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Town of Silt
Water and Wastewater Update

June 22, 2022

Presentation Agenda

- Projections - Planning and Design Criteria
- Regulatory Review
- Water Treatment Plant Evaluation
- Water Treatment Plant Alternatives Discussion
- Wastewater Treatment Plant Evaluation
- Wastewater Treatment Plant Alternatives Discussion
- Conclusions and Recommendations

Demand Projections

- Water – 85 gpd/capita with peak day of approximately 150 gpd/capita
- Ratio of AAD to PD is low compared to many other municipalities
- Assumes continued raw water irrigation and limited use of potable water for irrigation
- Recommend capacity of 2 mgd now with room to expand to 3 mgd

TOTAL			
YEAR	POPULATION	AAD, GPD	PEAK DAY, GPD
Current	3,600	300,000	480,000
2027	4,567	388,200	698,800
2032	5,484	466,100	839,000
2037	6,584	559,600	1,007,300
2042	7,904	671,900	1,209,300

Wastewater Flow/Load Projections

PARAMETER	YEAR 2027			YEAR 2037			YEAR 2042		
	AA	MM	PH	AA	MM	PH	AA	MM	PH
Flow, MGD	0.31	0.34	0.96	0.44	0.49	1.36	0.53	0.59	1.64
BOD5, ppd	913	1,334		1,317	1,922		1,581	2,308	
TSS, ppd	731	950		877	1,140		1,265	1,644	
NH3-N, ppd	100	147		145	211		174	254	

- Wastewater – 0.2 lbs BOD5/capita and 67 gpd/capita.
- MMPF = 1.1 for Flow and 1.45 for BOD_5

Water Regulatory Review

- LT2 – Membrane WTPs not required to sample for TOC removal.
- DBP formation potential is a function of TOC and chlorine. Improving TOC removal decreases DBP formation potential.
- New DBP rule in development. Not likely until late 2020s.
- PFAS monitoring (not required due to size)
  - First surface WTP downstream of Grizzly Creek Fire
- TENORM in residuals (not required until disposal)
- Secondary standards for iron and manganese (T&O)

Wastewater Regulatory Review

- Regulation 85
  - Technology based effluent nutrient limits - not applicable because facility is less than 1 MGD.
- Regulation 31
  - Water quality based stream standards
  - WQCC has stated they want the WQCD to write these into discharge permits starting in 2027

WATER BODY	TOTAL PHOSPHORUS, MG/L [A]	TOTAL NITROGEN AS N, MG/L [A,B]	CHLOROPHYLL-A, MG/M^2 [C]
Rivers and Streams – cold	0.11	1.25	150

WTP Evaluation

- In 100 year flood plain. All tanks and equipment need to be above established flood elevation.
- Raw water flow measurement and control
- Pretreatment
  - Good coagulant.
  - Insufficient flocculation time. Reduces performance of plate settler.
  - Coagulant dosing control is limited
  - No TOC removal (e.g. DBP formation potential) monitoring
  - Need an Fe/Mn treatment option and to reduce sequestering agent

WTP Evaluation

- Membranes
  - True WTP capacity (both skids) is only 0.6 million gallons per day (mgd) and NOT 1.0 mgd
    - Average capacity per skid – 265 gpm (0.38 mgd)
    - Peak capacity per skid – 350 gpm (0.5 mgd)
  - Influent turbidity is higher than design criteria of 1 NTU
  - Maintenance
    - Backwashing
    - Maintenance clean performed daily.
    - CIPs not performed. No heater and insufficient time (6 hrs required)
    - Pinning performed when required. Requires additional staff and takes 1 unit out of service

WTP Evaluation

- Disinfection
  - Tablet system works but seems to produce inconsistent dosage.
  - Which could lead to increased DBP formation potential
  - Contact basin
    - One basin
    - Sufficient for 4 log virus removal/inactivation at projected future capacity
    - Insufficient for 0.5 log giardia inactivation at current and projected capacity.
      - Only required if change from membranes to conventional
- Finished water pumping
  - Will need to be expanded

WTP Short Term Alternatives Discussion

- Raw water pumping
  - Upgrade controls (flow monitoring and pacing to rest of process)
- Strainer
  - Could replace strainer with new one with better removal
- Pretreatment (Goal to reduce turbidity to membranes)
  - Will likely improve membrane life, but will NOT increase capacity.
  - Floc tank?
  - Utilize pond across river
  - Expansion of well field outside existing Town property
- Disinfection – switch to hypochlorite and/or chloramines

WTP Long Term Alternatives Discussion

- Pretreatment Upgrades
  - Process to handle wide range in turbidity
  - DAF (needs < 10 NTU feed turbidity)
  - Conventional floc/sed with plate settlers
  - Coagulation with Upflow clarifiers
  - Actiflo/Ballasted flocculation
  - Green sand, Chlorine Dioxide, or Ozone (T&O and Fe/Mn)
- Filtration
  - Pressure membranes (with FIRM AD capacity of 1.2 MGD)
  - Conventional mixed media filters (with firm AD capacity of 1.2 MGD)

WTP Short Term Alternatives

- Improved pretreatment
  - Strainer
  - Coagulation/flocculation/sedimentation
- Filtration
  - Mixed Media
  - Membranes
- Additional
  - Fe/Mn removal (green sand in the mixed media)
  - Ozone or aeration for membranes
  - UV disinfection for mixed media filters
  - Water Tank

WTP Long Term Alternatives

- Increase in capacity to accommodate growth or increases in peak day demands
  - Pretreatment
  - Filtration

WTP Alternatives

- Alternative 1 – Solids Contact Clarifier with Mixed Media Filtration
- Alternative 2 – Plate Settlers with Filtration
- Alternative 3 – Conventional Package WTP
- Alternative 4 – Ballasted Flocculation with Mixed Media Filtration

Alt 1 Site Plan Solid Contact Clarifier with Mixed Media Filtration

ALTERNATIVE 1 – CLARICONE WITH MIXED MEDIA FILTRATION

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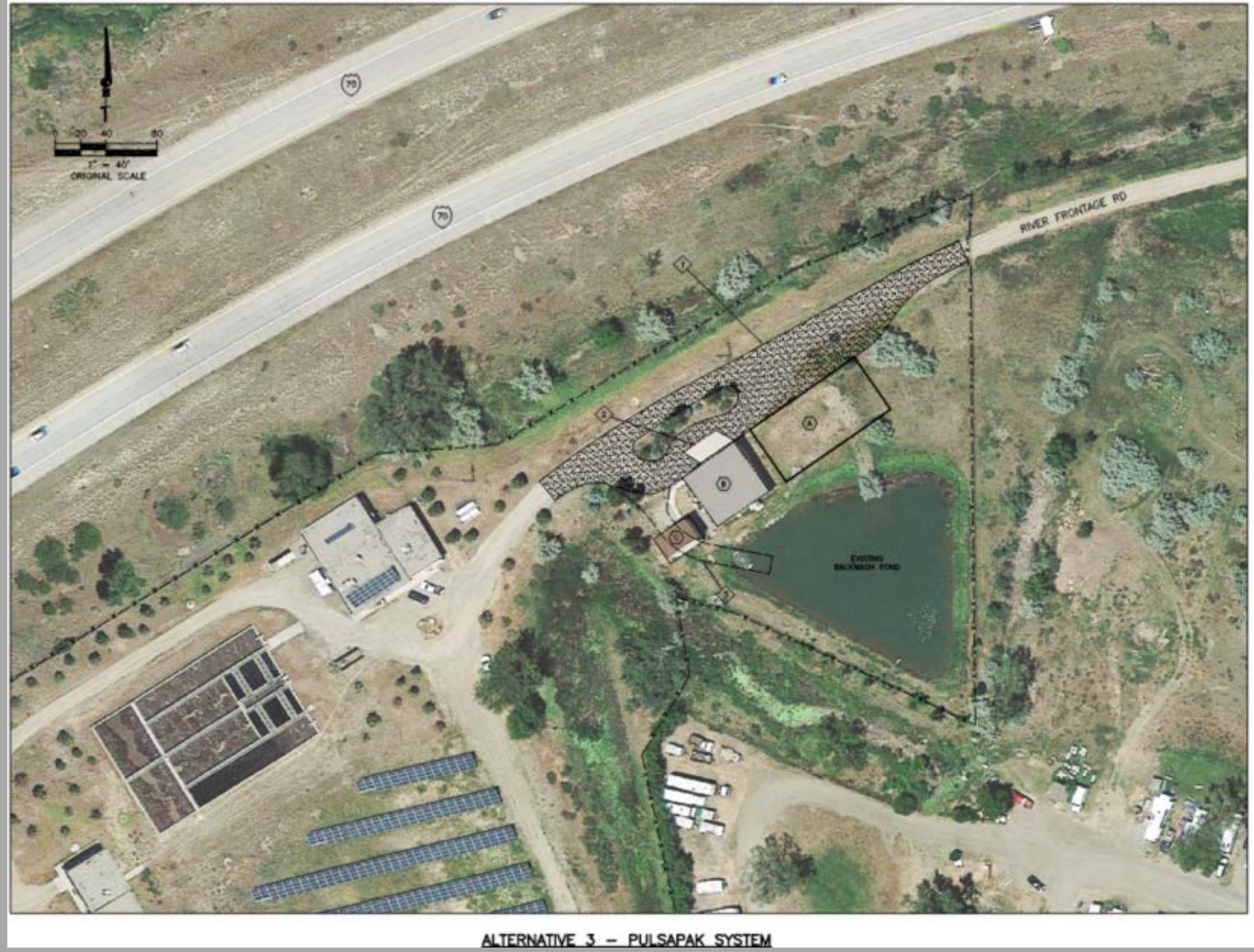
Alt 2 Site Plan Plate Settlers with Filtration

ALTERNATIVE 2 – PLATE SETTLERS WITH FILTRATION OPTIONS

Alt 3 Site Plan Conventional Package WTP



ALTERNATIVE 3 – PULSAPAK SYSTEM

Alt 4 Site Plan Ballasted Flocculation with Mixed Media Filtration

ALTERNATIVE 4 – ACTIFLO WITH MIXED MEDIA FILTRATION

Summary of Process Improvements

UNIT PROCESS	ALT 1. SOLIDS CONTACT CLARIFIER WITH MM FILTRATION	ALT 2. PLATE SETTLERS WITH FILTRATION	ALT 3. PULSAPAK (CONVENTIONAL PACKAGE SYSTEM)	ALT. 4 BALLASTED FLOCCULATION WITH MIXED MEDIA FILTRATION
Strainer	Included	Included	Included	Included
Coag/Floc/Sec	Occurs in one solids contact clarifier. Can accommodate	Separate Floc/coag with plate settlers	Package floc/coag/sed system	Utilizes polymer and sand to improve settling.
Filtration	Mixed Media with Fe/Mn removal	(a) Mixed Media with Fe/Mn removal (b) Membranes	Mixed Media with Fe/Mn removal	Mixed Media with Fe/Mn removal Ballasted floc cannot be utilized with membranes
Disinfection	Needs UV and Cl	MM needs UV and Cl. Membranes – Cl only	Needs UV and Cl	Needs UV and Cl
Residuals	Pond with periodic dredging/cleaning	Pond with periodic dredging/cleaning	Pond with periodic dredging/cleaning	Pond with periodic dredging/cleaning

Summary of WTP Costs

ALTERNATIVE	PROBABLE OPINION OF CONSTRUCTION COST, $ MILLION	OPINION OF TOTAL PROJECT COST, $ MILLION
Alt 1 – Solids Contact Clarifier with Mixed Media Filtration	$22.7	$27.2
Alt 2a – Plate Settlers with Mixed Media Filtration	$21.2	$25.5
Alt 2b – Plate Settlers with Mixed Membrane Filtration	$18.6	$22.3
Alt 3 – Package Media Filtration	$22.6	$27.1
Alt 4 – Ballasted Flocculation with Mixed Media Filtration	$25.1	$30.2
New Additional 0.5 MG Water Storage Tank	$2.2	$2.6

Summary of WTP Annual Costs

ALTERNATIVE	QTY	ANNUAL COST
Staffing	3	$267k
Coagulant	125 gal/day	$82k
Disinfection Chemical	75 gal/day	$228k
Power	125 hp	$82k
Residuals	Cleaning out pond once every 1-5 years	$75k
Equipment/Structure O&M		$85k
Total		$819k

WTP Alternatives Matrix

CRITERIA	ALT 1 – SOLIDS CONTACT CLARIFIER WITH MM FILTRATION	ALT 2- PLATE SETTLERS WITH FILTRATION	ALT 3 – PACKAGE CONVENTIONAL WTP	ALT 4 – BALLASTED FLOC WITH MM FILTRATION
Able to meet projected 20 year flow and load projections	Yes	Yes	Yes	Yes
Chemicals required	Higher chemical use	Higher chemical use	Higher chemical use	Highest chemical use
Redundancy	AD – one train PD – both trains	AD – one train PD – both trains	AD – one train PD – both trains	AD – one train PD – both trains
Expansion Capability	Significant	Moderate	Moderate	Moderate
Ease of Operations	More complex	Similar to existing	Similar to existing	More complex
Can accommodate wide range in turbidity	Great	Good	Good	Great
Energy Use	Moderate	Moderate	Moderate	Moderate

WWTP Evaluation

- In 100 year flood plain with no established flood elevation. All tanks and equipment need to be the flood elevation. Use the upstream elevation?
- Headworks
  - HVAC and NFPA 820
  - Screening – may want to put manual screen in bypass channel
  - All equipment seems to have capacity to meet projected future PHF
- Secondary Process/Digestion
  - Sufficient capacity, but can’t meet Reg 31 requirements without upgrades

WWTP Evaluation

- Disinfection
  - Sufficient capacity to meet future PHF
- Dewatering
  - Nearing end of useful life.
  - May want to upgrade to system with improved performance
  - Polymer dosing control upgrades needed.
- Hydraulic Profile
  - Going to be an issue with upgrades
- Discharge
  - Need to respond to CDPHE. Discharge is in floodplain

