Ivins City
Request for Proposals for
Engineering/Financial Services to prepare the Wastewater Master Plan, Impact Fee Facilities Plan, and Impact Fee Analysis

Ivins City, Utah is soliciting competitive sealed proposals from qualified engineering/financial firms to provide services as outlined in the **SCOPE OF SERVICES SECTION** of this request.

I. Background:

Ivins City's most current capital facilities plan for wastewater was prepared in 2006 by Alpha Engineering. The major capital facilities that were recommended as part of this plan have not been constructed, based on the opinion of the City that the assumed State standard contribution flow rate per ERU used may have been too high and didn't reflect actual flow data measured. It is also the desire of the City to evaluate possible conveyance alternatives for the Kayenta development. This development currently does not have wastewater collection infrastructure, but relies on individual septic systems for treatment. The density of septic tanks in Kayenta is a concern based on a 1998 groundwater study conducted county wide by Hansen Allen and Luce that concluded new subdivisions must be sewered. In the Taviawk area of Kayenta the city has already implemented, on a trial basis, a Septic Tank Effluent Gravity (STEG) system to collect the "clear" effluent. The household sewage is pretreated in the septic tank where the solids and grease are held back. The "clear" effluent is then conveyed by gravity to the City's conventional sewer by small-diameter gravity collector lines. The STEG system is currently on a trial period to determine its effectiveness compared to a conventional system and this trial period is nearing its end. Ivins City is seeking professional engineering services to update the master plan with recommendations regarding future improvements according to the adjusted design criteria and provide recommendations regarding the STEG system and possible scenarios for its full scale implementation in the Kayenta development. Ivins City is also seeking professional engineering/financial services to prepare an Impact Fee Facilities Plan and Impact Fee analysis based on recommendations from the master plan. In addition, the City is requesting services to update the GIS databases as needed, including any potential survey work.

The following information will be provided by the City:

- GIS Database including the following feature classes:
    - Sewer Manholes, point data, invert elevations, rim elevations
    - Sewer Pipes, line data, size, invert elevations
    - Collection Basins (existing and buildout), polygon data
    - Land Use Plan
    - Zoning Map
    - Planning Points (Identifies each existing property with a point feature, identifies the number of ERU's and identifies current use and anticipated future use based on the land use plan)

- 2006 Aerial Photogrammetry, 1" = 100', 2' contours
- 2012 LiDAR Aerial Topography, 1 meter point cloud and processed 2' contours
- 2006 Wastewater Capital Facilities Plan
- March 2014 Aerial Photography by Pictometry, 3-inch pixels
- As-builts of City and Developer projects can be provided as needed
- Wastewater Flow Data

II. Scope of Services:

The following is the scope of services that should be considered during the preparation of the fee proposal:

WASTEWATER MASTER PLAN

A. Provide GPS Survey and GIS Mapping Input
   i. Ivins City Wastewater System GIS mapping is outdated in some areas and needs to be brought to date. Provide a unit price per 100 data points to collect field data and input the data into the City GIS databases.
   ii. The following data should be collected in the field and input into the database: rim elevation, invert elevation and pipe diameter of all pipes entering the manhole.

B. Land Use /Population Analysis
   i. Incorporate 2013 analysis prepared by City.

C. Establish Design Criteria
   i. Review existing flow data provided by the City.
   ii. Establish design flows per capita for truck lines based on existing flow data.
   iii. Provide recommendations to update the City's current Standard Specifications based on the results of the updated design criteria analysis.

D. Existing Condition Analysis
   i. Model the existing trunk line network based on the City GIS data and the appropriate GIS data from scope services A. A map has been included here to show the trunk lines to be modeled and evaluated.
   ii. Evaluate hydraulics of pipe system and identify locations where wastewater facilities are deficient.
   iii. Work with City staff to identify problem locations and calibrate model to check ability of model to identify capacity problems.

E. Alternative Analysis for Kayenta Development
   i. Research STEP (septic tank effluent pump) and STEG (septic tank effluent gravity-draining) systems.
   ii. Compare three alternatives and provide a recommendation to the City
      1. The three alternatives include:

a) Conventional Sewer System (septic tanks are removed or bypassed all together)
b) STEP and/or STEG system for the entire region
c) Combination of a Conventional Sewer System and a STEP/STEG system.

2. The comparison should consider, but not limited to, the following: ease of implementation/conversion, implementation/conversion costs, capital cost of improvements, maintenance costs, financial cash flow analysis, etc.

iii. Provide pros and cons of a STEP/STEG system and provide recommendations to the City whether or not these types of systems should be allowed.

F. Build-out Condition Analysis
   i. Prepare wastewater collection system model for future fully developed conditions.
   ii. Incorporate the recommendations from the Kayenta development alternative analysis into the model.
   iii. Identify facilities that will be needed to address existing deficiencies and future development.
   iv. Update the model to include other recommended facilities.
   v. Prepare a financial viability analysis for the sewer system that considers the following:
      1. Improvements Project Costs
      2. Cash Flow (existing and proposed expenses and revenues)
      3. Funding Sources
      4. User Rates
      5. Impact Fees

IMPACT FEE FACILITIES PLAN

A. Identify facilities that will be needed to address existing deficiencies and possible future deficiencies for a planning period of 6 years.
B. Identify costs for each capital facility identified for the 6 year planning period.
C. Identify an implementation/phasing plan identifying the year each facility is anticipated to be needed and installed.
D. Identify which facilities are eligible to be funded either fully or partially with impact fees meeting the requirements of State Laws for an impact fee facility plan.

IMPACT FEE ANALYSIS

A. Prepare an impact fee analysis meeting the requirements of State Laws, which may include the following:
   i. Identify the anticipated impact on or consumption of existing capacity of the wastewater facility by anticipated development activity.

ii. Identify the anticipated impact on system improvements required by the anticipated development activity to maintain the established level of service for the wastewater facility.
iii. Demonstrate how these anticipated impacts are reasonably related to the anticipated development activity.
iv. Estimate the proportionate share of the following:
    i. Cost for existing capacity that will be recouped,
    ii. Cost of impacts on system improvements that are reasonably related to the new development activity.
v. Calculate impact fees and identify how the impact fee was calculated based on the information identified in these previous sections.
vi. Ensure that when analyzing whether or not the proportionate share of the costs of the wastewater facilities are reasonably related to the new development activity, that items in Section 11-36a-304 (2) of the State Code have been identified as applicable.

III. Compensation for Services:

Ivins City intends to enter into a professional services contract with the successful engineering/financial firm. Compensation for the services rendered, is to be based upon a time-expended basis with an agreed maximum not to exceed value. **The selection of the firm will not be based solely on the fee.**

Attached to this RFP is the City's template contract for professional services. By submitting a proposal for this RFP you are agreeing with the standard terms and conditions of the contract.

IV. Evaluation Criteria and Selection Process:

A selection committee will review each submittal. Selection criteria to be used by the selection team include the following:

A. Level of training, experience, expertise, and availability of key project personnel.
B. References regarding past performance on similar projects for other owners and the City.
C. Quality, clarity, and completeness of previous projects and of the example report.
D. Professional services fee proposal.

V. Proposal Format and Content:

Proposals are to follow the format and are to contain information listed in this section. In order to be considered, proposals must address all the items listed in this section and adhere to page limitations.

A. Letter of transmittal introducing firm and nature of proposal.
B. Project Team and Approach (Two pages maximum)
C. Firm Experience and References (Two pages maximum)

i. Provide a listing of previous experience the firm has had with projects of similar size and complexity. (Two projects minimum).
ii. For each project, provide the name of a contact person and his/her phone number.

D. Fee Proposal (Two pages maximum)
i. Provide proposed fee for meeting the requirements of the Scope of Services in Section II. Fees shall be reasonably itemized based on Scope of Services.
ii. Identify billing rates of each member of project team and number of hours required for project tasks as well as estimated direct charges.

E. Appendices
i. Resumes (1 or ½ page per person) – Include principal-in-charge and key technical/professional personnel to be assigned to the project. Identify the role assigned for each person.
ii. Provide copy of report from a previous project that is most similar to this project.

VI. Submittal Requirements:

Proposals are due on Tuesday, December 8th at 5:00 p.m.

The proposal should be submitted electronically in a PDF format to jchapman@ivins.com. Large files may be transmitted by including a link to an FTP site on the email. Hard copies will not be accepted.

Inquiries regarding the RFP should be directed to Chuck Gillette, P.E., Public Works Director or Tom Jorgensen, P.E., Assistant Public Works Director at (435) 634-0689, or by inquiry to the address above. The City reserves the right to award the contract to the firm chosen by the selection committee without further consideration or discussion. **The City reserves the right to reject any and all proposals received.** The City also reserves the right to waive any irregularity, informality, or technicality in the proposals in its best interest, and is not obligated to award a contract based upon the lowest price submission. If terms cannot be mutually agreed upon, the City will enter into negotiations with the secondary firm.

This RFP is due concurrent with the following RFPs:

A. Irrigation Master Plan, IFFP, IFA, & Implementation Plan
B. Wastewater Master Plan, IFFP, & IFA
C. Transportation IFA
D. Combined User Rate Plan

The professional services firm may choose to offer discounts if they are chosen for more than one of the proposed projects. Please identify what those discounts might be.

PROPOSAL

to provide **Professional Engineering Services**
for **Wastewater Master Plan, IFFP, and IFA**

December 2015

Prepared by:

Bowen Collins
& Associates, Inc.
CONSULTING ENGINEERS

Prepared for:

OUR HOME BENEATH THE BIG RED MOUNTAIN
IVINS
UTAH

Bowen Collins
& Associates, Inc.
CONSULTING ENGINEERS

20 NORTH MAIN, SUITE 107 • ST. GEORGE, UTAH 84770
TEL: 435.656.3299 • FAX: 435.656.2190

December 8, 2015

Jennifer Chapman
Administrative Assistant – Parks & Public Works
Ivins City
55 North Main
Ivins, Utah 84738

Subject: Proposal to Provide Engineering Services for the Wastewater Master Plan, Impact Fee Facilities Plan, and Impact Fee Analysis

Dear Jennifer:

Bowen Collins & Associates (BC&A) appreciates the opportunity to submit the attached proposal for the Ivins City Wastewater Master Plan, Impact Fee Facilities Plan, and Impact Fee Analysis project. BC&A is an engineering firm with extensive experience in planning, modeling, and performing impact fee analyses for Cities just like yours. By selecting BC&A, you can be confident that your facilities plan and impact fees will be:

- **Accurate –** BC&A has completed dozens of capital facilities plans and impact fee studies for service districts and cities throughout Utah. Our proposed principal-in-charge, Keith Larson, along with our proposed project manager, Todd Olsen, are regional experts with these studies. Our team will offer the City a rare combination of technically minded engineers with a deep level of understanding of the financial aspects and challenges associated with the development of impact fees.
- **Defensible –** We will provide defensible impact fees that will meet State code requirements. Our understanding of the law will help you avoid pitfalls that could result in potential challenges to your impact fees. To date, none of our impact fees or rate studies have been successfully challenged after adoption.
- **Cost Effective –**With our experience and the tools and templates we have developed for this type of study, we will hit the ground running. This will allow you to get the most for your money, saving valuable City resources for other needs.

Our personnel and proposed project team are available and ready to devote the time and resources required to meet the needs of the project. We are anxious for the opportunity to work with you on these plans.

Sincerely,
Bowen Collins & Associates, Inc.

Todd Olsen

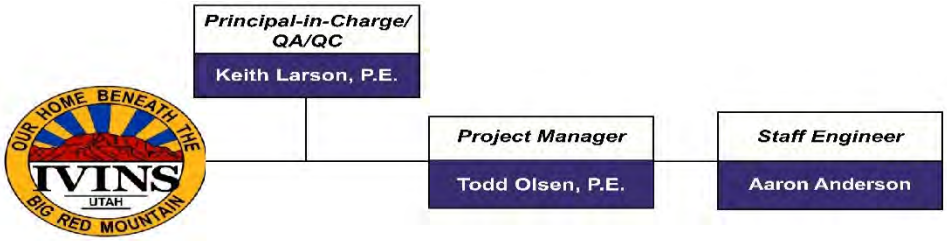
Todd Olsen, P.E.
Principal/Project Manager

Enc: Proposal

A. PROJECT TEAM AND APPROACH

PROJECT TEAM

From experience, we know that having a seasoned, qualified team is vital to the success of any project. For this reason, Bowen Collins & Associates (BC&A) is pleased to present the following team of professionals carefully selected to make this project a success. Detailed resumes for each of the team members are included in Appendix A for reference.



APPROACH/KEY ISSUES

Ivins City is at an important junction in its existence. Projected new development will result in an expanding need for infrastructure and utilities to support growing demands. The City is also facing important decisions regarding existing septic systems. Addressing these issues must be balanced with the need to keep existing rates affordable and protect existing users from funding improvements that only benefit future growth. BC&A understands the pressures that the City will face, the importance of maintaining affordable rates, and the challenges that can come when trying to plan for future development. BC&A is in a unique position to assist the City with the development of an accurate master plan and capital facilities plan (CFP) including an Impact Fee Facilities Plan (IFFP) and Impact Fee Analysis (IFA). ***We are one of the only engineering firms in Utah who understand and are frequently hired to perform both the engineering and financial analysis for these types of studies.***

Based on our understanding of the project and our experience with these studies, we have identified the following key issues to make your project a success:

- **Experience with Master Planning and System Modeling** – Our proposed project team members have spent a significant portion of their time working on various sanitary sewer master plans and related computer models during the last several decades. Master planning and modeling efforts in the past several years include projects for many clients similar to you such as Provo City, Layton City, Ogden City, South Valley Sewer District, Kearns Improvement District, Timpanogos Special Service District, Mt. Olympus Improvement District, Ashley Valley Sewer Management Board, Twin Creeks Special Service District, and others. ***In short, no other consultant has prepared master plans affecting a larger number of residents in the State of Utah than BC&A.*** Because of this, we can use the knowledge we have gained working on dozens of other master plans to help the City achieve accurate and useful results in the way that is most efficient and cost effective.
- **Understanding Our Role in Your Long-Term Plans –** As the ones who work day in and day out with the system, we know that your staff is the best source of understanding for master planning of the system. What you need most is a consulting firm that can work as a member of your team to move your plans forward. We will explain and demonstrate the technical steps and details behind the development of the model and the plan. We will also guide the City's staff in the skills needed to understand and use the master plan so that the plan will be more than just a document on the shelf. We will partner with you to review the current state of the District's system, make recommendations to move the system forward where gaps exist, and develop a comprehensive plan for system improvements that works both technically and financially. ***You provide the vision and direction for the system. We will help identify what is needed and support your staff in achieving their goals.***

- **Comprehensive Planning Results** – There are likely a few other engineering firms who can show experience developing a system model and identifying a few conveyance projects to be included in a "Master Plan". However, to completely fulfill all of the project goals and produce an exceptional plan for the future will require close attention to many of the other facets of master planning.
    - ***Kayenta Development Conveyance*** – It is understood that the existing Kayenta Development relies on individual septic systems for treatment and that the density of the tanks in the area have been identified as a concern. It is also understood that the Kayenta Development is testing a new septic tank system. Installing a new conventional sewer system to collect all of the existing septic systems would be a significant cost and cannot be funded with impact fees. As part of previous master plans, BC&A has evaluated potential costs to collect existing septic systems with a conventional sewer system. Just recently, BC&A also completed an evaluation very similar to the Kayenta Development for the Washington County Water Conservancy District in Dammeron Valley. This evaluation included reviewing and comparing multiple different large underground wastewater disposal systems, hydraulic flow analysis, treatment capabilities to meet State of Utah default wastewater organic strength loading values, and developing preliminary design criteria to meet the densities. ***We see making the correct decision regarding the future wastewater service for the Kayenta Development as one of the most critical part of this project.*** BC&A has the experience and technical ability (including treatment analysis) to work with the City to make a sound decision regarding the future wastewater needs of the Kayenta Development.
    - ***Asset Management*** – Along with preparing for future growth through system expansion, the City will also need a plan for maintaining and replacing infrastructure as it ages. BC&A has helped establish condition assessment and asset management programs for Salt Lake City and other entities with aging infrastructure. Our experience on these other programs can provide unique insight and perspective as the City develops its own plan for system maintenance and renewal.
    - ***Financial Planning*** – While each of the steps above will help the City identify the best path forward, the final recommendation will only be a dream until a solid financial plan is developed for its implementation. One unique aspect of BC&A master plans is our balanced look at both the technical and financial aspects of planning. BC&A can offer the City the rare combination of technically minded engineers with a deep level understanding of the financial aspects and challenges associated with the development of capital facility plans, impact fees, and rates. ***With BC&A on your side, you can be comfortable that your final plan will be not only technically sound, but financially feasible.***
- **Defensible Fees -** The City has probably seen the problems that have resulted when other entities experience legal challenges to impact fees. The development of fees that are defensible when challenged will be critical to the success of this project. BC&A has assisted numerous cities and special service districts with the development of justifiable impact fees. ***To date, none of our fees have been successfully challenged after adoption.***

Even though all of our impact fees have withstood scrutiny from developers and others, we have also kept ourselves educated on those that have not. We are in frequent contact with members of the impact fee task force, who are responsible for developing impact fee law and have served as an expert witness in impact fee challenges. Within the last few months, we have spent considerable time with the most prominent impact fee attorneys in the State, discussing their concerns with other studies and identifying approaches to avoid conflict. A few of the things we have learned are summarized in Appendix B for reference. ***Our understanding of the law will help you avoid pitfalls that could result in potential challenges to your impact fees.***

B. FIRM EXPERIENCE AND REFERENCES

The proposed BC&A team members have worked on and completed numerous wastewater masterplans, IFFPs, and IFAs. Since the last major change in the impact fee law (in 2011 with additional minor revisions in 2013), BC&A has helped dozens of clients bring their capital facility plans and impact fees into compliance with the new legislation. This has included: reviewing existing master plans or developing new ones, identifying any past inconsistencies in methodology or assumptions with current impact fee law, updating existing models and analysis to develop both capital and impact fee facility plans, looking at options for funding improvements, documenting analysis in accordance with current law and recommending changes in impact fees. Brief project descriptions and references for a few related projects are presented below. A table at the end of this section provides a larger list of similar master plans and financial studies completed by BC&A.

Layton City Sewer Master Plan – Layton City

Client Contact: James Woodruff, Phone: 801-336-3700
Date of Project Completion: 2014-2015
Project Description: Layton City retained the services of BC&A to provide a comprehensive sewer master plan for the City. Because the City does not have any spatially accurate indoor water use information within the City, the City's general land use plan was used to estimate domestic flow production within the City. Infiltration within the City was estimated using flow monitoring data provided by the North Davis Sewer District. A hydraulic model for the City was setup using the GIS based InfoSWMM by Innovyze. Because of limited survey data within the City and time constraints for the master plan, only key trunk lines were identified for sewer modeling within the City. Preliminary results using the domestic flow estimates from the City's general plan were then used to identify potential problem areas in the City. Once preliminary results were available, Layton City used results to further identify areas to conduct flow monitoring for model calibration and additional survey. BC&A conducted flow monitoring and the hydraulic model was further calibrated to match flow monitoring results and new survey data. Using this approach, it was possible to reduce the amount of flow monitoring and survey needed within the City. Alternatives to resolve existing and future system deficiencies were evaluated and a prioritized list of capital improvements was in included in the final report.

Water and Sewer Master Plan, Impact Fee Facilities Plan, and Impact Fee Analysis – Jordanelle Special Service District, Twin Creek Special Service District, North Village Special Service District

Client Contact: Darrel Scow, Phone: 801-450-3505
Date of Project Completion: 2015
Project Description: BC&A recently completed master plan and impact fee projects for three separate service districts in Wasatch County. These studies were more complicated than many capital facility and impact fee studies in two respects. First, although each is its own district and generally has its own collection system, they are jointly managed under Jordanelle Special Service District and share some treatment and conveyance facilities. Because of the interconnectedness of the several systems, is was necessary to conduct significant analysis to accurately identify and divided shared costs. A second challenge with these studies is that the systems were financed largely through Special Assessment Areas. As a result the impact fee calculations were divided according to whether a user was included in the SAA (a "bonded" user) or was not ("unbonded") to account for payments made through the SAA bonds. The District's plans include costs for wastewater collection, treatment, and property/easement acquisition.

Capital Facilities Plan and Impact Fee Facilities Plan Development and Updates – South Valley Sewer District

Client Contact: Craig White, Phone: 801-571-1166

Date of Project Completion: 2013

Project Description: BC&A has been assisting South Valley Sewer District with the development and maintenance of its capital facilities plan for the past decade. Because of rapid growth in the District, the historic practice has been to compete a comprehensive master plan every 4 to 5 years. In the years in between, the capital facilities plan and impact fee facilities plan are updated to reflect new development projects and other new information that may affect system development. BC&A is involved in all aspects of this process. We have assisted the District is developing a GIS based model, developed comprehensive capital facilities plans, identified projected future construction costs, and developed a comprehensive financial plan for the CFP implementation (including both impact fees and rates). The District's plans include costs for wastewater collection, treatment, and property/easement acquisition.

Client	Client Reference	Project Name	Short Project Description	Year Completed
Orem City, Utah	Neal Winterton 801-229-7510	Orem City Sewer Master Plan	The City owns and maintains approximately 287 miles of sewer pipe and 7 lift stations. BC&A helped the City identify major trunk lines to including within the GIS based sewer model. The final model included almost 1,400 pipes. Along with the alternatives evaluations, BC&A evaluated existing struvite problems at the City's treatment plant, maintenance and manpower requirements, and sewer rates.	Ongoing
Salt Lake City, Utah	Jason Brown 801-483-6729	Salt Lake City Sewer Master Plan	BC&A completed a sewer master plan and asset management assessment for the City's sewer system which consists of approximately 640 miles of pipe, 8,500 manholes, and 33 lift stations. Several GIS based modeling software packages were evaluated, with BC&A providing a final recommendation to the City. This project also involved identifying existing deficiencies, evaluating costs associated with collecting existing septic systems, a condition assessment of the City's existing system to identify key areas for capital improvements. The Asset Management Assessment also included an evaluation of the City's current design and maintenance practices and making recommendations for improving current practices and design criteria. As part of this assessment, a decision support system was developed to aid with the City in prioritizing annual capital improvement.	2010
Provo City, Utah	Brad Jorgensen 801-369-9100	Provo Wastewater Collection System Master Plan and Updates	BC&A has assisted the City with modeling and master planning of its sewer system for the last 15 years. This included evaluating the performance of existing sewer facilities and developing future system improvements, including costs associated with collecting existing septic systems. The GIS based model developed includes 42 miles of sewer trunk lines, several pump station and flow diversions.	2011
Mt. Olympus Improvement District	Don Telford 801-262-2904	Capital Facilities Plan and Impact Fee Update	The District owns approximately 377 miles of collection pipeline. The purposes of this study were to summarize the cost of needed project, determine a detailed 6 year sewer rate, and perform an equivalent residential unit analysis.	2013
Ashley Valley Sewer Management Board (AVSMB)	Dean Gibbs 435-789-9805	Ashley Valley Sewer Master Plan	Completed a combined master plan for all four sewer collection agencies in the Ashley Valley. The master plan included coordinating surveys, 2,400 manholes, 157 miles of gravity sewer main, and 10 lift stations.	2010
Kearns Improvement District	Greg Anderson 801-986-1011	CPF, IFFP, and Impact Fee Study	BC&A's work included assessing existing rate structure, developing sewer rate models, evaluating funding options, and recommending future changes in impact fees and pricing	2015
Timpanogos Special Service District	Jon Adams 801-756-5231	CFP, IFFP, IFA, and Rate Study	BC&A gathered survey and GIS data, assembled a hydraulic model, evaluated treatment improvements, and assembled a CFP, IFFP, IFA, and rate study	2013
North Davis Sewer District	Kevin Cowan 801-825-0712	CFP, IFFP, and IFA Study	BC&A completed a CFP, IFFP and IFA to include the District's treatment facility along with major trunk lines	2013
Saratoga Springs, Utah	Jeremy Lapin 801-766-6506	CFP and IFA Study	This study included updating the City's existing master plan, assembly and calibration of a GIS based model, development and evaluation of service strategies for rapid growth, developing CFP and IFFPs, and recommending changes in user rates and impact fees.	2015
Sandy Suburban Improvement District	Jerry Knight 801-561-7662	Sewer User Charge and Impact Fee Study	Completed a service charge and impact fee study	Ongoing

C. FEE PROPOSAL

BC&A has studied the scope of work outlined in the City's Request for Proposals (RFP). Based on the level of detail included in the scope of work, it is apparent that the City has carefully thought through the tasks required to accomplish the project. Because the scope of work in the RFP already provides an excellent outline of the required work to complete this project, we would propose following it as written with only a few modifications. Thus, instead of restating the scope of work already contained in the RFP, the following section discusses only those areas where we would propose modifying or adding to the existing RFP scope. This means we will perform all work contained in the RFP scope unless otherwise noted below.

- **Additional Tasks:** We recommend adding the following tasks that were not included in your detailed scope of services:

    - Collect and review existing information
    - Progress and coordination meetings – We will meet with City personnel to gather information, report results, and review work products. It is expected that there will be three progress meetings during the project and a final presentation during the required public hearing associated with the IFFP and IFA.
    - Master Plan report preparation – BC&A will prepare a master plan report summarizing the results of the activities identified in the scope. Five hard copies and an electronic copy of this report will be provided to the City. The same will be provided for the IFFP and IFA.

- **Surveying Task:** The task for GPS survey and GIS mapping have not been shown in the base cost below. However, these services can and will be provided to the City as desired. We have teamed with Roger Bundy to provide these services. Our cost to survey and import the system data into your GIS database will be $6,000 for the first 100 points. Each 100 points thereafter will cost $4,300 (or a portion thereof).

