COLORADO
Department of Public Health & Environment

Water Pollution Control Project Needs Assessment (PNA) Form
Water Quality Control Division

1. Applicant Information:

Entity Name	Upper Thompson Sanitation District				
Facility Name:	UPPER THOMPSON SANITATION DISTRICT			Original ID:	
Mailing Address 1:	2196 Mall Road PO BOX 568	Mailing Address 2:		County:	
City:	Estes Park	State:	CO	Zip Code:	80517
Property Address 1:	2196 Mall Rd	Property Address 2:		County:	
City:	Estes Park	State:	CO	Zip Code:	80517
Latitude :	39.7517291	Longitude :	-104.992107		
Name of Project:	Upper Thompson Sanitation District WRF and Lift Station Improvements Project				

Type of Project (Check all that apply)

- ☑ New domestic wastewater treatment plant
- ☐ Construction project resulting in increase or decrease in design capacity of existing wastewater treatment plant
- ☐ Modification of wastewater treatment plant that will not result in a change to treatment capacity
- ☑ New or relocated wastewater treatment plant outfall
- ☑ New or expansion of lift station
- ☑ Collection system (gravity sewer mains less than 24-inches in diameter)
- ☑ New interceptor (24-inch diameter or larger pipeline)
- ☐ In-Kind Replacement (Replacement of any process or hydraulic treatment conveyance component with an identical or similar component. Usually in cases where equipment has reached end of life and replacement is necessary to maintain compliance)
- ☐ Stormwater
- ☐ Non-Point Source Discharge

Please enter the following information for your organization if you have it. Visit http://fedgov.dnb.com/webform and https://www.sam.gov/portal/public/SAM/ for details. Note: you will be required to obtain both of these items prior to loan execution.

Owner Information:

First Name:	Chris	Middle Name:		Last Name:	Bieker
Phone Number:	970-586-4544				
Mailing Address1:	PO BOX 568		Mailing Address2:	2196 Mall Road	
City:	Estes Park	State:	CO	Zip Code:	80517
E-mail:	chris@utsd.com				

Consulting Engineer Information:

First Name:	Steven	Middle Name:	Michael	Last Name:	Ravel

Phone Number:	303-800-9045				
Mailing Address1:	2480 West 26th Avenue		Mailing Address2:	Unit B225	
City:	Denver	State:	CO	Zip Code:	80211
E-mail:	steven.ravel@merrick.com				

Self-Certification:

☑ Yes ☐ No Does the system intend to self-certify all or a portion of the project?

If yes, please identify the portions of the project that the system will self-certify.

☑ Collection system piping

Provide additional explanation, if necessary:

There are four primary project elements: 1) Water Reclamation Facility (WRF); 2) Wapiti Lift Station (WLS) and Interceptor; 3) WLS Force Main; and 4) Fish Creek Lift Station (FCLS). The project will comply with Federal and State regulations and Colorado Department of Public Health and Environment (CDPHE) Regulation 22 Site Location and Design Regulations for Domestic Wastewater Treatment Works. The WRF and WLS interceptor design information will be submitted using the self-certification submittal option. The WRF and WLS Interceptor submittals allow the CDPHE Water Quality Control Division (WQCD) staff to focus on the pertinent process design and permit compliance considerations of the Process Design Report (PDR). CDPHE's review will provide the District with flexibility to save time within its overall project schedule by self-certifying the final WRF and WLS Interceptor design rather than submitting the full set of drawings and specifications to the WQCD for review. The WLS and FCLS are not applicable for self-certification and the design information will be submitted with a Basis of Design engineering report and the final drawing and specifications.

Streamlined Review:

☑ Yes ☐ No Does the system intend to use the streamlined review process for all or a portion of the project?

If yes, please identify the portions of the project that the system will utilize streamlined review process.

☑ Wastewater treatment new construction or modifications that do not include an alternative technology

There are four primary project elements: 1) Water Reclamation Facility (WRF); 2) Wapiti Lift Station (WLS) and Interceptor; 3) WLS Force Main; and 4) Fish Creek Lift Station (FCLS). The project will comply with Federal and State regulations and Colorado Department of Public Health and Environment (CDPHE) Regulation 22 Site Location and Design Regulations for Domestic Wastewater Treatment Works. The WRF and WLS interceptor design information will be submitted using the self-certification submittal option. The WRF and WLS Interceptor submittals allow the CDPHE Water Quality Control Division (WQCD) staff to focus on the pertinent process design and permit compliance considerations of the Process Design Report (PDR). CDPHE's review will provide the District with flexibility to save time within its overall project schedule by self-certifying the final WRF and WLS Interceptor design rather than submitting the full set of drawings and specifications to the WQCD for review. The WLS and FCLS are not applicable for self-certification and the design information will be submitted with a Basis of Design engineering report and the final drawing and specifications.

Yes No Does the system intend to use the streamlined review process for all or a portion of the project?

2. Executive Summary

The Upper Thompson Sanitation District (District), provides conveyance and wastewater treatment to the Estes Park, Colorado area. The District's existing two lift stations and WWTF have reached the end of their useful life (2025) and the WWTF is unable to reduce nutrients (phosphorus and nitrogen), metals, and temperature to the anticipated future water quality standard effluent levels without significant modification of the existing treatment process and site expansion. The facilities do not meet current (2022) codes (building, electrical, and fire). There is limited treatment capacity of the aerobic digesters, nitrification towers, and tertiary filters.

A site alternatives analysis, system needs assessment, process technology alternatives analysis, and environmental evaluation are summarized in the Preliminary Engineering Report (PER) of July 2021. Of four alternatives, the Membrane Bioreactor (MBR) was selected for the new Water Reclamation Facility (WRF). The MBR will increase removal efficiencies and support future discharge limitations with a reduced site footprint. The MBR will be designed to achieve Regulation 31 nutrient limitations. The WRF process includes fine screening, grit, fat, oil, and grease removal, biological nutrient removal, and filtration through membranes followed by ultraviolet disinfection.

The project will improve water quality in the fragile montane/alpine ecosystem and benefit nearby and downstream users (municipal, business, agricultural, wildlife, and recreational) of the Big Thompson River watershed. The project supports compliance with the Colorado discharge permit requirements. The project provides capacity for consolidation of surrounding wastewater treatment facilities into the new location and improves WRF odor control. The project is anticipated to saves the District an estimated $21 over its lifetime using an SRF loan compared to direct bank loan.

3.System Structure and Operation

3.1 Legal Ownership of System (TMF: Managerial-1)

First Name:	Chris Bieker				
Mailing Address1:	PO BOX 568		Mailing Address2:	2196 Mall Rd	
City:	Estes Park	State:	CO	Zip Code:	80517
Phone Number:	970-586-4544	Fax:			

3.2 Organizational Chart

Include an Organizational Chart as Attachment 2.