WWTP Short Term Alternatives Discussion

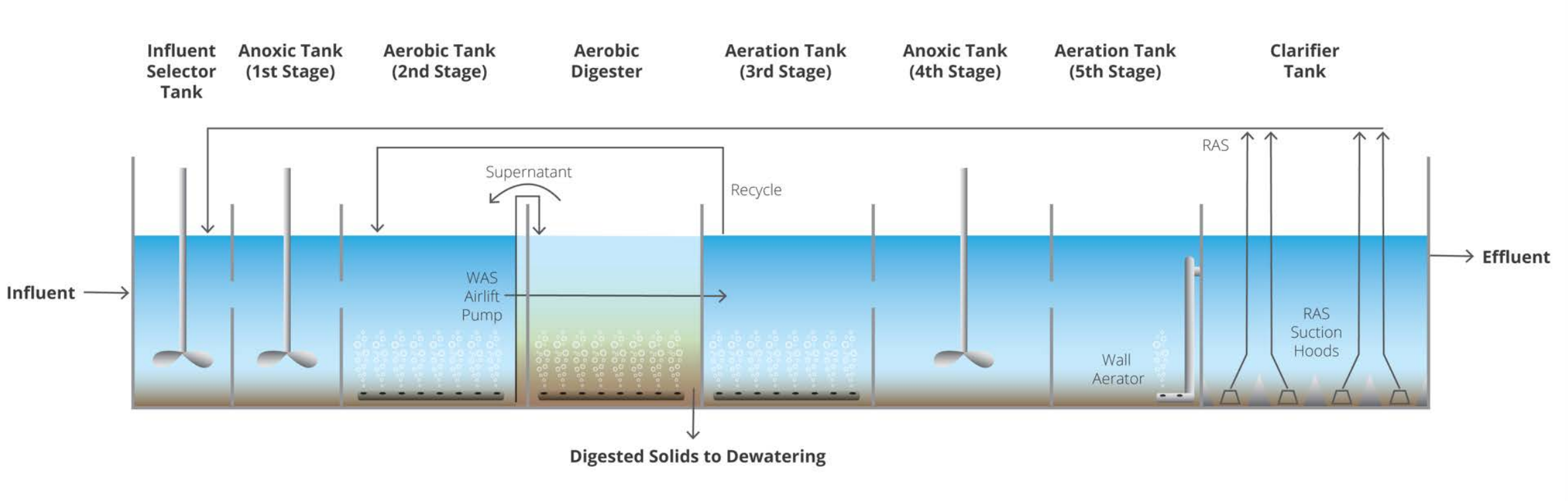
- Headworks screening and HVAC
- Dewatering
- Extension of Outfall

WWTP Long Term Alternatives - 2027

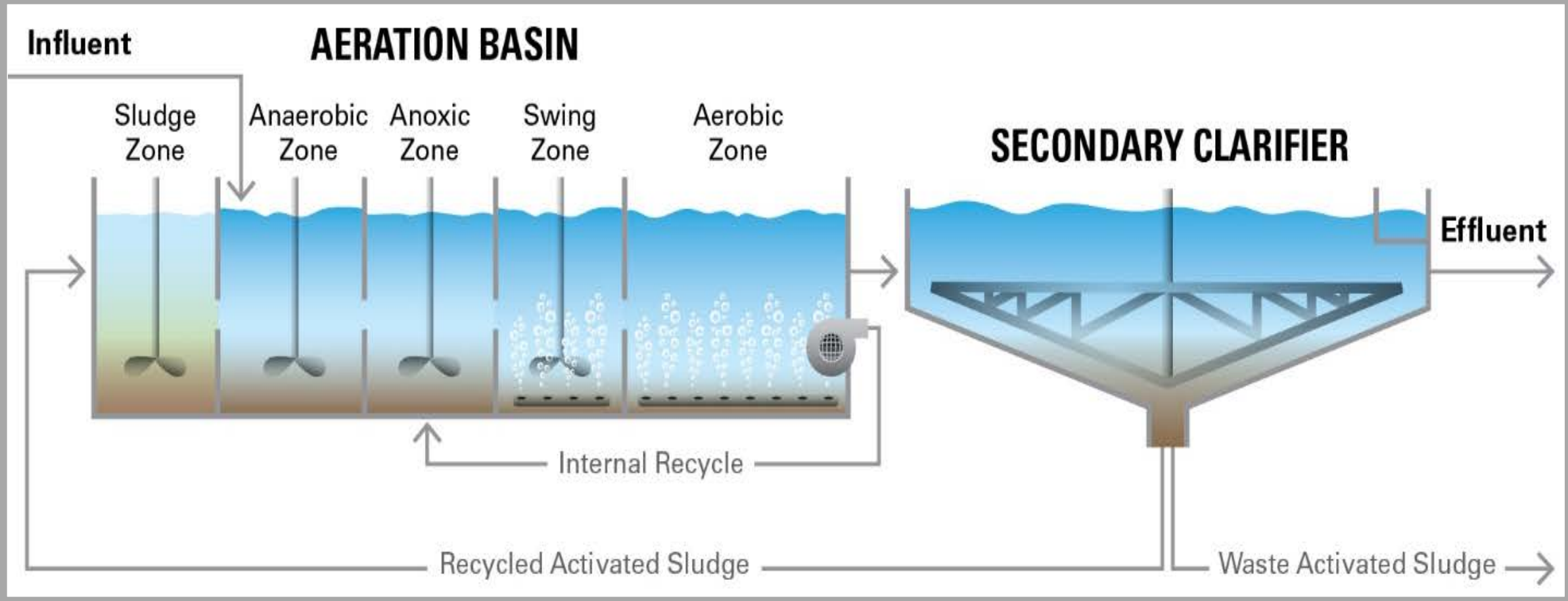
- Secondary Process
  - Expand Aeromod with tertiary N removal and filtration
  - Johannesburg with tertiary N removal and filtration
- Disinfection
  - New UV?
  - Chlorine?
- Digestion
  - Aerobic
  - ATAD

Wastewater Alternatives

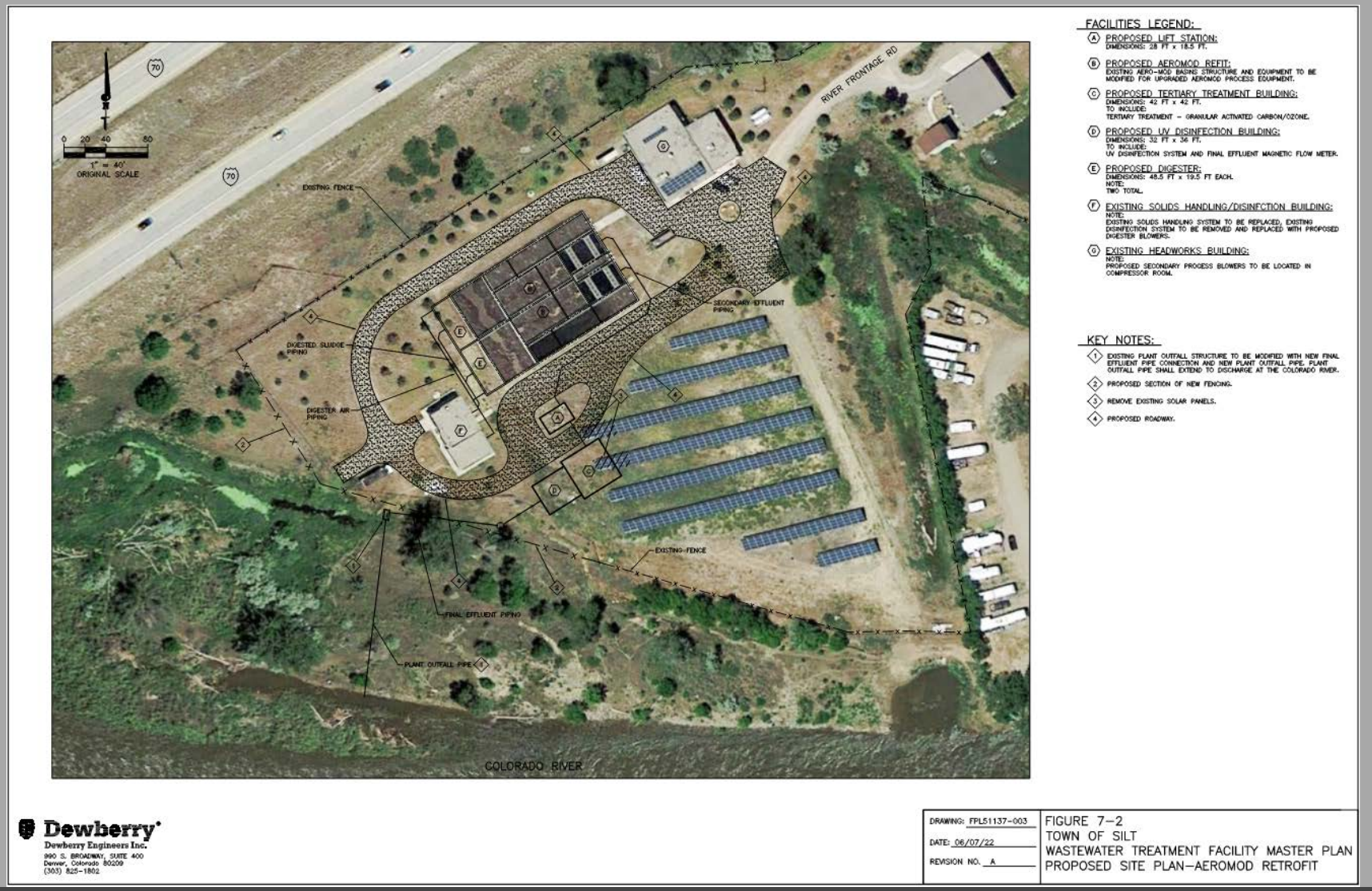
- Expanding Aeromod



Wastewater Alternatives



Aeromod Site Plan



Johannesburg Site Plan

FACILITIES LEGEND:

- (A) PROPOSED LIFT STATION:
  DIMENSIONS: 28 FT x 18.5 FT.
- (B) PROPOSED BNR BASIN:
  EXISTING AERO-MOD BASINS STRUCTURE TO BE MODIFIED FOR NEW PROCESS.
- (C) PROPOSED SECONDARY CLARIFIER:
  DIMENSIONS: 30 FT DIAMETER.
- (D) PROPOSED RAS/WAS BUILDING:
  DIMENSIONS: 80 FT x 29 FT.
  TO INCLUDE:
  RAS/WAS PUMPS AND PRIMARY SCUM PUMPS IN LOWER LEVEL, CHEMICAL FEED SYSTEMS AND DIGESTER BLOWERS.
- (E) PROPOSED TERTIARY TREATMENT BUILDING:
  DIMENSIONS: 42 FT x 42 FT.
  TO INCLUDE:
  TERTIARY TREATMENT - GRANULAR ACTIVATED CARBON/OZONE.
- (F) PROPOSED UV DISINFECTION BUILDING:
  DIMENSIONS: 32 FT x 36 FT.
  TO INCLUDE:
  UV DISINFECTION SYSTEM AND FINAL EFFLUENT MAGNETIC FLOW METER.
- (G) PROPOSED DIGESTER:
  DIMENSIONS: 62 FT x 20 FT EACH.
  NOTE:
  FOUR TOTAL.
- (H) EXISTING SOLIDS HANDLING/DISNFECTION BUILDING:
  NOTE:
  EXISTING SOLIDS HANDLING SYSTEM TO BE REPLACED, EXISTING DISINFECTION SYSTEM TO BE DECOMMISSIONED.
- (I) EXISTING HEADWORKS BUILDING:
  NOTE:
  PROPOSED SECONDARY PROCESS BLOWERS TO BE LOCATED IN COMPRESSOR ROOM.

KEY NOTES:

1. EXISTING PLANT OUTFALL STRUCTURE TO BE MODIFIED WITH NEW FINAL EFFLUENT PIPE CONNECTION AND NEW PLANT OUTFALL PIPE. PLANT OUTFALL PIPE SHALL EXTEND TO DISCHARGE AT THE COLORADO RIVER.
2. PROPOSED SECTION OF NEW FENCING.
3. REMOVE EXISTING SOLAR PANELS.
4. PROPOSED ROADWAY.

Dewberry
Dewberry Engineers Inc.
999 S. BROADWAY, SUITE 400
Denver, Colorado 80209
(303) 825-1802

DRAWING: FPL51137-002
DATE: 06/03/22
REVISION NO. A

FIGURE 7-1
TOWN OF SILT
WASTEWATER TREATMENT FACILITY MASTER PLAN
PROPOSED SITE PLAN-BNR BASINS

Summary of Process Improvements

UNIT PROCESS	AEROMOD	JOHANNESBURG
Outfall Extension	Outfall to be extended into Colorado River	Outfall to be extended into Colorado River
Sludge Handling Improvements	New dewatering equipment	New dewatering equipment
Site Civil	Paving, grading, stormwater, etc.	Paving, grading, stormwater, etc
Secondary Process	Upgrade Aero-Mod with fixed film. Additional digesters added. Aeration blowers in HW building.	Retrofit Aero-Mod concrete basins to a RAS Denitrification zone, anaerobic zones, anoxic zones, a swing zone, and aerobic zones. Digesters and clarifiers added. Aeration blowers in HW building.
Process Building	N/A	RAS/WAS pumps, primary scum pumps in lower level, chemical feed system and digester blowers
Lift Station	New lift station	New lift station
Tertiary Treatment Building	Ozone and GAC	Ozone and GAC
Disinfection	New UV system	New UV system

Summary of Total WW Costs

UNIT PROCESS	AEROMOD	JOHANNESBURG
Outfall Extension	$203,000	$203,000
Sludge Handling Improvements	$1,490,000	$1,490,000
Site Civil	$2,052,000	$2,271,000
Secondary Process	$8,515,000	$21,242,000
Process Building	-	$8,557,000
Lift Station	$2,139,000	$2,139,000
Tertiary Treatment Building	$13,083,000	$13,083,000
Disinfection	$2,913,000	$2,913,000
Total Opinion of Probable Construction Cost	$30,395,000	$51,898,000
Total Project Cost	$36,475,000	$62,278,000
Net Present Value	$74,311,000	$108,485,000

Summary of Short-Term WW Costs

UNIT PROCESS	AEROMOD	JOHANNESBURG
Outfall Extension	$203,000	$203,000
Sludge Handling Improvements	$1,490,000	$1,490,000
Total Opinion of Probable Construction Cost	$1,693,000	$1,693,000
Total Project Cost	$2,031,000	$2,031,000

Summary of Long-Term WW Costs

UNIT PROCESS	AEROMOD	JOHANNESBURG
Site Civil	$2,052,000	$2,271,000
Secondary Process	$8,515,000	$21,242,000
Process Building	-	$8,557,000
Lift Station	$2,139,000	$2,139,000
Tertiary Treatment Building	$13,083,000	$13,083,000
Disinfection	$2,913,000	$2,913,000
Total Opinion of Probable Construction Cost	$28,702,000	$50,205,000
Total Project Cost	$34,442,000	$60,246,000
Average O&M	$957,000	$965,000
Net Present Value (does not include any estimate of future expansion cost)	$74.3m	$108.5m

Wastewater Alternatives Matrix

CRITERIA	AEROMOD	JOHANNESBURG
Able to meet projected 20 year flow and load projections	Yes	Yes
Able to meet Reg 31	Yes	Yes
Chemicals required	Higher chemical use	Lower chemical use
Redundancy	Would require all trains in operation to meet projected 20 year flows/loads	Could meet 20 year flows and loads with one train out of service.
Expansion Capability	Would require significant infrastructure	Can increase capacity ~100 percent
Ease of Operations	Likely same as current	New process
Energy Use	Higher	Lower
Construction Feasibility	Feasible at current projected schedule; however, would be less feasible as get closer to plant capacity in the future.	Feasible at current projected schedule; however, would be less feasible as get closer to plant capacity in the future.