We propose to complete the scope of services for a time and materials basis, with a not-to-exceed limit. Our detailed man-hour and cost estimate is summarized in the table below. The additional recommended tasks are shown in bold italics print.

Multiple Project Discount

The fee shown in the table represents the cost to complete this project on its own. If BC&A is awarded multiple projects there is expected to be significant increases in efficiency associated with project meetings, growth projections, etc. As a result, BC&A would offer the following discounts for the award of multiple projects:

- Award of Rate Study with one master plan (either sewer or irrigation) – $500 Discount
- Award of both irrigation and sewer master plans – $3,500 Discount
- Award of both irrigation and sewer master plans and Rate Study – $4,500 Discount

We appreciate the opportunity to provide this proposal and hope to have the opportunity to work with you on this project. We would be pleased to negotiate scope and fee if there is something in this proposal that does not meet your needs. Please call if you have any questions or if you need additional information.

Table 1
Ivins City
Wastewater Master Plan, Impact Fee Facilities Plan, and Impact Fee Analysis
Engineering Man-Hour and Fee Estimate
Last Updated 12/08/2015

		Office/Support		Engineers				Subtotal Hours	Subtotal Labor	Subtotal Expenses	Total Cost
	Labor Category	Office	Editor	Eng. 1	Eng. 3	PM	PIC				
	Staff	GR	MH	AA	KB	TO	KL				
	2014 Labor Rate	$62	$62	$93	$98	$112	$135				
Task No.	**Task Description**										
1	***Collect and Review Existing Information***			12		4		**16**	$ 1,564.00	$112	$ 1,676.00
2	***Project Coordination Meetings***	1				16	4	**21**	$ 2,394.00	$147	$ 2,541.00
3	Land Use/Population Analysis			8		2		**10**	$ 968.00	$70	$ 1,038.00
4	Establish Design Criteria			8		12	4	**24**	$ 2,628.00	$168	$ 2,796.00
5	Existing Condition Analysis	1		40		8	4	**53**	$ 5,218.00	$371	$ 5,589.00
6	Alternative Analysis for Kayenta Development			20		12	2	**34**	$ 3,474.00	$238	$ 3,712.00
7	Build-out Condition Analysis	1		40		8	12	**61**	$ 6,298.00	$427	$ 6,725.00
8	Impact Fee Facilities Plan			24		12	16	**52**	$ 5,736.00	$364	$ 6,100.00
9	Impact Fee Analysis	1		12		4	10	**27**	$ 2,976.00	$189	$ 3,165.00
10	***Report Preparation***	1	12	48		20	6	**87**	$ 8,320.00	$609	$ 8,929.00
	Subtotal	**5**	**12**	**212**	**0**	**98**	**58**	**385**	**$ 39,576.00**	**$2,695**	**$ 42,271.00**
	Total Hours	**5**	**12**	**212**	**0**	**98**	**58**	**385**			
	Total Cost								**$ 39,576.00**	**$2,695**	**$ 42,271.00**

Expenses include:
Mileage reimbursement at $0.75/mile
Computer/Communications Charge at $7/labor hour
Surveyor: Roger Bundy

Assumptions:
Fee to survey and incroporate manholes and associated sewer pipes: $6,000/100 Manholes
Up to three (3) inverts will be measured at each point (i.e. manhole depth to invert)
Pipe and manhole database is assumed to be accurate, including pipe sizes and routing
Only the trunk lines show in the RFP figure will be modeled

APPENDIX A
RESUMES



KEITH J. LARSON, P.E.

PRINCIPAL/PROJECT MANAGER

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

DISTINGUISHING QUALIFICATIONS

- Recognized in the region as a leading expert in water, wastewater, and storm drain master plan, impact fee facility plan studies,
- Extensive experience with hydraulic and hydrologic computer modeling applications
- Capable of providing unique engineering insight in the areas of asset management and utility finances

EDUCATION

M.S., Civil and Environmental Engineering, University of California – Davis, 2000

B.S., Civil and Environmental Engineering, University of Utah, 1998

EXPERIENCE

Master Planning

Mr. Larson has extensive experience in the master planning of water, wastewater and storm drain facilities. He has served as Project Manager or Project Engineer on numerous master plans including:

Jordanelle Special Service District Water and Sewer Master Plans	WBWCD Supply and Demand Study
Orem City Water, Sewer, and Storm Drain Master Plans	Ogden City Major Conveyance Study
Layton City Water, Sewer, and Storm Drain Master Plans	Ashley Valley Wastewater Collection System Master Plan
American Fork Storm Drain Master Plan	Salt Lake County Supply and Demand Study
2013 and 2008 Park City Water Master Plan	Salt Lake City Major Conveyance Study
Herriman City Potable and Secondary Water System Master Plans	Snyderville Basin Water Transport Study
Saratoga Spring Sewer and Storm Drain CFP and Impact Fee Plans	MWDSL&S Supply and Demand Study
2011 and 2002 Provo City Sewer and Water Master Plans	Major Conveyance Master Plan for JVWCD
Salt Lake City Sewer Master Plan	Ogden City Sanitary Sewer Master Plan
2010 and 2001 Sandy City Water Master Plan	

In each of these projects, his work included master planning activities such as network system development, model calibration, population growth and development projections, recommendations for capital improvements, asset management, cost estimates, project scheduling, and training.

Rate and Impact Fee Analysis

Mr. Larson has extensive experience in impact fee studies. He understands the details of recent impact fee law changes and has completed dozens of Impact Fee Facility Plans and Impact Fee Analyses in accordance with State law. He also served as Project Engineer on recent water rate studies for Cedar Hills, American Fork City, Kearns Improvement District, Sandy City, Murray City, Provo City, Logan City, Pleasant Grove City, and Virgin Valley Water District in Mesquite, Nevada. His work included assessing existing rate structures, developing water rate models, and recommending future changes in water pricing. In each case, he has worked with city councils and residents to successfully implement new conservation-oriented rate structures. He has also been the Project Engineer for sewer and/or storm drain rate studies for Provo City, Cedar Hills, Kearns Improvement District, Mount Olympus Improvement District, Sandy Suburban Improvement District, Timpanogos Special Service District, and South Valley Sewer District. These projects included the development of rate models for multiple service areas within each of the entities analyzed.



TODD OLSEN P.E.

PRINCIPAL

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

DISTINGUISHING QUALIFICATIONS

- Principal/Project Manager at Bowen, Collins & Associates with over twelve years of experience focused on planning, design, and construction management services for water, wastewater, stormwater, and flood control/irrigation infrastructure projects.
- Experience as a construction manager, and on-site field representative in related wastewater, water, storm drainage and flood control projects.

EDUCATION

B.S., Civil Engineering-Hydraulics and Water Resources, Utah State University

EXPERIENCE

STUDIES

Master Plan, Capital Facilities Plan, IFFP, and IFA Study, Ash Creek Special Service District, Utah. Mr. Olsen is currently serving as project manager for the Ash Creek Special Service District's Wastewater Master Plan, Capital Facilities Plan, Impact Fee Facilities Plan, and Impact Fee Analysis. This project involves developing a new master plan and GIS based model to inventory the system, develop a 5 to 10 year plan of recommended system improvements, and develop new impact fee.

Ivins City Storm Drain Master Plan and Capital Facilities Plan, Ivins City, Utah. Mr. Olsen is currently serving as project manager for the Ivins City Storm Drain Master Plan and Capital Facilities Plan. This project also includes an updated Impact Fee Facility Plan (IFFP) and Impact Fee Analysis (IFA). The project included updating the City's storm drain master plan, developing a new design storm, storm distribution, and storm water design criteria. BC&A will completed the IFFP and IFA using in-house resources and help the City develop and new users fee structure.

St. George City Storm Drain Impact Fee Facility Plan, St. George, Utah. BC&A completed a Storm Drain Master Plan update for St. George City. As part of this master plan, BC&A also developed a capital facilities plan. Mr. Olsen used this capital facilities plan to complete an Impact Fee Facility Plan (IFFP) for the City. This IFFP was used by the City to develop their impact fee for future development related projects.

PROFESSIONAL REGISTRATION

Professional Engineer – Arizona, Nevada, and Utah

PROFESSIONAL ASSOCIATIONS AND AWARDS

American Water Works Association, Water Resources – Young Professionals Committee Chair (2008 to 2014)

Member of Tau Beta Pi, Engineering Honor Society

2014 ASCE Southern Utah Branch Engineer of the Year



AARON ANDERSON, E.I.T.

STAFF ENGINEER

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

DISTINGUISHING QUALIFICATIONS

- Staff Engineer at Bowen, Collins & Associates with over one year of engineering experience focused on planning, design, and construction management services for water, wastewater, stormwater, and flood control projects.
- Experience with master planning, including hydraulic and hydrologic computer modeling as well as the development of Impact Fee Facility Plans, Impact Fee Analyses, and Rate Studies.
- Construction inspector for a variety of water distribution and storm water management projects.

EDUCATION

M.S., Civil and Environmental Engineering, Utah State University, 2014

B.S., Civil Engineering, Utah State University, 2013

EXPERIENCE

MASTER PLANNING/COMPUTER MODELING

Orem City Water & Sewer Master Plans

Mr. Anderson worked as a project engineer in the development of the 2013 Water and Sewer Master Plan update for Orem City. The project involved extensive population growth evaluations and hydraulic computer modeling (steady-state and extended period simulation) to determine necessary infrastructure improvements to meet future demands. Mr. Anderson aided in the development of a Capital Improvements Plan for Orem City, providing budgeting recommendations and cost estimates for future improvements to the City's infrastructure.

Lehi City Storm Drain Impact Fee Facilities Plan

Mr. Anderson served as a project engineer for the 2013 Impact Fee Facilities Plan for Lehi City. The project required the evaluation of population growth and land use in GIS to determine the capacity of existing storm drain facilities and necessary future improvements. This analysis provided the framework to develop the IFFP, allocating the costs of storm drain improvements in the City to existing and future users.

Twin Creeks Special Service District Sewer Master Plan

Mr. Anderson played a key role in the development of a 2014 Master Plan Update for Twin Creeks Special Service District located near Heber City, Utah, including an Impact Fee Facilities Plan, Impact Fee Analysis, and Rate Study. The formulation of the report required Mr. Anderson to develop an extended period hydraulic computer model of existing and future sewer conveyance components. The results of this modeling effort were used to identify necessary improvements to the sewer system to meet the demands of future growth. The IFFP, IFA, and Rates Study provided the District with a budgetary plan to pay for the proposed improvements.

Tooele Valley Airport Water and Sewer Master Plan Update

Mr. Anderson was a project team member for the 2014 update to the Water and Sewer Master Plan update for Tooele Valley Airport. The project required Mr. Anderson to work closely and coordinate with County and State regulatory agencies, including the Utah Division of Drinking Water, Tooele County Public Health Department, and the North Tooele County Fire District.

APPENDIX B
UNDERSTANDING OF THE IMPACT FEE ACT

UNDERSTANDING OF THE IMPACT FEES ACT

Impact fee law in Utah is a constantly moving target. On an almost yearly basis, the Utah Legislature makes changes to the law to respond to disagreements between municipalities and the development community. In recent years, Utah Legislature made major changes to the impact fee law in 2011 with a few smaller additional changes in 2013.

Notable changes in the 2011 law can be grouped into four categories:

- **Division of analysis into an Impact Fee Facilities Plan and Impact Fee Analysis –** One of the primary outcomes of the 2011 impact fee law changes was to formalize the process and format of impact fee calculation. The biggest of these changes was to require a separate submittal of two different documents, with public hearings and adoption of each document separately. In general, the IFFP focuses on identification of projects needed to service future growth, while the IFA focuses on calculation of the impact fee required to support the identified projects. Each requires a certification of the author that the document was prepared in accordance with the requirements of the impact fee law.

  BC&A works frequently with members of the task force responsible for drafting the language contained in the impact fee law. Based on our conversations with the task force, one of the primary reasons for this change in the law was to encourage greater engineering analysis associated with impact fees. Prior to the 2011 law, impact fee evaluations were often completed by financial firms alone. While the financial evaluation in these reports was sound, it was clear in many cases that the financial firms did not understand the underlying engineering principles that governed the need for improvement. As a result, calculation of needed improvements and resulting responsibility for cost was often inaccurate. By adding the additional requirements and certifications in the new law, the task force hoped to require someone with engineering knowledge to be involved in the process. Through our extensive work in master planning of sewer facilities throughout Utah, BC&A is well equipped to understand the unique engineering aspects of your system and accurately represent these issues in your impact fee calculation.

- **Noticing Requirements –** Another major change of the 2011 law was establishment of process for noticing associated with impact fees. BC&A has completed dozens of impact fee studies under the new law, and we are well versed in the current noticing requirements. We can help the City stay compliant during each step of the law.

- **Planning Window –** Prior to the 2011 law, it was common to look at required improvements based on the same planning period as used for master planning. In many cases, this included identification of required improvements through buildout. This created some concern from the development community who worried that long-range projects were speculative or unrealistic. In response to these concerns, the current interpretation of the 2011 law is that the planning window for projects to be included in the IFFP must be limited to 6 to 10 years.

  This requirement has created difficulty in calculating impact fees for many engineers who are not as familiar as BC&A with the law. Lacking the knowledge and experience to do anything different, they will often just divide the cost associated with the 10-year projects by growth through buildout resulting in a significantly lower fee than in the past. In other cases, an even more dangerous approach is taken where the full 10-year project costs are divided by 10-year growth only. This is inaccurate because many of the 10-year projects contain capacity for growth beyond the 10-year planning window. By assigning all 10-year project costs to 10-year growth, the impact fees unfairly include costs beyond the actual cost of service and leave the municipality vulnerable to legal challenge.

  BC&A has pioneered a better approach to resolve this issue. In our unique approach, the evaluation of costs for 10-year projects includes identification of the cost of service for 10-year growth independent of

capacity associated with growth beyond 10 years. This allows you to establish an equitable fee without simplifying assumptions that result in lower impact fees.

- **Actual Costs –** The 2011 law requires that all calculations associated with use of capacity in existing facilities be based on actual, documented expenditures. In the past, it was common to use the replacement value of facilities as the basis for system "buy-in". We will work closely with your staff to identify historic expenditures and bring your analysis into compliance with this requirement.

Notable changes in the 2013 law can also be grouped into the following four categories:

- **IFFP Requirements –** The 2011 law required that the impact fee facility plan (IFFP) include only two items: projected growth and the facilities to meet that growth. The new law requires that the IFFP also include an analysis of excess capacity to service new growth.
- The requirement to identify excess capacity was in the 2011 law, but was only required as part of the impact fee analysis (IFA). Since 2013, BC&A has developed a template for IFFPs that assure we include all items required by the report in each report.
- **Level of Service –** Perhaps the largest fundamental change in the 2013 law is regarding level of service. In times past, there has been significant debate on what an appropriate level of service should be. A specific example is the amount of sewer production for residential use. Some communities use the State standard of 100/gpd, while others use historic metered values which are often significantly less. In an attempt to minimize this issue, the new law gives the service provider some flexibility in establishing the level of service as long as this level of service is met by all users (both existing and future) within six years. In other words, if there are any existing deficiencies in the level of service, they must be eliminated through the entity's capital improvement program within six years.

  While this change has reduced conflict over the level of service for some utilities (parks, public safety, etc.), it has not been as successful in reducing the argument over State standards for water and sewer service. BC&A is aware of several challenges to current impact fees that are based on differences between actual use and State standards. This is an issue of particular interest to Craig Call. He is an attorney for the development community who is active in the St. George area. While a conclusive court decision has yet to be issued on the subject, the State appears to be in the process of reevaluating its current standards. Most legal experts we have discussed the subject with recommend using historic data as a more defensible approach to level of service.

  This is important because most historic master plans currently use demands based on State standards. BC&A will help you understand how moving to historic demands could affect your past master planning efforts and then help you make the best decision on how to move forward.
- **Equitable Allocation of Costs –** The 2013 legislation removes a clause that required "an equitable allocation of the costs borne in the past and to be borne in the future, in comparison to the benefits already received." This clause has been interpreted by some individuals to mean that new users cannot be asked to pay any more than existing users have paid. This is problematic since the cost of serving new users is often higher than the cost of serving existing users (e.g. treatment regulations become more stringent so the cost of treatment goes up for future users). The new law drops the "equitable allocation of costs" clause and replaces it with what BC&A has labeled as an "equitable allocation of service" clause. This means new users cannot be required to meet a level of service that is different from the level of service required of existing users.

APPENDIX C
SAMPLE REPORT

SEWER SYSTEM MASTER PLAN

March 2015

Prepared for:
Twin Creeks Special Service District

Prepared by:
Bowen, Collins & Associates
154 East 1400 South
Draper, Utah 84020

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

INTRODUCTION

In March of 2014, Twin Creeks Special Service District (TCSSD or District) contracted the services of Bowen, Collins & Associates, Inc. (BC&A) to complete a Sewer System Master Plan. The purpose of this study is to provide TCSSD with an updated plan to maintain a viable and efficient sewer system capable of meeting reasonable future demands of its service area and satisfying customer expectations.

SERVICE AREA

The TCSSD water system service area is shown in Figure ES-1.

PROJECTED CONNECTIONS AND GROWTH

The projected number of sewer service connections for the TCSSD service area for a build-out scenario was based on zoning as defined in the 2010 Wasatch County General Plan. A growth curve was selected, and the results of the projected growth are summarized in Table ES-1.

WASTEWATER PRODUCTION PROJECTIONS

Wastewater production for the District was determined based on indoor water use and an estimated quantity of flow attributed to inflow and infiltration. Historic water use data for TCSSD indicates that indoor water use is 258 gallons per day per ERU. Assuming that 90 percent of water used indoors is converted to wastewater and that infiltration and inflow is approximately 45 gallons per day per ERU (based on the ASCE recommendation), sewer flows for the District were projected through build-out. Table ES-1 summarizes the sewer production projections for TCSSD.

Table ES-1
Summary of Projected Demands

Year	ERUs	Estimated Average Daily Sewer Production (Gallons)	Estimated Peak Daily Sewer Production (Gallons)
2014	636	176,300	440,750
2020	938	260,000	650,000
2030	1,749	484,900	1,212,250
2040	2,790	773,400	1,933,500
2050	4,223	1,170,700	2,926,750
2060	5,374	1,489,700	3,724,250
2070	6,587	1,826,000	4,565,000
2080	7,916	2,194,400	5,486,000

NORTH:

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TCSSD STUDY AREA

TCSSD

TCSSD SEWER SYSTEM MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.

ES-1

Red Ledges

Heber

Twin Creeks

Timber Lake

Daniels

LDS Camp/Land

Independence/CCSSD

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EVALUATION OF SEWER COLLECTION SYSTEM

The existing and future TCSSD sewer systems were evaluated using a hydraulic computer model. There were no observed deficiencies in the existing collection system. Recommendations for future sewer system improvements were determined based on hydraulic model results and the TCSSD master plan from 2002. The following is a list of recommended system improvements:

- **S-1 – Sewer line: 1200 South between 2400 East and Mill Road** – Approximately 5,300 feet of new 12-inch sewer line will provide service to new and existing development along 1200 South. This project will act as the first phase in providing sewer service to the southern region of the District.

- **S-2 – Sewer line: 2400 East between Center Creek Road and 1200 South** – The second recommended project is to construct an additional 5,300 feet of 12-inch sewer line along 2400 East which would tie into Project S-1 at 2400 East and 1200 South, extending south to Center Creek Road. This would be the second phase in providing sewer service to the southern region of the District.

- **S-3 – Sewer line: Center Creek Road between 2400 East and 3600 East** - This project would further expand the TCSSD service area to the south by installing another 5,300 foot long segment of 12-inch sewer pipe along Center Creek Road between 2400 East and 3600 East.

- **S-4 – Sewer line: Center Creek Road between 3600 East and 4200 East** – The final phase of the TCSSD sewer collection system expansion involves the construction of approximately 2,700 feet of 8 inch sewer pipe along Center Creek Road between 3600 E and 4200 E.

- **S-5 – 1200 South Sewer Outfall Project** – Based on the availability of capacity in the Heber City collection system at 1200 South, TCSSD could construct 1,300 feet of 15 inch sewer line and tie into the existing Heber City system along 1200 South at approximately 800 east (on the west side of the existing canal).

CAPITAL IMPROVEMENTS PLAN

A summary of the capital improvements for TCSSD is shown in Table ES-2, and the location of each project is shown in Figure ES-2.

NORTH:

SCALE: 0 2,000 Feet

RECOMMENDED BUILDOUT SYSTEM IMPROVEMENTS

TCSSD

TCSSD SEWER MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.
ES-2

600 South Outfall

Existing 18 inch Heber City Collection Line

S1

S5

New Sewer Diversion at 1200 South

S2

S3

S4

HEBER CITY

INDEPENDENCE

DANIEL

Legend

New Pipe Improvements

- 8 inch
- 12 inch
- 15 inch
- Existing Pipes
- TCSSD Service Area

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Table ES-2
Sewer System Improvements

Project	Project Year	Description	Estimated 2015 Cost	Unit	Unit Cost	Construction Cost (With 20% Contingency)	Engineering (15%)	Total Project Cost
S-1	2022	1200 South Sewer Line						
		12" Pipeline	5,280	LF	$270	$1,426,000	$214,000	$1,640,000
S-2	2025	2400 East Sewer Line						
		12" Pipeline	5,280	LF	$270	$1,426,000	$214,000	$1,640,000
S-3	2025+	2400 South (2400 East and 3600 East)						
		8" Pipeline	5,280	LF	$245	$1,294,000	$194,000	$1,488,000
S-4	2025+	2400 South (3600 East and 4200 East)						
		8" Pipeline	2,640	LF	$245	$647,000	$97,000	$744,000
S-5	2025+	1200 South Outfall						
		15" Pipeline	1,300	LF	$306	$398,000	$60,000	$458,000
		SEWER COLLECTION IMPROVEMENTS						**$5,970,000**

CHAPTER 1
INTRODUCTION

INTRODUCTION

In March of 2014, Twin Creeks Special Service District (TCSSD) contracted the services of Bowen, Collins & Associates, Inc. (BC&A) to complete a Sewer System Master Plan, Impact Fee Facilities Plan, Impact Fee Analysis and Wastewater Rate Model. The purpose of this study is to provide TCSSD with an evaluation of its existing sewer collection system, project future production as a result of growth, and provide an updated plan to meet the future needs of customers within the service district.

BACKGROUND

TCSSD is situated in Wasatch County and services an area just east of Heber City. It was established in 1993 by Wasatch County in response to a request by a group of developers to provide culinary water and sewer services to unincorporated parts of Wasatch County. Currently, it still services unincorporated parts of Wasatch County.

SCOPE OF SERVICES

The most recent sewer master plan prepared for TCSSD was completed in 2002 by Sowby and Berg Consultants (2002 Master Plan). BC&A was retained to complete the following tasks as part of this 2014 Sewer System Master Plan:

Task 1: Collect and Review Data

Task 2: Evaluate Current Wastewater Flow Patterns and Project Wastewater Flow

Task 3: Develop and Calibrate a Hydraulic Model of the Existing Wastewater Collection System

Task 4: Identify Existing Operating Deficiencies

Task 5: Identify Projected Future Operating Deficiencies

Task 6: Develop a Wastewater System Capital Facilities Plan

Task 7: Develop an Impact Fee Facility Plan and an Impact Fee Analysis

Task 8: Develop a Wastewater Rate Model

Task 9: Document Results

This report was prepared as part of Task 9 to document the study efforts for Tasks 1 through 6. Tasks 7 and 8 will be documented in separate reports.

Questions may be addressed to Keith Larson, Project Manager, at (801) 495-2224.

CHAPTER 2
WASTEWATER PROJECTIONS

INTRODUCTION

In order to accurately evaluate the existing sewer collection facilities as well as required improvements to accommodate future growth, one must first have an understanding of the flows through the system. This chapter summarizes the work that was performed to estimate the wastewater production for the existing and future sewer collection system for TCSSD.

METHODOLOGY

There are several methods that can be used to estimate future wastewater production. This study develops projections based on the general plan that has been adopted by Wasatch County. The methodology used in this study is as follows:

1. Define the service area.
2. Project the growth of the number of water meter connections for the study area through build-out based on County's General Plan.
3. Convert projections of connection growth to a system water demand based on historic per connection water demands.
4. Convert water demand projections to sewer production projections based on a percentage of indoor water use.
5. Estimate sewer system infiltration in terms of flow per Equivalent Residential Unit (ERU).
6. Consider the effect of State Water Conservation Goals on future demands.

Each step of this process is summarized in the sections that follow.

SERVICE AREA

The TCSSD sewer system service area is shown in Figure 2-1. The system serves a large portion of the unincorporated land within Wasatch County east of Heber City. Included on the figure are the Red Ledges development, Timber Lake Development, Independence, Daniels Township, and the LDS Church camp which fall within the potential boundary of TCSSD. However, these areas not expected to be served by the TCSSD collection system have correspondingly not been included in this master plan evaluation. The one slight exception to this is Red Ledges. Red Ledges currently sends sewer flows to the TCSSD outfall at 600 South, but TCSSD personnel have acknowledged that this will change in the near future. By 2016, Red Ledges will begin to send sewer flows to the Jordanelle Special Service District (JSSD) Treatment Plant rather than into the TCSSD collection system which conveys flows to the Heber Valley Special Service District (HVSSD) Treatment Plant. Therefore, flows from Red Ledges will not be included in the development of capital improvements for TCSSD. However, since Red Ledges will continue to

NORTH:

SCALE:

0 2,000 4,000 Feet

TCSSD STUDY AREA

TCSSD

TCSSD SEWER SYSTEM MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.
2-1

Red Ledges

Heber

Twin Creeks

Timber Lake

Daniels

LDS Camp/Land

Independence/CCSSD

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remain a part of the District, growth projections for Red Ledges are included in this document, but will be presented independently to avoid ambiguity.