3.3 Current Operator in Responsible (ORC) Charge

First Name:	Henry	Middle Name:	Michael	Last Name:	Newhouse III
Certification Number:	27836	Certification Expiration Date:	05/17/2023		

Operator Certification Level (check one) ☑ Staff Operator ☐ Contract Operator

Treatment	☐ Class D	☐ Class C	☐ Class B	☑ Class A
Distribution	☐ Class 4	☐ Class 3	☐ Class 2	☐ Class 1

Combined Treatment/Distribution ☐ Class S

3.4 Operator Certification

☑ Yes ☐ No Do the system operators have adequate operator certification levels for the proposed project as defined by Regulation 100 Water and Wastewater Facility Operators Certification Requirements?

Explain the impact of the proposed project on the required operator in responsible charge (ORC) certification level and other predicted staffing changes.

The District's ORC holds an class "A" certification level. This level applies to the proposed membrane bioreactor (MBR) facility. There are no expected impacts on the ORC. Many of the staff members at the District are class "A" certified or actively are working towards a class "A" certification.

3.5 20-year cash flow projection

Include a copy of the 20-year cash flow projection as Attachment 4.

4. Project Purpose and Need

Discuss the issue or concern that the proposed project will address. Specific issues are outlined below. All issues must be discussed in each sub section below even if they are not the project driver.

4.1 Compliance

Summarize the system's compliance status that necessitates the proposed project.

The District meets existing discharge permit compliance limitations; however, the WWTF discharge permit requires that the District "initiate engineering and financial planning for expansion… wherever throughput reaches eighty (80) percent of the treatment capacity" and "… commence construction of… expansion wherever throughput reaches ninety-five (95) percent of the treatment capacity." The District's 80% and 95% flow throughput is 1.6 and 1.9 MGD, respectively. The peak month flow in May 2015 was 1.7 MGD. The District's 80% and 95% influent organic loading throughput is 3,560 and 4,228 lbs BOD5/day, respectively. The WWTF has not exceeded the 80% peak month organic loading. The highest peak month loading between January 2014 and December 2019 was in June 2017 at 2,540 lbs BOD5/day.
Additionally, the District's existing two lift stations and WWTF has reached the end of their useful life (2025) and the WWTF is unable to reduce nutrients (phosphorus and nitrogen), metals, and temperature to the anticipated future water quality standard effluent levels without significant modification of the existing treatment process and site expansion. The facilities do not meet current (2022) codes (building, electrical, and fire). There is limited treatment capacity of the aerobic digesters, nitrification towers, and tertiary filters.
The District received Preliminary Effluent Limits (PEL) in 2019 for a proposed WRF (WRF) located at a new location. The PEL identified the proposed outfall location and proposed flow and loading. A site location application was submitted for the new WRF and is pending approval by the WQCD.

4.2 Existing facility limitations

Summarize existing water system facility(ies) limitations that necessitate the proposed project.

There is limited treatment capacity of the aerobic digesters as they were designed for 1.5 MGD which is lower than the WWTFs permitted capacity. The aerobic digesters are at risk of poor performance. Digester capacity is limited during peak loading events and will be further limited as the influent flow and loadings increase. The enclosed digester roof and walls experienced severe corrosion, were replaced in 1997, and it is anticipated that the existing digester roof will likely require replacement in the next five years. There is limited treatment facility capacity of the tertiary filters, as they were designed for 1.5 MGD which is lower than the WWTFs permitted capacity. The filters are at risk of poor performance. The filters capture solids sloughed from the nitrification towers during normal operation and are operated without polymer addition. Both the filter beds and surface wash arms require replacement. The filters require significant upgrades to operate at a higher flow rate for the WWTF capacity of 2 MGD. At a flow rate of 100 gallons per minute into the filters, nearly constant backwashing is required. The filter capacity will be limited for phosphorous removal without the addition of alum and/or a polymer. One of the three clarifiers is located outside and inoperable in the winter due to freezing. The lift stations have limited space, deteriorating concrete, and the inability to meet current building, electrical, and safety codes.

4.3 Operations and Maintenance Issues

Summarize operational and maintenance (O&M) issues with the existing water facilities.

The existing WWTF and lift stations were constructed in the mid-1970s with minor upgrades provided in the 2000s. The WWTF and lift stations will reach their 50-year design life in 2025. Although the staff have maintained the facilities in excellent condition, the facilities lack operational flexibility. Operation and maintenance issues are frequently encountered. The main issues are the buildings do not meet current (2022) codes (building, electrical, and fire), standards, and regulations. The WWTF and lift stations consist of deteriorating structures and equipment. Replacement parts are difficult to obtain and equipment has become obsolete with the requirement for custom manufactured parts. Updated equipment and systems are required for compliance with current and future discharge limitations. The cost to maintain as well as retrofit existing structures and equipment require significant investment.

5. Existing Facilities Analysis

5.1 Existing Source Water– Section required for treatment and supply projects

☐ Not applicable (for collection system piping, lift stations, interceptors, only)

Existing Permitted Treatment Capacity: Flow: 2 MGD Loading: 4,450 Pounds per Day BOD5

5.1.1 Area Discharge Permits

Identify all other discharge permits for facilities discharging to the same stream segment as the existing treatment facilities.

The District's WWTF discharges to stream segment COSPBT02. CDPHE's February 1, 2022 active permits summary lists two individual permits on this stream segment: 1) Upper Thompson and 2) Estes Park Sanitation District (EPSD). The EPSD discharge is located upstream and the Upper Thompson Sanitation District discharge is downstream of the Lake Estes dam. There are two water treatment plant wastewater discharge permits one from Town of Estes Park and one from City of Loveland. There are 23 construction or commerce industry permits for stormwater with 18 permits open through 2024 and 4 expired. The construction industry permits include: commercial, highway, residential, non-structural, and pipeline.

5.1.2 Service Area

Describe the existing service area including residential, commercial and industrial users, as well as flows and loads from the service area.

