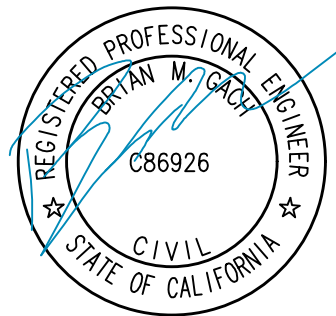


EFFLUENT BLENDING COMPLETION REPORT

TUOLUMNE CITY SANITARY DISTRICT
and
BAKER RANCH

April 16, 2021



4/16/2021

Prepared for:



Prepared by:

FORSGREN
Associates Inc.

Table of Contents

1.	Introduction	1
1.1	Background	1
1.2	Statement of Problem.....	1
1.3	Regulatory Requirements.....	1
1.4	Permit Compliance.....	2
2.	Effluent Blending Project.....	2
2.1	Install Blind Flanges	2
2.2	Install Pump-Back Pipeline.....	4
2.3	Install Flow Meters & Sampling Station	5
3.	Timeline	7
4.	Start-up / Testing.....	7
5.	Operation and Maintenance	7

1. Introduction

This Report documents the cessation of the discharge of unblended effluent from the Tuolumne City Sanitary District (TCSD) wastewater treatment plant (WWTP) at its land application facility near Tuolumne City, California. The following subsections provide background on the land application process, a statement of the problem with this process, the regulatory requirements driving the discharge improvements, and the steps TCSD has taken to comply with the regulatory requirements.

1.1 Background

Undisinfected secondary-treated effluent flowed by gravity from the TCSD WWTP via one 10-inch, and one 6-inch diameter pipeline to Land Application Areas (LAAs) at the Baker Ranch (Ranch), approximately one mile southeast of the WWTP, as shown in Figure 1. The effluent has elevated salinity and nitrate concentrations, and is used to irrigate pastureland for non-dairy animals.

The Ranch includes approximately 114 acres of LAAs, of which about 13 acres are flood-irrigated, and about 101 acres sprinkler-irrigated. The Ranch owns and maintains the irrigation system. A map showing the layout of the LAAs is included as Figure 2.

Grinding Rock Reservoir (Reservoir), which is owned and operated by TCSD, is also located on the Ranch. The Reservoir has a surface area of approximately 640,000 square feet, and a capacity of 98.7 million gallons.

Turnback Creek (Creek) flows from the area of the WWTP through the Ranch. It is seasonal, and is typically dry in the area of the LAAs by the beginning of July, except in wetter years.

Prior to the completion of this project, most of the effluent flowed into the Reservoir, where it was blended with supplemental water from the Creek prior to being used for sprinkler-irrigation over approximately 101 acres of the LAAs. Prior to this project, some of the effluent was applied directly to the land (without blending) by means of flood-irrigation on approximately 13 acres of the LAAs. The unblended effluent was delivered to the flood-irrigation field through two small pipeline segments connected to the 10-inch and 6-inch outfall pipelines.

1.2 Statement of Problem

The California Regional Water Quality Control Board, Central Valley Region (RWQCB) identified the application of the unblended effluent to the 13-acre field as having a potentially negative impact on groundwater due to the elevated salinity and nitrate concentrations.

1.3 Regulatory Requirements

On June 7, 2019 the RWQCB implemented Order R5-2019-0058, Waste Discharge Requirements (WDRs, Permit) for the Baker Ranch (Ranch) and the Tuolumne City Sanitary District (TCSD, District) wastewater treatment plant, rescinding previous Orders for the Ranch and TCSD, and consolidating them into the new Permit. This Permit includes specific provisions which TCSD must implement in a proper and timely manner in order to legally operate, including the following:

1. *Until 1 June 2021*, TCSD must minimize diversion of unblended effluent to the Land Application Areas (LAAs) at the Ranch,

2. *Effective 1 June 2021*, TCSD is prohibited from discharging unblended effluent to the LAAs, and
3. *By 1 June 2021*, TCSD must submit a completion report demonstrating that all treated effluent from the WWTP is conveyed to the reservoir for blending with supplemental water prior to discharge to the LAAs.
4. In order to monitor the quality and volume of blended effluent discharged to the LAAs, two flow meters and a second effluent sampling station must be installed.