It should also be noted that, while a small region of southeast Heber City was included in the 2012 TCSSD Water Master Plan prepared by BC&A, the majority of this area (except for the frontage on Mill Road) is expected to be served by Heber City and was excluded from this analysis.

PROJECTED CONNECTIONS

To maintain consistency between the 2012 Water Master Plan and this Sewer Master Plan and because sewer production projections are directly proportional to water service connections, a similar method to that used in the Water Master Plan was used to estimate population growth within the service area of the District for this analysis. Connection projections for the TCSSD sewer system service area were prepared through the year 2080 in the following steps:

- **Future Connections -** The projected number of connections when the study area is fully developed (build-out) was estimated based on zoning and land use.
- **Population Growth –** A growth curve was estimated for the growth in TCSSD connections between 2014 and build-out.

The steps listed above are discussed in greater detail below.

Future Connections

Projected connections for the TCSSD sewer service area were prepared for a build-out scenario based on zoning as defined in the 2010 Wasatch County General Plan. The zoning within the study area supports only residential development (no commercial or industrial zoning). While some commercial development will likely occur in the future, the primary type of development will be residential. Some of the zoning within the study area is preservation, state, or federal land, which cannot be developed.

Table 2-1 shows a summary of different land types, areas, densities, and total number of residential units anticipated at build-out within the sewer service area.

Table 2-1
Summary of Land Types and Residential Units

Land Type	Total Area (acres)	Acres/Res Unit	Total Res Units
Mountain Use (M)	1,781	5	356
Municipal	400	0.25	1,600
Residential Agricultural 1 acre (RA-1)	5,962	1	5,962
Preservation, Federal or State Land (P-160)	960	0	0
Red Ledges	1,825	1.5*	1,210
Total Build-out	10,928	-	9,128

*Value shown is based on the total area of Red Ledges and the predicted total number of ERUs at buildout. Because a large portion of the area is occupied by a golf course, actual lot sizes will be substantially less than 1.5 acres.

As shown in Table 2-1, the total number of acres in the sewer study area is 10,928 and the total number of residential units at build-out is estimated to be 9,128 (including Red Ledges). The total number of residential units corresponds to the total number of Equivalent Residential Units (ERUs). If commercial, institutional, or industrial development occurs in the area, it has been assumed it will be offset by a corresponding decrease in residential ERUs.

Projected Sewer Service Area Growth

As part of the 2012 Water Master Plan prepared for TCSSD, three different growth scenarios were analyzed:

1. **2008 Master Plan Projections (Aggressive Growth) –** The Water Master Plan from 2008 indicated there were 1,600 ERUs (not including Red Ledges) approved or in the planning process for development. That master plan used an aggressive growth scenario that assumed most of the 1,600 ERUs would be built within a 15 year window. After the intense growth for the first 15 years, the growth gradually slows until 2080.
2. **GOPB Projections (Low Growth) –** The Low Growth scenario is based on the Governor's Office of Planning and Budget (GOPB). The GOPB (which projects growth through 2060) assumes that the growth for the next 50 years will fluctuate between 3.0 percent and 5.5 percent. The GOPB growth pattern was extrapolated beyond the year 2060.
3. **Proposed Planning Projections (Medium Growth) –** The Medium Growth scenario is an average of the aggressive growth and the low growth scenarios.

After discussing the growth curves with TCSSD representatives, the medium growth scenario was selected for the Water Master Plan. Because the sewer service area differs slightly from the water service area, growth rates for each utility will deviate at some point in the future. However, it is reasonable to assume that total growth of the sewer service area will match the growth of the water

service area over the next 10 years. Figure 2-2 and Table 2-2 display the projected growth of ERU's within the sewer service area through 2080.

Figure 2-2
TCSSD/Red Ledges Projected Sewer Service Area Growth

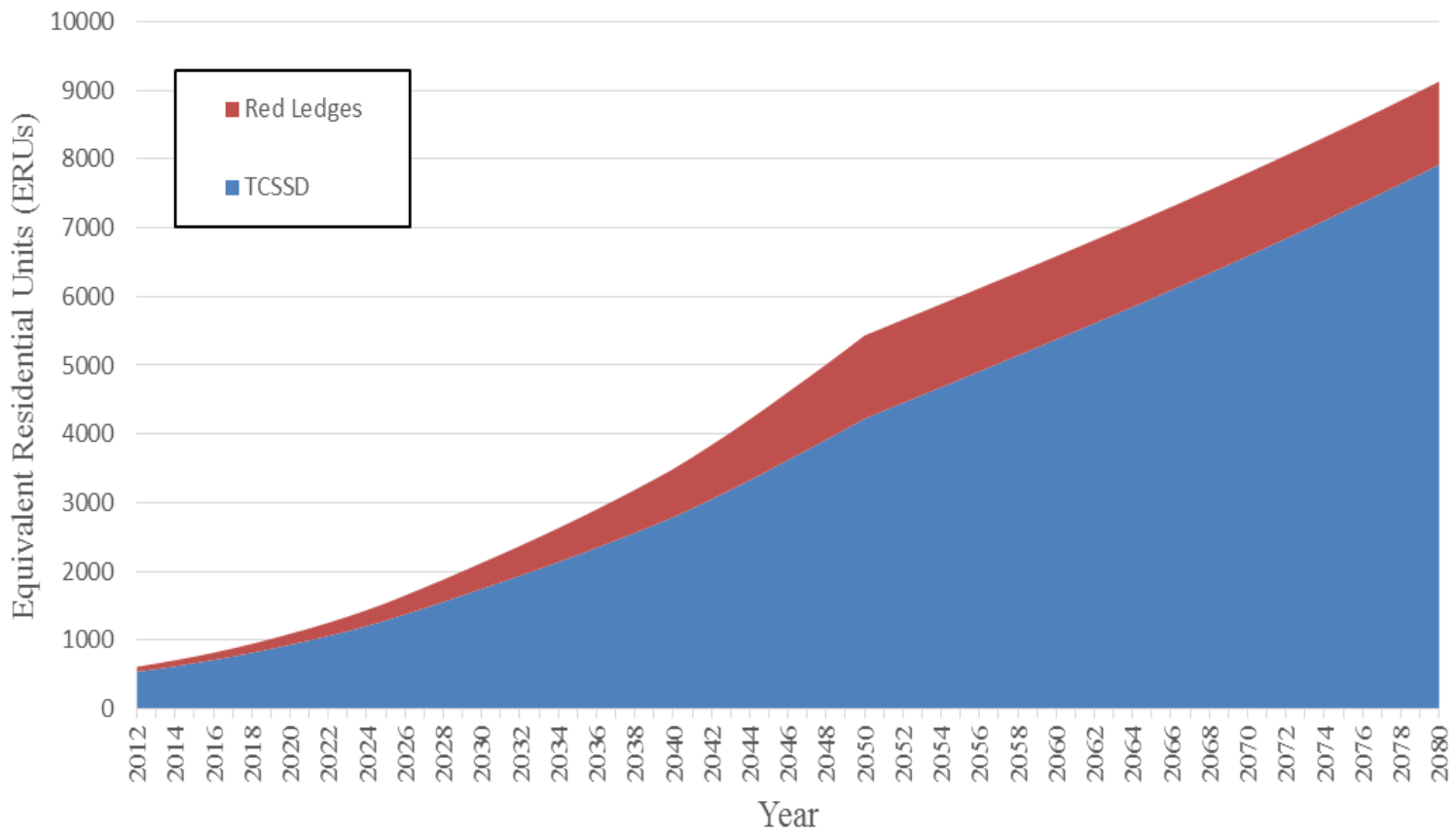


Table 2-2
Summary of Growth Projections

Year	TCSSD Projected Growth in ERUs	Red Ledges Projected Growth in ERUs*
2014	636	88
2020	938	159
2030	1,749	378
2040	2,790	700
2050	4,223	1210
2060	5,374	1210
2070	6,587	1210
2080	7,917	1210

*Assumption made that Red Ledges reaches build-out capacity by 2050

WASTEWATER FLOW PROJECTIONS

Total wastewater flow in a wastewater collection system comes from the combination of three potential sources:

1. Domestic Flow – Generally speaking, the majority of sewer flow in a collection system will be the result of domestic water use. Household toilets, showers, and sinks all contribute to wastewater flows. Approximately 90% of all indoor water use ends up in the wastewater system.
2. Infiltration – Over time, sewer collection pipes can deteriorate and allow for the entrance of groundwater. Pipes joints are particularly susceptible to such an occurrence. Depending on the age and condition of the system, infiltration may contribute significant flow to the system.
3. Inflow – During rainfall events, water may enter into the sewer collection via gaps in surface manholes, damaged pipes or manholes, or through illegal drain connections to the sanitary sewer system.

Because the quantity of water related to inflow is highly unpredictable, only domestic flow and infiltration are considered when estimating sewer production projections. To account for the uncertainty of inflow, additional capacity is reserved in sewer lines in order to properly convey flows during a rainfall event.

Domestic Flow

Domestic sewer flows for this analysis were estimated from culinary water use data in the year 2011. Based on data provided from TCSSD, sewer flow estimates are shown in Table 2-3.

Table 2-3
Estimated Daily Sewer Flows

2011 Water System Production (ac-ft/yr)	147
Average 2011 Water System Demand (gals/day)	131,000
2011 System Connections (ERUs)	508
Average Water Demand Per ERU (GPD)	258
Average Domestic Sewer Production Per ERU (GPD)	232.2
Estimated Daily Infiltration per ERU (GPD)	45
Total Estimated Daily Sewer Flow per ERU (GPD)	277.2
Estimated Peak Daily Sewer Flow per ERU (GPD)	693

As shown in Table 2-3, total estimated daily flow per ERU is 277.2 gallons. Average domestic wastewater flow is estimated as 90% of total indoor water use. Infiltration was estimated using the ASCE recommended infiltration allowance for new sewer systems of 400 gallons per inch diameter of pipe per mile of pipe. From previous planning experience, this equates to approximately 45 gpd per ERU. Peak flows were estimated conservatively by applying a 2.5 peaking factor to total average flows.

Based on the projected growth in connections over time and the average flow per connection summarized above, Table 2-4 shows the projected wastewater flows through 2080.

Table 2-4
Summary of Projected Demands

Year	ERUs	Estimated Average Daily Sewer Production (Gallons)	Estimated Peak Daily Sewer Production (Gallons)
2014	636	176,300	440,750
2020	938	260,000	650,000
2030	1,749	484,900	1,212,250
2040	2,790	773,400	1,933,500
2050	4,223	1,170,700	2,926,750
2060	5,374	1,489,700	3,724,250
2070	6,587	1,826,000	4,565,000
2080	7,916	2,194,400	5,486,000

CONSERVATION

The State water conservation goal is to reduce per capita water usage by 25 percent by the year 2050, measured from usage in the year 2000. Because conservation is generally achieved through the reduction of outdoor water use, no reduction in sewer flows due to conservation was assumed

for the planning window of this study. It is recommended that the District continue to track water use and adjust its projections in future studies to account for any changes in per capital water use.

CHAPTER 3
SYSTEM INVENTORY

As part of this master plan, BC&A has assembled an inventory of existing infrastructure within the sewer collection system. The purpose of this chapter is to present a summary of TCSSD's existing sewer system and is intended to be used as a quick reference for TCSSD personnel. This summary of facilities does not include those found in Red Ledges.

SEWER COLLECTION PIPES

The TCSSD sewer system is composed of collection lines ranging up to 18 inches in diameter, as shown in Figure 3-1. Table 3-1 provides a summary of the length and size of all TCSSD sewer pipes. Pipe material is unknown, but they are most likely built from PVC with some concrete pipe possible for the larger diameter pipes.

Table 3-1
TCSSD Sewer Collection Pipe Inventory

Pipe Diameter (inches)	Length (ft)	Percentage of Network
8	72,862	56%
12	10,628	8%
15	28,227	22%
Unknown	18,396	14%
Total	130,113	100%

The TCSSD sewer collection system currently does not use any lift stations; the system operates completely under gravity flow.

WASTEWATER TREATMENT

TCSSD currently sends all wastewater flow to the treatment plant operated by Heber Valley Special Service District. Sewer flows from TCSSD are routed to the Heber City sewer collection system at 600 South where they are then conveyed to HVSSD's plant. TCSSD has an active agreement with Heber City to utilize capacity in their collection system for this purpose until the year 2022.

NORTH:

SCALE:

0 1,000 2,000 Feet

TCSSD
EXISTING SEWER
COLLECTION SYSTEM

TCSSD
TCSSD SEWER
SYSTEM MASTER PLAN

Bowen Collins
& Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.
3-1

600 South Outfall

INDEPENDENCE

Center Creek

Legend

Existing Sewer Lines

Diameter

- 8 inch
- 12 inch
- 15 inch
- TCSSD Service Area

P:\Twin Creeks SSD\2014 TCSSD SSMP\4.0 GIS\4.4 Figures\Sewer System Fig 3-1.mxd aanderson 2/5/2015

CHAPTER 4
COLLECTION SYSTEM EVALUATION

INTRODUCTION

The purpose of this chapter is to provide TCSSD with an evaluation of the sewer collection system under existing and future flow conditions. An extended period simulation (EPS) hydraulic model was developed with Innovyze's InfoSWMM software using data provided by TCSSD. This chapter presents a summary of the methodology and results of the hydraulic model. Also presented in this chapter are the recommended system improvements which were developed from model results.

MODEL DATA

There are two major types of data required to develop a hydraulic model of a sewer system: geometric data and flow data. Geometric data consists of information on the location and size of system facilities such as pipes and lift stations. It also includes the physical characteristics of the facilities such as pipe roughness. This information is generally collected from system inventory data or through direct field measurement. The following sections describe how geometric data was assembled for use in the hydraulic model.

Pipelines

It is not economically feasible to model all of the sewer pipes in the TCSSD sewer system. As smaller pipes are added to the model, the more refined the analysis becomes. However, this requires additional time, effort, and expense. Hence, it is important to consider the required accuracy and available budget when selecting the sewer lines to model.

For this study, modeling major trunk lines was considered adequate for assessing potential hydraulic deficiencies in the system. Due to a lack of data pertaining to manhole locations and invert elevations, pipe slopes in the model were estimated using surface topography and an assumed manhole depth. It is recommended that the model information be updated as more detailed survey information on pipeline inverts becomes available.

Pipe Flow Coefficients

Pipes in the hydraulic model were assigned a Manning's roughness coefficient of 0.013. This is approximately equal to the flow coefficient of concrete and clay pipe. While there may be other materials in the system with lower published flow coefficients (e.g. PVC), 0.013 was used throughout the system as a conservative approach for estimating pipe capacity. In reality, most collection pipes can develop thin layers of bacteria and solids (a slime layer) that result in a relatively uniform flow coefficient (close to 0.013) despite varying materials.

Sediment and Debris

Because of the transportable nature of grease and debris in a sewer collection system, it is not possible to identify the exact location and quantity of grease or debris accumulation in the system for any specific point in time. Similarly, the build-up and erosion rates of sediment in sanitary sewer systems are not always well understood. As a result, the detailed modeling of sediment, grease, and debris on a system wide basis is not possible because of continually changing conditions. Therefore, no sediment was included in the various runs of the hydraulic model. Instead, the design and evaluation criteria for the TCSSD's collection system is based on "clean" pipes. It will be important for the District to follow an active maintenance program that will keep its pipes in a condition consistent with this assumption.

It should be noted that the hydraulic modeling software used to simulate the operation of the wastewater collection system does have the ability to set sediment depth in pipes. Therefore, if the District does collect detailed sediment data for a given section of pipe, the sediment may be added to the model and its effects evaluated. However, it should be emphasized that any sediment levels defined today will change in the future as flow conditions vary.

FLOW DATA

Once all required geometric data was collected and a physical model of the system was developed, flow data was added in order to run a hydraulic simulation. Three types of flow information were required for hydraulic modeling: total magnitude of flow, timing of flow, and distribution of flow across the TCSSD service area. Each of these flow characteristics is discussed below.

Total Flow

Flow projections for the TCSSD service area were presented in Chapter 2. Total flow for modeling scenarios is summarized in Table 4-1.

Table 4-1
Hydraulic Modeling Scenario Total Daily Flow Volumes (gpd)

Scenario	Existing	2025	Build-Out
Dry Weather Flow/Infiltration	176,300	380,000	2,195,000

As discussed in Chapter 2, inflow was not incorporated into the model. Instead, the evaluation criteria was formulated to provide adequate excess pipe capacity to accommodate inflow.

Timing of Flow

The values shown in Table 4-1 represent the total flows in the collection system over a 24-hour period. Since sanitary sewer flows vary throughout the day with varying indoor water demands, of much greater importance for the purposes of modeling collection system capacity is the calculation of peak flows that occur during the day. In order to accurately determine the variation of sewer flow throughout the day, flow monitoring data must be collected for the system. Because there is

no available flow data to develop a daily, or diurnal, flow pattern specific to TCSSD, a typical flow pattern based on studies for other similar municipalities with hourly multipliers was chosen. This is shown in Table 4-2.

Table 4-2
Hydraulic Model Diurnal Pattern

Hour	Multiplying Factor
12:00 a.m.	0.8
1:00 a.m.	0.6
2:00 a.m.	0.4
3:00 a.m.	0.3
4:00 a.m.	0.2
5:00 a.m.	0.25
6:00 a.m.	0.3
7:00 a.m.	0.45
8:00 a.m.	0.64
9:00 a.m.	1.1
10:00 a.m.	1.7
11:00 a.m.	2.5
12:00 p.m.	2
1:00 p.m.	1.6
2:00 p.m.	1.4
3:00 p.m.	1.25
4:00 p.m.	1.1
5:00 p.m.	1.05
6:00 p.m.	1.15
7:00 p.m.	1.33
8:00 p.m.	1.09
9:00 p.m.	0.97
10:00 p.m.	0.9
11:00 p.m.	0.92
12:00 a.m.	0.8

Based on the diurnal pattern shown in Table 4-2, peak flows simulated in the model are summarized in Table 4-3.

Table 4-3
Hydraulic Modeling Scenario Peak Hour Flows* (gpd)

Scenario	Existing	2025	Build-Out
Dry Weather Flow	384,000	830,000	5,220,000

*Values shown are peak flows at the system outfall under each flow scenario and include the effect of peak attenuation in the system

Distribution of Flow

With total flow magnitude and timing estimated, the final step in developing flow inputs for the model is determining spatial distribution across the District. Flow distribution was estimated by first breaking the service area into separate sewer basins as shown in Figure 4-1. Once basins within the service district were delineated, surface topography was used to assign flow from that basin to a particular junction in the model. In most instances flows from a basin were input at the high point of a pipe so as to maintain a conservative evaluation. Flow assigned to junctions from each basin was estimated based on the number of ERUs located in each area (approximated from aerial photography of existing conditions and land use/zoning projections for future conditions).

HYDRAULIC MODEL RESULTS

This section presents the hydraulic modeling results for the TCSSD sewer collection system under estimated existing and future conditions. Based on these results, any deficiencies in the existing or future sewer system were determined.

Evaluation Criteria

In defining what constitutes a hydraulic deficiency, it is important to consider the assumptions made in estimating sewer flows in the model. As described in Chapter 2, the sewer flow included in the model is composed of two parts: domestic sewer flow and infiltration. Because flow estimates are based on a limited data set, actual flows will fluctuate and may be greater than the model estimates. For example, infiltration during extremely wet years could be more than estimated in the model. The criteria established for identifying deficiencies should be sufficiently conservative to account for occasional flows higher than those estimated in the model.

The most important deficiency to eliminate in the sewer system is inadequate pipe capacity. For this master plan a pipe capacity deficiency has been defined as any point where the dry weather peak hour flow in the pipe is greater than 75 percent of the pipe's full flow capacity, which occurs when flow exceeds a depth of approximately 65 percent of the maximum depth. The remaining 25 percent of pipe capacity was reserved for inflow and/or unaccounted for fluctuations in domestic flow and infiltration.

Existing Model Results

Figure 4-2 displays the results of the 24 hour hydraulic model simulation for the TCSSD sewer collection system. The figure displays the ratio of the maximum flow depth to diameter for each section of pipe. According to the level of service for the system which limits peak flows to a depth of 65% of the diameter, there are no existing pipe capacity deficiencies.

Future Model Results

Figure 4-3 presents to results of the hydraulic model simulation with the predicted wastewater production at build-out. The future model incorporated the addition of new sewer pipes along 1200 South, 2400 East, and Center Creek Road. Results indicate that the majority of the system has adequate capacity through build-out. However, as shown in Figure 4-3, flows from the

NORTH:

SCALE: 0 2,000 Feet

TCSSD SEWER SUB BASINS

TCSSD

TCSSD SEWER MASTER PLAN

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FIGURE NO. 4-1

600 South Outfall

Flow from basin split in future model

INDEPENDENCE

Legend

- Model Junctions
- Existing Model Pipes
- Future Model Pipes
- Sewer Sub Basins

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NORTH:

SCALE:

0 2,000 Feet

EXISTING SEWER SYSTEM MODEL RESULTS

TCSSD

TCSSD SEWER MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.
4-2

600 South Outfall

Legend

Maximum Flow Depth

- Less than 0.1
- 0.1 - 0.25
- 0.251 - 0.50
- 0.51 - 0.65
- Greater than 0.65
- TCSSD Service Area

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NORTH:

SCALE:

0 2,000 Feet

FUTURE SEWER SYSTEM MODEL RESULTS

TCSSD

TCSSD SEWER MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO. 4-3

600 South Outfall

Deficient Section of Pipe

INDEPENDENCE

Legend

Maximum Flow Depth

- Less than 0.1
- 0.1 - 0.25
- 0.251 - 0.50
- 0.51 - 0.65
- Greater than 0.65
- TCSSD Service Area

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additional development will exceed the capacity of the 12 inch line on Mill Road between 1200 South and 600 South.

600 South Outfall

According to the results of the hydraulic model, the majority of the existing system is capable of adequately conveying wastewater flows through build-out. The only exception is the 12-inch sewer line on Mill Road between 1200 South and 600 South, which is shown as a deficiency under the assumption that TCSSD continues to discharge all sewer flows at the 600 South outfall.

The service agreement with Heber City to utilize the outfall at 600 South began in 1997. As part of this agreement, TCSSD was required to upsize the pipe which was being constructed along 600 South between 1200 East and 600 West. In order to accommodate flows from the District, the pipe had to be increased from a 15 inch pipe to an 18 inch pipe. The agreement allows the District to discharge peak flows of up to approximately 2,570 gpm at the outfall, but the terms of the current contract will expire in 2022.

The determine the best course of action for TCSSD relative to the future use of the 600 South outfall, BC&A contacted the engineer for Heber City to discuss potential alternatives once this agreement comes to an end. As of the year 2000, all sewer pipes in the Heber City collection system up to the inlet at the HVSSD treatment plant belong to Heber City, whereas previously a portion of the transmission lines were owned and operated by HVSSD. Therefore, in order to convey flows to the treatment plant, TCSSD will need to either utilize the Heber City collection system or construct a dedicated sewer line all the way to either the HVSSD Plant or the JSSD Plant. Since the latter alternative is likely to be more costly, it is recommended that TCSSD pursue an extension to its agreement to discharge into the Heber City collection system.

Because TCSSD paid for capacity in the Heber City sewer line on 600 South in 1997, the District should be able to secure an extended agreement of the current contract to discharge wastewater at 600 South. Under the assumption that the District does continue to utilize 600 South after 2022, the District will run into one of two future deficiencies:

- **#1 - <u>Exceeding Capacity in Mill Road between 1200 South and 600 South</u>** – As noted above, this pipeline has insufficient capacity to convey projected flows at build-out. Based on the growth estimates for the District, the capacity of this pipe will be exceeded by approximately 2047.

- **#2 – <u>Exceeding 600 South Capacity Outfall Capacity</u> –** The current contract agreement with Heber City allows for peak flows of up to 2,570 gpm from TCSSD at 600 South. Assuming this capacity allowance is the same in future agreements, TCSSD is projected to exceed the allowable flow to the outfall by approximately 2060.

As noted above, current projections indicate that capacity in Mill Road will likely be the first capacity restriction encountered in the future. However, where capacity is actually restricted first will depend on how and where development occurs in the District. If heavy development occurs in the southern area of the District, Deficiency #1 will almost certainly occur first. If the northern

region experiences more development, Deficiency #2 may occur sooner. Regardless of which deficiency occurs first, the most cost effective solution to addressing both issues appears to be constructing a new outfall at 1200 South into the Heber City system, a project that was identified as part of the 2002 sewer master plan for TCSSD (see Figure 4-4). This will pull flow out of Mill Road and also reduce the total amount of flow reaching 600 South. However, this plan is obviously contingent on Heber City having adequate capacity for a new outfall at 1200 South.

BC&A recommends that TCSSD begin negotiations with Heber City to extend the terms of the current contract indefinitely. Estimated peak flow at build-out for the area that would continue to discharge into 600 South is approximately 2,400 gpm, making the terms of the current agreement sufficient for predicted future flows. In addition, it is recommended that TCSSD discuss with Heber City the possibility of acquiring approximately 1,400 gpm of peak flow capacity in 1200 South at a future date. Whether or not capacity will be available for TCSSD in 1200 South is uncertain at this time, due to the fact that development within Heber City will likely take precedence over TCSSD.

If capacity is not available to TCSSD in 1200 South, the District will need to explore different options. Potential options would include:

- Replacing the 12 inch Mill Road sewer pipe with a 15 inch pipe and negotiating a cost share to replace the 18 inch pipe at 600 South in the Heber City system with a larger diameter pipe
- Constructing a new sewer line down 1200 South to the Heber Valley Special Service District treatment plant
- Replacing the 12 inch Mill Road sewer pipe with a 15 inch pipe and constructing a new lift station and sewer line to take any portion of flow above the capacity of 600 South to the Jordanelle Special Service District water treatment plant

Since existing capacity is adequate to convey projected flows for at least the next 30 years, it is not recommended that any action be initiated relative to 1200 South immediately. Instead, it is recommended that the District pursue an extension of the agreement in 600 South and then postpone any specific decision on 1200 South until the District is closer to needing additional capacity.

