the defined level of service in terms of ERCs. Each component of the drinking water system was allotted a capacity in terms of ERCs. The components include: Source (wells, wholesale connections, and pump stations), Source Conveyance (transmission pipelines and facilities), Storage (tanks and associated transmission lines), Fire Suppression, and Water Rights. Each component was also assigned a number of existing ERCs currently using each component. The difference between the ERCs capacity and ERCs existing demand for each component is the remaining capacity. For example, to calculate the remaining capacity for source in ERCs, the required source for existing users in ERCs is subtracted from the capacity of the wells and CUWCD in ERCs. For storage, the required storage for existing users in ERCs is subtracted from the capacity of the tanks in ERCs to calculate the remaining capacity for storage in ERCs.

A hydraulic model was developed for the purpose of assessing system operation and capacity. For pipelines, the capacity in ERCs is estimated by the flow capacity of the pipe at a velocity of 5 feet per second subtracted by the minimum fire flow requirement of 1,500 gpm and dividing the remainder by 375 gpd per ERC. The transmission pipelines out of Tanks 4, 5, 6, 7, and 8 down to the first intersection include a fire flow capacity of 2,000 gpm or larger based on the fire flow assumed from these tanks. Capacity, demand, and remaining capacity is presented in the following paragraphs for each component of the drinking water system.

### **2.8 Water Source and Remaining Capacity**

Drinking water source primarily comes from groundwater wells. However, the City has also begun using Central Utah Water Conservancy District (CUWCD) to provide drinking water source. There is additional physical groundwater and water right capacity remaining, but this is mostly in the form of water right credit owned by developers. An assessment of available water rights and physical groundwater capacity of drinking water quality is limited. Once the capacity is gone, all future drinking water source and water rights will be from CUWCD.

All current drinking water wells, located on the eastern border of the City, are actively used throughout the year on a rotating basis. The active wells are equipped with either submersible or vertical turbine pumps. These wells provide the well source capacity level of service of 375 gpd/ERC for indoor water use and 375 gpd/ERC for redundancy. Three CUWCD connections provide the wholesale source capacity level of service of 375 gpd/ERC for indoor water use. Although each connection will provide up to 3,000 gpm at buildout, CUWCD capacity is restricted by the amount of purchased water the City has available each year.

Several of the drinking water wells are producing half capacity due to groundwater and well conditions. Because of the lack of excess redundancy capacity available to supplement the PI system, CUWCD water needed to be purchased earlier than planned. Table 2-3 summarizes the information for each well and the two existing CUWCD connections. An ERC count was not allocated to specific wells or CUWCD connections as all sources are in the same zone.

**TABLE 2-3  
EXISTING WATER SOURCES**

<b>Name</b>	<b>Capacity (gpm)</b>	<b>Existing Demand (gpm)</b>	<b>Remaining Capacity (gpm)</b>
Well No. 1	1,000	-	-
Well No. 2	1,020	-	-
Well No. 3	1,750	-	-
Well No. 4	1,000	-	-
Well No. 6	1,100	-	-
CUWCD Connection #1	3,000	-	-
CUWCD Connection #2	3,000	-	-
CUWCD Connection #3	3,000	-	-
<b>TOTAL</b>	<b>14,870</b>	<b>2,828</b>	<b>12,042</b>

The City operates pump stations to move water from a lower zone to a higher zone. These pump stations provide the water source to the upper zones and therefore must meet the pump station source capacity level of service of 375 gpd/ERC for indoor use and 375 gpd/ERC for redundancy. Table 2-4 is a summary of the pump station information for drinking water demands in units of ERCs. Table 2-5 is a summary of the pump station information for drinking water demands in gallons per minute (GPM).

**TABLE 2-4  
EXISTING PUMP STATION SUMMARY BY ERC**

<b>Zone</b>	<b>Name</b>	<b>Capacity (ERC)</b>	<b>Existing Demand (ERC)</b>	<b>Remaining Capacity (ERC)</b>
2 South	PS 1 (Grandview)	4,808	3,053	1,755
2 North	PS 2 (Harvest Hills)	1,923	2,439	3,300
	Crossroads Blvd	3,846		
3 North	PS 3 (Harvest Moon)	2,403	391	4,319
	PS 5 (Talus Ridge)	2,307		
3 South	PS 4 (Fox Hollow)	8,365	307	8,058

**TABLE 2-5  
EXISTING PUMP STATION SUMMARY BY GPM**

<b>Zone</b>	<b>Name</b>	<b>Capacity (gpm)</b>	<b>Existing Demand (gpm)</b>	<b>Remaining Capacity (gpm)</b>
2 South	PS 1 (Grandview)	2,500	1,590	910
2 North	PS 2 (Harvest Hills)	1,000	1,270	1730
	Crossroads Blvd	2,000		
3 North	PS 3 (Harvest Moon)	1,250	204	2,246
	PS 5 (Talus Ridge)	1,200		
3 South	PS 4 (Fox Hollow)	4,350	160	4,190

## **2.9 Storage Facilities and Remaining Capacity**

Saratoga Springs currently operates eight buried concrete water storage tanks. Each pressure zone has at least one tank to provide storage. Storage requirements are determined on a per zone basis. Some fire flow is shared between zones through pressure-reducing valves (PRV's) used to transfer water from a higher zone to a lower zone during fire events or peak demands. The total storage capacity is 14.35 million gallons (MG). All tanks are in good condition.

The storage level of service is 267 gallons of storage per ERC for equalization storage, and 100 gallons of storage per ERC for emergency storage. The fire flow storage requirements were provided by the Fire Marshal as per IFC. The amount of fire suppression storage was assigned to each tank based on available capacity for fire storage in the tank, the amount of fire flow in the

pressure zone or zones the tank can serve, and the capacity of the transmission lines from the tank to where the largest fire flows are required. The required fire storage capacity and existing capacity for each pressure zone is found in Table 2-6. The capacity of each tank was analyzed in respect to the zone it serves. It was assumed that storage in upper pressure zones could assist in providing a portion of the required fire flow demand to a lower zone. Table 2-7 is a summary of the storage facility information. Capacity calculations are shown in Table 2-7 for each tank and account for fire suppression storage volumes.