1.4 Permit Compliance

To satisfy the provisions of the RWQCB Permit described in Section 1.3, above, TCSD undertook the following actions:

1. To minimize diversion of unblended effluent to the LAAs, TCSD worked with the Ranch to shift more of the irrigation to the spray fields which used the blended effluent, and away from the flood-irrigation field which used the unblended effluent.
2. To eliminate the discharge of unblended effluent to the LAAs, TCSD completed an Effluent Blending Project, as described in detail in section 2.
3. This Effluent Blending Completion Report demonstrates that all treated effluent from the WWTP is now blended before discharge to the LAAs, as required in the third provision in Section 1.3, above.

2. Effluent Blending Project

In planning to eliminate the discharge of unblended effluent to the LAAs, TCSD had two primary objectives:

- Satisfy the provisions of the RWQCB Permit.
- Retain the full 114-acre area of the LAAs so that a) loading to groundwater would not be concentrated in a smaller area, and b) so pastureland available to the Ranch's non-dairy animals would not be reduced.

TCSD completed an Effluent Blending Project that met these objectives by means of three specific steps:

1. Installed two blind flanges needed to direct all unblended effluent to the Reservoir, thereby eliminating direct discharge of any unblended effluent.
2. Installed a pipeline segment to allow blended effluent from the Reservoir to be pumped back to the top of the flood-irrigation field.
3. Installed two flow meters and a second effluent sampling station in order to monitor the quality and volume of blended effluent discharged to the LAAs, and expanded the TCSD SCADA system to include telemetry at the LAAs to automatically transmit flow data.

These project elements are discussed in further detail below.

2.1 Install Blind Flanges

To direct all unblended effluent to the Reservoir, and thereby eliminate the direct discharge of any unblended effluent to the LAAs, TCSD made the following changes:

- Removed the valve and installed a blind flange on the pipe that connects the 10-inch outfall pipeline from the WWTP to the flood-field discharge monument, as shown in

Photos 1 and 2, below, and as depicted in the As-Built drawing C-1. This prevents unblended effluent from the 10-inch pipeline from being discharged to the flood field, and forces all of the unblended effluent to the reservoir.



Photo 1- 6" pipe blind flanged and isolated flood filed monument.



Photo 2 – Section of direct discharge pipe removed and direct discharge pipe blind flanged.

- Removed the 6-in HDPE WWTP supplemental outfall pipeline from service by installing a blind flange in the vault, north of the tee that flows to the discharge monument. This work is shown in Photo 3, below, and is depicted in the As-Built drawing (C-1).



Photo 3 – Cross connection

2.2 Install Pump-Back Pipeline

In order to allow blended effluent from the Reservoir to be pumped back to the top of the flood-irrigation field, TCSD made the following improvements to the irrigation system:

- Installed approximately 1,300 linear feet of 6-inch SDR11 High-Density Polyethylene (HDPE) pipeline from the existing pump station at the toe of the reservoir to the existing 6" C900 spray irrigation feed pipe on the existing 6" C900 pipeline that previously served as a supplemental effluent pipeline from the WWTP. This work is shown in Photos 4 and 5, below, and is depicted in the As-Built drawing C-1.



Photo 4 – New irrigation pipe.



Photo 5 - New irrigation pipe.

- Modified pump discharge piping and valving to connect new 6-inch HDPE pipe. This work is shown in Photos 6 and 7, below, and is depicted in the As-Built drawings C-1 and C-2.



Photo 6 - Modifications to pump discharge piping.



Photo 7 - Modifications to pump discharge piping.

2.3 Install Flow Meters & Sampling Station

In order to monitor the quality and volume of blended effluent discharged to the LAAs, TCSD made the following improvements to the irrigation system:

- Installed flow meter on pump inlet piping, as shown in Photo 8, and as depicted in the As-Built drawing C-2.