RECOMMENDED SEWER COLLECTION SYSTEM IMPROVEMENTS

There are a few uncertainties regarding the future outfall of the TCSSD sewer system. However, projects related to expansion of the service area will occur regardless. This section provides a list and description of the recommended capital improvement projects for the District. Figure 4-4 provides a visual reference for the recommended system improvements.

- **S-1 – Sewer line: 1200 South between 2400 East and Mill Road** – Approximately 5,300 feet of new 12-inch sewer line will provide service to new and existing development along 1200 South. This project will act as the first phase in providing sewer service to the southern region of the District.

NORTH:

SCALE:

0 2,000 Feet

RECOMMENDED FUTURE SYSTEM IMPROVEMENTS

TCSSD

TCSSD SEWER MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.
4-4

600 South Outfall

Existing 18 inch Heber City Collection Line

S1

S5

New Sewer Diversion at 1200 South

S2

S3

S4

Legend

New Pipe Improvements

- 8 inch
- 12 inch
- 15 inch
- Existing Pipes
- TCSSD Service Area

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- **S-2 – Sewer line: 2400 East between Center Creek Road and 1200 South** – The second recommended project is to construct an additional 5,300 feet of 12-inch sewer line along 2400 East which would tie into Project S-1 at 2400 East and 1200 South, extending south to Center Creek Road. This would be the second phase in providing sewer service to the southern region of the District.

- **S-3 – Sewer line: Center Creek Road between 2400 East and 3600 East** - This project will further expand the TCSSD service area to the south by installing another 5,300 foot long segment of 12-inch sewer pipe along Center Creek Road between 2400 East and 3600 East.

- **S-4 – Sewer line: Center Creek Road between 3600 East and 4200 East** – The final phase of the TCSSD sewer collection system expansion involves the construction of approximately 2,700 feet of 8 inch sewer pipe along Center Creek Road between 3600 E and 4200 E.

- **S-5 – 1200 South Sewer Outfall Project** – Based on the availability of capacity in the Heber City collection system at 1200 South, TCSSD could construct 1,300 feet of 15 inch sewer line and tie into the existing Heber City system along 1200 South at approximately 800 east (on the west side of the existing canal).

CHAPTER 5
CAPITAL IMPROVEMENTS FACILITIES PLAN

INTRODUCTION

Recommended capital improvements pertaining to the TCSSD sewer collection system are identified in Chapter 4. The purpose of this chapter is to summarize each project, present a cost estimate for each project, and develop an implementation plan for the recommended improvements.

CAPITAL IMPROVEMENT PLAN SUMMARY

The recommended capital improvements for the TCSSD sewer collection system are summarized in Table 5-1. Included in this table is a summary of each project, along with an itemized estimate of project costs. A 15 percent engineering cost has been included for each project. The location of each project is shown on Figure 4-4. Funds have been included in the 10 year capital improvements budgeting schedule to reflect the cost to update this master plan and its associated analyses.

RECOMMENDED CAPITAL IMPROVEMENT BUDGET

As with most things, each component of a wastewater system has a finite service life. Therefore, it is necessary to continually budget funds for the rehabilitation or replacement of system components. If an adequate quantity of money is not set aside for routine system renewal, the system will deteriorate and be incapable of providing the intended level of service. To maintain the sewer system in good operating condition, it is recommended that the TCSSD annual budget for sewer system renewal be approximately equal to the replacement value of the system divided by the estimated service life.

- **Replacement Value –** Based on available information from the TCSSD GIS database, the replacement value of the sewer collection system is estimated to be $34.5 million.

- **Service Life –** Service life of sewer collection lines can vary greatly. For the purposes of this analysis, it has been assumed that sewer facilities have an average service life of 80 years.

Based on these estimates, the annual capital improvements budget for the TCSSD sewer collection system could be set at $430,000. However, because the system is relatively new, this value may be higher than necessary and would result in an undesirable rate increase. Based on the needs of the District over the next 10 years, BC&A recommends that TCSSD start funding capital improvement projects at $260,000 in 2015. Naturally, annual funding will need to increase as the size of the system increases through the proposed expansion projects over the next 10 years.

Table 5-1
Sewer System Improvements

Project	Project Year	Description	Estimated 2015 Cost	Unit	Unit Cost	Construction Cost (With 20% Contingency)	Engineering (15%)	Total Project Cost
S-1	2022	1200 South Sewer Line						
		12" Pipeline	5,280	LF	$270	$1,426,000	$214,000	$1,640,000
S-2	2025	2400 East Sewer Line						
		12" Pipeline	5,280	LF	$270	$1,426,000	$214,000	$1,640,000
S-3	2025+	2400 South (2400 East and 3600 East)						
		8" Pipeline	5,280	LF	$245	$1,294,000	$194,000	$1,488,000
S-4	2025+	2400 South (3600 East and 4200 East)						
		8" Pipeline	2,640	LF	$245	$647,000	$97,000	$744,000
S-5	2025+	1200 South Outfall						
		15" Pipeline	1,300	LF	$306	$398,000	$60,000	$458,000
		SEWER COLLECTION IMPROVEMENTS						**$5,970,000**

10-YEAR CAPITAL FACILITIES IMPLEMENTATION PLAN

Table 5-2 presents an implementation plan of the proposed improvements for the next 10 years. The total inflated cost of capital improvements over the next 10 years is estimated to be approximately $4.3 million. Based on the recommended level of annual funding of $260,000 in 2015 (and increasing in the future with inflation and system value), it is anticipated that TCSSD will collect a total of $3.5 million in revenue over the next 10 years that can be applied toward capital facility improvements.

As shown in the implementation plan, it is expected that the cost of the first improvement project in 2022 can be covered entirely by capital reserve funds generated by District revenue, while the next improvement in 2025 will require bonding to cover a portion of the cost. This will only be true if the District sets its rates to generate the required income for capital projects. If the District does not fund capital projects at the level recommended or delays implementation of this plan, it may be necessary to bond for larger portions or entire portions of the project costs.

Table 5-2
10-Year Capital Facilities Implementation Plan

Project	Description	Estimated 2015 Cost[1]	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total Inflated Cost[1]
S-1	**1200 South from Mill Road to 2400 South**	$1,640,000								$2,017,000				**$2,017,000**
S-2	**2400 East from 1200 South to Center Creek Road**	$1,640,000											$2,204,000	**$2,204,000**
-	**Update Master Plan and Associated Analyses**	$28,000	28,000					$32,000						**$60,000**
	Total Improvements	**$3,308,000**	**$ 28,000**	**$0**	**$0**	**$0**	**$0**	**$32,000**	**$0**	**$2,017,000**	**$0**	**$0**	**$2,204,000**	**$4,281,000**
	Target Yearly Budget		**$260,000**	**$267,800**	**$275,834**	**$284,109**	**$292,632**	**$301,411**	**$310,454**	**$337,804**	**$365,282**	**$394,863**	**$426,703**	-
	Existing Debt Service		$24,000	$24,000	$24,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$0	**$247,000**
	Bond Revenue												1,012,000	**$1,012,000**
	Bond Payment[2]													**$1,593,467**

[1]Inflation rate of 3.0% applied to capital costs in future years
[2] Represents total amount to be paid over 20 year payment schedule, 4.5% interest rate with 2.5% bond issuance fee

SEWER IMPACT FEE FACILITIES PLAN

March 2015

Prepared for:
Twin Creeks Special Service District

Prepared by:
Bowen, Collins & Associates
154 East 1400 South
Draper, Utah 84020

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

INTRODUCTION

Twin Creeks Special Service District (TCSSD or District) has retained Bowen Collins & Associates (BC&A) to prepare an impact fee facility plans (IFFP) for the sanitary sewer system. The purpose of the IFFP is to identify sewer demands placed upon the District by future development and evaluate how these demands will be met. The IFFP is also intended to outline the sewer system 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 District. This document will address the future infrastructure needed to serve the District 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 sewer demands will increase in the future. Demands on the existing system were used in conjunction with projected population growth to estimate future demands. System demands were projected in terms of Equivalent Residential Unit (ERU) and are discussed in detail in Chapter 2 of the 2014 Sewer Master Plan for TCSSD. Table ES-1 provides a summary of the demands under existing and 10 year growth conditions.

Table ES-1
TCSSD Service Area Historic Flows

Item	Value for Existing Conditions	Value for 10-Year Growth Conditions
Equivalent Residential Units (ERUs)	636	1,288
Domestic Wastewater Production (gpd)	147,680	299,000
Infiltration, Maximum Month (gpd)	28,620	58,000
Average Day, Maximum Month Flow (mgd)	176,300	357,000
Peak Hour Production (gpd)	440,750	892,500
Flows per ERU		
Domestic Wastewater Production (gpd/ERU)	232.2	232.2
Average Day, Maximum Month Flow (gpd/ERU)	277.2	277.2
Peak Hour Production (gpd/ERU)	693	693
Average Indoor Water Use (gpd/ERU)	258	258

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. Existing capacity available to serve new growth in the sewer collection system was determined using a hydraulic computer model. According to the results of the analysis, the existing sewer collection system is approximately 8.4% utilized. This leaves roughly 91.6% of the system infrastructure available to serve future growth.

REQUIRED SYSTEM IMPROVEMENTS

Beyond available existing capacity, additional improvements required to serve new growth were identified. The required improvement projects to serve 10-tear growth are summarized in Table ES-2.

Table ES-2
Project Costs Allocated to Projected Development, 10-year Planning Window

Project No.	Project Description	Project Year	Estimated Project Year Inflated Construction Cost	Percent to Existing	Percent to 10-Year Growth	Percent to Growth Beyond 10 Years	Cost to Existing	Cost to 10-Year Growth	Cost to Growth Beyond 10 Years
S-1	12 inch sewer line along 1200 South between Mill Road and 2400 East	2022	$2,017,000	0%	9.2%	90.8%	$0	$185,564	$1,831,436
S-2	12 inch sewer line along 2400 East from 1200 South to Center Creek Road	2025	$2,204,000	0%	9.4%	90.6%	$0	$207,176	$1,996,824
-	Impact Fee Facility Plan and Impact Fee Analysis Update	Multiple	$43,000	0%	100%	0%	$0	$43,000	$0
	TOTAL CAPITAL COSTS		$4,264,000				$0	$435,740	$3,828,260

SECTION 1
INTRODUCTION

Twin Creeks Special Service District (TCSSD or the District) has retained Bowen Collins & Associates (BC&A) to prepare an impact fee facility plan (IFFP) for sewer collection services provided by the District. The purpose of an IFFP is to identify demands placed upon District facilities by future development and evaluate how these demands will be met by the District. The IFFP is also intended to outline the improvements which may be funded through impact fees.

Much of the analysis forming the basis of this IFFP has been taken from chapters found in the 2014 TCSSD Sewer Master Plan. The reader should refer to the master plan for additional discussion of planning and evaluation methodology beyond what is contained in this report.

TCSSD does not currently treat its own wastewater. All wastewater collected by TCSSD is treated at the Heber Valley Special Service District (HVSSD) treatment plant. As a result, this IFFP focuses exclusively on collection facilities and does not have a treatment component. Impact fees for treatment will be calculated and administered separately by HVSSD.

Requirements for the preparation of an IFFP are outlined in Title 11, Chapter 36 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. The level of service has been defined previously in Chapter 4 of the 2014 Master Plan.

- **Pipeline Capacity:** The recommended level of service provided by the TCSSD sewer system is such that the peak flow depth in the pipe is less than or equal to 65 percent of the pipe's diameter, using a Manning's roughness factor *n* of 0.013. This depth equates to approximately 75 percent of the full flow capacity of the pipe. This allows for extra capacity to be reserved in the pipeline to account for potential inflow into the system and other unknowns. This design standard was used as the level of service for existing and future system evaluation.
- **Design Flows:** Chapter 2 of the 2014 Master Plan identifies historic and projected flows in the TCSSD service area. The level of service for existing flow rates as calculated previously is summarized in Table 2-1.

Table 2-1
TCSSD Service Area Historic Flows

Item	Value for Existing Conditions
Equivalent Residential Units (ERUs)	636
Domestic Wastewater Production (gpd)	147,680
Infiltration, Maximum Month (gpd)	28,620
Average Day, Maximum Month Flow (mgd)	176,300
Peak Hour Production (gpd)	440,750
Flows per ERU	
Domestic Wastewater Production (gpd/ERU)	232.2
Average Day, Maximum Month Flow (gpd/ERU)	277.2
Peak Hour Production (gpd/ERU)	693
Average Indoor Water Use (gpd/ERU)	258

It should be noted that the projected flow used to design and evaluate system components will vary depending on the nature of each component. For example, most treatment plant processes are designed based on average day, maximum month flow. Conversely, conveyance pipelines must be designed based on peak hour flow (function of daily flow and diurnal flow variation).

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 District 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.

In the case of this IFFP, no changes are proposed to the existing level of service for design standards. Future growth will be evaluated based on the same design standards level of service as identified for existing users. Table 3-1 presents the proposed level of service for flows projected through the next 10 years. Due to the fact that the TCSSD sewer collection system is relatively new, the same estimates for rate of infiltration were used in the 10-year projection.

Table 3-1
TCSSD Service Area Projected 10-year Flows

Item	Value for 10-year Projections
Equivalent Residential Units (ERUs)	1,288
Domestic Wastewater Production (gpd)	299,000
Infiltration, Maximum Month (gpd)	58,000
Average Day, Maximum Month Flow (gpd)	357,000
Peak Hour Production (gpd)	892,500
Flows per ERU	
Domestic Wastewater Production (gpd/ERU)	232.2
Average Day, Maximum Month Flow (gpd/ERU)	277.2
Peak Hour Production (gpd/ERU)	693
Average Indoor Water Use (gpd/ERU)	258

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. This section will identify available excess capacity to serve future growth in the District's existing collection system.

Collection System Capacity

To calculate the percentage of existing capacity to be used by future growth in existing facilities, existing and future flows were examined in a hydraulic model for each major collection pipeline. A summary of the results of this analysis are contained in the Table 1A of the Appendix of this report. 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.
- **Identify Available Capacity –** Where a facility has capacity in excess of projected flows at build-out, the available capacity in the facility was defined as the difference between existing flows and build-out flows. Where the facility has capacity less than projected flows at build-out, 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. If projected flow within the 10 year window exceeds the capacity of the facility, the available excess capacity is zero. By definition, this corresponds to facilities with deficiencies that are identified in the facilities plan. Because model results have indicated that there are no deficiencies in existing pipelines in the next 10 years, this concept does not apply to any collection pipes in the TCSSD system.
- **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 contribution to system. For this purpose, each pipeline has been weighted based on its estimated value, approximated as the product of its diameter and length (e.g. a 12 inch pipe with a length of 4,000 ft. contributes more to the system than 300 ft. of 8 inch pipe). 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 calculated percentage of existing capacity in collection system facilities in use by existing users is 8.4 percent. Growth during the 10 year planning window is calculated to use an additional 9.4 percent, with the remaining 82.2 percent of existing capacity to be used by growth beyond the 10 year planning window.

DEMANDS PLACED ON FACILITIES BY NEW DEVELOPMENT (11-36A-302.1.A.IV)

Growth within the District's service area and projections of sewer flows resulting from said growth is discussed in detail in Chapter 2 of the 2014 Sewer Master Plan. Growth in terms of equivalent residential units is summarized in Table 3-2. Projected flows for the 10-year planning window have been summarized previously in Table 3-1.

Table 3-2
TSSD Service Area ERU Projections

	Projected ERUs	Average Annual Growth
2014	636	7.0%
2015	667	7.0%
2016	714	7.0%
2017	764	7.0%
2018	818	7.0%
2019	875	7.0%
2020	938	7.0%
2021	999	6.6%
2022	1,064	6.6%
2023	1,134	6.6%
2024	1,209	6.6%
2025	1,288	6.6%
2030	1,749	6.3%
2040	2,790	4.8%
2050	4,223	4.2%
2060	5,374	2.4%
2070	6,586	2.1%
2080	7,917	1.9%

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. Each of the steps were completed as part of this plan's development. More description of the methodology used in the process outlined below can be found in the 2014 TCSSD Master Plan.

- **Existing Demand** – The demand existing development places on the TCSSD system was estimated based on historic water use and flow records.
- **Existing Capacity** – The capacities of existing system collection facilities were estimated using size data provided by TCSSD and a hydraulic computer model

- **Existing Deficiencies** – Existing deficiencies in the system were looked for by comparing defined levels of service against calculated capacities. No existing capacity deficiencies were identified in this study.
- **Future Demand** - The demand future development will place on the system was estimated based on development projections described in Chapter 2 of the 2014 master plan report.
- **Future Deficiencies** - Future deficiencies in the collection system were identified using the defined level of service and results from the hydraulic computer model
- **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

In Chapter 5 of the 2014 Master Plan, capital facility projects needed to provide service to various parts of the District at projected build-out were identified. Most of these projects will need to be constructed in phases as development occurs. Only infrastructure to be constructed within a ten year horizon will be considered in the calculation of impact fees to avoid uncertainty surrounding improvements further into the future. Table 3-3 summarizes the components of projects identified in the capital facilities plan that will need to be constructed within the next ten years. Included in the table is also a line item to prepare this and subsequent impact fee facility plans and impact fee analyses.

Table 3-3
Project Costs Allocated to Projected Development, 10-year Planning Window

Project No.	Project Description	Project Year	Estimated Project Year Inflated Construction Cost	Percent to Existing	Percent to 10-Year Growth	Percent to Growth Beyond 10 Years	Cost to Existing	Cost to 10-Year Growth	Cost to Growth Beyond 10 Years
S-1	12 inch sewer line along 1200 South between Mill Road and 2400 East	2022	$2,017,000	0%	9.2%	90.8%	$0	$185,564	$1,831,436
S-2	12 inch sewer line along 2400 East from 1200 South to Center Creek Road	2025	$2,204,000	0%	9.4%	90.6%	$0	$207,176	$1,996,824
-	Impact Fee Facility Plan and Impact Fee Analysis Update	Multiple	$43,000	0%	100%	0%	$0	$43,000	$0
	TOTAL CAPITAL COSTS		**$4,264,000**				**$0**	**$435,740**	**$3,828,260**

Project Cost Attributable to Future Growth

To satisfy the requirements of state law, Table 3-3 provides a breakdown of the capital facility projects and the percentage of the project costs attributed to existing and future users. As defined in Section 11-36-304, 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." Since the projects presented in Table 3-3 are for new service areas and only provide benefit to future users, no cost has been attributed to existing users.

Project Cost Attributable to 10-Year Growth

Included in Table 3-3 is a breakdown of capacity associated with growth both at full build-out and through the next 10 years. This is necessary because some of the projects identified in the table will be built with capacity to accommodate flows beyond the 10-year growth window. As summarized in the table, the total cost of future projects in the impact fee facility plan that are attributable to future growth is approximately $4.27 million. Of these costs, about $436,000 is attributable to growth in the next ten years.

Basis of Construction Cost Estimates

Construction costs have been taken directly from the 2014 Sewer Master Plan. These costs have been estimated based on past experience with projects of a similar nature. Collection system project costs are based on average per foot costs for pipes of the same size. Additional details regarding cost estimates are contained in Chapter 5 of the 2014 Master Man document.

ADDITIONAL CONSIDERATIONS

Manner of Financing (11-36a-302.2)

The District 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 District 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. 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. It is expected that at least a portion of the IFFP projects will be funded through bonds. Bond costs including interest will need to 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 also 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 District. If the value of the improvements dedicated is worth more than the development's impact fee liability, the District 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 improvements (i.e. projects not identified in the impact fee facility plan), developers will be responsible for the construction of the improvements without credit against the impact fee.

Necessity of Improvements to Maintain Level of Service (11-36a-302.3)

According to State statute, impact fees cannot be used to correct deficiencies in the 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.

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 14 days before the actual hearing. A copy of the proposed IFFP must be made available in each public library within the District during the 14 day noticing period for public review and inspection. Utah Code requires that the District must post a copy of the ordinance in at least three places. These places may include the District offices and the public libraries within the District's service area. Following the 14-day noticing period, a public hearing will be held, after which the District may adopt, amend and adopt, or reject the proposed IFFP.

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 District and their designees.

In accordance with Utah Code Annotated, 11-36a-306(1), Bowen Collins & Associates, certifies that this impact fee facilities 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.

APPENDIX

Table 1A
Percentage of Existing Facility Capacity Occupied by Development

Model Conduit Identifier	Length (ft)	Diameter (in)	Length x Diameter	Existing Peak Flows (cfs)	10 Year Peak Flows (cfs)	Build Out Peak Flows (cfs)	% Existing	% 10 year	% BO	Existing Weighted Percentage	10 Year Weighted Percentage	Buildout Weighted Percentage
CDT-59	5,820	15	87,303	0.097	0.234	1.457	6.7%	9.4%	83.9%	5812	8209	73282
CDT-61	5,006	15	75,093	0.127	0.298	1.828	6.9%	9.4%	83.7%	5217	7024	62851
CDT-63	1,495	15	22,430	0.151	0.348	2.119	7.1%	9.3%	83.6%	1598	2085	18746
CDT-65	3,627	8	29,016	0.027	0.071	0.458	5.9%	9.6%	84.5%	1710	2787	24518
CDT-67	1,292	15	19,380	0.174	0.413	2.571	6.8%	9.3%	83.9%	1311	1801	16267
CDT-71	5,525	8	44,202	0.093	0.183	0.979	9.5%	9.2%	81.3%	4199	4063	35940
CDT-73	3,728	15	55,918	0.161	0.268	1.228	13.1%	8.7%	78.2%	7331	4872	43714
CDT-75	1,262	15	18,922	0.381	0.733	3.969	9.6%	8.9%	81.5%	1816	1678	15428
CDT-77	1,647	15	24,705	0.427	0.812	4.415	9.7%	8.7%	81.6%	2389	2154	20161
CDT-79	5,371	15	80,563	0.471	0.899	4.94	9.5%	8.7%	81.8%	7681	6979	65902
CDT-83	2,624	12	31,486	0.029	0.06	0.339	8.6%	9.1%	82.3%	2693	2879	25913
CDT-85	2,622	12	31,458	0.053	0.125	0.768	6.9%	9.4%	83.7%	2170	2949	26338
CDT-87	2,708	12	32,491	0.099	0.194	1.016	9.7%	9.4%	80.9%	3166	3038	26287
CDT-89	1,753	12	21,032	0.128	0.392	1.834	7.0%	14.4%	78.6%	1467	3027	16537
CDT-91	2,016	15	30,240	0.184	0.424	2.61	7.0%	9.2%	83.8%	2131	2780	25328
CDT-95	920	12	11,040	0.13	0.392	1.834	7.1%	14.3%	78.6%	782	1577	8680
									Percent Attributed	**8.4%**	**9.4%**	**82.2%**

SEWER IMPACT FEE ANALYSIS

March 2015

Prepared for:
Twin Creeks Special Service District

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Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

INTRODUCTION

Twin Creeks Special Service District (TCSSD or District) has retained Bowen Collins & Associates (BC&A) to prepare an impact fee analysis (IFA) for its sewer system based on a recently completed impact fee facility plan. An impact fee is a one-time fee, not a tax, imposed upon new development activity as a condition of development approval to mitigate the impact of the new development on public infrastructure. The purpose of an IFA is to calculate the allowable impact fee that may be assessed to new development in accordance with Utah code.

WHY ASSESS AN IMPACT FEE?

As new users join a system, they add demands that must be satisfied through new facilities or use of excess capacity in existing facilities. Until all required projects are completed and new development is utilizing the full capacity of existing facilities, the District can assess an impact fee to recover its cost of latent capacity available to serve the future development. The general impact fee methodology divides the available capacity of existing and future capital projects between existing and future users based on their projected demands.

HOW ARE IMPACT FEES CALCULATED?

A fair impact fee is calculated by dividing the cost of existing and future facilities by the amount of new growth that will benefit from the unused capacity. Only the capacity that is needed to serve the projected growth within in the next ten years is included in the fee. Costs used in the calculation of impact fees include:

- New facilities required to maintain (but not exceed) the proposed level of service identified in the IFFP; only those expected to be built within ten years are considered in the final calculations of the impact fee.
- Historic costs of existing facilities that will serve new development
- Cost of professional services for engineering, planning, and preparation of the impact fee facilities plan and impact fee analysis

Costs not used in the impact fee calculation

- Operational and maintenance costs
- Cost of facilities constructed beyond 10 years
- Cost of facilities funded by grants, developer contributions, or other funds which the City is not required to repay
- Cost of renovating or reconstructing facilities which do not provide new capacity or needed enhancement of services to serve future development

IMPACT FEE CALCULATION

Impact fees for this analysis were calculated by dividing the proportional cost of facilities required to service 10-year growth by the amount of growth expected over the next 10-years. This is done for each of the major component categories in the system. To facilitate calculation, impact fees

are often defined in terms of an Equivalent Residential Unit, or ERU, which represents the impact of demand that a typical single family residence places on the system. Calculated impact fees are summarized in Table ES-1.

Table ES-1
Impact Fee Calculation per ERU

Sewer Collection System Components	Total Cost of Component	% Serving 10-year Growth	Cost Serving 10-year Growth	10-year ERUs Served	Cost Per ERU
Collection Facilities					
Existing Facilities	$2,598,943	9.4%	$244,301	652	$374.69
Existing Facility Interest Costs Outstanding	$0	0%	$0	652	$0.00
10-year Projects	$4,221,000	9.3%	$392,740	652	$602.36
10-Year Project Interest Costs	$2,041,996	9.3%	$189,996	652	$291.41
Subtotal	**$8,861,938**		**$827,037**		**$1,268.46**
Other					
Impact Fee Studies	$43,000	100%	$43,000	652	$65.95
Subtotal	**$43,000**		**$43,000**		**$65.95**
Total	**$8,904,938**		**$870,037**		**$1,334.41**

The total impact fee per ERU can be calculated by adding up the fee for each type of system component. This is separate from any additional charges levied by the District for hookup costs or for other reasonable permit and application fees.