**TABLE 2-6  
EXISTING FIRE SUPPRESSION STORAGE BY ZONE**

<b>Zone</b>	<b>Fire Flow (gpm)*</b>	<b>Fire Duration (hours)</b>	<b>Fire Storage (MG)</b>	<b>Existing Fire Storage in Zone (MG)</b>	<b>Existing Fire Storage from Upper Zones (MG)</b>
1	4,000	4	0.96	0.72	0.24
2 North	3,000	3	0.54	0.30	0.24
2 South	4,000	4	0.96	0.68	0.28
3 North	2,000	2	0.48	0.48	-
3 South	2,000	2	0.24	0.24	-
<b>TOTAL</b>	<b>-</b>	<b>-</b>	<b>3.18</b>	<b>2.42</b>	<b>0.76</b>

\*Fire flow requirements are based on largest required fire flow in each zone.

The following are assumptions for fire flow storage at each tank:

- Tank 1—The recommended fire flow for Zone 1 is 4,000 gpm for 4 hours, or 0.96 MG. Tank 1 supplies about 1,000 gpm, or 0.24 MG. The remainder was assigned to Tanks 5 and 3.
- Tank 5—The recommended fire flow for Zone 1 is 4,000 gpm for 4 hours, or 0.96 MG. Tank 5 supplies about 2,000 gpm, or 0.48 MG. The remainder was assigned to Tanks 1 and 3.
- Tank 3—The recommended fire flow for Zone 2 North is 3,000 gpm for 3 hours, or 0.54 MG. Tank 3 supplies 0.30 MG. The remainder was assigned to Tank 4 and Tank 8. Tank 3 may also supply fire flow to Zone 1.
- Tank 2—The recommended fire flow for Zone 2 South is 4,000 gpm for 4 hours, or 0.96 MG. Tank 2 supplies about 850 gpm, or 0.20 MG. The remainder was assigned to Tanks 6 and 7.
- Tank 6—The recommended fire flow for Zone 2 South is 4,000 gpm for 4 hours, or 0.96 MG. Tank 6 supplies about 2,000 gpm, or 0.48 MG. The remainder was assigned to Tanks 2 and 7.

- Tank 4—The recommended fire flow for Zone 3 North is 2,000 gpm for 2 hours, or 0.48 MG. Half of the requirement (1,000 gpm or 0.24 MG) was assigned to Tank 4. Tank 4 may also supply fire flow to Zone 2 North.
- Tank 7—The recommended fire flow for Zone 3 South is 2,000 gpm for 2 hours, or 0.48 MG. Half of the requirement (1,000 gpm or 0.24 MG) was assigned to Tank 7. Tank 7 may also supply fire flow to Zone 2 South.
- Tank 10—The recommended fire flow for Zone 3 North is 2,000 gpm for 2 hours, or 0.48 MG. Half of the requirement (1,000 gpm or 0.24 MG) was assigned to Tank 8. Tank 8 may also supply fire flow to Zone 2 North or Zone 1.

**TABLE 2-7  
EXISTING STORAGE TANK SUMMARY**

Zone	Total Capacity (MG)	Fire Storage (MG)	Demand Storage (MG)	Emergency Storage (MG)	Remain. Capacity (MG)	Total Capacity (ERC)	Remain. Capacity (ERC)
1	0.75	0.24	0.25	0.09	0.17	1,390	463
	3.0	0.48	1.00	0.37	1.15	6,866	3,134
2 N	2.0	0.30	0.65	0.24	0.80	4,632	2,207
2 S	1.0	0.20	0.20	0.08	0.52	2,180	1,417
	3.0	0.48	0.61	0.23	1.68	6,866	4,578
3 N	1.2	0.24	0.05	0.02	0.89	2,616	2,425
	1.4	0.24	0.06	0.02	1.08	3,161	2,943
3 S	2.0	0.24	0.08	0.03	1.65	4,796	4,496
<b>TOTAL</b>	<b>14.35</b>	<b>2.42</b>	<b>2.90</b>	<b>1.08</b>	<b>7.95</b>	<b>32,507</b>	<b>21,662</b>

## 2.10 Water Rights and Remaining Capacity

The City owns a total of 13,150 acre-feet of water rights that can be used between its drinking and PI systems. The existing drinking water right demand at the proposed level of service of 0.3 acre-feet per ERC is 3,258 acre-feet. The existing supply of water rights attributed to the drinking water system is 5,184 acre-feet. The existing remaining capacity in the drinking water system is 1,926 acre-feet. This excess capacity is water right credits owned by various developers within the City that previously deeded the water rights to the City in exchange for the credits. It is recommended that the City not collect impact fees for water rights in the drinking water system for the next ten years. Rather than paying impact fees to the City for new drinking water rights, new developments can utilize the credit they own, or if they do not have a credit, they can purchase a water right credit held by others or work with the City to contract CUWCD water. All water right volumes are annual diversions in acre-feet.

## **2.11 Distribution System**

Pipe diameters in the drinking water distribution system range from 8 inches to 30 inches, with the majority being 8 inches within subdivisions. The larger pipes in the system were provided as transmission lines to deliver water from sources and storage tanks and fire flow scenarios. All pipes are in good condition. The City's current standard allows for Ductile Iron Pipe (DIP) for pipe diameters of 24 inches and larger and Polyvinyl Chloride (PVC) pipe for pipes up to 24 inches. Figure 2-1 illustrates the existing distribution pipelines. The capacity of the distribution system is assumed to be accounted for in the source, storage, and fire flow capacities since the pipeline sizes include a component of each.

## **2.12 Capital Facilities to Meet System Deficiencies**

The existing drinking water system meets the current level of service. There are no existing deficiencies.







## **CHAPTER 3**

### **CAPITAL FACILITIES TO MEET FUTURE GROWTH**

#### **3.1 Growth Projections**

The development of impact fees requires growth projections over the next ten years. Growth projections for Saratoga Springs were developed by Zions Public Finance, Inc., and have been provided in a memorandum in Appendix A. Because the memorandum was developed in 2019, the existing value of ERCs differs from the value provided in the memo. In order to match the growth projections provided in the memo, the City has utilized the ERU growth for each year and applied them to the existing ERCs (Table 3-1).

Saratoga Springs experienced rapid growth at the beginning of 2000 followed by a cooling period from 2007 to 2010 with growth rebounding to a more moderately strong rate. The City projected stronger growth occurring in the near future due to projected development of large property. Total growth projections for the City through 2035 are summarized in Table 3-1. The existing system served about 10,861 connections at the beginning of 2022. As shown in Table 1, projected growth adds 5,500 ERCs in the next 10 years for a total of 16,361 ERCs.