Service area contributors include: residential population; the YMCA of the Rockies; Rocky Mountain National Park (RMNP); the Town of Estes Park WTP; Cheley Camp; and the American Honda Education Corporation (AHEC) Eagle Rock facility. The average raw wastewater from the residential population is approximately 190 mg/L BOD5, which is within the typical range of 120 to 380 mg/L (Metcalf & Eddy, 4th Edition, page 186). The average total suspended solids (TSS), ammonia (NH3-N), Total Kjeldahl Nitrogen (TKN), and total phosphorus (TP) for the raw wastewater are approximately 243 mg/L, 28 mg/L, 40 mg/L, and 8 mg/L, respectively. Residential estimated average daily wastewater flow is 70 gpcd (District Rules and Regulations), which is within the typical range of 54 to 81 gpcd for a 2- to 3-person household (Metcalf & Eddy, 4th Edition, page 156). The peak month peaking factor for the residential is approximately 1.6 MGD and provides for a peak month per capita of approximately 91 gpcd. The YMCA, largest non-residential contributor, average wastewater flow from 2013 through 2018 was approximately 0.10 MGD. The RMNP provides wastewater service to visitors through on-site facilities that are not connected to the WWTF. The waste generated by the onsite facilities are hauled to a RMNP dump station, diluted with potable water, conveyed through a grinder, and discharged to the collection system for treatment. Metering records indicate average flows from RMNP at approximately 0.03 MGD. The Town of Estes Park's WTP membrane concentrate is discharged to the District's WWTF. The peak month allocation from the WTP is 23,000 gpd. Cheley Camp is a private facility. Metering records indicate that the peak month wastewater flow from Cheley Camp is approximately 14,800 gpd. The AHEC contributes flow via the Eagle Rock Lift Station (ERLS). The peak hour capacity of the ERLS is 20,000 gpd. Metering records indicate the average flow is approximately 8,700 gpd.

5.1.3 Facilities Layout and Description

Describe existing facilities including design capabilities and conditions of existing treatment processes including treatment processes used and major design parameters (e.g. process capacities, unit loading rates, side stream flows, and solids handling).

Key existing facilities requiring improvements include two (2) lift stations and the WWTP. The Thompson River Lift Station (TRLS) has a firm capacity: 3.9MGD based on 2-40 HP pumps rated at 1,350 GPM each. The TRLS receives centrate, backwash waste, and septage side stream flows. The FCLS has a firm capacity: 2.6MGD based on 2-25 HP pumps at 900 GPM each. Flow from the TRLS and FCLS is conveyed to the equalization (EQ) basin. The WWTF permitted peak month capacity is 2 MGD. The main liquid treatment facilities at the WWTF are influent screening (at the lift stations); flow equalization (325,440 gal); secondary treatment in aeration basins followed by secondary clarification (two 40 feet and one 55 feet diameter, overflow rates: 700 GPD/feet2 peak month and 1,200 GPD/feet2 peak hour with flow: 3.4 MGD peak month and 5.9 MGD peak hour). The capacity with the largest unit out of service is 1.8 MGD peak month and 3.0 MGD peak hour. The nitrification towers have a firm capacity of one tower (two media types) at a hydraulic loading of 1.0 GPM/feet2 and a modeled flow rate of 4.1 MGD. The tri-media filters have firm hydraulic capacity of 5 GPM/feet2 at 3.1 MGD and have limited capacity during peak hour events. The sodium hypochlorite disinfection system has a contact basin with firm capacity of 2.4 MGD at 30 minutes of contact time. The solids handling has aerobic digesters with a loading rate at 2.5 MGD of 0.13 lbs volatile suspended solids (VSS)/day/feet3 and is limited during peak loading events. The digester walls and roof are severely corroded. The centrifuge has a flow range of 70 to 150 GPM. The solids treatment facilities at the WWTF include aerobic digestion, dewatering, and land application and/or landfilling of the dewatered biosolids.

5.1.4 Existing Process Flow Diagram

Provide a process flow diagram of the existing treatment system as Attachment 5.

5.1.5 Wastewater Flows

Please describe the existing wastewater flows and influent characteristics (including toxic pollutants), discharge permit limits, and overload conditions. Discuss and analyze the average, peak, dry, and wet weather flows. Describe flow contributions from residential, commercial, and industrial users, as well as infiltration and inflow.

The District's highest recorded peak month flow was 1.7 MGD in 2015. Average maximum month flow is approximately 1.2 MGD. Estes Park experiences significant seasonal summer tourism. Summer and winter average flow range from 1.2 MGD to 0.653 MGD, respectively in 2019. No direct correlation with rain events and infiltration and inflow (I&I) have been identified and/or documented in the District's Wastewater Utility Master Plan (WUMP). Influent BOD5 loadings include a peak month loading between of 2,450 lbs BOD5/day and an average loading of 1,303 lbs BOD5/day. The average BOD5 concentration was 190 mg/L. The average total suspended solids (TSS) loading and concentration was 1,672 lbs/day and 243 mg/L. The average ammonia (NH3-N) loading and concentration was 191 lbs/day and 28 mg/L, respectively. The average Total Kjeldahl Nitrogen (TKN) loading and concentration was 275 lbs per day and 40 mg/L. The average effluent total inorganic nitrogen (TIN) was 18 mg/L. The average effluent total phosphorous (TP) was 8 mg/L. The average effluent dissolved copper (PD Cu) was 10 µg/L. The average total recoverable arsenic (TR As) was 0.35 µg/L with a proposed future limit of 0.02µg/L. The discharge permit contains two (2) tiers: 1) outfall 001A for flows between 1 MGD and <= 2 MGD) and 2) outfall 001B for flow <= 1 MGD.

5.1.6 Appropriateness of Treatment Technologies

Discuss if the existing treatment process(es) are appropriate to meet the current discharge permit considering existing influent quality and discharge permit limits.

The filters and the aerobic digestors are not adequately designed for 2.0 MGD as they were designed for original 1970's permitted flow of 1.5 MGD. There is a risk of poor performance during peak flows. The existing WWTF is not anticipated to be able to achieve compliance with the proposed 2024 arsenic limitation of 0.02mg/L.

5.1.7 Capacity of Treatment Technologies

☐ Yes ☑ No Is the capacity of the existing wastewater treatment system appropriate to accommodate wastewater flows through the next 20 years?

Please explain:

The existing wastewater treatment system is not appropriate to accommodate the maximum monthly wastewater for the next 20 years . The projected 2042 maximum monthly flow is 1.8 MGD. The capacity of the filters and aerobic digesters are designed for 1.5MGD. A major goal of the project is to consolidate the two wastewater treatment facilities in the Estes Valley with the improvements project. This project would merge in the 1.2 MGD max monthly flow with the Estes Park Sanitation District maximum monthly flow of 1.1 MGD. If consolidation occurs the existing system is not appropriate in the next 20 years.

5.1.8 Operational Controls

Describe if the existing treatment processes have appropriate operational controls.

The existing treatment processes do have appropriate operational controls. The existing WWTF has an onsite laboratory with sampling and analysis equipped for all analyses as required for operation, regulated by the EPA and the CDPHE. The existing WWTF has level sensors within the secondary, tertiary, and disinfection steps of treatment. Parameters such as pH and alkalinity are taken for process control data. Operational control tests are run daily as well as testing at specified periods for pH, fecal coliforms, chlorine residual, suspended solids, volatile solids, biochemical oxygen demand, nitrogen ammonia, phosphorus, nitrates, and alkalinity.

5.2 Collection - Required for collection system, lift station, and interceptor projects only

☐ Not applicable (for treatment and outfall projects, only)

5.2.1 Service Area

Describe the existing service area including residential, commercial and industrial users, as well as flows and loads from the service area.

