Town of Paradise
Regular Adjourned Town Council Meeting Agenda

6:30 p.m. February 28, 2017

Location: Paradise Performing Arts Center
777 Nunnelley Road, Paradise, CA 95969

Mayor, Scott Lotter
Vice Mayor, Jody Jones
Council Member, Greg Bolin
Council Member, Melissa Schuster
Council Member, Mike Zuccolillo

Town Manager, Lauren Gill
Town Attorney, Dwight L. Moore
Town Clerk, Dina Volenski
Community Development Director, Craig Baker
Finance Director/Town Treasurer, Gina Will
Public Works Director/Town Engineer, Marc Mattox
Division Chief, CAL FIRE/Paradise Fire, David Hawks
Chief of Police, Gabriela Tazzari-Dineen

1. OPENING

a. Call to Order
b. Pledge of Allegiance to the Flag of the United States of America
c. Roll Call

d. The Draft Sewer Report will be presented by Bennett Engineering. There will be no decisions made tonight by the Town Council. There will be a 30-day review and comment period with several opportunities for the public to address the Town Council about the project.

The Draft Sewer report may be viewed at Town Hall in the Clerk's Department, the Paradise Public Library and online at the Town's Website, www.townofparadise.com.

Comments or questions must be submitted by March 31, 2017 and must be in writing. Comments or questions can be dropped off in person or submitted via USPS mail to Town of Paradise, 5555 Skyway, Paradise, CA 95969.

You may also submit comments through email at info@paradisesewer.com

2. PUBLIC COMMUNICATION

3. ADJOURNMENT

STATE OF CALIFORNIA) SS.
COUNTY OF BUTTE)

I declare under penalty of perjury that I am employed by the Town of Paradise in the Town Clerk's Department and that I posted this Agenda on the bulletin Board both inside and outside of Town Hall on the following date:

_____

_____
TOWN/ASSISTANT TOWN CLERK SIGNATURE

DRAFT

TOWN OF PARADISE

Sewer Project

Alternatives Analysis and Feasibility Report: Determining a Preferred Option for Implementation

February 23, 2017

DRAFT

FEBRUARY 23, 2017

TOWN OF PARADISE
SEWER PROJECT

Alternatives Analysis and Feasibility Report:
Determining a Preferred Alternative for Implementation

TOWN COUNCIL

Scott Lotter, Mayor
Jody Jones, Vice Mayor
Greg Bolin, Council Member
Melissa Schuster, Council Member
Mike Zuccolillo, Council Member

TOWN STAFF

Lauren Gill, Town Manager
Marc Mattox, Town Engineer
Colette Curtis, Administrative Analyst

PROJECT STAKEHOLDERS GROUP

Town Council
Town Staff
Town Business Owners
State Water Resources Control Board Staff
State Revolving Fund Staff
Butte County Environmental Services Staff
City of Chico Staff
Paradise Irrigation District Staff
Chamber of Commerce

ENGINEERING CONSULTANT

Bennett Engineering Services
1082 Sunrise Avenue, Suite 100
Roseville, California 95661
(916) 783-4100
www.ben-en.com

Table of Contents

List of Abbreviations

ADWF	Average Dry Weather Flow
APN	Assessor's Parcel Number
BRCP	Butte Regional Conservation Plan
BOD	Biochemical Oxygen Demand
CDF	California Department of Finance
CEC	Contaminants of Emerging Concern
CSD	Crescent Sanitary District
CT	Residual Chlorine Concentration x Total
CWA	Clean Water Act
DBP	Disinfection Byproducts
DEQ	Department of Environmental Quality
DRA	Downtown Revitalization Area
EDU	Equivalent Dwelling Unit
EGL	Energy Grade Line
EPA	Environmental Protection Agency
GPD	Gallons Per Day
I/I	Inflow and Infiltration
MBR	Membrane Bioreactor

MGD	Million Gallons per Day
MHI	Median Household Income
MOU	Memorandum of Understanding
MPN	Most Probable Number
NPC	Net Present Cost
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OWTS	Onsite Wastewater Treatment Systems
PDWF	Peak Dry Weather Flow
POTW	Publicly Owned Treatment Works
PSG	Project Stakeholder Group
PWWF	Peak Wet Weather Flow
RDA	Redevelopment Area
ROW	Right-of-Way
ROWD	Report of Waste Discharge
RV	Recreational Vehicle
RWQCB	Regional Water Quality Control Board
SDWTS	Small Domestic Wastewater Treatment Systems
SRF	State Revolving Fund
STEG	Septic Tank Effluent Gravity
STEP	Septic Tank Effluent Pumping
SWRCB	State Water Resources Control Board
UPA	Urban Permit Area
UV	Ultraviolet
WDR	Waste Discharge Requirement
WPCP	Water Pollution Control Plant
WWTP	Wastewater Treatment Plant

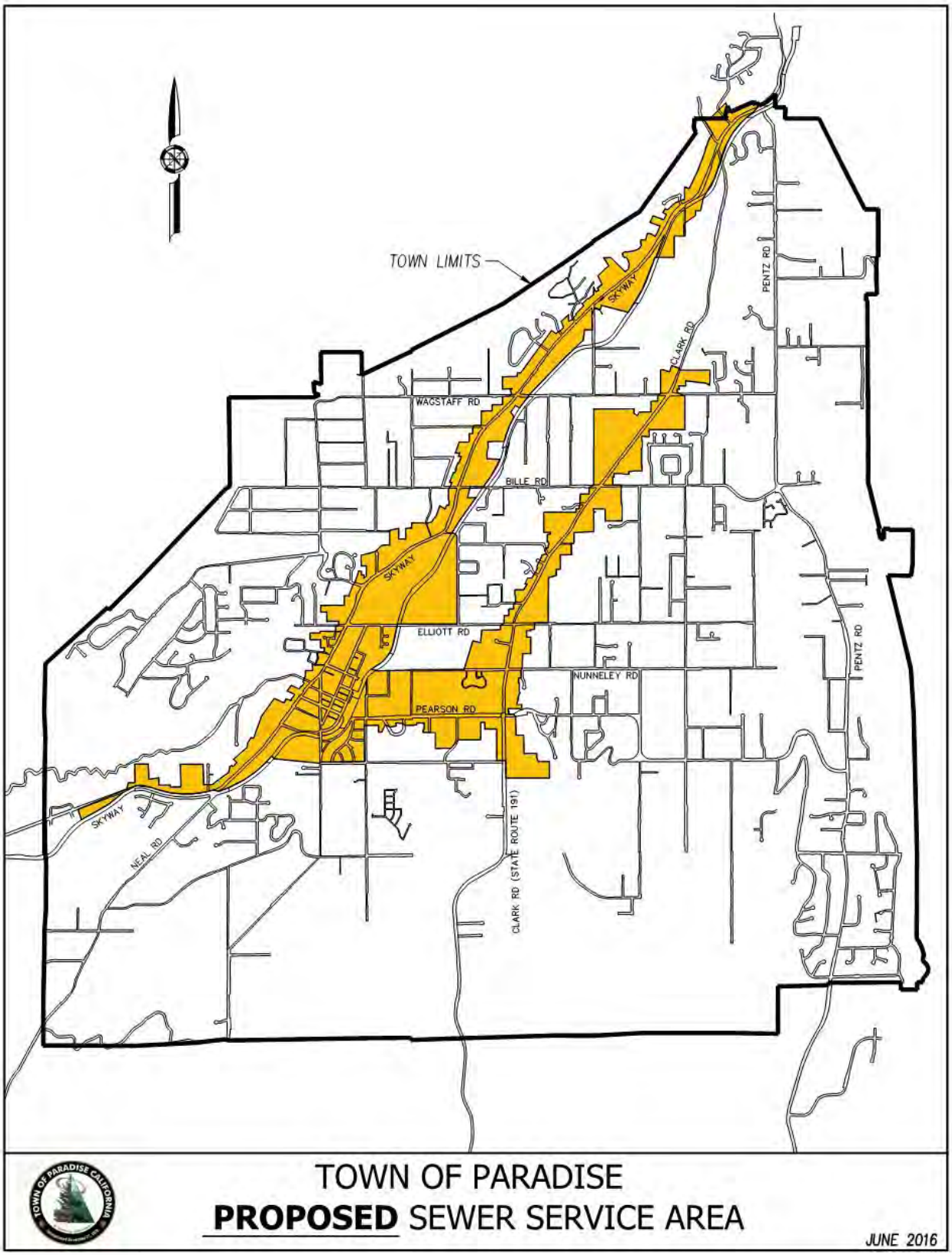

Figure 1.1: Town of Paradise Proposed Sewer Service Area.

Executive Summary

Since its incorporation in 1979, the Town of Paradise has sought a formal wastewater treatment solution for various zones and boundaries, all of which primarily focused on commercial and densely populated residential areas – the portions of Paradise most vulnerable to groundwater degradation and economic collapse. Professional studies from industry experts in every decade since 1980 have been completed and all essentially come to the same conclusion: The Town of Paradise is running out of time. It is inevitable that the continual degradation of groundwater quality and exceedance of soil capacities to absorb and treat high volumes of wastewater will require action on behalf of the Town and its constituents.

According to recent figures, on Skyway alone, 122 septic systems have failed or are predicted to fail in the next 10 years.

According to recent figures, on Skyway alone, 122 septic systems have failed or are predicted to fail in the next 10 years.

Some systems can be replaced with batch systems or septic tanks with filter treatment systems at high individual cost; but only so long as adequate land area for leachfield of the system effluent is available. Businesses without this option must operate a holding tank to be pumped on a regular basis and hauled to a septage receiving facility. Commercial property owners that cannot afford these options will likely fail as businesses cannot be re-sold without a viable sewer system. This is the fate for many of the businesses in the main corridors of the Town as systems fail.

More but this comes at a significant cost and disruption of service over, additional multi-family housing cannot be developed as current on-site septic restrictions will not allow the development density due to wastewater flows. The current on-site policies used to protect groundwater quality and public health have contributed to the stagnation of population and economic growth in the Town. A wastewater collection and treatment system could alleviate these limitations for the Town but this comes at a significant cost and disruption of service.

The current on-site policies used to protect groundwater quality and public health have contributed to the stagnation of population and economic growth in the Town. A wastewater collection and treatment system could alleviate these limitations for the Town.

This Feasibility Study marks the 7th study to assess the problem, review prior work, and develop alternatives. Alternatives in this study were analyzed to address sewer service reliability problems and select the best alternative for the Town to carry forward to district formation, environmental documentation, and preliminary design. Although many alternatives have been previously studied and estimated for cost, this study eliminated non-viable options and brought complete solutions together for evaluation on an equal basis.

All alternatives that provide sewer service must be a "complete project." A complete project has been defined by the project team as a project that provides for collection, treatment, and disposal in addition to being permit-able, construct-able, and financially and operationally feasible. The five options are as follows:

A. **Localized Wastewater Treatment Plant with Effluent Land Application.** Local sewer collection system for service area. Acquire land with adequate area for secondary level treatment plant and land application area to comply with Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements (WDR).

B. **Localized Wastewater Treatment Plant with Surface Water Discharge Location.** Local sewer collection system for service area. Acquire land with adequate area for a tertiary level treatment plant and location for effluent discharge to creek. Will require a RWQCB National Pollutant Discharge Elimination System (NPDES) Permit.

C. **Regional Connection to the City of Chico Water Pollution Control Plant.** Local sewer collection system for service area. Acquire right-of-way for regional pipeline and connection to the City of Chico WPCP. Requires regional agreement with the City of Chico and appropriate connection fee.

D. **Wastewater Treatment with Beneficial Reuse.** Local sewer collection system for service area. Acquire land with adequate area for a tertiary level treatment. Treated effluent connected to reclaimed water system for distribution and re-use via irrigation. Excess reclaimed water would be taken to a land application area for irrigation.

E. **No Project.** No collection system or treatment plant. The Town continues to function on septic systems and accept the environmental and economic risks.

Some of the additional efforts included in this study that prior studies did not include were public outreach and engagement and a socio-economic study to assess both the beneficial economic aspects of building a major infrastructure project and the negative economic aspects of the No Project Option. The socio-economic study projected benefits to the Town and region that included 161 added jobs, additional $12.8 million in sales and output to the region in all sectors, regional long term impact of $68 million in private and public investment, and $56 million increase in the property tax base. The study also predicted a 5 to 13 percent property value increase for parcels within the sewer district.

The socio-economic study projected benefits to the Town and region that included 161 added jobs, additional $12.8 million in sales and output to the region in all sectors, regional long term impact of $68 million in private and public investment, and $56 million increase in the property tax base.

The restrictions that continue under the No Project Option have a broader effect beyond individual businesses. They burden the overall local economy's ability to grow and diversify, as well as limit resiliency of businesses during any sustained economic downturn. Business districts thrive and survive based on the diversity of its members and the goods and services provided. It is the collection of businesses, more than the sum of the individual ones, that draws customers to shop in a particular business district as opposed to other places (for example, Chico). Retail shoppers who come to the district may choose to purchase additional items from that of their original intended visit. There will be less incentive for potential customers to choose to visit the business district if the diversity of business offerings continues to shrink.

The project team engaged a Project Stakeholder Group (PSG) to gather feedback through the study process and assist in the development of alternative selection criteria and weighting for preferred option selection.

Two options emerged from the process with the highest scores: Regional Connection to the Chico WPCP and Localized Wastewater Treatment Plant with Surface Water Discharge. The Localized Treatment Plant had the lowest capital cost of the options at $64 million, while a Regional Project was estimated to cost $83 million. However, the Regional Project had the lowest Net Present Cost over the 80 year life cycle and was chosen as the recommended option due to life cycle cost, environmental impacts, public impacts, and long term operational burden.

The draft allocation of available grant, State Revolving Fund (SRF) loan, and property tax assessment yielded preliminary rates that are higher than adjacent and similar sewer agencies. This is primarily due to a difference in what the other agency rates are actually paying for. Most sewer rates are paying for operations and maintenance and some level of SRF loan or capital fund for system expansions, recent wastewater treatment plant (WWTP) upgrades, and re-investment. But almost no other agency we compare rates to is currently paying back the cost of building an entire collection system, major conveyance, and treatment plant. That being said, it is clear that the cost is significant and will be a considerable burden to the residents and business owners within the sewer service area. The project team believes additional grant funds will need to be identified in order to form an assessment district and move forward with a vote.

While the feasibility study identified the best long term solution for the Town, it did not identify an adequate source of grant funding to make the project economically feasible for the rate payers. The funding burden of the preferred options would require significant tax assessments, individual loans for equipment and connections, higher than average fees for operations and State Revolving Fund low interest loan payback. In order to move forward with Option C – Regional Connection to Chico WPCP, a memorandum of understanding will need to be worked through with the City of Chico Council. A significant source of additional grant funding will need to be identified to support the project beyond the maximum $8 million allowed through the State Water Resources Control Board's (SWRCB's) SRF Program.

It is the recommendation of this study that both negotiations with the City of Chico progress to achieve a memorandum of understanding and discussions with state and federal representatives progress to identify additional funding on the order of $40 million.

PROJECT NEXT STEPS

1. Address public comments from feasibility report
2. Town council endorsement of preferred option(s)
3. Negotiation for memorandum of understanding with the City of Chico
4. Obtain commitments for additional grant funding
5. Assessment District formation and vote
6. Obtain additional grant funding for preliminary design and environmental documentation
7. Secure loans and Assessment (Bond Sale)
8. Final design and right-of-way acquisition
9. Project construction and start-up

It is the recommendation of this study that both negotiations with the City of Chico progress to achieve a memorandum of understanding and discussions with State and Federal representatives progress to identify additional funding.

1
Background and Problem Statement

The need for a centralized wastewater treatment solution in Paradise may be the single most studied, unfunded capital project in Butte County. A Town of over 26,000 residents with high groundwater, poor soils and limited land, cannot continue to rely on individual septic tanks and leach fields indefinitely—at least not in all sections of the Town. Since its incorporation in 1979, the Town of Paradise has sought a formal wastewater treatment solution for various zones and boundaries, all of which primarily focused on commercial and densely populated residential areas—the portions of Paradise most vulnerable to groundwater degradation and economic collapse. In every decade since 1980, professional studies from industry experts have been completed and all essentially come to the same conclusion: The Town of Paradise is running out of time. It is inevitable that the continual degradation of groundwater quality and exceedance of soil capacities to absorb and treat high volumes of wastewater will require action on behalf of the Town and its constituents. Prior studies have recommended plans and policies which have been implemented and provide benefit to defer collection and centralized treatment Town-wide, but for the densely populated residential and commercial corridors in Paradise, time is of the essence.

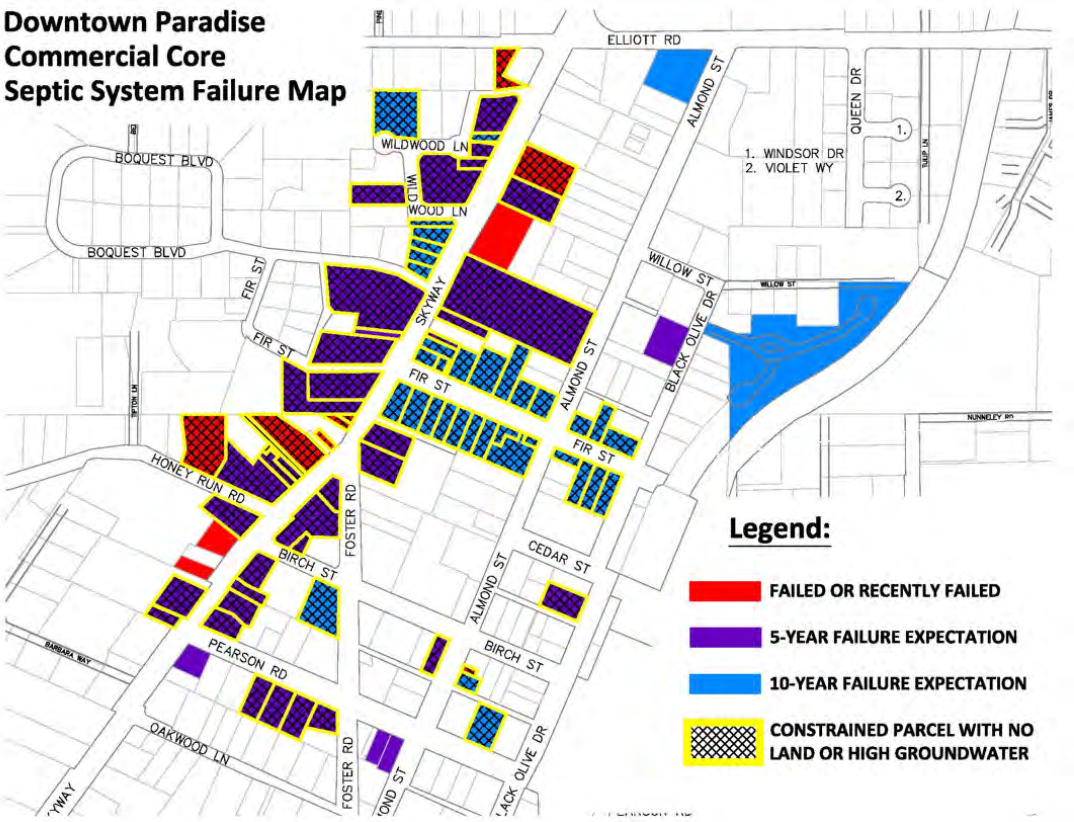

Figure 1.1 – Downtown Paradise Commercial Core Septic System Failures

According to recent figures, 27 septic systems have already failed on Skyway alone, with 39 systems predicted to fail in five years and 56 systems predicted to fail in the next ten years. A depiction of the Town's commercial core septic system failures is shown in **Figure 1.1**.

The lack of a sewer system has a twofold impact—both are very important local and regional drivers. The first is an impact on the area's economy and the second is on the environment.

If the economy in Paradise suffers, the regional economy suffers as well. Regional economic hubs, like the City of Chico, depend upon profitable local economies to be successful. Even in a healthy economy, many of the businesses in Paradise cannot afford the high cost of septic system repairs or replacement. Continual operation of septic systems and leach fields impose inherent limitations on businesses that affect their ability to make a profit or create jobs. The creation of jobs provides regional cash flow and the potential for a better quality of life for area residents.

If the economy in Paradise suffers, the regional economy suffers as well.

Residential properties within the proposed service area also suffer due to the lack of sewer. Many residential parcels in the densely populated and commercial areas of Town are constrained by small size (and lack of sufficient area for additional leach fields), and high ground water. With the construction of a sewer, currently constrained parcels could be developed into multi-family housing or low income/fixed income housing. As a recipient of a HOME Grant from California State Housing and Community Development, the Town of Paradise is required to offer a certain number of low income housing units that it is currently unable to meet due to septic constraints. Development of low income multi-family housing made possible by a sewer could help the Town comply with these regulations.

The lack of a viable sewer infrastructure to serve the commercial and densely populated residential areas is not only a detriment to the local and regional economy, but also poses an environmental threat to groundwater and surface water, both precious regional resources. The practice of collecting wastewater and processing through individual septic tanks and leach fields has a direct impact to water resources. The same limitations which restrict economic development, also protect groundwater resources. The Town of Paradise has proven that successful monitoring and enforcement can prevent blatant and negligent groundwater contamination, yet environmental risk for discharging the wastewater of over 26,000 people within 18.3 square miles of land remains highly disconcerting. Efforts to reduce this risk to local groundwater through identification and collection of the most concentrated wastewater flows must be explored.

The lack of a viable sewer infrastructure to serve the commercial and densely populated residential areas is not only a detriment to the local and regional economy, but also poses an environmental threat to groundwater and surface water, both precious regional resources.

The decision to finance and build a collection and treatment system has been deferred several times due to concerns over costs and the necessary political will to implement a project. The effect of this inaction is significant. Many businesses are dealing with failing septic systems with inadequate leach field capacity and they lack the land area to correct the situation. The only remaining individual remedy available to them is sewage holding tanks that need to be pumped out regularly or expensive, engineered, on-site batch treatment systems that produce a higher quality effluent to the leach fields but still require adequate land area for

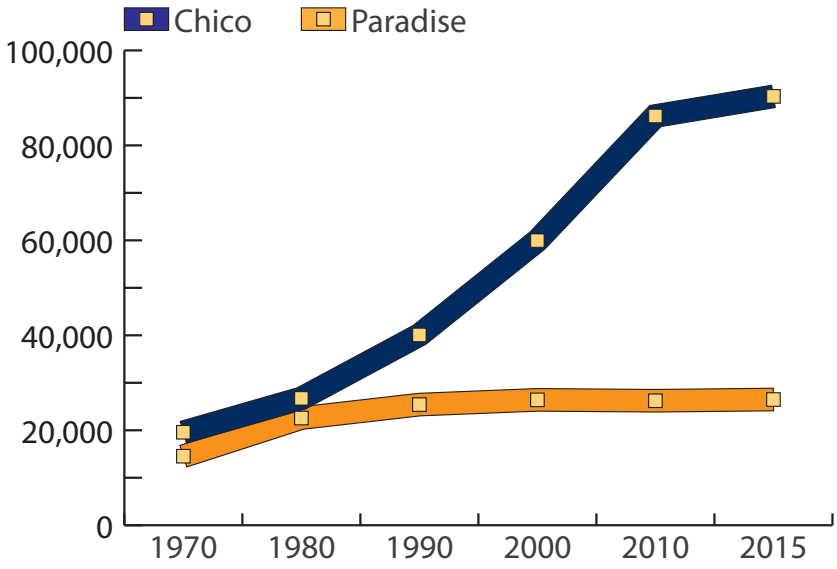

Figure 1.2 – Town of Paradise and City of Chico Population Change Since 1970
(Source U.S. Census, retrieved June 4, 2015. 2015 Estimated)

dispersal. For some, neither of these options are viable and subsequently the property becomes abandoned—literally destroying the economic future of the Town.

The lack of economic growth tied to the lack of a sewer system may have contributed to the stagnant population and a distressingly stagnant economy.

The Town of Paradise's challenges with sewer collection and treatment are not unique. Many small to medium size communities have endeavored to plan, finance, design, construct, and operate wastewater systems where none had existed before. Motives for such projects varied between communities, including mandates due to groundwater degradation. Through review of these projects, it is clear that improving groundwater quality and increasing the water supply are two key objectives of the State of California. Both of these goals are attainable through a wastewater collection, treatment, and dispersal solution which fits the needs of the Town of Paradise.

A LOOK BACK

Over the past four decades—even before the Town's incorporation (1979)—the effects of wastewater from the Town's onsite septic systems have been studied as to their impacts on local streams. Many of the studies identified the Town's commercial areas and associated onsite septic systems would cause severe limitations and negatively affect streams due to the commercial area concentration and volume. Several independent studies and reports have supported these claims and set the foundation for current and ongoing wastewater treatment and disposal solutions considered in this report.

HISTORICAL STUDIES

A common theme in many of the previous studies is the prediction of future population as it relates to future sewer flows. The benefit of 30 years of hindsight shows that all of the previous reports significantly overestimate population in the future, **Figure 1.2**. The current population of the Town is 26,476 which is equivalent to the population in 2000. The lack of economic growth tied to the lack of a sewer system may have contributed to the stagnant population and a distressingly stagnant economy.

Study No. 1: 1983 Wastewater Management Study Phase 1 Report and Supplementary

The 1983 study focused on groundwater quality and potential degradation due to septic systems and leach fields. The study monitored shallow wells for fecal coliforms and Nitrate. The study evaluated performance of the majority of septic systems as adequate and that through proper inspection and maintenance, the existing systems could continue to function. It was recommended that only the Middle and Upper Honey Run and Lower Skyway basins pursue a centralized wastewater collection and treatment at that time.

Discussion of bacteriological samples in the lower Skyway Basin yielded this conclusion:

> ***"...high septic system density has resulted in wastewater application rates which appear to have exceeded the assimilative capacity of the soil mantle and have caused water quality degradation and potential public health hazards."***

The report predicted the population of the Town to reach 29,000 by 1992 and 35,000 by 2002. Wastewater flow projections for the sewer service area arrived at 1.68 mgd for Average Dry Weather Flow (ADWF) and 4.2 mgd for Peak Wet Weather Flow (PWWF).

The supplementary study's intent was to document the need for centralized wastewater management facilities. This was accomplished by bacteriological study of surface water samples near the central Skyway area. Samples were tested for fecal coliforms, fecal streptococcus, and total coliforms. The result of the supplementary study was that a serious pollution problem did not exist in most of the streams of the central Skyway area. The study recommended implementation/continuation of the sewer ordinance mandated in 1984 to limit loading rate of leach fields in high density areas to 900 gal/acre-day.

The study concluded that the Town should start planning for collection and treatment in the commercial areas via clustered treatment systems. It was felt that the clustered concept would eventually give way to a centralized system for the Town as growth demanded.

The sample sites should likely be revisited and re-sampled to compare to the prior study to identify with there has been further water quality degradation in the last 30-plus years.

The study concluded that the Town should start planning for collection and treatment in the commercial areas via clustered treatment systems. It was felt that the clustered concept would eventually give way to a centralized system for the Town as growth demanded. The short-term recommendation also suggested the development of an on-site wastewater management district (septic tank and leach field monitoring program), which was soon implemented by the Town.

The report proposed paying for the $17.8 million capital cost with property assessment and connection fees of $1,500 per user initially. Monthly rates were estimated at $30 per month with 60 percent going to debt service and 40 percent paying for system operations and maintenance costs.

Study No. 2: 1985 Wastewater Management Plan Phase II Report

Objectives of this study included development of an on-site wastewater management district, with rules, regulations, and financing; development of a long range plan for sewer collection and treatment for the central commercial areas, Skyway and Clark Roads, including financing; and developing long range plans for disposal of septage. Finally, the report discussed options for hazardous waste management.

This study predicted a population of 32,000 in 1995 and 35,000 in 2005. Flow projections for the service area assumed an ADWF of 1.2 mgd and a build out ADWF of 2.4 mgd. At the time of the report more than 100 on-site systems needed annual repairs and more were chronically malfunctioning in the Town.

The study evaluated four options for collection and treatment including a regional option to the City of Chico. The study also considered a dam and storage for reclaimed water. Based on cost estimates and present worth evaluation for the options, the report recommended an aerated lagoon process for treatment and a gravity system for collection. The study also recommended energy turbine recovery for the effluent pipeline with various effluent disposal options including a dammed reservoir, land application, and fodder crop irrigation on the lands between "the Ridge" and HWY 99.

The study estimated the connection fee to the City of Chico's Water Pollution Control Plant (WPCP) using Chico's development criteria based on Equivalent Dwelling Units (EDUs) and estimated at $7.7 million in two phases totaling $15.5 million (1985 dollars). Therefore, it recommended land application and treatment as the cheaper option over regional connection.

The report proposed paying for the $17.8 million capital cost for the wastewater treatment plant with property assessment and connection fees of $1,500 per user initially. Monthly rates were estimated at $30 per month with 60 percent going to debt service and 40 percent paying for system operations and maintenance (O&M) costs.

Study No. 3: 1992 Wastewater Collection, Treatment and Disposal Preliminary Design Report

This study includes the preliminary design and costs for the wastewater collection system and treatment system to serve the commercial corridors of the Town. The study anticipated serving 3,010 EDUs initially and 7,800 EDUs at buildout, which equates to an ADWF at buildout of 1.56 mgd.

For the collection system, this study deviated from the 1985 study and recommended a hybrid system including both Septic Tank Effluent Pumping (STEP) and gravity collection with a few lift stations to serve the service area. Recommendations were based on a 20-year horizon and present worth analysis of capital and O&M for each option.

The recommended treatment system was aerated ponds followed by sand filtration and ultraviolet (UV) disinfection with a stream discharge to Nugen Creek. Wastewater reclamation was analyzed but found to be too expensive to produce versus current irrigation cost of potable water from Paradise Irrigation District.

Study No. 4: 2004 Downtown Revitalization Area Clustered Wastewater Treatment System Master Plan

After the commercial corridor collection and treatment system failed to advance in 1993, alternative plans needed to be made by the downtown area to alleviate septic system failures. The Town of Paradise Redevelopment Agency developed a master plan for clustered wastewater treatment and disposal system.

The intent was to serve the redevelopment area and have a treatment capacity of 100,000 gallons per day serving 93 residential lots and 187 commercial lots. The treatment system would continue to rely on infiltration via buried equalization tanks, aeration tanks, digesters, clarifier tank, and disinfection tanks on a six-acre parcel. This system would produce a higher quality effluent than a traditional septic tank, but would need appropriate land with good percolation characteristics for disposal.

Study No. 5: 2010 Wastewater Treatment and Collection System Feasibility Study for the Downtown Cluster System

This study consisted of feasibility design and evaluation of a clustered wastewater system for the Downtown Revitalization Area (DRA) as well as other commercial corridors (redevelopment areas (RDAs)). Key issues identified in this report include: a conventional gravity sewer system was not feasible and a STEP system was recommended for the collection system; and the key to providing sewer service was identifying adequate dispersal area for the sewer effluent.

The study recommended a MBR treatment system for the treatment plant with the incorporation of a septage receiving facility. It was anticipated that flow would be 184,000 gpd for the DRA and RDA-1, which would equate to Phase I of the system. Phase II and III would include the DRA and all of the RDAs and design flow was estimated to be 534,000 gpd. The cost of collection, treatment, and dispersal for Phase I was estimated at $20 million (2010 dollars).

Study No. 6: 2012 TOP Wastewater Treatment Historical Background and Comparative Analysis

Report to council included a problem statement and discussion of the project need. It also included a recap of previous studies. The focus of the report is the description and analysis of three collection and treatment options. The options include:

1. STEP collection system with MBR treatment and land application of effluent just outside of Town limits along the Skyway corridor
2. Collection system with a regional pipeline to the City of Chico WPCP
3. Collection system with treatment plant, storage, and effluent re-use at the Tuscan Ridge Golf Course

Town Council directed staff to further study Options 2 and 3. Analysis depicted the storage component of the Tuscan Ridge option problematic with regards to dam safety and permitting. Therefore the regional option was selected as preferred due to cost and permitting complexity and time requirements.

PURPOSE OF THE CURRENT FEASIBILITY REPORT (STUDY NO. 7)

The purpose of the 2017 Sewer Project is to develop options to address sewer service reliability problems and select the best alternative for the Town to carry forward to district formation, environmental documentation, and preliminary design. Although many options have been previously studied and estimated for cost, this study will eliminate non-viable options and bring complete solutions together for evaluation on an equal basis.

All options that provide sewer service must be a "complete project." A complete project is a project that provides for collection, treatment, and disposal in addition to being permit-able, construct-able, and financially and operationally feasible.

A complete project has been defined by the project team as a project that provides for collection, treatment, and disposal in addition to being permit-able, construct-able, and financially and operationally feasible.

The report evaluates project cost, sewer service area, funding options, anticipated regulatory requirements, and public support for the five options. The five alternates are:

A. **Localized Wastewater Treatment Plant with Effluent Land Application.** Local sewer collection system for service area. Acquire land with adequate area for secondary level treatment plant and land application area to comply with RWQCB Waste Discharge Requirements (WDR).

B. **Localized Wastewater Treatment Plant with Surface Water Discharge Location.** Local sewer collection system for service area. Acquire land with adequate area for a tertiary level treatment plant and location for effluent discharge to creek. Will require a RWQCB National Pollutant Discharge Elimination System (NPDES) Permit.