Photo 8 – Flow Meter.

- Installed new flow meter as shown in Photo 9, and as depicted in the As-Built drawing C-2.



Photo 9 – Flow Meter.

- Installed a second effluent sampling station, as shown in Photo 10, and as depicted in the As-Built drawing C-2.

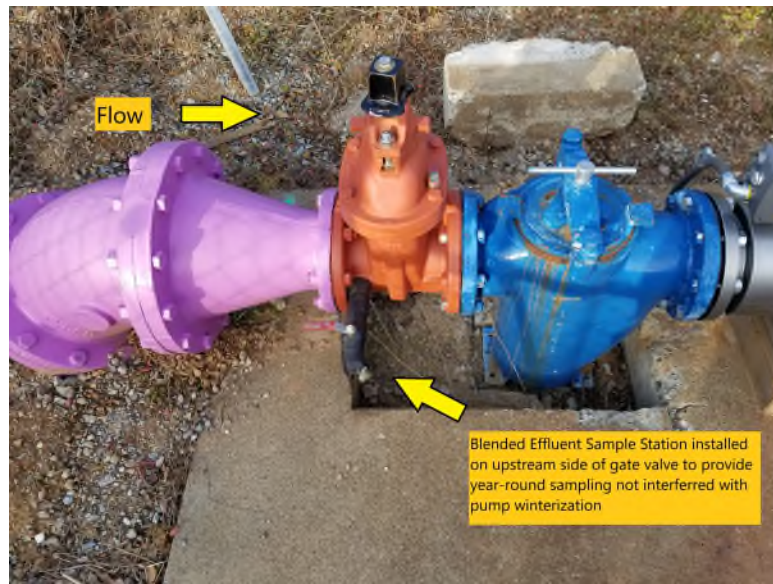


Photo 10 – New effluent sample tap.

- Expanded the TCSD SCADA system to include telemetry at the LAAs to automatically transmit flow data, as shown in Photos 11-14



Photo 11 - New SCADA Cabinet.



Photo 12 - New SCADA cabinet on top of Reservoir.

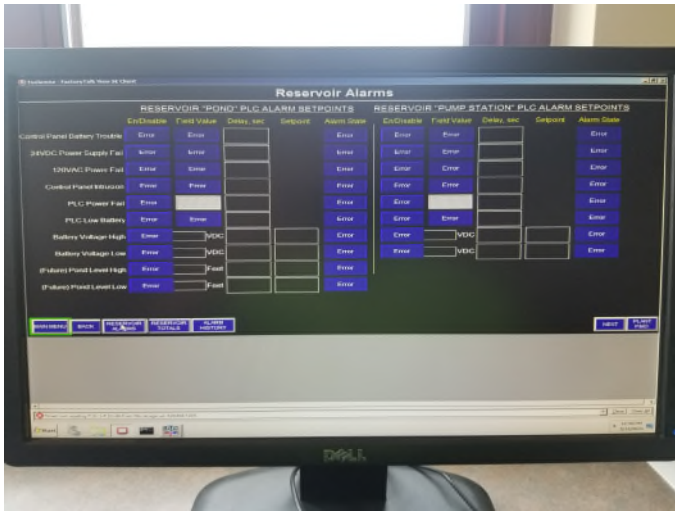


Photo 13 - HMI Screenshot.