The existing service contributors for the District can be broken down to the following: (1) Residential, (2) Commercial, and (3) Industrial. The residential flows fluctuate from spikes in the summer to lows in the winter due to summer tourism and residency in the summer, with population approximates of 16,570 in the summer to 9,130 in the winter, in a representative year. The estimated average daily wastewater flow is 70 gpcd with a peak month of 91 gpcd. The major commercial contributors are the following: YMCA of the Rockies, Rocky Mountain National Park (RMNP), Cheley Camp, and American Honda Education Corporation. The YMCA is the largest non-residential contributor with approximately 0.10 MGD average flow and a peak of 0.18 MGD. The average flow of the RMNP is approximately 0.03 MGD with a peak of 0.05MGD. The YMCA and RMNP are not expected to grow significantly during the 20 year planning period. The Cheley Camp and American Honda Corporation have peak flows of roughly 15,000 gpd and 20,000 gpd, respectively. The industrial contributors are Town of Estes Park Water Treatment Plant which discharge membrane concentrate with an agreement of 23,000 gpd. The typical loading averages as 190 mg/L BOD5, 243 mg/L total suspended solids (TSS), 28 mg/L Ammonia (NH3-N), 40 mg/L total kjeldahl nitrogen (TKN), and 8 mg/L total phosphorous (TP).

5.2.2 Overall Collection System Description

Discuss the existing collection system including: gravity collection pipelines, facility age, material type, condition of materials, and amount of AC pipe. Describe the location and capacities of all relevant lift stations and interceptor sewers and their relation to the proposed project. Provide a map of the existing collection system as Attachment 6.

The existing collection system consists of approximately 96 miles of sewer mains and interceptors ranging from 6-inch to 30-inch diameters. In 1972 the District constructed the majority of the collection system with vitrified clay pipe (VCP) and stretching approximately 30 miles. More recent mains have been constructed with polyvinyl chloride (PVC) lengths of approximately 50 miles, with some cured-in-place (CIPP) stretching approximately 1.5 miles, and high-density polyethylene (HDPE) stretching less than 1/5th of a mile.

Provide information on current infiltration and inflow.

The May 2020 Wastewater Utility Master Plan determined the collection system does not have substantial infiltration and inflow. Influent flow, monthly and daily, to the existing WWTF was compared to monthly and daily rainfall in inches for January 2018 through December 2018. The conclusion of the comparison of daily influent flow versus daily rainfall for the wettest month in 2018 (May) was that the influent flows did not increase substantially during a rain event.

6.Facility Planning Analysis

6.1 Planning Area Description

6.1.1 Project Area Map

Provide a map or maps showing the current and projected service area for the 20-year planning period; identify environmental features such as streams, lakes, wetlands, and floodplains for the entire planning area. On the map, identify the locations of municipal and industrial treatment plants, sludge management areas and facilities, pretreatment plants, lift station sites and any significantly developed areas served by onsite or unconventional systems. Include the map as Attachment 7.

6.1.2 208 Plan Coordination

☑ Yes ☐ No Is the project within or near the boundaries of a 208 Agency or regional council of governments (COG)?

Regional planning efforts were considered by incorporating the goals of the designated Section 208 planning agency for Larimer and Weld County, North Front Range Water Quality Planning Area (NFRWQPA) into the project. As stewards of the Big Thompson River Basin and the greater South Platte Water shed for Colorado, coordination with the regional planning agencies has occurred through Utility Plan review and approval. The May 2020 Upper Thompson Sanitation District Wastewater Utility Master Plan was submitted to NFRWQPA. NFRWQPA designated land use management agencies for the District wastewater utility service area (WUSA). The 208 WUSA completely surrounds the Estes Park Sanitation District (EPSD) service area. The EPSD provides wastewater conveyance and treatment to the area generally described by the Town boundary. The District provides wastewater conveyance and treatment to the areas surrounding the EPSD limits. The District's WWTF is located along the Big Thompson River, and downstream of Lake Estes and downstream of the EPSD's WWTF. Potential WUSA expansion would be to include areas around Crocker Ranch / Pole Hill. The Growth Management Area (GMA) for the District, as defined by the NFRWQPA Utility Plan Guidance document, includes the WUSA and potential to expand into the Crocker Ranch / Pole Hill area. The WUSA population (and associated wastewater flow) experiences dramatic seasonal fluctuations due to large seasonal contributors (tourism) and individual seasonal residential customers. Seasonal fluctuations in flow result in historical summer influent monthly flow averages as high as twice the winter average. Additionally, the analysis of consolidating facilities with Estes Park Sanitation District was planning consideration in the May 2020 Wastewater Utility Master Plan.

6.1.3 Local and Regional Issues

☑ Yes ☐ No Were local and regional planning efforts considered?

Please describe.

Local and regional planning efforts were considered. Regional planning efforts were considered by aligning the goals of the designated Section 208 planning agency for Larimer and Weld County, North Front Range Water Quality Planning Area (NFRWQPA) with the goals of the project. As stewards of the Big Thompson River Basin and the greater South Platte Water shed for Colorado, coordination with the regional planning agencies has occurred through Utility Plan review and approval. The May 2020 Upper Thompson Sanitation District Wastewater Utility Master Plan was submitted to NFRWQPA. NFRWQPA designated land use management agencies for the District wastewater utility service area (WUSA). The 208 WUSA completely surrounds the Estes Park Sanitation District (EPSD) service area. The EPSD provides wastewater conveyance and treatment to the area generally described by the Town boundary. The District provides wastewater conveyance and treatment to the areas surrounding the EPSD limits. The District's WWTF is located along the Big Thompson River, and downstream of Lake Estes and downstream of the EPSD's WWTF. Potential WUSA expansion would be to include areas around Crocker Ranch / Pole Hill. The Growth Management Area (GMA) for the District, as defined by the NFRWQPA Utility Plan Guidance document, includes the WUSA and potential to expand into the Crocker Ranch / Pole Hill area. The WUSA population (and associated wastewater flow) experiences dramatic seasonal fluctuations due to large seasonal contributors (tourism) and individual seasonal residential customers. Seasonal fluctuations in flow result in historical summer influent monthly flow averages as high as twice the winter average. Additionally, the analysis of consolidating facilities with Estes Park Sanitation District was planning consideration in the May 2020 Wastewater Utility Master Plan.

☑ Yes ☐ No Was consolidation with another wastewater system / treatment facility considered?

Please describe.

