Summary of Clean Water System Improvements

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Project:	Clean Waters Program
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Date:	April 20, 2022
Subject:	Program Capacity Improvements

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1.0 Introduction

The City of Sandy (City) is currently implementing a Clean Waters System Improvement Program (CWSIP) that will further protect receiving stream water quality while planning for a growing community. This program is based on the 2019 Facilities Master Plan and contains many projects to address challenges such as population growth, aging infrastructure, system capacity, and regulatory compliance.

This Technical Memorandum provides an overview of work that has been completed so far, the results of the work on, and a summary of upcoming improvements.

2.0 Overview of completed work

2.1 Collection System

The City of Sandy, Oregon is rehabilitating a significant portion of its wastewater collection system to control excessive rainfall-derived infiltration and inflow (RDII) that is overwhelming the downstream pipe and treatment systems' capacities. The City has accelerated the RDII Reduction Program implementation in order to reduce the peak wet weather flows to the treatment plant that are contributing to the Oregon Department of Environment (DEQ) National Pollutant Discharge Elimination System (NPDES) permit compliance issues.

The collection system is separated by meter basins. Collection System Modeling during the 2019 Master Planning effort ranked the basins by the largest amount of infiltration and inflow or "Leakiest" basins. A map outlining the limits of the meter basins can be found in *Attachment A*. The city is implementing RDII projects based on leakiest rankings.

The first phase of the RDII program was completed this spring and included Meter Basins 2 and 8. In less than 2 years the City has completed the inspection, design, and rehabilitation of approximately 25,400 linear feet of mainline sewer, 350 private laterals, and the grouting of 195 manholes. A full recalibration of the collection system model is currently in progress to finalize capacity improvements based on this project. However, the initial response to wet weather during the past winter indicates positive results from this project.

2.2 Result of collection system projects

Rehabilitation of the collection system in basins 2 and 8 has reduced peak flows and daily volumes at the wastewater treatment plant (WWTP). The following figures illustrate the relative performance of the entire collection system before and after the rehabilitation of sewer basins 2 and 8.

A comparison of the largest storms (by rainfall depth) occurring before and after rehabilitation is shown in *Figure 1,* a 72-hour rainfall on December 20, 2020, was 3.2 inches. The largest storm recorded since rehabilitation was on January 6, 2022, with 4.1 inches of rain in 72 hours. This storm resulted in 6.2

MGD peak flow and 5.3 million gallons of daily flow. The pre-rehabilitation storm on December 20, 2020 storm resulted in a peak flow of 8 MGD and a daily volume of 6.6 million gallons.