WWTP Conclusions and Recommendations

- WWTP is in a good spot; it has capacity and meets current regulatory requirements.
- Recommended WWTP Improvements can be performed in two phases
  - 1st Phase – Dewatering improvements can be performed anytime in next 5 years.
  - 2nd Phase – Completed prior to Reg 31 requirements (2032 at latest)

WTP Conclusions and Recommendations

- WTP is NOT in a good spot; it is operating at capacity.
- Recommended WTP Improvements can be performed in two phases
  - 1st Phase – Capacity and pretreatment improvements needed now
  - 2nd Phase – Additional capacity (if required) to improve resiliency or increase redundancy.
- Expanding well field or use of forebay pond would likely reduce impacts of turbidity on operations.

Questions?

Patrick Radabaugh, PE

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- Tel: 303.951.0642

Kyria Bosma, PE

- kbosma@dewberry.com
- Tel: 303.951.0632

Date: November 8, 2022
To: Mayor Richel & Board of Trustees
From: Jeff Layman, Town Administrator
Subject: Staff Report

Activities, initiatives and news:

- **Selection of Consultants by Staff for Water Plant Project:** You will recall that the Board voted on October 24 to allow the staff to select two consultants in order to accelerate the work being done on the water plant project. Public Works Director Trey Fonner, Town Attorney Mike Sawyer, Dewberry Engineer Patrick Radabaugh and ORC and engineer Tony Zancanella all weighed in on these decisions.
    - **Water Enterprise Revenue/Rate Modeling Consultant:** Jim Mann was selected over another consultant. You may remember Jim from the financial work he did for the Town during our conversations about River Valley Metro District in 2020. Jim's contract is for $15,000.
    - **Environmental Assessment Services:** Front Range company ERO was selected over a Glenwood Springs based company. ERO had a significantly lower fee proposal and Dewberry's Radabaugh has worked with them and has observed the skill with which they have negotiated the CDPHE Water Quality Control Division's requirements. The fee is $38,000.
- **Silt Charter Amendments Pass:** The three Town of Silt Charter amendments passed in last Tuesday's election by an overwhelming margin, with 743 voting in favor and 275 opposed. The changes will save Silt some money, streamline processes, utilize Garfield County resources that are already being paid for by Silt residents and increase voter turnout.

  An interesting point made by Town Clerk Sheila McIntyre is that 1,018 of Silt's registered voters voted out of almost 1900 registered. That's a rather amazing 54% turnout! Compare this to the 343 ballots cast in the last municipal election—an 18% turnout. If the Charter change will further encourage voter participation, as it appears, we can anticipate better turnout in the future.

Zancanella & Associates, Inc.
Memorandum

To: Jeff Layman and Trey Fonner
From: Matt Weisbrod and Tony Zancanella
Date: November 22, 2021
Subject: DHSEM Needs Narrative – Town of Silt WTP

Below is a brief narrative on the needs of the Town of Silt as it pertains to the Grizzly Creek Wildfire and associated debris flows, cleanup of the Colorado River from the debris flows, and future potential debris flows impacting the quality of water in the Colorado River.

During July and August of 2021, precipitation events in the Glenwood Canyon over the Grizzly Creek burn scar caused significant debris flows that impacted the Colorado River. During these events, high sediment load fouled the water in the Colorado River caused treatment issues on downstream water users. The Town of Silt is the first Municipal Water provider that draws directly from the Colorado River causing greater direct impacts from the debris flows and the subsequent cleanup to the Town's water system. Due to this, the Town saw decreased treatment capabilities and life expectancy from their primary treatment filters this past summer.

In a typical runoff season, the Town has the capabilities to convert to the Town's wells for short periods of time. By utilizing well water in conjunction with River water, the Town can reduce the amount of total dissolved solids, total organic compounds, and turbidity the WTP experiences. This is only a short duration solution as the wells are high in manganese. During the prolong debris flow events this past summer and predicted prolonged future events, the well water is not a viable solution due to water quality issues experienced in the Town caused by prolonged well usage. In addition, the Colorado River tested high in iron and manganese post the debris flow events which contributes to the water quality issues experienced by the Town with prolong well usage.

To allow for the Town of Silt WTP to be able treat the additional ongoing loading for the foreseeable future from the Colorado River, the plant will require pre-treatment and primary treatment upgrades. Pre-treatment additions of a settling pond, a clarifier, and an additional plate settler will help meet the immediate needs. Pre-treatment reduces the loading on the primary filters and will decrease the frequency of replacement of filters due to increased fouling. Without pre-treatment upgrades, the increased frequency of the primary filter replacement will cause additional ongoing expenses for the Town as future events impact the river.

The addition of pre-treatment and primary treatment upgrades is a long-term solution to treat the lasting impacts caused by the continued debris flows from the Grizzly Creek Fire burn scar. Upgrades to the primary treatment would allow the Town to have the capabilities to put units offline for increased cleaning and membrane replacement while still maintaining adequate treated water produced for the Town's residences.

The early replacement cost of the filters due to the debris flows this year was approximately $48,000. The estimated cost for the immediate improvements to the water treatment plant's pre-treatment capabilities is estimated at $13,000,000 which includes a pre-treatment settling pond, a pre-treatment clarifier, an additional plate settler, and associated waste stream improvements due to these pre-treatment upgrades. The estimated cost for the full upgrades and enhancements to the WTP to treat the long-term impacts of the debris flows associated with the Grizzly Creek Fire is estimated at $28,000,000.

TOWN OF SILT Est. 1915

231 N. 7th Street / P.O. Box 70 / Silt, CO 81652
Phone: 970-876-2353 / Fax: 970-876-2937

December 8, 2022

Board of Directors
Colorado Water Resources and Power Development Authority
1580 Logan Street, Suite 620
Denver, CO 80203

Re: Determination of Disadvantaged Community Status-Silt, Colorado

Members of the CWRPDA Board of Directors,

The Town of Silt is respectfully requesting the determination of disadvantaged community status, even though the Town has not met the standard program criteria. We would submit that the Town of Silt is truly disadvantaged based upon the totality of current and past circumstances.

According to the 2020 census, the Town of Silt has a total population of 493. The Town is also obligated to provide municipal water for over 24 taps outside of the Town's actual boundaries. The total number of taps has remained largely stagnant since 2017 at 351. The Town's water plant needs replacement and sidewalks, and other infrastructure are in disrepair or non-existent in many parts of the Town.

While the Town of Silt is located within the boundaries of Garfield County, the Town of Silt and the Town of Colbran are distinguishable from the other municipalities in Garfield County. Geographically, the Town is approximately 35 miles from the Cities of Grand Junction, Fruita, and Palisade. Given the Colorado weather, this 35-mile stretch can be arduous at times not only for commerce passing through the intervening Silt Canyon, but for residents commuting to and from work or services. Often, the City of Grand Junction is considered a "mini-hub" of the Denver metropolitan area. The Grand Junction regional airport, current industry, and proximity to Salt Lake City

support the significant economic growth in Grand Junction, Fruita, and Palisade. Unfortunately, the economic benefits of this “hub” do not extend to the outlying areas of Silt and Colbran.

It is very difficult to find reliable data specific to the Town of Silt and the surrounding community. The Town would submit that utilizing data encompassing all of Garfield County may result in an unreliable analysis for the purposes of the determination of disadvantaged community status for the Town of De Beque.

The entire staff for the Town fluctuates from approximately 10FTE to 15FTE. Most of the professional staff commute into the Town of Silt, while residents tend to commute outside of the Town to obtain gainful employment. There are only a handful of small businesses within the Town itself. Over the past two years the only restaurant and bar and a local tavern have closed. The local coffee shop closed as of May 1, 2022. According to the 2020 American Community Survey 5-Year Estimates, the employment rate in Silt is 63%. However, this is distinguishable from the County as a whole. According to the Garfield County Workforce Center, the unemployment rate for all of Garfield County reached it’s highest level in April of 2020 at 12.6%.

Historically, the Town of Silt has been highly reliant upon the oil and gas industry, which continues to impact the economy in Silt. With the exception of the short-term boost in the economy resulting from the marijuana industry, the Town’s economy rises and falls with the ebbs and flows of the oil and gas industry.

In 2008, Schlumberger Technology Corporation, an oil and gas field service company requested annexation into the Town of Silt for the purposes of developing their national headquarters. The development was to include 70 acres South of I-70, with buildings and facilities supporting Schlumberger’s business activities as a support company for development of natural resources. However, after the annexation was complete and development of the necessary infrastructure and public services on the South side of the interstate were beginning, Schlumberger abruptly abandoned the entire project and breached the terms of the annexation agreement. This resulted in acreage being annexed into the Town without the necessary infrastructure to effectively provide both water and sewer on the South side of the interstate. The impact of this breach was devastating to the Town of Silt and continues to this day. The Town is currently seeking grant funding for a bore under the interstate to

mitigate the issue of lack of sewer services to the annexed area.

In an effort to mitigate the negative impact of the withdrawal of Schlumberger and to diversify it's economy, the Town of Silt became the first community East of the Utah border to welcome the marijuana industry, resulting in a short term boost to the local economy. Without the excise tax revenues derived from the marijuana industry, the Town of Silt would have had only 1 year with a net income between the years of 2014-2020 and the General Fund balance for the Town of Silt in 2020 would have been -500,000.

However, the voters in the City of Grand Junction have recently approved of the establishment of 10 new retail marijuana shops and the voters in Garfield County have approved of marijuana grows in the County. While the exact impact of these new developments is yet to be determined, it is anticipated that the excise tax revenues will significantly decline for the Town of Silt. Once again, the 35-mile drive from Grand Junction through the Silt canyon constitutes a significant economic barrier for the Town.

There is significant interest in development in the community as the Town struggles to grow it's economy. However, just as the 35-mile geographical distance constitutes an economic barrier, so does the lack of services to the annexed portion of the Town South of the interstate.

The Town appreciates this opportunity to provide the Board with additional information and data which may fall outside of the standard criteria for the determination of disadvantaged community. The designation would provide the Town of Silt an opportunity to obtain reasonable funding for the necessary replacement of the Town's water plant.

Respectfully submitted,

Care' McInnis

Town Administrator

Town of Silt

Sincerely,

Jeff Layman
Town Administrator

jlayman@townofsilt.org

970.876.2353

CO0123710 Town of Silt

Record of Approved Waterworks (RAW)

System Name	Town of Silt
PWSID No.	CO0123710
County	Garfield
Created Date	December 28, 2022
Previous CDPHE Approvals	
Date	**Details**
January 4, 2003	Plans and Specifications Approval for Town of Silt Water Treatment Plant Upgrades (Robert Cribbs & Thomas Schaffer, P.E.)
November 29, 2004	Plans Approval for Town of Silt Microfiltration Plant (Mark Kadnuck, P.E.)
July 17, 2014	Approval of Drinking Water Final Plans and Specifications for Construction of WTP Water Supply Improvements Project; ES.14.DWDR.00626 (Emily Becker, P.E., Senior Review Engineer)
RAW Version Control Log	
Date Modified	**Reason for Modification**
December 28, 2022	Creation of RAW document as part of the Disinfection Outreach Verification Effort (DOVE) project; ES.14.DOVE.01373 (Andrew Rice, P.E., DOVE Team Engineer)

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Public Water System Facility Summary

Public Water System Classification	Community
Overall Source Classification	Surface Water

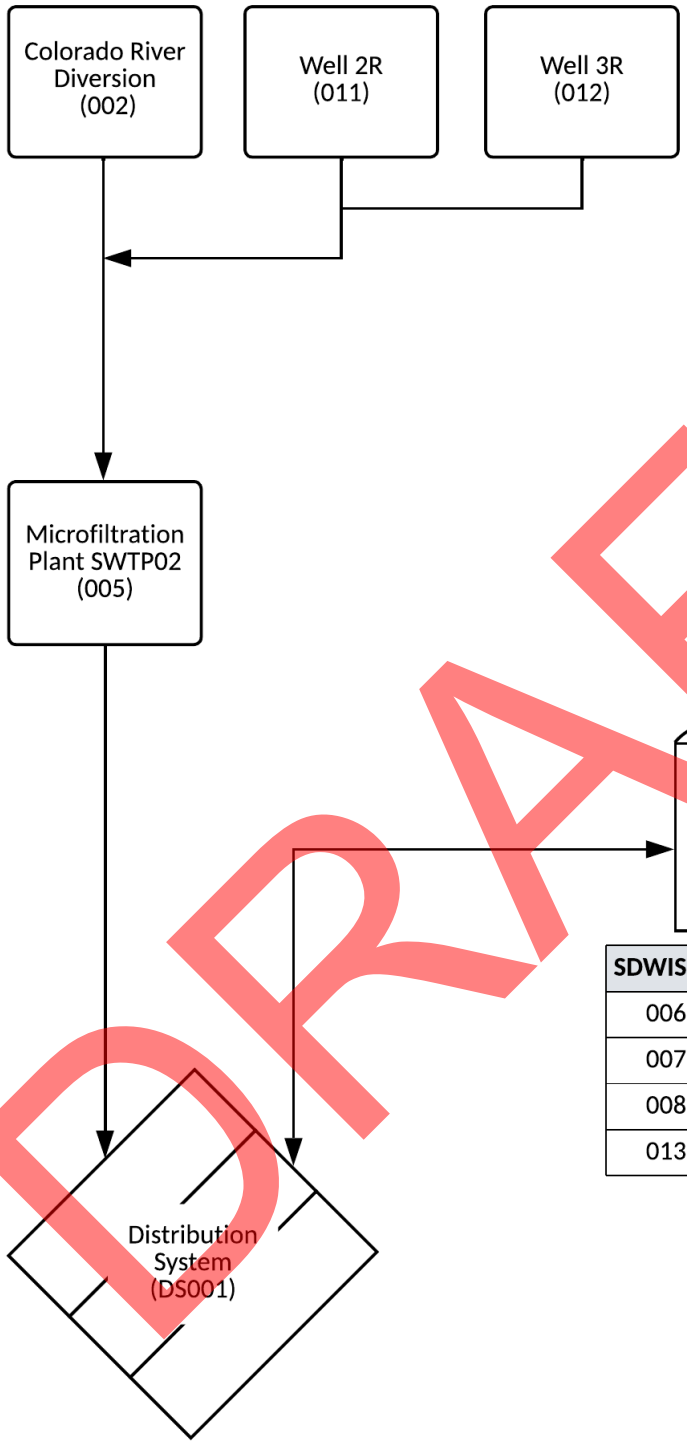
Section S: Sources			
ID	**Name**	**Acceptance or Approval Date**	**Last Modified**
Groundwater Sources: None			
GWUDI Sources: None			
011	Well 2R	March 31, 2016	
012	Well 3R	May 23, 2016	
Surface Water Sources:			
002	Colorado River Diversion	June 1, 1974	
Consecutive System Connections: None			