The analysis of consolidating facilities with Estes Park Sanitation District (EPSD) was a planning consideration in the May 2020 Wastewater Utility Master Plan. The distance from the District's WWTF and the EPSD WWTP is 1.7 miles and the District's service area completely surrounds EPSD's service area. Based on topography, the consolidation of facilities would involve bypassing the existing EPSD WWTF by gravity through an existing interceptor and directing the combined wastewater flow from both districts to a new centralized WWTF located at or near the existing District's WWTF site. EPSD discharges upstream of Lake Estes, which in turn discharges to the Big Thompson River and the Northern Colorado Water Conservancy District's Olympus Siphon as part of the Colorado-Big Thompson (C-BT) project. The District discharges directly into the Big Thompson River downstream of Lake Estes. Conveyance of EPSD flow downstream of Lake Estes would require coordination with Northern Water and the town of Estes Park. The District and EPSD do not recommend consolidating facilities at the current time. However, future consolidation would be practical and will be considered as wastewater flow increases, the WWTFs age, additional regulations are implemented, and the District completes planning and design of the proposed WWTF. The proposed WWTF will accommodate for future consolidation with EPSD due to location and the ability to expand. A phased consolidation approach, such as EPSD initially conveying solids to the District for treatment, is one consideration. In regards to treatment agreements, the District and EPSD have agreements in place that allow for processing of wastewater during a period of seventy-two hours or less when emergency repairs or changes in the operating process pose a pollution threat to the State receiving waters of either WWTF.

6.2 Population and Water Demand Projections (TMF: Technical-2)

For a 20 year planning period, forecast the population growth, projected increase in Equivalent Residential Taps (ERT), and projected drinking water demands.

Current SFEs - As Calculated in the Prequalification Form: 7212

Population and Demand Projections - The department generally accepts two methodologies for projecting water flows over the 20 year planning period. Other methodologies are acceptable with a clear explanation and all assumptions and parameters listed:

☑ Method 1: Population based projections. Recommended for primarily residential systems and/or for systems without potable water meter data.

☐ Method 2: Equivalent Residential Unit (EQR) Analysis. Recommended for systems with a high multifamily, commercial, and industrial users.

Method 1 and 2 templates can be found at the end of this form.
Attach the population projection as Attachment 8.

Discuss supporting data and reasons for projected future growth during the 20 year planning period.
Note: Projects designed solely to serve future development or population growth are not eligible for State Revolving Fund financing.

Data which supports the projected future growth during the 20-year planning period are from the Colorado Department of Local Affairs (DOLA). The population increase for the town of Estes Park was 0.85% per year growth rate and Larimer County experienced a 1.9% per year growth rate between 2010 and 2018. DOLA forecasts a 1.72% per year growth rate for Larimer County between 2019-2040. A growth rate of 1.42% is applied to the District's population. For the consolidation analysis. The Estes Park Sanitation District (EPSD) is considered "built out" except for minor infill of existing properties. A growth rate of 0.85% is applied to EPSD.

Identify waste load projections for major effluent parameters such as BOD, TSS, ammonia, phosphorus, metals, etc.

In general the wastewater loadings for the District are directly proportional to population. The population growth rate has been applied to projected loadings versus projected population for use with future wastewater loading rates. A growth rate of 1.72% is applied to the loading data for a 20 year period. 2040 waste load projections for average BOD5 estimate 1,753 ppd. 2040 waste load projections for average TSS estimate 2,248 ppd. 2040 waste load projections for average Ammonia estimate 256 ppd. 2040 waste load projections for average phosphorus estimate 77 ppd. Waste load projections for metals and other constituents of concern are less predictable due to the unknown sources and lack of influent data. Design loadings will be based on compliance with stream standards, preliminary effluent limits, and the CDPHE Water Quality 10-Year Roadmap.

7.Assessment of Alternatives

This section should contain a description of the reasonable alternatives that were considered in planning a solution to meet the identified needs. If the proposed project includes new technology then the please discuss whether or not the technology is covered in the CDPHE Design Criteria.

7.1 Alternatives

For each alternative, please provide:
1. A description of the alternative addressing the issues identified in Section 4: Project Purpose and Need. (TMF: Technical-7)
2. Capital cost estimates and annual operation and maintenance costs.
3. Advantages and Disadvantages of each alternative.

Alternative 1 Title : Existing Site Expansion

Alternative 1 Description (2000 character limit):

Alternative 1, the existing site expansion, utilizes the existing WWTF site with modifications and/or reused as necessary for the expansion. The proposed site will require significant revisions to meet upcoming nutrient and metals regulations at a capacity of 2.0 MGD. Alternative 1 modifications are based on the recommended expansion alternative in the 2012 Nutrient Report as modified to meet the updated future regulations at the existing WWTF at a capacity of 2.0 MGD. Alternative 1 will require the following (1) Installation of integrated fixed-film activated sludge (IFAS) media in two (2) of the four (4) existing aeration basins for biological nitrogen and phosphorus removal using the A2O process, (2) Repurposing of the existing digesters as aeration basins to provide additional capacity for nutrient removal, (3) Covering Clarifier No. 3 to allow operation through the winter months, (4) Construction of a new secondary clarifier to meet the current WQCD design criteria for a nutrient removal facility, (5) Construction of an Advanced Water Treatment (AWT) facility for metals treatment, and (6) Construction of a new solids handling facility east of Mall Road from the existing WWTF.

Alternative 1 Capital and Operation and Maintenance Costs (2000 character limit):

Alternative 1, the existing site expansion, capital costs were estimated at $38 million dollars for the proposed water reclamation facility, and with the FCLS and TRLS and force main improvements a total of $50 million. This alternative does not require additional property acquisition. The existing site has exiting easements and right-of-way in place to deliver and treat wastewater on-site and convey treated effluent to the discharge point. The existing site will require further expansion for construction of additional basin capacity to achieve low level nitrogen removal. The operational and maintenance costs were estimated to be approximately $1,500,000 per year. These costs include salaries, chemical expenses, utilities, lab and chemical supplies, sludge hauling, repairs, outside services, and typical ongoing costs (garbage, clothing, tools, etc).

Alternative 1 Advantages and Disadvantages (2000 character limit):

Alternative 1, the existing site expansion, benefits include: (1) lower capital costs, (2) short term benefit of no additional acquisition of property, and (3) no impact to the existing Big Thompson River floodplain.

Disadvantages include for Alternative 1 include: (1) limited access to new facilities as due to space constraints, (2) modification of existing facilities to achieve required treatment will require additional operator duties and time, (3) increased safety risk due to required road crossings from the east to the west of mall road, and (4) limited for future expansion, incapable of treating flow beyond 2.0 MGD.