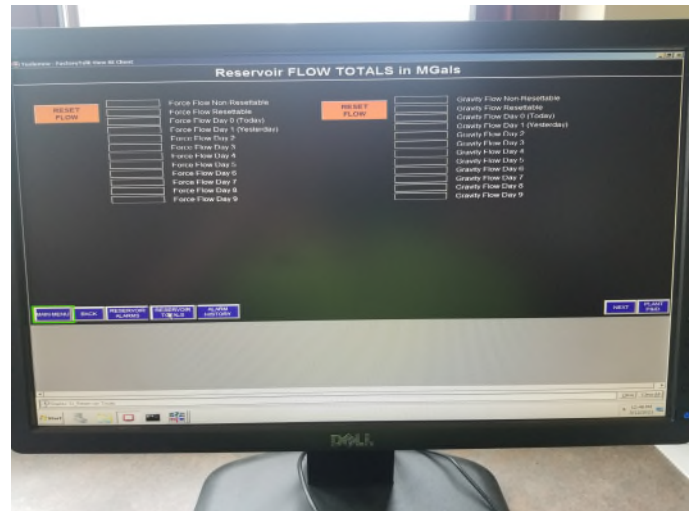


Photo 14 - HMI Screenshot.

3. Timeline

The table below shows the timeline over which the project activities were completed.

Event / Activity	2019				2020				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
New WDRs												
Planning												
Contracting												
Install Blind Flanges												
Install Pump-Back Pipeline												
Install Flow Meters, Sampling Station												
Start-up/ Testing												
Completion Report												
O&M												

4. Start-up / Testing

The improvements to the irrigation system were completed on February 23, 2021 with TCSD and Baker Ranch initiating the “Start-up and Testing” phase of the project immediately thereafter. TCSD monitored the System closely to verify that it was functioning properly for a period of 30 days, and identified no problems with the System.

5. Operation and Maintenance

The improved irrigation system, along with the flow meters, sampling station, and expanded SCADA system are now fully functional. TCSD and Baker Ranch have already begun normal operation and maintenance of the System, along with all attendant monitoring and reporting.