**TABLE 3-1**  
**GROWTH PROJECTIONS**

<b>Year</b>	<b>Total Projected ERCs</b>	<b>Annual Growth</b>
2022	10,861	5%
2023	11,411	5%
2024	11,961	5%
2025	12,511	4%
2026	13,061	4%
2027	13,611	4%
2028	14,161	4%
2029	14,711	4%
2030	15,261	4%
2031	15,811	4%
2032	16,361	3%
2033	16,911	3%
2034	17,461	3%
2035	18,011	3%

### **3.2 Cost of Future Facilities**

The facilities and costs presented in Table 3-2 and Figure 3-1 are proposed projects essential to maintain the proposed level of service while accommodating future growth within the next 10 years. The facility sizing for the future proposed projects was based on the proposed level of service with growth projections provided by the City and hydraulic modeling. All future projects have a design life greater than 10 years, as required by the Impact Fee Act, and all the projects are 100% growth-related. Each project has a detailed cost for each component of the drinking water impact fee: Wells, Source Conveyance (transmission lines associated with source conveyance and pump stations), Storage (tanks and associated transmission lines), Fire Suppression. See Appendix B for cost estimate details of future projects.

**TABLE 3-2  
COST OF FUTURE FACILITIES**

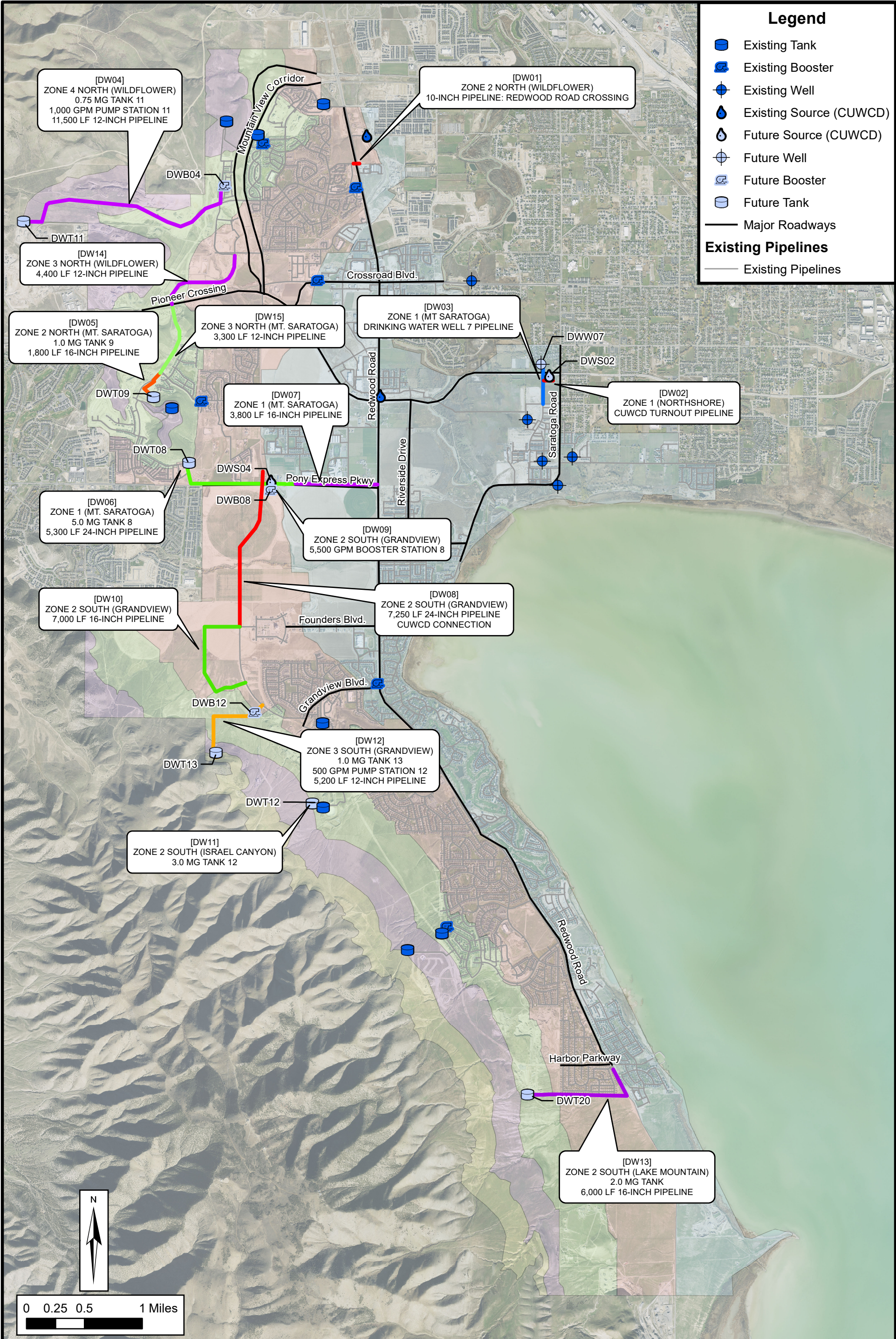
<b>Project</b>	<b>Map ID<sup>1</sup></b>	<b>Wells</b>	<b>Source Conveyance</b>	<b>Storage</b>	<b>Fire</b>	<b>Water Rights</b>	<b>TOTAL<sup>2</sup></b>
Zone 2 North (Redwood Road Crossing)	DW01	\$0	\$345,700	\$0	\$115,300	\$0	\$461,000
Zone 1 (CUWCD Turnout Pipeline)	DW02	\$0	\$371,000	\$0	\$0	\$0	\$371,000
Zone 1 (Drinking Water Well 7 Pipeline)	DW03	\$536,000	\$0	\$0	\$0	\$0	\$536,000
Zone 4 North (Wildflower Zone 4 Tank)	DW04	\$0	\$3,522,300	1,976,000	\$2,104,800	\$0	\$7,603,100
Zone 2 North (Mt Saratoga Zone 2 Tank)	DW05	\$0	\$766,300	\$2,255,100	\$653,100	\$0	\$3,674,500
Zone 1 (Mt Saratoga Zone 1 Tank)	DW06	\$0	\$3,029,300	\$8,855,800	\$2,930,100	\$0	\$14,845,200
Zone 1 (Mt Saratoga Zone 1 Pipeline)	DW07	\$0	\$1,337,500	\$0	\$445,700	\$0	\$1,783,200
Zone 2 South (Grandview CUWCD Connection)	DW08	\$0	\$2,709,700	\$0	\$656,900	\$0	\$3,366,600
Zone 2 South (Grandview Zone 2 Booster Station)	DW09	\$0	\$2,779,300	\$0	\$926,000	\$0	\$3,705,300
Zone 2 South (Grandview Zone 2 Pipeline)	DW10	\$0	\$1,844,800	\$0	\$814,800	\$0	\$2,659,600
Zone 2 South (Grandview Zone 2 Tank)	DW11	\$0	\$0	\$5,277,800	\$2,052,400	\$0	\$7,330,200
Zone 3 South (Grandview Zone 3 Tank)	DW12	\$0	\$3,020,900	\$3,232,700	\$2,028,400	\$0	\$8,282,000
Zone 2 South (Lake Mountain Zone 2 Tank)	DW13	\$0	\$1,899,000	\$3,789,900	\$1,301,300	\$0	\$6,990,200
Zone 3 North (Wildflower Zone 3 Pipeline)	DW14	\$0	\$1,542,600	\$0	\$514,600	\$0	\$2,057,200
Zone 3 North (Mt Saratoga Zone 3 Pipeline)	DW15	\$0	\$1,402,000	\$0	\$350,700	\$0	\$1,402,000
<b>TOTAL<sup>2</sup></b>		<b>\$536,000</b>	<b>\$24,219,700</b>	<b>\$25,417,300</b>	<b>\$14,894,100</b>	<b>\$0</b>	<b>\$65,067,100</b>