Alternative 2 Title : Mall Road /Highway 34 Site

Alternative 2 Description (2000 character limit):

Alternative 2, the selected alternative, Mall Road / Highway 34 Site, a new water reclamation facility to be constructed on acquired Crocker Ranch property at the southeast corner of the intersection of Mall Road and Highway 34. Key structures for this alternative are lift station/headworks, equalization basin, biological nutrient removal basins, blowers, advanced water treatment filtration with membrane bioreactor, UV disinfection, solids handling, waste activated sludge storage, aerobic digesters, solids dewatering, and an operations building. Key design items are (1) phased construction of initial facilities for a 2.0 MGD capacity with space, (2) allocated for future expansion to 3.0 MGD and 4.0 MGD, (3) Continued use of the FCLS with gravity flow through a new interceptor from the discharge to the new lift station/headworks, (4) construction of new outfall pipe and outfall discharge location at the Big Thompson River, and (5) demolition of the existing WWTF and TRLS. The site layout will impact the Big Thompson River floodplain mapping and will require analysis. The District's administration and collection buildings will remain at the existing location. The existing WWTF including the Thompson River Lift Station will be demolished. The Fish Creek Lift Station will flow by gravity to the new WWTF headworks. A phased approach is recommended to appropriately size the WWTF for current and future flows. Phase 1 will include facilities to meet a 2.0 MGD capacity. Buildings will be sized for a buildout capacity of 4.0 MGD, with installation of equipment for a 2.0 MGD capacity. Phase 2 will include the construction of a third BNR basin and additional membrane bioreactors as well as the installation of necessary equipment to expand the capacity to 3.0 MGD. Phase 3 will include the construction of a fourth BNR basin and additional membranes to expand to the buildout capacity of 4.0 MGD.

Alternative 2 Capital and Operation and Maintenance Costs (2000 character limit):

The capital costs were estimated at $46 million dollars for the proposed water reclamation facility, and with the FCLS and TRLS and force main improvements a total of $58 million. In this alternative, a new WRF will be constructed on acquired Crocker Ranch property at the southeast corner of the intersection of Mall Road and Highway 34. Building structures to accommodate for three (3) phased expansion is estimated to be greater than single phase expansion. The operational and maintenance costs were estimated to be approximately $1,500,000 dollars per year. These costs include chemical expenses, lab and chemical supplies, sludge hauling, plain repairs, outside services, and typical ongoing WRF costs (garbage, clothing, tools, etc).

Alternative 2 Advantages and Disadvantages (2000 character limit):

Alternative 2, the existing site expansion, benefits include: (1) approximately 9 acres of relatively flat open space to accommodate future expansion as well as buildout of the Estes Valley flow of 4 MGD, (2) ability to achieve required treatment to meet future nutrient and metals requirements, and (3) truck traffic for deliveries will take place further away from residential and public recreation areas.

Disadvantages include for Alternative 2 include: (1) structures to exist in the Big Thompson River floodplain with an expected Conditional Letter of Map Revision (CLOMR) required, an expensive and lengthy process, (2) the Town of Estes Park's existing above ground electrical power lines will require relocation, and (3) capital cost is greater.

Alternative 3 Title : South of Mall Road Site

Alternative 3 Description (2000 character limit):

Alternative 3, the south of Mall Road Site , a new WWTF will be constructed on acquired private property south of Mall Road. The District's administration and collection buildings will remain at the existing location. The existing WWTF including the TRLS will be demolished as necessary following the expansion. The FCLS will flow by gravity to a new TRLS. The new TRLS will pump wastewater to the new headworks. A phased approach is recommended to appropriately size the WWTF for current and future flows. Phase 1 will include facilities to meet a 2.0 MGD capacity. Two (2) clarifiers and two (2) BNR basins with a 1.0-mgd capacity each will be constructed. Buildings will be sized for a buildout capacity of 4.0 MGD, with installation of equipment for a 2.0 MGD capacity. Phase 2 will include the construction of a third BNR basin and third clarifier as well as the installation of necessary equipment to expand the capacity to 3.0 MGD. Phase 3 will include the construction of a fourth BNR basin and fourth clarifier as well as the installation of necessary equipment to expand to the buildout capacity of 4.0 MGD.

Alternative 3 Capital and Operation and Maintenance Costs (2000 character limit):

The capital costs were estimated at $45 million dollars for the proposed water reclamation facility, and with the FCLS and TRLS and force main improvements a total of $57 million. This alternative requires acquisition of multiple residential properties across from the existing. The operational and maintenance costs were estimated to be approximately $1,500,000 dollars per year. These costs include chemical expenses, lab and chemical supplies, sludge hauling, plain repairs, outside services, and typical ongoing costs (garbage, clothing, tools, etc).

Alternative 3 Advantages and Disadvantages (2000 character limit):

Alternative 3, the existing site expansion, benefits include: (1) approximately 7 acres of relatively flat open space to accommodate future expansion as well as buildout of the Estes Valley flow of 4 MGD and (2) ability to achieve required treatment to meet future nutrient and metals requirements.

Disadvantages include for Alternative 3 include: (1) acquisition of three residential properties, could pose a challenge and take a long duration of time (2) requires negotiations with Larimer County and the Town of Estes Park for new Mall road access for biosolids hauling, and (3) capital cost is greater.

Provide discussions of additional alternatives as Attachment 19.

8. Selected Alternative

8.1 Justification of Selected Alternative

Please demonstrate why the selected alternative best meets system needs based on both monetary and non-monetary considerations.

The selected alternative was Alternative 2, Mall Road / Highway 34 Site, meets system requirements effectively, based on monetary considerations because it allows for multiple years of future expansion and will save the District monetarily over a longer period of time.

The Mall Road / Highway 34 Site alternative best meets system needs based on non-monetary considerations with (1) advanced technology for treatment with membranes which provide ability to achieve required treatment, (2) ability to treat Estes Valley flows and expansion flexibility, (3) community aesthetics.

8.2 Technical Description and Design Parameters

For the selected alternative, please describe all proposed project components and assumed design parameters.

The following proposed project components for the selected alternative are lift station/headworks, equalization basin, biological nutrient removal basins, blowers, membrane bioreactor (MBR), UV disinfection, solids handling, waste activated sludge storage, aerobic digesters, solids dewatering, and an operations building. Key design items are (1) phased construction of a WRF with a 3.0 MGD capacity with space, (2) allocated for future expansion to 4.0 MGD, (3) construction of new outfall pipe and outfall discharge location at the Big Thompson River, and (4) demolition of the existing WWTF and TRLS, (5) construction of a new FCLS and associated pipe improvements with continued used of the existing dual FCLS force main; (6) construction of a new WLS, WLS interceptor improvements, and WLS force main to convey wastewater to the new WRF .

8.3 Proposed Process Flow Diagram

Include a proposed treatment facility process flow diagram or map of the collection system, lift station, or interceptor, as applicable as Attachment 10.

8.4 Appropriateness of Treatment Technologies

Discuss appropriateness of the proposed treatment process(es) to meet proposed discharge limits considering anticipated influent wastewater quality.