ORDER R5-2019-0058

FIGURE 1

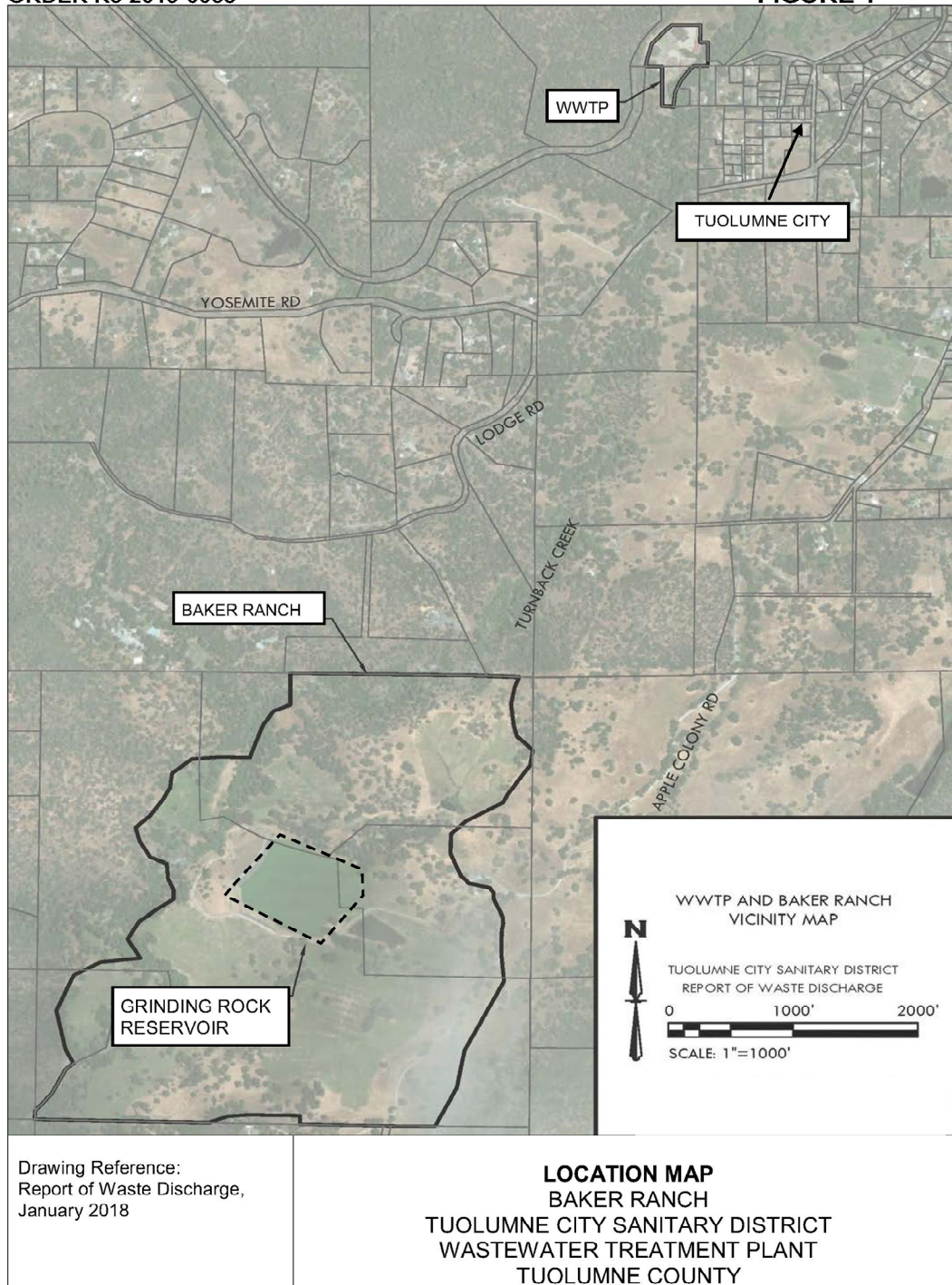