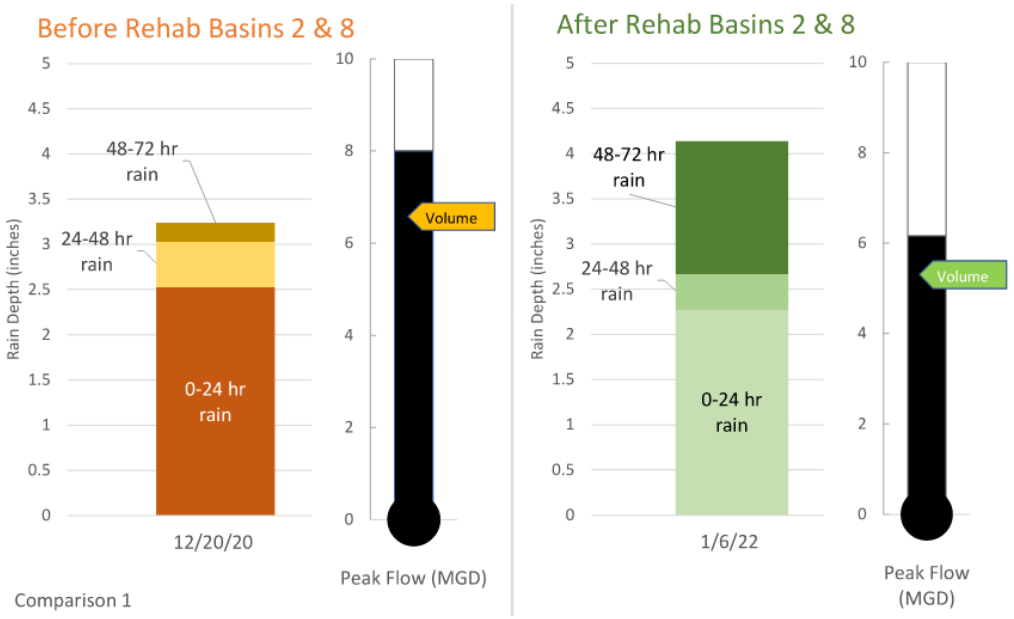


Figure 1. Two largest storms by rainfall and peak flow shows post-rehabilitation reductions in peak flows and volumes.

Figure 2 shows the rainfall depths resulting in peak flows of just over 6 MGD. Prior to the rehabilitation of Basins 2 and 8, a 72-hour rainfall depth of 2.5 inches led to a peak WWTP influent flow of 6.4 MGD. After rehabilitation of Basins 2 and 8, a storm with a 72-hour rainfall depth of 4.1 inches resulted in a peak flow of 6.2 MGD. This indicates that the rehabilitation has reduced the volumes of wet-weather flows reaching the WWTP.

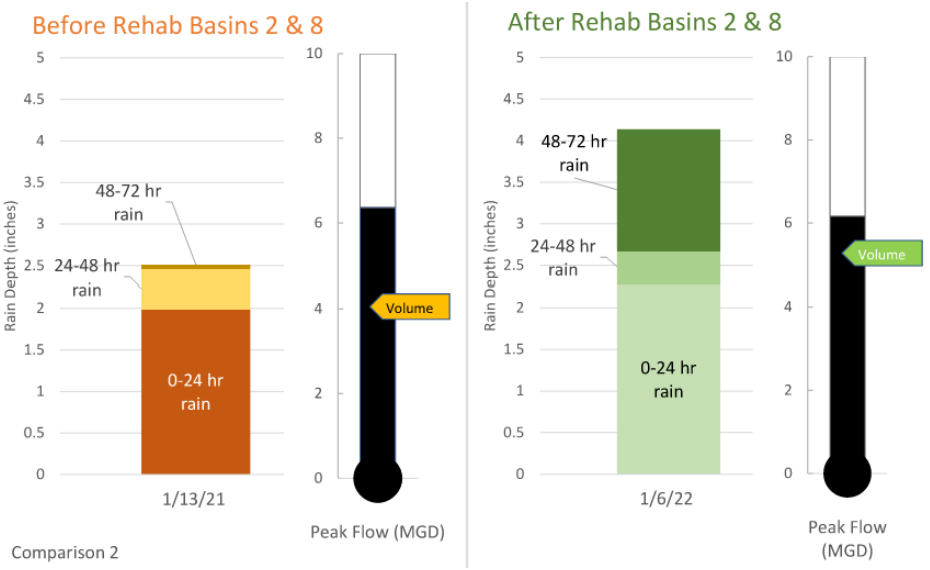


Figure 2. Post-rehabilitation larger storm results in similar flow response compared to a pre-rehabilitation smaller storm.

The collection system is now performing better during smaller storms as well as larger storms. A comparison of two smaller storms (by rainfall depth) occurring before and after rehabilitation is shown in *Figure 3*. After rehabilitation, a larger storm event (0.2 inches larger 24-hour rainfall depth and 0.2 inches larger 72-hour rainfall depth) resulted in similar pre-rehabilitation peak flows and volumes (4 MGD and 3.3 million gallons of daily flows, respectively).