1. See Figure 3-1 (Additional details on cost estimates are in Appendix B).

2. Total costs rounded up to the nearest \$100.



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Only those costs attributed to the new growth in the next 10 years can be included in the impact fee. Table 3-3 is a summary of the existing and future facility costs by drinking water system component and by time period. Existing costs are those costs attributed to capacity currently being used by existing connections. Costs attributed to the next 10 years are costs for the existing capacity or new capacity for the assumed growth in the next 10 years. Costs attributed to beyond 10 years are costs for the existing capacity or new capacity for the assumed growth beyond 10 years.

**TABLE 3-3  
FACILITY COST BY TIME PERIOD**

	<b>Existing</b>	<b>Next 10 Years</b>	<b>Beyond 10 Years</b>	<b>TOTAL</b>
<b>Wells</b>	\$3,373,199	\$1,326,372	\$0	<b>\$4,699,571</b>
<b>Source Conveyance</b>	\$12,393,323	\$5,618,509	\$24,015,018	<b>\$42,026,850</b>
<b>Storage</b>	\$6,510,504	\$2,951,535	\$28,341,362	<b>\$37,803,401</b>
<b>Fire</b>	\$3,551,178	\$4,966,272	\$15,860,493	<b>\$24,377,944</b>
<b>TOTAL COST</b>	<b>\$25,828,205</b>	<b>\$14,862,688</b>	<b>\$68,216,873</b>	<b>\$108,907,766</b>

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# APPENDIX A

## Growth Projections Memo

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## GROWTH PROJECTIONS MEMORANDUM

### Historic Growth

Saratoga Springs has been experiencing extremely rapid growth over the past 20 years, growing by an average of 429 Equivalent Residential Units (ERUs) per year since 2000. Growth has been even more rapid in recent years, with an average increase of 551 ERUs since 2015. In 2019, the City increased by 642 ERUs; and in the first half of 2020 alone the City has seen 550 ERUs. Interestingly, there has been no discernible slowdown yet from COVID-19.

TABLE 1: HISTORIC GROWTH IN ERUs

Year	Historic ERUs	AAGR*	ERU Increase per Year
7/1/2000	235		
7/1/2001	582	148%	347
7/1/2002	896	54%	315
7/1/2003	1,223	36%	326
7/1/2004	1,655	35%	432
7/1/2005	2,109	27%	454
7/1/2006	2,656	26%	548
7/1/2007	3,167	19%	511
7/1/2008	3,938	24%	771
7/1/2009	4,238	8%	301
7/1/2010	4,399	4%	160
7/1/2011	4,569	4%	170
7/1/2012	4,771	4%	202
7/1/2013	5,097	7%	325
7/1/2014	5,630	10%	534
7/1/2015	6,097	8%	467
7/1/2016	6,603	8%	506
7/1/2017	7,150	8%	547
7/1/2018	7,743	8%	593
7/1/2019	8,385	8%	642

\*AAGR = average annual growth rate

### Projected Growth

Based on trends over the past two years, a sensitivity analysis of future growth has been projected first based on an average of 550 and then 600 ERUs per year. The recommended approach then uses a blend of these two assumptions, plus actual anticipated growth of 650 ERUs in 2020 (based on the record number of permits pulled halfway through 2020). Even though the City has seen increasing numbers of ERUs over the past few years, this model conservatively assumes somewhat smaller growth in 2021 and

2022 (600 ERUs per year) followed by growth of 550 ERUs per year through 2035. While the effects of the COVID-19 pandemic event are not known at this time, the growth projections included in this document reflect our best current estimate of the impact COVID-19 will have on system growth to reflect the expected slowdown in the economy associated with current conditions.

**TABLE 2: PROJECTED GROWTH IN ERUs**

Projected Growth	550 ERU Growth	600 ERU Growth	Recommended Growth Projections	AAGR, Recommended Growth Projections
7/1/2019	8,385	8,385	8,385	
7/1/2020	8,935	8,985	9,035	8%
7/1/2021	9,485	9,585	9,635	7%
7/1/2022	10,035	10,185	10,235	6%
7/1/2023	10,585	10,785	10,785	5%
7/1/2024	11,135	11,385	11,335	5%
7/1/2025	11,685	11,985	11,885	5%
7/1/2026	12,235	12,585	12,435	5%
7/1/2027	12,785	13,185	12,985	4%
7/1/2028	13,335	13,785	13,535	4%
7/1/2029	13,885	14,385	14,085	4%
7/1/2030	14,435	14,985	14,635	4%
7/1/2031	14,985	15,585	15,185	4%
7/1/2032	15,535	16,185	15,735	4%
7/1/2033	16,085	16,785	16,285	3%
7/1/2034	16,635	17,385	16,835	3%
7/1/2035	17,185	17,985	17,385	3%

### Other Considerations

As part of this analysis, we have reviewed the availability of vacant land in Saratoga Springs and have found that there is sufficient land available that there are no constraints to development taking place or that would slow the historic growth experienced in the City.