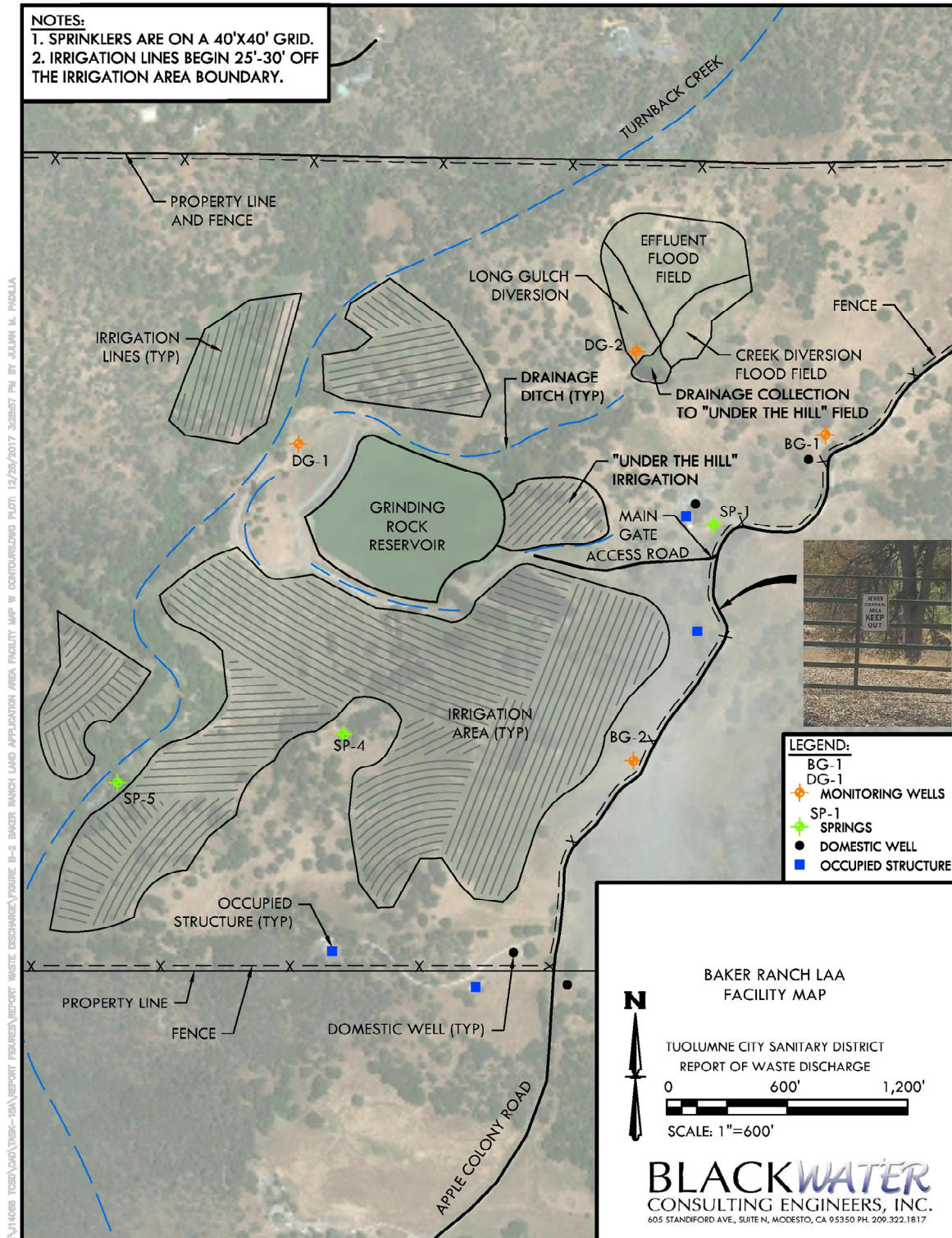