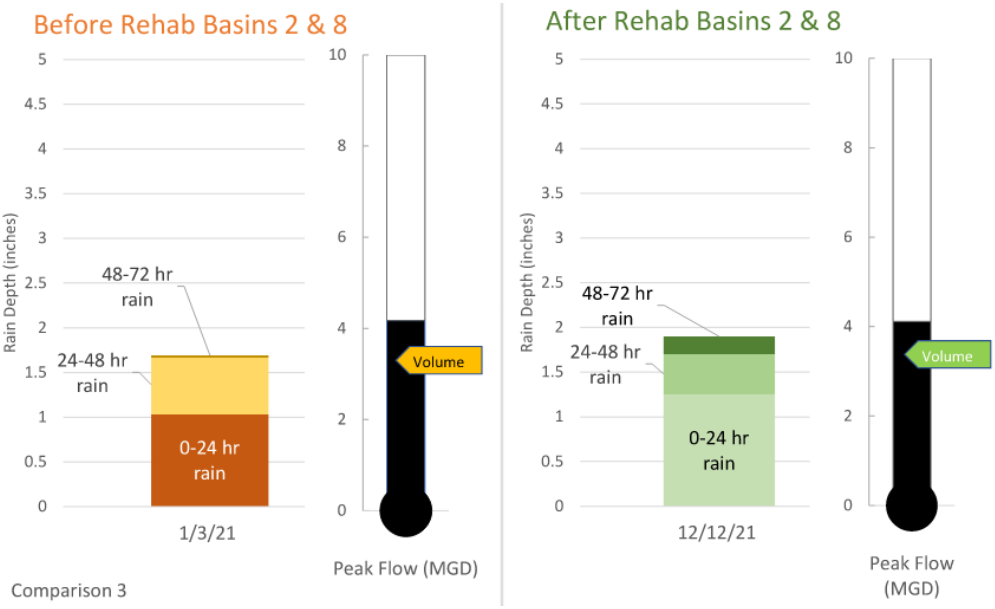


Figure 3. Post-rehabilitation larger storm results in similar flow response compared to pre-rehabilitation smaller storm.

Figure 4 compares December 20, 2020 (from Figure 1) to December 20, 2021, which was a post-rehabilitation storm with similar rainfall depth. The pre- and post-rehabilitation storms had a 72-hour rainfall depth of 3.2 inches and 3.1 inches, respectively, but the post-rehabilitation peak flows were 29% lower and the daily volumes were 26% lower than the pre-rehabilitation peak flows and volumes.

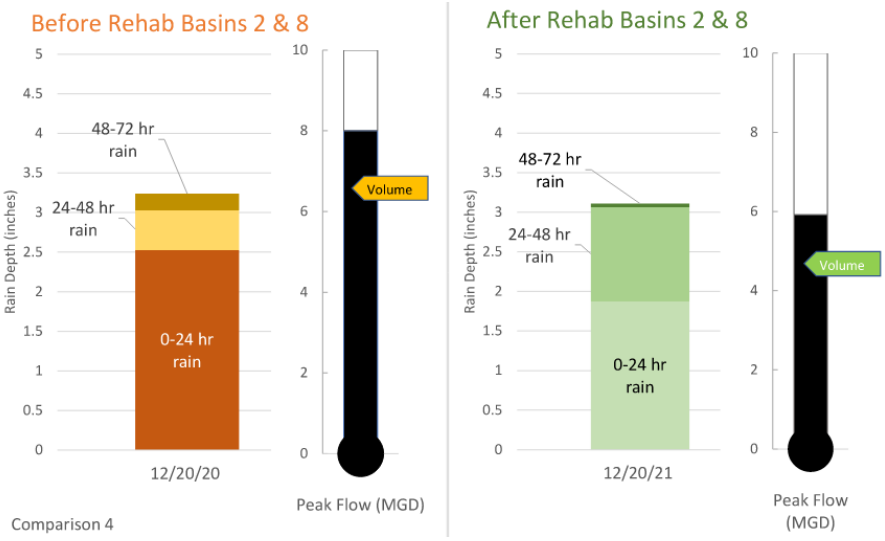


Figure 4. Two storms with rainfall depths over 3 inches show a significant reduction in peak flows and volumes.

2.3 Existing wastewater treatment plant

The City is upgrading the existing WWTP to provide greater ease of operability, worker safety, and environmental permit compliance.