RECOMMENDED IMPACT FEE

The total calculated impact fee is summarized in Table ES-2. This is the legal maximum amount that may be charged as an impact fee. A lower amount may be adopted if desired, but a higher fee is not allowable under the requirements of Utah Code.

Table ES-2
Recommended Impact Fee Per ERU

Current Impact Fee	Maximum Allowable (Recommended) Impact Fee	Percent Decrease
$3,731	$1,334	64.2%

Included in the table is a comparison of the new calculated fee with the District's current impact fee. The calculated fee represents a 64.2% decrease from the District's current sewer impact fee of $3,731 per ERU. This decrease can be explained primarily by changes in the impact fee law since it was last calculated.

SECTION 1
INTRODUCTION

TCSSD has retained Bowen Collins & Associates (BC&A) to prepare an impact fee analysis (IFA) for its sewer system based on a recently completed impact fee facility plan. An impact fee is a one-time fee, not a tax, imposed upon new development activity as a condition of development approval to mitigate the impact of the new development on public infrastructure. The purpose of an IFA is to calculate the allowable impact fee that may be assessed to new development in accordance with Utah code.

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

1. Identify the impact of anticipated development activity on existing capacity and system improvements required to maintain the established level of service
2. Demonstrate how the impacts are reasonably related to anticipated development activity
3. Estimate the proportionate share of:
    a. Costs of existing capacity that will be recouped
    b. Costs of impacts on system improvements that are reasonably related to the new development activity
4. Identify how the impact fee was calculated
5. Consider the following additional issues
    a. Manner of financing improvements
    b. Dedication of system improvements
    c. Time-price differential

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

SECTION 2
IMPACT ON SYSTEM (11-36A-304.1.A & B)

Growth within the District's service area, and projections of sewer flows resulting from said growth is discussed in detail in the District's Master Plan and Impact Fee Facilities Plan. For the purposes of impact fee calculation, growth in the system has been expressed in terms of equivalent residential units (ERUs). Growth in ERUs projected for the service area is summarized in Table 2-1.

Table 2-1
TCSSD Service Area ERU Projections

	Projected ERUs	Average Annual Growth
2014	636	7.0%
2015	667	7.0%
2016	714	7.0%
2017	764	7.0%
2018	818	7.0%
2019	875	7.0%
2020	938	7.0%
2021	999	6.6%
2022	1,064	6.6%
2023	1,134	6.6%
2024	1,209	6.6%
2025	1,288	6.6%
2030	1,749	6.3%
2040	2,790	4.8%
2050	4,223	4.2%
2060	5,374	2.4%
2070	6,586	2.1%
2080	7,917	1.9%

As indicated in the table, projected growth for the 10-year planning window of this impact fee analysis is 1,288 ERUs. In order to maintain the established level of service, projected future growth will be met through a combination of available excess capacity in existing facilities and construction of additional capacity in new facilities.

SECTION 3
RELATION OF IMPACTS TO ANTICIPATED DEVELOPMENT (11-36A-304.1.C)

To satisfy the requirements of state law, it is necessary to show that all impacts identified in the impact fee analysis are reasonably related to the anticipated development activity. This has been documented in detail in Impact Fee Facilities Plan. In short, only that capacity directly associated with demand placed upon existing system facilities by future development has been identified as an impact of the development. The steps completed to identify the impacts of anticipated development are as follows.

1. **Existing Demand** – The demand existing development places on the system was estimated based on historic demand records.
2. **Existing Capacity** – The capacities of existing facilities were calculated based on the level of service criteria established for each type of facility in the Impact Fee Facilities Plan.
3. **Existing Deficiencies** – Existing deficiencies in the system were looked for by comparing defined levels of service against calculated capacities. Where existing deficiencies existed, projects were identified to eliminate the deficiencies. Costs associated with existing deficiencies were not assigned to impacts of development.
4. **Future Demand** - The demand future development will place on the system was estimated based on development projections as discussed in Section 2.
5. **Future Demand Use of Existing Capacity** – Whenever possible, excess capacity in existing facilities has been used to serve future demands. Where this occurs, the amount of capacity used by future growth has been calculated as described in detail in the Impact Fee Facilities Plan.
6. **Future Deficiencies** – Where excess capacity in inadequate to meet projected demands, future deficiencies in the system were identified using the same established level of service criteria used for existing demands.
7. **Recommended Improvements** – Needed system improvements were identified to meet demands associated with future development.

SECTION 4
PROPORTIONATE SHARE ANALYSIS (11-36A-304.D)

A comprehensive proportionate share analysis associated with anticipated future development and its impact on the system was completed as part of the Impact Fee Facilities Plan. A summary of that analysis is contained here with additional discussion of the costs of facilities impacted by growth.

EXCESS CAPACITY TO ACCOMMODATE FUTURE GROWTH

Defining existing system capacity in terms of a single number is difficult for systems that deal with collection and treatment. Since TCSSD sends all wastewater flows to the treatment plant owned and operated by Heber Valley Special Service District, the only component to consider with respect to system capacity for this impact fee analysis is the collection system. As part of the Impact Fee Facilities Plan, the capacity used by existing and future users was analyzed in detail. Based on the analysis, the calculated percentage of existing capacity in system facilities used by existing users, growth during the 10 year planning window, and growth beyond the 10 year planning window is summarized in Table 2-2.

Table 4-1
Use of Existing Collection System Capacity

Type of User	Percent of Capacity
Existing	8.4%
10-year Growth	9.4%
Growth Beyond 10 Years	82.2%
Total	**100%**

EXISTING SYSTEM INFRASTRUCTURE COSTS

To calculate the value of excess capacity in the existing system, BC&A first looked at the value of all existing facilities. These costs were obtained from a fixed asset detailed report for the District, a copy of which is contained in the Appendix of this report. The total impact fee eligible construction and purchase cost of the District's existing collection system components is $2,598,952.74, which is summarized in Table A1 of the Appendix.

It should be noted that the impact fee eligible cost identified above represent only a portion of the total system value. System costs not included in the total include: facilities with a service life of less than 10 years, project level improvements serving single developments, and improvements not paid for by the District (e.g. projects funded through grants, developer dedications, etc.). In this study, public facility costs already incurred by the District will be included in the impact fee only to the extent that new growth will be served by the previously constructed improvements.

REIMBURSEMENT AGREEMENTS

No reimbursement agreements exist within the system that will affect the impact fee calculation.

FUTURE IMPROVEMENTS

In addition to using available existing capacity, demand associated with projected future development will be met through the construction of additional capacity in new facilities. A primary focus of the Impact Fee Facilities Plan was the identification of projects required to serve new development. The results of the Impact Fee Facilities Plan are summarized in Table 4-2. Provided in the table are the costs of each required project and the portion of costs associated with development.

Table 4-2
Impact Fee Eligible Capital Projects

Project	District Construction/Purchase Cost	Percent Attributable to 10 Year Growth	Cost Attributable to 10 Year Growth
1200 South Sewer Line	$2,017,000	9.2%	$185,564
2400 East Sewer Line	$2,204,000	9.4%	$207,176
		TOTAL	**$392,740**

FUTURE IMPACT FEE STUDIES

Utah code allows for the cost of planning and engineering associated with impact fee calculations to be recovered as part of impact fee. This study includes the cost of this study and one impact fee update during the 10-year planning window.

SECTION 5
IMPACT FEE CALCULATION (11-36A-304.1.E)

Using the information contained in the previous sections, impact fees can be calculated by dividing the proportional cost of facilities required to service 10-year growth by the amount of growth expected over the next 10-years. Calculated impact fees are summarized in Table 5-1.

Table 5-1
Impact Fee Calculation per ERU

Sewer Collection System Components	Total Cost of Component	% Serving 10-year Growth	Cost Serving 10-year Growth	10-year ERUs Served	Cost Per ERU
Collection Facilities					
Existing Facilities	$2,598,943	9.4%	$244,301	652	$374.69
Existing Facility Interest Costs Outstanding	$0	0%	$0	652	$0.00
10-year Projects	$4,221,000	9.3%	$392,740	652	$602.36
10-Year Project Interest Costs	$2,041,996	9.3%	$189,996	652	$291.41
Subtotal	**$8,861,938**		**$827,037**		**$1,268.46**
Other					
Impact Fee Studies	$43,000	100%	$43,000	652	$65.95
Subtotal	**$43,000**		**$43,000**		**$65.95**
Total	**$8,904,938**		**$870,037**		**$1,334.41**

The total impact fee per ERU can be calculated by adding up the fee for each component. This is separate from any additional charges levied by the District for hookup costs or for other reasonable permit and application fees.

BONDING INTEREST COSTS

In addition to construction costs, impact fees may include the cost of bond interest expense where applicable. This includes any outstanding interest costs on existing facilities where new growth will benefit from excess capacity and future interest costs for bonds required to build projects needed for growth as identified in the Impact Fee Facilities Plan. Similar to project construction costs, only that portion of interest expense associated with capacity for growth is included in the impact fee calculation.

RECOMMENDED IMPACT FEE

The total calculated impact fee is summarized in Table 5-2. This is the legal maximum amount that may be charged as an impact fee. A lower amount may be adopted if desired, but a higher fee is not allowable under the requirements of Utah Code.

Table 5-2
Recommended Impact Fee

Current Impact Fee	Maximum Allowable Impact Fee	Percent Decrease
$3,731	$1,334	64.2%

Included in the table is a comparison of the calculated fee with the District current impact fees. The calculated fee of $1,334 represents a 64.2% decrease from the District's current sewer impact fee of $3,731 per ERU. This decrease can be explained primarily by changes in the impact fee law since it was last calculated.

Calculation of Non-Standard Impact Fees

The calculations above have been based on an equivalent residential unit (ERU). The impact fee ordinance should include a provision that allows for calculation of a fee for customers other than typical residential connections. Consistent with the level of service standards established in the Impact Fee Facilities Plan, the following formula may be used to calculate an impact fee for a non-standard user based on the calculated daily indoor water use for an average residential connection.

$$\frac{Estimated\ Average\ Indoor\ Water\ Use\ (gpd)}{258\ gallons\ per\ day} X\ Impact\ Fee\ per\ ERU = Impact\ Fee$$

SECTION 6
ADDITIONAL CONSIDERATIONS (11-36A-304.2)

MANNER OF FINANCING (11-36A-304.2.A-E)

As part of this Impact Fee Analysis, it is important to consider how each facility has been or will be paid for. Potential infrastructure funding includes a combination of different revenue sources.

User Charges

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. Repayment of interfund loans should be considered in subsequent accounting of impact fee expenditures.

Special Assessments

Where special assessments exist, the impact fee calculation must take into account funds contributed. Contributions from past special assessments have been accounted for in the calculation of existing system value. No additional special assessments are expected for the planning period.

Bonds

Where District financial plans identify that bonding will be required to finance impact fee eligible improvements, the portion of bond cost and interest expense attributable to future growth may be added to the calculation of the impact fee. Based on current District plans as outlined in the master plan and the IFFP, the District will likely have money in its reserve fund to loan the required amount for the construction for the majority of planned improvements from the District reserve fund to the impact fee fund. It has been assumed that this interfund loan will be done without bond costs, but at interest rates equal to market rates for municipal bonds at the time. For the purposes of this analysis, it has been estimated that the impact fee fund will require that this interfund loan be for 90 percent of the project value at 4.5 percent interest over 20 years. For additional project costs which exceed the amount available from an interfund loans, the District will need to utilize a traditional municipal bond.

General Taxes

If taxes are used to pay for infrastructure, they should be accounted for in the impact fee calculation. Specifically, any contribution made by property owners through taxes should be credited toward their available capacity in the system. In this case, no taxes are proposed for the construction of infrastructure.

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 District 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 has been removed from the system value during the impact fee analysis.

DEDICATION OF SYSTEM IMPROVEMENTS (11-36A-304.2.F)

Developer exactions may be considered in the inventory of current and future 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 District. If the value of the improvements dedicated is worth more than the development's impact fee liability, the District 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 facility plan), developers will be responsible for the construction of the improvements without credit against the impact fee.

EXTRAORDINARY COSTS (11-36A-304.2.G)

The impact fee act indicates the analysis should include consideration of any extraordinary costs of servicing newly developed properties. In cases where one area of potential growth may cost significantly more to service than all other growth, a separate service area may be warranted. No areas with extraordinary costs have been identified as part of this analysis.

TIME-PRICE DIFFERENTIAL (11-36A-304.2.H)

Utah code requires consideration of time-price differential in order to create fairness for amounts paid at different times. To address time-price differential, this analysis includes construction inflation for future construction projects. Per the requirements of the code, existing infrastructure value is based on actual historical costs without adjustment.

NOTICING AND ADOPTION REQUIREMENTS (11-36A-504)

The Impact Fees Act requires that entities must publish a notice of intent to prepare or modify any IFA. Before the resulting impact fee can be adopted, the District must:

- Provide notice in accordance with Section 17B-1-111 of State Code. This includes reasonable notice of a public hearing published in a local newspaper at least 14 days before the actual hearing.
- A copy of the IFA and proposed impact fee enactment must be made available on the District's website or posted in each public library within the service area during the notice period for public review and inspection.
- Following the noticing period, a public hearing will be held, after which the IFA and impact fee enactment may be adopted, amended and adopted, or rejected.

SECTION 7
IMPACT FEE CERTIFICATION (11-36A-306.2)

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 District and their designees.

In accordance with Utah Code Annotated, 11-36a-306(2), Bowen Collins & Associates, makes the following certification:

I certify that this impact fee analysis:

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.

Dated: March 23, 2015

APPENDIX
BOOK ASSET DETAIL

Table A1
Summary of Book Asset Detail Attributed to the Sewer System

Group	Asset ID	Property Description	Book Cost	Percent Attributed to Sewer	Cost Attributed to Impact Fee
Easements	6	Easements	$95,575.00	20%	$19,115.00
	51	Easements	$41,510.00	20%	$8,302.00
	94	Easements - Jeffrey Kummer	$4,000.00	20%	$800.00
				Subtotal	**$28,217.00**
Land	7	Land	$47,735.00	20%	$9,547.00
				Subtotal	**$9,547.00**
Bond Issuance Cost	34	1999 Sewer Revenue Bond	$17,997.16	100%	$17,997.16
	35	1999 Sewer Assessment Bond	$24,423.16	100%	$24,423.16
				Subtotal	**$42,420.32**
Sewer System	4	Distribution Lines	$13,527.59	100%	$13,527.59
	8	Sewer System	$1,515,321.48	100%	$1,515,321.48
	30	Improvements	$12,953.45	100%	$12,953.45
	31	Improvements	$49,020.47	100%	$49,020.47
	41	Improivements - Engineering	$2,160.00	100%	$2,160.00
	43	Distribution Lines - Greener Hills	$423,467.05	100%	$423,467.05
	48	Lake Creek Rd. Sewer Line	$451,506.71	100%	$451,506.71
	49	Drain Lines	$3,800.00	100%	$3,800.00
	53	Lake Creek Rd. Sewer Line	$25,877.86	100%	$25,877.86
	54	Lake Creek Rd. Sewer Line	$4,950.50	100%	$4,950.50
	55	Big Pole Sewer Line	$616.25	100%	$616.25
	85	Ron Davis Sewer Line	$15,557.06	100%	$15,557.06
				Subtotal	**$2,518,758.42**
				TOTAL	**$2,598,942.74**

Book Asset Detail 1/01/11 - 12/31/11

FYE: 12/31/2011

Asset	dt	Property Description	Date In Service	Book Cost	Book Sec 179 Exp	c	Book Sal Value	Book Prior Depreciation	Book Current Depreciation	Book End Depr	Book Net Book Value	Book Method	Book Period
Group: Billy Bethers Water													
109		Computer equipment	11/14/05	1,417.00	0.00		0.00	1,417.00	0.00	1,417.00	0.00	S/L	5.0
110		Billy Bethers Water System	1/01/05	465,771.00	0.00		0.00	55,892.52	9,315.42	65,207.94	400,563.06	S/L	50.0
165		BILLY BETHERS WATER SYSTI	6/30/08	3,613.18	0.00		0.00	180.65	72.26	252.91	3,360.27	S/L	50.0
		Billy Bethers Water		470,801.18	0.00	c	0.00	57,490.17	9,387.68	66,877.85	403,923.33		
Group: Bond Issuance Costs													
34		1999 Sewer Revenue Bond	8/12/99	17,997.16	0.00		0.00	17,997.16	0.00	17,997.16	0.00	Amort	10.0
35		1999 Sewer Assessment Bond	4/26/99	24,423.16	0.00		0.00	24,423.16	0.00	24,423.16	0.00	Amort	10.0
95		Water Rev. Bond 2004A	5/21/04	10,648.20	0.00		0.00	2,366.27	354.94	2,721.21	7,926.99	Amort	30.0
96		2004-1 SID Sewer Assessment Bon	10/25/04	21,951.85	0.00		0.00	6,859.94	1,097.59	7,957.53	13,994.32	Amort	20.0
163		RED LEDGES BAN ISSUANCE C	7/15/08	320,500.00	0.00		0.00	320,500.00	0.00	320,500.00	0.00	Amort	2.0
195		RED LEDGES SAB 2010 COI	7/16/10	182,454.00	0.00		0.00	3,801.13	9,122.70	12,923.83	169,530.17	Amort	20.0
		Bond Issuance Costs		577,974.37	0.00	c	0.00	375,947.66	10,575.23	386,522.89	191,451.48		
Group: Easements													
6		Easements	6/01/98	95,575.00	0.00		0.00	0.00	0.00	0.00	95,575.00	Land	0.0
51		Easements	6/15/01	41,510.00	0.00		0.00	0.00	0.00	0.00	41,510.00	Land	0.0
94		Easement - Jeffrey Kummer	5/12/04	4,000.00	0.00		0.00	0.00	0.00	0.00	4,000.00	Land	0.0
136		HOLMES EASEMENT	8/19/08	58,000.00	0.00		0.00	0.00	0.00	0.00	58,000.00	Land	0.0
		Easements		199,085.00	0.00	c	0.00	0.00	0.00	0.00	199,085.00		
Group: Equipment													
5		Equipment	6/01/98	2,232.39	0.00		0.00	2,232.39	0.00	2,232.39	0.00	S/L	10.0
9		Confined Space Entry Kit	10/30/98	2,197.30	0.00		0.00	2,197.30	0.00	2,197.30	0.00	S/L	10.0
10		Backhoe	10/29/98	53,670.00	0.00		0.00	53,670.00	0.00	53,670.00	0.00	S/L	5.0
15		Cable Locator	5/07/99	885.00	0.00		0.00	885.00	0.00	885.00	0.00	S/L	10.0
16		Mobile Meter Reading Package	3/31/99	5,026.67	0.00		0.00	5,026.67	0.00	5,026.67	0.00	S/L	10.0
21		Mobile Compressor	5/20/99	848.30	0.00		0.00	848.30	0.00	848.30	0.00	S/L	10.0
22		Trash Pump	4/26/99	2,299.65	0.00		0.00	2,299.65	0.00	2,299.65	0.00	S/L	10.0
23		Service Truck Bed & Crane	1/01/99	21,343.00	0.00		0.00	21,343.00	0.00	21,343.00	0.00	S/L	6.0
25		Welder	2/10/99	2,912.67	0.00		0.00	2,912.67	0.00	2,912.67	0.00	S/L	10.0
26		File Cabinets	6/02/99	650.00	0.00		0.00	650.00	0.00	650.00	0.00	S/L	10.0
32		24" Super Ripcord	5/02/99	1,292.10	0.00		0.00	1,292.10	0.00	1,292.10	0.00	S/L	10.0
33		PH Level Tester	5/02/99	1,696.70	0.00		0.00	1,696.70	0.00	1,696.70	0.00	S/L	10.0
36		Flags & Poles	11/06/00	2,004.63	0.00		0.00	2,004.63	0.00	2,004.63	0.00	S/L	10.0
		Equipment		97,058.41	0.00	c	0.00	97,058.41	0.00	97,058.41	0.00		
Group: Land													
7		Land	1/01/97	47,735.00	0.00		0.00	0.00	0.00	0.00	47,735.00	Land	0.0
76		Land - Billy Bethers Tank Site	5/20/04	20,206.00	0.00		0.00	0.00	0.00	0.00	20,206.00	Land	0.0
135		MCGUIRE POND	1/31/08	245,500.00	0.00		0.00	0.00	0.00	0.00	245,500.00	Land	0.0
166		JONES RESERVOIR	10/28/08	104,000.00	0.00		0.00	0.00	0.00	0.00	104,000.00	Land	0.0

Book Asset Detail 1/01/11 - 12/31/11

FYE: 12/31/2011

Asset	d t	Property Description	Date In Service	Book Cost	Book Sec 179 Exp	c	Book Sal Value	Book Prior Depreciation	Book Current Depreciation	Book End Depr	Book Net Book Value	Book Method	Book Period
Group: Land (continued)													
		Land		417,441.00	0.00	c	0.00	0.00	0.00	0.00	417,441.00		
Group: Orion System													
105		Orion Water Meter System	9/30/05	20,905.60	0.00		0.00	940.75	0.00	940.75	19,964.85	Memo	50.0
		Orion System		20,905.60	0.00	c	0.00	940.75	0.00	940.75	19,964.85		
Group: Red Ledges Infrastructure													
142		20 DIP WATER LINE	12/31/08	1,288,181.91	0.00		0.00	0.00	0.00	0.00	1,288,181.91	Memo	0.0
144		COYOTE LANE	12/31/08	75,404.13	0.00		0.00	0.00	0.00	0.00	75,404.13	Memo	0.0
145		COYOTE LANE PUMP STATION	12/31/08	13,869.48	0.00		0.00	0.00	0.00	0.00	13,869.48	Memo	0.0
146		LAKE CREEK IRRIGATION	9/01/08	658,943.98	0.00		0.00	30,750.72	13,178.88	43,929.60	615,014.38	S/L	50.0
147		LAKE CREEK ROAD WATER LI	9/01/08	1,137,395.07	0.00		0.00	53,078.43	22,747.90	75,826.33	1,061,568.74	S/L	50.0
148		LIFT STATION TO NORTH PROI	12/31/08	68,549.98	0.00		0.00	0.00	0.00	0.00	68,549.98	Memo	0.0
149		OFF-SITE UTILITY CORRIDOR	12/31/08	307,378.06	0.00		0.00	0.00	0.00	0.00	307,378.06	Memo	0.0
150		ON-SITE SEWER SYSTEM	9/01/08	3,400,470.10	0.00		0.00	158,688.60	68,009.40	226,698.00	3,173,772.10	S/L	50.0
151		ON-SITE WATER SYSTEM	9/01/08	2,701,810.50	0.00		0.00	126,084.49	54,036.21	180,120.70	2,521,689.80	S/L	50.0
152		RED LEDGES TANK	12/31/08	1,152,368.20	0.00		0.00	0.00	0.00	0.00	1,152,368.20	Memo	0.0
153		RED LEDGES TANK ACCESS RC	12/31/08	70,181.58	0.00		0.00	2,807.26	1,403.63	4,210.89	65,970.69	S/L	50.0
154		RIVER ROAD SEWER PUMP ST/	12/31/08	9,261.72	0.00		0.00	0.00	0.00	0.00	9,261.72	Memo	0.0
156		RED LEDGES SEWER LIFT STA	12/31/08	3,223.90	0.00		0.00	0.00	0.00	0.00	3,223.90	Memo	0.0
157		TRIPLE CROWN SEWER CONNI	9/01/08	306,494.31	0.00		0.00	14,303.08	6,129.89	20,432.97	286,061.34	S/L	50.0
159		UVSC RIVER ROAD WATER LI	12/31/08	23,707.61	0.00		0.00	0.00	0.00	0.00	23,707.61	Memo	0.0
160		WASATCH CANAL TO TIMP CA	9/01/08	1,070,067.09	0.00		0.00	49,936.46	21,401.34	71,337.80	998,729.29	S/L	50.0
161		WATER BOOSTER PUMP STATI	12/31/08	50,232.50	0.00		0.00	0.00	0.00	0.00	50,232.50	Memo	0.0
162		WRF TO RED LEDGES - DESIGN	12/31/08	16,851.05	0.00		0.00	0.00	0.00	0.00	16,851.05	Memo	0.0
167		RED LEDGES 2008 CAPITALIZE	12/31/08	819,763.54	0.00		0.00	32,790.54	16,395.27	49,185.81	770,577.73	S/L	50.0
169		20" DIP WATER LINE - 2009 ADI	12/31/09	224,899.75	0.00		0.00	0.00	0.00	0.00	224,899.75	Memo	0.0
170		COYOTE LANE PUMP STATION	12/31/09	20,779.86	0.00		0.00	0.00	0.00	0.00	20,779.86	Memo	0.0
171		LAKE CREEK IRRIGATION - 20(	5/31/09	10,449.66	0.00		0.00	330.90	208.99	539.89	9,909.77	S/L	50.0
172		LAKE CREEK ROAD WATER LI	5/31/09	4,645.95	0.00		0.00	147.12	92.92	240.04	4,405.91	S/L	50.0
173		LIFT STATION TO NORTH PROI	12/31/09	232,734.39	0.00		0.00	0.00	0.00	0.00	232,734.39	Memo	0.0
174		OFF-SITE UTILITY CORRIDOR -	12/31/09	481,347.14	0.00		0.00	0.00	0.00	0.00	481,347.14	Memo	0.0
175		RED LEDGES TANK - 2009 ADD	12/31/09	2,601.87	0.00		0.00	0.00	0.00	0.00	2,601.87	Memo	0.0
177		SECONDARY IRRIGATION	4/30/09	424,357.20	0.00		0.00	14,145.24	8,487.14	22,632.38	401,724.82	S/L	50.0
178		TRIPLE CROWN SEWER CONNI	10/31/09	6,000.00	0.00		0.00	140.00	120.00	260.00	5,740.00	S/L	50.0
179		WATER BOOSTER PUMP STATI	12/31/09	30,763.21	0.00		0.00	0.00	0.00	0.00	30,763.21	Memo	0.0
180		RED LEDGES 2009 CAPITALIZE	12/31/09	894,287.50	0.00		0.00	17,885.75	17,885.75	35,771.50	858,516.00	S/L	50.0
181		ON-SITE SEWER LIFT STATION	12/31/09	12,297.23	0.00		0.00	0.00	0.00	0.00	12,297.23	Memo	0.0
182		CONNECTION FEES - SEWER	6/30/09	3,442,482.90	0.00		0.00	103,274.49	68,849.66	172,124.15	3,270,358.75	S/L	50.0
183		HWY 40 SEWER FORCE MAIN	12/31/09	8,330.98	0.00		0.00	0.00	0.00	0.00	8,330.98	Memo	0.0
190		RED LEDGES 2009 CAPITALIZE	12/31/09	894,287.50	0.00		0.00	17,885.75	17,885.75	35,771.50	858,516.00	S/L	50.0
191		CONNECTION FEES - WATER	6/30/09	3,442,482.89	0.00		0.00	103,274.49	68,849.66	172,124.15	3,270,358.74	S/L	50.0
194		2010 RED LEDGES BAN CAPITA	7/15/10	968,811.46	0.00		0.00	9,688.11	19,376.23	29,064.34	939,747.12	S/L	50.0