C. **Regional Connection to the City of Chico Water Pollution Control Plant.** Local sewer collection system for service area. Acquire right-of-way for regional pipeline and connection to the City of Chico WPCP. Requires regional agreement with the City of Chico and connection fee.

D. **Wastewater Treatment with Beneficial Reuse.** Local sewer collection system for service area. Acquire land with adequate area for a tertiary level treatment. Treated effluent connected to reclaimed water system for distribution and re-use via irrigation. Excess reclaimed water would be taken to a land application area for irrigation.

E. **No Project.** No collection system or treatment plant. The Town continues to function on septic systems and accept the environmental and economic risks.

2

No Project Alternative and Socio-Economic Study

SOCIO-ECONOMIC STUDY

A variety of economic factors can influence the community decision to invest in a sewer project for the commercial core of the Town of Paradise. This section details the economic impacts and related issues associated with the proposed sewer project, beginning with a brief overview of public investment and the community and property impacts of sewer investment. Quantitative benchmarks are provided.

Other communities have faced the decision of providing a centralized sewer system before the Town of Paradise. Case studies from these communities provide valuable insight and lessons learned. Relevant studies will be discussed in this section. A reconnaissance forecast of the economic impacts of the proposed sewer project is presented. The impact estimates rely on parameters and factors developed in comparable studies, and are applied to current estimates of construction cost.

ECONOMICS OF PUBLIC INVESTMENT

Public infrastructure is considered the foundation for economic development. A vibrant community requires access to roads, water, sewer, communication technologies, and electricity. Investment in both the infrastructure (i.e., the purchase of physical plant and equipment) and the operation and maintenance (e.g., labor, supplies) of these

structures will expand the productive capacity of an economy, by both increasing resources and enhancing the productivity of existing resources.

A wide variety of empirical research recognizes the importance of infrastructure to the growth and function of a regional economy. Regions that lead in economic development have better physical infrastructure. The studies that find a positive impact conclude that public infrastructure stimulates economic activity in two primary ways: by increasing the productivity of private businesses, or as an unpaid factor of production (Janeski and Whitacre, 2014). Private inputs are typically purchased in an open market; however, public capital is provided by government and financed through taxes. Because tax payments are not necessarily connected to the quantity of public capital used by private businesses, public capital can be seen as an unpaid input to the businesses' production process. Aschauer (1989) argued that public investment creates an increase in the rate of return to private capital, resulting in private investments four to seven times as large as the original public investments themselves. Improved water treatment and sewer plants have been identified as one of the infrastructure types most responsible for improving economic productivity.

Improved water treatment and sewer plants have been identified as one of the infrastructure types most responsible for improving economic productivity.

ECONOMIC IMPACTS OF SEWER INVESTMENT

Economic impact studies show a direct correlation between economic growth and public infrastructure investment. A review of the economic impacts of public investment in water treatment and sewers found that these investments yield positive returns and have greater returns than most other types of public infrastructure investments. New sewer development generates direct, short-term benefits through construction activity and labor, and long-term benefits through economic activity required for operation and maintenance of the sewer infrastructure. Indirect benefits are generated to virtually all other sectors of the economy through need for equipment, materials, and supplies; insurance and financing services; fuel; and restaurants and retail establishments, as required by construction activity and laborers. In addition, locally-earned wages and income is re-spent in the local community following normal household spending patterns for goods, services, and taxes.

In general, a community decision to upgrade to a sewer system will recognize these benefits:

1. Cleaner water with fewer bacteria and disease-causing pathogens in creeks.
2. Safer drinking water in areas where poor septic tanks threaten the same groundwater also used for drinking water.
3. A more attractive community for businesses looking to locate in a small Town, but avoid operating their own wastewater treatment system.
4. Increased home values for properties within the district, as buyers want to avoid upgrading or maintaining a private septic system. Increased home values for properties outside the district as the overall economy of Paradise improves.

In-depth research on the economic impact of rural water and sewage investments was conducted by Bagi (2002). Bagi's study examined the impact of 87 water and sewer projects across 30 different states, with 54 located in urban areas and 33 in rural areas. The Economic Development Administration (EDA) financed all of the projects in the study. Each project was built for specific businesses or potential investors. The potential to attract new businesses was found to be an indirect benefit. Businesses that would use the new water and sewage system, including retail stores and other services, would emerge as a result of increased economic activity, population, and personal and family income.

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Among the rural water/sewer projects, total construction cost per project was $1,418,738 in 1990 dollars (or $2,325,230 in current dollars). The study determined that every dollar spent in constructing an average water/sewer project:

- Generated almost $15 of private investment
- Leveraged $2 of public funds
- Added $14 to the local property tax base

Results of the study showed that investments in sewer projects can save and create additional jobs, stimulate private sector investment, attract additional government funds, and increase the property tax base.

A later study by Krop, et al. (2008) explored the economic contribution of water and sewer investment on the local and regional economy. The primary output of the water and sewer industry is clean water. Producing this output requires infrastructure (new and rehabilitated), water treatment supplies, and labor (operating and maintaining infrastructure). Because output is used as an input for households (wages and water)

and industry (water), increases in water and sewer output has a direct impact on other sectors of the economy. The authors cite U.S. Bureau of Economic Analysis estimates that each dollar of output in the water and wastewater sector results in an additional $2.095 of output in all sectors combined (as a "multiplier effect"). In addition, for every job in the water and sewer industry is responsible for another 2.9177 jobs in the economy. The numbers cited apply to California, which are somewhat lower than for the United States as a whole.

A detailed study for the Water Research Foundation and Water Environment Research Foundation by AECOM (2014) estimated that nationally, on average, every $1 million in direct spending (capital and operating) by surveyed water and wastewater utilities supports 16 jobs across all sectors of the economy.

Impacts on Property Values

Property values increase for private residences and businesses when a septic system is replaced by a sewer system. **Septic systems put strict limitations on private and commercial structures and constrain property values.** Residential homes are limited as to the number of bedrooms which can be constructed, and multi-family parcels are regulated to non-existence. Septic systems limit expansion or potential uses for a site for business parcels. A centralized sewer system can remove limitations on property use, including home size for private residences, and allow for a broader approach to general community planning. Neighborhood and community planning contributes to value on individual properties by virtue of the synergistic relationship with adjacent properties

Property values increase for private residences and businesses when a septic system is replaced by a sewer system.

Business districts that are connected to a central sewer system add to property values for landowners. A central collection system provides usage flexibility for individual land parcels and removes density constraints on adjacent land parcels. This means that land can be used for a wide range of purposes consistent with local zoning and planning, and without the need for accommodating for existing uses on adjacent or nearby parcels that may saturate soils (EPA, 1978, p. 135). Business districts often benefit from higher density—closer together storefronts or restaurants—because of its walkability and inviting atmosphere for potential customers. In contrast, a reliance solely on septic systems means each parcel must have its own leach field, so small lots are not practical or even possible.

Efforts by researchers to quantify the role of sewer connections versus septic systems on property values are limited. Property values are determined, in large part, by potential uses for the land. These potential uses are limited by physical characteristics, location, and restrictions such as zoning. Soil restrictions create additional limitations for septic systems, as does minimum lot sizes; public sewer service does not create such limitations, and the increased potential income of the property is reflected in its value.

Land appraisers tend to be skeptical as to whether an individual property connected to a public sewer is more valuable than a comparable property with a fully-functioning septic system. However, the qualifier of "fully-functioning" implies that the property in consideration already contains suitable soils and is of adequate lot size to accommodate replacement leach fields in the future. Many properties in Paradise are constrained by poor soils, high ground water and inadequate lot size.

One study in Michigan attempted to evaluate whether residential property values were influenced by the availability of a public sanitary sewer. The study included a statistical analysis of residential parcels connected to public sewer and those on septic systems. Parcels were grouped by acreage, house size, and other attributes, in order to isolate the sewer or septic variable. The researchers found that property value was roughly the same for those connected to a public sewer versus those with septic systems. However, they did find that a home (and property) was more valuable if the property had access, or was adjacent, to a public sewer, as compared to those where there is no public sewer. This finding reinforces that "free-riders," or those with access but do not connect, receive benefits without paying for it. In other words, the expense of public sewer should be shared by all who have access, comparable to fire protection service that is assessed to all property owners (W.E. Upjohn Institute, 2015).

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A recent study of small communities in Oklahoma found that "quantitatively, communities that obtain a water infrastructure project can expect their median house values to increase by between five and thirteen percentage points higher than in an otherwise similar community without a water infrastructure project" (Janeski and Whitacre, 2014).

Case Studies

The following case studies all have similarities to the Town of Paradise. All four communities were facing economic growth limitations due to reliance on septic systems and a lack of a centralized sewer service and treatment. All of the communities were driven by groundwater quality degradation to implement a permanent solution. One key difference between the case studies and the Town of Paradise's situation is that the Town is not currently facing fines and time scheduled orders to implement sewer.

Port St. Lucie, Florida

In 1993, the City of Port St. Lucie was in a period of steady growth in population and residential housing. During this time, the City had a limited, disaggregate sewer and wastewater system. The City acquired existing private systems and treatment plants as part of a multi-phased water and waste water expansion program. Under the program, property owners were assessed their share of infrastructure costs within their respective neighborhoods. In addition to public health concerns (septic systems could pollute the groundwater aquifer supplying fresh water to the community), there were three identified economic concerns:

1. Commercial development was constrained without an adequate water system.
2. The absence of a diversified commercial base meant the burden of providing services was on single-family residences.
3. Continued reliance on septic systems placed a limit on home sizes, and thus property values. This also limited property tax revenues for the community.

The City Council conducted a series of public hearings beginning in 1994. Based on community feedback, and after conducting extensive research, a low-pressure system was selected in lieu of a more expensive gravity system. Cost savings were realized by reduced pipe costs and shallower depth (three feet below the surface) for low-pressure systems as compared to gravity systems. Homeowners could choose to options: (1) pay their assessments in full before a cutoff period, and receive a discount; or (2) pay over a 20-year period via an annual escrow payment attached to their mortgage.

When the City assumed ownership of the utility in 1994, there were 10,800 sewer connections. The final phase of the sewer installation was completed in 2006, resulting in 43,472 customers with City sewer service.

Malibu, California

In 2009, the Regional Water Quality Control Board (RWQCB), Los Angeles Region, passed a resolution (R4-2009-007) prohibiting on-site wastewater disposal systems in the City of Malibu Civic Center. In response, the City of Malibu, the RWQCB, and the State Water Resources Control Board entered into a Memorandum of Understanding, whereby a special Assessment District would be established in order to construct wastewater collection and recycled water distribution facilities, and an off-site wastewater treatment plant. The cost of connecting to these facilities would be borne separately by each property owner, and each property would be provided with the right to discharge up to a predetermined wastewater flow and load based upon the type of parcel development. In other words, individual parcels were assessed to determine the allowable wastewater load based upon existing and anticipated uses. A total of 57 individual parcels were included. The cost of the new wastewater collection, treatment, and distribution facilities were apportioned among the 57 parcels according to an approved allocation formula. The total assessable cost of the improvement was determined to be $63.7 million.

Yucca Valley, California

The Hi-Desert Water District provides water service for the Town of Yucca Valley and surrounding areas in San Bernardino County. Until recently, Yucca Valley depended almost exclusively on septic systems and leach fields for disposal of wastewater. The Colorado River Basin Regional Water Quality Control Board (RWQCB) determined that effluent from the septic tank systems within Yucca Valley and the Water District is the cause of ground water quality degradation in the area.

Following a resolution (R7-2011-0004) adopted by the RWQCB prohibiting septic tank discharges in the Town of Yucca Valley, the Hi-Desert Water District is following a three-phase project to construct and operate required facilities, including a wastewater treatment and reclamation facility, trunk sewer lines, and a collection system to serve individual properties. Three Benefit Areas were established representing three phases of construction as well as being used to apportion costs of the improvements relative to the benefits that are received within each Benefit Area. Certain improvements constructed in Phase 1 of the construction provide a direct and special benefit to all properties within the three benefit areas; these improvements are called the common facilities. The improvements include the local sewer collection system,

sewer laterals and improvements that provide treatment capacity within the wastewater reclamation facility.

Benefit Area 1 includes the central business district and surrounding residential area. Benefit Area 2 is a high-density residential area on the west side of the Assessment District. Benefit Area 3 will include an expansion area and is expected to account for future buildout in the community.

The total estimated assessment cost, including facilities, incidental expenses, district offset credits, and construction period financing, is $145.2 million. This cost, including acquisitions and works of improvement, will be assessed and apportioned upon the several lots, pieces or parcels or portions of lots or subdivisions of land.

Crescent, Oregon

All residents and businesses in the community of Crescent, Oregon, are currently solely dependent on individual septic systems. Oregon's Department of Environmental Quality (DEQ) has determined that nitrate groundwater contamination levels in the area are out of compliance with Environmental Protection Agency standards. The community has a shallow groundwater table with rapidly draining soils and no barrier to fluid movement into the shallow groundwater. The DEQ also confirms that at certain times of the year, fecal contamination is detected in the groundwater. As a result, the adjacent Little Deschutes River is being impacted by the failing septic systems. The DEQ concludes that combining and better treating wastewater in the community, through a sanitary treatment facility at a location further from and at a higher elevation than the Little Deschutes River, will better protect public health and the river water quality.

The Crescent Sanitary District (CSD), working with the multi-agency Central Oregon Regional Solutions Team, developed an approved facilities plan to finance, and construct a community wastewater treatment facility. The plan proposes a lagoon treatment system on a roughly 200-acre land area to include approximately 50-60 acres for a chlorination facility, treatment, and storage lagoons. An additional 160 acres is need for two 80-acre areas for crop irrigation. The large area is required to allow land application of the treated effluent while protecting groundwater.

A proposed site is located on Gilchrest State Forest land adjacent to the community, which would require that the State of Oregon sell and transfer approximately 200 acres to the CSD. The parcel is a low site

class for timber production, will have an insignificant impact on Gilchrest Forest Management, and meets the state's Greatest Permanent Value standard than the current use for timber production.

Summary

The Port St. Lucie demonstrated the long term vision of the community to remove a barrier to growth as well as develop a creative way to bring in customers to the new sewer system via a low interest loan program for the cost of initial connection. This approach may be helpful to the Town of Paradise. The City of Malibu provided a good example of how an expensive project could be distributed between large commercial properties and smaller residential properties. The Yucca Valley case study demonstrates a phased approach to development of the sewer collection and treatment system and an example of how costs and benefits can be divided among the stakeholders assessed. The Crescent, Oregon example illustrates the impact of the large amount of land needed to implement a lagoon and land application approach to wastewater treatment.

ESTIMATED ECONOMIC IMPACTS TO THE TOWN OF PARADISE

With a population of about 27,000, and spread over 18 square miles of terrace topography, the Town of Paradise evolved from its roots as a desirable bedroom community and destination for retirees, to a home for young families in search of its rural, foothills community lifestyle (Rocky Mountain Institute, 2004, p. 7-1). Commercial businesses, including service, medical, and retail sectors, accompanied the population growth, but are fairly limited relative to the population. All properties rely on septic systems, and there are no public sewer systems, including within the business district.

The Town of Paradise relies upon over 11,000 individual septic systems to treat and disperse wastewater generated by residential and commercial land uses.

The Town of Paradise relies upon over 11,000 individual septic systems to treat and disperse wastewater generated by residential and commercial land uses. As the Town has grown and evolved, concerns over wastewater collection and treatment, especially in commercial areas, both downtown and elsewhere, has become more urgent (Town of Paradise, 2012, p. 2). According to a Paradise-commissioned report, some 27 septic systems along the Skyway have failed, another 39 are expected to fail in the next five years, and 56 are expected to fail in the next ten years (Scharaga, 2015). Most downtown businesses lack space for replacement leach fields, or funds for an engineered solution to individual septic issues. Businesses also face restrictions on what and how much can be put into their septic systems, which are sensitive to oils, fats, and excessive water, and that has led to limits on the functions that can take place on individual parcels. For example, some restaurants

face restrictions on number of tables allowed, washable versus disposal dishes, employees hired, or in some cases even whether there is a public restroom (Town of Paradise, 2012; Scharaga, 2015).

Wastewater problems in the Town have long been recognized, with many septic system failures noted even in the 1970s. Water sampling conducted in the late 1970s through 1982 found high bacteria levels in surface waters and some private drinking wells around the commercial district, and septic system problems thought to be the source (Rocky Mountain Institute, 2004, p. 7-3). According to a 1992 Town of Paradise report, the 1980s showed significant commercial growth for the nearby cities of Chico and Oroville, with growth in sales tax revenues per capita of 37 percent and 45 percent, respectively. Paradise, meanwhile, saw only an 8 percent increase in sales tax revenues per capita (Town of Paradise, 1992, Table II). At the time, the Paradise business community perceived itself to be at a competitive disadvantage to Chico due to the lack of a wastewater collection and treatment system, small lot sizes, and a strained soil capacity in the Paradise business district, which often precluded commercial development and building renovations that would increase wastewater generation.

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Despite the recognized need for sewer infrastructure to service the downtown commercial area, the Town and its Council rejected several proposals, prepared from studies beginning with a 1988 feasibility study, as too costly to the business community. Many residents were also upset with how assessment units were assigned to properties, the implications of sewers for the growth on the Town's character, and the projected construction cost of the sewer system (Rocky Mountain Institute, 2004, p. 3-2).

Following defeat of the sewer plan, an onsite wastewater management program became the means for Paradise to manage all wastewater systems in Town. This program is highly regarded in the state, and "represented a permanent solution for residential areas." However, over the past several decades of growth, the need for a better means of wastewater collection and treatment, especially in commercial areas and densely populated residential areas, has become more urgent. As noted in a 2012 report to the Town Council, "This [urgency] is particularly true within the Town's more intensively developed Downtown and other commercial areas where septic system failures are increasing and available land for replacement leach fields is constrained, or non-existent… the Town's commercial areas would be severely limited if a more permanent solution was not attained" (Town of Paradise, 2012, p. 2).

According to the 2010 Census, the Town's population was 26,218, and included 12,981 housing units. California Department of Finance (CDF) is responsible for preparing population projections for each of the state's counties. **Table 2.1** shows CDF's projection for Butte County, starting from the 2010 Census and projecting through to the year 2040. **Table 2.2** presents the projection for the Town of Paradise if it grows at a rate similar to that of Butte County as a whole. The median home price in Butte County from November, 2013, the latest data available, is $255,950, according to the California Association of Realtors (CAR, 2016). Zillow indicates the current home value in the Town of Paradise is $228,200 (Zillow, 2016).

Table 2.1 – Butte County Population (2010) and Projections to 2040

	2010	2015	2020	2025	2030	2035	2040
Butte County	220,273	226,656	236,936	247,378	254,725	264,150	267,852

Source: California Department of Finance, 2014.

Table 2.2 – Town of Paradise Population (2010) and Projections to 2040

	2010	2015	2020	2025	2030	2035	2040
Town of Paradise	26,218	26,978	28,202	29,445	30,320	31,442	31,883

Source: U.S. Census (2010), and adapted from California Department of Finance, 2014, with Butte County projections applied to the Town of Paradise.

The data seem to indicate that both population and home values have not risen on pace with the rest of Butte County and are the lack of typical sewer service appears to contribute as a limitation.

THE COST OF DOING NOTHING: LIMITS TO GROWTH WITHOUT A PUBLIC SEWER SYSTEM

Town of Paradise commercial businesses face a difficult future without resolution to its wastewater collection problem. Existing septic systems in the business district continue to function, but continuing failures can and will harm existing and adjacent businesses that utilize common leach field areas, as well as contamination of the groundwater underlying the community.

Many of the commercial businesses are unable to afford the high cost of septic system repairs or replacement. In addition, limitations on business operations, such as the number of tables allowed in restaurants, the number of chairs in a salon, or the number employees that a business can hire, restrict their ability to pay for costly repairs. Septic systems also limit or prohibit existing businesses or commercial property owners from expanding or developing property to maximize its full potential, or restrict their ability to take advantage of market opportunities.

The restrictions have a broader effect beyond individual businesses. They burden the overall local economy's ability to grow and diversify, as well as limit resiliency of businesses during any sustained economic downturn. Business districts thrive and survive based on the diversity of its members and the goods and services provided. It is the collection of businesses, more than the sum of the individual ones, that draws customers to shop in a particular business district as opposed to other places (for example, Chico). Retail shoppers who come to the district may choose to purchase additional items from that of their original intended visit. This could mean buying a latte, enjoying a meal, filling the car with gas, and stopping by the bank or credit union before returning home. Employees of other businesses also tend to shop locally. There will be less incentive for potential customers to choose to visit the business district if the diversity of business offerings continues to shrink.

There are two alternatives presently being considered: local control and treatment vs. regional connection. The first alternative would have the Town of Paradise build its own treatment plant. The second alternative would connect to Chico's sewer system via a regional pipeline.

Action Alternative Effects

There are two alternatives presently being considered: local control and treatment vs. regional connection. The first alternative would have the Town of Paradise build its own treatment plant. The second alternative would connect to Chico's sewer system via a regional pipeline. The below analysis considers the economic effects of the regional alternative.

The Regional Option for creating a collection system and connections for 1,400 customers, as well as a conveyance pipeline to the Chico treatment plant, has an estimated capital cost of $83 million. With a four percent rate of interest for capital financing, annual repayment costs amount to a total of $6,107,285. This figure does not include annual operating and maintenance costs.

The capital cost of the collection system within the Town of Paradise is estimated to be $47 million of the total for the Regional Option, with an annual capital repayment cost of $3.5 million. Based on this annual cost on construction and operation costs for large infrastructure projects such as a sewer serving 1,400 customers, and applying estimates from comparable studies, the following economic impacts can be anticipated:

- An additional 55 jobs in wastewater management and treatment (based on 16 jobs per $1 million in local investment).
- An additional 161 total jobs in all sectors in the Town of Paradise and vicinity (based on a 2.9177 employment multiplier)
- An additional $12.8 million in additional sales and output in the region in all sectors within the Town of Paradise (based on a 2.10 output multiplier).

- An estimated long term regional impact of an additional $68.3 million in private and public investment, and an additional $56.4 million increase in the property tax base (based on past research in water and sewer infrastructure impacts (Bagi, 2002)).
- An estimated increase in property values of five to thirteen percent.

NO PROJECT OPTION

The No Project Option of the Sewer Project study evaluated the impacts on the economic growth of the Town if no improvements to the existing sewer collection and treatment system were made. The study confirmed that the economic potential of the Town is limited due to a lack of a centralized wastewater treatment system.

All businesses in Paradise currently fall into one of two categories: those businesses that have adequate land for an effective septic tank/leach field system and those that do not. Commercial properties that do not have enough land for a suitably sized leach field are limited to three alternatives:

- Reduce the size of their operation—a profit limiting solution and a step that may lead to the closing of a business
- Purchase additional land for wastewater disposal – an expensive option, many times untenable for small businesses and impossible for businesses with no additional land to purchase
- Install a more robust treatment system (such as batch reactor or an in-situ biological filter system) to reduce the leach field area required for effluent disposal—another expensive option that is not possible for many small businesses

Commercial properties with failing septic systems that lack the capital for a new treatment system must limit both sewage demand and customer base. The same applies for commercial properties that cannot afford to purchase additional land for a leach field. For commercial properties with higher water demands and sewage loading, like restaurants, growth is not possible and even sustaining the existing level of operation is a struggle.

A centralized sewer system serving the commercial core of the Town would remove the limitations on economic growth and encourage new business ventures and current Town businesses to invest and expand. The discussion below attempts to define and quantify the socio-economic benefits of a sewer project to the Town of Paradise.

PROJECT VS. NO PROJECT OPTION

All of the project alternatives provide equal initial benefit to the commercial core of the Town, with the exception of the No Project Option.

The No Project Option has been chosen in the past for economic reasons. This option is fatally flawed within the study because it does not solve the problem nor does it meet the current and future needs of the Town. By selecting the No Project Option, each property owner within the service area would continue to be financially responsible to solve the problems that result from a septic system failure. A septic system failure could be catastrophic for business owners and lead to a total loss of the business. If their system fails and they lack the land area or capital to build a newer or more technically robust system, their business and property value effectively goes to $0.

3
Public Involvement and Outreach

One of the most crucial elements of the sewer project feasibility study is the full involvement of the public and critical project stakeholders throughout the entire process. One of the key lessons learned from the completion of prior studies and history of inaction is that for a project of any type to move forward, the public must be provided with good, factual information from the beginning. The decision process for a project of this magnitude needs also the decision making process needs to be open, transparent and provide multiple opportunities for public input. A multi-faceted outreach program was developed by the consultants to ensure a high level of community participation. This program includes the following components:

- Development of a Public Participation Plan
- Development and launch of www.paradisesewer.com
- Provide monthly updates and public comment period at regularly scheduled Town Council meetings
- Formation of a Project Stakeholder Group
- Host public workshops at critical stages of the study process
- Identify and coordinate with interested private and public sector parties

Public Meeting

PUBLIC PARTICIPATION PLAN

The Public Participation Plan, included in the Appendix, was formulated to provide a written approach to implementing various public engagement activities. The plan identified key audiences, listed below:

- All Town of Paradise Residents
- Town of Paradise Residents in Potential Service Boundary Area
- Town of Paradise Businesses in Potential Service Boundary Area
- Chamber of Commerce
- Butte Environmental Council
- Media
- Butte County
- City of Chico
- Regulatory agencies

The Public Participation Plan also included key messages which were to be emphasized through the public process and development of the study. These messages are summarized below:

NEED

- Paradise is one of the largest municipalities in the country that relies solely on septic systems for the treatment and dispersal of its wastewater
- Downtown business corridor septic system failures continue to increase
- Available land for replacement leach fields is constrained or non-existent
- Groundwater is impacted by the quantity of septic systems and system failures, as are local streams, a precious resource in Butte County
- A better wastewater collection and treatment system is becoming an urgent necessity

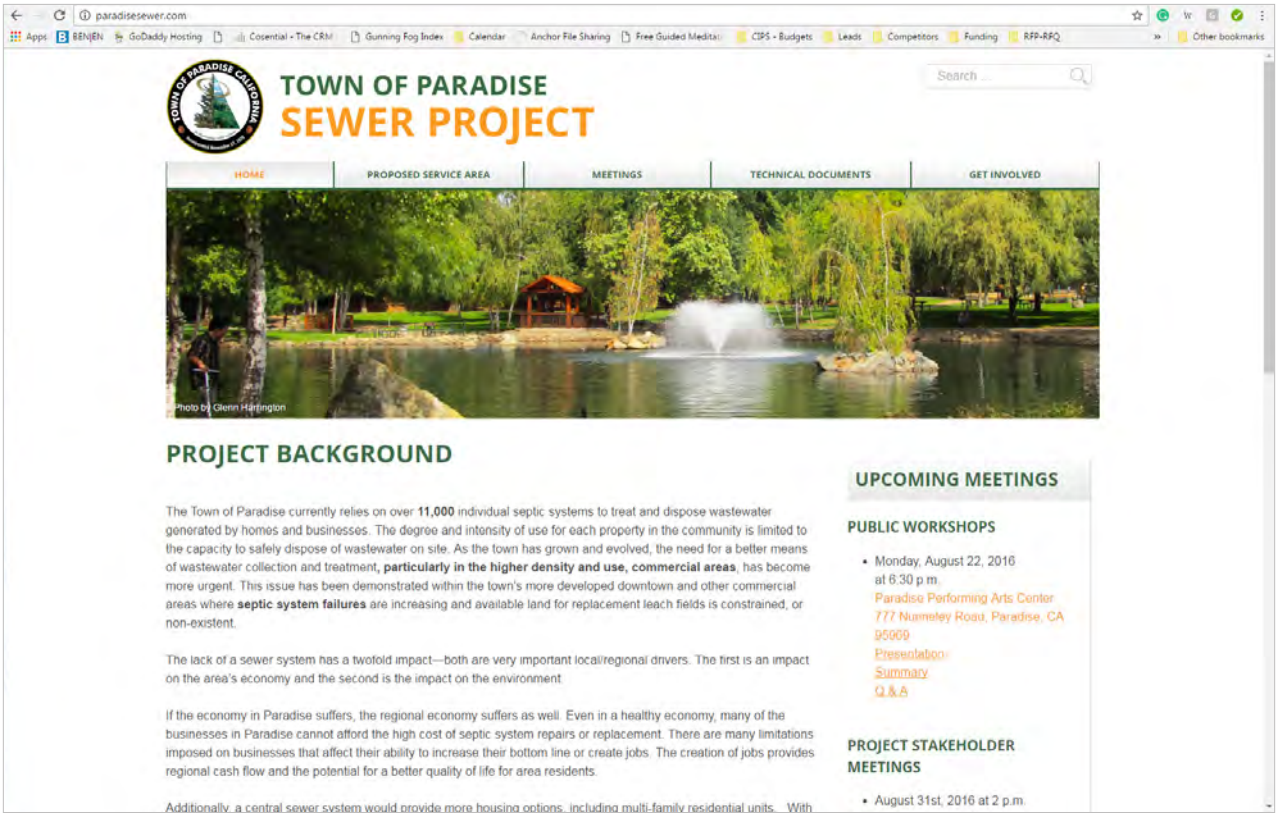
BENEFITS

- Positive economic impact
- Businesses will no longer have to take extraordinary measures to prevent or reduce septic system failures
- Multi-family, affordable housing developments will no longer be considered unsuitable land use due to constraints from too-small septic systems
- Environmental impact
- The risk of groundwater and local streams pollution by failing septic systems will be decreased

PLANNING PROCESS

- By working together to identify the appropriate solution to the Town of Paradise sewer problem, the Town gets better together
- The Project Stakeholder Group and frequent public open houses will provide Paradise residents and businesses opportunities to help plan and guide the process

Lastly, the Public Participation Plan provided a step-by-step outline of proposed public engagement activities. This outline primarily focused on hosting public workshops as needed with regular public input opportunities throughout.



Project Website

PARADISESEWER.COM WEBSITE LAUNCH

The intent of launch a dedicated website to the study was to provide a central location for all project information including previous studies, public engagement opportunities, frequently asked questions, and an interactive service area boundary map. These tools allowed residents with zero project background information to perform their own research and get needed critical information. Residents were also able to determine in real time if their property was in the Proposed Service Area Boundary using a GIS-based map. This map accepts both Assessor's Parcel Number (APN) and property addresses to give a direct and clear answer for every property owner in Paradise. Finally, the website provides a direct means for residents to ask questions specific to their property. Copies of the website pages are included in Appendix X for reference.

These tools allowed residents with zero project background information to perform their own research and get needed critical information.

REGULAR COUNCIL MEETING UPDATES

See appendix for presentations, dates, and topics.

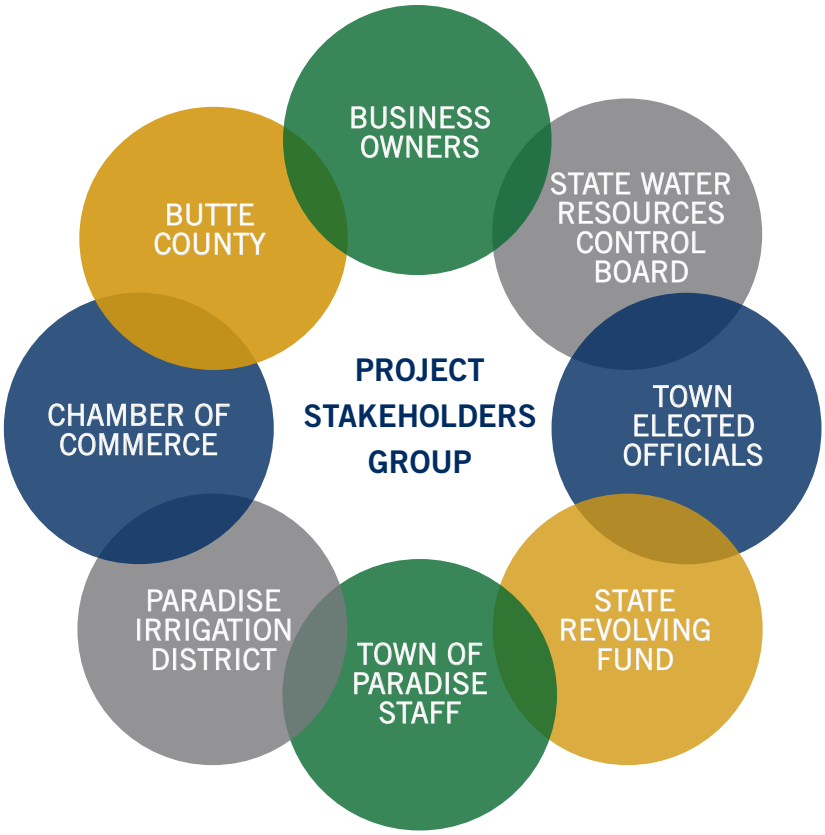
PROJECT STAKEHOLDER GROUP

The Project Stakeholder Group (PSG) was envisioned as an informal non-decision making body with participants representing a wide cross-section of the community and potentially impacted agencies. The intent of the PSG was to provide transparency and opportunity for timely input while arming representatives with good, quality information for them to distribute to their respective constituencies.