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# APPENDIX B

## Cost Estimates

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**CITY OF SARATOGA SPRINGS**  
**DRINKING WATER FACILITIES - COST OPINIONS**  
**2022-2031**



ID #

DW01

ZONE 2 NORTH - WILDFLOWER 10-INCH PIPELINE: REDWOOD ROAD CROSSING Preliminary Opinion of Probable Cost						
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST	
1	Mobilization/Demobilization	LS	10%	\$ 350,000	\$	35,000
2	Construction Surveying	LS	2%	\$ 350,000	\$	7,000
3	SWPPP	LS	3%	\$ 350,000	\$	11,000
4	Relocate existing utilities	LS	1	\$ 112,500	\$	112,500
5	30-inch Jack & Bore casing installation (50% of the cost in irrigation water project)	LF	140	\$ 575	\$	80,500
6	10-inch HDPE Pipe installed in casing	LF	120	\$ 175	\$	21,000
7	Connections to existing pipelines	EA	0	\$ -	\$	-
8	10-in PVC Irrigation Water Pipeline	LF	150	\$ 425	\$	63,750
9	Fittings & valves	LS	1	\$ 20,000	\$	20,000
10	Pipeline connections	EA	2	\$ 20,000	\$	40,000
11	Flushing, disinfecting, pressure testing	LS	1	\$ 10,000	\$	10,000
				Sub-Total Construction	\$	400,800
				Contingency and Unknowns:	\$	-
				TOTAL CONSTRUCTION	\$	400,800
				Engineering Design and Construction Services 15%	\$	60,200
Preliminary Opinion of Probable Cost					\$	461,000

DW02

ZONE 1 - NORTSHORE CUWCD TURNOUT PIPELINE Preliminary Opinion of Probable Cost						
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST	
1	Mobilization/Demobilization	%	10%	\$ 250,000	\$	25,000
2	Construction Surveying	LS	2%	\$ 250,000	\$	5,000
3	SWPPP	LS	3%	\$ 250,000	\$	8,000
4	upsized from 8-in to 16-in PVC Pipeline	LF	0	\$ 70	\$	-
5	16-in PVC Pipeline	LF	600	\$ 270	\$	163,000
6	Fittings & valves	LS	1	\$ 50,000	\$	50,000
7	Pipeline connections	EA	2	\$ 10,000	\$	20,000
8	Flushing, disinfecting, pressure testing	LS	1	\$ 10,000	\$	10,000
				Sub-Total Construction	\$	281,000
				Contingency and Unknowns: 10%	\$	28,100
				TOTAL CONSTRUCTION	\$	309,100
				Engineering Design and Construction Services 20%	\$	61,900
Preliminary Opinion of Probable Cost					\$	371,000

DW03

<b>ZONE 1 - MT SARATOGA</b> <b>DRINKING WATER WELL 7 PIPELINE</b> Preliminary Opinion of Probable Cost					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization/Demobilization	%	10%	\$ 340,000	\$ 34,000
2	Construction Surveying	LS	2%	\$ 340,000	\$ 7,000
3	SWPPP	LS	3%	\$ 340,000	\$ 11,000
4	10-inch Directional drilled HDPE pipeline	LF	170	\$ 1,000	\$ 170,000
5	10-inch Drinking Water Pipeline	LF	375	\$ 234	\$ 87,750
6	Fittings & valves	LS	1	\$ 50,000	\$ 50,000
7	Pipeline connections	EA	2	\$ 10,000	\$ 20,000
8	Flushing, disinfecting, pressure testing	LS	1	\$ 10,000	\$ 10,000
				Sub-Total Construction	\$ 389,800
				Contingency and Unknowns: 10%	\$ 39,000
				<b>TOTAL CONSTRUCTION</b>	<b>\$ 428,800</b>
				Engineering Design and Construction Services 25%	\$ 107,200
				<b>Preliminary Opinion of Probable Cost</b>	<b>\$ 536,000</b>

DW04

<b>ZONE 4 NORTH - WILDFLOWER</b> <b>0.75 MG TANK #11, 1,000 GPM PUMP STATION #11, 11,500 LF 12-INCH PIPELINE</b> Preliminary Opinion of Probable Cost					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization/Demobilization	%	10%	\$ 5,250,000	\$ 525,000
2	Construction Surveying	LS	2%	\$ 5,250,000	\$ 105,000
3	SWPPP	LS	3%	\$ 5,250,000	\$ 158,000
4	Materials Testing	LS	1	\$ 20,000	\$ 20,000
5	12-inch PVC Pipeline	LF	11,500	\$ 247	\$ 2,842,909
6	12-inch valves and connections to existing	EA	1	\$ 20,000	\$ 20,000
7	Pressure Reducing Station	LS	1	\$ 75,000	\$ 75,000
8	Pump Station Structure	LS	1	\$ 150,000	\$ 150,000
9	Pumps, Valves, and Piping	LS	1	\$ 225,000	\$ 225,000
10	Yard Piping & Valving	LS	50%	\$ 225,000	\$ 113,000
11	Electrical Systems	LS	1	\$ 200,000	\$ 200,000
12	HVAC Systems	LS	1	\$ 15,000	\$ 15,000
13	Fencing	LF	500	\$ 25	\$ 12,500
14	Landscaping	SF	8,000	\$ 5	\$ 40,000
15	Pump Station Site Improvements	LS	1	\$ 100,000	\$ 100,000
16	Tank Construction (750,000 gallons)	Gallon	750,000	\$ 1.62	\$ 1,215,000
17	Yard Piping & Valving	LS	15%	\$ 1,215,000	\$ 182,000
18	Pipeline connections	EA	2	\$ 10,000	\$ 20,000
19	Flushing, disinfecting, pressure testing	LS	1	\$ 15,000	\$ 15,000
20	Land Acquisition	ACRES	1	\$ 250,000	\$ 250,000
				Sub-Total Construction	\$ 6,283,500
				Contingency and Unknowns: 10%	\$ 628,400
				<b>TOTAL CONSTRUCTION</b>	<b>\$ 6,911,900</b>
				Engineering Design and Construction Services 10%	\$ 691,200
				<b>Preliminary Opinion of Probable Cost</b>	<b>\$ 7,603,100</b>