Section T: Treatment			
ID	**Name**	**Acceptance or Approval Date**	**Last Modified**
005	Microfiltration Plant SWTP02	October 3, 2005	

Section ST: Storage Tanks			
ID	**Name**	**Acceptance or Approval Date**	**Last Modified**
006	Main Tank	November 2, 2007	
007	Sunrise Tank 1	November 2, 2007	
008	Mesa View Tank	November 2, 2007	
013	Sunrise Tank 2	November 2, 2007	

Section D: Distribution			
ID	**Name**	**Acceptance or Approval Date**	**Last Modified**
DS001	Distribution System	June 1, 1974	

System Wide Schematic



SDWIS ID	TANK NAME
006	Main Tank
007	Sunrise Tank 1
008	Mesa View Tank
013	Sunrise Tank 2

Water Source Details

Source ID/ Name	(002) Colorado River Diversion
Flow Rate	
Information	
Appurtenances	
Deviations from Design Criteria: None	
Conditions of Approval: None	

Source ID/ Name	(011) Well 2R
Flow Rate	
Information	• Type: Alluvial well, drilled • Well Permit: 79594-F • Casing Diameter: 8-inch (nominal) • Total Depth: 29-ft • Screened Interval: 19-ft to 24-ft • Static Water Depth: 8-ft

Appurtenances	• Pump:
	  ○ Number: one (1)
	  ○ Type: submersible
	  ○ Capacity: 300 gpm
	• Pressure transducer for water level measurement

Deviations from Design Criteria: None	
Conditions of Approval: None	

Source ID/ Name	(012) Well 3R
Flow Rate	
Information	• Type: Alluvial well, drilled • Well Permit: 79593-F • Casing Diameter: 8-inch (nominal) • Total Depth: 38-ft • Screened Interval: 27-ft to 32-ft • Static Water Depth: 8-ft

Appurtenances	• Pump:
	  ○ Number: one (1)
	  ○ Type: submersible
	  ○ Capacity: 300 gpm
	• Pressure transducer for water level measurement

Deviations from Design Criteria: None	
Conditions of Approval: None	

Water Treatment Plant Details

NOTE: "Design Basis" means either specified equipment or equivalent must be used. If the term "Design Basis" does not appear, then the specified equipment must be used.

Treatment ID/ Name	**(005) Microfiltration Plant STWP02**			
Plant Design Flowrate and Limiting Process	Design Flowrate: 0.5 MGD Rate Limiting Process: Filtration (1 of 2 membrane filters online)			
Minimum Water Treatment Facility Classification/Basis	"B" Per Regulation 100.4.2: membrane filtration with coagulants or polymers; 350 - 1,400 gpm design flow			
Disinfection Credits (Triggered GW)	n/a			
Disinfection Credits (4-log Certified)	n/a			
Treatment Credits (GWUDI/SW Bin 1) "membrane filtration"	**Required from Regulation 11**	***Cryptosporidium***	***Giardia***	**Virus**
	Minimum Total Required	2.0	3.0	4.0
	Removal Credit	3.0	3.0	0.0
	Inactivation Needed	0.0	0.0	4.0
Optimal Corrosion Control Treatment	None			
Overall Treatment Process Description	Submerged membrane filtration with calcium hypochlorite disinfection			
Treatment Processes				
Process	**Description**			

Raw Water Pump Station	• Diversion Structure: Cast-in-place concrete structure with stop logs and 2-inch manually cleaned bar screen
	• Pump Wetwell: Cast-in-place concrete structure; two parallel wetwell compartments sized for four (4) pumps
	• Pumps:
	  ○ Number: 2
	  ○ Type: submersible, solids handling
	  ○ Capacity: 831 gpm @ 54-ft TDH
	  ○ Location: Raw Water Pump Station
	  ○ Control: variable speed, and automatic on/off based on WTP run status			

Microscreening (520)	• Description: Automatically backwashing conical screen strainer for particulate removal (design basis: Thompson Filter strainer model MU-10) • Quantity: 1 • Screening Size: 0.8 mm (#20 mesh) • Screening discharge: to backwash pond

Chemical Feed, Coagulation (240)	• Chemical Feed: polyaluminum chloride (design basis: Polydyne Clarifloc C-1400)
	  ○ Treatment goal: coagulation
	  ○ Type: Delivered, stored and fed as liquid
	  ○ Feed Pump:
	  ▪ Type: peristaltic (design basis: Blue-White FlexFlo A1N20V-6T)
	  ▪ Number: one (1)
	  ▪ Capacity: 24 gpd
	  ○ Cross connection control: N/A, chemical fed neat
	  ○ Chemical Storage: one (1) 105-gallon HDPE storage tanks
	  ○ Secondary containment: concrete knee wall around tank
	  ○ Injection point: into raw water line prior to inline mixer
	  ○ Mixing: inline mixer
	  ○ Control: flow paced and on/off control based on WTP run status

Inline Mixer	• Description: flange mounted in-line propeller mixer • Number: one (1) • Motor size: ¼-hp • Design basis: Lightnin' model EV1L50

Sedimentation (660)	• Description: upflow clarifier with plate settlers; above grade welded stainless steel tank inside heated building
	• Number of trains: one (1)
	• Dimensions and Volumes:
	  ○ Depth: ±20'-0"; Width: ±8'-0"; Operating Depth: ±19'-0")
	  ○ Volume: ±9,000 gallons
	• Plate Settlers
	  ○ Total number of plate settler racks: two (2)
	  ○ Number of plates per rack: 50
	  ○ Plate Inclination Angle: 55 degrees
	  ○ Plate Dimensions:
	  ▪ Width: ±3'-6"; Length: ±10'-0"
	  ▪ Projected Horizontal Area, per plate: ±20 sf
	  ▪ Total Projected Horizontal Plate Area: ±2,000 sf
	• Solids removal: gravity drain with discharge to backwash pond
	• Maximum Surface Overflow Rate (SOR): 0.3 gpm/sf of horizontal projected plate area
	• Maximum Rated Capacity: ±600 gpm based on SOR

Filtration, Ultrafiltration (347)	• Description: Membrane filter skids using submerged polyvinylidene fluoride (PVDF) hollow fiber membrane modules
	• Number of trains: two (1) in parallel
	• Skid Model: USFilter Axia CMF-S 48S10V
	• Filter Module Models: Evoqua Memcor S10N
	• Number of membrane modules per skid: 48
	• Nominal membrane pore size: 0.04-micron
	• Membrane surface area:
	  ○ Per module: 302 sq ft
	  ○ Per skid: 14,~~496~~500 sq ft
	• Rated capacity:
	  ○ Filtrate flow: 350 gpm per filter skid based on 2004 design parameters
	  ○ Design flux @ rated capacity: 35 gfd
	  ○ Maximum flux: Refer to Condition of Approval No. 2
	• Filtrate pumps
	  ○ Number: 1 per skid
	  ○ Type: end suction centrifugal
	  ○ Capacity: 775 gpm @ 140-ft TDH
	  ○ Location: skid mounted
	• Filtrate storage tanks:
	  ○ Number: 1 per skid
	  ○ Type: fiberglass reinforced plastic
	  ○ Capacity: 325 gallons
	  ○ Location: skid mounted
	• Cross connection control: filtrate piping block and bleed assemblies
	• Backwash:
	  ○ Type: air scour with liquid
	  ○ Water Supply: filtrate storage tank
	  ○ Discharge: to backwash pond and to Colorado River under discharge permit COG641112

Membrane Clean-in-Place Chemical Feed Systems	• Chemical Feed: sodium hypochlorite (NaOCl)
	  ○ Type: Delivered, stored and administered as liquid, dilution via CIP makeup water (design basis: 12.5% sodium hypochlorite)
	  ○ Chemical transfer: manual operation of chemical transfer pump to deliver chemical to skid mounted filtered water tank for CIP process
	  ○ Chemical Storage: 55-gallon drum
	  ○ Secondary containment: spill containment pallet
	• Chemical Feed: citric acid
	  ○ Type: Delivered, stored and administered as liquid, dilution via CIP makeup water (design basis: 50% citric acid)
	  ○ Chemical transfer: manual operation of chemical transfer pump to deliver chemical to skid mounted filtered water tank for CIP process
	  ○ Chemical Storage: 55-gallon drum
	  ○ Secondary containment: spill containment pallet
	• Chemical Feed: sodium sulfite ($Na\,SO_3$) for dechlorination prior to discharge
	  ○ Type: Delivered, stored and fed as solid (design USA Blue Book

	dechlorination tablets) ○ Chemical transfer: tablets placed in net bag in inlet of CIP Neutralization Vault ○ Chemical Storage: 45-lb bucket with threaded lid from supplier ○ Secondary containment: none • CIP Neutralization Vault ○ Description: cast-in-place concrete vault located below grade and part of WTP building foundation (no common wall with clearwell) ○ Volume: 830 gallons ○ Appurtenances: 12-inch diameter overflow to backwash pond, pumped discharge to sanitary sewer
Inhibitor/Sequestering Agent, Phosphate Based (815)	• Chemical Feed: liquid ortho/polyphosphate blend • Treatment goal: iron and manganese sequestration • Type: Delivered, stored as dry chemical and fed as liquid, (design basis: SeaQuest) • Feed Pumps: ○ Type: peristaltic (design basis: Blue-White FlexFlo A1N20V-6T) ○ Number: two (2); one for each filtration train ○ Capacity: 24 gpd • Chemical Storage: One (1) 50-gallon polyethylene tank • Cross connection control: dilution water provided from house water system with RPZ device and air-gap fill into batch tank • Secondary containment: none • Injection point: into filter effluent on each membrane filtration skid prior to combined filter effluent piping • Mixing: pipeline turbulence • Control: Flow paced chemical feed based on filtered water flowrate
Disinfection, Hypochlorite (421)	• Chemical feed: calcium hypochlorite • Type: Delivered, stored as dry tablets (design basis: Accu-Tab SI; 68% calcium hypochlorite) • Description: Type: tablet chlorinator capable of delivering 12 lbs free chlorine per hour into an onboard solution tank (design basis: Accu-Tab Power Pro model 3150) • Feed Pump ○ Type: multi-stage centrifugal (design basis: Grundfos CR 5-3) ○ Number: one (1) ○ Capacity: 30 gpm at 65-ft TDH • Number of pumps: 1 • Chemical Storage: one (1) 92-gallon skid mounted batch tank • Cross connection control: make-up water provided from house water system with RPZ device • Secondary containment: none • Injection point: combined filter effluent pipe prior to discharge into clearwell • Mixing: turbulence in pipeline • Control: automatic, variable speed control based on target clearwell chlorine residual

Disinfection, Contact Time (825)	• Type: fixed volume contact tank
	• Description: WTP clearwell with polyester baffle curtains; Refer to Condition of Approval No. 3
	• Dimensions & Volume:
	  ○ Floor area: 582 sf
	  ○ Minimum depth: 8.83-ft (height of weir wall at clearwell outlet)
	• Minimum volume: controlled by weir; re: Condition of Approval No. 1
	• Baffle Factor: 0.6; based on L:W ratio of 26.3:1 using Figure 4.17 of American Water Works Association Research Foundation Improving Clearwell Design for CT Compliance
	• Water Level/Volume Control: Water level is controlled by a concrete weir wall at the outlet end of the clearwell. Water level is measured via a hydrostatic level sensor and monitored/recorded via WTP SCADA system.
	• Appurtenances: polyester baffle curtains, Inlet pipe at bottom of tank at southwest corner, 30"x30" hinged manway hatch; chlorine sample pump located near clearwell inlet.

House Water System	• Description: -water supply for potable and non-potable process supply purposes. Supplied by tap on high zone distribution pump discharge piping. • Cross connection control: potable water provided from house water system with RPZ device
High Zone Distribution Pumps	• Number: two (2) • Type: vertical turbine • Capacity, each: 700 gpm @ 337-ft TDH • Location: installed in below-grade wetwell located immediately downstream of and adjacent to clearwell weir wall

Monitoring Locations	• Combined Raw Source Sample (CRS005): grab sample obtained from raw water piping inside WTP immediately prior to microscreen strainer
	• Turbidity:
	  ○ Combined Filter Effluent (CFE)
	  ▪ Sampling Location: tap on combined filter effluent piping downstream of phosphate based sequestering agent feed and upstream of chlorine injection (Refer to Design Criteria Deviation No. 1)
	  ▪ Instrumentation design basis: continuously monitored via Hach TU5300sc turbidimeter with Hach sc200 controller
	  ○ Individual Membrane Unit(IMU):
	  ▪ Sampling Location: taps on individual filter effluent piping
	  ▪ Instrumentation design basis: continuously monitored via Hach TU5300sc turbidimeter with Hach sc200 controller
	• Entry Point Chlorine Residual, pH and temperature
	  ○ Sample Location: sample point is located on high zone distribution pump discharge piping prior to piping exiting the building
	  ○ Instrumentation design basis: continuously monitored via Hach CL17sc chlorine analyzer with Hach sc200 controller
	• Flow Measurement for disinfection compliance monitoring: Flow entering the clearwell is measured by 6-inch electromagnetic flowmeters (on each membrane filter skid). The flowrate of filtered water entering the clearwell is the sum of flows measured by these flowmeters.