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Group: Red Ledges Infrastructure (continued)													
		Red Ledges Infrastructure		24,275,714.20	0.00	c	0.00	735,211.43	405,058.62	1,140,270.05	23,135,444.15		
Group: Sewer System													
4		Distribution Lines	6/01/98	13,527.59	0.00		0.00	3,404.42	270.55	3,674.97	9,852.62	S/L	50.0
8		Sewer System	6/01/98	1,515,321.48	0.00		0.00	381,355.91	30,306.43	411,662.34	1,103,659.14	S/L	50.0
29		Improvements - 13 Fire Hydrants	12/01/99	23,400.00	0.00		0.00	5,187.00	468.00	5,655.00	17,745.00	S/L	50.0
30		Improvements	8/08/99	12,953.45	0.00		0.00	2,957.72	259.07	3,216.79	9,736.66	S/L	50.0
31		Improvements	1/01/99	49,020.47	0.00		0.00	11,764.92	980.41	12,745.33	36,275.14	S/L	50.0
41		Improvements-Engineering	11/30/00	2,160.00	0.00		0.00	435.60	43.20	478.80	1,681.20	S/L	50.0
42		2 Fire Hydrants	3/20/00	3,600.00	0.00		0.00	774.00	72.00	846.00	2,754.00	S/L	50.0
43		Distribution Lines-Greener Hills	9/08/00	423,467.05	0.00		0.00	87,516.51	8,469.34	95,985.85	327,481.20	S/L	50.0
48		Lake Creek Rd Sewer Line	10/31/01	451,506.71	0.00		0.00	82,776.19	9,030.13	91,806.32	359,700.39	S/L	50.0
49		Drain Lines	10/31/01	3,800.00	0.00		0.00	696.67	76.00	772.67	3,027.33	S/L	50.0
53		Lake Creek Rd. Sewer Line	1/14/02	25,877.86	0.00		0.00	4,658.04	517.56	5,175.60	20,702.26	S/L	50.0
54		Lake Creek Rd. Sewer Line	3/28/02	4,950.50	0.00		0.00	866.34	99.01	965.35	3,985.15	S/L	50.0
55		Big Pole Sewer Line	9/30/02	616.25	0.00		0.00	101.72	12.33	114.05	502.20	S/L	50.0
84		Country Estates Sewer Line	8/01/04	479,961.10	0.00		0.00	61,595.00	9,599.22	71,194.22	408,766.88	S/L	50.0
85		Ron Davis Sewer Line	12/31/04	15,557.06	0.00		0.00	1,866.84	311.14	2,177.98	13,379.08	S/L	50.0
86		Cobblestone Phase I Sewer Line	1/01/04	134,442.00	0.00		0.00	18,821.88	2,688.84	21,510.72	112,931.28	S/L	50.0
87		Cobblestone Phase II Sewer Line	5/01/04	90,040.00	0.00		0.00	12,005.33	1,800.80	13,806.13	76,233.87	S/L	50.0
116		07 Beaufontaine - Sewer Sys	10/01/07	163,282.00	0.00		0.00	10,613.33	3,265.64	13,878.97	149,403.03	S/L	50.0
117		07 Cobblestone - Sewer Sys	11/01/07	33,390.00	0.00		0.00	2,114.70	667.80	2,782.50	30,607.50	S/L	50.0
118		07 Wasatch Meadows - Sewer Sys	11/01/07	12,300.00	0.00		0.00	779.00	246.00	1,025.00	11,275.00	S/L	50.0
119		07 Crossings - Sewer Sys	9/01/07	124,830.00	0.00		0.00	8,322.00	2,496.60	10,818.60	114,011.40	S/L	50.0
120		07 Fox Run - Sewer Sys	4/01/07	70,800.00	0.00		0.00	5,310.00	1,416.00	6,726.00	64,074.00	S/L	50.0
		Sewer System		3,654,803.52	0.00	c	0.00	703,923.12	73,096.07	777,019.19	2,877,784.33		
Group: Vehicles													
12		Dodge Ram 3500	11/30/98	24,716.00	0.00		0.00	24,716.00	0.00	24,716.00	0.00	S/L	5.0
47		1997 Ford F150	1/17/01	15,000.00	0.00		0.00	15,000.00	0.00	15,000.00	0.00	S/L	5.0
83		2005 Ford F150 XLT Supercab	12/31/04	23,572.00	0.00		0.00	23,572.00	0.00	23,572.00	0.00	S/L	5.0
111		2002 Dodge Quad Cab	11/16/06	16,500.00	0.00		0.00	13,475.00	3,025.00	16,500.00	0.00	S/L	5.0
		Vehicles		79,788.00	0.00	c	0.00	76,763.00	3,025.00	79,788.00	0.00		
Group: Water Shares													
45		16.82 Shares Reservoir Water	1/01/01	757,000.00	0.00		0.00	0.00	0.00	0.00	757,000.00	Land	0.0
46		20.1111 Shares LC IRR Water	1/01/01	905,000.00	0.00		0.00	0.00	0.00	0.00	905,000.00	Land	0.0
52		2.777777 shares LC IRR Water	3/28/02	125,000.00	0.00		0.00	0.00	0.00	0.00	125,000.00	Land	0.0
64		2.1111 Shares LC IRR Water	3/11/03	95,000.00	0.00		0.00	0.00	0.00	0.00	95,000.00	Land	0.0
65		.22222 Shares LC IRR Water	3/31/03	10,000.00	0.00		0.00	0.00	0.00	0.00	10,000.00	Land	0.0
66		1/9 Share	8/31/03	5,000.00	0.00		0.00	0.00	0.00	0.00	5,000.00	Land	0.0
67		1/9 Share	12/10/03	5,000.00	0.00		0.00	0.00	0.00	0.00	5,000.00	Land	0.0
77		1/9 Share	3/23/04	5,000.00	0.00		0.00	0.00	0.00	0.00	5,000.00	Land	0.0
78		7 2/9 Share	6/22/04	325,000.00	0.00		0.00	0.00	0.00	0.00	325,000.00	Land	0.0

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Group: Water Shares (continued)													
79		1/9 Share	8/17/04	5,000.00	0.00		0.00	0.00	0.00	0.00	5,000.00	Land	0.0
80		2/9 Share	10/22/04	10,000.00	0.00		0.00	0.00	0.00	0.00	10,000.00	Land	0.0
81		1 7/36 Share	12/22/04	53,750.00	0.00		0.00	0.00	0.00	0.00	53,750.00	Land	0.0
82		21.35 Water Right 55-8222 Shares	12/30/04	960,000.00	0.00		0.00	0.00	0.00	0.00	960,000.00	Land	0.0
97		2.25 Shares	5/26/05	101,250.00	0.00		0.00	0.00	0.00	0.00	101,250.00	Land	0.0
98		1 Share	5/26/05	45,000.00	0.00		0.00	0.00	0.00	0.00	45,000.00	Land	0.0
99		1.5 Shares	5/26/05	67,500.00	0.00		0.00	0.00	0.00	0.00	67,500.00	Land	0.0
100		1 Share	11/14/05	70,000.00	0.00		0.00	0.00	0.00	0.00	70,000.00	Land	0.0
101		3 4/9 Shares	11/14/05	241,111.00	0.00		0.00	0.00	0.00	0.00	241,111.00	Land	0.0
102		1/9 Share	12/02/05	7,778.00	0.00		0.00	0.00	0.00	0.00	7,778.00	Land	0.0
103		1/2 Share	12/02/05	35,000.00	0.00		0.00	0.00	0.00	0.00	35,000.00	Land	0.0
131		Lake Creek Irr. Co. - 1,011.33 acre	12/31/07	25,283,250.00	0.00		0.00	0.00	0.00	0.00	25,283,250.00	Land	0.0
132		Timp Irr. Co. - 100.00 acre feet	12/13/07	350,000.00	0.00		0.00	0.00	0.00	0.00	350,000.00	Land	0.0
133		Wasatch Irr. Co. - 8.00 acre feet	12/31/07	56,000.00	0.00		0.00	0.00	0.00	0.00	56,000.00	Land	0.0
192		WASATCH IRRIGATION 11.815	12/31/09	472,600.00	0.00		0.00	0.00	0.00	0.00	472,600.00	Land	0.0
193		LAKE CREEK IRRIGATION 3 SH	12/31/09	545,200.00	0.00		0.00	0.00	0.00	0.00	545,200.00	Land	0.0
		Water Shares		30,535,439.00	0.00	c	0.00	0.00	0.00	0.00	30,535,439.00		
Group: Water System													
44		Water Lines - Greener Hills	9/08/00	621,842.25	0.00		0.00	128,514.12	12,436.85	140,950.97	480,891.28	S/L	50.0
58		Water Lines-1200 South	3/28/02	3,325.00	0.00		0.00	581.88	66.50	648.38	2,676.62	S/L	50.0
59		Water Lines-1200 South	4/30/02	8,645.00	0.00		0.00	1,498.47	172.90	1,671.37	6,973.63	S/L	50.0
60		Water Lines-1200 South	6/18/02	2,228.25	0.00		0.00	378.84	44.57	423.41	1,804.84	S/L	50.0
61		Water Lines-1200 South	7/31/02	133.00	0.00		0.00	22.39	2.66	25.05	107.95	S/L	50.0
75		Water Lines - 1200 South	5/31/03	263,307.92	0.00		0.00	39,935.05	5,266.16	45,201.21	218,106.71	S/L	50.0
88		Ron Davis Water Line	12/30/04	15,557.05	0.00		0.00	1,866.84	311.14	2,177.98	13,379.07	S/L	50.0
91		Cobblestone Phase I Water Line	1/01/04	56,920.00	0.00		0.00	7,968.80	1,138.40	9,107.20	47,812.80	S/L	50.0
92		Cobblestone Phase II Water Line	5/01/04	68,780.00	0.00		0.00	9,170.67	1,375.60	10,546.27	58,233.73	S/L	50.0
104		Pvr Valve Meter System Imprvmnt	4/15/05	5,571.84	0.00		0.00	640.78	111.44	752.22	4,819.62	S/L	50.0
112		Water Line Extenstion	5/26/06	23,502.00	0.00		0.00	2,154.35	470.04	2,624.39	20,877.61	S/L	50.0
114		CLYDE LAKE LINE RPR	10/31/06	13,500.00	0.00		0.00	1,125.00	270.00	1,395.00	12,105.00	S/L	50.0
121		07 Beaufontaine - Water lines	10/01/07	222,750.00	0.00		0.00	14,478.75	4,455.00	18,933.75	203,816.25	S/L	50.0
122		07 Cobblestone - Water lines	11/01/07	80,762.00	0.00		0.00	5,114.93	1,615.24	6,730.17	74,031.83	S/L	50.0
123		07 Wasatch Meadows - Water lines	11/01/07	28,600.00	0.00		0.00	1,811.33	572.00	2,383.33	26,216.67	S/L	50.0
124		07 Crossings - Water lines	9/01/07	210,778.00	0.00		0.00	14,051.87	4,215.56	18,267.43	192,510.57	S/L	50.0
125		07 Wild Mare Farm - Water lines	4/01/07	149,977.00	0.00		0.00	11,248.27	2,999.54	14,247.81	135,729.19	S/L	50.0
126		07 Fox Run - Water lines	4/01/07	266,000.00	0.00		0.00	19,950.00	5,320.00	25,270.00	240,730.00	S/L	50.0
127		Eden Valley Pipeline	4/18/07	9,405.18	0.00		0.00	689.70	188.10	877.80	8,527.38	S/L	50.0
168		LAKE CREEK CULVERT	3/31/09	17,912.65	0.00		0.00	626.94	358.25	985.19	16,927.46	S/L	50.0
185		BIG POLE WATER LINE	12/31/09	10,991.48	0.00		0.00	0.00	0.00	0.00	10,991.48	Memo	0.0
188		IRRIGATION METER PROJECT	12/31/09	9,311.51	0.00		0.00	0.00	0.00	0.00	9,311.51	Memo	0.0
197		Holding Tank Fencing	8/01/11	6,431.00	0.00	c	0.00	0.00	267.96	267.96	6,163.04	S/L	10.0
		Water System		2,096,231.13	0.00	c	0.00	261,828.98	41,657.91	303,486.89	1,792,744.24		

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Group: Water System Improvements													
139		2008 DEER VALLEY DAM IMPR	10/01/08	25,547.15	0.00		0.00	1,149.62	510.94	1,660.56	23,886.59	S/L	50.0
140		2008 JONES DAM IMPROVEMEI	10/01/08	59,845.07	0.00		0.00	2,693.03	1,196.90	3,889.93	55,955.14	S/L	50.0
141		2008 ATKINSON DAM IMPROVI	6/30/09	14,276.13	0.00		0.00	428.28	285.52	713.80	13,562.33	S/L	50.0
186		CLYDE LAKE RESERVOIR DAM	8/31/09	40,782.86	0.00		0.00	1,087.55	815.66	1,903.21	38,879.65	S/L	50.0
187		DEER VALLEY DAM	9/30/09	5,507.88	0.00		0.00	137.70	110.16	247.86	5,260.02	S/L	50.0
189		PRV REPLACEMENT PROJECT	11/30/09	268,324.85	0.00		0.00	5,813.71	5,366.50	11,180.21	257,144.64	S/L	50.0
		Water System Improvements		414,283.94	0.00	c	0.00	11,309.89	8,285.68	19,595.57	394,688.37		
Group: Water Treatment Plant													
3		Water Treatment Plant	3/01/96	2,346,049.94	0.00		0.00	695,902.83	46,921.00	742,823.83	1,603,226.11	S/L	50.0
13		Improvements	7/01/98	6,282.50	0.00		0.00	1,570.63	125.65	1,696.28	4,586.22	S/L	50.0
14		Power Pond Improvements	1/05/98	14,830.00	0.00		0.00	3,855.80	296.60	4,152.40	10,677.60	S/L	50.0
27		Sprinkler System	10/13/99	6,100.00	0.00		0.00	3,431.25	305.00	3,736.25	2,363.75	S/L	20.0
28		Gas Hookup	10/13/99	1,200.00	0.00		0.00	270.00	24.00	294.00	906.00	S/L	50.0
63		Carpet	4/15/02	1,615.55	0.00		0.00	1,413.55	161.56	1,575.11	40.44	S/L	10.0
128		Filter Sand	4/03/07	10,423.27	0.00		0.00	3,908.74	1,042.33	4,951.07	5,472.20	S/L	10.0
129		Landscaping - Split railing	7/10/07	13,963.00	0.00		0.00	2,443.53	698.15	3,141.68	10,821.32	S/L	20.0
137		HYDRO-CHLORINATOR	4/25/08	46,976.64	0.00		0.00	2,505.42	939.53	3,444.95	43,531.69	S/L	50.0
138		SOURCE MIXING PLANT - 2008	12/31/08	30,689.75	0.00		0.00	0.00	0.00	0.00	30,689.75	Memo	0.0
184		SOURCE MIXING PLANT - 2009	12/31/09	109,831.96	0.00		0.00	0.00	0.00	0.00	109,831.96	Memo	0.0
196		Source Mixing Plant - 2010	1/01/11	11,697.00	0.00	c	0.00	0.00	0.00	0.00	11,697.00	Memo	0.0
		Water Treatment Plant		2,599,659.61	0.00	c	0.00	715,301.75	50,513.82	765,815.57	1,833,844.04		
		Grand Total		65,439,184.96	0.00	c	0.00	3,035,775.16	601,600.01	3,637,375.17	61,801,809.79		

Book Current Year Additions

FYE: 12/31/2011

Asset	Property Description	Date In Service	Book Cost
Group: Water System			
197	Holding Tank Fencing	8/01/11	6,431.00
		Water System	6,431.00
Group: Water Treatment Plant			
196	Source Mixing Plant - 2010	1/01/11	11,697.00
		Water Treatment Plant	11,697.00
		Grand Total	18,128.00

SEWER RATE STUDY

March 2015

Prepared for:
Twin Creeks Special
Service District

Prepared by:
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& Associates, Inc.
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

INTRODUCTION

Twin Creeks Special Service District (TCSSD or District) has not updated its service charges for several years. The District faces some significant capital improvement plan costs as well as maintenance and operation costs which will likely increase in the years to come. The purpose of this study is to update the District's sewer service charges. Implementing the recommendations contained in this report will assist the District in adequately funding the recommended infrastructure improvements and staying on track with projected operation budgets.

SEWER RATE ANALYSIS

The primary objective of this sewer rate analysis is to establish fair and equitable rates that will be sufficient to meet revenue requirements for the District. To accomplish this goal, this analysis focused on four major tasks:

1. **Projecting Growth:** In the 2014 TCSSD Sewer Master Plan, the estimated growth rate for the next 5-10 years was estimated to be approximately 7%. However, due to the current economic conditions, these projections may over-estimate the growth of sewer service accounts, wastewater production, and corresponding revenue from rates. For this reason, a more conservative growth rate of approximately 5% was used to project growth within the planning window of this rate study.

2. **Calculating Revenue Requirements:** Total revenue requirements for the District were projected for the next several years. This includes operations and maintenance costs, capital improvement costs, facilities rehabilitation/replacement costs, and debt service. Revenue generated outside of sewer rates (impact fees, interest income, penalty fees) was deducted from the total to give the net revenue requirement to be recovered from service charges.

3. **Cost Allocation:** This analysis generally followed the design cost-causative procedure recommended by the Water Pollution Control Federation (WPCF), American Society of Civil Engineers (ASCE), and American Public Works Association (APWA). The essential principle of this method is that sewer rates should be recovered from customers in proportion to the cost of serving customers.

4. **Sewer Rate Design:** Sewer rates were calculated to recover the allocated cost of service based on operation and maintenance costs and capital improvement plan costs.

The recommended increases to the sewer rates shown in Table ES-1 reflect a multiple year rate schedule needed to meet the cost of capital improvements and system renewal. While the rate increase required to meet the budgetary needs of the District is relatively aggressive, the multiple year rate schedule has been designed to distribute the increases over several years to avoid excessive "rate shock" to customers. Incremental changes in rate levels and rate structures are more acceptable to the public and benefit the utility in terms of financial stability.

Table ES-1
Calculated/Recommended Rates

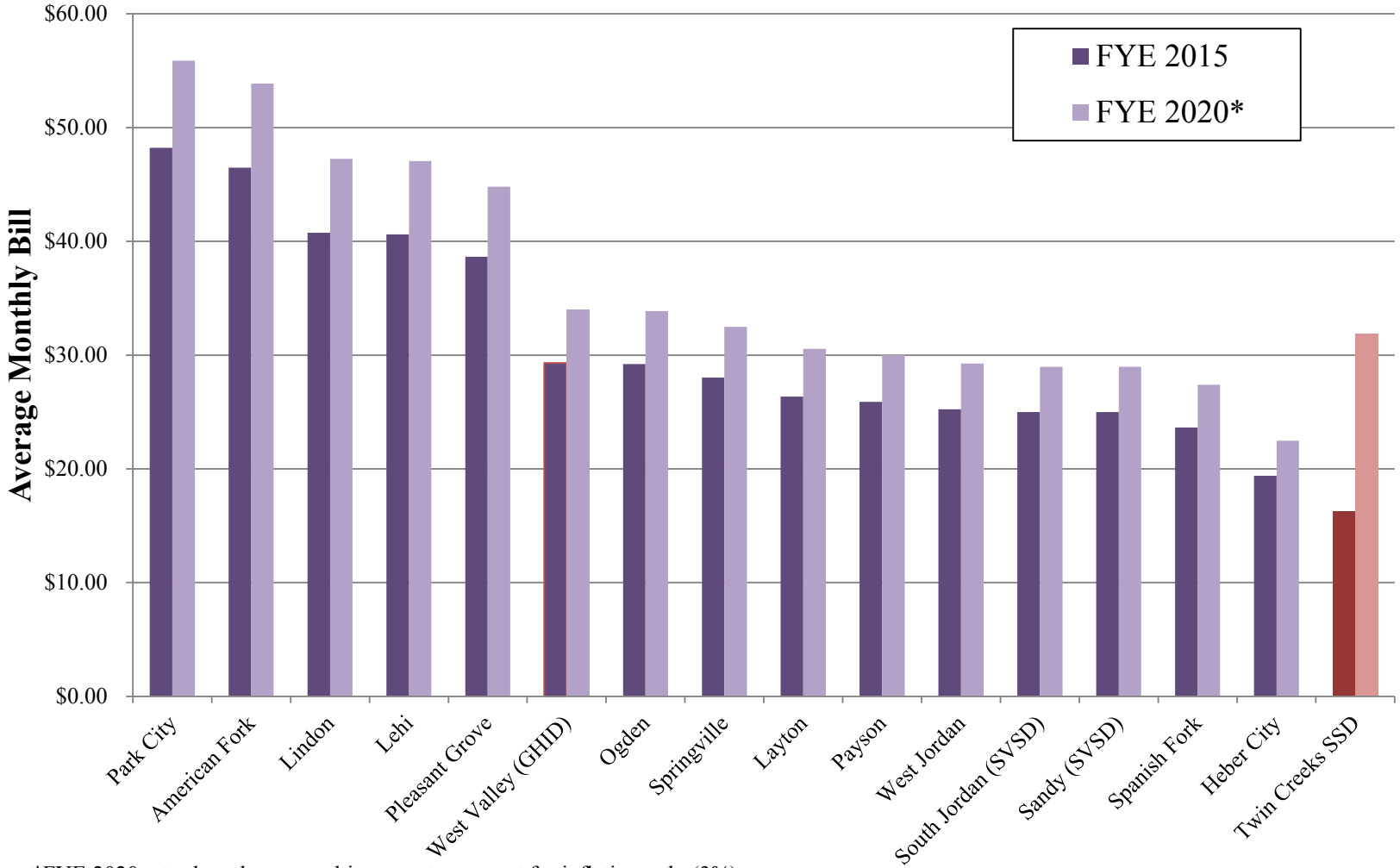
Monthly Base Rate	Current Sewer Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customers	$10.00	$11.46	$13.87	$15.92	$17.89	$19.09	$19.73
Total Volume Rate							
All customers	$0.80	$1.13	$1.29	$1.43	$1.56	$1.64	$1.68
Estimated Total Monthly Rate							
All customers	$16.24	$20.28	$23.93	$27.08	$30.06	$31.88	$32.83
Percent Increase		25%	18%	13%	11%	6%	3%

Even with the rate increases shown in Table ES-1, the overall cost of service in TCSSD will be about average when compared to other sewer service entities in Northern Utah, as shown in Figure ES-1.

RECOMMENDATIONS

It is recommended that the service charges summarized in Table ES-1 be adopted by the District. The proposed rates should be re-evaluated after five years to ensure that the District's revenue requirements and goals are being met.

Figure ES-1
Comparison of Annual Sewer Rates, Average Residential Customer



*FYE 2020 rates based on annual increase to account for inflation only (3%)

SEWER RATE ANALYSIS

INTRODUCTION

The purpose of this rate study is to update District sewer rates based on changes in demand patterns and system revenue requirements that have occurred since the District last established rates. The rate study will calculate detailed rates for the next six years and present a longer term finance plan to achieve the District's primary objectives of:

- Maintaining high quality, reliable sewer service at affordable prices for customers;
- Sustain stable revenue generation adequate to fund system needs; and
- Minimizing the District's long-term costs by avoiding further debt where possible.