In 2019, the City entered into a contract with Veolia Environment S.A. (Veolia) to provide operational services for the WWTP. The new contractor has been focused on both minor and major maintenance improvements and has been working with the City to increase investments into the aging WWTP. Improvements include, but are not limited to, rehabilitation of the biosolids conveyance, UV disinfection, tertiary filter overhaul, RAS pump, domestic and processed water systems, and electrical and controls systems.

The existing WWTP Improvements Project includes various rehabilitation projects throughout the plant, split into three separate work packages, Guaranteed Maximum Price Package (GMP) #1, #2, and #3, as defined in *Figure 5* below. A map of the WWTP displaying the location of construction improvements by work package is found in *Attachment B*. During the 2021 construction season, one secondary clarifier, half of the aeration basin, and the headworks improvements were completed. The remaining improvements are scheduled to be completed by the end of 2022.

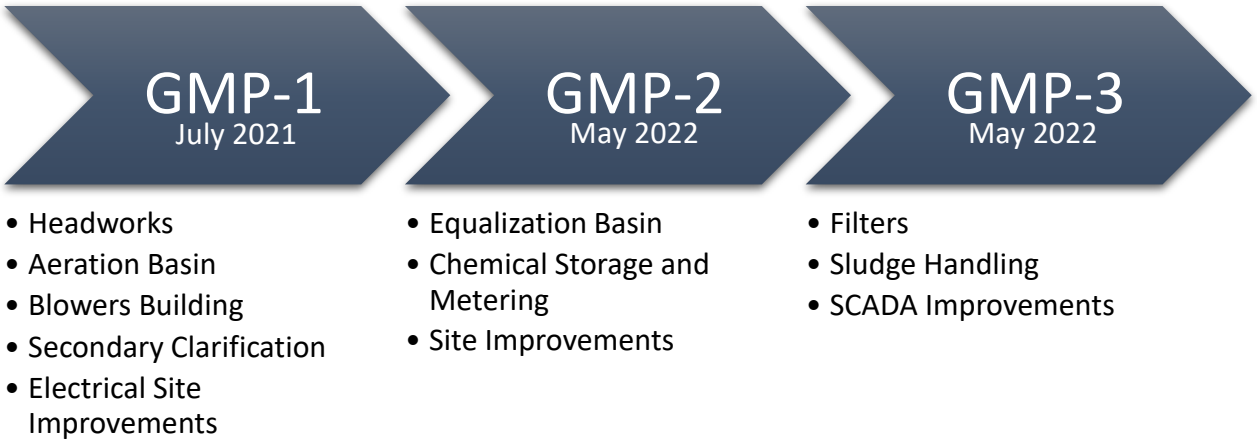


Figure 5. Project construction flow chart showing improvements included by work package and construction start dates.

2.4 Result of WWTP projects

Work at the City of Sandy WWTP has decreased the number of permit violations and increased operational performance. *Figure 6* below shows the positive trend in the number of violations per year over time. Improvements are due to the following three items:

- Increase in preventative and routine maintenance of facilities and equipment.
- Reduction of influent peak flows and total volume from the RDII program
- Process improvements from the WWTP Improvement Project.