Approach to Achieving Adequate Disinfection (Log-Inactivation or Minimum Chlorine)	Minimum Chlorine

Additional Sample Locations	• Raw water turbidity:
	  ○ Sample location: sample tap located on raw water line prior to coagulant feed point
	  ○ Instrumentation design basis: continuously monitored via Hach Surface Scatter 7 SC turbidimeter with Hach sc200 controller
	• Clearwell influent chlorine residual:
	  ○ Sample Location: sample pump located near clearwell inlet
	  ○ Instrumentation design basis: continuously monitored via Hach CL17sc with sc200 controller

Deviations from the Colorado Design Criteria for Potable Water Systems (Design Criteria)	
Deviation No. 1	CDPHE Design Criteria 2.10.d.ii requires the combined filter effluent (CFE) sample point be located as close as practical to the point at which filtered water from multiple filters commingles and prior to any chemical feed. The existing facility is configured for the phosphate based sequestering agent to be fed on the filtrate piping from each filter skid prior to the filtered water combining. As such, the CFE sample point is located downstream of this chemical feed. There is negligible reaction time in the piping between the chemical feed point and the CFE sample point and the sequestering agent is not expected to introduce or create particulate matter in this setting. Therefore, the existing CFE sample point is approved as located. Any future modifications or improvements to the filter effluent piping must be in conformance with all aspects of current Design Criteria for combined filter effluent sampling.
Conditions of Approval	

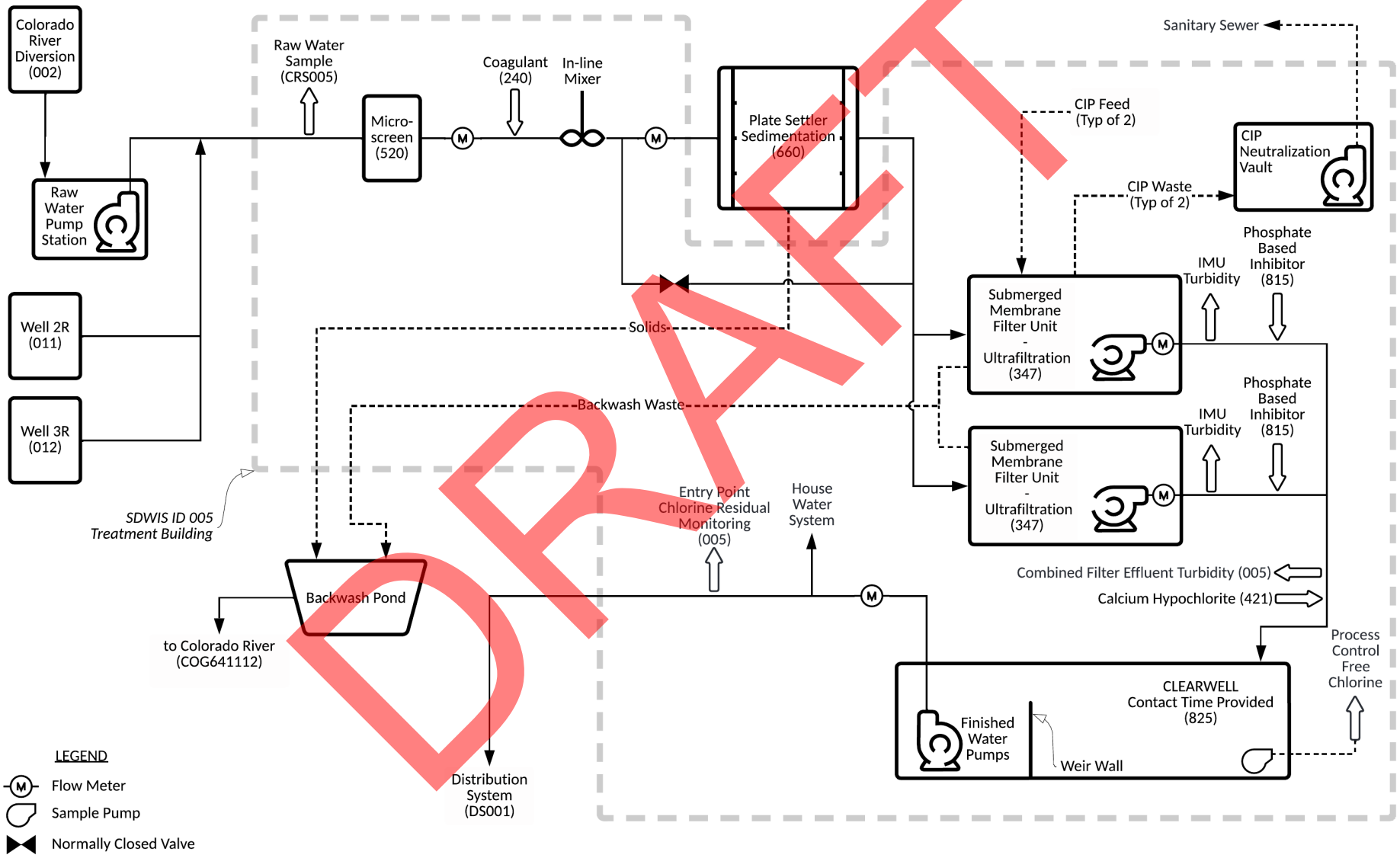
Condition No. 1	Per filtration credits identified above, the Supplier is required to continuously provide a minimum of 4.0-log virus inactivation by disinfection. Pursuant to Section 11.1(6), to demonstrate adequate disinfection and compliance with Section 11.8(3)(b)(i)(A) of Regulation 11, the Supplier must:
	A. Continuously maintain a **minimum free chlorine residual of 0.4 mg/L** at the entry point sampling location assuming:
	  i. Maximum peak hour flowrate of 700 gpm entering the clearwell
	  ii. Maximum pH: 9.0
	  iii. Minimum temperature: 0.5 deg C
	  iv. Minimum clearwell volume/level: 38,500 gallons (8.83-ft level)

Condition No. 2	A. The Supplier must continuously meet the design, performance, and operation and maintenance requirements established in Section 4.3.8 of the Design Criteria (effective December 15, 2017) B. The following are required by the Department's Membrane acceptance letter titled *Acceptance of the Evoqua Memcor S10N Membrane Modules an Alternative Filtration Technology for meeting Colorado Primary Drinking Water Regulations(CPDWR) requirements for Giardia lamblia and Cryptosporidium Removal* dated October 29, 2019 (or most recent version: i. Turbidity Performance Standards: Combined Filter Effluent (CFE) turbidity of less than or equal to 0.1 NTU 95% of the time; never to exceed 0.5 NTU. Turbidity data shall be monitored and reported to

	the department in accordance with the requirements of Regulation 11. ii. Direct Integrity Testing Frequency: 1X per calendar week that the membrane is in operation and immediately following a chemical clean in place (CIP). CIP and Integrity testing records subject to Department review during sanitary surveys. C. The following operating criteria must be met: i. Maximum membrane inlet pressure: n/a ii. Maximum transmembrane pressure (TMP) differential: 12 psi (vacuum) iii. Minimum direct integrity test pressure (starting pressure): 15 psi iv. Direct integrity testing failure criteria: >1.5 psi per minute decay
Condition No. 3	The baffle curtains in the clearwell are integral to ensuring adequate chlorine contact time for pathogen inactivation. Therefore: A. The integrity of the baffle curtain assembly must be inspected and confirmed at least once every five (5) years. Tank entry, baffle curtain system inspection methods, and documentation are expected to be similar to that defined by Regulation 11.28 as a "comprehensive inspection". B. The Supplier of water must document the inspection procedure as well as the integrity and condition of the entire baffle curtain assembly/support structure to confirm its ability to prevent short circuiting of flow within the clearwell. C. Records of baffle curtain system inspection procedures and results are to be maintained and are subject to Department review during sanitary surveys.

Treatment Process Schematic

(005) Membrane Plant SWTP02



Distribution System Details

Distribution System ID	DS001
Overall Distribution System Description	
Minimum Distribution System Class/ basis	Class 2 Distribution System, per Regulation 100.8.2(a) • Four (4) pressure zones and population between 3,301 - 25,000
Distribution System Appurtenances	
No. of Pressure Zones	4
No. of Distribution System Pump Stations	2
No. of Pressure Reducing Valves	
Typical Pressure Range	40 – 110 psi
Flushing Protocol	

Storage Tank Details

Tank ID/ Name	(006) Main Tank
Description	Type: circular, at grade Material: steel, steel Inside diameter: 77’-0” Sidewall height: 24’-0”
Tank Volume (gallons)	836,000 gallons
Operating Volume (gallons)	
Tank Residence Time/ Turnover Info	
Tank Appurtenances	
Deviations from Design Criteria: None	
Conditions of Approval: None	

Tank ID/ Name	(007) Sunrise Tank 1
Description	Type: circular, at grade Material: steel, steel Inside diameter: 68’-0” Sidewall height: 24’-0”
Tank Volume (gallons)	652,000 gallons
Operating Volume (gallons)	
Tank Residence Time/ Turnover Info	
Tank Appurtenances	
Deviations from Design Criteria: None	
Conditions of Approval: None	

Tank ID/ Name	(008) Mesa View Tank
Description	Type: circular, at grade Material: steel, steel Inside diameter: 43-6” Sidewall height: 24’-0”
Tank Volume (gallons)	267,000 gallons
Operating Volume (gallons)	
Tank Residence Time/ Turnover Info	
Tank Appurtenances	
Deviations from Design Criteria:	
Conditions of Approval:	

Tank ID/ Name	(013) Sunrise Tank 2
Description	Type: circular, at grade Material: steel, steel Inside diameter: 34’-0” Sidewall height: 24’-0”
Tank Volume (gallons)	163,000 gallons
Operating Volume (gallons)	
Tank Residence Time/ Turnover Info	
Tank Appurtenances	
Deviations from Design Criteria:	
Conditions of Approval:	

231 N. 7th Street / P.O. Box 70 / Silt, CO 81652
Phone: 970-876-2353 / Fax: 970-876-2937

December 28, 2022

Board of Directors
Colorado Water Resources and Power Development Authority
1580 Logan Street, Suite 620
Denver, CO 80203

Re: Determination of Disadvantaged Community Status-Silt, Colorado

Dear Members of the CWRPDA Board of Directors,

The Town of Silt is respectfully requesting the determination of "disadvantaged community status", despite having fallen short in meeting the standard program criteria. We contend that our Town is truly disadvantaged based upon the totality of current and past circumstances.

Description: The Town of Silt, incorporated in 1915, (2021 population 3,581) is a rural community located three hours west of Denver on Interstate 70. US Highway 6 also serves as Silt's Main Street.

Employment: Of those in Silt who work for a living, more than 90% commute out of town. Some go to the neighboring cities of Rifle (10 minutes) and Glenwood Springs (20 minutes) to work, but many continue on to Grand Junction in the west (1 hour and 9 minutes) and the resorts in Pitkin County (Aspen, 1:22, Snowmass Village, 1:15) and Eagle County (Vail, 1:17 and Beaver Creek, 1:06). The time spent commuting is, of course, not the only hazard since Colorado's mountain climate makes driving hazardous during several months of the year. The natural barriers of DeBeque, South and Glenwood Canyons contribute to these hazards.

With the dramatic decline in the oil and gas industry in our neighborhood, high incomes have been replaced with the relatively lower hospitality and construction wages. Several oil/gas field operating companies owned or leased office and warehouse space in Silt. Nearly all of those companies have liquidated and left over the last four years, leaving many thousands of vacant square feet of warehouse and office space. Also shuttered were two hardware stores, one for the general public and the other specializing in industrial applications, and one small specialty grocery store.

Obviously, those commuting such distances are more vulnerable to the ebbs and flows in the fuel market. Another impact on household fuel budgets is the fact that there are no grocery stores in Silt. Rifle and New Castle, seven miles to the east have full-service groceries.

Housing costs, while certainly less expensive than our up-valley neighbors, have increased dramatically over the last two years, settling now at about 30% higher.

Economic Development: While the Town of Silt has enjoyed significant sales tax increases over the last several years, almost solely a result of the requirement that on-line retailers pay sales tax on sales generated in Silt, these funds are severely restricted in their use for water enterprise fund purposes and little will be available in the support for this water plant project.

Rifle, New Castle and Glenwood Springs have had success in bringing significant economic development to the region, but these benefits do not generally extend to Silt. Located fully within a census tract that was designated as an Opportunity Zone, Silt would seem to be poised to have more growth than has come its way. The two projects that have benefitted from the OZ (that we know of) are a 96-unit apartment complex (under construction) and a highway convenience store, completed about three years ago.

Significant interest in economic development exists within the community as the Town struggles to grow its offerings of services. A new challenge has now cropped up in the form of water treatment capacity.

Domestic Water: The Town of Silt's Water Enterprise serves 1,379 residential and commercial customers. Fewer than 30 of these accounts, including Coal Ridge High School are outside of Town limits. Silt has an irrigation utility, established in the 1990's, that serves the majority of irrigation needs for those who live in Town. The Town also provides three bulk water stations that serve many subdivisions and homes outside of Town in unincorporated Garfield County. Silt has domestic water rights to support a population of more the twice its current size. Water for the plant is drawn from the Colorado River.

Domestic Water Challenge: Silt's water treatment plant was built new in 2005 with technology thought to be "cutting edge" microfiltration. The Town has not been able to afford the additional "pre-treatment" required of a plant drawing from the turbid Colorado River. As a result, the plant now needs near total replacement.

Impacts of the Grizzly Creek Events: Add to this the significant events of the summers of 2020 and 2021: the Grizzly Creek Fire and resulting mudslides. Debris flows in the Colorado River were increased almost overnight. Due to this, the Town saw decreased treatment capabilities and life expectancy from primary treatment filters.

The combination of a poorly designed plant and natural disasters have pushed Silt's drinking water situation to the breaking point.

Town Process: The Town has contracted with Dewberry Engineers, a nation-wide engineering consulting firm to understand Silt's issues and recommend solutions. After a thorough process, Dewberry has recommended $28 M fix. Dewberry has been contracted now as design engineer and to help Silt through the State Revolving Fund loan application process.

The Town has sought to involve its citizens for the last many months in this process. Significant concern has been raised by folks and the Mayor Pro Ten exclaimed that "the Town can't afford this", when told of the estimated price tag. At this point in the process, the financial modeling shows that an average monthly water bill will increase from $50 to $150.

Conclusion: It is for these reasons that the Town hopes to be designated a "disadvantaged community" and given the maximum amount of loan forgiveness.

The Town appreciates this opportunity to provide the Board with additional information and data which may fall outside of the standard criteria for the determination of disadvantaged community. The designation would provide the Town of Silt an opportunity to obtain reasonable funding for the necessary replacement of the Town's water plant.

Sincerely,

Jeff Layman
Town Administrator

jlayman@townofsilt.org
970.876.2353

TOWN OF SILT
RESOLUTION NO. 4
SERIES 2023

A RESOLUTION OF THE BOARD OF TRUSTEES OF THE TOWN OF SILT, ACTING BY AND THROUGH ITS WATER/WASTEWATER ENTERPRISE FUND, DECLARING ITS OFFICIAL INTENT TO REIMBURSE ITSELF WITH PROCEEDS OF A FUTURE BORROWING FOR CAPITAL EXPENDITURES TO BE UNDERTAKEN BY THE TOWN OF SILT; IDENTIFYING THE CAPITAL EXPENDITURES AND THE FUNDS TO BE USED FOR SUCH PAYMENT; AND PROVIDING CERTAIN OTHER MATTERS IN CONNECTION THEREWITH.