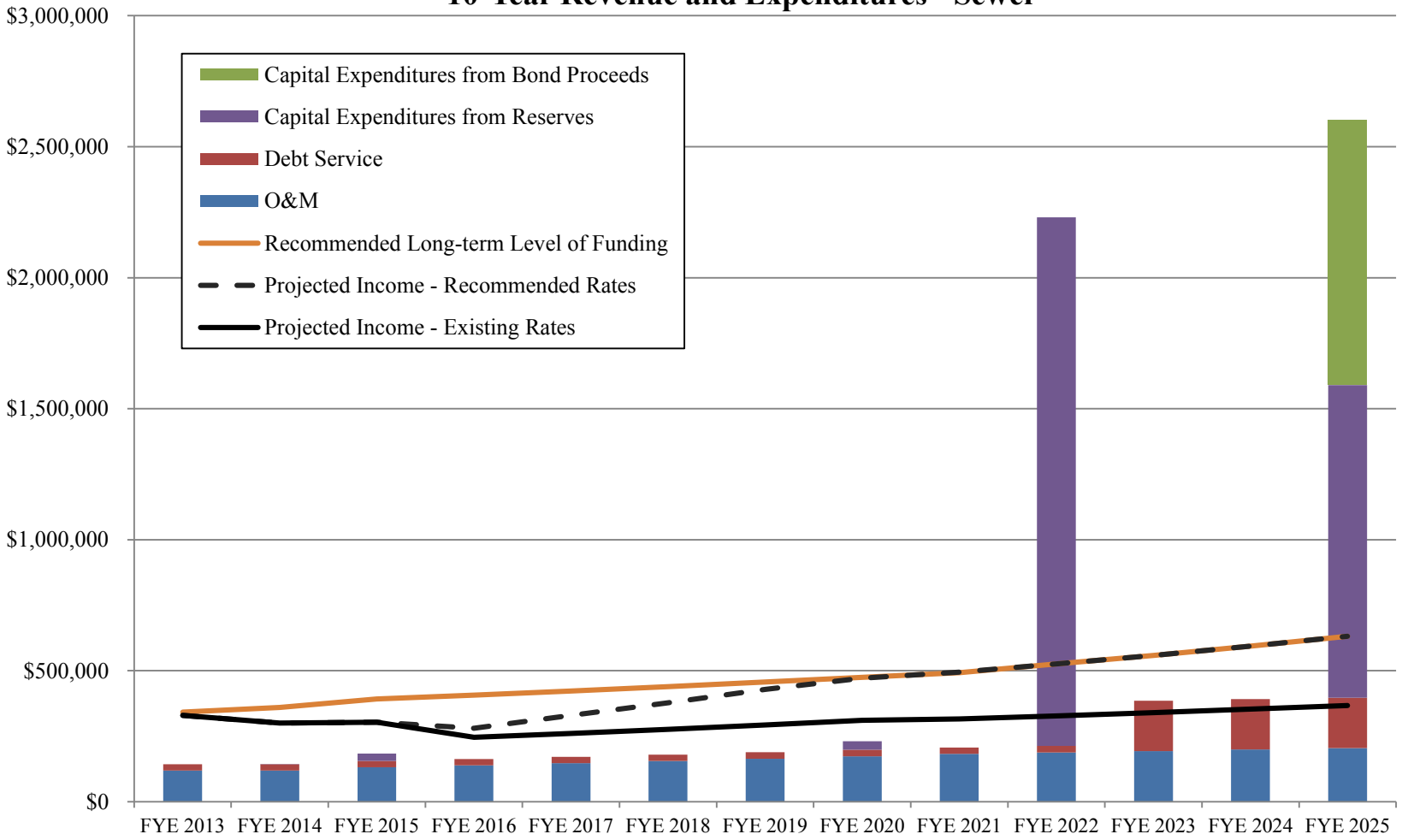
Implementing the recommendations contained in this report will help TCSSD keep its sewer system adequately funded to maintain its current infrastructure and keep pace with its approved capital improvement plans.

PROJECTED REVENUE NEEDS

Before calculating detailed rates for individual users, it is important to consider the overall plan for meeting the future revenue needs of the District. The first step in this process is to project future expenditures. Historic and projected expenditures for the District from 2013 to 2025 are shown in Figure 1. Future expenditures can be grouped into three categories:

- **Operation and Maintenance Expenditures –** These are the annual costs of running the system. They include items such as salary and benefit costs for District staff, equipment and supplies, power costs, and all other costs associated with doing business throughout the year. Operation and maintenance (O&M) costs are relatively constant from year to year and tend to follow the rate of inflation. O&M costs for the District are slightly unique in that no separate account is kept for some expenditures to distinguish between water and sewer. Thus, where combined expenditures exist, costs have been assigned 80 percent to water and 20 percent to sewer based on estimates from District personnel.
- **Debt Service Expenditures –** These are the costs paid toward bonds taken out by the District in previous years. These costs are easily predictable because they are tied to set payment schedules for each bond.
- **Capital Improvement Expenditures –**These are costs for constructing new facilities within the District. This can include completely new facilities or replacement of existing facilities. Capital improvement expenditures are usually the most volatile of expenditure categories. Because O&M and debt service costs are basically fixed, budgets are usually balanced by increasing or decreasing capital improvement expenditures as necessary. For this report, capital improvement expenditures have been based on the capital facilities plan contained in the District's 2014 Sewer Master Plan.

Figure 1
10-Year Revenue and Expenditures - Sewer



10-YEAR BUDGET PLAN

With the expected expenditures discussed previously, it is possible to prepare a future budget plan. A budget plan has been developed and is shown on top of projected expenditures in Figure 1. The process of creating this budget plan was as follows:

1. **Identify projected revenue based on existing sewer rates –**Using the District's existing sewer rates, BC&A calculated the revenue the District could expect to receive over the next 10 years. These projections include consideration of future system growth. As can be seen in the figure, projected revenue based on existing rates falls short of projected expenditures.
2. **Identify recommended level of funding based on long-term system needs** –As with most things, each component of a sewer system has a finite service life. As such, it is necessary to continually budget money for the rehabilitation or replacement of these system components. If adequate funds are not set aside for regular investment into the system, the system will fall into disrepair and be incapable of providing the level of service customers in the District expect. To maintain the sewer system in good operating condition, it is recommended that the District's annual investment into the system (including debt service costs and capital improvements) be approximately equal to the replacement value of the system divided by its estimated service life.

   The estimated replacement value of the District's sewer system is $34.5 million. The service life for sewer facilities can vary greatly depending on the type of facility and the conditions in which it operates. For the purposes of this analysis, it has been estimated that the average life of sewer facilities in the District system is 80 years. This would suggest the District should invest around $430,000 dollars per year into the sewer system. However, because the system is relatively new and the majority of existing facilities have adequate capacity through build-out, increasing the annual budget to $430,000 may be higher than necessary and would increase the rates in TCSSD to an undesirable level. Based on these factors (and the capital improvements budget identified in the Sewer Master Plan), BC&A would recommend that the District fund the capital portion of its budget starting at $260,000 per year and then increase this amount to keep pace with system growth and inflation.

   If the recommended system investment budget identified above is added to the District's projected O&M costs, the total represents an estimate of recommended long-term level of funding based on system needs. This projected funding level is shown in Figure 1. As shown in the figure, the District's historic level of investment in the system falls short of the long-term recommendations. This gap will become larger and larger in future years unless existing rates are increased.
3. **Create a plan to transition from existing revenue to revenue adequate to support long-term system needs** – To close the gap between projected revenue from existing rates and recommended revenue for long-term system needs, it is recommended that existing rates be increased over the next several years. To minimize the impact and potential for "rate shock" on customers, it is recommended that this increase be completed gradually over several years as shown in Figure 1. To generate the revenue shown in the budget plan in Figure 1, annual increases to existing rates will need to be as shown in Table 1.

Table 1
Recommended Annual Rate Increase for 10-Year Budget Plan

Fiscal Year Ending	Percent Rate Increase
2016	25%
2017	18%
2018	13%
2019	11%
2020	6%
2021	3%
2022	3%
2023	3%
2024	3%
2025	3%

These recommended rate increases include some significant increases over the next four years to get rates closer to the recommended long term level of funding. These increases are also necessary to keep the District's debt service coverage at acceptable levels for future bonding. After this initial jump, increases in subsequent years can be more modest. The recommended annual increases of 3 percent reflect the projected rate of inflation.

4. **Modify capital improvement expenditures to fit within the identified budget** – As noted previously, there is not much change that can be made to O&M or debt service expenditures. As a result, any modifications required to meet the recommended budget plan will need to come through capital improvement expenditures. The District has prepared capital improvement plans for the sewer system based on the results of master planning efforts and knowledge of District staff. These plans were used as a starting point to project future capital improvement expenditures in the District. The capital expenditures shown in Figure 1 represent the level of expenditures that can be supported by the budget plan. Included in the figure is a distinction between those projects that will be financed from District reserves and those that will be financed from other sources (bonds, loans from State revolving construction funds, etc.). A detailed outline of available capital expenditures in each year is contained in the rate models described in subsequent chapters of this report.

DETAILED RATE CALCULATION

With an overall revenue plan in place, the next step in the rate calculation process is a detailed cost-of-service rate analysis. This analysis focuses on four major tasks:

1. **Projecting Wastewater Production:** Future wastewater production was estimated by examining historic production patterns and by projecting sewer system growth for the next several years.
2. **Calculating Revenue Requirements:** Total revenue requirements for the system were projected for the next several years based on the budget plan outlined in Chapter 5 of the 2014 Master Plan. Non-rate revenue (including impact fee revenue) was deducted from the total to give the net revenue requirement to be recovered from rate payers.
3. **Cost Allocation:** This analysis generally follows the design cost-causative procedure recommended by the Water Pollution Control Federation (WPCF), American Society of Civil Engineers (ASCE), and American Public Works Association (APWA)[1]. The essential principle of this method is that wastewater revenue should be recovered from classes of customers in proportion to the cost of serving those customers. While TCSSD does provide service to an elementary school and a couple of churches, all connections have been grouped into a single customer class, resulting is a standard rate for all users in the District.
4. **Wastewater Rate Design:** Wastewater rates were calculated to recover the allocated cost of service based on operation and maintenance costs and capital improvement plan costs. The report develops one rate for all TCSSD users.

The remainder of this report details the results of each of these four major tasks. Detailed rate tables from the model used to develop the rate recommendations are located in the Appendix.

KEY ASSUMPTIONS

The results presented in this report are based on the following assumptions:

1. The District operating fund will continue to be a self-funding enterprise fund.
2. The study follows the basic recommended methodologies of the joint publication, "Financing and Charges for Wastewater Systems". Only the "cash basis" approach has been used to allocate costs to users.
3. This wastewater rate study is based on projections of future wastewater production and projected system operation, maintenance, and improvement costs. These projections are based on current economic conditions and wastewater use patterns. Because conditions may change over time, it is recommended that the City review the wastewater rates periodically and adjust them as needed to provide a revenue stream that will adequately fund operation and maintenance costs as well as needed rehabilitation and replacement projects. It is also recommended that a comprehensive review and updating of wastewater

[1] Water Pollution Control Federation, American Society of Civil Engineers, and American Public Works Association. Financing and Charges for Wastewater Systems, 1984.

rates be undertaken in three to five years so that the basic analytical foundations of this study can be re-evaluated.

PROJECTING WASTEWATER PRODUCTION

Historic Indoor Water Use

The District currently provides sewer service to approximately 636 ERUs (not including Red Ledges). Since TCSSD does not provide water for irrigation to its customers, indoor water use can be estimated based on production data from the water treatment plant. To maintain consistency with the updated Water Master Plan for TCSSD, water use data from the year 2011 was used to estimate indoor water use in terms of demand per ERU. Estimated indoor water use for the District in 2011 is summarized in Table 2.

Table 2
2011 Estimated ERUs and Indoor Water Use Summary

Customer Class	Annual Use (kgal)	ERUs	Average Use per ERU (gallons/day)
Residential	131,000	508	258
Total	**131,000**	**508**	**258**

Projected ERUs

The District has experienced relatively steady growth over recent years. In the 2014 TCSSD Sewer Master Plan, the estimated growth rate for the next 5-10 years was estimated to be approximately 7%. However, due to the current economic conditions, these projections may over-estimate the growth of sewer service accounts, wastewater production, and corresponding revenue from rates. For this reason, a more conservative growth rate of approximately 5% was used to project growth within the planning window of this rate study. Projected growth rates of accounts are summarized in Table 3.

Table 3
Projected Growth in System Accounts

Customer Class	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
	5.26%	**5.26%**	**5.26%**	**5.26%**	**5.26%**	**4.28%**
Residential	702	739	778	819	862	899
Total	**702**	**739**	**778**	**819**	**862**	**899**

Projected Indoor Water Use

Future sewer demands were projected by multiplying the estimated average use per ERU in 2011 from Table 2 by the projected number of accounts in Table 3. Using this methodology, the projected growth in total sewer sales are shown in Table 4.

Table 4
Projected Annual Indoor Water Use

Customer Class	Average Annual Use/ERU (kgal)	Amount (kgal)					
		FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Residential	94.2	66,107	69,592	73,264	77,056	81,175	84,659
Total		**66,107**	**69,592**	**73,264**	**77,056**	**81,175**	**84,659**

Infiltration and Inflow

Infiltration and inflow is the intrusion of groundwater or stormwater into the sewer system through cracked pipes, broken and offset joints, improper connections, leaky manholes, etc. In areas with aging sewer lines and high groundwater, infiltration can actually be the largest component of flow being conveyed in the sewer. Infiltration is very difficult to measure because it varies across the service area based on climate conditions, water table levels, pipe diameter, and pipe condition. Because of the difficulty of identifying the source of infiltration, the District does not bill sewer accounts for infiltration directly. Thus, infiltration and inflow are not included in the rate model and billing flows are based on indoor water use only.

Peaking Characteristics

Unlike water used for outdoor irrigation, indoor water use is relatively constant year round. As a result, the calculation of sewer rates does not need to consider peak day demands. However, sewer flow does tend to vary significantly over the course of a single day. For a sewer system with different user classifications (commercial, industrial etc.), peaking factors will differ significantly from user to user. However, because TCSSD has one predominant user type (residential), the peaking factor was assumed to be the same for all connections. Therefore, peaking characteristics ultimately will not affect how the sewer rate is structured.

Strength Characteristics

Strength characteristics of wastewater are generally used to scale the cost of treatment between different users. For example, an industrial connection may produce stronger wastewater than a residential connection, thus meriting a higher sewer rate to cover the increased treatment cost. Due to the fact that there are no available data regarding wastewater strength in the District and because all sewer connections have been grouped in the same customer class, wastewater strength is assumed to be the same for all users and will therefore have no impact on rates.

CALCULATING REVENUE REQUIREMENTS

There are two methods for determining revenue requirements for the District: the cash basis and utility basis. Wastewater rates were developed under the cash basis only.

Impact Fee Revenue

The projected impact fee revenue is expected to increase gradually over the next 6 years, as shown in Table 5, with a slight reduction in 2021 due to a predicted reduction in growth in the District. The projected annual revenue from impact fees is based on the projected number of new accounts. For this analysis, it has been assumed that the District's new impact fee rates as discussed in the 2015 Impact Fee Analysis will be constant throughout the planning period. If the District adopts impact fees other than those recommended, the rates calculated in this report will need to be adjusted accordingly.

Table 5
Projected Impact Fee Revenue

Year	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Annual Growth Rate						
Projected Impact Fee Revenue	$46,704	$49,373	$52,042	$54,711	$57,380	$49,373

Non-Rate Revenue

The projected non-rate revenue for the District is summarized in Table 6. This revenue is the net income from activities not associated with sewer user rates or impact fees. It may include service charges, net interest income, fees, and tax revenue.

Table 6
Projected Non-Rate Revenue

Item	Projected FYE 2016	Projected FYE 2017	Projected FYE 2018	Projected FYE 2019	Projected FYE 2020	Projected FYE 2021
Operating						
Sewer Reservation Fee	$51,965	$56,257	$60,904	$65,935	$71,381	$76,577
Interest Revenue	$4,937	$5,344	$5,786	$6,264	$6,781	$7,275

Item	Projected FYE 2016	Projected FYE 2017	Projected FYE 2018	Projected FYE 2019	Projected FYE 2020	Projected FYE 2021
Total Operating Non-Rate Revenue	**$57,742**	**$62,510**	**$67,674**	**$73,265**	**$79,316**	**$85,192**
Non-Operating						
Inspection Fees	$4,210	$4,432	$4,665	$4,910	$5,169	$5,390
Total Non-Operating Non-Rate Revenue	**$4,210**	**$4,432**	**$4,665**	**$4,910**	**$5,169**	**$5,390**
Total Non-Rate Revenue	**$61,952**	**$66,942**	**$72,339**	**$78,175**	**$84,485**	**$90,582**

District Expenditures

The projected District expenditures for the planning period are summarized in Table 7. Included in the table are the projected total costs for the three major categories of expenditures: operations and maintenance, debt service, and capital expenditures. Each of these categories is discussed in more detail in following sections.

Table 7
Projected Revenue Requirements

Item	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
O&M	$139,346	$147,189	$155,475	$164,226	$173,471	$182,387
Debt Services	$24,000	$24,000	$24,000	$25,000	$25,000	$25,000
Capital Expenditures	$116,787	$158,123	$198,286	$239,725	$241,698	$287,283
Total Expenditures	**$280,133**	**$329,312**	**$377,761**	**$428,951**	**$440,169**	**$494,670**

Operation and Maintenance Costs. The projected operation and maintenance (O&M) costs for TCSSD have been taken from the District's budget for 2015. A detailed list of all O&M budget categories is included as part of the rate model in the Appendix. Beyond 2015, it has been assumed that all O&M cost categories will increase at a rate equal to half the system growth rate in each year and an assumed inflation rate of 3.0 percent (e.g. budget growth in 2016 = 5.26%/2 + 3% = 5.63%).

Debt Service Costs. The projected debt service costs for the District have been taken from the District's bond payment schedule through 2021. A detailed list of bond payments is included as part of the rate model in the Appendix.

Capital Improvement Costs. The projected capital improvement costs for the District have been taken from the District's 10-year capital improvement plan. A detailed list of all capital improvements is included as part of the rate model in the Appendix. The District will incur two

large project costs in 2022 and 2025. In the years prior, rate revenue will be transferred to a reserve fund which will be used to pay for future improvements. Most of the capital expenditures shown in the next six years are actually transfers to the reserve fund for future projects. Even with these transfers, there will likely not be enough in reserves to completely fund the projected projects in 2022 and 2025. Due to the magnitude of those planned capital improvements, the District will need to utilize a bond for a portion of the future project costs.

COST ALLOCATIONS

A key step in a cost-causative wastewater rate analysis is the allocation of costs to customer service characteristics. The allocation approach used in this study reflects the basic approaches recommended by WPCF, ASCE, and APWA.

Customer Service Characteristics

This approach recommends the allocation of costs into one of four cost allocation categories:

- **Volume costs –** Volume costs refer to costs that are determined by the volume of wastewater generated in the system.
- **Capacity costs –** Capacity costs are costs determined by the peak wastewater production of system users. This category would include such items as the design and construction of major trunk lines since they are sized based on peak flow rates.
- **Strength costs –** Strength costs are those costs determined by biochemical oxygen demand (BOD) or total suspended solids (TSS) concentrations.
- **Customer related costs –** Customer related costs are any costs independent of the quantity or quality of wastewater generated. This category is mostly limited to administrative services such as the cost of generating and sending out a bill each month.

Because all of the District users are being grouped in a single customer class, Capacity costs and Strength costs will not differ from customer to customer. For this reason, each of the revenue requirements discussed previously was divided between volume costs and customer related costs only. However, Strength and Capacity cost categories have been left in the rate model so that they can be added back into future rate studies as new customer classes arrive.

Detailed cost divisions have been completed in the sewer rate model (see Tables A12 and A13 of the Appendix). In each case, these allocations are based on professional engineering judgment and knowledge of system operations. Table A12 in the Appendix provides a division by cost allocation category for O&M expenditures. Table A13 in the Appendix provides the same information for capital and bonding expenditures.

Using the percentages assigned to each budget category, the system revenue costs are distributed among the customer service characteristics. This is also shown in detail in the rate model. The total revenue requirement for each customer service characteristic is given in Table A15 of the Appendix. Table A16 of the Appendix shows the total cost allocation for each customer class (which as discussed previously is a single residential user class).

CURRENT WASTEWATER RATE STRUCTURE

Existing wastewater rates and projected revenue for each customer class are shown in Table 8. The monthly base administrative charge is the amount charged to existing users to be connected to the system, regardless of the amount of water discharged. Volumetric charges are those charges assessed based on the amount of wastewater generated by the customer (as estimated based on indoor water use). It should be emphasized that this is based on indoor water use and not actual wastewater production. This is because the District does not measure wastewater production directly, but does collect data on water use. Winter water meter data is used to estimate indoor water use.

Table 8
Existing Sewer Rates

Base Rate ($/month)	Existing
All Customers	$10.00

Volume Rate ($/kgal)	Existing
All Customers	$0.80

In general, the District's existing sewer rate structure appears to be a reasonable, cost based structure. BC&A recommends that the District continue forward with the same rate structure for users, charging a monthly base rate plus additional rate based on monthly usage.

Total projected revenues based on existing District water rates are shown in Table 9. The District's current sewer rates are very inexpensive when compared to the rates of other Utah sewer service entities. As shown in the table, the District will soon find themselves in a deficit which will increase over time if rates are not increased. The District will need to implement a relatively aggressive rate increase over the next 6 years, followed by a gradual, steady increase in the years that follow.

Table 9
Projected Revenue Based on Existing Sewer Rates

	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Projected Revenue-Existing Rates	$245,851	$260,744	$276,434	$292,954	$310,339	$315,562
Projected Revenue Requirements	$280,133	$329,312	$377,761	$428,951	$440,169	$494,670
Projected Difference	**($34,282)**	**($68,568)**	**($101,327)**	**($135,997)**	**($129,830)**	**($179,108)**

RECOMMENDED FUTURE RATES

Based on projected revenue requirements for the District, calculated sewer rates are shown in Table 10. Included in Table 10 is a breakdown of the monthly base rate, the volume rate, and the estimated total monthly rate for the average residential user. BC&A recommends that the District implement the recommended rates as outlined in Table 10.

Table 10
Calculated/Recommended Rates

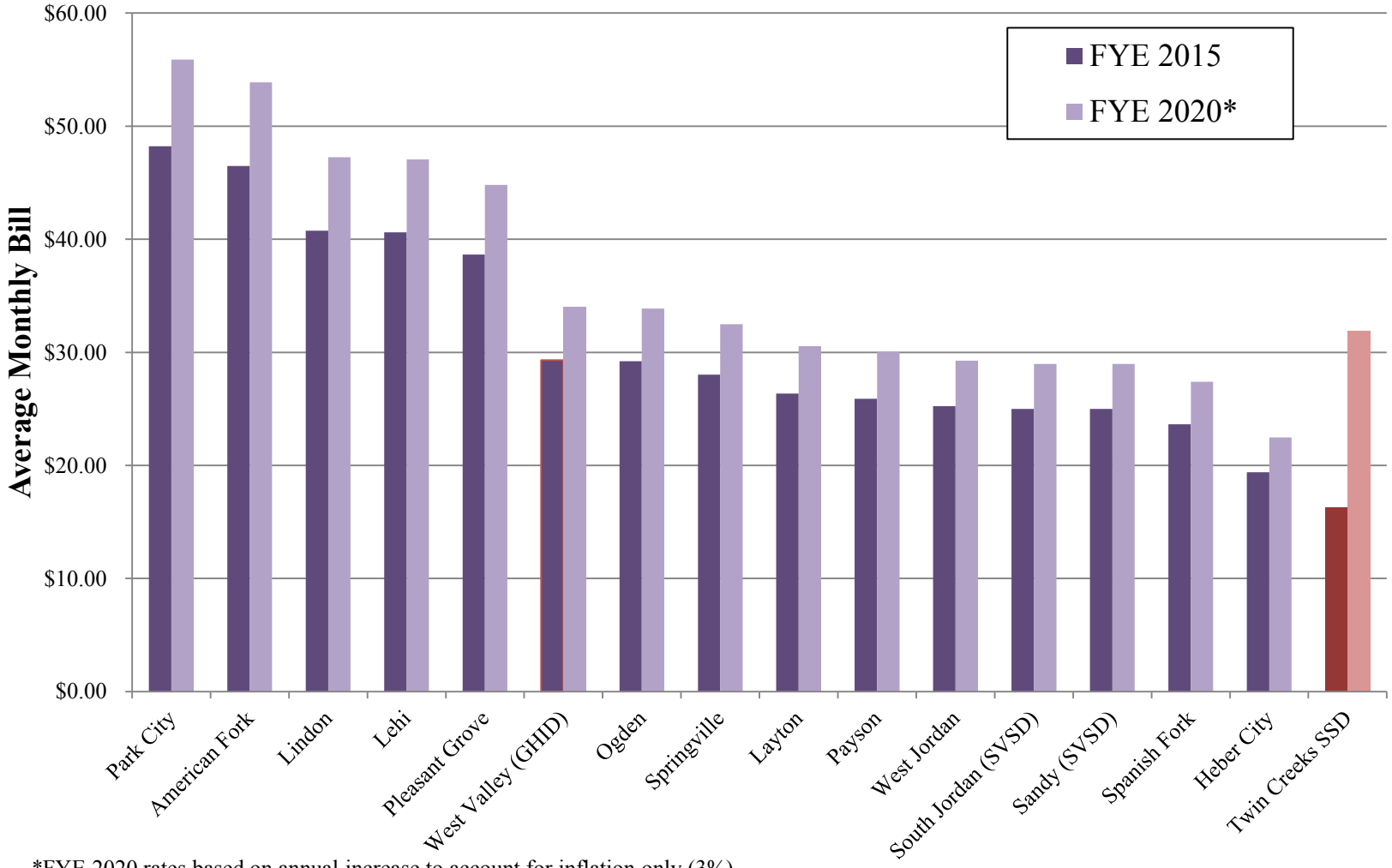
Monthly Base Rate	Current Sewer Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customers	$10.00	$11.46	$13.87	$15.92	$17.89	$19.09	$19.73
Total Volume Rate							
All customers	$0.80	$1.13	$1.29	$1.43	$1.56	$1.64	$1.68
Estimated Total Monthly Rate							
Average Residential Customer	$16.24	$20.28	$23.93	$27.08	$30.06	$31.88	$32.83
Percent Increase		25%	18%	13%	11%	6%	3%

As can be seen in Table 10, the recommended change in rates is aggressive over the next 6 years. To avoid shocking customers with a sudden rate increase, rates changes should occur gradually over the next 6 years until the District reaches its target yearly budget. After 2021, the District should plan to continue increasing rates by approximately 3% to keep pace with inflation.