DW05

<b>ZONE 2 NORTH - MT SARATOGA</b> <b>1.0 MG TANK #9, 1,800 LF 16-INCH PIPELINE</b> Preliminary Opinion of Probable Cost						
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST	
1	Mobilization/Demobilization	%	10%	\$ 2,380,000	\$	238,000
2	Construction Surveying	LS	2%	\$ 2,380,000	\$	48,000
3	SWPPP	LS	3%	\$ 2,380,000	\$	72,000
4	Tank Construction (1,000,000 gallons)	Gallon	1,000,000	\$ 1.62	\$	1,620,000
5	Yard Piping & Valving	LS	15%	\$ 1,620,000	\$	243,000
6	16-inch PVC Pipeline	LF	1,800	\$ 270	\$	486,492
7	Pipeline connections	EA	1	\$ 10,000	\$	10,000
8	Flushing, disinfecting, pressure testing	LS	1	\$ 15,000	\$	15,000
9	Land Acquisition	ACRES	1.0	\$ 250,000	\$	250,000
Sub-Total Construction					\$	2,982,500
Contingency and Unknowns: 10%					\$	298,300
TOTAL CONSTRUCTION					\$	3,280,800
Engineering Design and Construction Services 12%					\$	393,700
<b>Preliminary Opinion of Probable Cost</b>					<b>\$</b>	<b>3,674,500</b>

DW06

<b>ZONE 1 - MT SARATOGA</b> <b>5.0 MG TANK #8, 5,300 LF 24-INCH PIPELINE,</b> Preliminary Opinion of Probable Cost						
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST	
1	Mobilization/Demobilization	%	10%	\$ 10,340,000	\$	1,034,000
2	Construction Surveying	LS	2%	\$ 10,340,000	\$	207,000
3	SWPPP	LS	3%	\$ 10,340,000	\$	311,000
4	Tank Construction (5,000,000 gallons)	Gallon	5,000,000	\$ 1.52	\$	7,600,000
5	Yard Piping & Valving	LS	10%	\$ 7,600,000	\$	760,000
6	24" PVC Transmission Pipeline	LF	5,300	\$ 365	\$	1,935,655
7	Pipeline connections	EA	2	\$ 10,000	\$	20,000
8	Flushing, disinfecting, pressure testing	LS	1	\$ 20,000	\$	20,000
9	Land Acquisition	ACRES	2.9	\$ 250,000	\$	725,000
Sub-Total Construction					\$	12,612,700
Contingency and Unknowns: 10%					\$	1,261,300
TOTAL CONSTRUCTION					\$	13,874,000
Engineering Design and Construction Services 7%					\$	971,200
<b>Preliminary Opinion of Probable Cost</b>					<b>\$</b>	<b>14,845,200</b>

DW07

<b>ZONE 1 - MT SARATOGA</b> <b>3,800 LF 16-INCH PIPELINE</b> Preliminary Opinion of Probable Cost					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization/Demobilization	%	10%	\$ 1,130,000	\$ 113,000
2	Construction Surveying	LS	2%	\$ 1,130,000	\$ 23,000
3	SWPPP	LS	3%	\$ 1,130,000	\$ 34,000
4	16" PVC Transmission Pipeline	LF	3,800	\$ 270	\$ 1,027,039
5	Fittings & valves	LS	1	\$ 50,000	\$ 50,000
6	Pipeline connections	EA	2	\$ 15,000	\$ 30,000
7	Flushing, disinfecting, pressure testing	LS	1	\$ 15,000	\$ 15,000
				Sub-Total Construction	\$ 1,292,100
				Contingency and Unknowns: 20%	\$ 258,500
				<b>TOTAL CONSTRUCTION</b>	<b>\$ 1,550,600</b>
				Engineering Design and Construction Services 15%	\$ 232,600
				<b>Preliminary Opinion of Probable Cost</b>	<b>\$ 1,783,200</b>

DW08

<b>ZONE 2 SOUTH- GRANDVIEW</b> <b>7,250 LF 24-INCH PIPELINE, CUWCD CONNECTION</b> Preliminary Opinion of Probable Cost					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization/Demobilization	%	10%	\$ 2,320,000	\$ 232,000
2	Construction Surveying	LS	2%	\$ 2,320,000	\$ 47,000
3	SWPPP	LS	3%	\$ 2,320,000	\$ 70,000
4	CUWCD connection	LS	1	\$ 10,000	\$ 10,000
5	24" DIP Pipeline incl fittings and valves	LF	7,250	\$ 365	\$ 2,647,831
6	16" DIP Pipeline incl fittings & valves	LF	1,385	\$ 270	\$ 374,329
7	Pipeline connections	EA	2	\$ 10,000	\$ 20,000
8	Flushing, disinfecting, pressure testing	LS	1	\$ 10,000	\$ 10,000
9	Economy of scale in roadway project	LS	1	\$ (750,000)	\$ (750,000)
				Sub-Total Construction	\$ 2,661,200
				Contingency and Unknowns: 10%	\$ 266,200
				<b>TOTAL CONSTRUCTION</b>	<b>\$ 2,927,400</b>
				Engineering Design and Construction Services 15%	\$ 439,200
				<b>Preliminary Opinion of Probable Cost</b>	<b>\$ 3,366,600</b>

DW09

<b>ZONE 2 SOUTH- GRANDVIEW</b> <b>5,500 GPM BOOSTER STATION #8</b> Preliminary Opinion of Probable Cost						
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST	
1	Mobilization/Demobilization	%	10%	\$ 2,340,000	\$	234,000
2	Construction Surveying	LS	2%	\$ 2,340,000	\$	47,000
3	SWPPP	LS	3%	\$ 2,340,000	\$	71,000
4	Materials Testing	LS	1	\$ 15,000	\$	15,000
5	Pump Station Structure	LS	1	\$ 400,000	\$	400,000
6	Pumps, Valves, and Piping	LS	1	\$ 500,000	\$	500,000
7	Yard Piping & Valving	LS	50%	\$ 500,000	\$	250,000
8	Electrical Systems	LS	1	\$ 400,000	\$	400,000
9	HVAC Systems	LS	1	\$ 100,000	\$	100,000
10	Fencing	LF	1,400	\$ 35	\$	49,000
11	Landscaping	SF	14,000	\$ 6	\$	84,000
12	Pump Station Site Improvements	LS	1	\$ 100,000	\$	100,000
13	24" valves and connections to existing	EA	3	\$ 20,000	\$	60,000
14	Land Acquisition	ACRES	1.5	\$ 250,000	\$	375,000
Sub-Total Construction					\$	2,685,000
Contingency and Unknowns: 20%					\$	537,000
TOTAL CONSTRUCTION					\$	3,222,000
Engineering Design and Construction Services 15%					\$	483,300
<b>Preliminary Opinion of Probable Cost</b>					<b>\$</b>	<b>3,705,300</b>