The following groups attended various PSG meetings:

- Chamber of Commerce
- State Water Resources Control Board Staff
- State Revolving Fund Staff
- Butte County Environmental Services Staff
- Various business owners within the Town
- Town of Paradise Staff
- City of Chico Staff
- Paradise Irrigation District Staff
- Elected officials

PSG meetings were open to the public, with most discussions involving the identified stakeholders. The PSG was particularly involved in the selection of evaluation criteria for the options analysis and the weighting of the criteria for the matrix. Meetings were held with the PSG at the Town Hall on the following dates:



JUNE 1, 2016

The Paradise Sewer Project Team gave a presentation outlining the background, purpose, and need for the project; the scope of the feasibility study; the project charter and roles of the team members; preliminary service area map; overview of the options to be evaluated; plan for future meetings; and finally the role of the PSG for the project. PSG members introduced themselves and were asked to share their thoughts on the project.

AUGUST 31, 2016

The meeting focus was on discussion of recent informational public meeting and feedback. Service Area Maps were handed out and discussed. Draft Alternatives Analysis Selection Criteria and Weighting were distributed for review, discussion, and modification. The no project alternative was also discussed.

OCTOBER 26, 2016

The Sewer Project Team provided an update on the study progress including: sewer flow estimation, types of sewer collection systems, alternative cost development, and discussion of revised alternatives selection criteria and revised weighting based on prior feedback. Feedback and discussion was primarily on the project costs and how it

translates down to the individual land owner in terms of assessment, connection fee, and monthly service charge. Concern was high for the number of Town residents who are retired and have fixed incomes.

JANUARY 25, 2017

The team presented the results of the socio-economic study and discussed project benefits and No Project Option impacts at a PSG meeting.

PUBLIC WORKSHOPS

Public Workshops were determined to be important throughout the development of the study. Some residents may not have access to the internet or attend Council meetings—therefore, hosting a dedicated date and time to discuss the project with the public has served as an effective engagement tool. The first public meetings were held June 15, 2016. Two meetings were held that day in order to provide multiple opportunities for local residents to learn more about the project. The first meeting was held from 2:00 p.m. to 3:30 p.m. and the second meeting was held from 6:30 p.m. to 8:00 p.m.

Public Meeting Participation

Notification for the meeting was provided with a postcard that was mailed to every address in Town. The intention of reaching the entire Town was to provide a comprehensive overview of the study and to make one facet of the project clear: only those who are in the district pay for the project. An advertisement was placed in the Paradise Post and ran in the Saturday June 11, 2016 edition of the paper. A news release was also sent to the Paradise Post, and that ran in the online edition of the newspaper. Copies of these notifications can be found in the Appendix.

On August 22, 2016 a third public meeting was held to share information with residents about the service area boundary and the status of the feasibility study. This meeting also allowed local residents additional opportunities to ask questions about the Project. Notification for the meeting was provided with a postcard that was mailed to residents and property owners who were within the Proposed

Service Area Boundary only, approximately 1,168 addresses. The intention of reaching the service area only was to definitively notify owners of their properties' status as included in the study, and subsequently a potential sewer district. An advertisement was placed in the Paradise Post and ran in the Wednesday, August 17, 2016 edition of the paper. A news release was also sent to the Paradise Post. A media advisory was sent to Action News/ KHSL, KRCR, and KCVU. Copies of these notifications and a complete summary of the meeting is provided in the Appendix. The meeting included a formal presentation covering information on Project status, proposed service boundary area, anticipated flows, funding structures, and next steps. After the presentation was complete, the engineering consulting team and Town of Paradise staff answered questions in an open forum. Attendee questions ranged in topics from pump station types and locations, service area boundary, timeline, and property values. While some answers were straight forward, many were yet to be determined since the Project was still in early stages.

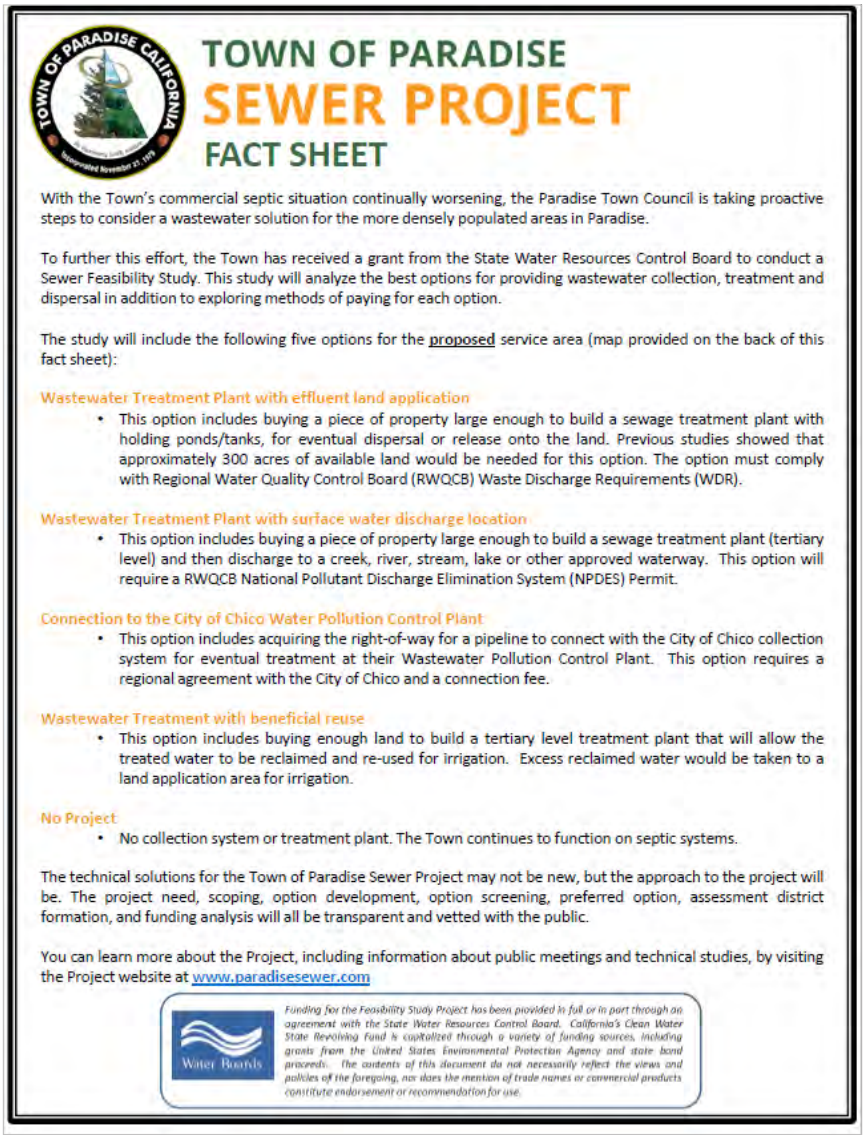
Public Meeting Postcard

TECHNICAL ENGAGEMENT MEETINGS

The project team met with the following individuals and organizations to gather information, develop the project options, and understand opportunities for project synergies with other work in the region.

- Town of Paradise Staff on service area and land use
- Equipment and process vendors to gather capital and operations costs
- City of Chico to discuss technical challenges and opportunities of the Regional Option
- Butte County to discuss land use and WWTP siting and environmental resource background data
- RWQCB to discuss WWTP discharge options and anticipated permit limits
- Tuscan Ridge Golf Course to discuss reclaimed water reuse opportunities
- Paradise Irrigation District to discuss water demand data and reclaimed water reuse opportunities
- California Water Service to discuss operations costs and reclaimed water opportunities

The outcome of these technical engagement meetings was that the feasibility study team had a much better understanding of other agency roles and responsibilities, alignment of goals with the Town of Paradise and the potential sewer district to be formed, opportunities for future collaboration, and the limitations the agencies have going forward. All of the agencies contacted expressed enthusiasm and encouragement for the sewer project going forward and were open to future discussions to provide technical assistance and data.



TOWN OF PARADISE
SEWER PROJECT
FACT SHEET

With the Town's commercial septic situation continually worsening, the Paradise Town Council is taking proactive steps to consider a wastewater solution for the more densely populated areas in Paradise.

To further this effort, the Town has received a grant from the State Water Resources Control Board to conduct a Sewer Feasibility Study. This study will analyze the best options for providing wastewater collection, treatment and dispersal in addition to exploring methods of paying for each option.

The study will include the following five options for the **proposed** service area (map provided on the back of this fact sheet):

Wastewater Treatment Plant with effluent land application

- This option includes buying a piece of property large enough to build a sewage treatment plant with holding ponds/tanks, for eventual dispersal or release onto the land. Previous studies showed that approximately 300 acres of available land would be needed for this option. The option must comply with Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements (WDR).

Wastewater Treatment Plant with surface water discharge location

- This option includes buying a piece of property large enough to build a sewage treatment plant (tertiary level) and then discharge to a creek, river, stream, lake or other approved waterway. This option will require a RWQCB National Pollutant Discharge Elimination System (NPDES) Permit.

Connection to the City of Chico Water Pollution Control Plant

- This option includes acquiring the right-of-way for a pipeline to connect with the City of Chico collection system for eventual treatment at their Wastewater Pollution Control Plant. This option requires a regional agreement with the City of Chico and a connection fee.

Wastewater Treatment with beneficial reuse

- This option includes buying enough land to build a tertiary level treatment plant that will allow the treated water to be reclaimed and re-used for irrigation. Excess reclaimed water would be taken to a land application area for irrigation.

No Project

- No collection system or treatment plant. The Town continues to function on septic systems.

The technical solutions for the Town of Paradise Sewer Project may not be new, but the approach to the project will be. The project need, scoping, option development, option screening, preferred option, assessment district formation, and funding analysis will all be transparent and vetted with the public.

You can learn more about the Project, including information about public meetings and technical studies, by visiting the Project website at www.paradisesewer.com

Water Boards

Funding for the Feasibility Study Project has been provided in full or in part through an agreement with the State Water Resources Control Board. California's Clean Water State Revolving Fund is capitalized through a variety of funding sources, including grants from the United States Environmental Protection Agency and state bond proceeds. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

Public Meeting Flier

4
Service Area

The following section describes the project history and current need for the Town of Paradise to implement a centralized sewer system. Details about how the service area will be served by the sewer system, the sewer service plan, and the opportunity for the public to provide input on the service area and map are provided below.

HISTORY

The proposed service area for this Feasibility Study is based on the original areas designated in previous studies for downtown revitalization and redevelopment. The study also considers anticipated areas of future commercial density, infill, or more densely populated multi-family residential parcels. The proposed service area boundary serves 1,471 parcels through the Skyway, Clark Road, and Pearson Road corridors, as shown in **Figure 4.1**.

The service area boundary was developed based on primarily the most densely populated areas and commercial corridors that can be served with the most efficient investment in collection pipelines. The majority of residential parcels within Town limits are outside of the service area boundary, which means the land use and character of the Town is not anticipated to change. The septic system density in most residential areas is adequate for sewer treatment and is not anticipated to significantly change. **Landowners of parcels outside the service area would not participate in a vote for formation of the special district nor bear any financial responsibility for the costs of the project.**

Landowners of parcels outside the service area would not participate in a vote for formation of the special district nor bear any financial responsibility for the costs of the project.

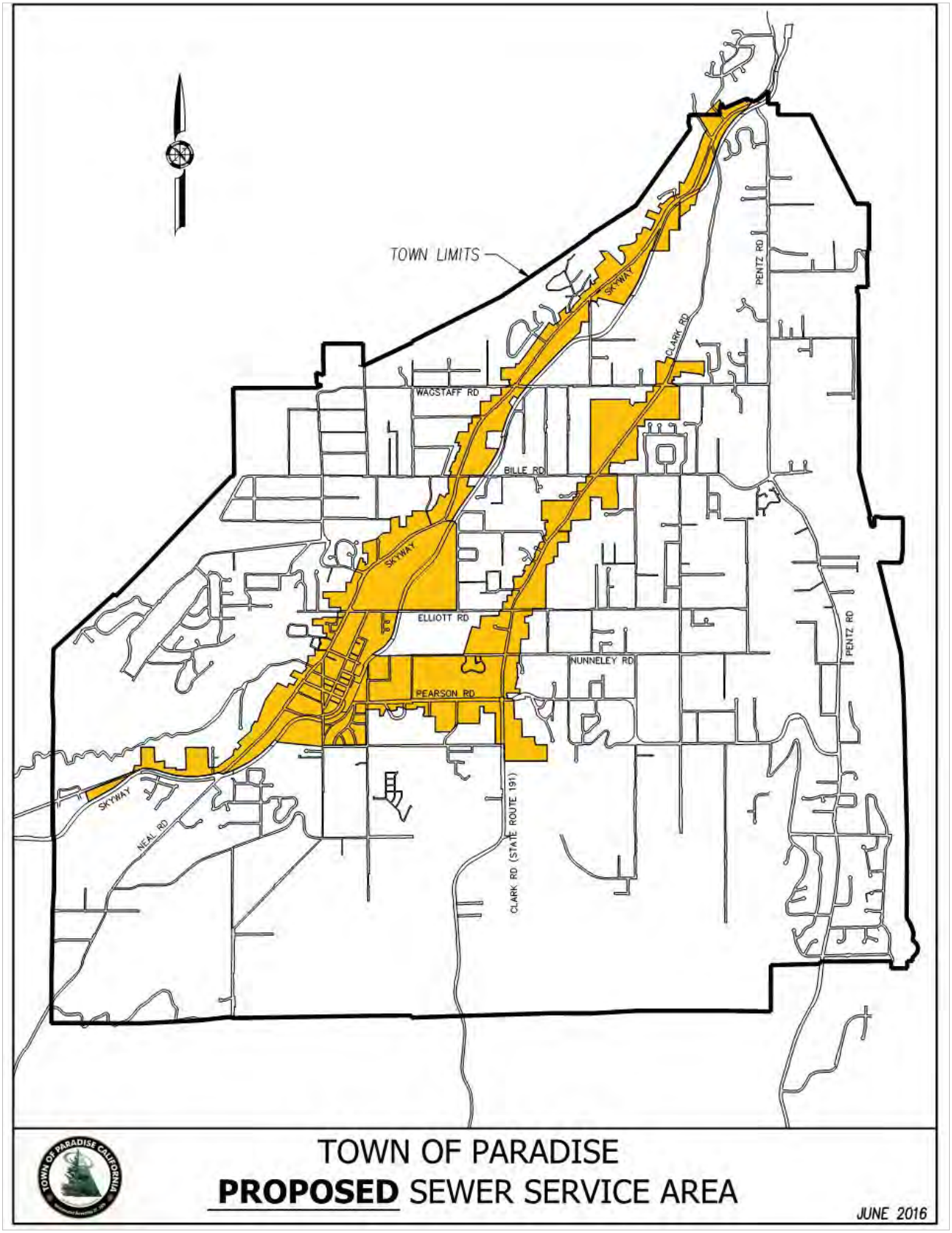


Figure 4.1 – Town of Paradise Proposed Sewer Service Area

The Town will consider adjustment to the proposed service area based on land use changes and public input prior to a final project approval. Parcel owners with land nearby and adjacent to the proposed service area boundary have requested to be included in the study area. All requests will be considered, and many have been accommodated to date.

NEED

Defining an exact service area is critical to the success of the plan. This allows for an accurate estimate for waste flow, which dictates the appropriate collection system size and treatment options. The service area will be defined on a map and provide a count of who will vote on the formation of a special sewer district.

The need to modernize the densely populated areas and commercial corridor district with a centralized sewer system is clear. To date, there have been 27 septic system failures. This is just the beginning. It is expected that 39 more will fail in the next five years, based on monitoring the existing systems. In 2015, nine septic system replacements were completed. In 2016, six more were replaced. The cost of replacement can vary by the severity of the system failure. For some, the cost can be as high as $80,000 to $100,000—these are costs that can force businesses, especially small businesses to relocate or close their doors altogether. The impacts of the septic systems and their high repair costs are noticeable. Some restaurants have restricted service because their septic tank and leach field systems cannot accommodate full-service loading and have limited leach field infiltration capacity – meaning fewer seats in the restaurant, fewer booths in the salon, fewer hours of operation or equivalent reduction in economic and community potential.

To date, there have been 27 septic system failures. This is just the beginning. It is expected that 39 more will fail in the next five years, based on monitoring the existing systems. In 2015, nine septic system repairs were completed. In 2016, six more were repaired.

SERVICE PLAN

Prior studies have looked at slightly different service areas, but all emphasize the Skyway, Pearson Road, and Clark Road commercial corridors. This study looked at each corridor, with significant consideration of the topography, and created a conceptual layout of pipelines to serve parcels within the service area. Prior studies have also evaluated both gravity and low pressure collection systems.

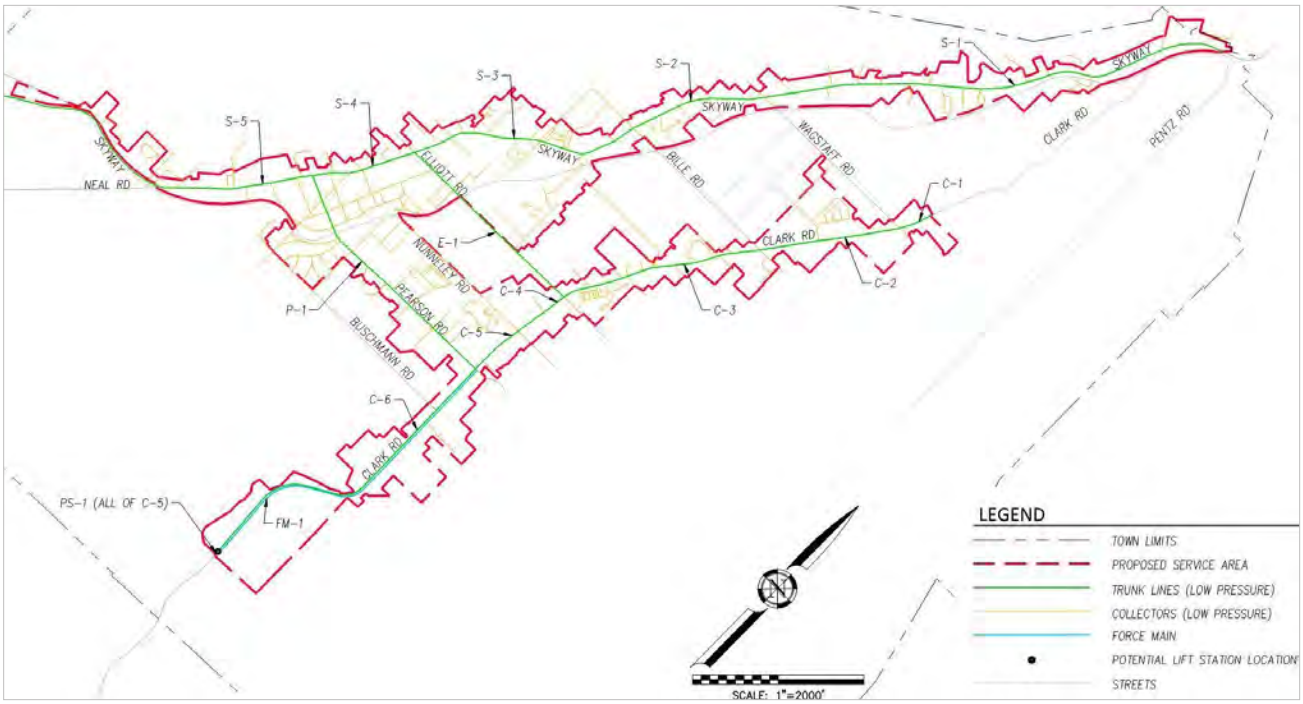


Figure 4.2 – Service Area Collection System

The initial layout of a gravity collection system requires a lift station with sewer force mains. This option proved to be much more expensive than a low-pressure system fed by individual septic tank pumps. Due to the difference in cost, a low-pressure system was developed for the feasibility-level collection system cost estimate, as shown in **Figure 4.2**. The low-pressure collection system relies on small diameter laterals to transport effluent from on-site septic tanks with small pumps or gravity (where head is available) to a collector. Collectors are located in each street within the service area. The collectors convey wastewater to the trunk lines, which are located in the major corridor streets. The trunk lines move the wastewater to the treatment facility. This system reduces the number of pipes buried in the streets.

The service area was divided into shed areas based on major road intersections and topography. The following is a description of each sewer-shed area.

UPPER CLARK

The Upper Clark shed area includes all connecting parcels north of Nunnely Road, within the service area. The area also includes connecting parcels between Nunneley Road and Pearson Road east of Clark Road and those within approximately 500 feet west of Clark Road. These parcels can feasibly connect service laterals directly to the trunk line.

LOWER CLARK

The Lower Clark shed area includes connecting parcels in the service area on Clark Road, south of Pearson Road. The 350-foot elevation change from the southern service area boundary to the intersection of Pearson Road and Clark Road may require the use of a pump station to convey the wastewater to the trunk line at Pearson Road.

PEARSON

The Pearson shed area includes connecting parcels between Nunneley Road and Pearson Road, from Clark Road to the Memorial Trail. It also includes the connecting parcels south of Pearson Road to the service area boundary. The Pearson Road corridor trunk line will have a larger pipe diameter compared to other corridors to accommodate more wastewater flow from the Clark Road shed areas. The trunk line will convey wastewater to the proposed treatment facility near Skyway or to a regional pipeline connecting to the City of Chico's WPCP.

UPPER SKYWAY

The Upper Skyway shed area includes the connecting parcels within the service area from the northern service area on Skyway near Pentz Road, to Pearson Road, and is bordered by the Memorial Trail to the east near the Pearson Road and Skyway intersection. The trunk line running down Skyway will utilize the topography and gravity to convey wastewater to the lower elevation, while maintaining low-pressure in the system. Parcels with an elevation higher than the street along Skyway may be equipped with a gravity connection rather than a pumped connection.

LOWER SKYWAY

The Lower Skyway shed area includes connecting parcels along skyway south of Pearson Road. The area between Pearson Road and Buschmann Road is also included. The trunk line in the Lower Skyway area is a large diameter pipe because it must transport all the wastewater flow of the collection system to the treatment facility.

A list of all parcels, areas, and anticipated average dry weather flows is included in the Appendix.

CONSTRUCTION PHASING

At a feasibility design level, the construction for the conceptual collection system is presumed to be a phased process.

Collection system construction phasing would begin at the treatment facility or regional pipeline connection and work up from the lower elevation sewer-shed areas to the higher elevation shed areas. Areas

furthest from the major corridors connected by collectors, such as parcels along Nunneley Road, will likely be connected during later phases of construction. Larger diameter trunk lines installed in major corridors, like Pearson Road, would have tie-ins positioned for connecting collectors and laterals during later phases of construction.

The on-site construction of the septic tank effluent systems would occur during the same phase as adjacent conveyance system construction. Ongoing coordination efforts with individual land owners will be an important element of construction.

PUBLIC OUTREACH

The draft service area map was released for comment at a June 2016 Project Stakeholder Group meeting. After review by Town planning staff, the map was shared at the August 2016 public meeting and added to the project website.

The interactive website map allows Town residents to search for an address or Assessor's Parcel Number (APN) to determine if a particular parcel is included in the proposed service area. The project team received comments at the public meeting, where some parcel owners asked how they could be added to the service area while others asked if they would have the ability to "opt-out" if they choose. The project team fielded all questions, and let meeting attendees know the ability to join or leave the service area would be decided by the Town Council. All parcels within the final service area will be assessed to help pay for the project as they receive benefit.

...some parcel owners asked how they could be added to the service area while others asked if they would have the ability to "opt-out" if they choose. The project team...let meeting attendees know the ability to join or leave the service area would be decided by the Town Council.

Other questions about project timing and connecting to the system were discussed. Some parcel owners asked if they would need to connect immediately, even if their septic system was functioning well. The attendees were told that this will be determined by the specific districts. Some districts will allow customers to connect at a later date, but will provide incentive to customers to connect to the system sooner rather than later.

5
Wastewater Generation and Collection

COLLECTION SYSTEM

OVERVIEW

The collection and conveyance system for the Town of Paradise service area would require a hybrid system of pumping and gravity pipelines to convey wastewater to a treatment facility. The varying topography throughout the service area will require pumping for areas in lower elevations (in canyons) to convey wastewater to areas where gravity flow becomes more efficient. A gravity system and a pumped effluent sewer system were analyzed and compared. The analysis looked at routes to a treatment facility that may be located down either Skyway or Clark Road. The analysis considered pipe sizes, depths, lengths, and associated costs for the options. Upon review of the initial cost estimates, the effluent sewer system has lower costs due to shallow pipes, fewer manholes, and fewer pump stations.

A conventional gravity system, using lift stations at low points, was the initial alternative analyzed for the service area. This alternative would seem reasonable for an area with naturally sloping topography, using gravity to move wastewater to a treatment facility. However, the undulating terrain in the Town of Paradise would require a large number of pump stations and force mains and deeper trenching for gravity pipes to convey wastewater to a treatment location. The cost of a gravity

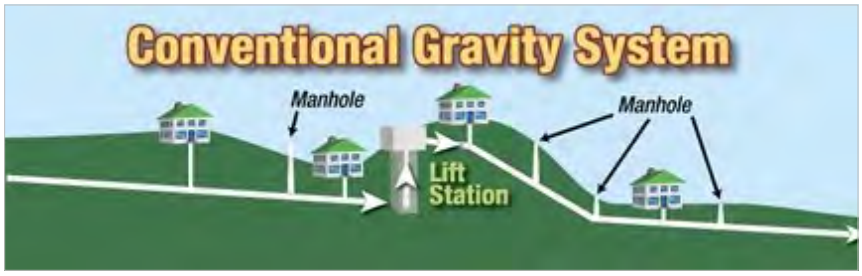


Figure 5.1 – Conventional Gravity Sewer System
(http://www.orenco.com/systems/wastewater_collection.cfm)

dominated system proved to be high, approximately double that of an effluent sewer system. **Figure 5.1** shows a conceptual illustration of a conventional gravity sewer system with pump stations.

An effluent sewer system was the other alternative analyzed as an option for collection and conveyance of wastewater. The effluent sewer systems will use a septic tank (primary treatment) for each connection and convey the effluent by means of pump or gravity to the collection system. The effluent sewer system will operate under low pressure and will reduce cost of the collection and conveyance system compared to a conventional gravity sewer system. The lower cost is due to a reduction in pipe size, shallower depth of pipe installation, fewer manholes, and fewer pump stations. **Figure 5.2** shows a conceptual illustration of a effluent sewer system.

Figure 5.2 – Effluent Sewer System
(http://www.orenco.com/systems/wastewater_collection.cfm)

FEASIBILITY-LEVEL DESIGN

Onsite Facilities (Private)

The effluent sewer system will require each connection to use a septic tank to separate solids and decant effluent wastewater for conveyance to a treatment facility. The existing onsite septic tanks may be evaluated for usefulness in the effluent sewer system, however it is assumed that a majority of the existing septic tanks will be replaced. Due to the varying topography in the Town of Paradise, the onsite (private facilities) will require either an effluent pumping system or an effluent gravity system. The size of the onsite systems will be site-specific based on design

Figure 5.3 – STEP and STEG Collection Systems

loading. Connections with high solids loading may require a grinder pump system to manage solids and reduce the frequency of periodic septage pumping requirements. **Figure 5.3** illustrates a septic tank effluent pumping (STEP) system located below the grade line of the collector pipeline and a septic tank effluent gravity (STEG) system located above the grade line of the collector pipeline.

1. STEP system connections (**Figure 5.4**)
    a. Primary Tank – Influent is separated by gravity, with solids settling and fats, oils and grease rising to the top. Effluent (water) from the middle of the tank is decanted to the secondary tank.
    b. Secondary (Pumping) Tank – Effluent is accumulated until a design volume (size dependent) is reach for pumping. The pump discharges to the service connection lateral under low pressure.
    c. Controls and SCADA – The STEP system is equipped with a system that provides power, controls, and alarms for the system.
2. STEG system connections
    a. Primary Tank – Same as STEP system.
    b. Secondary Tank – A drain line from the secondary tank will discharge to the service connection lateral. Effluent gravity systems will only work where the secondary tank is in a location that is above the energy grade line (EGL) of the pressurized system.
    c. The STEG systems will be equipped with an alarm in case of a clog and/or overflow. No power is required except for the alarm.

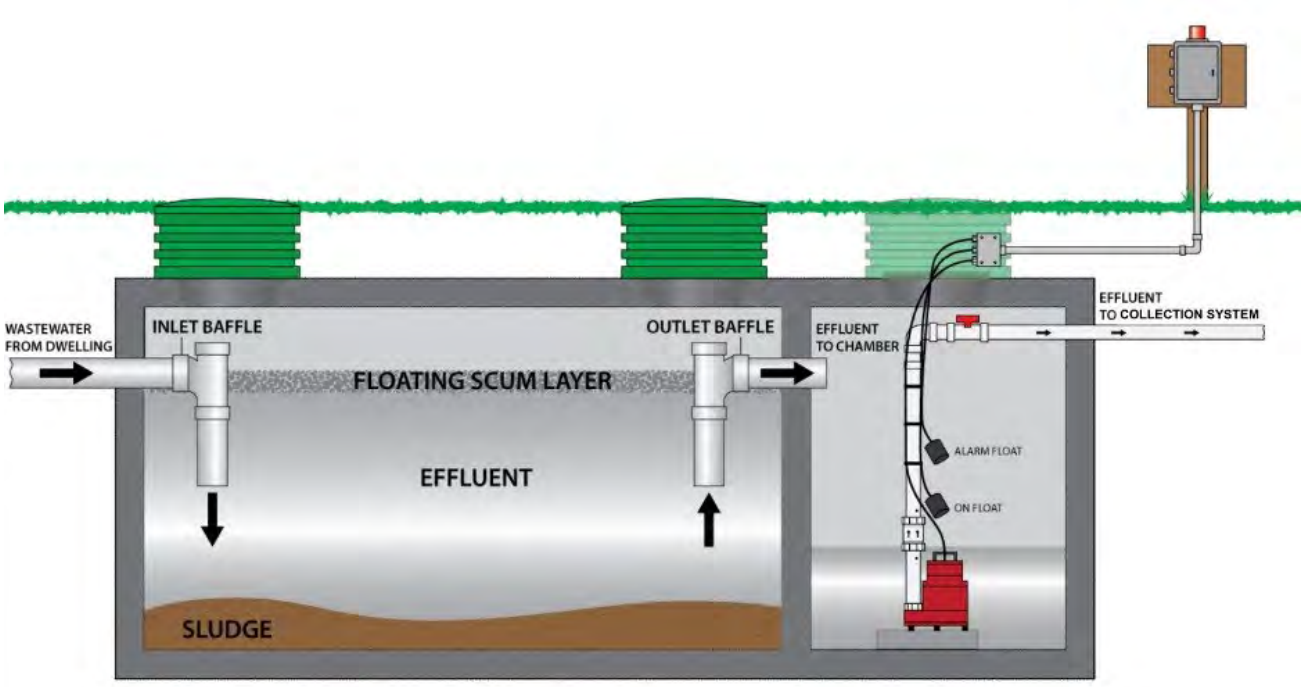


Figure 5.4 – STEP Tank Detail

3. Additional requirements for connection

   a. House to Tanks Connection – The new STEP or STEG tanks will require a new gravity connection from the house sewer pipeline to the tank.

   b. Septic Tank Decommissioning – The existing on-site septic tanks will require removal or abandonment. **It would be the responsibility of the property owner to demolish and remove or properly abandon in place (pump septage, seal inlets, and outlets, etc.) the existing septic tanks and leach fields.**

Business and home owners should understand that this system still utilizes a tank on their property and the tank will need to be maintained on a similar frequency to the current septic systems they have now. The tanks will likely need to be pumped by a septage hauler for sludge and grease buildup every 10 to 15 years. Commercial properties, especially restaurants, may have to be pumped more often. Restaurants should use grease traps ahead of their tanks to prolong the tank's maintenance cycle.

Laterals

The sewer service laterals convey water from the individual tanks for each service connection to the collector pipelines located in the public right-of-way. The laterals include pipe owned by the property owner (private) and a portion of pipeline in public right-of-way, which is the responsibility of the Town or Service District.

1. Lateral Installation – The effluent sewer system uses smaller laterals, typically no larger than 1.5-inch diameter pipe, installed at a shallower depth than conventional gravity sewer laterals (4-inch pipe). In many cases, the effluent sewer laterals may be installed using directional drilling, minimizing damage to property and reducing the need for road closures due to open trenches.
2. Feasibility Assumptions
    a. Private Laterals – 100 feet of lateral on private property (up to the public right-of-way) is the assumed average length that **will be the responsibility of the property owners**. This assumption includes the distance from the tank to the back of walk.

Collectors

Collector pipelines are located in the public right-of-way through the service area and provide collection of wastewater from the service laterals.

1. Gravity Collectors – A conventional gravity system conveys wastewater through the collectors to manholes then into trunk lines for conveyance to the treatment plant. Gravity collectors require larger pipes to accommodate gravity flow in an 80 percent full pipe. Gravity pipe installations require open trenching to provide adequate slope, increasing the cost of the project.
2. Effluent Collectors – Since the effluent sewer system is a pressurized, closed system, the collector will increase in size as flow accumulates as wastewater moves toward the treatment facility. The pressurized laterals can connect directly into the collector, eliminating the need for trunk lines and reducing the amount of pipe needed to convey wastewater through the system.