RATE COMPARISON

Figure 2 shows a comparison of TCSSD's current and proposed sewer rates with other communities in Northern Utah. The figure displays the current average monthly sewer rate as well as the estimated sewer rate in FYE 2020 for several sewer service entities. As shown in the figure, the District's current rates are extremely low compared to other cities and service districts. With the proposed rate increase over the next several years, TCSSD's monthly sewer fee will be roughly average in comparison to other entities. As other entities increase their rates, the District may still find itself on the lower end of regional rates. TCSSD should plan to re-evaluate sewer rates again in 5 years in order to assure that the District's revenue requirements are being met.

Figure 2
Comparison of Annual Sewer Rates, Average Residential Customer



*FYE 2020 rates based on annual increase to account for inflation only (3%)

APPENDIX
RATE MODEL

10-Year Budget Plan - Sewer

	Historic Year			Projected Year									
	FYE 2013	**FYE 2014**	**FYE 2015**	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**	**FYE 2022**	**FYE 2023**	**FYE 2024**	**FYE 2025**
Total ERUs	604	636	667	702	739	778	819	862	899	938	978	1,020	1,064
% Growth from Previous Year	-	5.30%	4.87%	5.25%	5.27%	5.28%	5.27%	5.25%	4.29%	4.29%	4.29%	4.29%	4.29%
Expenditures													
O&M	$119,498	$118,834	$131,920	$139,346	$147,189	$155,475	$164,226	$173,471	$182,387	$187,864	$193,506	$199,318	$205,304
Debt Service	$24,000	$24,000	$24,000	$24,000	$24,000	$24,000	$25,000	$25,000	$25,000	$25,000	$192,000	$192,000	$192,000
Total Capital Expenditures	$0	$764	$28,000	$0	$0	$0	$0	$32,000	$0	$2,017,000	$0	$0	$2,204,000
Total Expenditures	*$143,498*	*$143,598*	*$183,920*	*$163,346*	*$171,189*	*$179,475*	*$189,226*	*$230,471*	*$207,387*	*$2,229,864*	*$385,506*	*$391,318*	*$2,601,304*
Capital Expenditures from Bond Proceeds	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,011,108
Capital Expenditures from Reserves	$0	$764	$28,000	$0	$0	$0	$0	$32,000	$0	$2,017,000	$0	$0	$1,192,892
Income													
Connection Fees	$119,392	$119,392	$115,661	$46,704	$49,373	$52,042	$54,711	$57,380	$49,373	$51,492	$53,703	$56,008	$58,412
Other Non-Rate	$91,919	$57,260	$53,400	$57,811	$62,586	$67,756	$73,352	$79,411	$85,192	$87,748	$90,380	$93,092	$95,885
Sales - Existing Rates	$117,983	$124,234	$130,289	$137,126	$144,353	$151,971	$159,980	$168,380	$175,607	$183,145	$191,006	$199,205	$207,755
Projected Income - Existing Rates	*$329,294*	*$300,886*	*$303,350*	*$245,851*	*$260,744*	*$276,434*	*$292,954*	*$310,339*	*$315,562*	*$327,775*	*$340,479*	*$353,694*	*$367,441*
System Investment Goal	$222,554	$241,021	$260,000	$267,800	$275,834	$284,109	$292,632	$301,411	$310,454	$337,804	$365,282	$394,863	$426,703
Recommended Long-term Level of Funding	$342,052	$359,855	$391,920	$407,146	$423,023	$439,584	$456,859	$474,882	$492,840	$525,668	$558,788	$594,180	$632,007
Recommended Rate Increases				25.0%	18.0%	13.0%	11.0%	6.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Sales Revenue With Increase	$117,983	$124,234	$130,289	$171,407	$212,921	$253,298	$295,978	$330,209	$354,714	$381,038	$409,315	$439,691	$472,321
Projected Income - Recommended Rates	*$329,294*	*$300,886*	*$303,350*	*$280,133*	*$329,312*	*$377,761*	*$428,952*	*$472,168*	*$494,669*	*$525,668*	*$558,788*	*$594,180*	*$632,007*

Table A1
Twin Creeks Special Service District - Sewer Rate Study
Historic Indoor Water Use
(kgal)

	FYE 2013			*FYE 2014*			*FYE 2015*				
Customer Class	**Use**	**ERUs**	**Use per ERUs**	**Use**	**ERUs**	**Use per ERUs**	**Use**	**ERUs**	**Use per ERUs**	**Planning Use/ERU**	**Use/ERU (kgal/month)**
All customers	56,879	604	94.2	59,892	636	94.2	62,811	667	94.2	94.2	7.8
Total	**56,879**	**604**	**94.2**	**59,892**	**636**	**94.2**	**62,811**	**667**	**94.2**	**94.2**	**7.8**

Table A2
Twin Creeks Special Service District - Sewer Rate Study
Projected ERUs

		Number					
Customer Class		**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
	% Growth	**5.26%**	**5.26%**	**5.26%**	**5.26%**	**5.26%**	**4.28%**
All customers		702	739	778	819	862	899
Total		**702**	**739**	**778**	**819**	**862**	**899**

Table A3
Twin Creeks Special Service District - Sewer Rate Study
Projected Annual Indoor Water Use

		Amount (kgal)					
Customer Class	**Use/ERU.**	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	94.2	66,107	69,592	73,264	77,125	81,175	84,659
Total		**66,107**	**69,592**	**73,264**	**77,125**	**81,175**	**84,659**

Table A4
Twin Creeks Special Service District - Sewer Rate Study
Projected Total Wastewater Flow

	FYE 2015
Total Flow at Treatment Plant (mgd)=	**0.1849**

		Amount (mgd)					
Customer Class		**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers		0.19	0.20	0.22	0.23	0.24	0.25
Total		**0.19**	**0.20**	**0.22**	**0.23**	**0.24**	**0.25**

Table A5
Twin Creeks Special Service District - Sewer Rate Study
Peaking Factors

Customer Class	**Est. Peak Hour Factor**
All customers	2.50

Table A6
Twin Creeks Special Service District - Sewer Rate Study
Projected Flow Peaking Characteristics

	Estimated Peak Hour (mgd)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	0.49	0.51	0.54	0.57	0.60	0.62
Total	**0.49**	**0.51**	**0.54**	**0.57**	**0.60**	**0.62**

	Excess Over Average Day (mgd)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	0.29	0.31	0.32	0.34	0.36	0.37
Total	**0.29**	**0.31**	**0.32**	**0.34**	**0.36**	**0.37**

Table A7
Twin Creeks Special Service District - Sewer Rate Study
Strength

Customer Class	BOD (mg/L)	TSS (mg/L)
All customers	250	250
Approximate Cost Division	50%	50%

Table A8
Twin Creeks Special Service District - Sewer Rate Study
Projected Strength Characteristics

	BOD (lbs/year)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	148,091	155,897	164,124	172,773	181,844	189,650
Total	**148,091**	**155,897**	**164,124**	**172,773**	**181,844**	**189,650**

	TSS (lbs/year)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	148,091	155,897	164,124	172,773	181,844	189,650
Total	**148,091**	**155,897**	**164,124**	**172,773**	**181,844**	**189,650**

	Weighted Average (lbs/year)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	148,091	155,897	164,124	172,773	181,844	189,650
Total	**148,091**	**155,897**	**164,124**	**172,773**	**181,844**	**189,650**

Table A9
Twin Creeks Special Service District - Sewer Rate Study
Connection Fee Revenue

Size of Meter	Impact Fee ($/ERU)	Budgeted FYE 2015	Projected FYE 2016	Projected FYE 2017	Projected FYE 2018	Projected FYE 2019	Projected FYE 2020	Projected FYE 2021
Per ERU	$1,334.41		$46,704	$49,373	$52,042	$54,711	$57,380	$49,373
Total Impact Fee Revenue		**$115,661**	**$46,704**	**$49,373**	**$52,042**	**$54,711**	**$57,380**	**$49,373**

Table A10
Twin Creeks Special Service District - Sewer Rate Study
Non-Rate Revenue (Including Connection Fees)

Assumed Inflation Rate = 3.0%

Item	Total Amount (Wat. & Sew.)	Projected FYE 2015	Projected FYE 2016	Projected FYE 2017	Projected FYE 2018	Projected FYE 2019	Projected FYE 2020	Projected FYE 2021
Operations								
Penalty Revenue	**4200**	$840	$909	$984	$1,066	$1,154	$1,249	$1,340
Interest Revenue	**22800**	$4,560	$4,937	$5,344	$5,786	$6,264	$6,781	$7,275
Sewer Reservation Fee	**48000**	$48,000	$51,965	$56,257	$60,904	$65,935	$71,381	$76,577
Total Operations Non-Rate Revenue		$53,400	$57,811	$62,586	$67,756	$73,352	$79,411	$85,192
Expansion and Replacement								
Connection Fees (Impact Fee)		$115,661	$46,704	$49,373	$52,042	$54,711	$57,380	$49,373
Inspection Fees	**20000**	$4,000	$4,210	$4,432	$4,665	$4,910	$5,169	$5,390
Total Expansion Non-Rate Revenue		$119,661	$50,915	$53,805	$56,707	$59,621	$62,548	$54,763
Total Non-Rate Revenue		**$173,061**	**$108,726**	**$116,391**	**$124,463**	**$132,973**	**$141,959**	**$139,955**

Table A11
Twin Creeks Special Service District - Sewer Rate Study
Revenue Requirements
Cash Basis

Percent attributed to Sewer =	20%

Item	Total Expense	FYE 2015	Projected FYE 2016	Projected FYE 2017	Projected FYE 2018	Projected FYE 2019	Projected FYE 2020	Projected FYE 2021
O&M								
Travel	$0.00	$0	$0	$0	$0	$0	$0	$0
Training/Conferences	$0.00	$0	$0	$0	$0	$0	$0	$0
Utilities	$51,600.00	$10,320	$10,901	$11,515	$12,163	$12,848	$13,571	$14,269
Phones	$6,000.00	$1,200	$1,268	$1,339	$1,414	$1,494	$1,578	$1,659
Overhead/Management	$216,000.00	$43,200	$45,632	$48,201	$50,915	$53,781	$56,809	$59,729
Legal Fees	$0.00	$0	$0	$0	$0	$0	$0	$0
Heber City Flow Usage	$37,000.00	$37,000	$39,083	$41,283	$43,608	$46,063	$48,656	$51,157
Bank Charges	$3,600.00	$720	$761	$803	$849	$896	$947	$995
Materials	$2,500.00	$500	$528	$558	$589	$622	$658	$691
Supplies	$70,000.00	$14,000	$14,788	$15,621	$16,500	$17,429	$18,410	$19,357
Postage	$0.00	$0	$0	$0	$0	$0	$0	$0
Tools	$0.00	$0	$0	$0	$0	$0	$0	$0
Services	$55,000.00	$11,000	$11,619	$12,273	$12,964	$13,694	$14,465	$15,209
Insurance-Liability	$18,500.00	$3,700	$3,908	$4,128	$4,361	$4,606	$4,866	$5,116
Vehicle Expense	$1,100.00	$220	$231	$243	$255	$267	$281	$295
Bad Debt Expense	$0.00	$0	$0	$0	$0	$0	$0	$0
Debt Service Fees	$50,000.00	$10,000	$10,563	$11,158	$11,786	$12,449	$13,150	$13,826
Contribution to fund Balance	$300.00	$60	$63	$67	$71	$75	$79	$83
Total O&M		**$131,920**	**$139,346**	**$147,189**	**$155,475**	**$164,226**	**$173,471**	**$182,387**
Debt Service								
2004-1 SID Sewer Assess		$24,000	$24,000	$24,000	$24,000	$25,000	$25,000	$25,000
Bond Payment								
Total Debt Service		**$24,000**	**$24,000**	**$24,000**	**$24,000**	**$25,000**	**$25,000**	**$25,000**
Expansion and Replacement		**FYE 2015**	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
1200 South Sewer Line								
2400 South Sewer Line								
Master Plan Update		$ 28,000					$ 32,000	
Rehabilitation and Replacement Budget								
Bond Proceeds								
Transfer to/(from) Reserve Fund		$ 119,430	$ 116,787	$ 158,123	$ 198,286	$ 239,725	$ 241,698	$ 287,283
Total Capital Outlays		**$ 147,430**	**$116,787**	**$158,123**	**$198,286**	**$239,725**	**$273,698**	**$287,283**
Total Revenue Requirements		**$ 303,350**	**$280,133**	**$329,312**	**$377,761**	**$428,952**	**$472,168**	**$494,669**
LESS:								
Operations Non-Rate Revenue		$53,400	$57,811	$62,586	$67,756	$73,352	$79,411	$85,192
Expansion Non-Rate Revenue		$119,661	$50,915	$53,805	$56,707	$59,621	$62,548	$54,763
Net Revenue Requirements		**$ 130,289**	**$ 171,407**	**$ 212,921**	**$ 253,298**	**$ 295,978**	**$ 330,209**	**$ 354,714**

Table A12
Twin Creeks Special Service District - Sewer Rate Study
Cost Allocation Percentages to Service Characteristics

Item	Volume	Capacity	Strength	Customer	Total
O&M					
Travel	35%	0%	0%	65%	100%
Training/Conferences	35%	0%	0%	65%	100%
Utilities	35%	0%	0%	65%	100%
Phones	35%	0%	0%	65%	100%
Overhead/Management	35%	0%	0%	65%	100%
Legal Fees	35%	0%	0%	65%	100%
Heber City Flow Usage	100%	0%	0%	0%	100%
Bank Charges	35%	0%	0%	65%	100%
Materials	35%	0%	0%	65%	100%
Supplies	35%	0%	0%	65%	100%
Postage	35%	0%	0%	65%	100%
Tools	35%	0%	0%	65%	100%
Services	35%	0%	0%	65%	100%
Insurance-Liability	35%	0%	0%	65%	100%
Vehicle Expense	35%	0%	0%	65%	100%
Bad Debt Expense	35%	0%	0%	65%	100%
Debt Service Fees	35%	0%	0%	65%	100%
Contribution to fund Balance	35%	0%	0%	65%	100%

Table A13
Twin Creeks Special Service District - Sewer Rate Study
Fixed Assets Allocations to Service Characteristics

	Percent						*Allocated Amount*				
Item	**Assets**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
Easements	$28,217	35%	0%	0%	65%	100%	$9,876	$0	$0	$18,341	$28,217
Land	$9,547	35%	0%	0%	65%	100%	$3,341	$0	$0	$6,206	$9,547
Bond Issuance Cost	$42,420	35%	0%	0%	65%	100%	$14,847	$0	$0	$27,573	$42,420
Sewer System	$2,518,758	35%	0%	0%	65%	100%	$881,565	$0	$0	$1,637,193	$2,518,758
	$0	35%	0%	0%	65%	100%	$0	$0	$0	$0	$0
	$0	35%	0%	0%	65%	100%	$0	$0	$0	$0	$0
	$0	35%	0%	0%	65%	100%	$0	$0	$0	$0	$0
Total	**$2,598,943**						**$909,630**	**$0**	**$0**	**$1,689,313**	**$2,598,943**
Percent							**35.0%**	**0.0%**	**0.0%**	**65.0%**	**100.0%**

Table A14
Twin Creeks Special Service District - Sewer Rate Study
Allocation of O&M Costs to Service Characteristics

	FYE 2016					FYE 2017					FYE 2018					FYE 2019					FYE 2020					FYE 2021				
Item	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
O&M																														
Travel	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Training/Conferences	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Utilities	$3,815	$0	$0	$7,086	$10,901	$4,030	$0	$0	$7,485	$11,515	$4,257	$0	$0	$7,906	$12,163	$4,497	$0	$0	$8,351	$12,848	$4,750	$0	$0	$8,821	$13,571	$4,994	$0	$0	$9,275	$14,269
Phones	$444	$0	$0	$824	$1,268	$469	$0	$0	$870	$1,339	$495	$0	$0	$919	$1,414	$523	$0	$0	$971	$1,494	$552	$0	$0	$1,026	$1,578	$581	$0	$0	$1,078	$1,659
Overhead/Management	$15,971	$0	$0	$29,661	$45,632	$16,870	$0	$0	$31,331	$48,201	$17,820	$0	$0	$33,095	$50,915	$18,824	$0	$0	$34,958	$53,781	$19,883	$0	$0	$36,926	$56,809	$20,905	$0	$0	$38,824	$59,729
Legal Fees	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Heber City Flow Usage	$39,083	$0	$0	$0	$39,083	$41,283	$0	$0	$0	$41,283	$43,608	$0	$0	$0	$43,608	$46,063	$0	$0	$0	$46,063	$48,656	$0	$0	$0	$48,656	$51,157	$0	$0	$0	$51,157
Bank Charges	$266	$0	$0	$494	$761	$281	$0	$0	$522	$803	$297	$0	$0	$552	$849	$314	$0	$0	$583	$896	$331	$0	$0	$615	$947	$348	$0	$0	$647	$995
Materials	$185	$0	$0	$343	$528	$195	$0	$0	$363	$558	$206	$0	$0	$383	$589	$218	$0	$0	$405	$622	$230	$0	$0	$427	$658	$242	$0	$0	$449	$691
Supplies	$5,176	$0	$0	$9,612	$14,788	$5,467	$0	$0	$10,154	$15,621	$5,775	$0	$0	$10,725	$16,500	$6,100	$0	$0	$11,329	$17,429	$6,444	$0	$0	$11,967	$18,410	$6,775	$0	$0	$12,582	$19,357
Postage	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tools	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Services	$4,067	$0	$0	$7,553	$11,619	$4,296	$0	$0	$7,978	$12,273	$4,538	$0	$0	$8,427	$12,964	$4,793	$0	$0	$8,901	$13,694	$5,063	$0	$0	$9,402	$14,465	$5,323	$0	$0	$9,886	$15,209
Insurance-Liability	$1,368	$0	$0	$2,540	$3,908	$1,445	$0	$0	$2,683	$4,128	$1,526	$0	$0	$2,835	$4,361	$1,612	$0	$0	$2,994	$4,606	$1,703	$0	$0	$3,163	$4,866	$1,790	$0	$0	$3,325	$5,116
Vehicle Expense	$81	$0	$0	$150	$231	$85	$0	$0	$158	$243	$89	$0	$0	$166	$255	$94	$0	$0	$174	$267	$98	$0	$0	$183	$281	$103	$0	$0	$192	$295
Bad Debt Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Debt Service Fees	$3,697	$0	$0	$6,866	$10,563	$3,905	$0	$0	$7,253	$11,158	$4,125	$0	$0	$7,661	$11,786	$4,357	$0	$0	$8,092	$12,449	$4,603	$0	$0	$8,548	$13,150	$4,839	$0	$0	$8,987	$13,826
Contribution to fund Balance	$22	$0	$0	$41	$63	$23	$0	$0	$44	$67	$25	$0	$0	$46	$71	$26	$0	$0	$49	$75	$28	$0	$0	$51	$79	$29	$0	$0	$54	$83
Total	**$74,175**	**$0**	**$0**	**$65,171**	**$139,346**	**$78,351**	**$0**	**$0**	**$68,839**	**$147,189**	**$82,761**	**$0**	**$0**	**$72,713**	**$155,475**	**$87,420**	**$0**	**$0**	**$76,806**	**$164,226**	**$92,341**	**$0**	**$0**	**$81,129**	**$173,471**	**$97,087**	**$0**	**$0**	**$85,299**	**$182,387**
Percent	**53.2%**	**0.0%**	**0.0%**	**46.8%**	**100.0%**	**53.2%**	**0.0%**	**0.0%**	**46.8%**	**100.0%**	**53.2%**	**0.0%**	**0.0%**	**46.8%**	**100.0%**	**53.2%**	**0.0%**	**0.0%**	**46.8%**	**100.0%**	**53.2%**	**0.0%**	**0.0%**	**46.8%**	**100.0%**	**53.2%**	**0.0%**	**0.0%**	**46.8%**	**100.0%**

Table A15
Twin Creeks Special Service District - Sewer Rate Study
Revenue Requirements by Service Characteristics

	FYE 2016					FYE 2017					FYE 2018					FYE 2019					FYE 2020					FYE 2021				
Item	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
O&M	$74,175	$0	$0	$65,171	$139,346	$78,351	$0	$0	$68,839	$147,189	$82,761	$0	$0	$72,713	$155,475	$87,420	$0	$0	$76,806	$164,226	$92,341	$0	$0	$81,129	$173,471	$97,087	$0	$0	$85,299	$182,387
Debt Service	$8,400	$0	$0	$15,600	$24,000	$8,400	$0	$0	$15,600	$24,000	$8,400	$0	$0	$15,600	$24,000	$8,750	$0	$0	$16,250	$25,000	$8,750	$0	$0	$16,250	$25,000	$8,750.00	$0.00	$0.00	$16,250.00	$25,000
Capital Outlays	$40,876	$0	$0	$75,912	$116,787	$55,343	$0	$0	$102,780	$158,123	$69,400	$0	$0	$128,886	$198,286	$83,904	$0	$0	$155,821	$239,725	$95,794	$0	$0	$177,904	$273,698	$100,549	$0	$0	$186,734	$287,283
Less: Operations Non-Rate Revenue	$30,773	$0	$0	$27,038	$57,811	$33,315	$0	$0	$29,271	$62,586	$36,067	$0	$0	$31,688	$67,756	$39,046	$0	$0	$34,306	$73,352	$42,272	$0	$0	$37,139	$79,411	$45,349	$0	$0	$39,843	$85,192
Less: Expansion Non-Rate Revenue	$17,820	$0	$0	$33,095	$50,915	$18,832	$0	$0	$34,973	$53,805	$19,847	$0	$0.00	$36,860	$56,707	$20,867	$0	$0	$38,754	$59,621	$21,892	$0	$0	$40,656	$62,548	$19,167.06	$0.00	$0.00	$35,595.97	$54,763
Total	**$74,857**	**$0**	**$0**	**$96,550**	**$171,407**	**$89,947**	**$0**	**$0**	**$122,975**	**$212,921**	**$104,647**	**$0**	**$0**	**$148,652**	**$253,298**	**$120,160**	**$0**	**$0**	**$175,818**	**$295,978**	**$132,722**	**$0**	**$0**	**$197,487**	**$330,209**	**$141,870**	**$0**	**$0**	**$212,844**	**$354,714**

Table A16
Twin Creeks Special Service District - Sewer Rate Study
Cost Allocations to Customer Classes

	FYE 2016					FYE 2017					FYE 2018					FYE 2019					FYE 2020					FYE 2021				
	Volume	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
All customers	$74,857	$0	$0	$96,550	$171,407	$89,947	$0	$0	$122,975	$212,921	$104,647	$0	$0	$148,652	$253,298	$120,160	$0	$0	$175,818	$295,978	$132,722	$0	$0	$197,487	$330,209	$141,870.10	$0	$0	$212,844	$354,714
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.00	$0	$0	$0	$0
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.00	$0	$0	$0	$0
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.00	$0	$0	$0	$0
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$74,857**	**$0**	**$0**	**$96,550**	**$171,407**	**$89,947**	**$0**	**$0**	**$122,975**	**$212,921**	**$104,647**	**$0**	**$0**	**$148,652**	**$253,298**	**$120,160**	**$0**	**$0**	**$175,818**	**$295,978**	**$132,722**	**$0**	**$0**	**$197,487**	**$330,209**	**$141,870**	**$0**	**$0**	**$212,844**	**$354,714**
Allocation Basis	Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account	

Table A17
Twin Creeks Special Service District - Sewer Rate Study
Existing Rates and Projected Revenue

Base Rate	Existing	Meter Size	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customers	$10.00	All customers	$84,240	$88,680	$93,360	$98,280	$103,440	$107,880

Volume Rate	Existing		FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customers	$0.80	All customers	$52,886	$55,673	$58,611	$61,700	$64,940	$67,727
Revenue - Existing Rates			$137,126	$144,353	$151,971	$159,980	$168,380	$175,607
Revenue Required			$171,407	$212,921	$253,298	$295,978	$330,209	$354,714
Surplus/(Shortfall)			($34,281)	($68,568)	($101,327)	($135,998)	($161,829)	($179,107)

Table Rates A18
Twin Creeks Special Service District - Sewer Rate Study
Calculated Rates

Monthly Base Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customers	$11.46	$13.87	$15.92	$17.89	$19.09	$19.73

Volume Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Volume Component						
All customers	*$1.13*	*$1.29*	*$1.43*	*$1.56*	*$1.64*	*$1.68*
Capacity Component						
All customers	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*
Strength Component						
All customers	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*
Total Volume Rate						
All customers	$1.13	$1.29	$1.43	$1.56	$1.64	$1.68

Industrial Surcharges	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Volume Surcharge ($/kgal)	$1.13	$1.29	$1.43	$1.56	$1.64	$1.68
Capacity Surcharge ($/gpd)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
BOD Surcharge ($/lb)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
TSS Surcharge($/lb)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Table Rates A19
Twin Creeks Special Service District - Sewer Rate Study
Recommended Rates

Monthly Base Rate	**Current Sewer Rate**	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	$10.00	$11.46	$13.87	$15.92	$17.89	$19.09	$19.73
Total Volume Rate							
All customers	$0.80	$1.13	$1.29	$1.43	$1.56	$1.64	$1.68
Total Monthly Rate							
All customers	**$16.24**	**$20.28**	**$23.93**	**$27.08**	**$30.06**	**$31.88**	**$32.83**
Percent Increase		25%	18%	13%	11%	6%	3%

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