WHEREAS, the Town of Silt, acting by and Through Its Water/Wastewater Enterprise Fund (the "Town"), in the County of Garfield and the State of Colorado (the "State"), is a political subdivision duly organized and existing pursuant to the constitution and laws of the State, and

WHEREAS, the Board of Trustees of the Town (the "Board") is the governing body of the Town and each of its members has been duly elected and qualified; and

WHEREAS, the Board has determined that it is in the best interest of the Town to make certain capital expenditures which generally consist of water plant improvements (collectively, the "Project); and

WHEREAS, the Board has been in contact with and made application to the State of Colorado Drinking Water Revolving Fund ("DWRF") and the Colorado Water Resources and Power Development Authority in regard to the availability of a loan to fund the Project; and

WHEREAS, the Board intends and reasonably expects that the Town will borrow funds to finance the Project; will use a portion of such borrowed funds to reimburse the Town for capital expenditures paid or to be paid no earlier than 60 days before the date hereof; and will make such reimbursement no later than 18 months after the later of (a) the date the expenditure is paid or (b) the date the Project is placed in service (but in any event no more than 3 years after the date the expenditure is paid); and

WHEREAS, the Board desires to declare its official intent, pursuant to Treasury Regulations Section 1.150-2, to reimburse the Town for such capital expenditures with proceeds of one or more future borrowings by or on behalf of the Town.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE TOWN OF SILT THAT:

1. The Town hereby declares its reasonable official intention to incur indebtedness for the Project and to apply a portion of the proceeds thereof to reimburse the Town for the prior payment of capital expenditures for the Project.

2. The statements contained in this Resolution with respect to the reimbursement of the expenditures described in this Resolution are intended to be statements of official intent as required by, and in compliance with, Treasury Regulations Section 1.150-2.

3. The expenditures to be reimbursed pursuant to this Resolution have been paid within 60 days prior to the date hereof or will be paid on or after the date hereof (in each case from funds that are not proceeds of a borrowing) in connection with the Project.

4. The maximum principal amount of obligations expected to be issued for the Project is $28,000,000.

5. The Town reasonably expects to reimburse the expenditures described in this Resolution with the proceeds of debt to be issued subsequent to the date hereof, but this Resolution does not constitute a binding obligation with respect to the issuance of such debt.

6. This Resolution shall take effect immediately.

APPROVED AND ADOPTED by the Board of Trustees of the Town on this 9th day of January, 2023.

(Seal)

_____

Keith B. Richel, Mayor

ATTEST:

_____

Sheila M. McIntyre, Town Clerk

Karp Neu Hanlon PC
ATTORNEYS AT LAW

www.mountainlawfirm.com

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Direct Mail to Glenwood Springs

ATTORNEY CLIENT PRIVILEGED

MEMORANDUM

DATE: January 17, 2023

TO: Mayor and Board of Trustees, Town of Silt

FROM: Karp Neu Hanlon, P.C.

RE: Dewberry Contract

In November, the Board approved a contract with Dewberry for deign services related to a new water treatment plant. The parties worked quickly to reach agreement on terms for a contract due to submittal deadlines in January in order to qualify for federal funds. The January deadline has now been extended to June. The Board has the ability under the Agreement to reexamine its situation with Dewberry and, if desired, go a different direction. Section 14 of Attachment B to the Dewberry Agreement permits either party to "terminate the Agreement upon 30 days notice." If the Town were to terminate, it would owe Dewberry "for our Services rendered and expenses incurred through the termination date, including fees and expenses that we incur as a result of the termination."

This memorandum is not intended to indicate that Staff believes termination of the Agreement is in the best interest of the Town. Dewberry now has substantial background knowledge about the Town's water situation that a different water engineer would be required to obtain (at the Town's expense). That said, the opportunity to terminate the Agreement does exist if the Board desires to discuss the option.

Silt Water Treatment Plant Planning Information and Documents

- **Board of Trustees Meeting Memos**
    -
- **Dewberry Engineering Documents**
- **Silt Water Treatment Plant in the News**

December 1, 2021

Silt water treatment plant feeling effects of Glenwood Canyon mudslides months later

https://www.postindependent.com/news/silt-water-treatment-plant-feeling-effects-of-glenwood-canyon-mudslides-months-later/

December 14, 2022

Filtration Issues Prompt Silt to Consider 277% Water Bill Hike to Pay for New Plant

https://www.postindependent.com/news/filtration-issues-prompt-silt-to-consider-277-water-bill-hike-to-pay-for-new-plant/

December 28, 2022

West GarCo 2022 in review: Silt's water treatment center on the fritz

https://www.postindependent.com/news/west-garco-2022-in-review-silts-water-treatment-center-on-the-fritz/

EXTERNAL MEMORANDUM

To: Desi Santerre
Water and Wastewater Program Manager
Colorado Department of Local Affairs
1313 Sherman Street, Room 521
Denver, CO 80203

cc: Job File - W0317.23013.001

From: Doug Schwenke – Principal Engineer
Stephanie Schwenke – Project Engineer
RESPEC
5540 Tech Center Drive, Suite 100
Colorado Springs, CO 80919

Date: May 1, 2023

Subject: Town of Silt – Water Treatment Plant Master Plan / PNA Review and Response

BACKGROUND

RESPEC serves as the technical engineering contractor for the Colorado Department of Local Affairs (DOLA) Small Community Water and Wastewater Project Development Assistance Program. RESPEC has been tasked by the Town of Silt (Town) through DOLA's Northwest Regional Manager, Dana Hlavac to conduct a review of the Town of Silt's Master Plan, Project Needs Assessment (PNA), and other supporting documentation regarding a potential expansion and upgrade to the Town's potable water system. Specifically, the Town of Silt has experienced operational and capacity problems with the sedimentation, filtration, control, disinfection, and maintenance systems at its existing water treatment plant. The above-mentioned planning documents have been prepared by Silt's consultant engineer to evaluate the existing water treatment plant, identify issues with the existing water treatment plant, develop and analyze alternatives to address the issues identified at the water treatment plant, and select an appropriate alternative to solve the identified problems. At its root, the estimated project cost of approximately $30 million for the selected alternative can be considered high, especially if the Town of Silt anticipates servicing debt to support the estimated costs over a current constituency of 3,400 users. The Town of Silt has asked RESPEC to review planning documents and other supporting documents to determine if the proposed alternative is viable, and if the associated costs are within reason. In addition, the Town has asked RESPEC to consider and suggest any alternative treatment options, raw water source options, phasing options, or other opportunities that may help reduce the projected costs of the treatment plant solution. Note that as part of the Project Development Assistance Program, RESPEC cannot complete or prepare any specific engineering

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documents or evaluations, but can suggest potential alternatives, opinions, and recommendations which the Town and its Consulting engineer can consider and further evaluate.

DOCUMENTS REVIEWED

In preparing this document, RESPEC reviewed the following documents:

- Town of Silt Water Treatment Plant Master Plan, Dewberry Engineers Inc., December 2022.
- Town of Silt Project Needs Assessment for CDPHE Water Quality Control Division, Dewberry Engineers Inc., November 2022.
- CDPHE Project Needs Assessment Review Letter, DWRF Project No. 210320D-Q, Garfield County, PWSID #CO0123710, January 4, 2023.
- Silt Water Treatment Plant Informational Video, YouTube, December 28, 2022
- CDPHE DOVE Site Visit Notes, December 27, 2022, following site visit to Town of Silt on December 21, 2022
- Town of Silt 2022 Monitoring Schedule
- Town of Silt 2022 Cross Connection Control Plan
- Town of Silt Designation of Duties and Staffing Plan, 2022 by Dewberry Engineers, Inc., December 2022
- Town of Silt CDPS Industrial General Water Treatment Plant Discharge Permit, January 5, 2006
- Town of Silt Potable Water System Distribution Map
- Town of Silt Project Area Maps, Wetlands Map, and Floodplain Map
- Town of Silt Environmental Checklist and associated supporting documentation by Dewberry Engineers, Inc., December 2022
- Town of Silt Summary of Water Rights, E-mail by Michael J. Sawyer, Karp, Neu, Hanlon Attorneys at Law, to Trey Fonner, Public Works Director for the Town of Silt on August 27, 2022

EXISTING WATER TREATMENT PLANT AND PROCESSES

The existing water treatment plant was constructed in 2005 and treats two sources of raw water. The first raw water source is two alluvial wells that have been classified as Ground Water Under the Direct Influence of Surface Water (GWUDI). The second water source is surface water drawn from the Colorado River. Both sources require Silt to employ surface water type treatment. Water treatment is achieved using a microfiltration process with an associated plate settler to reduce turbidity prior to microfiltration. The water treatment plant is rated for a capacity of 1.0 Million Gallons per Day (MGD). However, due to treatment and backwashing limitations, the estimated capacity of the water treatment plant is closer to 0.60 MGD. Raw water is pumped to the water treatment plant via an intake structure located on the banks of the Colorado River or brought in from the two alluvial wells. Prior to sedimentation, the raw water is strained and metered. Following preliminary treatment, Clarifloc C1400 is dosed into the raw water at a concentration of 10 ppm to aid in coagulation and flocculation. The coagulant is mixed in-line using a flash mixer, and then sent to a plate settler for sedimentation and reduction of turbidity. Following sedimentation, treatment is achieved using two microfiltration membrane units. The microfiltration membranes require backwashing and membrane cleaning to ensure that the membranes do not foul. In addition, the membranes also go through leak testing to determine which membranes need to be replaced. Backwash is sent to an adjacent backwash holding pond, which is covered by a CDPS discharge permit through the Colorado Department of Public Health and Environment (CDPHE). Finished water from the

membrane filters is disinfected through a calcium hypochlorite tablet feed unit, with chlorine contact time achieved through a serpentine concrete chlorine contact chamber located below the treatment building. Following disinfection, water is sent to a finished water wet well where it is pumped into distribution using two vertical booster pumps. Throughout the distribution system, there are four storage tanks providing 1.8 MG of equalizing storage. However, the 0.15 MG tank is down, so there currently is only 1.68 MG of equalizing storage available.

The water treatment plant has been evaluated twice by two different engineering firms. The first evaluation occurred in 2010 and was conducted by SGM, while the second occurred in 2022 and was conducted by Dewberry Engineers, Inc. In addition, CDPHE also conducted a field visit reviewing the condition of the water treatment plant in December of 2022 as part of their Disinfection Outreach and Verification Effort (DOVE). Overall, as Silt is fully aware of, each evaluation has identified issues with the water treatment plant and associated processes that merit a renovation or full replacement of the facility. These identified issues include, but are not limited, to the following:

- Raw water system is not automatically controlled and can produce excess water that is not treated by the water treatment plant. Provision of controls to optimize raw feed to the water treatment plant should be considered.
- While the alluvial wells have relatively higher iron and manganese, they have substantially lower turbidity. Increased use or expansion of the alluvial well system would alleviate solids loading on the pre-treatment processes and improve surface water filtration.
- The Colorado River can experience high turbidity events during runoff season that can adversely impact the water treatment plant. Expanded use and development of the alluvial wells during runoff season could help alleviate some of the soils loading from the Colorado River.
- The ACH chemical used in conjunction with polymer as part of the Clarifloc coagulant to improve flocculation may be negatively impacting the membrane system, requiring increased cleanings of the microfiltration system. Ironically, CDPHE also recommends that the Silt consider increasing coagulant feed to help settle solids before the plate settler, which could further impact the performance and maintenance requirements of the microfiltration membranes.
- While the flash mixer helps with the mixing of the coagulant prior to the plate settler, the lack of flocculation volume and time does not allow influent raw water to bind with the coagulant. This reduces the plate settlers' ability to settle out solids and increases turbidity into the microfiltration system. Unless the plate settlers settle out well water only, the sedimentation process has a difficult time meeting the desired turbidity of 1 NTU before entering the microfiltration process. This is especially true when the Colorado River encounters runoff and high turbidities in this area.
- The raw water feed prior to the plate settler also lacks the dosing of an oxidant (i.e. pre-chlorination) to help oxidize iron and manganese prior to sedimentation and filtration. As seen later, iron and manganese concentrations in the alluvial wells are elevated and have exceeded the secondary Maximum Contamination Limits (MCLs) in the past.
- The plate settler itself is undersized and is only designed for a maximum flow of 600 gpm (0.86 MGD). While the actual capacity may be sufficient now for average day and peak hour loadings, it will not be sufficient to meet desired hydraulic loadings of 1 MGD.
- The existing raw water strainer and plate settler were repurposed from the previous water treatment plant and have likely served their useful life. Both of these processes should be replaced.
- Because of the issues with occasional high incoming turbidity and incompatible coagulant, the microfiltration membranes need to be cleaned more than originally intended. According to staff operations, backwashing must occur every 20 minutes with manual cleanings occurring

daily. This impacts how long the units can run each day, which can be a significant hinderance during peak day loadings in the summer.

>> The existing automated clean-in-place (CIP) process does not work. This is because the design CIP process uses water heaters to heat the CIP chemicals to appropriate temperatures to support the cleaning, but the water heaters are undersized for the application and do not work. In addition, operations staff does not have time to accommodate the required CIP cleaning to occur every 6-hours during the summer peak demand season. A new and automated CIP process is recommended for the membrane filtration system, or replacement of the existing membrane filtration system has also been suggested.

>> Because the water treatment plant uses membrane microfiltration as its surface water treatment process it does not need to sample for influent Total Organic Carbon (TOC), nor sample for its respective removal rates. Because of the suspect performance and capacity of the microfiltration system, there is potential for the formation of Disinfection Byproducts (DBP). It is recommended that Silt begin testing for influent TOC concentration, effluent TOC concentration, and subsequent TOC removal to assess DBP formation potential in the future.

>> As mentioned before, the existing water treatment plant was intended to be rated for 1.0 MGD, which is associated with the microfiltration membrane system. Each skid has a rated capacity of 350 gpm (0.5 MGD). However, operations believe that the maximum flow that they push through the membranes is closer to 250 gpm to 300 gpm (0.36 MGD to 0.43 MGD). After an evaluation of historical water production, operations, limitations, and demands by Dewberry Engineers, Inc. their estimate is that the true capacity of the water treatment plant is closer to 0.5 MGD to 0.76 MGD, with an average estimate of 0.6 MGD. While this capacity is enough to meet current average day demands of around 0.29 MGD to 0.39 MGD, the facility must run almost 95% of the time to meet peak demands of 0.48 MGD in the summer. Due to CDPHE redundancy requirements, the state would currently rate the average day design capacity of the facility at 0.50 MGD.

>> The current disinfection system is a calcium hypochlorite tablet system that must be manually timed to maintain chlorine residuals of 0.2 mg/L. This method may lead to overdosing of chlorine and make the finished water susceptible to the formation of DBP's. This is especially true being that the effluent concentration of TOC's is unknown. A flow paced liquid chlorine disinfection system is recommended for the efficient dosing of chlorine out of the plant.