DW10

<b>ZONE 2 SOUTH- GRANDVIEW</b> <b>7,000 LF 16-INCH PIPELINE</b> Preliminary Opinion of Probable Cost						
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST	
1	Mobilization/Demobilization	%	10%	\$ 1,910,000	\$	191,000
2	Construction Surveying	LS	2%	\$ 1,910,000	\$	39,000
3	SWPPP	LS	3%	\$ 1,910,000	\$	58,000
4	16-inch PVC Pipeline	LF	7,000	\$ 270	\$	1,890,000
5	Connections to existing pipelines	EA	2	\$ 10,000	\$	20,000
Sub-Total Construction					\$	2,198,000
Contingency and Unknowns: 10%					\$	219,800
TOTAL CONSTRUCTION					\$	2,417,800
Engineering Design and Construction Services 10%					\$	241,800
<b>Preliminary Opinion of Probable Cost</b>					<b>\$</b>	<b>2,659,600</b>

DW11

<b>ZONE 2 SOUTH- ISRAEL CANYON</b> <b>3.0 MG TANK #12</b> Preliminary Opinion of Probable Cost					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization/Demobilization	%	10%	\$ 5,270,000	\$ 527,000
2	Construction Surveying	LS	2%	\$ 5,270,000	\$ 106,000
3	SWPPP	LS	3%	\$ 5,270,000	\$ 159,000
4	Tank Construction (3,000,000 gallons)	Gallon	3,000,000	\$ 1.52	\$ 4,560,000
5	Yard Piping & Valving	LS	10%	\$ 4,560,000	\$ 456,000
6	Land Acquisition	ACRES	1.0	\$ 250,000	\$ 250,000
Sub-Total Construction					\$ 6,058,000
Contingency and Unknowns: 10%					\$ 605,800
TOTAL CONSTRUCTION					\$ 6,663,800
Engineering Design and Construction Services 10%					\$ 666,400
<b>Preliminary Opinion of Probable Cost</b>					<b>\$ 7,330,200</b>

DW12

<b>ZONE 3 SOUTH- GRANDVIEW</b> <b>1.0 MG TANK #13, 500 GPM PUMP STATION #12, 5,200 LF 12-INCH PIPELINE</b> Preliminary Opinion of Probable Cost					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization/Demobilization	LS	10%	\$ 5,590,000	\$ 559,000
2	Construction Surveying	LS	2%	\$ 5,590,000	\$ 112,000
3	SWPPP	LS	3%	\$ 5,590,000	\$ 168,000
4	Tank construction	Gallon	1,000,000	\$ 1.62	\$ 1,620,000
5	Tank Land Acquisition	AC	3.2	\$ 250,000	\$ 800,000
6	Yard Piping & Valving	LS	10%	\$ 1,620,000	\$ 162,000
7	12-inch pipeline	LF	5,200	\$ 247	\$ 1,286,000
8	Connections to existing pipelines	EA	2	\$ 10,000	\$ 20,000
9	Materials Testing	LS	1	\$ 15,000	\$ 15,000
10	Pump Station Structure	LS	1	\$ 250,000	\$ 250,000
11	Pumps, Valves, and Piping	LS	1	\$ 500,000	\$ 500,000
12	Yard Piping & Valving	LS	50%	\$ 500,000	\$ 250,000
13	Electrical Systems	LS	1	\$ 400,000	\$ 400,000
14	HVAC Systems	LS	1	\$ 50,000	\$ 50,000
15	Fencing	LF	1,200	\$ 35	\$ 42,000
16	Landscaping	SF	28,000	\$ 6	\$ 168,000
17	Pump Station Site Improvements	LS	1	\$ 20,000	\$ 20,000
18	Pump Station Land Acquisition	ACRES	0.5	\$ 250,000	\$ 125,000
Sub-Total Construction					\$ 6,547,000
Contingency and Unknowns: 10%					\$ 654,700
TOTAL CONSTRUCTION					\$ 7,201,700
Engineering Design and Construction Services 15%					\$ 1,080,300
<b>Preliminary Opinion of Probable Cost</b>					<b>\$ 8,282,000</b>

DW13

<b>ZONE 2 SOUTH- LAKE MOUNTAIN</b> <b>2.0 MG TANK, 6,000 LF 16-INCH PIPELINE</b> Preliminary Opinion of Probable Cost					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization/Demobilization	LS	10%	\$ 5,220,000	\$ 522,000
2	Construction Surveying	LS	2%	\$ 5,220,000	\$ 105,000
3	SWPPP	LS	3%	\$ 5,220,000	\$ 157,000
4	Tank construction (2,000,000 gallons)	Gallon	2,000,000	\$ 1.52	\$ 3,040,000
5	Yard Piping & Valving	LS	10%	\$ 3,040,000	\$ 304,000
6	16-inch pipeline	LF	6,000	\$ 270	\$ 1,622,000
7	Connections to existing pipelines	EA	2	\$ 10,000	\$ 20,000
8	Land Acquisition	AC	0.9	\$ 250,000	\$ 225,000
Sub-Total Construction				\$	5,995,000
Contingency and Unknowns: 10%				\$	599,500
TOTAL CONSTRUCTION				\$	6,594,500
Engineering Design and Construction Services 6%				\$	395,700
<b>Preliminary Opinion of Probable Cost</b>					<b>\$ 6,990,200</b>

DW 14

<b>ZONE 3 NORTH- WILDFLOWER</b> <b>4,400 LF 12-INCH PIPELINE</b> Preliminary Opinion of Probable Cost					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization/Demobilization	%	10%	\$ 1,230,000	\$ 123,000
2	Construction Surveying	LS	2%	\$ 1,230,000	\$ 25,000
3	SWPPP	LS	3%	\$ 1,230,000	\$ 37,000
4	12-in PVC Pipeline	LF	4,400	\$ 247	\$ 1,087,722
5	Connections to existing pipelines	LS	2	\$ 10,000	\$ 20,000
6	Pressure Reducing Station	LS	1	\$ 120,000	\$ 120,000
Sub-Total Construction				\$	1,412,800
Contingency and Unknowns: 30%				\$	423,900
TOTAL CONSTRUCTION				\$	1,836,700
Engineering Design and Construction Services 12%				\$	220,500
<b>Preliminary Opinion of Probable Cost</b>					<b>\$ 2,057,200</b>