FIGURE 2





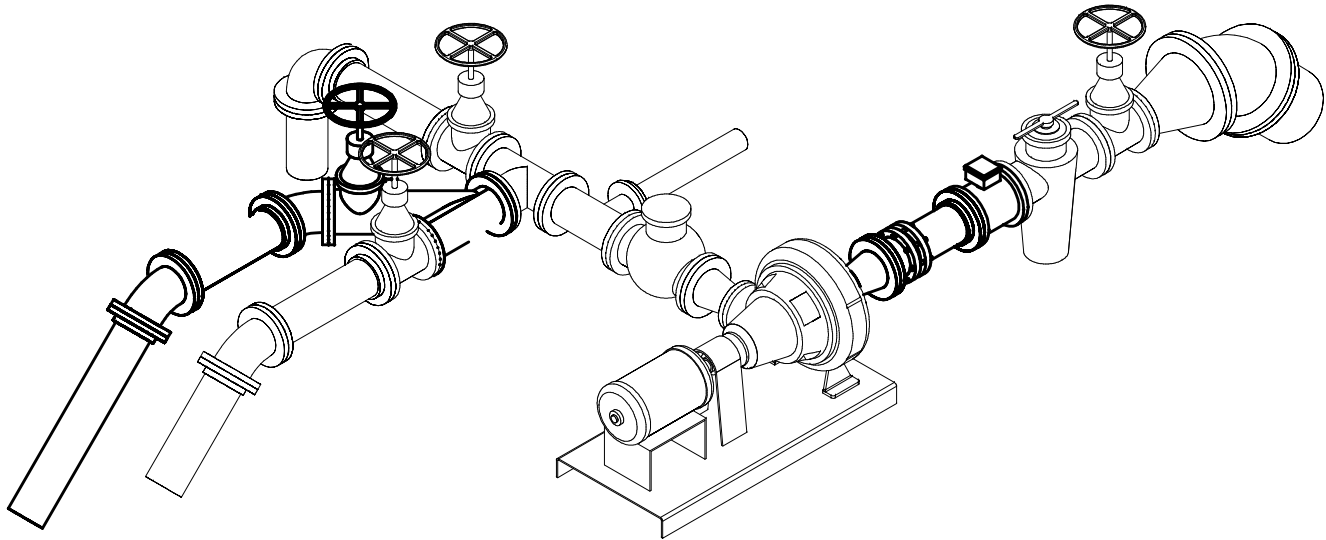
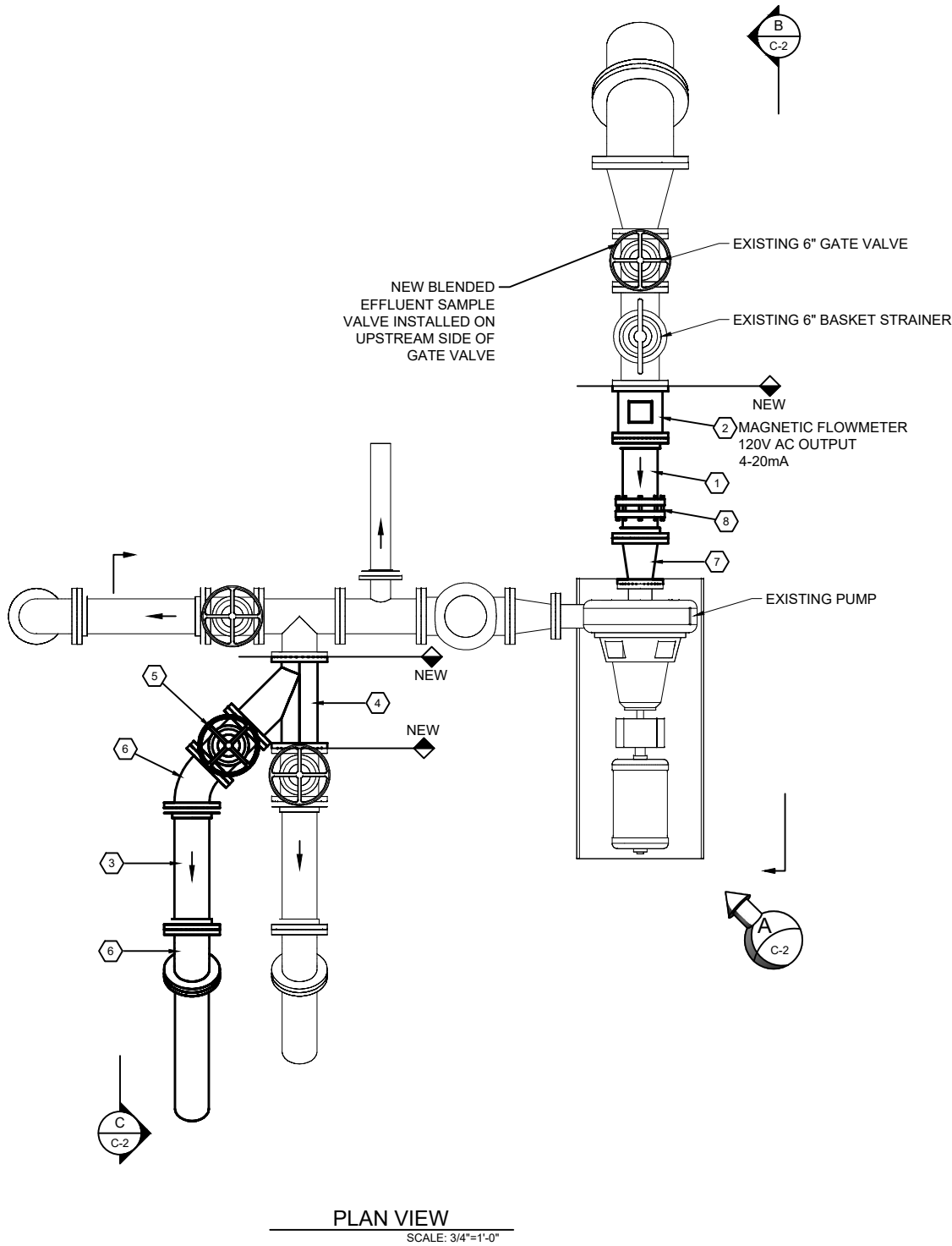
- NOTES:**
1. AT THE TIME OF THIS DRAWING, SURVEY DATA WAS NOT AVAILABLE. ALL LOCATIONS AND ALIGNMENTS WERE PROVIDED BY TCSD AND ARE APPROXIMATE.
 2. INSTALL BURIED HDPE IN A MANNER THAT MINIMIZES ELBOWS AND FITTINGS. MINIMUM BEND RADIUS = 12.5 FT.
 3. ALL HDPE PIPE TO BE PE4710 6" (DIPS) SDR11 PIPE.
 4. ALL FLANGES TO BE 150 LB FLANGES.