>> Influent test results show that the raw water out of the alluvial wells is marginally high in iron and exceedingly high in manganese. Effluent manganese levels from the plant have exceeded the secondary MCL in the past, especially when the alluvial wells are emphasized during low demand periods in the winter. The use of Seaquest has historically masked the impact of these constituents in the distribution system, but the Town of Silt should consider removing these contaminants in the treatment process all together.

>> While the existing chlorine contact chamber has sufficient contact volume and time to meet 4-logvirus inactivation requirements both now and in the future, it may not be able to provide sufficient volume should the Town elect to employ mixed media filtration or should the regulations change. The Town may wish to consider employing UV disinfection or increase the size of the contact chamber. In addition, there is only one serpentine contact chamber, which reduces the Town's ability to pull the chamber down and clean out any settleables or solids. The Town may wish to consider adding a second and redundant contact chamber or tank.

>> The Town may wish to increase the size of its finished water pumping to meet projected future demands.

>> The Town may wish to construct additional finished water storage to meet future demands.

>> The existing backwash pond has not been cleaned or maintained in some time. The pond should be cleaned of existing solids which are tested for Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) before removal.

- It does not appear that the existing facility is in immediate danger of catastrophic failure. This is mainly due to the diligent operations conducted by the Town of Silt staff. However, it is becoming harder and harder for Town of Silt staff to continue production at its current levels due to the issues and limitations mentioned above. In addition, the existing facility does provide a constraint on growth due to its limited design capacity and production capabilities. In addition, some of the processes (i.e. raw water strainer and plate settler) have probably reached the end of their useful life and need replacement.

PROPOSED WATER TREATMENT PLANT IMPROVEMENTS

As mentioned above, Dewberry Engineers, Inc. has completed a Master Plan document for the Town of Silt, evaluating the existing water treatment plant. This report was completed in December of 2022 and proposes alternatives to address the issues with the water plant as summarized above. Dewberry also has completed population growth projections, associated demand projections, potential drinking water regulatory projections, cost estimates, and O&M cost projections as part of the master plan document. Information from the master plan was used to complete a project needs assessment (PNA) which was submitted to CDPHE's Grants and Loans Units as part of a Drinking Water Revolving Fund (DWRF) loan application process to help finance the proposed water treatment plant selected alternative. Currently, the Town of Silt, with assistance from its consulting engineer, Dewberry Engineers, Inc., is putting through a loan application through DWRF requesting $30 million to finance the selected alternative as proposed in the PNA and water treatment plant master plan. The selected alternative and associated project consist of the following:

- New ballasted flocculation system which includes a new coagulant dosing pump, pre-coagulant tank, coagulation tank with mixing, maturation / settling tank with mixing and polymer dosing, settling clarifier with lamella and scraper arm, sand ballast recirculation pumps, and hydrocyclone to separate sand from settled sludge and return ballasted sand back to maturation / flocculation tank.
- New mixed media sand filtration with green sand.
- Combined UV and liquid chlorine disinfection system.
- New raw water strainer and finished water pumping into distribution.
- Two new buildings. One building to house the new ballasted flocculation system, and the other building to house the mixed media filtration system.
- Provision of new Motor Control Centers (MCC), supervisory control and data acquisition (SCADA), and associated programmable logic controllers (PLC) to be located in the new Local Control Center (LCC). All elements associated with the LCC will be housed in the existing water treatment plant building.
- Removal of existing plate settler and plate settler building.
- Removal of solids from backwash settling pond. Removal of solids from pond is assumed to include TENORM sampling and analysis before disposal is initiated.
- Construction of a new 0.5 MG water storage tank.
- This alternative does not include the expansion of the existing alluvial wells or pre-settling pond as Dewberry felt that the return on this $2.5 million initiative did not provide sufficient return on projected flows through the alluvial well system at this time.
- The master plan does not appear to include any upgrades to the existing chlorine contact chamber.

Overall, the intent of the design is to increase capacity of the water treatment plant to 2.0 MGD to meet projected demands in 20-years while meeting full redundancy requirements to enable 1 MGD of

capacity while an entire treatment train is offline for servicing. The overall site has been masterplanned to increase capacity to 3.0 MGD via master planning the site. It should be noted that the PNA and associated master plan did explore other alternatives in addition to the selected alternative described above. These alternatives included the following:

- Consolidation of water supply systems with either Rifle or New Castle.
- Construction of a new solids contact clarifier sedimentation, mixed media filtration with green sand, and UV / liquid chlorine disinfection.
- Construction of a new plate settler sedimentation system, mixed media filtration with green sand, and UV / liquid chlorine disinfection.
- Construction of a new plate settler sedimentation system, microfiltration membrane system, and liquid chlorine disinfection.
- Construction of a new conventional packaged water treatment system which includes coagulation, flocculation, sedimentation, and filtration. The new system would also include mixed media filtration with green sand following the package system, as well as UV / liquid chlorine disinfection.

ADVANTAGES OF SELECTED ALTERNATIVE

The proposed selected alternative addresses most of the issues identified by Dewberry in their water treatment plant master plan, SMG in their 2010 water treatment plant evaluation, and CDPHE's field visit inspection form completed in December 2022. A summary of these advantages is presented below:

- The proposed ballasted flocculation and sedimentation system is extremely robust and should be able to provide sufficient sedimentation and reduce turbidities to below 1 NTU in most raw water situations. The system provides ample flocculation volumes and employs a ballasted sand return system not unlike a secondary clarifier with return activated sludge process for wastewater. However, while this system is likely to succeed in providing adequate sedimentation capabilities ahead of the proposed mixed media filtration unit, it will require an extensive amount of concrete to construct the proposed basins. It is possible that one of the other sedimentation alternatives (i.e. adequately sized vertical plate settler) may require less infrastructure to house this process.
- The selected alternative replaces the existing strainer and plate settler system.
- The proposed mixed media filtration system is a proven method of filtrating surface water that is relatively easy to operate and maintain. These types of systems do not require a CIP process, and media is relatively easy to change out. In addition, mixed media filtration systems such as this can be very forgiving when handling large fluctuations in raw water quality and profiles, such as what can be found in the Colorado River. The existing microfiltration membranes seem to require too much in the way of pretreatment and O&M to consistently and efficiently treat surface water presenting the turbidity levels that the Colorado River does.
- Provision of green sand with the mixed media filtration will assist with the removal of iron and manganese out of the alluvial wells.
- The provision of advanced SCADA to assist with the instrumentation and control (IC) of not only the raw water feed, but also provide real time monitoring and control of the sedimentation, filtration, and disinfection processes.
- Utilizing UV disinfection will help reduce the necessary contact time credits required to accommodate the implementation of mixed media for filtration. This will help with the

adequacy of the existing chlorine contact basin vs. future disinfection requirements and possible expansion.

- Removal of solids from the backwash pond appears necessary, assuming that the existing backwash pond has not been dredged for a long time.
- Expanding the water treatment plant's capacity to 2 MGD positions the Town to accommodate future growth. The proposed treatment process features two treatment trains, each with the ability to provide 1.0 MGD of capacity while the other train is under service. Master planning the site for 3 MGD allows the Town to initiate longer term planning for full development buildout, with water supply accounted for.
- Incorporating a Construction Manager at Risk (CMAR) process is recommended during the construction phase as this type of construction application should help to offset potential increases in construction costs in the future.

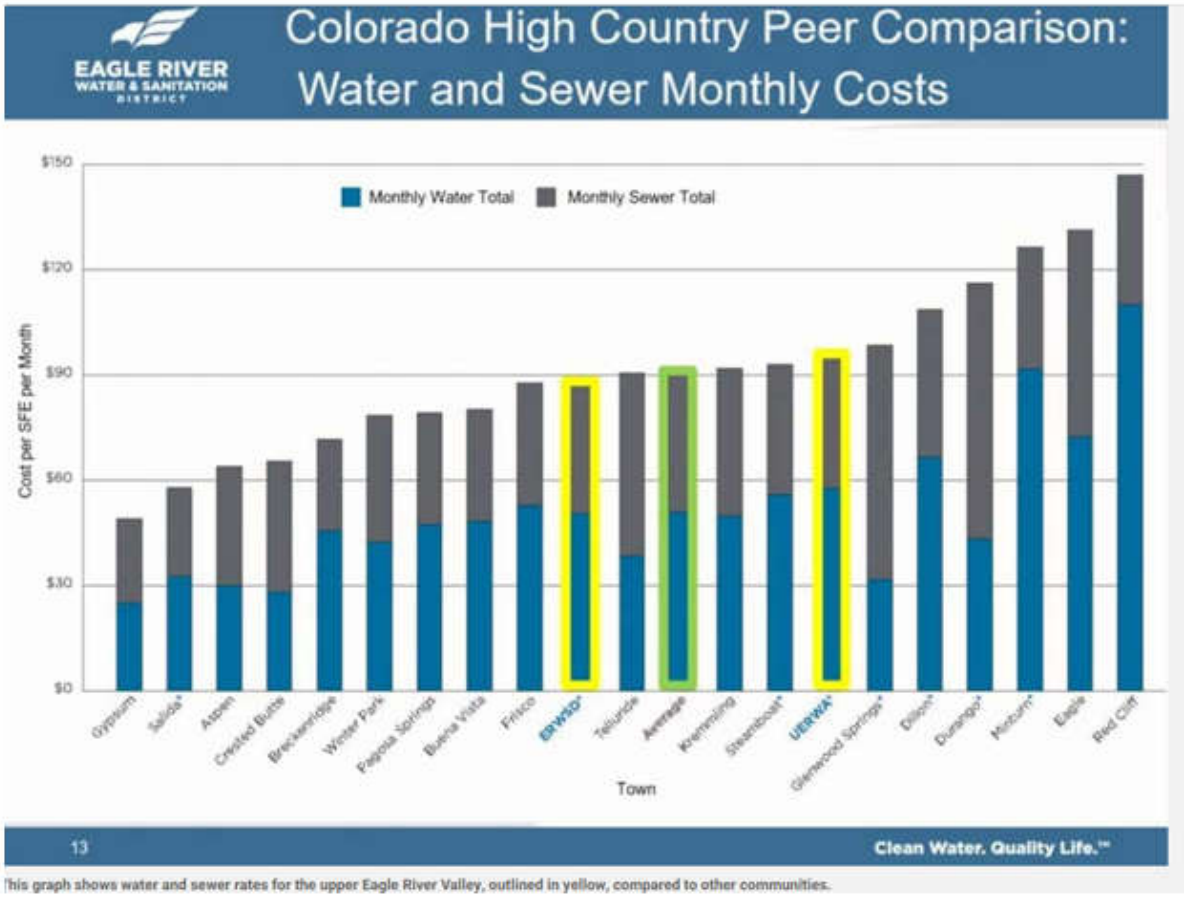
DISADVANTAGES OF THE SELECTED ALTERNATIVE

The main disadvantage of the selected alternative is the overall cost of the project. The estimated cost of $30 million to construct a 2 MGD water plant will ultimately require a loan or financing of some fashion. Electing to go through the State Revolving Fund process is a recommended means of securing this type of funding as the administrative requirements necessary to administer the funding are relatively benign. Also, the ability to qualify for principal forgiveness of up to $5 million through Bipartisan Infrastructure Legislation is an opportunity that was not available through SRF funding just a couple of years ago. This is especially advantageous given that it is likely that the Town of Silt will qualify as a disadvantaged community. However, the ability of the Town to service debt between $25 million to $30 million over a current population of 3,536 individuals (approximately 1,300 users) without significant impact to rate payers can be questioned. In the PNA response letter provided by CDPHE Water Quality Control Division Grants and Loans Unit, the Colorado Department of Local Affairs (DOLA) expressed concern regarding the Town's ability to service this debt with projected tap fee revenue and user fees. Preliminary projections performed by DOLA estimated that the required increase to user fees to service the debt while maintaining a 110% coverage ratio would range between $91.68 to as much as $142.32, depending upon the loan terms and amount of principal forgiveness available through the SRF program. In the December 28, 2022 public meeting presented by the Town of Silt and Dewberry Engineering, Inc., monthly user fees were projected to rise as much as $150 / user/ per month. Increases such as this would put Town of Silt water rates at the upper end of other Colorado High Country water providers in the area (see **Figure 1** on the next page).

As mentioned in the master plan document, many of the residents that live in the Town of Silt actually work in communities such as Aspen and Vail, which are 61 miles and 79 miles away from Silt respectively. The residents of Silt, however, generally cannot afford to live in communities such as Aspen, Vail, or even Glenwood springs, for that matter. However, the potential water rates of Silt may exceed those of the very communities in which they work but cannot afford to live. Therefore, the Town of Silt may need to ask itself if placing the burden of future growth on today's population is a viable means of servicing the debt. As mentioned in the December 28, 2022 video on You Tube, there was mention of being able to spread this debt service over a larger population in the future, thus providing the opportunity to reduce rates as population grows. While this approach appears viable in concept, it is very difficult to assume reductions in user fees over time as it is rare for rates to drop after municipalities become accustomed to this type of consistent revenue to help with operations, maintenance, staffing, financing capital improvement projects, and building reserves. So while the proposed alternative may address the majority of the identified issues at the existing water treatment plant, the costs associated with constructing such a facility may not be able to be supported by a community of this size. Thus, the Town of Silt may wish to reassess the proposed alternative and look

for ways to reduce project costs or increase the amount of potential grant or principal forgiveness opportunities associated with this project.

Figure 1: Colorado High Country Peer Comparison of Water and Sewer Monthly Costs by the Eagle River Water and Sanitation District – 2020 Costs per SFE



This graph shows water and sewer rates for the upper Eagle River Valley, outlined in yellow, compared to other communities.