The treatment process is appropriate for meeting the proposed nutrient regulations, organics, inorganics, and microorganisms. The secondary treatment, Biological Nutrient Removal (BNR) (4-Stage and 5-Stage), with Membrane Bioreactors, a physical removal process are capable of achieving compliance with the proposed Regulation No. 31 Total Nitrogen discharge limit of 12 mg/L. Typical discharge quality is <3mg/L. The Biological Nutrient Removal (BNR) (4-Stage and 5-Stage) with Membrane Bioreactors are capable of achieving compliance with Regulation No. 31 proposed total phosphorus limitation of 1.1 mg/L. The membranes are also able to remove remaining organics and metals after the biological process steps, to meet discharge limitations.

8.5 Environmental Impacts

Describe direct and indirect impacts on floodplains, wetlands, wildlife habitat, historical and archaeological properties, etc., including any projected permits and certifications. Indicate the need for a stormwater permit application, 401/404 permit applications, and CDOT and railroad permit applications.

An impacts to the floodplain is expected; however, the design is siting structures away from floodway to minimize impacts. It is expected that the project will require a FEMA Conditional Letter of Map Revision (CLOMR) with the Floodplain Coordinator. The CLOMR is used to inform FEMA of how a proposed project will, upon construction, affect the hydraulic characteristics of a river and thus result in the modification of a regulatory floodway and flood water surface elevations. In addition to the February 2021 Environmental Report and Cultural Resource Survey Report, by ERO, (Environmental Assessment (EA)) the CLOMR will require Endangered Species Act compliance associated with the Clean Water Act, Section 404 permitting for the project. The impacts to the wetlands are minimal, the site is northwest of wetland areas. The impacts to critical wildlife habitat are low to none, per the review of the federal and state listed species and Colorado Species of Concern in the EA. No primary conservation areas identified by the Colorado National Heritage Program overlap the project area and the closest potential conservation area is about 0.6 miles at Hermit Park. The EA determined no adverse effect to historic properties, per requirements of the National Historic Preservation Act. The project will require a stormwater permit application through Larimer County for the WRF, and both lift stations. The 404 permit applications expected are for fill material with wetlands or below the ordinary highwater mark. The WLS force main and WLS interceptor as well as the outfall construction will conform to the 404 permit requirements and a Nationwide Permit will be obtained as required. CDOT permits and coordination are expected for the emergency access road connecting to Highway 34 on the North side of the WRF site.

8.6 Land Requirements

Identify all necessary sites and easements, permits and certifications, and specify if the properties are currently owned, to be acquired, or leased by the applicant.

The 9-acre WRF site was purchased April 2018 from APC Crocker Ranch LLC. Additional property acquisition is currently being negotiated for the FCLS site, with Estes Lake Lodge LLC. Easements required for the project will be a United States Bureau of Reclamation From 299 application to amend the existing utility systems on federal lands and property, for the WRF lift station, interceptor, and WLS force main. Additionally, an approximately 50 Foot temporary easement (214 Foot by 50 Foot) from Dr. Scott Chew is required for the construction of the FCLS. It is expected the project will require the following Larimer County requirements: (1) subdivision requirements, updating the land use will be necessary for the FCLS (2) Limits and extents pre-application for the WRF and the FCLS, (3) Rezoning requirements for the WRF and the FCLS, (4)planning approval for the WRF and the lift stations, (5) development permit for grading and parking for the WRF and the lift stations, (6) building department approval for WRF and the lift stations.

8.7 Construction Challenges

Discuss construction challenges such as subsurface rock, high water table, limited access, or other conditions that may affect cost of construction or operation of a facility.

A planning level geotechnical investigation (Terracon 2020) included the advancement of five (5) test borings to 20 to 25 feet below existing site grades. Groundwater ranged from 4 to 14-feet. Two monitoring wells were installed during the geotechnical evaluation and the District will monitor groundwater levels on a weekly basis. Samples of site soils selected for plasticity testing exhibited low plasticity with liquid limits ranging from non-plastic to 16 and plasticity indices ranging from non-plastic to 2. The Seismic Site Classification is C. Based on subsurface conditions encountered in the borings, the site appears suitable for the proposed construction from a geotechnical point of view provided certain precautions and design and construction recommendations are followed. Geotechnical conditions that could impact design, construction, and performance of the proposed structures, pavements, and other site improvements include shallow groundwater and areas with cobbles, boulders, and shallow bedrock. These conditions will require attention in project planning, design and during construction. The location of the soil borings and monitoring wells have been located on the field survey. Additional soil borings may be completed during preliminary and final design. Access to the site is adequate, off Mall Road.

8.8 Operational Aspects

Discuss the operator staffing requirements, operator certification level requirements, the expected basic operating configuration and process control complexities, and the operational controls and equipment that allows operational personnel to respond to routine and unanticipated treatment challenges, such as flow rate, fluctuations in influent quality, process monitoring and chemical feed dosing.

Per Regulation 100 the wastewater operator class requirement for Membrane Bioreactor facilities is an “A” certification. The District staff members currently hold a level “A” operator certification level. Other staff members are working to obtain level “A” certification. The new WRF will require additional duties and time for processes necessary to achieve required treatment. The current staff have been coordinating with other facilities with Membrane Bioreactors to gain insight, equipment knowledge, and to prepare themselves for the new configuration. Equipment considered for the project is being thoroughly reviewed and explained to the District staff to be comfortable with the equipment. The Supervisory Control and Data Acquisition (SCADA) for the new WRF is including key alarms, data, and easy to visualize system process graphics to allow for operations staff to respond to routine and unanticipated treatment challenges. Key meters for flow rate, inline water quality testing, and signal feedback for information on dosing will be a part of the project.

8.9 Costs

Summarize the capital costs associated with the selected alternative. The 20 year cash flow projection included in Attachment 4 must reflect the capital and operation and maintenance costs associated with the selected alternative.

The capital cost associated with the Mall Road / Highway 34 Site alternative was $58,000,000 , note this includes all project components: (1) WRF, (2) WLS and interceptor, (3) WLS force main, and (4) FCLS. This cost includes preliminary and final design services as well as construction of the WRF.

Cost Category Selection (Assign a percent to each applicable category)

Secondary Treatment (Category I)	40
Advanced Treatment (Category II)	45
Infiltration/Inflow (Category IIIA)	0
Sewer System Rehabilitation (Category IIIB)	0
New Collector Sewers (Category IVA)	0
New Interceptors (Category IVB)	15

CSO Correction (Category V)	0
Storm Sewers (Category VI)	0
Recycle Water Distribution (Category X)	0
Nonpoint Source Pollution Control Activities (Category VII)	0
Total: (must equal 100%)	100

Please include an estimate of the projected increase in and total average monthly user charges. Does the user charge system allow for billing, collection, and enforcement?