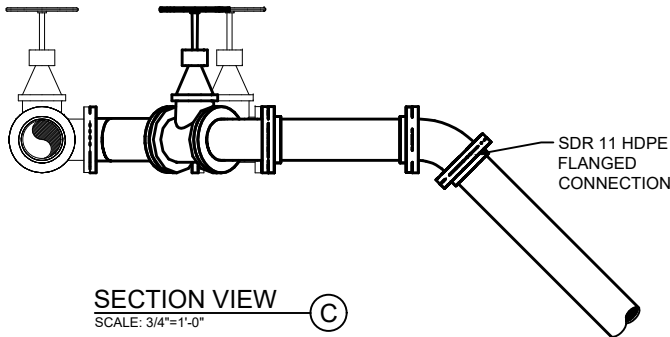
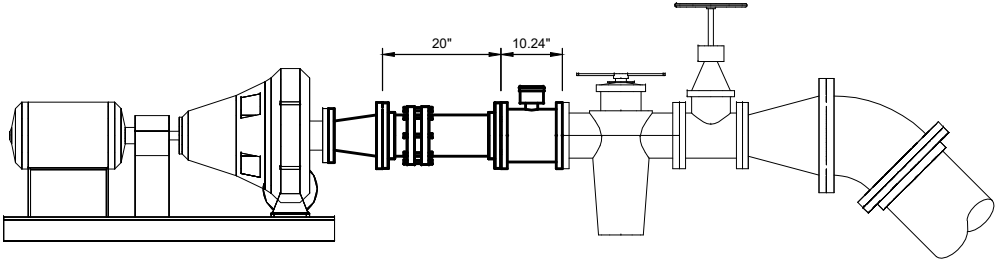
PROJECT NO. 07-20-0037		DRAWN CE		DESIGNED PG		APPROVED PG		QA/QC PG	
OWNER TCSD Tuolumne City Sanitary District		TCS D TAILWATER CONTROL PLAN IRRIGATION PLAN							
SHEET NO. C-1		DATE: APRIL 2021 PAGE NO: 1 OF 2							
FORSGREN Associates Inc. 200 S Virginia St., 8th Flr. Reno, NV 89501 PH: 775.399.0024		NO.		REVISIONS		BY		DATE	
This document or any part thereof in detail or design concept is the property of Forsgren Associates Inc. and shall not be reproduced without the written authorization of Forsgren Associates Inc.									

C:\Users\bgach\Desktop\Projects\TCSD\Record of Construction\As-Built Drawings\TCSD-2021\C-2.dwg - 4/16/2021 12:42 PM

PARTS LIST			
TAG	TYPE	SIZE	QTY
1	20" DIP SPOOL FLxFL	6"	1
2	MAGNETIC FLOWMETER	6"	1
3	24" DIP SPOOL FLxFL	6"	1
4	DUCTILE IRON WYE BEND FLxFLxFL	6"	1
5	GATE VALVE	6"	1
6	45° BEND FLxFL	6"	2
7	6"x4" DIP REDUCER FLxFL	6"	1
8	EQUIPMENT DISMANTLING JOINT	6"	1



PERSPECTIVE VIEW
SCALE: 3/4"=1'-0"



PROJECT NO. 07-20-0081	NP	BG	BG	BG
DRAWN	DESIGNED	APPROVED	QA/QC	
FORSGREN Associates, Inc. 200 S. Virginia St., 8th Flr., Reno, NV 89501 PH: 775.399.0024				
AS-BUILT DRAWINGS				
TCSD Tuolumne City Sanitary District				
PUMP STATION IMPROVEMENTS				
SHEET NO. C-2				
DATE: APRIL 2021				
PAGE NO. 2 OF 2				