POTENTIAL CONSIDERATIONS TO REDUCE PROJECT COSTS

Because the failure of the existing water treatment is probably not imminent as observed by CDPHE during their field inspection, and the existing water treatment plant is still able to meet current demands, we would suggest that the Town consider re-evaluating the current selected alternative in an attempt to bring down project costs. While the selected alternative would most likely be successful in addressing the identified issues with the existing water treatment plant, servicing the debt necessary to finance this project over 1,300 users may not be sustainable for the community. Because the plant does pose challenges to the existing operations staff (and the hard work by the operations staff has been identified as the reason that the existing water plant is not due for imminent failure) we would not suggest postponing the project beyond this year. However, we would suggest delaying the submittal of the Basis of Design Report, construction drawings, technical specifications, and SRF loan application until the Town of Silt and the project team are able to value engineer the selected alternative. After reviewing the above documents, RESPEC would like to present the following suggestions that the Town and its consulting engineer may wish to consider as it re-evaluates the currently proposed selected alternative:

- Proposed capacity of selected alternative: While proposing a new water treatment plant with an overall design capacity of 1.0 MGD, and peak capacity of 2.0 MGD sets up the Town of Silt well into the future regarding available water production, the cost to accommodate future growth may not be viable to assign to the current population. And as mentioned previously, DOLA expressed the same concerns about spreading such a large debt service over a limited user base while assuming user rates and tap fee revenue would remain the same as 2021. While the current selected alternative features an estimated peak capacity of 2.0 MGD, and single train design capacity of 1.0 MGD to provide full redundancy at 1.0 MGD, the Town of Silt may not need the level of capacity for quite some time. Demand projections in the water treatment plant master plan seem to indicate that average annual day demands will only reach approximately 0.67 MGD by the year 2042 and peak day demands will only reach approximately 1.21 MGD by 2042, assuming moderate growth over the next 20-years. Therefore, it may be possible to reduce the size of the proposed water treatment plant and its associated processes with this loan request, and then master plan subsequent expansions in a multi-phase approach (i.e., Phase 2 design capacity = 2.0 MGD and then Phase 3 design capacity = 3.0 MGD). This way, additional growth between now and 2042 could help finance additional expansion phases while also building potential reserves to help finance future expansions, if necessary. For now, the Town may wish to consider an average day capacity of 0.75 MGD, and then peak day capacity of 1.5 MGD to meet current demands and position themselves for moderate growth until the year 2035-2040 or so. RESPEC would recommend that the Town of Silt ask its project team how much it would stand to save by reducing the size of the project to 0.75 MGD design capacity (1.5 MGD peak capacity).
- Introduction of water efficient fixtures: While the installation of water efficient toilets, water fixtures, shower heads, and other devices will help with the improvement of the existing water plant, it should reduce water usage in the community. This would be especially helpful should the Town elect to go with a smaller selected alternative, subsequently extending the life of the smaller water plant and delaying the need for a second or third expansion. The use of water efficient fixtures has been prevalent among utilities along the front range and has generally resulted in substantially lower water usage. In the water treatment master plan, Dewberry noted that water usage per capita had actually increased over the last few years in Silt, which is counter to the national trends since the introduction of water efficient fixtures. Being that the Town employs a raw water distribution system for irrigation usage throughout town, domestic usage represents the majority of the demands on the water treatment plant. Therefore, outside of the two developments that use finished water for irrigation purposes, the introduction of more water efficient fixtures for existing homes should help extend the life of the new water treatment plant.
- Water accountability: In the water treatment plant master plan by Dewberry Engineering, Inc. Section 3.1.1. indicated that the amount of unaccounted for water between billings and water produced averaged around 36.3% between the years of 2019 – 2021. According to the American Water Works Association, an acceptable limit for water accountability is 20%, and a preferred range is 5% - 10%. An unaccounted-for water percentage of 36.3% should be considered unacceptable and indicates that there is a significant amount of water loss or unbilled water. RESPEC would recommend that the Town consider conducting an inventory of the Town's metering capability and distribution system, possibly implementing a leak detection effort. Ultimately, as part of the Town's expansion efforts in the future it may wish to identify the most suspect areas of the Town's distribution system in regard to leaks or metering accountability and focus on replacing identified leaky pipes or calibrating suspect meters. Replacing leaking pipes within the distribution system will increase delivered water to customers and subsequently reduce water demand on the water treatment plant. This would

help extend the life of the reduced capacity selected alternative and delay future expansion if the town elected to go this route. Calibrating or replacing meters would help in recovering water revenues should the Town employ tiered or usage-based rates. Either way, it is recommended that the Town further investigate the poor water accountability percentages as part of its re-evaluation of the proposed selected alternative. It is understood that in talking with Town of Silt staff that it is investigating potential water leaks around the distribution system in an attempt to improve water accountability.

>> Project Construction Cost Estimates: The proposed project costs contained in the water treatment plant master plan initially appear to be on the high side. CDPHE's review letter of the PNA also indicated the amount of ambiguity associated with the estimated costs, which indicated cost ranges between -30% to +50%. RESPEC would recommend that the Town of Silt invite a general contractor to review the projected costs contained in the water treatment plant master plan and PNA and corroborate the cost estimates. This may enable the Town to consolidate the estimates to a less ambiguous and more representative level. As mentioned above, the utilization of a CMAR into the design and construction process should help solidify the projected costs.

>> Rate study: In reviewing correspondence with CDPHE, the Town of Silt, and Dewberry Engineering, Inc. it appears that a rate study is being developed to evaluate the impacts of the proposed water treatment plant expansion on existing and future user rates. DOLA has already prepared a very cursory rate evaluation that was included in CDPHE's response to the Town of Silt following their review of the PNA. However, the rate study may indicate how tiered rates or blocked rates may be implemented so that higher water users may be more responsible for the financing of any potential debt service. The Town already employs a type of tiered rate system, so adjusting the tiered rate system following the rate study may encourage additional water conservation and thus extend the life of the proposed or reduced water plant project. However, to implement a robust and comprehensive tiered rate program, the employment of accurate metering is a necessity. So, the bench testing, calibrating, and replacement of inaccurate meters as suggested earlier is imperative for the implementation of a successful tiered or blocked rate program. It is understood that the Town is currently going through a rate study to restructure its tiered rate system.

>> Additional grants: Currently, the Town of Silt is anticipating financing the proposed water treatment plant project through the State Revolving Fund in the form of a Drinking Water Revolving Fund loan. Given that the Town of Silt is most likely considered a Disadvantaged Community (DAC) it will most likely be eligible for principal forgiveness of up to $5.0 million. However, given that the projected price tag for this project is currently estimated at $30 million, it is recommended that the Town consider pursuing additional grant funding or matching grant funding to reduce the amount of debt that needs to be services. While RESPEC agrees that pursuing a grant / loan through the United States Department of Agriculture (USDA) Rural Development (RD) is not recommended due to the elevated administrative and engineering costs required to work through the federal requirements, there are other grant programs in which the Town may wish to consider. And while the planning efforts required to apply for and administer other grants may be involved, the amount of money in which the Town may be able be eligible for could very well offset the administrative requirements. And because of the Town's disadvantaged status, it may prioritize higher for some of the more competitive grants. Note that if the Town would like to pursue potential state funded grants it will need to establish if it can receive state funds according to TABOR. The Town of Silt will want to consult with a bond attorney regarding its TABOR status and have an opinion available for reference. If the Town elects to delay the submittal of engineering documents and loan application to CDPHE

GLU department, it may wish to investigate some of the following grant opportunities (some of which the Town is looking into and has recently secured at this current time):

- Energy Impact and Assistance Fund (EIAF) Tier 2 grant through DOLA
- Colorado River District grants
- Colorado Water Conservation Board for Water Efficiency and Drought Planning Grant Program, Water Supply Reserve Account
- CDPHE Small Communities Grant (when available)
- DOLA Community Development Block Grant for water projects
- U.S. Economic Development Administration Public Works and Economic Adjustment Assistance Program Grant
- Congressional Directed Spending Program, EPA State and Tribal Assistance Grant, Drinking Water (last deadline was March 10, 2023)

>> Value Engineering of selected alternative: It may be possible to review the selected alternative and consider areas where the Town believes it can do without, or at least do with less. Being that the Town currently only has a population of 3,500, the proposed facility should probably reflect the population base. The water treatment plant may still be able to supply high quality water out of the Colorado River using the processes proposed in the selected alternative, but not necessarily need a lot monitoring and control that can accompany the more advanced processes. While the mixed media filtration system probably does not feature a lot in the way of advanced control and monitoring, other processes may be able to "do more with less". Following the review of the water treatment plant master plan and accompanying documentation, RESPEC might suggest looking into the following value engineering opportunities (if the Town and its consulting engineer have not done so already):

- Consolidate both the mixed media sand filtration process and ballasted flocculation sedimentation process into one building. This opportunity was previously suggested towards the end of the water treatment plant master plan.
- Consider replacing the proposed ballasted flocculation sedimentation system with a vertical plate settling system. While the ballasted flocculation sedimentation system may be well intended for an application such as removing highly turbid water from the Colorado River, this type of sedimentation system does require a lot of concrete to construct the sedimentation basin. A properly sized vertical plate settling system with adequate flocculation time should require a smaller footprint and infrastructure to house this type of system while providing adequate pre-treatment ahead of the proposed mixed media filter.
- Take inventory of the proposed SCADA automation and determine if any of the processes could be controlled or operated manually.
- Possibly incorporate the alluvial well expansion now to minimize turbidity to the proposed water treatment plant and conversely reduce sedimentation requirements to the proposed filtration process
- Consider only liquid chlorine for disinfection. This may reduce capital costs but could increase operational and chemical costs in the long run.

FINAL CONSIDERATIONS/RECOMMENDATIONS

A review of the available documentation regarding the condition of the existing water treatment plant indicates that it is in significant need of improvement or replacement. The actual capacity of the facility is not at the same level as the state design rating; there are elements of the existing plant that have reached its useful life; the existing plate settler system cannot adequately reduce turbidity many times

of the year; the existing filtration process does not provide adequate capacity nor is it conducive towards regular maintenance; the existing plant cannot remove iron or manganese; the existing distribution pumping system is undersized; the existing backwash pond needs servicing; and the Town would like to expand the use of the naturally filtered alluvial wells. The existing plant has been evaluated multiple times, and the Town's consulting engineer has proposed an adequate treatment process that is compatible with raw water use out of the highly turbid Colorado River. However, the selected treatment alternative may require costs to construct the project that the current population of Silt may not be able to support, especially if the debt service remains above $25 million. RESPEC recommends that the Town of Silt consider postponing the project so that it can consider and evaluate a portion, if not all, of the recommendations suggested below in an attempt to bring the projected project costs down to a more manageable level for the constituents of the Town of Silt. A summary of these suggestions is provided below:

- Consider reducing the capacity of the water treatment plant while phasing in future expansions (possibly down to 0.75 MGD average day capacity, or 1.5 MGD peak capacity)
- Introduce water efficient fixtures into the community to reduce demand and extend the life of the Phase 1 water treatment plant
- Investigate impacts of water accountability
- Corroborate project cost estimates with a municipal general contractor
- Complete rate study and consider adjusting current tiered rate schedule
- Pursue additional grant funding
- Investigate potential value engineering opportunities regarding proposed selected water treatment plant, especially considering reduced SCADA and plate settler sedimentation rather than the ballasted flocculation system.

FOLLOW-UP MEETING WITH TOWN OF SILT WATER TREATMENT PLANT PROJECT TEAM

On the afternoon of April 28th, 2023 RESPEC met with members of the Town of Silt's project team. Specifically, RESPEC met with the Town of Silt staff, Silt's consulting engineer, Silt's contract operator, and Silt's Construction Manager at Risk (CMAR) to discuss some of the recommendations made in the above report. Prior to the meeting, the Town of Silt's project team had a chance to review the report and digest some of the recommendations as proposed by RESPEC. From the conversation it was evident that the Town and its project team had considered some of the recommendations suggested by RESPEC, or was already actively employing some of the items mentioned above. A summary of the action items currently being employed by the project team in relation to the final considerations suggested above are presented below:

- Reduce capacity of water treatment plant – the project team has looked at reducing the size of the ballasted floc sedimentation equipment and mixed media filter skid from 1 MGD to 0.75 MGD as suggested earlier in this report. The reduction is size for both pieces of equipment results in a rough savings of $210,000. Reducing the equipment capacity also reduces the length of the ballasted floc equipment by roughly 4' and the length of the mixed media filtration by roughly 2'. The reduction in skid sizes does not appear to reduce the footprint size of either piece of equipment substantially enough to realize significant cost savings on the building by reducing equipment capacity.
- Introduce water efficient fixtures into community to reduce overall domestic demands – Town of Paonia staff is looking into this possibility.
- Investigate impacts of water accountability – according to the project team, the belief is that the existing residential meters are not completely accurate and need to either be replaced or recalibrated. A review of the wastewater flows at the WWTP appear to corroborate the production flows at the water treatment plant, indicating that there probably is not a lot of

leakage within the distribution system. However, Town Staff acknowledges that improving meter read capabilities would not only improve administrative water accountability, but also the Town's ability to accurately bill resident's for tiered water usage, improving on revenue collections. The Town is looking into replacing many residential meters while calibrating others as possible.

- Corroborate project cost estimates with a municipal general contractor – The Town of Silt has retained Garney Construction as a Construction Manager at Risk (CMAR) to begin reviewing the constructability of the proposed alternative as suggested in the report. Garney was added to the project team in March of 2023 and has begun reviewing 30% drawings by Dewberry. Current value engineering reviews have centered on the building foundation and weighing the benefits of construction the facility superstructure on shallow foundations with subgrade over-excavation and replacement with non-expansive soils vs. the provision of drilled piers. Other construction variables under consideration include superstructure materials, dewatering procedures, and equipment procurement.
- Complete rate study – The Town of Silt has already initiated a rate study to review its current tiered usage rates for water user constituents.
- Pursue additional grant funding – The Town of Silt has reviewed the preliminary list provided by RESPEC above on page 11 of the draft report and begun reaching out to these prospective funding agencies. In addition, the Town of Silt has also successfully secured a couple of other grants through additional financing avenues.
- Other value engineering opportunities:
  - Review Instrumentation and Control (/C) – the Project Team reviewed the need for automated control of certain elements of the water treatment plant. Overall, the Project Team believes that automated control of the influent pumps, specifically during high turbid events, is extremely important to protecting the plants ability to successfully treat flows during these flash events. Also, the facility is design to run completely independently of operator control for long periods of time, which operations staff feels is important to reduce staff costs and allow the Town to address other issues on the distribution and wastewater side around town. Ultimately, the Project Team feels that the $600,000 budget dedicated to Instrumentation and Control is adequate for properly automating the water treatment plant process.
  - Ballasted Floc vs. Vertical Plate Settling – the Project Team reviewed the potential cost savings of replacing the recommended ballasted floc sedimentation process with a vertical plate settling process, similar to what the Town currently employs at its water treatment plant. The thought being replacing the ballasted floc process with a vertical plate settling process is that it might save on the necessity of cast-in-place concrete to build the ballasted floc basin. However, the Project Team was able to identify a ballasted floc process that did not require the construction of cast-in-place basins, thus reducing the cost of the ballasted floc sedimentation alternative. In the end, the ballasted floc sedimentation equipment and vertical plate settler equipment ended up being similar in price. More importantly, Dewberry Engineering was able to refine the building costs to house the ballasted floc system and reduce projected building costs by $2.3 million. Conversely, Dewberry was only able to reduce building costs for the projected vertical plate settling system by $800,000. Therefore, the value engineering process has already been able to pay dividends due to efforts conducted by the water treatment plant project team.