DW 15

<b>ZONE 3 NORTH - MT SARATOGA</b> <b>3,300 LF 12-INCH PIPELINE</b> <b>Preliminary Opinion of Probable Cost</b>						
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST	
1	Mobilization/Demobilization	%	10%	\$ 840,000	\$	84,000
2	Construction Surveying	LS	2%	\$ 840,000	\$	17,000
3	SWPPP	LS	3%	\$ 840,000	\$	26,000
4	12-in PVC Pipeline	LF	3,300	\$ 247	\$	815,791
5	Connections to existing pipelines	LS	2	\$ 10,000	\$	20,000
Sub-Total Construction					\$	962,800
Contingency and Unknowns:				30%	\$	288,900
TOTAL CONSTRUCTION					\$	1,251,700
Engineering Design and Construction Services				12%	\$	150,300
<b>Preliminary Opinion of Probable Cost</b>					<b>\$</b>	<b>1,402,000</b>

SARATOGA SPRINGS FIRE FLOW UNITS CALCULATION

Fire Flow Requirement (gpm)	Fire Flow Duration (hours)	Fire Flow Volume (gallons)	Fire Flow Volume (MG)	Additional Fire Flow Volume per Requirement (gallons)	Existing Connections per Fire Flow	Total Existing Connections per Fire Flow	Total Storage Capacity per Fire Flow (ERC)	Total Storage Capacity per Fire Flow (Connections)	Difference after rounding number of connections	Additional cappacity added back	Fire Flow Volume per Connection per Fire Flow (gallons)	Total Fire Flow Volume per Connection (gallons)	Fire Flow Impact Fee Units per Connection	Storage Capacity (Connections)	Total Fire Flow Impact Fee Units	Total Fee Distribution	Fee per Connection	Existing Cost
1500	2	180000	0.18	0	9222	9397	56946.000	56946		69.44	41.1	41.1	1.0	55885.0	55885.0	\$17,942,806.12	\$321.07	\$2,960,876
1750	2	210000	0.21	30000	18	175	1060.503	1061	-0.50	-14.04	28.3	69.4	1.7	637.0	1075.3	\$345,249.77	\$541.99	\$9,756
2000	2	240000	0.24	30000	14	70	424.201	424	0.20	14.25	70.8	140.1	3.4	121.0	412.6	\$132,474.59	\$1,094.83	\$15,328
2250	2	270000	0.27	30000	11	50	303.001	303	0.00	0.09	99.0	239.1	5.8	97.0	564.5	\$181,238.64	\$1,868.44	\$20,553
2500	2	300000	0.3	30000	8	34	206.041	206	0.04	5.92	145.6	384.8	9.4	97.0	908.3	\$291,613.01	\$3,006.32	\$24,051
2750	2	330000	0.33	30000	4	18	109.080	109	0.08	22.11	275.2	660.0	16.1	48.0	771.0	\$247,526.82	\$5,156.81	\$20,627
3000	3	540000	0.54	210000	2	10	60.600	61	-0.40	-1376.39	3442.6	4102.6	99.8	25.0	2496.0	\$801,388.72	\$32,055.55	\$64,111
3250	3	585000	0.585	45000	1	6	36.360	36	0.36	450.14	1250.0	5352.6	130.3	12.0	1563.1	\$501,868.24	\$41,822.35	\$41,822
3500	3	630000	0.63	45000	1	4	24.240	24	0.24	450.14	1875.0	7227.6	175.9	6.0	1055.3	\$338,835.36	\$56,472.56	\$56,473
3750	3	675000	0.675	45000	1	3	18.180	18	0.18	450.14	2500.0	9727.6	236.7	6.0	1420.4	\$456,037.01	\$76,006.17	\$76,006
4000	4	960000	0.96	285000	1	2	12.120	12	0.12	2850.91	23750.0	33477.6	814.7	12.0	9776.5	\$3,138,905.41	\$261,575.45	\$261,575
						9572		58007		2853				56946.0	75928.0	\$24,377,943.69		\$3,551,178

Fire Flow Requirement (gpm)	Storage Capacity (Connections)	Total Fire Flow Impact Fee Units	Total Fee Distribution	Fee per Connection	Existing Units	Existing Cost	Next 10 Years Connections	Next 10 Years Units	Next 10 Years Cost	Beyond 10 Years Connections	Beyond 10 Years Units	Beyond 10 Years Cost
1500	55885.0	55885.0	\$17,942,806	\$321.07	9,222.0	\$2,960,876	13,397	13,397.0	\$4,301,329	33,266	33,266.0	\$10,680,601
1750	637.0	1075.3	\$345,250	\$541.99	30.4	\$9,756	26	43.9	\$14,092	593	1,001.0	\$321,402
2000	121.0	412.6	\$132,475	\$1,094.83	47.7	\$15,328	20	68.2	\$21,897	87	296.7	\$95,250
2250	97.0	564.5	\$181,239	\$1,868.44	64.0	\$20,553	16	93.1	\$29,895	70	407.4	\$130,791
2500	97.0	908.3	\$291,613	\$3,006.32	74.9	\$24,051	12	112.4	\$36,076	77	721.0	\$231,487
2750	48.0	771.0	\$247,527	\$5,156.81	64.2	\$20,627	6	96.4	\$30,941	38	610.3	\$195,959
3000	25.0	2496.0	\$801,389	\$32,055.55	199.7	\$64,111	3	299.5	\$96,167	20	1,996.8	\$641,111
3250	12.0	1563.1	\$501,868	\$41,822.35	130.3	\$41,822	1	130.3	\$41,822	10	1,302.6	\$418,224
3500	6.0	1055.3	\$338,835	\$56,472.56	175.9	\$56,473	1	175.9	\$56,473	4	703.6	\$225,890
3750	6.0	1420.4	\$456,037	\$76,006.17	236.7	\$76,006	1	236.7	\$76,006	4	946.9	\$304,025
4000	12.0	9776.5	\$3,138,905	\$261,575.45	814.7	\$261,575	1	814.7	\$261,575	10	8,147.1	\$2,615,755
	56946.0	75928.0	\$24,377,944		11,060.6	\$3,551,178	13,484	15,468.0	\$4,966,272	34,179	49,399.4	\$15,860,493