Trunk Lines

Trunk lines are typical in conventional gravity sewer systems. The trunk lines convey larger volumes of wastewater through the service area and usually run in parallel to the collectors. The conventional approach proved a very costly alternative in the analysis. For a more reasonable cost of construction, trunk lines and collectors would both receive flow directly from laterals, reducing the length of pipe required.

The pressurized laterals of the effluent sewer system can connect directly into any size collector, eliminating the need for trunk lines and reducing the amount of pipe needed to convey wastewater through the system. The pipe sizes of the effluent system are generally smaller in diameter, as the pipes flow completely full when under pressure pressurized.

Pump Stations (Lift Stations)

In areas with significant changes in elevation, such as the Town of Paradise, pump stations are required in a conventional gravity sewer system. The accumulation of flow by gravity to the low points in the system are pumped through a force main to a high point were gravity is then used to deliver flow to the next low point. With a gravity system, the service area in the Town of Paradise could require more than nine pump stations to lift wastewater out of the valleys and convey wastewater to a treatment facility down Skyway or Clark Road.

Eliminating the need for most, if not all, of the pump stations greatly reduces the cost of the collection and conveyance system.

The effluent sewer system does not require the use of pump stations (lift stations) for most of the service area, as each STEP or STEG tank provides the necessary pressure to convey the wastewater through the varying topography of the service area. In regions of the service area where it is required to pump the wastewater up several hundred feet, a pump station may still be required. Eliminating the need for most, if not all, of the pump stations greatly reduces the cost of the collection and conveyance system.

The elimination of pump stations reduces the cost of the system capital cost, land acquisition, as well as the operation and maintenance of a multitude of pumps and monitoring equipment.

Force Mains

A force main is the pressurized wastewater discharged from pump stations in a conventional sewer system. A system that requires the use of force mains can have two pipes in parallel to convey the collected wastewater to the pump station by gravity and then the force main to convey the pressurized wastewater to the next high point, depending on the location of the wastewater treatment facility.

In addition to reducing or eliminating the pump stations, the effluent system reduces or eliminates the need for two pipes in parallel in the same streets. Each collector is technically a force main, with the ability to receive services connection directly.

Man Holes/Cleanouts

A conventional gravity sewer system requires the installation of a manhole approximately every 300 to 500 feet on collectors and trunk lines. Along with the need for manholes, a clean out is required on every service connection.

The effluent sewer system is a closed, pressurized system that eliminates the need for manholes. The elimination of manholes also greatly reduces the potential for nuisance odors throughout the service area. The solids separation that occurs in the on-site tanks means the need for cleanouts at each service connection is not required. The elimination of manholes and cleanouts reduces the cost of the collection system. The effluent sewer system also reduces the maintenance on the collection system, as solids that may cause clogging are greatly reduced or eliminated from the system in the onsite tanks.

FLOW DEVELOPMENT ASSUMPTIONS

APPROACH TO FLOWS

The development of sewer collection, conveyance, treatment, and disposal system options requires an estimate for the wastewater flows generated within the proposed service area. The land area of each zoning designation in the proposed service area boundary was determined by using overlapping parcel boundaries with zoning designation boundaries. Flow generation rates for each zoning designation were determined based on area of land for non-residential zoning designations and equivalent dwelling units (EDUs) per acre for residential zoning designations.

Previous Studies

Previous studies for sewer projects in the Town of Paradise were reviewed. Each study developed flows and loads for the proposed district boundary in a slightly different manner. The flow estimates from the previous studies did not provide flow generation by land use in a format conducive to the changes in the proposed service area boundary.

The results of the previous studies are as follows:

Town of Paradise Wastewater Collection, Treatment, and Disposal Preliminary Design Report, Volume 1 prepared by Nolte and Associates (Nolte), dated July 17, 1992

This report used land use and residential density to determine flows for the studied service area. The assumed wastewater generation was as follows:

- Town Residential = 200 gallons/residence per day (EDU)
- Multi-Family Residential = 165 gallons/residence per day
- (EDU) Commercial and Industrial = 2,000 gallons/acre per day

Limited assumptions were provided for the calculations, however the projected flow appeared reasonable for the purpose of the 1992 report.

2010 TOP Wastewater Treatment & Collection System Feasibility Study for the Downtown Community Cluster System prepared by NorthStar Engineering (NorthStar), dated April 21, 2010

This study describes a comprehensive approach to development of design flows with a percentage breakdown of residential zoning designations and differing flows for commercial designations based on type of business. The general wastewater generation was estimated as follows:

- Residential (including Multi-Family) = 225 gallons/unit per day, to maximum density
- Commercial (High Flow) = 1,200 gallons/acre per day
- Commercial (Low Flow) = 600 gallons/acre per day

This study also applied a 20 percent reduction of design flows based on the assumption the maximum density would not be fully realized. The approach outlined by NorthStar does not lend itself to changes in the service area boundary and recalculation. The previous studies lacked sufficient descriptions of calculations and assumptions to be utilized for the proposed service area for this current analysis.

NORTHERN CALIFORNIA WASTEWATER AGENCIES - DESIGN CRITERIA COMPARISON

Several sewer service providers in the region were reviewed to compare design flow evaluation criteria by land use to estimate design flow for the project. Each sewer service provider has a different approach to wastewater flow generation.

Comparative Flows

The average results of the comparative flows for similar land uses designations are as follows:

- Single Family Residential = 284 gallons/unit per day or EDU
- Multi-Family Residential = 216 gallons/unit per day or EDU
- Commercial and Industrial = 1,220 gallons/acre per day

The average of the comparative flows provides a general perspective on the area's wastewater generation. Historically the per capita flow range is 80-100 gallons per person per day.

Demographic Consideration

The sewer service providers reviewed for this analysis have different demographics from the Town of Paradise. The Average Dry Weather Flow (ADWF) assigned to a dwelling unit is assumed to be in relation to the average number of people in a single family residence. Some of the more urban communities or regional sewer agencies use a somewhat higher flow rate per EDU.

A comparison of the other northern California communities to the Town of Paradise was reviewed for this analysis to aid in the development of daily wastewater generation per EDU and per acre. The number of people per household, between the years 2010-2014 and the population density were compared.

Table 5.1 summarizes the comparison between the Town of Paradise, the City of Chico, and the average for other northern California communities.

Table 5.1 – Demographic Comparison

	Persons per Household	People per Square Mile
Town of Paradise	2.36	1,432.1
Chico	2.45	2,617.8
Comparative Average	2.48	2,384.8

FLOW DEVELOPMENT

Land Use Designation

At the time of this analysis, the proposed service area boundary for the Town of Paradise was 1,165 acres with 1,041 acres of land area having zoning designations (124 acre of streets). The Town of Paradise has 24 zoning designations and 10 generalized zoning designations. The parcels located within the service area were separated by the generalized zoning designation, such as Town Residential (TR) rather than a specific designation of TR 1/3 or TR 1/2. An average number of residential units per acre was applied to the residential designations to calculate the estimated wastewater flow generation for the total area of each zoning designation in the proposed service area.

Wastewater Generation

Typically, wastewater generation is estimated by gallons per person per day, gallons per acre per day, or assigned a daily flow rate based on an equivalent single family residential dwelling unit (EDU). The zoning designations in the Town of Paradise allow for a reasonable assumption of wastewater generation based on EDUs and gallons per acre. A lower than average flow per EDU and flow per acre is assumed due to the history of water conservation, a lower than average population density, and an assumed reduction of inflow and infiltration (I/I) due to the use of modern construction materials and techniques.

The following is the assigned flow per EDU and flow per acre per day for the Town of Paradise for this analysis.

- Flow per Single Family EDU = 230 gallons per EDU per day
- Flow per Multi-Family EDU = 110 gallons per EDU per day
- No Residential Land Use = 600 gallons per acre per day

An average daily flow per EDU per day and the average daily flow per acre per day for the areas in each designation was applied to calculate an estimated wastewater flow for the proposed service area.

Build Out Flow Generation

Design at build out assumes zoning designation may change within the service area to allow for growth with an assumed increase of wastewater flows of 5 percent . Densification is likely to occur within the service area, therefore the maximum EDU per acre for the generalized residential zoning designations will apply.

DESIGN FLOWS

A design flow that accounts for the diurnal peaks of the average flows and infiltration and inflow (I/I) during wet weather is required for sizing the conveyance, treatment and disposal of wastewater in the proposed service area. A peaking factor is applied to the ADWF to calculate a peak dry weather flow (PDWF). Typically a peaking factor falls in the range between 1.5 and 3.0 and is derived using an empirical equation that generates a curve based on the average daily flow. In addition to the PDWF, I/I is usually accounted for during wet weather producing a prediction for peak wet weather flow (PWWF). However, the selection of a low pressure system and lack of manholes limits the inflow and anticipated infiltration to the collection system. Therefore I/I is negligible for the Town collection system. The PWWF will be used as a design criteria in the options analysis and feasibility study.

The PWWF of the proposed service area and anticipated buildout used for the design criteria is approximated at 1.86 mgd for the purpose of this study. Flows for septage receiving were not calculated for this level of design and are anticipated to be a minor contributor to the treatment system.

WASTEWATER CONSTITUENT LOADING

Town of Paradise Wastewater Collection, Treatment, and Disposal Preliminary Design Report, Volume 1 (by Nolte, 1992) provided projected wastewater characteristics that are used for the purpose of this study. That report stated that, "wastewater quality was determined using a mass balance prepared from the expected concentrations and flow rates of various waste streams entering the treatment plant. Approximately one half of the sewer district service area will be connected by conventional gravity sewer and the other half will be connected by STEP system. STEP effluent is less concentrated than conventional sewer effluent due to settling of solid particles in the septic tank." The 1992 Report calculated the concentrations for biological oxygen demand (BOD5), total suspended solids (TSS), nitrogen (Total N), and phosphorus (Total P) associated with wastewater from conventional sewer systems, wastewater from STEP systems, septage from conventional septic tanks, and septage from STEP systems. The assumptions in that report seem reasonable and are adopted for this evaluation. The treatment plant design concentrations were estimated in that report as follows:

- BOD5 = 310 mg/L
- TSS = 530 mg/L
- Total N = 57 mg/L
- Total P = 12mg/L

RECOMMENDATION

The PWWF of 1.86 mgd and corresponding loads derived above provide the design criteria for an option analysis. This design flow represents the anticipated 2040 build out within the service area and will be used for the conceptual design of the sewer system for all options analyzed in the feasibility study. To maintain a feasible cost of treatment, the ADWF of 0.98 mgd will be used for the design criteria, flow equalizations ponds will be used to attenuate the peak flows.

During the design of the preferred sewer collection, conveyance, treatment, and disposal system, a more specific and accurate prediction of flows and loads generated in the service area should be developed with a survey of actual land use, dwelling unit density, and the type of commercial usage.

CAPITAL AND OPERATIONS AND MAINTENANCE COST ASSUMPTIONS

Costs have been developed for the collection system including assumptions for engineering, legal, and administrative costs of the option design as well as contingency for unknowns commensurate with a feasibility level study. Operations and maintenance include the following staff levels:

- General Manager
- Administrative Assistant
- Receptionist (part-time)
- Operations Manager
- Field Crew (2)
- Septic On-site Lead

COST AND RECOMMENDATION

Costs for the collection system are common to all options except for the No Project Option. Additional costs for conveyance to various treatment plant options are included in the treatment plant alternatives.

A low pressure sewer effluent system is preferred to serve the Town. While the system requires a portion of infrastructure and maintenance on each parcel, it limits the number of pipelines and manholes needed in the collection system and reduces the cost of the collection system.

The capital cost of the collection system is estimated to be $47.4 million (including 20 percent design/construction contingency and 15 percent engineering design/permitting/environmental).

6
Alternatives Analyzed and Eliminated

Other alternatives that have been suggested over the years by the public are also discussed. Many of these alternative treatment systems represent other ways of treating wastewater than conventional treatment processes.

ALTERNATIVES ANALYZED AND ELIMINATED

Several years of studies and multiple potential sewer treatment options have been suggested for implementation in the Town of Paradise. Many of those suggestions have been offered by residents, and others have been brought forward by engineers. The scope of the treatment solution and area served vary for these alternatives. The most common concern from previously suggested alternatives and subsequent studies is two-fold. One is that the cost of a larger scale collection and treatment system is high; and two, is that potential rate payers are seeking the lowest capital cost option available as a viable solution. The stakeholders have shown a preference for the lowest possible initial capital cost investment in order to reduce both tax roll assessment and future sewer rates.

The principal challenge of these "natural" treatment alternatives is the availability of satisfactory land area for effluent disposal, not necessarily the biological adequacy of the treatment technology. Monitoring and controlling these systems can be difficult. If the effluent cannot meet discharge permit requirements, the reliability of these systems is not equivalent to conventional treatment systems. Often these systems are

described as cheaper than conventional treatment and are used in rural areas where conventional systems are not viable due to cost. However, the discharge requirements and permitting are not equivalent to those required by a municipal treatment permit.

One of the competing issues to consider with alternative small treatment systems is the need to pool the required resources (parcels/customers) together to help spread the capital cost and lower the financial burden of a treatment system from the individual parcel owner. At the same time, limiting flow to avoid discharge permit requirements is also a necessity. The amount of land needed to disperse treated effluent is directly related to the amount of sewage flow collected in a given area. As a result, more sewage flow means that more suitable land is needed- already a scarce commodity in the Town of Paradise.

Any collection system that yields more than 100,000 GPD will require a specific permit and cannot operate under the small systems general order. As defined earlier, the anticipated flow from the Paradise Sewer Project Service Area is over 800,000 GPD of Average Dry Weather Flow (ADWF).

The SWRCB has a General Waste Discharge Requirement for Small Domestic Wastewater Treatment Systems (SDWTS). Only Small Domestic Systems that discharge to land and with a monthly average flow rate of 100,000 GPD or less are eligible for coverage under this General Order. An SDWTS that produces more than 20,000 GPD requires a plan and a permit for controlling and monitoring nitrogen in a manner that is compliant with the basin plan for that specific area.

SDWTSs are typically located at individual residences, rural parks, schools, campgrounds, mobile home parks, roadside rest stops, small commercial or residential subdivisions, restaurants, resort hotels/ lodges, small correctional facilities, temporary fire-fighting camps, and recreational vehicle (RV) dump locations, including RV parks.

A Small Domestic System that uses subsurface disposal may be regulated by a local agency rather than a Regional Water Board, consistent with the Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems Policy (OWTS Policy). Wastewater systems regulated by local agencies may continue that coverage unless directed by the local agency or the Regional Water Board Executive Officer to seek WDRs from the Regional Water Board.

It is important to have this context when reviewing some of the options that have been suggested. Any collection system that yields more than 100,000 GPD will require a specific permit and cannot operate under the small systems general order. As defined earlier, the anticipated flow from the Paradise Sewer Project Service Area is over 800,000 GPD of Average Dry Weather Flow (ADWF). Therefore any alternative treatment system must have a clearly defined effluent location (stream, spreading ground,

leach field, seepage wells) and be monitored to affirm compliance with a discharge permit issued by the RWQCB. While an alternative treatment system with added disinfection process may meet discharge requirements of a specific discharge permit, monitoring and control of the treatment process is more difficult when compared to a conventional WWTP that has more operational controls and access for adjusting the treatment process.

Many of the smaller cluster treatment systems are appropriate treatment options for a single parcel or multiple parcels that are grouped together (cluster system). These advanced septic treatment systems provide a more robust treatment than a simple septic tank (settling and sludge digestion) and would produce a higher quality effluent, thereby prolonging the life of the leach field. However, selecting a dispersal area location is challenging. A significant amount of land (hundreds of acres) is necessary and even if the land area is available in or near Town boundaries, the soils may not be as amendable to infiltration as land off of the "Ridge." Prior geologic studies indicate more efficient infiltration characteristics in soils located in the valley off of the "Ridge."

The predominant soil type in the valleys around the Town is Aiken Clay Loam with moderate permeability, but there is variability within the Town for leach field effectiveness.

IN TOWN INFILTRATION AREAS AND GENERAL GEOLOGY

Skyway Corridor North of Wagstaff Road

This area has no history of issues for wastewater dispersal and, in general, has decent soil for septic systems with larger lots. Soil depth and permeability is good. There is a narrow band of high groundwater on the east side of Skyway up to Rocky Lane.

Clark Road Corridor South of Buschmann Road

This area is generally adequate for septic systems and wastewater dispersal. South of this area, the soils become increasingly shallow with an Andesite "lava cap" close to or at the native surface in much of the area. The commercially zoned parcels in this area have shallow soils and leach field construction or replacement is restricted by the Onsite group.

Parcels Surrounding Boquest Boulevard

Five parcels in the north side of this region are non-conducive to onsite wastewater treatment due to the perennial creek nearby and the small lot sizes. Almost all of these parcels have individual advanced treatment systems. Any failure of existing leach fields in this area would not be replaceable.

Parcels on Middle Skyway and West of Skyway

Failed septic and leach field systems in this area tend to require alternative systems, which are hard to fit on the steeply sloped lots. The soils are shallow, with "lava cap" and boulders prevalent. The systems in this area are well maintained, operate well, and typically have adequate room for leach field replacement.

Discussion

Infiltration and dispersal areas must be sited outside of Town in order to have the necessary acreage, and adequate permeability found in the area soils. This conclusion was reached through the prior studies that analyzed feasibility-level design of a collection system for the commercial corridors of the Town. Studies analyzed the land off of the "Ridge" and sited infiltration areas away from the Tuscan formation geology.

The Tuscan formation, in its "unweathered" state, is marked by predominantly hard and course rock fragments that make excavation difficult without blasting or the use of rock trenchers. In its weathered state, the Tuscan formation turns to red clay with hard fragments. The boulder and gravelly clay portion is referred to as the Aiken Phase. Soils that have accumulated in weathered swales have formed clay loam that is often two to five feet thick. These soils drain well, are conducive to wastewater disposal and become more common at further distances from the Ridge and at lower elevations. Infiltration characteristics also improve.

CLUSTER SYSTEMS

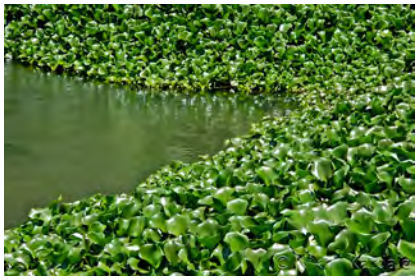
A typical cluster system is made of a sequence of buried tanks, each with a treatment process similar to a conventional treatment plant. The treated effluent from a cluster system would likely be dispersed by leach field or pressure dose trenches. The ambient ground water quality would need to be established and the ground water monitored for compliance with a RWQCB WDR. Adequate land area would be needed for both treatment and dispersal. These factors will likely cause the siting of the plant and discharge area to be outside of Town along Skyway or Neal Road. The distance of the plant and discharge area from Town will add significant conveyance cost. In addition, the project impacts would look similar to Option A with pond treatment and land disposal. This alternative has been eliminated from consideration because there is inadequate land area near Town and the cost of conveyance to an appropriate site would be equivalent to Option A, already considered in the study.

WETLAND TREATMENT

Natural wetlands function in nature to remove suspended solids and nutrients like nitrogen and phosphorous. These natural processes can be applied to municipal stormwater and wastewater treatment through a constructed wetland. There are three types of constructed wetlands:

1. Subsurface flow wetlands
2. Surface flow wetlands
3. Floating treatment wetlands

Wetland systems usually require more land area than a conventional wastewater treatment plant, which means the savings in treatment costs over conventional treatment costs would be somewhat offset by the need for additional land.



Examples of surface flow and floating treatment systems

Subsurface Flow Wetland

Typically this system flows through trenches filled with sand, rooted plants, and a gravel draining layer to collect effluent. Unfortunately, these systems do not completely replace conventional wastewater treatment as a primary treatment of screening, grit removal, and settling is usually needed as a pre-treatment step to prevent clogging the system. A final disinfection step would also be required to meet discharge permit requirements. Therefore the wetland concept only replaces the biological (BOD removal) portion of a conventional treatment process.

One advantage of a subsurface system over surface and floating wetlands is that they attract fewer mosquitoes.

Surface Flow Wetlands

Often known as free water surface wetlands, these wetlands are mainly applied to municipal treatment schemes as a polishing step for tertiary treatment after a conventional process. They are effective at removing residual nutrients and pathogens and will have both floating water plants (Hyacinth) and soil rooted reed plants. These systems are often utilized in concert with conventional treatments to create a wildlife habitat or a buffer zone between the treated effluent and sensitive ecological areas like estuaries. Surface wetlands attract wetland animal species and birds, which can contribute to the biological nutrient loading from the animal waste. This may lead to inconsistent removals of nitrogen as new ammonia (bird waste) is added to the system. Another challenge is mosquito control, especially in suburban areas. Wetland plants are also at risk of die-off under sustained freezing temperatures, which can upset treatment

capacity and nutrient uptake. Therefore, surface flow wetlands are generally a poor fit for areas with sustained snow periods. This alternative has been eliminated from consideration due to confidence in consistently meeting a discharge permit requirement and the challenge to manage additional impacts such as mosquitoes and planting replacement when assimilative capacity of nutrients is reached.

IN-SITU TREATMENT

These systems collect sewage and disperse the flow into buried chambers (perforated pipes with a filter matting) that act as both settling and filtration treatment steps. Sewage also infiltrates as the sewage makes its way through the chambers. These systems are relatively cheap to install and provide effective treatment for small systems. They are a good fit as a clustered system for small communities in rural areas. In-situ systems still require septic tanks or STEP systems at each service to act as primary settling/solids removal. Under higher flow conditions (>100,000 gpd), these systems would likely require flow equalization, an impermeable liner for the buried filter pipe array, and post treatment extraction and disinfection to meet a NPDES permit or be conveyed to an adequate area for spreading and infiltration under a WDR permit. A treatment system scaled up to 1.0 mgd would cost approximately $7 million without disinfection. This alternative has been eliminated from consideration due to its scalability to meet the needs of the Town of Paradise anticipated flows. However, this option might be revisited if a sewer district cannot be formed and blocks of businesses have failed septic systems. This option will still be challenged for land for treatment area and discharge/dispersal locations close to town.

VERMIFILTRATION

Vermifiltration is a filter bed system used to treat high BOD wastewater with soil as a filter and worms as the biological processor of dissolved organic carbon and nutrients. They have been used effectively on small scales of 10,000 to 50,000 GPD to treat agricultural, dairy, and human wastes. Large scale treatment of more than 1 mgd is rare but has been implemented in rural agricultural areas. The advantage of the system is the low energy usage to treat the wastewater, relative to conventional treatment. They are primarily sold as decentralized systems for rural and agricultural areas and are not widely demonstrated in municipal use with conventional collection systems.

Questions remain as to the reliability of the treatment system to consistently meet effluent requirements for either land application or stream discharge with municipal influent. Treated effluent would need to be conveyed to an adequate land application area or stream and additional disinfection would still be required and must be considered in any cost comparison with a conventional system. Systems have been in use in Australia and Chile for several years and have only recently been used in the U.S. in rural areas for food processing (wine and fruits) and dairy wastes. Representative costs are difficult to find. While data show good performance for removal of BOD, it is less clear on chloroform bacteria removal and consistency in disinfecting the effluent for stream discharges. The primary demonstration usage has utilized leach fields and land application and infiltration as the discharge step. This alternative has been eliminated from consideration due to concerns over its scalability and effluent reliability for stream discharge.

7
Alternatives Summary

The following section describes the options and alternatives that have been evaluated for consideration for the sewer project report. These options and alternatives have been informed by previous studies and public input. Each of the four main options include a detailed approach, expected regulatory requirements, design criteria, pros and cons, and summary cost estimates. The funding section of this report outlines the anticipated costs per connection for each of the options.

The options analyzed are as follows:

Option A – Localized Wastewater Treatment Plant with effluent land application

- Local sewer collection system for service area. Acquire land with adequate area for secondary level treatment plant and land application area for a RWQCB Waste Discharge Requirement (WDR).

OPTION B – LOCALIZED WASTEWATER TREATMENT PLANT WITH SURFACE WATER DISCHARGE LOCATION

- Local sewer collection system for service area. Acquire land with adequate area for a tertiary level treatment plant and location for effluent discharge to creek. Will require a RWQCB National Pollutant Discharge Elimination System (NPDES) permit.

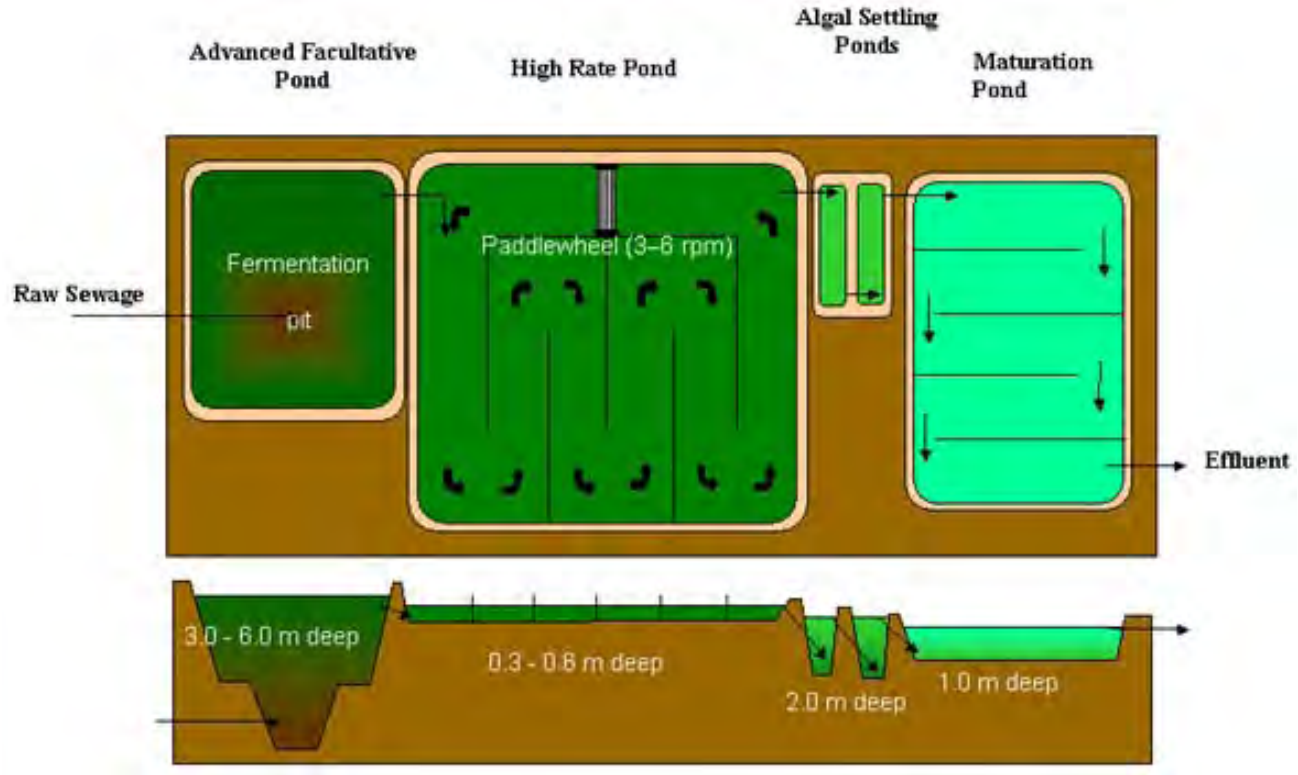


Figure 7.1 – Example of a Pond Treatment System

OPTION C – REGIONAL CONNECTION TO THE CITY OF CHICO WATER POLLUTION CONTROL PLANT

- Local sewer collection system for service area. Acquire right-of-way for regional pipeline and connection to the City of Chico WPCP. Requires regional agreement with the City of Chico and connection fee.

Pond treatment

OPTION D – WASTEWATER TREATMENT WITH BENEFICIAL REUSE

- Local sewer collection system for service area. Acquire land with adequate area for a tertiary level treatment. Treated effluent connected to reclaimed water system for distribution and re-use via irrigation. Excess reclaimed water would be taken to a land application area for irrigation.

OPTION E – NO PROJECT

- No collection system or treatment plant. The Town continues to function on septic systems.

GENERAL DISCUSSION OF DISCHARGE REQUIREMENTS AND PROJECT TREATMENT PLANT OPTIONS

The overall project alternatives rely on three different wastewater treatment options. Option A is a pond treatment system, **Figure 7.1**, that would store and treat sewage to a secondary level for land application of

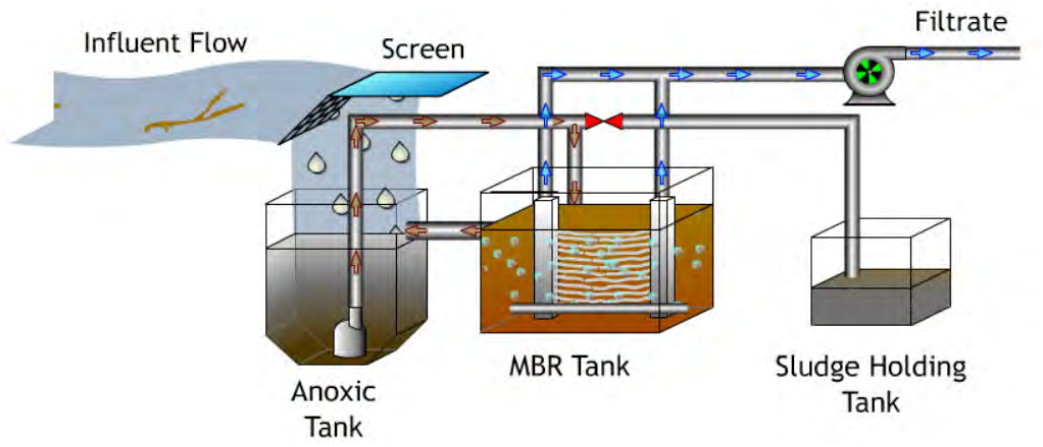


Figure 7.2 – Tertiary Treatment and Disinfection

the effluent. Options B and D are a tertiary treatment option, **Figure 7.2**, to produce high quality effluent for either creek/stream discharge or potential reuse. Option C utilizes the City of Chico's existing Wastewater Pollution Control Plant.

The treatment options are based on expected permit types, and their associated requirements for effluent discharge location and method. The permitted discharge requirements from the Regional Water Quality Control Board (RWQCB) would either be a National Pollutant Discharge Elimination System (NPDES) permit or a Waste Discharge Requirement (WDR) Order permit.

ANTICIPATED DISCHARGE REQUIREMENTS

The State Water Resources Control Board operates under the federal Clean Water Act (CWA) and is responsible for regulating wastewater treatment plants in the state of California. The permitting authority is delegated to nine Regional Water Quality Control Boards (RWQCBs). The NPDES Permit Program controls water pollution by regulating point sources that discharge pollutants into the waters of the United States. Point sources are individual conveyors like pipes or man-made ditches. Examples of pollutants include, but are not limited to, rock, sand, dirt, and agricultural, industrial, and municipal waste.

New discharges require that an application and a Report of Waste Discharge (ROWD) are submitted to the RWQCB board. Permits are granted with specific conditions, including discharge type and the specific environment within a watershed basin (Basin Plan) and specific to the water body (stream) receiving the discharge. Typically, discharges that lead to surface water (creeks, streams, rivers, or lakes) require a NPDES Permit and treatment plants that dispose of effluent

by land (evaporation, irrigation, infiltration, and recharge) require a WDR permit. The RWQCB typically reviews both permit types every five years. In that time span additional studies are often required, depending on changes in the watershed basin plan or new data from more recent constituent studies. The Environmental Protection Agency (EPA) establishes the Water Quality Research and resulting constituents' requirements. The requirements are then transferred to the State Boards for implementation.

Land application of effluent includes alfalfa or other fodder crops and pasture lands

National Point Discharge Elimination System (NPDES) Permit

NDPES permits are more burdensome to acquire between the two options for Publicly Owned Treatment Works (POTWs). NPDES permits often require more stringent discharge limits on nutrients, metals, disinfection byproducts (DBPs), and contaminants of emerging concern (CECs) such as pharmaceuticals.

Those dischargers pursuing a permit for surface water discharge should expect a higher level of staff time and operating costs for permit maintenance. The additional efforts can be seen in areas like constituent sampling and testing, effluent toxicity testing, pesticides, temperature, turbidity, and chemicals. Permits also typically require ongoing studies of both effluent and the water quality received by the discharger. These studies generally lead to plans that require updates and submission to the RWQCB on a regular basis.

Historical evidence demonstrates that a POTW will face more restrictive discharge permit limits and potential treatment plant upgrades and revisions every five years. These revisions are often driven by EPA requirements that the RWQCB cannot dismiss, which can lead to plant upgrade costs above the average life-cycle costs for equipment repair and replacement.

Waste Discharge Requirement (WDR) Permit

WDRs will typically require operations plans for flood control or spray irrigation and tail-water capture. Groundwater sampling and monitoring is the most common requirement in reporting to the RQWCB on permit performance.

Similar to a NDPES permit, the constituents for monitoring are usually based on a watershed basin plan or groundwater plan for the region. A key element in maintaining the WWTP process and monitoring discharge is avoiding groundwater degradation, which is verified by periodic groundwater sampling.