8.10 Green Project Reserve

Check one or more green category that applies to the project:

☐ Green Infrastructure ☐ Water Efficiency ☐ Energy Efficiency ☑ Environmentally Innovative

Describe any green components incorporated into the selected alternative.

The design for the WRF has implemented solar cells on the roof of the facility. With 36,700 square foot of area for solar panels, a 23.7% energy offset is achieved. The design of the roofing was balanced between aesthetics and southern solar energy potential. The gable roof style is able to produce approximately 1,037,098 kWh per year and when compared to the expected energy use of 4,380,000 kWh per year, the energy saving is above 20% of the total estimated electrical costs. The yearly savings is estimated at $148,130. The return on investment is approximately 5 years. The life time savings is estimated at approximately $2,000,000. The 2012 Clean Water State Revolving Fund 10% Green Project Reserve: Guidance for Determining Project Eligibility, defines solar projects as categorical, renewable energy projects and are to achieve a 20% reduction in energy consumption. The plan to incorporate solar into the Upper Thompson Sanitation District WRF & LS Improvements Project, aligns with the Green Project Reserve goals by being an onsite, directly connected renewable energy source which achieves over 20% energy reduction.

The system must reference the most recent copy of the EPA Green Project Reserve guidance and procedures. These references are available on the CDPHE WQCD GLU website under “Green Project Reserve”: https://www.colorado.gov/pacific/cdphe/wq-green-project-reserve
Include a business case for the project as Attachment 11, if applicable.

8.11 Environmental Checklist

Include the Environmental Checklist for the Selected Alternative as Attachment 12.

8.12 Project Implementation

8.12.1 Proposed Schedule

Request for WQPTs/PELs	12/14/2020	Site Application Submittal Date	8/5/2021
Process Design Report/Basis of Design Report Submittal Date		6/20/2022	
Final Plans and Specifications Submittal Date (for Non-Streamlined Review only)			
Discharge Permit	4/30/2020	Miscellaneous Permits	6/20/2022
Public Meeting Date	6/7/2017	Loan Application Submittal Date	4/12/2022
Advertisement for Bids Publication Date	1/16/2023	Construction Contract Award Date	3/1/2023
Construction Start Date	3/17/2023	Construction Completion Date	3/16/2025

8.12.2 Public Meeting

Provide documentation of a public meeting held or describe when and where the meeting will be held. The meeting must be noticed for 30 days. Provide the public notice, proof of publication, sign in sheet, and agenda as Attachment 14 or provide to your project manager in the Grants and Loans Unit after the meeting has taken place.

☑ Include the public meeting documentation as Attachment 14.

Or, will be provided to the Grants and Loans Unit project manager after the meeting takes place.

9. Projecting Water Flows Method 1: Population based projections

Assumptions/Data			Information Source
Current System Population	12533	People	Population data for the Town of Estes Park and Larimer County is from the Colorado Department of Local Affairs (DOLA). Preliminary Engineering Report July, 2021 and Wastewater Utility Master Plan May, 2020
Current Service Area Population (If providing water to neighboring community)		People	
Population Growth Rates	1.42	% increase/year	Preliminary Engineering Report July, 2021 and Wastewater Utility Master Plan May, 2020
Average Daily per Capita Flow Rate	70	Gallons per capita day	Preliminary Engineering Report July, 2021 and Wastewater Utility Master Plan May, 2020
Average Day Maximum Month per Capita Flow Rate	91	Gallons per capita day	Preliminary Engineering Report July, 2021 and Wastewater Utility Master Plan May, 2020
Maximum Daily per Capita Flow Rate	120	Gallons per capita day	Daily Monitoring Report information from Upper Thompson Sanitation District, Basis of Design Report 2022 draft
Peak Hour Factor	2.8		Historical Daily Monitoring Reporting Data from Upper Thompson Sanitation District, Basis of Design Report 2022 draft
Average Influent BOD5 Concentration	200	mg/L	Historical Daily Monitoring Reporting Data from Upper Thompson Sanitation District, Basis of Design Report 2022 draft
Average Day Maximum Month Influent BOD5 Concentration	250	mg/L	Historical Daily Monitoring Reporting Data from Upper Thompson Sanitation District, Basis of Design Report 2022 draft

Year	System Population	Service Area Population (if different)	Average Daily Flow	Maximum Daily Flow	Peak Hour Flow	Average BOD5 Loading (pounds per day)
+0	0	0	1.40	2.25	2.26	1351
+5	13449		1.50	2.27	2.24	1434

+10	14433		1.60	2.29	2.20	1585
+15	15489		1.80	2.33	2.16	1751
+20	16622		1.90	2.37	2.14	1918

10. Projecting Water Flow Method 2: Equivalent Residential Taps (ERT)

Current Equivalent Residential Taps (ERT)			
A	Number of active residential taps:	0	Units
B	Total Annual Potable Water Use less Irrigation Usage (gallons per year) – Residential	0	
C	Estimated equivalent residential potable water usage Annual flow per EQR = A/B	0	Gallons per SFE
D	Wastewater flow from commercial users	0	Gallons per ft2
E	Equivalent EQRs per 1000 ft2 of commercial space EQRs per 1000 ft2=D*1000/C	0	SFEs per 1000 ft2
F	Commercial space in service area	0	1000 ft2
G	Commercial EQRs Commercial EQRs = F*E	0	SFEs
H	Wastewater flow from industrial users	0	1000 ft2
I	Equivalent EQRs per 1000 ft2 of industrial space EQRs per 1000 ft2 = H*1000/C	0	1000 ft2
J	Industrial space in service area	0	1000 ft2
K	Industrial EQRs Industrial EQRs = H*J	0	1000 ft2
L	Length of sewer pipe in collection system	0	1000 ft2
M	Infiltration/Inflow contribution per 1000 feet of sewer pipe	0	1000 ft2
N	Equivalent EQRs per 1000 feet of sewer pipe EQRs per 1000 LF=M/C	0	1000 ft2
O	Infiltration/Inflow EQRs Infiltration/Inflow EQRs = L/1000*N	0	1000 ft2
P	Total EQR = A + G + K + N	0	1000 ft2

Population and Flow Assumptions / Data			Information Source
Current System Population	_____	People	_____
Current Service Area Population (If providing water to neighboring community)	_____	People	_____
Population Growth Rates	_____	% increase/year	_____
Average daily flow per ERT	_____	Gallons per capita day	_____
Maximum daily flow per ERT	_____	Gallons per capita day	_____
Peak Hour Factor	_____	Gallons per capita day	_____

Year	System Population	Service Area Population (if different)	Residential Taps (ERTs)	Multifamily Residential Taps (ERTs)	Commercial/ Industrial Taps (ERTs)	Irrigation Taps (ERTs)	Total Taps (ERTs)	Average Daily Flow	Maximum Daily Flow	Peak Hour Flow
+0										
+5										
+10										
+15										
+20										