Odor control and mosquito abatement are both key concerns for WWTP operators of pond systems. For these reasons, pond systems are typically located well outside of urban centers. Preferably, pond systems are surrounded by agricultural areas to act as a type of buffer zone for neighbors.

SURFACE DISCHARGE TO CREEK (NPDES PERMIT)

The Town-adjacent tertiary treatment option investigated wastewater discharge to either Hamlin Slough or Nugen Creek. Both of these creeks eventually feed into Butte Creek and the Sacramento River. Hamlin Slough and Nugen Creek are transitory water flows, so the WWTP effluent would be the predominant flow in the creeks. The RWQCB refers to this condition as "effluent dominated" and typically require effluent discharge to meet California Code of Regulations Title 22 Reuse Requirements for Disinfected Tertiary Recycled Water. This means that treatment would include removal of biochemical oxygen demand (BOD), nutrients, turbidity, and disinfection for coliform organisms. This level of treatment is equivalent to water quality requirements for reclaimed water or "purple pipe" systems.

"Disinfected tertiary recycled water" means a filtered and subsequently disinfected wastewater that meets the following criteria:

A. The filtered wastewater has been disinfected by either:

   a. A chlorine disinfection process following filtration that provides a CT (the product of total chlorine residual and modal contact time measured at the same point) value of not less than 450 milligram-minutes per liter at all times with a modal contact time of at least 90 minutes, based on peak dry weather design flow; or

   b. A disinfection process that, when combined with the filtration process, has been demonstrated to inactivate and/or remove 99.999 percent of the plaque forming units of F-specific bacteriophage MS2, or polio virus in the wastewater. (A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstration.)

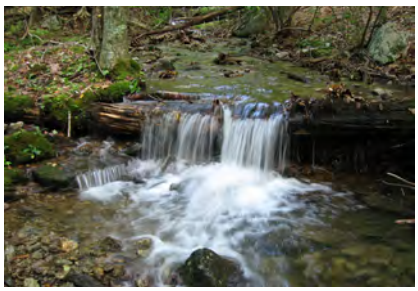
B. The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an Most Probable Number (MPN) of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters.

Land application of effluent may use spraying, flooding or drip application

LAND APPLICATION (WDR PERMIT)

Land application commonly allows for a lower level of treatment focused on removing BOD and the collection, digestion, and storage of sludge. Nutrient limits typically focus on Nitrate-Nitrogen. Monitoring generally focuses on background groundwater quality. Wells are sampled to measure Coliforms, Total Dissolved Solids, and Nitrate. Influent monitoring focuses on grit and debris removal to protect the aerobic processes. Plant monitoring tends to focus on odor control and wet weather flow to prevent overflow during a "100-year storm."

Sludge is stored for stabilization and eventually dewatered and hauled to a landfill. Volumes of storage are usually selected that require sludge off-haul every 10 years.



Effluent applications for the tertiary treatment and disinfection option include wetlands augmentation, surface discharge, reuse for select agriculture, and golf course irrigation

SEWER PROJECT OPTIONS

Now that the alternative treatment systems and discharge permit requirements have been discussed, the following sections describe the core project options analyzed at the feasibility level. They include a brief description of elements, discharge permit type, sizing based on anticipated flows, anticipated operation costs and staff, capital costs, and a list of pros and cons.

Operations costs for all of the proposed alternatives begin with staffing for the new sewer district. This cost includes the minimum number of staff needed to sufficiently manage the utility at the executive, engineering, administrative, and operations levels. Additional costs are included for each option. These costs depend on the treatment or conveyance requirement to operate the system from collection to conveyance to treatment to discharge.

POND TREATMENT – OPTION A

Pond systems utilize diked areas to store and treat sewage. Organic materials are bio-oxidized and stimulated by surface aerators. Solids are settled and bio-degraded anaerobically. Effluents are typically stored, evaporated, and discharged on controlled land via flood irrigation or spraying.

The aeration pond approach is limited to irrigation during the drier months and effluent storage in wetter months, which means that this treatment option requires significant land area for treatment, storage, and land application. In the case of the Town of Paradise, the project would need approximately 300 acres of land, and depending on availability, may need to purchase additional acreage to maintain a suitable buffer zone from adjacent creeks, homes, and businesses.

The advantages of aeration ponds for treatment are:

- Less stringent permitting requirements and monitoring
- Lower operational and maintenance cost
- Less complex system for operation
- Reduced disinfection requirements

The disadvantages of aeration ponds for treatment are:

- Large land areas required for moderate flows
- Additional storage for winter flows when effluents cannot be spread or evaporated effectively
- Limited locations available for storage, treatment, and spreading

DISCHARGE REQUIREMENTS/PERMITS

Option A would operate under a RWQCB WDR permit requiring that the treatment plant storage ponds, treatment lagoons, and spreading basins be outside of the 100-year floodplain and do not allow effluent to run-off to surface waters or come into public contact or contact with agriculture used for human consumption.

SIZING

Sizing for the plant was based on similar treatment plants utilizing this treatment scheme and scaled to the Town of Paradise's anticipated flows. The treatment plant would include a treatment pond, disinfection, effluent storage ponds, effluent pump station, irrigation pump station, land disposal field with spray irrigation, and tail-water recovery area with sump.

OPERATIONS AND MAINTENANCE

A summary of our operations and maintenance (O&M) assumptions and costs are show below in **Table 7.1**.

Table 7.1 – Option A - Operations and Maintenance Cost

Annual Operations and Maintenance - Treatment Ponds and Land Disposal (Option A)					
1	Chemicals ($/yr)(assume chlorine disinfection)	1	LS	$65,000	$65,000
2	Lead operator ($/yr)	1	LS	$130,000	$130,000
3	Assistant operator	1	LS	$85,000	$85,000
4	Additional Labor Cost ($/yr) (misc. repairs)	1	LS	$10,000	$10,000
5	Sampling and Lab Testing ($/yr)	1	LS	$50,000	$50,000
6	Power Requirements ($/yr)	1	LS	$25,000	$25,000
				Subtotal O&M	**$365,000**

CAPITAL COSTS

The anticipated capital cost for Option A is $34.9 million for the lagoon style treatment plant with land application of effluent. This includes the transmission main from the Town to the treatment plant and land acquisition to accommodate a 300 acre project site.

The total capital cost for the option is $82.5 million for private connection costs, collection system, and treatment plant.

OTHER CONSIDERATIONS

Septage Receiving

The proposed collection system utilizes tanks at each parcel and would need to be pumped for sludge periodically. Septage pumping, collection, hauling, and disposal would continue to be a future need just like the Town's septic systems require now. Although, it is anticipated that this type of maintenance will only be needed every 10 years on average, it means that any proposed wastewater treatment plant for the Town of Paradise must include septage receiving as part of the treatment scheme. This cost has been added to the treatment options of this report.

MEMBRANE BIOREACTOR (MBR) PLANT – OPTION B AND D

The MBR process used for conceptual design and cost estimates utilize a Flow Equalization/Attenuation Tank, a 3-stage MBR system, Solids Handling with Septage Receiving, ultraviolet (UV) disinfection, and a lab and/or office building. The overall plant is anticipated to utilize no more than a 20-acre parcel.

The MBR options assume the wastewater treatment plant effluent will be discharged to a creek where the volume of water is dominated by the effluent. Effluent-dominated discharges are common in California and the required treatment levels are high. The effluent leaving WWTPs typically meets reclaimed water requirements, which includes low turbidity, nutrient removal (Phosphorous and Nitrogen), and required disinfection.

Under this scenario a Membrane Bio Reactor (MBR) is assumed as the primary treatment option with UV disinfection. An MBR system generally uses 25 percent of the area of a conventional wastewater treatment process. MBR systems are typically more cost effective for treatment for lower flows and isolated areas where land availability is a primary concern. The cost of these systems continues to drop as they become more common. These systems have become the preferred method of

treatment in land constrained areas with flows in the 200,000 gallons per day (GPD) to 2 million gallons per day (MGD) range, due to their small footprint and effluent quality reliability.

The advantages of an MBR treatment process are:

- Small footprint
- High quality water effluent providing for re-use and irrigation opportunities
- Typically come in modular systems that are expandable
- Low turbidity effluent reduces disinfection dosing and costs

The disadvantages of an MBR treatment process are:

- Typically higher capital cost and operational costs due to energy demands
- Limited high flow capacity
- Storage and use of cleaning chemicals for maintenance (Sodium Hypochlorite and Citric Acid)

Discharge Requirements and Permits

Option B and D would operate under a RWQCB NPDES permit.

Sizing and Footprint of Treatment Options

The difference in treatment approach, operations, and discharge permits have been discussed, but land is the key difference between MBR treatment and aeration pond treatment. The MBR tertiary treatment approach allows for all-season discharge and even seasonal reclamation and reuse of effluent for irrigation. The process for the Town of Paradise's anticipated flows could fit on as little as 10 acres, with some of the processes taking place inside a building. For the purposes of this study, 20 acres has been assumed as appropriate for an MBR process with UV disinfection.

Capital Costs Comparison for Treatment

The MBR treatment plant option is estimated to cost approximately $16.4 million (including 20 percent design/construction contingency, 15 percent engineering design/permitting/environmental). The inclusion of a pipeline and storage facility for beneficial reuse (Golf course irrigation) costs approximately $25 million.

These costs are combined with the collection system cost to yield the overall capital construction cost for Options A, B, and D.

The total capital cost for Option B is $64 million and the total capital cost for Option D is $72.6 million

STAFFING AND OPERATIONS COSTS

A summary of our O&M assumptions and costs for Option B are shown below in **Table 7.2**.

Table 7.2 – Option B - Operations and Maintenance Cost

Annual Operations and Maintenance Cost - MBR (Option B)					
Item No.	Item	Estimated Quantity	Unit	Unit Price	Total
1	Chemicals ($/yr)	1	LS	$1,000	$1,000
2	Lead operator ($/yr)	1	LS	$130,000	$130,000
3	Assistant operator	1	LS	$85,000	$85,000
4	Additional Labor Cost ($/yr) (Filter cleanings)	1	LS	$10,000	$10,000
5	Sampling and Lab Testing ($/Month)	12	EA	$10,000	$120,000
6	Power Requirements ($/yr)	1	LS	$60,000	$60,000
7	UV Servicing ($/yr)	1	LS	$50,000	$50,000
8	Solids Management ($/yr)	1	LS	$6,000	$6,000
				Subtotal O&M	**$462,000**

A summary of our O&M assumptions and costs for Option D are shown below in **Table 7.3**.

BENEFICIAL REUSE – OPTION D

During the drought, political interest in wastewater reclamation and reuse increased significantly and remains high. Grant funding has been made available and projects have been implemented to encourage the practice across the state of California.

Ultimately, wastewater reuse implementation is determined by water demand and economics, not technology or public interest. The limitation on reuse is most often due to the cost to produce the appropriate water quality and the cost of conveyance to deliver the treated water to the end user. Usually, new infrastructure is required for conveyance and storage. As a product, reclaimed water has proven to be more effective than potable water for irrigation of golf courses, parks, fodder crops, and park-strips because of its higher nutrient levels (phosphorous and nitrogen).

Most of the communities currently using reclaimed wastewater are located adjacent to wastewater treatment plants, which limits the cost of infrastructure to deliver the water. Additionally, many communities subsidize the delivery cost to encourage its use and offset their potable water demands. This practice is most effective in cities that manage both water and wastewater responsibilities. For example, the City of Roseville

Table 7.3 – Option D - Operations and Maintenance Cost

Annual Operations and Maintenance Cost - MBR with Beneficial Reuse (Option D)					
Item No.	Item	Estimated Quantity	Unit	List Price	Total
1	Chemicals ($/yr)	1	LS	$1,000	$1,000
2	Lead operator ($/yr)	1	LS	$130,000	$130,000
3	Assistant operator	1	LS	$85,000	$85,000
4	Additional Labor Cost ($/yr) (Filter cleanings, Pipe inspection)	1	LS	$15,000	$15,000
5	Pond Maintenance and Discharge Monitoring ($/yr)	1	LS	$5,000	$5,000
6	Sampling and Lab Testing ($/Month)	12	EA	$10,000	$120,000
7	Power Requirements ($/yr)	1	LS	$65,000	$65,000
8	UV Servicing ($/yr)	1	LS	$50,000	$50,000
9	Solids Management ($/yr)	1	LS	$6,000	$6,000
				Subtotal O&M	**$477,000**

does not currently charge a connection fee for new users of reclaimed water adjacent to a reclaimed water main. Reclaimed water rates are 50 percent of the potable rate in the City of Roseville. The "purple pipe" infrastructure is paid for and installed by new developments and the connection fee is then paid via property assessments or Mello-Roos taxes passed through to the home owners who buy in the new developments.

The common relationship in Southern California is that special wastewater districts are the wholesalers of the treated reclaimed water and adjacent water companies build and manage the infrastructure to deliver the water as retailers.

Purple pipe used for reclaimed water distribution

Reuse Opportunities

The project team met with water agencies (California Water Service and Paradise Irrigation District) and Butte County officials to discuss interest and need for reclaimed water. While there are schools and parks within the Town that would be a good fit for reclaimed water, the water demand is very low relative to the anticipated wastewater treatment volume. These water customers are currently receiving potable water at very low rates and the cost of reclaimed water production and conveyance would not be offset by sales, which means that reclaimed water would not be cost effective.

The most likely end user for reclaimed water in the area is the Tuscan Ridge Golf Course, because the summertime water demand is significant. In addition, the landscaped area requires a considerable amount of groundwater pumping, which Butte County wants to limit. The demand is much lower during wetter months. Low demand means that a storage

pond and year round surface water discharge point is necessary. It is highly unlikely that the cost to produce and deliver the reclaimed water would be offset by its sale price. One potential benefit of reclaimed water use is the possibility of additional grant funding opportunities for the project. However, more research is required to determine the source and maximum amount of grant funding available to offset the additional cost of adding reuse to the MBR treatment option.

SEPTAGE RECEIVING

Both of these options will need to provide for Septage receiving as described in Option A.

REGIONAL CONNECTION – OPTION C

A regional connection to the Chico Water Pollution Control Plant (WPCP), **Figure 7.3**, presents several advantages as an option. Those advantages include the following:

1. Removes land requirement for WWTP in or near the Town of Paradise by moving the treatment component of the complete sewer solution to Chico.
2. Provides for "economy of scale" in distributing the cost of wastewater treatment for the Town to be included with over 80,000 people served by the WPCP. This has long term benefits to share costs for life cycle costs of the treatment plant in addition to costs required for regulatory environment changes.
3. Limits staffing requirements for the Town of Paradise Sewer District by only requiring collection system and conveyance operations oversight.
4. Is favored by the RWQCB as it limits the number of permits they are required to manage and is felt to be more protective of the watershed.

The regional connection option was previously identified in the 2012 study (Staff Report to Town Council) with the assumption that adequate capacity existed with the City of Chico in both the collection system adjacent to Skyway and at the WPCP. Treatment capacity at the treatment plant likely does exist, however changes to WPCP operations and retrofitting may be required. It is unlikely that capacity exists in the City of Chico collection system adjacent to Skyway Road. The City of Chico Sewer System Master Plan, June 2013, indicates planned growth areas in the southeast quadrant of the City. Within the same plan the future pipelines designed to serve this area show significant upsizing and larger parallel pipelines well into the older downtown area. These factors

indicate an inadequate pipeline capacity in the existing collection system; it would be unable to convey new flows to the WPCP. The pipeline capacity is based on anticipated flow within the current urban services boundary and sphere of influence.

If similar collection system capacity limitations are assumed for the flow from the Town of Paradise, then additional capacity would need to be added through portions of the City of Chico. Additional capacity requires construction, which would incur additional costs due to more traffic control, utility clearances, and crossings at Little Butte Creek and Highway 99. This would significantly increase the construction cost of the regional pipeline. After discussing various options with the City of Chico Engineering Staff, the conceptual alignment for the regional pipeline was directed south to avoid the more densely developed areas of south Chico. This realignment allows for a lower unit cost of pipeline construction by improving constructability and avoiding existing utilities. Furthermore, tying in at the WPCP directly removes any reduction of collection system capacity which could be needed for planned developments in southeast Chico—a significant hurdle in project feasibility.

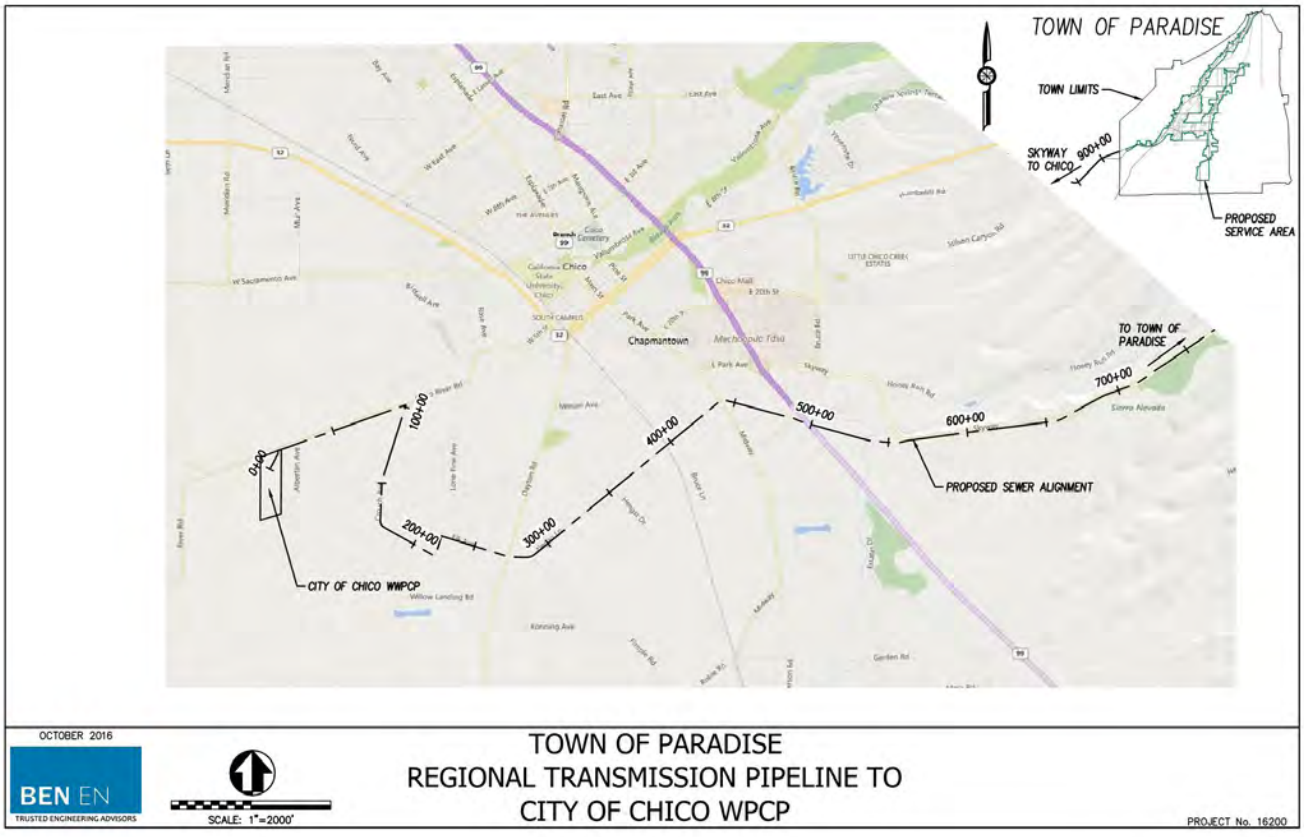


Figure 7.3 – Conceptual Regional Pipeline Alignment

Chico Water Pollution Control Plant.

The regional pipeline from the Town of Paradise is considered a closed conduit, which means no other connections are planned outside of the Town's Sewer Service Area. Once the pipeline reaches Chico city limits, opportunities may exist for the City of Chico to provide additional capacity in the pipeline for planned growth areas. Future developments would pay for the additional pipeline capacity, which would lower the unit cost of the pipeline within and adjacent to Chico city limits. Project partnerships and cost reduction opportunities could be explored further during the preliminary design phase, if the Regional Option is selected as the preferred alternative.

DISCHARGE REQUIREMENTS/PERMITS

This option would fall under the City of Chico's current NPDES permit requirements. Order No. R5-2010-0019, NPDES No. CA0079081. Receiving water discharge points are the Sacramento River and the M&T Irrigation Canal.

The regional option transports wastewater from Paradise to the Chico Pollution Control Plant

CAPITAL COSTS

The Regional Pipeline is anticipated to cost $35 million (including a 20 percent design/construction contingency, and a 15 percent engineering design/permitting/environmental cost). This cost is significantly higher than the previous study estimate due to following factors:

- Additional eight miles of pipeline to convey flows through and around the City of Chico to the WPCP to the west
- Associated right-of-way costs through the rural sections of South Chico to reach the WPCP
- Assumed City of Chico connection fee (to be negotiated)

These costs are considered to be as realistic as possible after discussions with City of Chico engineering staff. The connection fee estimate is based on anticipated Equivalent Dwelling Units (EDUs) from the Town of Paradise service area. The actual connection fee will ultimately be negotiated between the City of Chico and the Town of Paradise. The estimated connection fee is conservative because Chico's formula is calculated based on sewer impact to collection system and WPCP. However, the Town of Paradise sewer flow would only impact the WPCP and not the existing City of Chico collection system.

The total project capital cost for Option C is $83.4 million.

STAFFING AND OPERATIONS COSTS

A summary of our O&M assumptions and costs for Option C are shown below in **Tables 7.4**. **Table 7.5** includes the operations cost of the collection system and is common to all options.

Table 7.4 – Option C - Operations and Maintenance Cost - Conveyance

Annual Operations and Maintenance Cost - Regional Transmission Line (Option C)					
Item No.	Item	Estimated Quantity	Unit	Unit Price	Total
1	Miscellaneous Repairs ($/yr)	1	LS	$25,000	$25,000
				Subtotal O&M	**$25,000**

Table 7.5 – Option C - Operations and Maintenance Cost – Collection System

Annual Operations and Maintenance Cost - Service Area (Common to all Options)					
Item No.	Item	Estimated Quantity	Unit	List Price	Total
1	General Manager	1	LS	$150,000	$150,000
2	Receptionist (Assume 1 full 1 part time employee)	2	LS	$60,000	$90,000
3	Accountant	1	LS	$100,000	$100,000
4	Operations - Collection System				
	Operations Manager	1	LS	$130,000	$130,000
	Field Crew/Utility Worker (assume 2)	2	LS	$55,000	$110,000
	On-Site Serviceman	1	LS	$55,000	$55,000
5	Annual Maintenance ($/yr)	1	LS	$50,000	$50,000
6	Septage Hauling	100	EA	$1,000	$100,000
7	Building Cost (assumed service district housed at City Hall)	0	LS	$18,000	$0
8	IT Support ($/yr)	12	LS	$1,000	$12,000
9	Planning ($/yr)	1	LS	$30,000	$30,000
10	Miscellaneous Expenses ($/yr)	1	LS	$10,000	$10,000
				Subtotal O&M	**$837,000**

OTHER CONSIDERATIONS

Septage Receiving

Option C is limited in that the City of Chico WPCP does not allow septage receiving due to concerns over nitrogen limitations on their discharge permit. Therefore, septic tanks in the Town of Paradise will need to be serviced and delivered to the Neal Road Septage Receiving Station or alternate should the facility be closed.

8
Scoring Criteria

There are several factors that are both important and relevant to the selection of the recommended sewer project option. To determine the best option, a system for evaluation was established. The evaluation criteria considered all factors, not just capital cost. The project team wanted to make sure the selection criteria aligned with the known goals of the community and Town staff. It was also important that the selection criteria development and project option selection process be transparent. To create transparency, the criteria for project option comparison were drafted by the project team for review and vetting at two separate Project Stakeholder Group (PSG) meetings.

The evaluation criteria were expanded and modified then reduced, based on feedback and discussion with the PSG. Each option was considered and scored relative to each other for cost, environmental impact, secondary benefit, interagency agreements, public impacts, operational issues, and right-of-way (ROW). The measurement for each option relied on subjective estimates derived from known impacts. Scoring was based on a range of 1 - 100, with 100 representing a perfect score and 1 being a negative score. The selection criteria and scoring guidance is described in detail below.

In addition to the selection and refinement of the selection criteria, the team and the PSG established a criteria weighting. The criteria weighting was created because some factors are considered more important than others when selecting the preferred project option. For example, cost

was determined to be the single most important factor, so it was given the highest weight. The PSG meetings helped to determine the criteria weighting. Through discussion, the group agreed that each selection criteria would be given a weight between 5 percent and 40 percent, with the more important factors given a higher weight. See **Table 8.1** for the agreed upon criteria weighting.

Table 8.1 – Selection Criteria and Weighting

Selection Criteria	Weighting
Cost	40%
Environmental Impact	15%
Secondary Benefit Options	15%
Interagency Agreements	5%
Public Impacts	10%
Operational Issues	10%
Right-of-Way	5%

Each project option was scored, relative to the selection criteria above, on a range of 0 – 100. Higher scores indicate positive attributes for the option and lower scores indicate high impacts or negative attributes, as shown below in **Table 8.2**.

Table 8.2 – Scoring Parameters

Scoring Range	Interpretation
0 - 20	Poor or Prohibitive
20 - 40	Difficult
40 – 60	Moderate or Average
60 - 80	Favorable
80 - 100	Excellent

COST

As shown in the criteria weighting above, cost is the most important issue for the stakeholders in the Town of Paradise. Capital costs were combined with anticipated operations and maintenance costs to generate a net present cost (NPC). Measurement for this criteria was based on an 80-year NPC. The cost includes all capital costs, ROW, and the cost to implement project start-up. In addition, an estimation of annual operations, maintenance, and overhead of an operating system for collection and treatment were included. Replacement costs are also considered over the lifecycle. Scores: 1 = high cost, 100 = low cost.

ENVIRONMENTAL IMPACT

Environmental impacts are an important factor in project implementation because impacts to endangered species and habitats can stop and/or significantly delay project schedules. The probable areas for the WWTPs and pipeline alignment were evaluated against the Butte Regional Conservation Plan (BRCP). The project team also discussed potential environmental impacts with Butte County officials to gain a deeper understanding of current and future land use plans. Measurement for this criteria were based on a rated score for impacts to environmental resources like threatened or endangered species, wetlands, trees, air quality, and water quality. Anticipated RWQCB requirements for a discharge permit were also considered in scoring the options. Scores: 1 = high impact, 100 = low impact.

Environmental impacts are an important factor in project implementation because impacts to endangered species and habitats can stop and/or significantly delay project schedules.

SECONDARY BENEFIT OPTIONS

Secondary benefits are those that provide additional advantages above and beyond wastewater collection and treatment. An option that would provide secondary benefits would receive higher scores under these criteria. The rated score indicates the option's apparent benefits to economic growth, environmental water (stream flows for fish habitat), long-term water sustainability (potable water use offset), temporary water storage for fire fighting, potential re-use for irrigation, and potential re-use for fodder crops. A higher score in this criteria also indicates the option's position for additional grant money from sources not available to wastewater treatment alone. 1 = low benefit, 100 = high benefit.

INTERAGENCY AGREEMENTS

The interagency agreements criteria are used to measure the timeline, complexity, and potential negotiations between agencies. This is due to a Regional Memorandum of Understanding (MOU) for sewer connection. These criteria also measures an interagency agreement for recycled water use, or other coordination efforts beyond what is required for essential collection and treatment. 1= high complexity, 100 = low complexity.

PUBLIC IMPACTS

The public impacts criteria is focused on short-term (construction) and long-term (WWTP plant proximity) impacts. The rated score grades aesthetics, sound, odor, traffic, and the number of ROW/easement

negotiations that impact adjacent stakeholders. Benefits of the work are not considered here. Construction schedule and speed are also considered in the rated score. 1 = high impact, 100 = low impact.

OPERATIONAL ISSUES

The operational issues criteria are used to assess differences in the legacy of the option. In this case, legacy means the long-term operations, replacement, management, negotiation, overhead, and study for sewer district staff outside of operations and replacement costs, which are captured in the cost criteria. Discharge requirements vary, depending on the treatment plant processes. Some processes are less complex to monitor and maintain than others. The legacy of water quality studies and its analysis differ, depending on the treatment level of the effluent, location, and manner of discharge. The rated score represents the complexity of wastewater treatment process, and the number of discharge/anti-degradation studies. 1 = high complexity, 100 = low complexity.

RIGHT-OF-WAY

The ROW criteria uses a rated score based on the purchase of property, ROW, or easements needed to implement the construction of the project option. Additional ROW adds cost to the project but also adds complexity due to the longer bid and construction timeline. Property acquisition cost is included in the cost criteria. These criteria address the labor, management, and negotiation necessary to acquire more or less ROW depending on the sewer project option. 1 = high ROW coordination, 100 = low ROW coordination.

9
Alternatives Analysis

SUMMARY

Results of the initial scoring are included in **Table 9.1** – Sewer Project Scoring Matrix. Initial scoring indicates that Option C – Regional Connection to the Chico WPCP is the recommended option. The second choice would be Option B – Localized WWTP with a surface water discharge location.

Option B has the lowest capital costs due to the WWTP's proximity to the collection system. However, the longer the lifecycle, the more that Option C separates itself from the other options in lower NPC. See **Figure 9.1**. Also, Options B and D are more likely to face stronger challenges for siting and property acquisition from adjacent neighbors than Option C. Options B and D carry more long-term cost risk due to the RWQCB's 5-year permitting cycle and potential WWTP upgrades that will be required to meet updated regulation and controls.

Option C has the lowest long-term operations and maintenance cost and lowest long-term risk for discharge permit cost changes over time. This option has the highest capital cost due to the significant length of pipeline required to convey sewage from the TOP collection system to the City of Chico WPCP headworks.

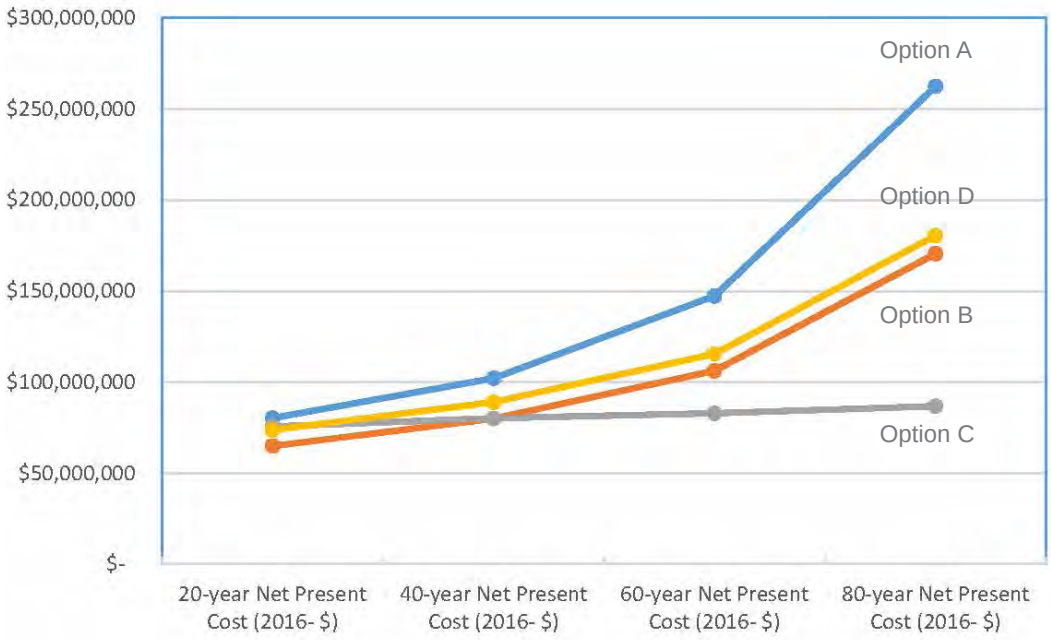


Figure 9.1 – Comparison of Option Net Present Cost Over Varying Life-Cycles

Option A is a localized WWTP with effluent land application and requires a significant amount of land acquisition and a long conveyance pipeline to deliver collected Town flow to the WWTP. Less stringent discharge requirements and long-term permit compliance with few anticipated upgrades over time are advantages for this option, however, long-term costs and initial capital costs are both high.

OPTION A – WWTP WITH LAND APPLICATION

The main advantages of this option are that the Town will be able to maintain local control and operate under a WDR permit with lower long-term management burden and less anticipated permit changes over time. This option has low energy consumption and the WWTP construction is less complex in relation to other treatment options. However, Option A ranks last in our scoring and evaluation due to high costs from both a capital cost and long-term NPC perspective. See **Table 8.1**.

Table 9.1 – Option A Scores

Criteria	Score
Cost	35
Environmental Impact	40
Secondary Benefit Options	80
Interagency Agreements	60
Public Impacts	50
Operational Issues	60
Right-of-Way	40

Cost

This option received a score of 35, mainly because it was the highest cost project over the lifecycle. Specifically, the pipeline from the TOP collection system to the new WWTP and the acquisition of over 300 acres for land for wet weather storage, treatment ponds, and effluent land application added up to significant capital costs.

Environmental Impact

This option scored a 40 for environmental impact due to the large amount of land required for construction. The land area designation is categorized as agricultural and is therefore compatible for use as a WWTP from a county planning perspective. The plausible area for the plant would be within a BRCP delineated Urban Permit Area (UPA) adjacent to Butte Community College and would likely affect a "Grassland Community" as defined in the BRCP. The land area is adjacent to the Butte County Deer Winter Migration Area. The WWTP area would not likely affect wetland or riparian habitat, but the grazing habitat for either cattle or deer could be affected. Cultural resources for the WWTP area have not been delineated as part of the BRCP, so it is assumed no cultural resources are affected.

The areas evaluated would be outside of the 100-year flood plains for Clear Creek and Little Dry Creek, but those flood plain areas would have limitations if additional land area were needed.

The remainder of the project, including the TOP sewer collection system and Clark Road sewer pipeline would lie outside the boundaries of the BRCP.

Secondary Benefit Option

Secondary benefits for Option A are favorable and received a score of 80, mostly because the effluent will only be treated to a secondary level and there are several potential uses for that water. Under Title 22 of California Water Code, disinfected secondary effluent can be used for irrigation of pasture for dairy, nurseries and sod farms, orchards without fruit/nut and water contact, and vineyards without fruit and water contact.

Interagency Agreements

This option scored a 60 for interagency agreements. Although the project would not need to form an agreement with another city or sewer agency, it would require the acquisition of land from private owners. This option would most likely participate in the BRCP for impacts during construction. In addition, encroachment permits from Butte County would need to be acquired, which is why the score was less than favorable.

Public Impacts

Public impacts received a score of 50, or moderate impact, because there would be fairly significant amount of construction needed for the conveyance. The construction would have a negative affect on traffic on Clark Road, which is a major access road for the Town of Paradise. The large acreage of land would require a willing seller with several large parcels – this may be difficult to find. If negotiations were unsuccessful, other large parcels would need to be acquired, which would demand additional pipeline length and road impacts.

Operational Issues

This option received a score of 60, or less favorable, due to the long-term operation and maintenance of the WWTP. The WWTP will require compliance with a RWQCB Waste Discharge Requirement that will be revisited every five years. Compliance sampling and reporting is essential to the permit maintenance. If groundwater monitoring demonstrates a lack of water quality degradation, additional requirements, or WWTP process changes are unlikely. The most common ongoing maintenance challenges with facultative ponds and effluent land application is odor control and mosquito abatement during warmer months.

Right-of-Way

A significant amount of land is required for this option, which is why it received a score of 40, or difficult, relative to the evaluation criteria.

OPTION B – WWTP WITH STREAM DISCHARGE

Option B would have several advantages, including local control of wastewater collection and treatment, a small environmental footprint, less conveyance from collection system to WWTP, and lower capital cost. However, this option will carry the most stringent treatment requirements from the RWQCB, because of an effluent dominated stream discharge. See **Table 9.2**.

Table 9.2 – Option B Scores

Criteria	Score
Cost	70
Environmental Impact	40
Secondary Benefit Options	60
Interagency Agreements	70
Public Impacts	40
Operational Issues	40
Right-of-Way	50

Cost

Option B received a score of 70, or favorable relative to other options, because it has the lowest capital cost and the second best net present cost. The preferred treatment option to meet the strict discharge requirements demands more energy than most treatment options; this is due to the MBR treatment and use of ultra violet light (UV) as a disinfection step. Because of the additional energy costs, this option would have the second highest anticipated operations and maintenance cost.

Environmental Impact

This option received a score of 40, or difficult to moderate, for environmental impact. The acquisition of a new NPDES permit from the RWQCB may present a challenge, because a WWTP located close to the Town and its residents is more likely to draw opposition from adjacent land owners. Streams in the area are ephemeral and although the effluent will be treated to a high level of quality, the stream flow will be dominated by the effluent year round.

Secondary Benefit Option

This option scored a 60, or average to favorable, for secondary benefits. The effluent stream flow would likely create a habitat for local wildlife. The effluent could be diverted to a reclaimed water delivery system in the future due to its high level of treatment and quality.

Interagency Agreements

This option would require the typical encroachment permits and environmental permitting for a large civil project, but would not need coordination with another city or special wastewater utility district. Because of the relatively low level of interagency agreements, this option received a score of 70, or favorable.

Public Impacts

This option rates lower for public impacts, with a score of 40, due to its proximity to Town residents. Keeping the WWTP close to the Town decreases the infrastructure cost, but increases the project profile. MBR plants provide a high level of water treatment with a small site footprint. A WWTP of this size is commonly used at the expected flow rate of this project. They are also often sited near homes and businesses with a relatively small aesthetic impact. Many WWTPs are completely enclosed in buildings to control odors and mitigate visual impacts. However, the stigma of a home or business's proximity to a WWTP can be challenging, because of the negative impacts on property values. This impact is more specific to owners looking to rent or re-sale their property.

Operational Issues

The MBR option requires process control and maintenance that exceeds a facultative pond system. Disinfection requirements for stream discharge will limit the use of chlorine due to the production of disinfection byproducts. A UV system is the most likely disinfection process to be used. The bulb replacements for UV disinfection systems are becoming less expensive each year as technology improves, but they are still relatively costly and require a higher energy supply than other disinfection options. Because of these operational costs, this option received a score of 40, or difficult to moderate.

Right-of-Way

This option will require significantly less property and land to purchase for the WWTP than Option A. However, it will still need a willing seller with adequate acreage. Due to ROW impacts, this option received a score of 50, or moderate.

OPTION C – REGIONAL PIPELINE

Option C, a regional pipeline connection to the Chico WPCP, has several advantages. It has the lowest net present cost for project life cycle over 40 years, lowers the discharge permit change risk by connecting to an established treatment plant, spreads treatment plant improvement costs over a significantly larger pool of rate payers, and significantly limits local and regional impacts to stakeholders and streams. See **Table 9.3**.

Table 9.3 – Option C Scores

Criteria	Score
Cost	80
Environmental Impact	80
Secondary Benefit Options	30
Interagency Agreements	40
Public Impacts	60
Operational Issues	90
Right-of-Way	30

Cost

Option C received the highest score of 80 for the cost criteria due to its more favorable net present cost. The higher initial cost for the length of conveyance to the Chico WPCP prevents the option from receiving an excellent score.

Environmental Impact

This option received a favorable score of 80 because it presents the least amount of impact to environmental resources (streams, RWQCB permit, grassland impacts). A preliminary alignment for the regional pipeline

would cross both streams and a 100-year floodplain. However, the stream crossings would use trenchless technology. This means that once construction is complete there is no impact to the floodplain because the topography of the construction corridor is unchanged. Highway 99 and the Union Pacific Railroad would also be crossed with trenchless technology.

Secondary Benefit Option

The selection of the regional option effectively eliminates opportunities for beneficial reuse in and around the Town. Therefore, the option received a score of 30, or difficult. Beneficial reuse of the effluent would likely only occur at the Chico WPCP if the City of Chico elected to add a reclaimed treatment step and conveyance option to potential end users.

Interagency Agreements

The success of the regional option is entirely dependent on the City of Chico's willingness to allow connection and treatment at the WPCP. While there are benefits to the WPCP to accept additional flow and connection fees, an interagency agreement is necessary to proceed. This option would require moderate interagency agreements, so it scored a 40; or difficult to moderate.

Public Impacts

Option C received a score of 60, or moderate to favorable, for public impacts. This is primarily due to the construction impacts of the regional pipeline to reach the Chico WPCP. The long-term impacts are small, but with most pipeline projects, the impact of construction is high when the progress passes homes, driveways, and intersections. However, the duration of high-impact is relatively short.

Operational Issues

This option scored 90, or excellent, for operational issues because once the regional pipeline is completed and operational, it would have lowest long-term maintenance effort of any of the options.

Right-of-Way

The cost for the acquisition of temporary construction easement is included in the cost criteria, but the level of effort to delineate impacts, negotiate easements, and execute payments and construction logistics is captured in the ROW. The regional pipeline will require the most property, utility, and stakeholder coordination for the pipeline construction, so it scored a 30, or difficult.

OPTION D – WWTP WITH BENEFICIAL REUSE

Option D is effectively the same as Option B, but with the added element of a reclaimed water system for storage and delivery to end users for irrigation purposes. This option provides an advantage for irrigators who have been impacted by the drought, because it creates more water for reuse. The treatment plant can install filling stations for contractors in need of water for water truck and dust control. The project team discussed the potential for recycled water use with several end users, including municipal water companies and private golf courses, however, only the public golf course had appreciable seasonal demand for reclaimed water for irrigation. While there are several programs for potential grant funding or low interest loans for projects implementing reclaimed water, they tend to focus on public and not private uses. Therefore this project option is unlikely to have the additional cost of the reclaimed distribution system offset by grant funding. The private end user would need to pay the additional infrastructure cost to deliver the reclaimed water in order to save the Town's rate payers from the added cost burden. For these reasons, Option D ranked third among options analyzed. See **Table 9.4**.

Table 9.4 – Option D Scores

Criteria	Score
Cost	45
Environmental Impact	50
Secondary Benefit Options	90
Interagency Agreements	50
Public Impacts	40
Operational Issues	30
Right-of-Way	40

Cost

As described in the summary for Option D, the additional capital cost for the reclaimed distribution would not likely directly benefit the Town, except for the reduction in stream discharge of effluent during the warmer months of the year. The option also ranks third on NPC. Therefore, the option scored a 45, or moderate.

Environmental Impact

This option will require a NPDES permit from the RWQCB just like Option B. However, the seasonal demand for reclaimed water will greatly reduce the discharge volume and would likely be more favorable for permitting than Option B. The option received a score of 50, or moderate, for environmental impact.

Secondary Benefit Option

Option D ranks the highest for secondary benefits and received a score of 90, or excellent. The project option seeks to minimize the amount of effluent discharged to streams and reuse water to the fullest extent.

Interagency Agreements

This option will require significant coordination with the RWQCB, private land owners and businesses, and compliance with California Water Code to affirm "Disinfected Tertiary" effluent status under Title 22 of the CWC. Because of the interagency agreements, this option scored a 50, or moderate for these criteria.

Public Impacts

The public impacts for Option D are equivalent to Option B with the exception of the additional impacts in public ROW for the reclaimed water product distribution pipeline. Because of these additional costs, this option received a score of 40, or difficult to moderate.

Operational Issues

This option scored a 30, or difficult, because it is the most complex project to operate. It still requires all the operation and monitoring of the WWTP with surface discharge, but it also includes the operation of the reclaimed water storage and distribution system.

Right-of-Way

The complexity of ROW management and acquisition is equivalent to Option B and received a score of 40, or difficult to moderate.

10
Overall Scoring Outcome

OVERALL SCORING OUTCOME

Based on the criteria and weighting developed by the project team and the PSG, and the scoring described above, Option C – Regional Connection is the recommended option. The secondary option is Option B – Localized WWTP with surface water discharge. See **Table 10.1**.

Table 10.1 – Sewer Project Scoring Matrix

Criteria	Localized Wastewater Treatment Plant – Effluent Land Application	Localized Wastewater Treatment Plant – Surface Water Discharge Location	Regional Connection to the City of Chico Water Pollution Control Plant	Wastewater Treatment with Beneficial Reuse
Option	**A**	**B**	**C**	**D**
Cost	35	70	80	45
Environmental Impact	40	40	80	50
Secondary Benefit Options	80	60	30	90
Interagency Agreements	60	70	40	50
Public Impacts	50	40	60	40
Operational Issues	60	40	90	30
Right-of-Way	40	50	30	40
Weighted Sum	**48**	**57**	**67**	**50.5**

Based on the scoring outcome, Options A and D would be dropped from further consideration. The recommended Option C – Regional Connection carries some risk because it is contingent on agreement with the City of Chico, which depends on their future plans for the Chico WPCP. An MOU, a connection agreement, and cost must be agreed upon to move this option forward. Therefore, Option B – Localized Treatment Plant with surface water discharge should continue to be carried forward as a secondary option. See **Table 10.2** for a list of project option capital costs.

Table 10.2 Option Capital Costs

Option	Description	Capital Cost
A	WWTP with Land Application	$82,545,000
B	WWTP with Stream Discharge	$64,046,000
C	Regional Connection	$83,430,000
D	WWTP with Reuse	$72,672,000

11

Project Funding Options and Rate Evaluation

HOW ARE PROJECTS TYPICALLY FUNDED?

Medium to large infrastructure projects generally acquire funding before design and construction. The method of generating funds is guided by a planning process, which is included in an overall capital improvement plan. Funds for a large-scale project can be generated in a variety of ways, including governmental grants, governmental loans, assessment of properties benefitting from the improvement, and collecting fees from rate payers customers' monthly bill for specific initiatives. It is common for agencies to raise service charges in the years leading up to the project to generate the necessary funds for future improvements.

WHAT IS AN ASSESSMENT?

An assessment is an amount that a property owner is required to pay as a tax. An Assessment District is a financing tool that allows cities, counties and special districts to generate funding for a specific project. Assessment Districts generate funds by selling municipal improvement bonds and repaying those bonds by collecting a tax from each property that will benefit from the improvement or project that is being funded. An assessment district can only be formed with the approval of a majority of the landowners that will benefit from the project. Assessment Districts help each property owner pay a fair share of the costs of the improvement over a period of years at reasonable interest rates. They

also insure that the cost will be spread to all properties that receive direct and special benefit by the improvements constructed.

For this project, there are two assessment options. Each option requires voting approval by a majority of the benefiting property owners and will be paid through a property tax bill. Interest rates for the assessments are dependent upon the bond market at the time of the bond sale. Assessments for this project are expected to have an interest rate between 2 percent and 5 percent for 30 years. In general, a special tax will be determined by an Engineer's Report, which will be applied to each parcel. If an Assessment District is formed, an assessment tax will be included in the property owner's property tax bill. Both assessment options allow land to be used as collateral for bonds that are sold to investors.

The Improvement Act of 1913 allows public agencies to create a Special Assessment District to benefit the property owners in the district. This total assessment is reduced each year over the life of the assessment and is collected with the regular property taxes.

The Improvement Act of 1913 allows public agencies to create a **Special Assessment District** to benefit the property owners in the district. This total assessment amount is reduced each year over the life of the assessment and is collected with the regular property taxes. An Engineer's Report determines the benefit each parcel will receive. The assessment amount on each parcel is based upon that benefit and not based upon the value of the parcel. For this project, the benefit received by a parcel is the allocation of anticipated sewer flows based on land area and land use. For approval, a Special Assessment District requires a 50 percent plus one "yes" vote of all parcel owners that will benefit from the project.

An Engineer's Report is prepared to define the project costs and allocate benefits to each parcel served in accordance with the Special Assessment Investigation, Limitation and Majority Protest Act of 1931. The Engineer's Report estimates the cost of the project, including construction, engineering, administration, bond counsel, construction management and inspection, and environmental permitting costs and fees. Costs and fees for the project are distributed to each parcel proportionate with the benefit. This allocation of benefits becomes the Assessment Roll for parcels within the district. The assessment includes all parcels within the special district and its allocation of benefit based on land use and anticipated sewer flow. The new district engages a professional Bond Counsel to sell municipal bonds to fund the project.

The other assessment option is to create a **Mello-Roos Assessment District**, based upon the Mello-Roos Community Facilities Act of 1982. Like the Special Assessment District, Mello-Roos assessments are not based on the property value but on benefit received by each parcel. Mello-Roos have more flexibility in its method of assessment than Special Assessment Districts. Mello-Roos Assessment Districts also have more flexibility in the way funds can be spent. For example, Mello-Roos tax can be used to fund planning and operations costs as well as capital costs.

These funding options make the Mello-Roos Assessment District a good instrument for phased projects. The special tax can directly pay for operations and services, as well as to pay debt service on funds used to pay for planning, environmental permitting, design, and construction. District boundaries can be set without contiguous borders. Mello-Roos Assessment Districts allow non-contiguous parcels to be included and others to be excluded. Although a special district's boundaries can be flexible, they are required to fall within an agency's territorial limit. Any special district formed for the Town of Paradise must have all parcels of the District within the Town's limits.

Mello-Roos Assessment Districts allow non-contiguous parcels to be included and others to be excluded.

Both of the above funding methods could be used for the Town of Paradise sewer project. The pros and cons of each method will be further discussed in the final project report. The main goal of this report is to select a preferred assessment option to serve the Town. An equally important goal is to maximize opportunities for grant funding, which will help reduce the bond financed portion of the project cost.

WHAT DOES A LOW INTEREST LOAN LOOK LIKE?

There are many organizations that offer low interest loans to fund public infrastructure projects. Each organization or fund has its own specific requirements for eligibility. For example, there may be requirements for specific parts of the project, the entirety of a project, or the demographics for those served by a project when applying for funding. In general, a loan is requested for a proposed project by a public agency – in this case, it's the Town. The terms of the loan (interest rate, length of term, etc.) are established before an agreement is signed. Reimbursements are requested as the money is spent on the project through the design and construction phases. Typically, the payments on the loan begin once construction is complete, although sometimes payments can be delayed up to a year after completion of construction.

Currently, there are multiple low interest loan options available. The following will provide more information for each of those options.

We'll begin with our recommendation, which is funding through the State Water Board's Clean Water State Revolving Fund (CWSRF) wastewater program. CWSRF loans typically have a low interest rate and an available grant funding portion. The CWSRF is the main funding source for water and wastewater projects throughout the state of California.

http://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/index.shtml

CWSRF loans currently have a 2 percent interest rate and a 30-year term. (That rate changes periodically and is based on the State's Bond Sales.) CWSRF funding is for planning, design, construction, and land acquisition for wastewater projects. There is no maximum funding limit. CWSRF offers grants (principal forgiveness), based on availability. The grant amount can be 75 percent of project costs up to $8 million for disadvantaged communities. To qualify as a disadvantaged community, 1) the Median Household Income (MHI) for the Town must be 80 percent of the State MHI. The Town of Paradise meets that requirement. 2) the sewer service charges (including assessments) must be 1.5 percent of the Town's MHI. Based on these criteria, the Town's position is as follows:

CWSRF loans typically have a low interest rate and an available grant funding portion. The CWSRF is the main funding source for water and wastewater projects throughout the state of California.

- Median Household Income for Paradise: $41,482
- Median Household Income for California: $61,489
- 1.5% of MHI: $51.85 per month

CWSRF requires that a majority of the project beneficiaries are residential—this is a key issue that must be resolved for this project. The zoning of land within the service area does not meet that requirement, but the current land use does meet that requirement. The final service area of the project must address the land use beneficiaries to affirm that the Town will qualify for both the CWSRF loan, and to maximize the loan forgiveness (grant) available to the Town.

CWSRF also has loan forgiveness Green Project Reserve (GPR) for projects that have green elements. Green elements for wastewater projects could consist of LEED certified wastewater treatment buildings, or collection system infiltration/inflow detection equipment and other similar elements. Green elements may have a greater appeal, but will

likely carry a higher capital cost. The GPR can cover 50 percent of the eligible cost up to $4 million. The GPR loan can offer financial assistance, but could reduce eligibility for other grant sources from the State Water Board.

OTHER AVAILABLE FINANCING

The United States Department of Agriculture – Rural Development (USDA – RD) offers loans for small community wastewater projects for rural areas. The USDA defines a rural area as a city or town with a population of less than 10,000. Unfortunately the Town of Paradise doesn't qualify as "rural," based on these USDA-RD requirements.

https://www.rd.usda.gov/programs-services/community-facilities-direct-loan-grant-program

Another low interest loan option is the IBank program. IBank provides low interest loans for California's infrastructure and economic development projects. Infrastructure projects are funded through the Infrastructure State Revolving Fund (ISRF) with loan amounts up to $25 million for 30 years.

Infrastructure projects are funded through the Infrastructure State Revolving Fund (ISRF) with loan amounts up to $25 Million for 30 years.

US Bureau of Reclamation (Department of the Interior) has funding for water reclamation and reuse under Title XVI. If beneficial reuse is included in the project, the eligible portions of the project may be funded through Title XVI. However recycled water cannot be used for commercial use. This restriction is problematic, because commercial use at a private golf course is the only potential recycled water user in the vicinity with appreciable seasonal demand to use the majority of recycled water.

A Community Development Block Grant (CDBG) provided through the U.S. Department of Housing and Urban Development (HUD), is another source of funding. The Town of Paradise is in the CDBG entitlement program to receive funds. In order to compete for other CDBG grant funding programs, the Town of Paradise would need to withdraw from the entitlement program.

CDBG funding for a sewer project in the Town of Paradise would likely come from the Public Improvement Activities Program and could potentially provide up to $1.5 million, which could help fund property and Right-of-Way acquisition needed for the project. To be eligible, the project would need to demonstrate a benefit to all the residents in the service area and demonstrate benefits to at least 51 percent of the low and moderate-income (LMI) residents in the service area. The cost related to jobs created by the project must also be considered. It

should be noted that, for other communities, CDBG funds leveraged an additional $4.07 million from other funds, based on reporting from fiscal years 2010 - 2012.

http://www.hcd.ca.gov/financial-assistance/community-development-block-grant-program/index.html

The Environmental Protection Agency has established the Water Infrastructure Finance and Innovation Act (WIFIA) program to accelerate investment in water and wastewater projects. The program works separately, but in coordination with SRF programs to provide subsidized financing for large dollar-value projects. Wastewater collection and treatment projects must be eligible for the Clean Water SRF program and have a minimum project size of $20 million for large communities and $5 million for small communities (population of 25,000 or less). The WIFIA is a low interest loan with a maximum of 49 percent funding of the eligible project cost.

The Environmental Protection Agency has established the Water Infrastructure Finance and Innovation Act (WIFIA) program to accelerate investment in water and wastewater projects. The program works separately, but in coordination with SRF programs to provide subsidized financing for large dollar-value projects.

RCRC (Rural County Representatives of California) is an organization that has been organized to help communities acquire infrastructure funding. This group is still in the planning stage of getting an allocation of money from the federal government. They are currently collecting information from communities who have projects that need funding. It is anticipated that it will use the USDA as the platform to administer the funds. The RCRC are also planning to be a liaison to help either streamline the application process or possibly help with some components of the application process. Currently USDA only has low interest loans available and their interest rate is currently higher than the SWRCB SRF program. RCRC are planning to request the money from the federal government, along with proposed terms of the agreements. It has yet to be determined whether the allocation would be administered as loans or grants. Also a proposed amount is to be determined based on the list of projects being collected now. The project team will keep informed of the progress of this possible funding source and will provide the necessary information RCRC requested on the Paradise Sewer Project.

PROPOSED APPROACH TO FUNDING

The project team recommends that the Town of Paradise acquire as much grant money as possible, obtain a low interest loan, and establish an Assessment District to fund this project. This would mean structuring

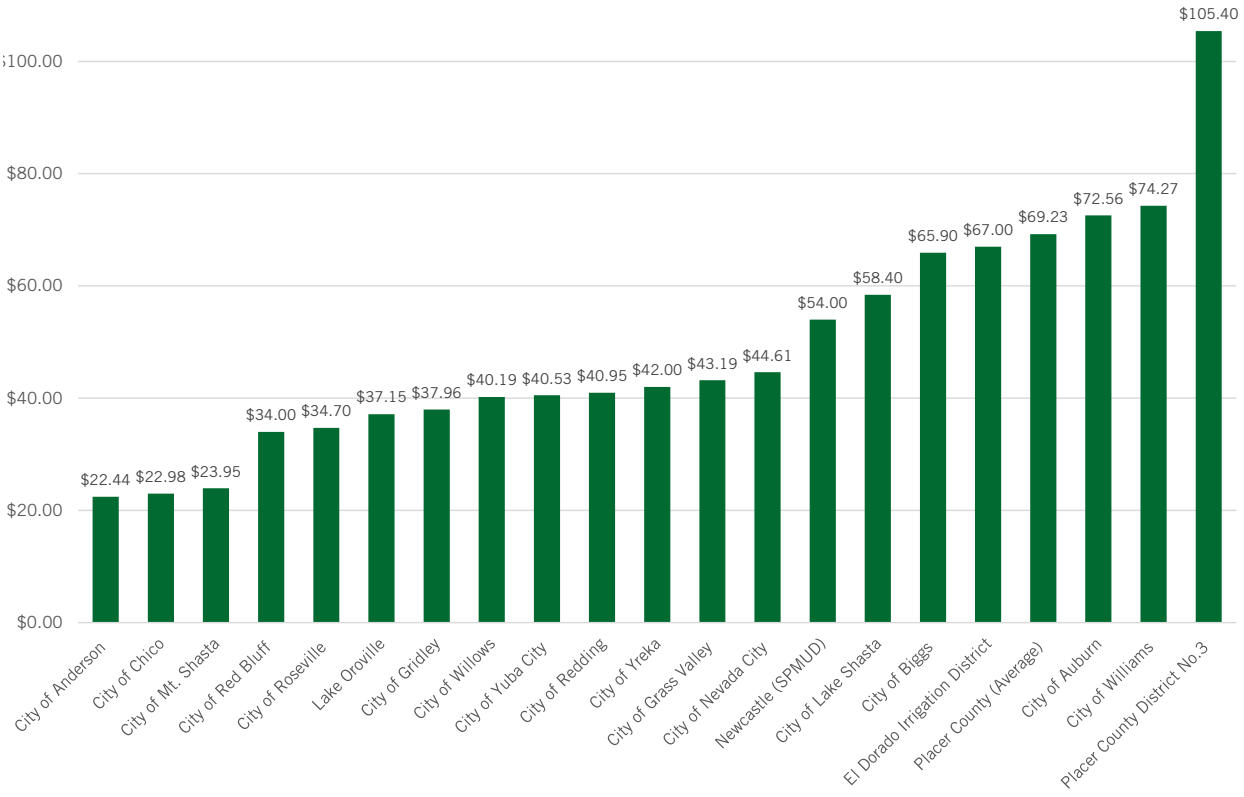


Figure 11.1 – Sewer Rate Comparison to Neighboring Sewer Districts

sewer rates to be greater than 1.5 percent of the MHI to meet CWSRF grant requirements. The CWSRF grant seems the most likely grant available to the Town.

The division of project funding between low interest loan and parcel assessment can be a difficult decision. An Assessment District charge is paid by a parcel's property tax paid twice each year. A loan is repaid by a sewer service charge paid once each month.

The entire project cannot be funded by the Assessment. Assessment Districts require a vote by the land owners proposed to be assessed. If the Assessment payment amount is too high, land owners may vote "no" and the Assessment District won't be approved. A balance that accommodates both appropriate sewer service charge and reasonable assessment repayment amounts is recommended. The sewer service charges should be set high enough to qualify for the full SRF grant amount, but remain reasonable relative to the rates of neighboring municipalities, **Figure 11.1**.

Private improvements are another key piece of this project. Most existing homes and businesses have on-site septic systems. Improvements to these private systems are required to establish a connection with a

public sewer system. The costs associated with the improvements will vary. For example, a home with a short driveway would likely cost less to connect than a home with a long driveway.

One option is to combine all of the costs for the private improvements with the total cost of the project, which would be included in the cost for the SRF loan. If this approach is taken, the burden to fund and construct the private improvements would be part of the project cost. It is important to note that special assessment funds cannot be used for improvements on private property.

Another option is to have parcel owners pay for individual service costs.

It is recommended that the Town fund the private improvements and offer low interest loans to the parcel owners to pay for the private improvements.

It is recommended that the Town fund the private improvements and offer low interest loans to the parcel owners to pay for the private improvements. The loans would be repaid on the monthly sewer service charges. This option will encourage early connection and help to establish project flows.

DELINQUENCIES/NON-PAYMENTS

Customer non-payments and delinquencies could cause potential funding deficits. Decreased funding can cause the Town to raise service charges to overcome the deficit. Delinquencies and non-payments seem more likely for the sewer service charges than for assessments associated with the customer's property taxes. This should be considered when determining the cost breakdown between assessment amounts and service charges.

PROPOSITION 218 REQUIREMENTS

Proposition 218 is a California constitutional amendment, which defines the methods by which local agencies increase taxes and fees. Proposition 218 requires voter approval prior to imposing or increasing general taxes, assessments, and certain user fees. The law does not specify the method or formula that should be used to apportion the assessments in any special Assessment District proceedings.

Proposition 218 requires all local agencies notify parcel owners of proposed new or increased general taxes and service charges. In most cases, individual notices must be mailed to affected parcel owners. A formal protest hearing is required. For the new taxes and service charges to be approved, less than 50 percent plus one of the parcel owners must not protest.

FUTURE MANAGEMENT AND FINANCIAL RESPONSIBILITY FOR SEWER SYSTEM

Continued operation and management throughout the service life of the sewer system will be required once the facilities are in place. Continued system operations, funds management, legal requirements, and other practice areas are all important factors to a successful new sewer system operations. The Town will be responsible for maintaining these capabilities. In addition, the funding agency will do a thorough evaluation of the proposed funding mechanisms for project construction as well as continued operation and maintenance. A detailed cost estimate for annual operation and maintenance is included in the overall cost estimate for each alternative. The operations and maintenance costs are included in the project costs.

FUNDING OPTIONS

Another funding option is to have both assessments and a loan kept separately. The assessment amount would pay back the bonds sold for project initiation and the service charges would pay back the low interest loan and future operation and maintenance. For purposes of this report, we have chosen to keep the assessment and the loan funds separate. The Town can decide which portion of the funding they would like to obtain from assessment versus low interest loan.

A detailed cost estimate for annual operation and maintenance is included in the overall cost estimate for each alternative. The operations and maintenance costs are also considered in the service charge estimates.

There are many factors that will be used to determine funding for this project. For purposes of this report, many of these decisions were assumed and used to develop comparable funding and rate scenarios for each alternative.

The following assumptions were made in an effort to prepare comparable alternatives:

- The Town and this project will be eligible for SRF funding – primarily residential and disadvantaged; using current terms (30 years at 2 percent interest); 1.2 times debt service requirement
- The maximum SRF grant will be obtained—$8 million
- Parcel owners will obtain a loan from the Town for improvements to the private laterals at 1% interest for 10 years
- Service charge monthly rates to commercial/industrial customers will be two times residential rates
- Terms for assessment bond sales is 20 years at 3.5% interest
- Bond Counsel will charge approximately $150,000 for implementation of the Assessment district and sale of the bonds
- The project will be funded by $8 million grant, 40% of remaining costs would be funded through low interest SRF loan, and 60% funded through an assessment

POTENTIAL FUNDING AND RATES FOR THE SEWER PROJECT OPTIONS

The following tables summarize project capital costs, funding sources and amounts, and a breakdown of possible rates to pay back the funding sources (not including grants). It should be noted that the funding payback exceeds the project costs due to required loan interest charges. Non-residential rates correspond to parcels zoned as commercial or industrial.

OPTION A – LAND APPLICATION

Table 11.1 – Option A – Total Costs for Project

Total Costs for Project	
Land Application	$34,972,000
Collection System	$28,767,000
Private Connections	$18,656,000
Bond Counsel	$150,000
Total Cost	**$82,545,000**

Table 11.2 – Option A – Funding

Funding	
SRF Grant	$8,000,000
SRF Loan	$48,593,000
Assessment	$66,725,000
Private Loans	$20,607,000
Total Funding	**$143,925,000**

Table 11.3 – Option A – Individual Payments

Individual Payments				Frequency
Private Lateral Loan	$117			Monthly
Assessment Range	Low	High	Average	
Residential	$891	$9,991	$1,384	Annually
Multi-Family Residential	$426	$77,447	$3,834	Annually
Non-Residential	$2*	$62,141	$2,253	Annually
Residential Service Charges	$124			Monthly
Non-Residential Service Charges	$195			Monthly

OPTION B – MBR TREATMENT WITH STREAM DISCHARGE

Table 11.4 – Option B – Total Costs for Project

Total Costs for Project	
Land Application	$16,473,000
Collection System	$28,767,000
Private Connections	$18,656,000
Bond Counsel	$150,000
Total Cost	**$64,045,996**

Table 11.5 – Option B – Funding

Funding	
SRF Grant	$8,000,000
SRF Loan	$32,509,000
Assessment	$44,639,000
Private Loans	$20,607,000
Total Funding	**$105,756,000**

Table 11.6 – Option B – Individual Payments

Individual Payments				Frequency
Private Lateral Loan	$117			Monthly
Assessment Range	Low	High	Average	
Residential	$596	$6,684	$926	Annually
Multi-Family Residential	$285	$51,813	$2,565	Annually
Non-Residential	$1*	$41,573	$1,508	Annually
Residential Service Charges	$106			Monthly
Non-Residential Service Charges	$159			Monthly

OPTION C – REGIONAL PIPELINE TO CHICO WPCP

Table 11.7 – Option C – Total Costs for Project

Total Costs for Project	
Land Application	$35,857,000
Collection System	$28,767,000
Private Connections	$18,656,000
Bond Counsel	$150,000
Total Cost	**$83,430,000**

Table 11.8 – Option C – Funding

Funding	
SRF Grant	$8,000,000
SRF Loan	$49,363,000
Assessment	$67,782,000
Private Loans	$20,607,000
Total Funding	**$145,752,000**

Table 11.9 – Option C – Individual Payments

Individual Payments				Frequency
Private Lateral Loan	$117			Monthly
Assessment Range	Low	High	Average	
Residential	$905	$10,150	$1,406	Annually
Multi-Family Residential	$433	$78,674	$3,894	Annually
Non-Residential	$2*	$63,126	$2,289	Annually
Residential Service Charges	$131			Monthly
Non-Residential Service Charges	$197			Monthly

OPTION D – MBR TREATMENT WITH BENEFICIAL REUSE

Table 11.10 – Option D – Total Costs for Project

Total Costs for Project	
Land Application	$25,099,000
Collection System	$28,767,000
Private Connections	$18,656,000
Bond Counsel	$150,000
Total Cost	**$72,672,000**

Table 11.11 – Option D – Funding

Funding	
SRF Grant	$8,000,000
SRF Loan	$40,009,000
Assessment	$54,938,000
Private Loans	$20,607,000
Total Funding	**$123,554,000**

Table 11.12 – Option D – Individual Payments

Individual Payments				Frequency
Private Lateral Loan	$117			Monthly
Assessment Range	Low	High	Average	
Residential	$733	$8,227	$1,140	Annually
Multi-Family Residential	$351	$63,766	$3,156	Annually
Non-Residential	$2*	$51,164	$1,855	Annually
Residential Service Charges	$117			Monthly
Non-Residential Service Charges	$176			Monthly

***Small, non-residential parcels generate minimal flow based on criteria. Final rates will likely include a minimum benefit and assessment and some parcels may be dropped from the assessment roll, if they are unlikely to develop.**

The project team also evaluated the Median Household Income (MHI) of several communities to compare to the existing sewer rates paid in these communities, see **Figure 11.1**. The data reveal that communities with higher sewer rates do not have higher incomes. Instead the correlation is that communities paying the highest rates have the most recent upgrades in WWTP's or recent regionalization projects. Therefore communities relying on older systems of collection and treatment tend to have lower rates regardless of whether they are in the foothills or the central valley.

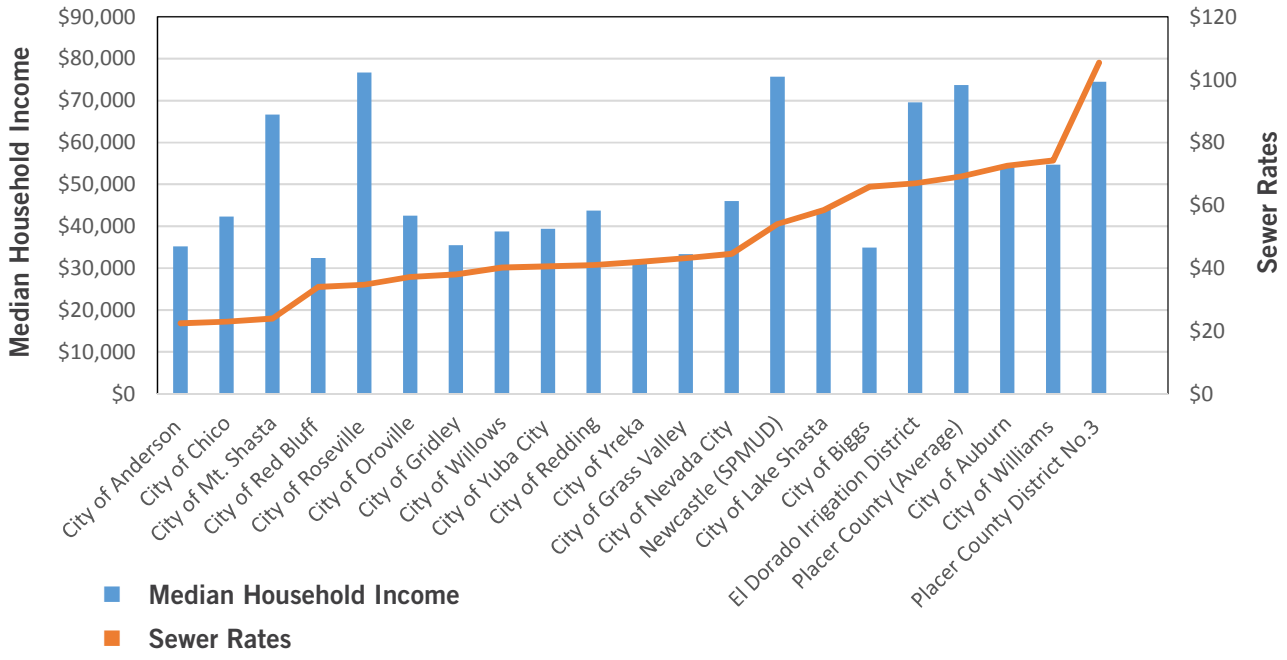


Figure 11.2 – Sewer Rate Comparison to Neighboring Sewer Districts

Much of the sewer infrastructure relied upon in California, was installed in the 1970s and early 1980s utilizing significant financial support from the federal government made available after the Clean Water Act. Many communities built major conveyance and treatment with 75 percent of cost covered by federal grant. More recent projects have had to "pay their own way" with low interest loans and assessments.

Funding a project the size of the Town of Paradise Sewer Project is difficult. The project team believes that the estimated rates will need to come down 30 to 40 percent from the current estimate for the rates to be comparable to other communities in the region. This would require an additional $40 million in grant funding. Securing the targeted grant amount would bring the residential sewer rate to $89 per month and the non-residential rate to $134 per month for the Regional Option – C. The WWTP Option – B would have a residential rate of $65 per month and a non-residential rate of $97 per month.

12
Report Recommendations

The need for a sewer project for the Town's business and commercial area has been well established. The project options to meet this need have been developed and the benefits of a project to the local and regional economy have also been considered. The options have been developed and evaluated based on project cost, environmental impacts, public impacts, and the long term operational burden.

Two options emerged from the evaluation process with the highest scores: Option B - Localized Wastewater Treatment Plant with Surface Water Discharge and Option C - Regional Connection to the Chico WPCP. Option B had the lowest capital cost of the options at $64 million, while Option C was projected to cost $83 million. However, Option C had the lowest Net Present Cost over the 80-year life cycle compared and overall scored high based on life cycle cost, environmental impacts, public impacts, and long term operational burden.

The recommended preferred option is Option C - Regional Connection to the Chico WPCP. However, the cost to implement a project of this scale is high. Even with low interest loans and an assumed SRF maximum $8 million grant, the burden of the project on small businesses and residential customers is significant.

As currently described, the preferred Option C – Regional Connection to the Chico WPCP, will cost an average Residential User $1,406 in annual property tax assessment (paid over 20 years), $117 per month to pay back an individual loan for a tank, pump, and connection to the collection system (paid over 10 years), and $131 per month in sewer fees to cover sewer district operations and maintenance and debt service on a 30-year low-interest loan from the SWRCB.

An average Non-Residential User would pay $2,289 in annual additional property tax (some as high as $60,000) for 20 years, $117 per month to pay back an individual loan for a tank, pump, and connection to the collection system (paid over 10 years), and $196 per month in sewer fees to cover sewer district operations and maintenance and debt service on a 30-year low-interest loan from the SWRCB.

It is recommended that the Town seek additional grant funding from state and federal sources to reduce the assessment and sewer rate burden on the Town residences and businesses.

While the preferred option represents the lowest operational burden for the Town and the best net present cost over the project life cycle, the cost is too high to proceed with sewer district formation and subsequent bond sale, property assessment, and SRF loan application. It is recommended that the Town seek additional grant funding from state and federal sources to reduce the assessment and sewer rate burden on the Town residences and businesses. The project team estimates that an additional $40 million in grant money is needed to improve the chances of a successful vote to form an assessment district. Parallel to this effort, the regional connection will need to be discussed and vetted with the City of Chico so that connection costs and a memorandum of understanding between the two agencies can be reached. It is also recommended that the project team apply for additional grant funds to complete a preliminary design, environmental document, and formal rate study for the preferred option.

If a regional partnership is not reached with the City of Chico, then the Town can begin preliminary design and implementation of Option B - Localized Wastewater Treatment Plant with Surface Water Discharge. The preliminary design would allow for siting of a treatment plant, updated cost estimates, collection system phasing, Environmental Impact Report for CEQA compliance, establishment of discharge parameters with the RWQCB, as well as discussion of alternative funding options. It is likely the Town would be able to secure additional grants to pay for the preliminary design and environmental document.

13
Project Implementation Next Steps

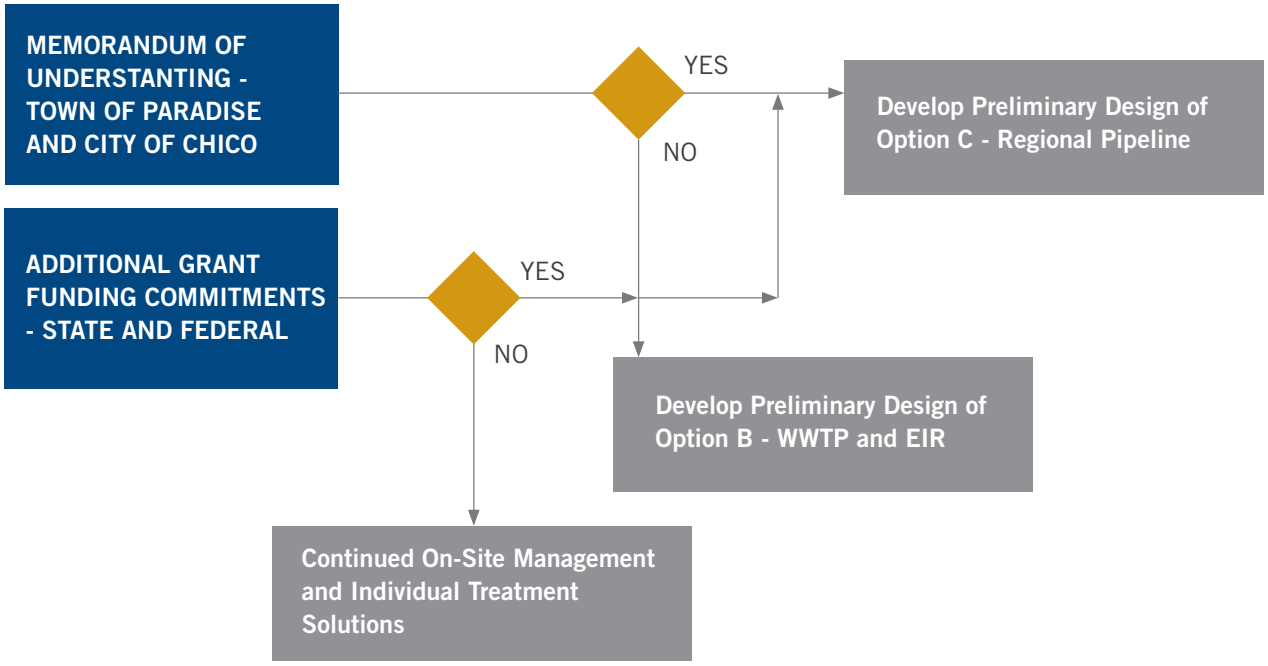
PROJECT IMPLEMENTATION

Once the feasibility study is complete and a preferred alternative is selected for implementation by the Town Council, the Town would form a special district and proceed to a vote of sewer district stakeholders. If the project sewer district vote is successful then the District would acquire the funding necessary via bond sale, property assessment to pay back the bonds, grant(s), and a loan in order to proceed to preliminary design, environmental permitting, property acquisition, final design, construction, and start-up of the sewer system.

The recommendation for the regional connection, Option C, and the project's estimated high cost necessitate a few critical early steps to proceed. **Figure 13.1** shows the path options going forward.

It should be noted that the sewer project options are preserved if the City of Chico elects not to support the preferred regional option. However, moving forward without funding offsets will be a challenge. The team will need to ascertain the level of monthly service charge that commercial properties, multi-family properties, and residential properties could accept. Property tax assessments will also be carried on properties for 20 years and represent a significant annual burden to be added to existing

Figure 13.1 – Flow Chart of Project Next Steps



property tax. The perceived long term benefit to the property value and the Town's economic growth need to exceed the tax burden and fees for the sewer district stakeholders to support the project.

The next steps would include:

1. Town Council approved the report with recommendation for Option C
2. Proceed with discussions with the City of Chico for a memorandum of understanding for the regional sewer treatment option
3. Obtain additional state and federal grant funds required for project (concurrent with step 2)
4. Assessment District formation (services area vote)
5. Grant applications
6. SRF loan application
7. Preliminary design and cost estimate
8. Environmental document to meet CEQA and NEPA guidelines
9. Final design and cost estimate
10. ROW needs definition, plats and legal descriptions, appraisal and acquisition
11. RWQCB permit (if necessary)
12. Bid and construction
13. Wastewater system testing and start-up

Appendices

APPENDIX A. COST ESTIMATES

APPENDIX B. PUBLIC OUTREACH MATERIALS

Annual Operations and Maintenance Cost - Service Area (Common to all Options)					
Item No.	Item	Estimated Quantity	Unit	List Price	Total
1	General Manager	1	LS	$150,000	$150,000
2	Receptionist (Assume 1 full 1 part time employee)	2	LS	$60,000	$90,000
3	Accountant	1	LS	$100,000	$100,000
4	Operations - Collection System				
5	Operations Manager	1	LS	$130,000	$130,000
6	Field Crew/Utility Worker (assume 2)	2	LS	$55,000	$110,000
7	On-Site Serviceman	1	LS	$55,000	$55,000
8	Annual Maintenance ($/yr)	1	LS	$50,000	$50,000
9	Septage Hauling	100	EA	$1,000	$100,000
10	Building Cost (assumed service district housed at City Hall)	0	LS	$18,000	$0
11	IT Support ($/yr)	12	LS	$1,000	$12,000
12	Planning ($/yr)	1	LS	$30,000	$30,000
13	Miscellaneous Expenses ($/yr)	1	LS	$10,000	$10,000
	Subtotal O&M				**$837,000**

Annual Operations and Maintenance Cost - Regional Transmission Line (Option C)					
Item No.	Item	Estimated Quantity	Unit	Uint Price	Total
1	Miscellaneous Repairs ($/yr)	1	LS	$25,000	$25,000
	Subtotal O&M				**$25,000**

Annual Operations and Maintenance Cost - MBR (Option B)					
Item No.	Item	Estimated Quantity	Unit	Uint Price	Total
1	Chemicals ($/yr)	1	LS	$1,000	$1,000
2	Lead operator ($/yr)	1	LS	$130,000	$130,000
3	Assistant operator	1	LS	$85,000	$85,000
4	Additional Labor Cost ($/yr) (Filter cleanings)	1	LS	$10,000	$10,000
5	Sampling and Lab Testing ($/Month)	12	EA	$10,000	$120,000
6	Power Requirements ($/yr)	1	LS	$60,000	$60,000
7	UV Servicing ($/yr)	1	LS	$50,000	$50,000
8	Solids Management ($/yr)	1	LS	$6,000	$6,000
	Subtotal O&M				**$462,000**

Annual Operations and Maintenance Cost - MBR with Benificial Reuse (Option D)					
Item No.	Item	Estimated Quantity	Unit	List Price	Total
1	Chemicals ($/yr)	1	LS	$1,000	$1,000
2	Lead operator ($/yr)	1	LS	$130,000	$130,000
3	Assistant operator	1	LS	$85,000	$85,000
4	Additional Labor Cost ($/yr) (Filter cleanings, Pipe inspection)	1	LS	$15,000	$15,000
5	Pond Maintenance and Discharge Monitoring ($/yr)	1	LS	$5,000	$5,000
6	Sampling and Lab Testing ($/Month)	12	EA	$10,000	$120,000
7	Power Requirements ($/yr)	1	LS	$65,000	$65,000
8	UV Servicing ($/yr)	1	LS	$50,000	$50,000
9	Solids Management ($/yr)	1	LS	$6,000	$6,000
	Subtotal O&M				**$477,000**

Annual Operations and Maintenance - Treatment Ponds and Land Disposal (Option A)					
1	Chemicals ($/yr)(assume chlorine disinfection)	1	LS	$65,000.00	$65,000
2	Lead operator ($/yr)	1	LS	$130,000.00	$130,000
3	Assistant operator	1	LS	$85,000.00	$85,000
4	Addional Labor Cost ($/yr) (misc. repairs)	1	LS	$10,000.00	$10,000
5	Sampling and Lab Testing ($/yr)	1	LS	$50,000	$50,000
6	Power Requirements ($/yr)	1	LS	$25,000	$25,000
	Subtotal O&M				**$365,000**

Opinion of Probable Construction Cost - Capital

Town of Paradise

Paradise - Sewer Feasibility

BEN|EN
TRUSTED ENGINEERING ADVISORS

Location Town of Paradise - Collection System		**QTY. BY** D.Harden	**ESTIMATE LEVEL** **CONCEPT**
Limits Proposed Paradise Sewer Service Area		**QTY. CHCK** M.Massaro	**PRICED BY** D.Harden
BEN|EN PROJECT NO. 16200		**AGENCY** Town of Paradise	 11/14/2016

Item No.	Item	Estimated Quantity	Unit	Unit Price	Total
SEWER TRUNKS (Low Pressure)-Public ROW					
1	S-1 (Skyway) - 6 inch	10,987	LF	$100	$1,099,000
2	S-2 (Skyway) - 6 inch	3,215	LF	$100	$322,000
3	S-3 (Skyway) - 8 inch	5,422	LF	$120	$651,000
4	S-4 (Skyway) - 10 inch	2,464	LF	$150	$370,000
5	S-5 (Skyway) - 12 inch	8,071	LF	$175	$1,413,000
6	C-1 (Clark) - 6 inch	808	LF	$100	$81,000
7	C-2 (Clark) - 8 inch	3,302	LF	$120	$397,000
8	C-3 (Clark) - 8 inch	4,746	LF	$120	$570,000
9	C-4 (Clark) - 8 inch	1,330	LF	$120	$160,000
10	C-5 (Clark) - 8 inch	1,332	LF	$120	$160,000
11	C-6 (Clark) - 6 inch	8,051	LF	$100	$806,000
12	E-1 (Elliott) - 6 inch	4,859	LF	$100	$486,000
13	P-1 (Pearson) - 10 inch	6,015	LF	$150	$903,000
	Subtotal	60,602	LF		$7,418,000
PUMP STATION Lower Section (Below Pearson RD)					
	PS-1 (<0.5MGD)	1	LS	$680,000	$680,000
	8 inch gravity to PS (Clark)	8,051	LF	$150	$1,208,000
	Subtotal				$1,888,000
SEWER COLLECTORS					
14	Nunneley - 4 inch max	4,677	LF	$90	$421,000
15	Minor Roads - 4 inch max	116,006	LF	$90	$10,441,000
	Subtotal	120,683	LF		$10,862,000
CONNECTIONS					
	Total Number of Service Laterals	1,471			
	Total Public ROW Lateral (Assume 20 LF per connection)	29,420			
16	STEP Connections (60% of Total) - 1.5 inch max	17,652	LF	$25	$442,000
17	STEG (40% of Total) - 1.5 inch max	11,768	LF	$20	$236,000
	Public Connection Subtotal				$678,000
	Total Private Lateral (Assume 130 LF per connection)	191,230			
18	STEP Connections (60% of Total) - 1.5 inch max	114,738	LF	$25	$2,869,000
19	STEG (40% of Total) - 1.5 inch max	76,492	LF	$20	$1,530,000
20	Connection Fee	1,471	EA	$300	$442,000
	Tank Installation				
21	STEP Connections (60% of Total)	883	EA	$8,500	$7,503,000
22	Gravity Connection or STEG (40% of Total)	588	EA	$2,000	$1,177,000
	Private Connection Subtotal				$13,521,000
	Subtotal				$14,199,000

Estimated Construction Cost	**$34,367,000**
Construction Contingency (20%)	$6,874,000
Estimated Construction Total	**$41,241,000**
Design, Permitting, and Environmental Cost (15%)	$6,187,000
Total Collection System Cost	**$47,428,000**

BENNETT ENGINEERING SERVICES ASSUMES NO RESPONSIBILITY FOR DIFFERENCES BETWEEN THESE QUANTITIES AND FINAL PAY QUANTITIES.

Opinion of Probable Construction Cost - Capital

Town of Paradise

Paradise - Sewer Feasibility

Location Town of Paradise - Pond Treatment with Land Disposal		**QTY. BY** D.Harden	**ESTIMATE LEVEL** **CONCEPT**
Limits Proposed Paradise Sewer Service Area		**QTY. CHCK** M.Massaro	**PRICED BY** D.Harden
BEN|EN PROJECT NO. 16200		**AGENCY** Town of Paradise	**Date** 11/14/2016

Item No.		Item	Estimated Quantity	Unit	List Price	Total
Out of Town Treatment - Assume Clark Rd Location						
1		Treatment Pond				
2		Pond excavation (assume average 6 ft)	100,000	CY	$11	$1,100,000
3		Liner	12,963	CY	$25	$325,000
4		Disinfection	1	LS	$500,000	$500,000
5		Effluent Pump Station	1	LS	$900,000	$900,000
6		Land Disposal (Spray irrigation)	250	AC	$13,000	$3,250,000
7		Lab and Buildings	1	LS	$500,000	$500,000
8		Effluent Storage Ponds Grading				
9		Pond bottom (6 ft deep)	342,222	CY	$11	$3,765,000
10		Berm (8 ft)	180,148	CY	$11	$1,982,000
11		Liner	35,185	CY	$25	$880,000
12		Irrigation Pump Station	1	LS	$600,000	$600,000
13		Tail Water Recovery (Grading and Pumps)	1	LS	$200,000	$200,000
		Subtotal				$14,002,000
Ptransmisson Pipe and Appurtenances						
14		Pipe to Treatment (Clark Rd & Durham Pentz)	35,800	LF	$200.00	$7,160,000
15		ARV (every 1500 ft)	25	EA	$2,000.00	$50,000
16		Isolation Valves (every 2000 ft)	19	EA	$3,000.00	$57,000
		Subtotal				$7,267,000
Right of Way Acquisition						
17		Assessment per Parcel	3	EA	$10,000.00	$30,000
18		Purchase Price (minimum 300 usable aces)	2	EA	$350,000.00	$700,000
		Subtotal				$730,000

Estimated Construction Cost	**$21,999,000**
Construction Contingency (20%)	$4,400,000
Estimated Construction Total	**$26,399,000**
Design, Permitting, and Environmental Cost (15%)	$3,960,000
Total Collection System Cost	**$30,359,000**

BENNETT ENGINEERING SERVICES ASSUMES NO RESPONSIBILITY FOR DIFFERENCES BETWEEN THESE QUANTITIES AND FINAL PAY QUANTITIES.

Opinion of Probable Construction Cost - Capital

Town of Paradise

Paradise - Sewer Feasibility

Location Town of Paradise - MBR Surface Discharge		**QTY. BY** D.Harden	**ESTIMATE LEVEL** **CONCEPT**
Limits Proposed Paradise Sewer Service Area		**QTY. CHCK** M.Massaro	**PRICED BY** D.Harden
BEN|EN PROJECT NO. 16200		**AGENCY** Town of Paradise	**Date** 11/14/2016

Item No.		Item	Estimated Quantity	Unit	Uint Price	Total
In Town Treatment - Assume Skyway Location						
1		Ovivo MBR (ADWF 0.85 MGD)	1	LS	$1,740,000	$1,740,000
2		UV Disinfection	1	LS	$534,000	$534,000
3		Solids Handling	1	LF	$290,000	$290,000
4		Septage Receiving	1	LS	$162,000	$162,000
5		Yard Piping (with valves and appertunances)	3,000	LF	$250	$750,000
6		Attenuation Tank (1 MG)	1	LS	$1,100,000	$1,100,000
7		SCADA Controls	1	LS	$580,000	$580,000
8		Site Work (Grading, retaining walls, concrete, asphalt, structures	1	LS	$5,870,000	$5,870,000
9		Lab Building	1	LS	$580,000	$580,000
		Subtotal				$11,606,000
Property Acquisition						
10		Assessment per Parcel	3	EA	$10,000	$30,000
11		Purchase Price (Assume minimum 20 acres needed)	1	EA	$300,000	$300,000
		Subtotal				$330,000

Estimated Construction Cost	**$11,936,000**
Construction Contingency (20%)	$2,388,000
Estimated Construction Total	**$14,324,000**
Design, Permitting, and Environmental Cost (15%)	$2,149,000
Total Collection System Cost	**$16,473,000**

BENNETT ENGINEERING SERVICES ASSUMES NO RESPONSIBILITY FOR DIFFERENCES BETWEEN THESE QUANTITIES AND FINAL PAY QUANTITIES.

Opinion of Probable Construction Cost - Capital

Town of Paradise

Paradise - Sewer Feasibility

Location Town of Paradise - Transmission Line to Chico		**QTY. BY** D.Harden	**ESTIMATE LEVEL** **CONCEPT**
Limits Proposed Paradise Sewer Service Area		**QTY. CHCK** M.Massaro	**PRICED BY** D.Harden
BEN|EN PROJECT NO. 16200		**AGENCY** Town of Paradise	11/14/2016

Item No.		Item	Estimated Quantity	Unit	Unit Price	Total
Regional Transmission Pipeline						
1		TR-1 (Skyway Town Limits to private RW) - 12 " Pipe (paved)	36,600	LF	$200	$7,320,000
2	*	TR-2 (Private RW to Butte Creek) - 12" Pipe (unpaved)	2,250	LF	$160	$360,000
3	*	TR-3 (Bore and Jack, Butte Creek) - 24" Casing w/ Carrier Pipe	850	LF	$630	$536,000
4	*	TR-4 (Butte Creek to HWY 99 RW) - 12" (unpaved)	2,750	LF	$160	$440,000
5	*	TR-5 (Bore and Jack, HWY 99) - 24" Casing w/Carrier Pipe	1,000	LF	$630	$630,000
6	*	TR-6 (Private RW to Hegan Ln) - 12" Pipe (40% paved)	5,100	LF	$170	$867,000
7		TR-8 (Hegan Ln to RR) - 12" Pipe (paved)	4,480	LF	$180	$807,000
8	*	TR-9 (Bore and Jack, RR) - 24" Casing w/ Carrier Pipe	250	LF	$630	$158,000
9		TR-10 (RR to Elk Ave) - 12" Pipe (paved)	12,210	LF	$180	$2,198,000
10		TR-9 (Elk Ave to Lone Pine Ave) - 12 " Pipe (paved)	4,425	LF	$180	$797,000
11		TR-10 (Lone Pine Ave to Crouch Ave) - 12 " Pipe (paved)	1,315	LF	$180	$237,000
12		TR-11 (Crouch Ave to Comanche Cree) - 12 " Pipe (paved)	2,520	LF	$180	$454,000
13	*	TR-12 (Bore and Jack, Comanche Creek) - 24" Casing w/ Carrier Pipe	500	LF	$630	$315,000
14		TR-13 (Comanche Creek to Little Chico Creek) - 12" Pipe (paved)	5,500	LF	$180	$990,000
15	*	TR-14 (Bore and Jack, Little Chico Creek) - 24" Casing w/ Carrier Pipe	500	LF	$630	$315,000
16		TR-15 (Little Chico Creek to Chico River Rd) - 12" Pipe (paved)	2,635	LF	$180	$475,000
17		TR-16 (Chico River Rd to WWTP) - 12" Pipe (paved)	8,560	LF	$180	$1,541,000
18		TR-17 (Pipe within WWTP) - 12" Pipe (paved)	613	LF	$180	$111,000
19		Bore and Jack Pit (Jack Pit)	5	EA	$100,000	$500,000
20		Bore and Jack Pit (Receiving Pit)	5	EA	$35,000	$175,000
		Subtotal	92,058	LF		$19,226,000
Appurtenances						
21		ARV (every 1500 ft)	62	EA	$2,000	$125,000
22		Isolation Valves (every 2000 ft)	47	EA	$3,000	$142,000
		Subtotal				$267,000
Right of Way Acquisition						
23		Assessment per Parcel (Assume route with low density)	100	EA	$10,000	$1,000,000
Permanent Utility Easement (Assume 15 ft wide)						
24		TR-2 (Ag RW)	33,750	SF	$0.70	$24,000
25		TR-3 (Water Crossing/Ag RW)	12,750	SF	$0.70	$9,000
26		TR-4 (Ag RW)	41,250	SF	$0.70	$29,000
27		TR-5 (HWY Crossing)	15,000	SF	$0.70	$11,000
28		TR-6 (Industrial RW)	76,500	SF	$0.70	$54,000
29		TR-9 (RR Crossing/Ag RW)	3,750	SF	$0.70	$3,000
30		TR-12 (Water Crossing/Ag RW)	7,500	SF	$0.70	$6,000
31		TR-14 (Water Crossing/Ag RW)	7,500	SF	$0.70	$6,000
		Subtotal PUE	5	AC		$142,000
Temporary Construction Easement (Assume 50ft-PE)						
32		TR-2 (Ag RW)	78,750	SF	$0.07	$6,000
33		TR-3 (Water Crossing/Ag RW)	29,750	SF	$0.07	$3,000
34		TR-4 (Ag RW)	96,250	SF	$0.07	$7,000
35		TR-5 (HWY Crossing)	35,000	SF	$0.07	$3,000
36		TR-6 (Industrial RW)	178,500	SF	$0.07	$13,000
37		TR-9 (RR Crossing/Ag RW)	8,750	SF	$0.07	$1,000
38		TR-12 (Water Crossing/Ag RW)	17,500	SF	$0.07	$2,000
39		TR-14 (Water Crossing/Ag RW)	17,500	SF	$0.07	$2,000
40		Additional TCE along roads (assume 10ft)	782,450	SF	$0.07	$55,000
		Subtotal TCE	29	AC		$92,000
Regional Connection Fee						
41		Connection Fee	1	LS	$5,000,000	$5,000,000

* Permanent Utility Easement Required

Estimated Construction Cost	**$25,727,000**
Construction Contingency (20%)	$5,146,000
Estimated Construction Total	**$30,873,000**
Design, Permitting, and Environmental Cost (15%)	$4,631,000
Total Regional Transmission Cost	**$35,504,000**

BENNETT ENGINEERING SERVICES ASSUMES NO RESPONSIBILITY FOR DIFFERENCES BETWEEN THESE QUANTITIES AND FINAL PAY QUANTITIES.

Opinion of Probable Construction Cost - Capital

Town of Paradise

Paradise - Sewer Feasibility

Location Town of Paradise - MBR with Beneifical Reuse (Tuscan Ridge Golf Course)		**QTY. BY** D.Harden	**ESTIMATE LEVEL** **CONCEPT**
Limits Proposed Paradise Sewer Service Area		**QTY. CHCK** M.Massaro	**PRICED BY** **D.Harden**
BEN|EN PROJECT NO. 16200		**AGENCY** Town of Paradise	**Date** 11/14/2016

Item No.		Item	Estimated Quantity	Unit		Total
In Town Treatment - Assume Skyway Location						
1		Ovivo MBR (ADWF 0.85 MGD)	1	LS	$1,740,000	$1,740,000
2		UV Disinfection	1	LS	$534,000	$534,000
3		Solids Handling	1	LF	$290,000	$290,000
4		Septage Receiving	1	LS	$162,000	$162,000
5		Yard Piping	3,000	LF	$250	$750,000
6		Attenuation Tank (1 MG)	1	LS	$1,100,000	$1,100,000
7		SCADA Controls	1	LS	$580,000	$580,000
8		Site Work (Grading, retaining walls, concrete, asphalt, structures	1	LS	$5,870,000	$5,870,000
9		Lab Building	1	LS	$580,000	$580,000
10		Effluent Storage Pond	1	LS	$3,000,000	$3,000,000
		Subtotal				$14,606,000
Piping and Appurtenances						
11		12" Pipe to Tuscan Ridge Golf Course	16,000	LF	$200	$3,200,000
12		ARV (every 1500 ft)	12	EA	$2,000.00	$24,000
13		Isolation Valves (every 2000 ft)	9	EA	$3,000.00	$27,000
		Subtotal				$3,251,000
Right of Way Acquisition						
14		Assessment per Parcel	3	EA	$10,000	$30,000
15		Purchase Price (Assume minimum 20 acres needed)	1	EA	$300,000.00	$300,000
		Subtotal				$330,000

Estimated Construction Cost	**$18,187,000**
Construction Contingency (20%)	$3,638,000
Estimated Construction Total	**$21,825,000**
Design, Permitting, and Environmental Cost (15%)	$3,274,000
Total Collection System Cost	**$25,099,000**

BENNETT ENGINEERING SERVICES ASSUMES NO RESPONSIBILITY FOR DIFFERENCES BETWEEN THESE QUANTITIES AND FINAL PAY QUANTITIES.

Appendix B – Public Outreach Collateral Material

Notification Postcard

PLEASE JOIN US

FOR AN INFORMATIONAL OPEN HOUSE ON THE PARADISE SEWER FEASIBILITY PROJECT.

In order to provide residents with an opportunity to attend, there will be two different "Open House" times available:

Wednesday, June 15, 2016

Between 2:00 p.m. and 3:30 p.m.

AND

Between 6:30 p.m. and 8:00 p.m.

Paradise Town Hall Chambers
5555 Skyway, Paradise, CA 95969

At each of the Open Houses, Town of Paradise staff and consultants will be on hand to provide you with information about the nature and scope of the Feasibility study and how you can provide feedback as the study progresses. This is an opportunity for Paradise residents to drop by any time during one of the hour and a half sessions to provide staff with input on the types of sewer alternatives to include in the Feasibility Study.

For more information about the Paradise Sewer Project, please visit **www.paradisesewer.com**

TOWN OF PARADISE
SEWER PROJECT
5555 Skyway
Paradise, CA 95969

Website Notification

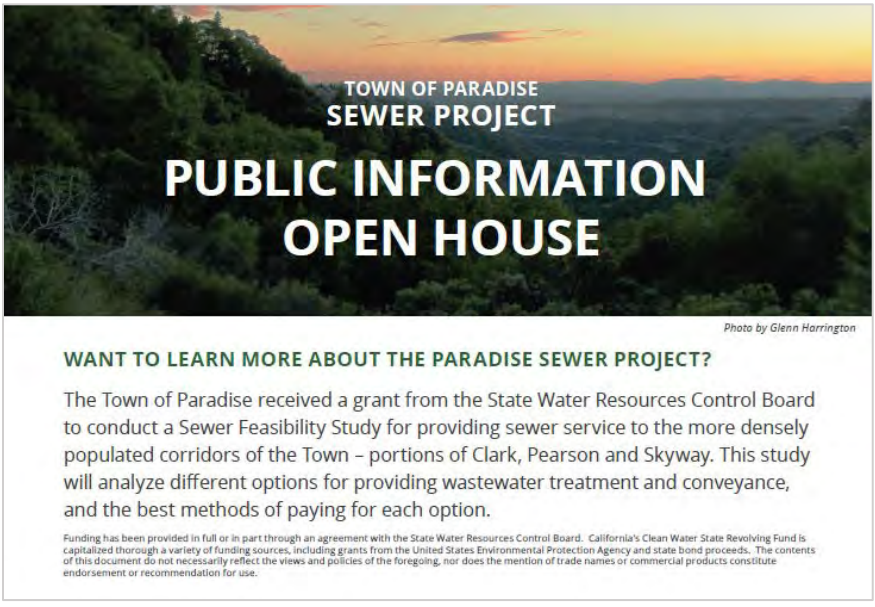


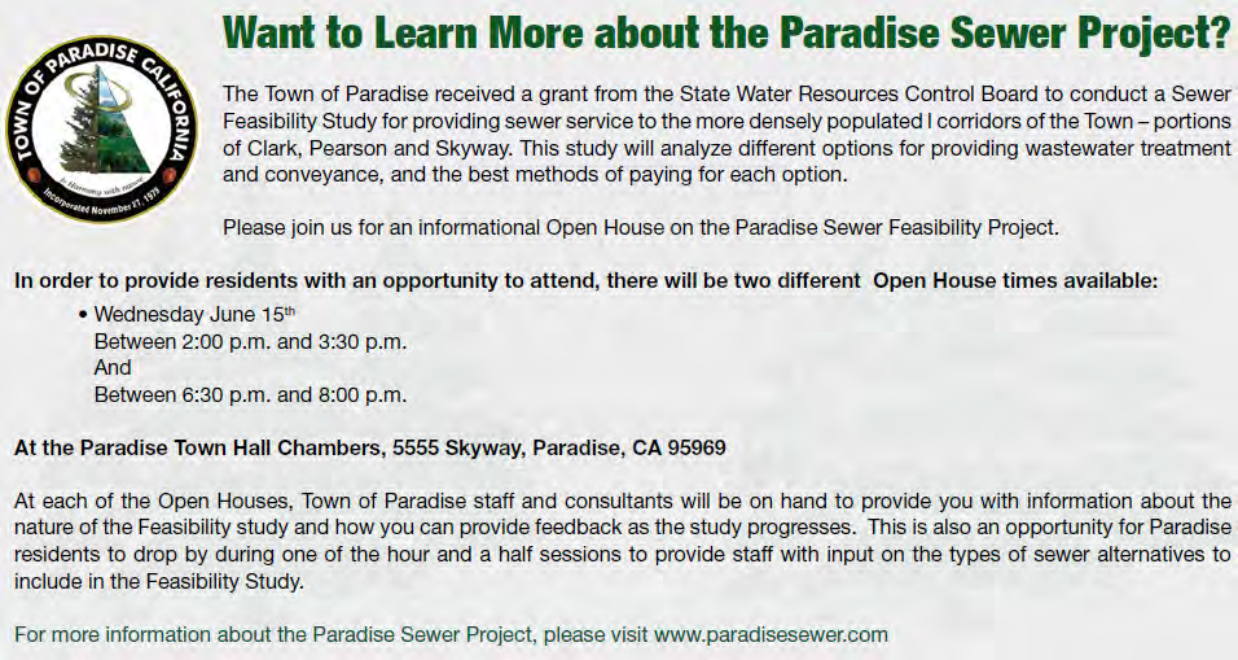
Photo by Glenn Harrington

WANT TO LEARN MORE ABOUT THE PARADISE SEWER PROJECT?

The Town of Paradise received a grant from the State Water Resources Control Board to conduct a Sewer Feasibility Study for providing sewer service to the more densely populated corridors of the Town – portions of Clark, Pearson and Skyway. This study will analyze different options for providing wastewater treatment and conveyance, and the best methods of paying for each option.

Funding has been provided in full or in part through an agreement with the State Water Resources Control Board. California's Clean Water State Revolving Fund is capitalized thorough a variety of funding sources, including grants from the United States Environmental Protection Agency and state bond proceeds. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

Paradise Post Advertisement



Want to Learn More about the Paradise Sewer Project?

The Town of Paradise received a grant from the State Water Resources Control Board to conduct a Sewer Feasibility Study for providing sewer service to the more densely populated I corridors of the Town – portions of Clark, Pearson and Skyway. This study will analyze different options for providing wastewater treatment and conveyance, and the best methods of paying for each option.

Please join us for an informational Open House on the Paradise Sewer Feasibility Project.

In order to provide residents with an opportunity to attend, there will be two different Open House times available:

- Wednesday June 15th
  Between 2:00 p.m. and 3:30 p.m.
  And
  Between 6:30 p.m. and 8:00 p.m.

At the Paradise Town Hall Chambers, 5555 Skyway, Paradise, CA 95969

At each of the Open Houses, Town of Paradise staff and consultants will be on hand to provide you with information about the nature of the Feasibility study and how you can provide feedback as the study progresses. This is also an opportunity for Paradise residents to drop by during one of the hour and a half sessions to provide staff with input on the types of sewer alternatives to include in the Feasibility Study.

For more information about the Paradise Sewer Project, please visit www.paradisesewer.com

Meeting Handouts

At the meeting, attendees were provided with a Project fact sheet and a comment card when they signed in to the meeting. Those materials are included below.

Project Fact Sheet

TOWN OF PARADISE
SEWER PROJECT
FACT SHEET

With the Town's commercial septic situation continually worsening, the Paradise Town Council is taking proactive steps to consider a wastewater solution for the more densely populated areas in Paradise.

To further this effort, the Town has received a grant from the State Water Resources Control Board to conduct a Sewer Feasibility Study. This study will analyze the best options for providing wastewater collection, treatment and dispersal in addition to exploring methods of paying for each option.

The study will include the following five options for the proposed service area (map provided on the back of this fact sheet):

Wastewater Treatment Plant with effluent land application

- This option includes buying a piece of property large enough to build a sewage treatment plant with holding ponds/tanks, for eventual dispersal or release onto the land. Previous studies showed that approximately 300 acres of available land would be needed for this option. The option must comply with Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements (WDR).

Wastewater Treatment Plant with surface water discharge location

- This option includes buying a piece of property large enough to build a sewage treatment plant (tertiary level) and then discharge to a creek, river, stream, lake or other approved waterway. This option will require a RWQCB National Pollutant Discharge Elimination System (NPDES) Permit.

Connection to the City of Chico Water Pollution Control Plant

- This option includes acquiring the right-of-way for a pipeline to connect with the City of Chico collection system for eventual treatment at their Wastewater Pollution Control Plant. This option requires a regional agreement with the City of Chico and a connection fee.

Wastewater Treatment with beneficial reuse

- This option includes buying enough land to build a tertiary level treatment plant that will allow the treated water to be reclaimed and re-used for irrigation. Excess reclaimed water would be taken to a land application area for irrigation.

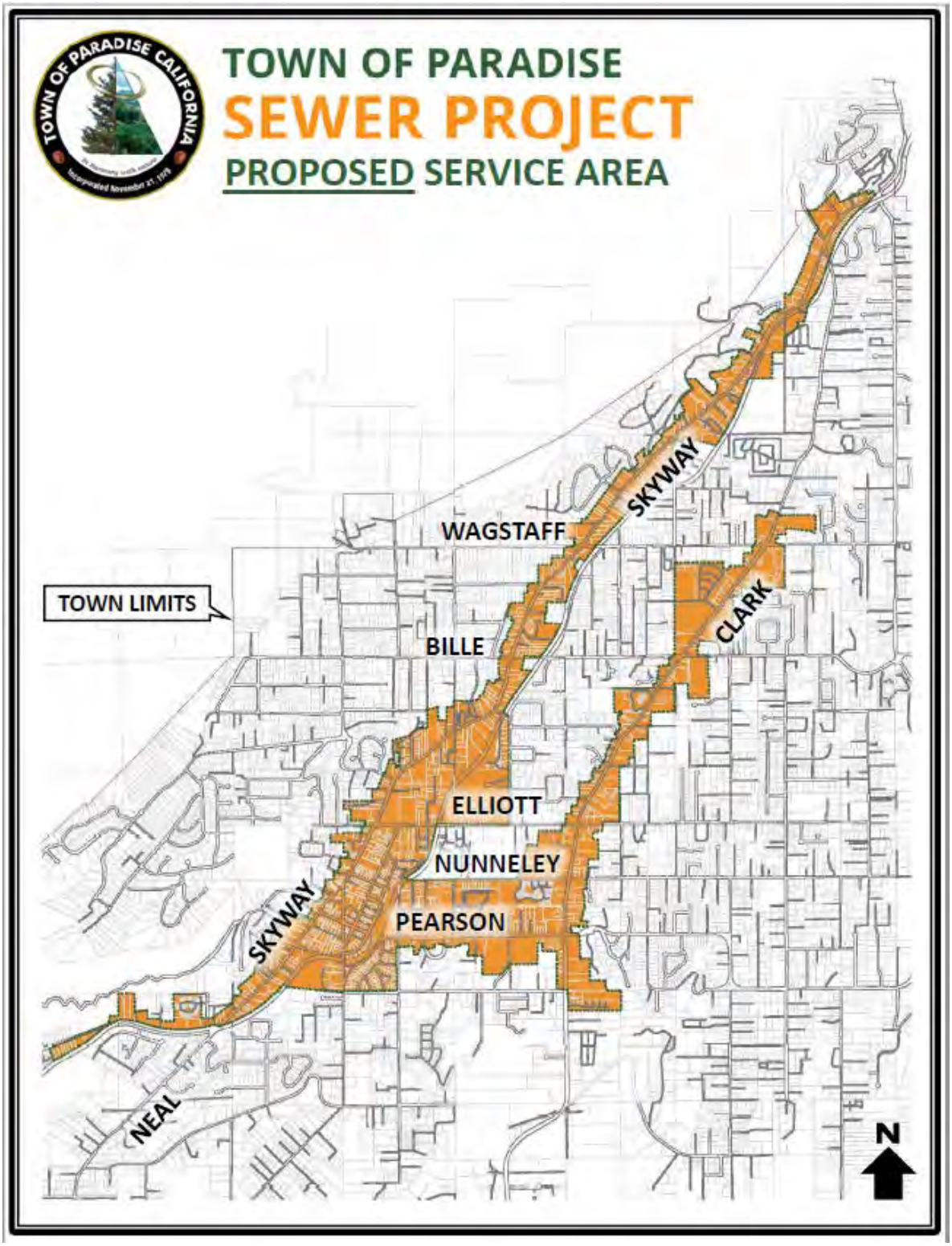
No Project

- No collection system or treatment plant. The Town continues to function on septic systems.

The technical solutions for the Town of Paradise Sewer Project may not be new, but the approach to the project will be. The project need, scoping, option development, option screening, preferred option, assessment district formation, and funding analysis will all be transparent and vetted with the public.

You can learn more about the Project, including information about public meetings and technical studies, by visiting the Project website at www.paradisesewer.com

Funding for the Feasibility Study Project has been provided in full or in part through an agreement with the State Water Resources Control Board. California's Clean Water State Revolving Fund is capitalized through a variety of funding sources, including grants from the United States Environmental Protection Agency and state bond proceeds. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.


TOWN OF PARADISE
SEWER PROJECT
PROPOSED SERVICE AREA
TOWN OF PARADISE CALIFORNIA
SKYWAY
WAGSTAFF
TOWN LIMITS
CLARK
BILLE
ELLIOTT
NUNNELEY
PEARSON
SKYWAY
NEAL
N

Comment Card

We welcome your feedback!

TOWN OF PARADISE
SEWER PROJECT

Please note any questions or comments you have concerning the Town of Paradise Sewer Project on this card.
You may submit your comments to Town of Paradise staff here or send them back at your convenience.
Mail: Town of Paradise, 5555 Skyway, Paradise, CA 95969
Website: You may also submit comments through email at info@paradisesewer.com

Name: _____

Organization (if applicable): _____

Street Address: _____

City, State: _____ Zipcode: _____

Phone Number: (_____)_____

E-mail Address: _____

Preference for Contact: ☐ Mail ☐ Phone ☐ E-mail

Water Boards

Funding for the Feasibility Study Project has been provided in full or in part through an agreement with the State Water Resources Control Board. California's Clean Water State Revolving Fund is capitalized through a variety of funding sources, including grants from the United States Environmental Protection Agency and state bond proceeds. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

Comments:

For more information: Call: (530) 872-6291 x112 Website: paradisesewer.com E-mail: info@paradisesewer.com

August 2016 Public Meeting

Meeting Notification

Notification Postcard

PLEASE JOIN US
FOR AN INFORMATIONAL MEETING ON THE PARADISE SEWER FEASIBILITY PROJECT.

The meeting will take place on:

Monday, August 22, 2016
at 6:30 p.m.

Paradise Performing Arts Center
777 Nunneley Road, Paradise, CA 95969

At the meeting, Town of Paradise staff and consultants will be on hand to provide you with information about the service area boundary of the project, outlining the remaining steps of the Feasibility study, and discussing possible funding structures. Information on how a district may be formed will also be presented.

Your property has been identified as being within the proposed service area. While this service boundary is not final, we want to make sure you have information about how this project may affect your property, and an opportunity to ask questions early in the process.

We hope to see you there!

For more information about the Paradise Sewer Project, please visit **www.paradisesewer.com**

TOWN OF PARADISE
SEWER PROJECT
5555 Skyway
Paradise, CA 95969

Photo by Glenn Harrington

YOUR PROPERTY HAS BEEN IDENTIFIED AS BEING WITHIN THE PROPOSED SERVICE BOUNDARY

The Town of Paradise received a grant from State Water Resources Control board to conduct a Sewer Feasibility Study for providing sewer service to the more densely populated corridors of the Town – portions of Clark, Pearson and Skyway. This study will analyze different options for providing wastewater collection conveyance, treatment, and disposal (and re-use); as well as the best methods of paying for the selected preferred option.

Funding has been provided in full or in part through an agreement with the State Water Resources Control Board. California's Clean Water State Revolving Fund is capitalized thorough a variety of funding sources, including grants from the United States Environmental Protection Agency and state bond proceeds. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

Paradise Post Advertisement

Town of Paradise
Sewer Project Proposed Service Boundary Public Meeting

The Town of Paradise staff and consultants will be holding a public meeting to provide an opportunity for residents to hear about what is coming next for the Project and ask questions early in the process. Information on how a service area may be formed will also be presented.

In order to accommodate all residents who wish to attend, the meeting will be held at the Paradise Performing Arts Center:

Monday, August 22, 2016

6:30 PM

Paradise Performing Arts Center

777 Nunneley Road, Paradise, CA 95969

Staff and consultants will be on hand to provide attendees with information about the proposed service area boundary of the project, outlining the remaining steps of the Feasibility study, and discussing possible funding structures.

For further information including a map of the proposed service area, details, and documents related to the Town of Paradise Sewer Project, visit www.paradisesewer.com

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Press Release

TOWN OF PARADISE
5555 Skyway
Paradise, CA 95969
(530) 872-6291

Media Release

Sewer Project Proposed Service Boundary Public Meeting

August 17, 2016

For further information, contact Lauren Gill at
(530) 872-6291 ext 112 Monday – Thursday, 8am to 5pm

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Media Advisory

MEDIA ADVISORY
DATE: August 17, 2016

CONTACT: Lauren Gill
PHONE: (530) 872-6291 ext. 112

Sewer Project Proposed Service Boundary Public Meeting

Town of Paradise will hold a meeting to provide an update on the Sewer Project

WHO: Lauren Gill, Town of Paradise, Town Manager
Marc Mattox, Town of Paradise, Public Works Director/Town Engineer
Mike Massaro, Bennett Engineering, Consulting Engineer
Trin Campos, Bennett Engineering, Consulting Engineer

WHAT: Public meeting about Paradise Sewer Project service area boundary, funding, and next steps

WHERE: **Paradise Performing Arts Center**
777 Nunneley Road, Paradise, CA 95969

WHEN: **Monday, August 22, 2016 – 6:30 PM**

WHY: This meeting will provide an opportunity for residents to hear and ask questions about what is coming next for the Project. Town of Paradise staff and consultants will be providing information about finalizing the Project's service area boundary, outlining the remaining steps of the Feasibility study, and discussing possible funding structures. Information on how a district may be formed will also be presented.

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Water Boards

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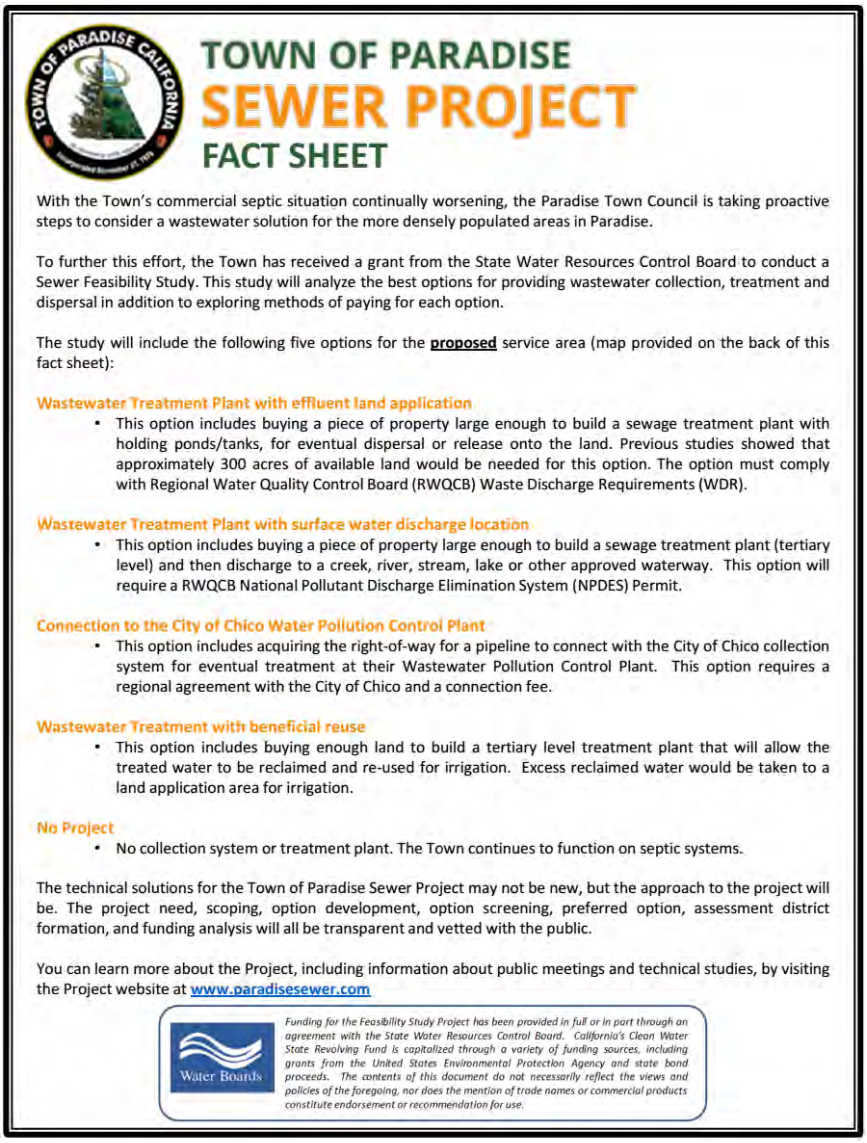
Meeting Handouts

Attendees were provided with a copy of the presentation, fact sheet and a comment card when they signed in to the meeting. Those materials follow:

Project Fact Sheet



TOWN OF PARADISE
SEWER PROJECT
FACT SHEET

With the Town's commercial septic situation continually worsening, the Paradise Town Council is taking proactive steps to consider a wastewater solution for the more densely populated areas in Paradise.

To further this effort, the Town has received a grant from the State Water Resources Control Board to conduct a Sewer Feasibility Study. This study will analyze the best options for providing wastewater collection, treatment and dispersal in addition to exploring methods of paying for each option.

The study will include the following five options for the **proposed** service area (map provided on the back of this fact sheet):

Wastewater Treatment Plant with effluent land application

- This option includes buying a piece of property large enough to build a sewage treatment plant with holding ponds/tanks, for eventual dispersal or release onto the land. Previous studies showed that approximately 300 acres of available land would be needed for this option. The option must comply with Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements (WDR).

Wastewater Treatment Plant with surface water discharge location

- This option includes buying a piece of property large enough to build a sewage treatment plant (tertiary level) and then discharge to a creek, river, stream, lake or other approved waterway. This option will require a RWQCB National Pollutant Discharge Elimination System (NPDES) Permit.

Connection to the City of Chico Water Pollution Control Plant

- This option includes acquiring the right-of-way for a pipeline to connect with the City of Chico collection system for eventual treatment at their Wastewater Pollution Control Plant. This option requires a regional agreement with the City of Chico and a connection fee.

Wastewater Treatment with beneficial reuse

- This option includes buying enough land to build a tertiary level treatment plant that will allow the treated water to be reclaimed and re-used for irrigation. Excess reclaimed water would be taken to a land application area for irrigation.

No Project

- No collection system or treatment plant. The Town continues to function on septic systems.

The technical solutions for the Town of Paradise Sewer Project may not be new, but the approach to the project will be. The project need, scoping, option development, option screening, preferred option, assessment district formation, and funding analysis will all be transparent and vetted with the public.

You can learn more about the Project, including information about public meetings and technical studies, by visiting the Project website at www.paradisesewer.com

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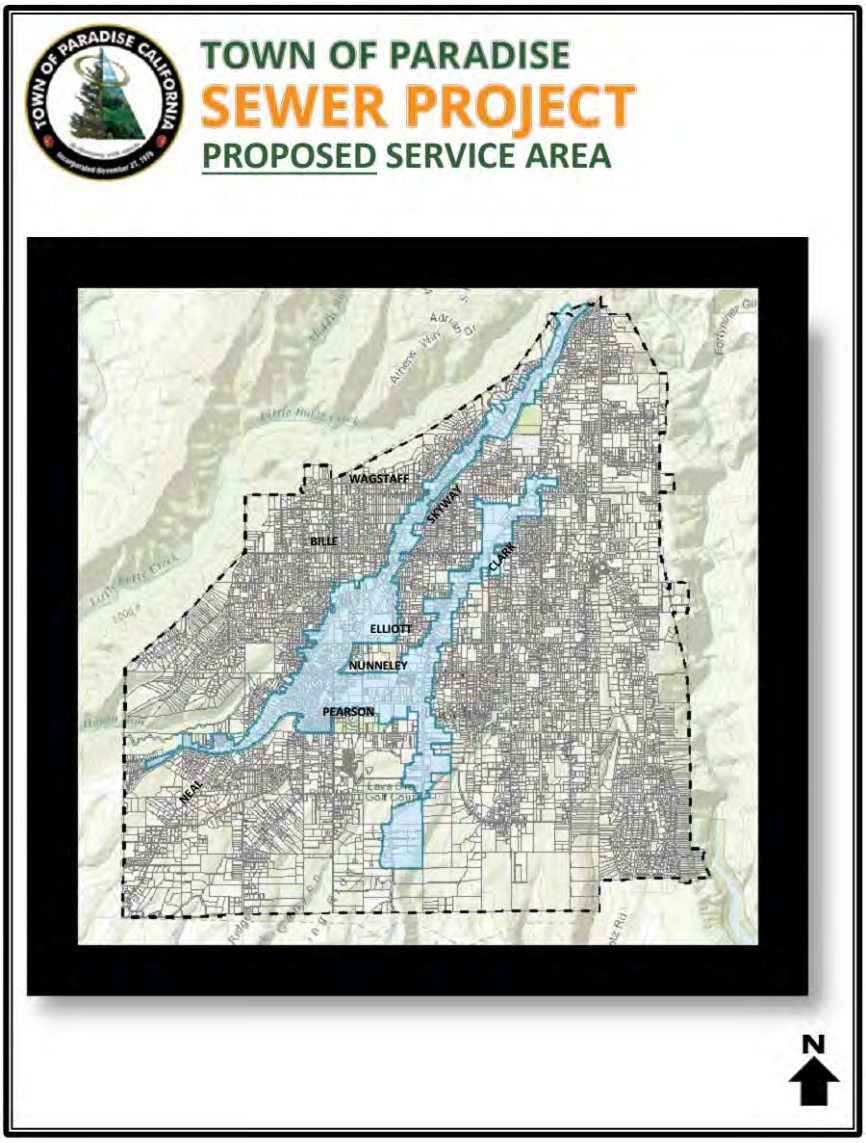
TOWN OF PARADISE
SEWER PROJECT
PROPOSED SERVICE AREA
WAGSTAFF
SKYWAY
BILLE
CLARK
ELLIOTT
NUNNELEY
PEARSON
NEAL
N

Comment Card

We welcome your feedback!

TOWN OF PARADISE
SEWER PROJECT

Please note any questions or comments you have concerning the Town of Paradise Sewer Project on this card.
You may submit your comments to Town of Paradise staff here or send them back at your convenience.
Mail: Town of Paradise, 5555 Skyway, Paradise, CA 95969
Website: You may also submit comments through email at info@paradisesewer.com

Name: _____
Organization (if applicable): _____
Street Address: _____
City, State: _____ Zipcode: _____
Phone Number: (_____)_____
E-mail Address: _____

Preference for Contact: ☐ Mail ☐ Phone ☐ E-mail

Water Boards

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Comments:

For more information: Call: (530) 872-6291 x112 Website: paradisesewer.com E-mail: info@paradisesewer.com

A summary of the meeting is included below.

Attendance: There were approximately 79 people in attendance at the meeting.

Summary: At the meeting, a formal presentation covered information on Project status, proposed service area, anticipated flows, funding structures, and next steps was given. After the presentation was complete, the engineering consulting team and Town of Paradise staff answered questions in an open forum. Attendee questions ranged in topic from pump station type and location, service area finalization, Project timeline, and property values. While some answers were straight forward, many were yet to be determined since the Project is still in early stages.

After the open question and answer period was completed, meeting attendees were encouraged to review the exhibits on display and ask further questions of Town and consultant staff.

Attendees were provided with a copy of the presentation, fact sheet, and a comment card when they signed in to the meeting.

The questions asked by meeting attendees, and the answers provided by staff to those questions, are included below.

Questions and Answers

• Has a vacuum system been considered or only a gravity system?

We have looked at both. Right now, we are looking at a hybrid system for collection that include Septic Tank Effluent Pumps (STEP) and gravity collection with lift stations.

• Where will the tertiary land treatment plant be located and will the water be suitable for reuse?

Wastewater Treatment Plant (WWTP) location depends on the alternative. We are looking at locations close to Town near Skyway as well as location further off of "the ridge" adjacent to Neal Road and Clark Road.

If a tertiary treatment system were utilized and disinfection added then the effluent would be suitable for re-use for irrigation.

• Which waterway will the plant discharge to?

Some alternatives would not have a creek discharge, but the options close to Town and the tertiary treatment option would utilize a National Pollutant Discharge Elimination System (NPDES) permit via the Regional Water Quality Control Board (RWQCB) to discharge to a creek. Locations for potential discharge are Nugen Creek and Hamlin Creek.

• When you met with Paradise Irrigation District (PID), who did you meet with, when, and what did you discuss?

We met with the Director and his engineer about a week ago to discuss the PID water management plan with regard to reclaimed water planning. We also discussed water demands, pipeline and pump station cost data, and agreed to coordinate on project status. Engineering and technical feasibility topics were discussed. There were no discussions on policy issues.

• We have seen this done in cities before; will you consider pumping to waste water treatment plants?

We are considering a regional option that would pump the collected wastewater to Chico's WWTP.

• Can I opt out? We already paid a bond for a sewer link at Skyway.

Council will decide if properties within the service area can opt out of connection or delay connection to a later date. Typically, all parcels within a service area map are assessed for their apportioned cost of the capital project commensurate with their benefit. Some communities have elected to allow a delay for actual connection, connection fee, and monthly service charges depending on the situation.

• Who determines the potential benefit to properties and their value?

An engineer's report is written based on the preliminary design of the system. The cost to build the project is spread over the assessed parcels based on benefit. Benefit is typically defined by the volume of wastewater anticipated to be generated by the property. The volume of wastewater generated is assumed based on land use.

• What if a property hasn't yet been developed? Will there be zoning changes allowed?

Zoning changes would work through the Town's standard process. However, the anticipated benefits and assessment would be based on current zoning. Note that a connection fee and monthly maintenance fee would not be required for undeveloped properties within the service area.

• Some property cannot be serviced without a line going through an adjacent property. Will there be easements for this?

Yes. The need for specific easements would be determined in the final design phase. But, if a connection to the system cannot be made from the public right-of-way, then an easement would be negotiated and purchased to provide a connection and service.

• I am not in the blue area. When can I get a connected and what about connecting Magalia?

The current service area is focused on the commercial corridors and urban core of the Town and there are no plans for additional expansion at this time.

• Some Chico properties have had hefty assessments, have you gone over these for comparison?

We have coordinated with Chico staff on engineering elements, construction costs, and hydraulic capacity, but have not reviewed their current assessments. The Town of Paradise Assessment will be specific to the sewer project and needs of the Town's urban core.

• The timeline goes through mid-2017, but how long before actual use?

If the project is approved by council and stakeholders support the sewer district formation, then construction could be complete in 4-5 years.

• Have you looked at sites for a potential location for treatment plants?

We have assessed multiple potentially viable sites and they will be evaluated in the alternatives analysis.

• Will there be restrictions placed on future rezoning permits?

Currently there are restrictions with regard to septic tank and leach-field capacities for several properties. A sewer system and treatment would remove those restrictions for those served.
Since the benefit and assessment are tied to the present zoned use, a change in zoning may require additional fee to match connection fee to updated zoning. This decision would need to be brought to the Town Planning Department and brought to Council for a vote.

• The three case studies shows yield significant differences in costs. Are these appropriate for the Feasibility Study?

The methodology of project cost apportionment is appropriate for the TOP Sewer Feasibility Study. However, the regulatory motivators, technical solution, and construction cost is different for each of the case studies and specific to the situation.

• I am on the edge of the proposed district. How will the boundaries become settled?

The boundaries could change right up until an assessment is voted upon. However, for the purposes of the study, the service area will be set for sizing the system and treatment alternatives.

• It seems that you're focusing on commercial septic tanks in the urban core. About how many businesses and residences are included? If I am not in the corridor, will I still be assessed?

Based on the current assessment area, about 35% of the parcels are residential. Only those parcels within the service area would be assessed. You would only be assessed if you are in the service area and receive the benefit of sewer service. Preliminarily there are 1,471 planned service connections.

• Will the sewer system require more water than what is already used? Will the Town lose water to run the system?

The Town would likely not use more water than is used today. It is anticipated that a sewer system would support growth in the urban core, but the sewer system does not need additional water to work.

• I am currently 1-2 blocks out of the boundary. Can I opt to get pulled in in the end?

You can make a request and it will be evaluated. Town Council will ultimately decide if the service area expands to serve additional areas.

• Do we get a vote on this?

Yes. Anyone who is in the service area will vote to decide whether or not to move forward with a project.

• Do you believe there will be an increase in commercial growth?

Yes. Case studies have shown this to be the case.

• Does one alternative method seem superior?

We are still assessing the pros and cons of each option and developing the costs for comparison.

• Is running the system downhill to the treatment plant quicker?

Construction could likely be faster for the regional option, however environmental permitting and easement acquisition could take longer than a treatment plant option.

• What is the assessment per parcel after grants? Do home and business owners have to come up with the money at the beginning?

We do not have a preferred option, full cost estimate, or grant allocation yet. However, all available grants would be pursued to help offset the cost per parcel before an assessment would be allocated. The cost of the initial project, after grants, would be paid for by assessment on property. Home and business owners would have to pay for connection fees once the system was operational.

• Are you using PID's numbers for water usage in order for accuracy?

Our initial assessment of flows have been based on established planning parameters. Our assessment of future flow is consistent with previous studies and similar communities for flow estimation. However, we have requested the demand data from PID and will re-evaluate the estimated flow data based on current usage.

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