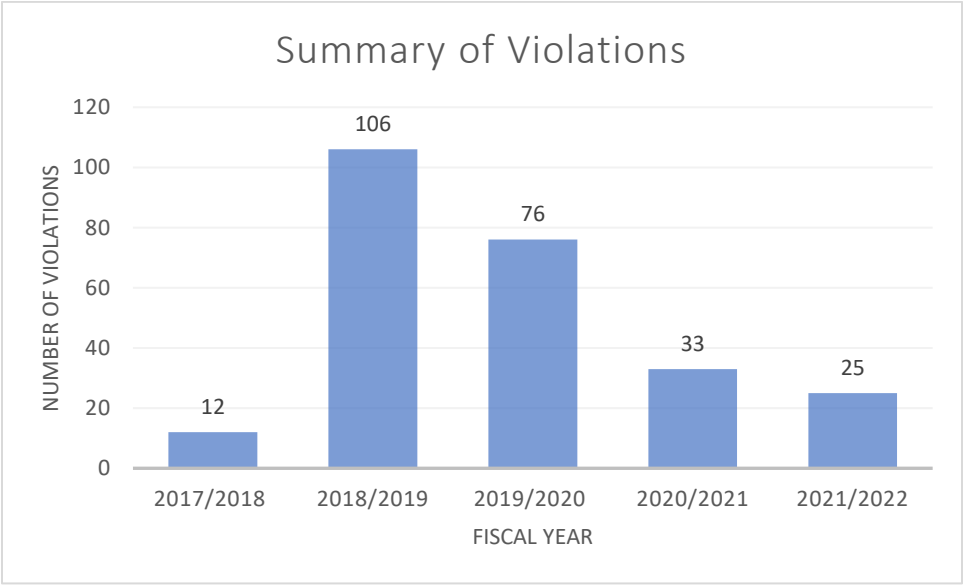


Figure 6. Summary of NPDES violations by fiscal year.

The cause of each Violation was categorized using anecdotal information from the operations team. A formal evaluation of data and violation root cause analysis will be completed under the upcoming Operations Efficiency Project. Violations have not been issued by DEQ during the 2021/2022 fiscal year; therefore, it was assumed that every permit non-compliance event or discharge limit exceedance was one individual violation. Each violation was categorized into one of the following defined categories:

Capacity – hydraulic capacity of the WWTP was exceeded.

Maintenance – Mechanical, electrical, instrumentation, or controls failure caused plant upset.

Operation – Operation error caused upset conditions.

Lab QA/QC – There is data that indicated an error in laboratory analysis results.

Should not be a permit violation – According to the City of Sandy NPDES Permit Number 102492 Schedule A.1.a.2, "*The daily mass load limit is suspended on any day in which the flow to the treatment facility exceeds 2.5 MGD (twice the design ADWF).*" Many of the violations given by DEQ were for daily mass loading on dates that the influent flow exceeded 2.5 MGD; therefore, the permit limits should have been suspended.

Three Basin Rule –The mass loading limits in the NPDES were set in conformity with the Three Basin Rule. The mass loading daily limits are suspended for days in which the flows to the treatment facility exceed 2.5 MGD but are not suspended from the weekly and monthly mass loading averages. Including mass loadings for days that exceeded 2.5 MGD in the weekly and monthly averages makes the permit limits often impracticable.

Table 1 concluded the summary of violation causes. A detailed list of each violation and suspected cause is included in *Attachment C*.

Table 1. Summary of NPDES violations by category.

Violation category	*2020/2021*	*2021/2022*
Capacity	3	6
Maintenance	2	10
Operation	2	0
Lab QA/QC	1	5
Should not be a violation	11	0
Three Basin Rule	14	4
Total	**33**	**25**

The following summarizes the City's response to each category of violation.

Capacity

In the 2020/2021 and 2021/2022 fiscal years, 9% and 24% of violations were due to capacity limitations respectively. Of 9 capacity-related violations, only one capacity event was not due to a hydraulic bottleneck at tertiary treatment portion of the WWTP. The capacity of the tertiary treatment system is being addressed in the WWTP Improvements Project, this project is adding a new tertiary treatment train that will increase the Peak Instantiations Flow (PIF) capacity by 3.5 MGD by the end of 2022.

Maintenance

The City continues to invest in major and minor maintenance to address rehabilitation of the aging infrastructure responsible for many of the mechanical issues. Veolia has performed a condition assessment evaluation on the unimproved portions of the WWTP, and the City has retained a consultant specifically to focus on operations at the plant and make recommendations regarding maintenance and redundancy.

Operations

The City has hired a consultant to work with operation staff to help increase operational reliability. This effort will include an assessment of standard operating procedures, record-keeping, evaluation of needed staffing, etc.

Lab QA/QC

The City is currently looking for a new laboratory that can demonstrate better QA/QC procedures, including split sample testing. In the meantime, the reporting and quality issues at the laboratory have been reported to the current laboratory in hopes that their current QA/QC procedures will be improved.

Three Basin Rule

The City has begun the discussions with the Oregon Department of Environmental Quality regarding the terms of the NPDES permit. As part of the upcoming NPDES permit renewal process, the City is asking to suspend the daily mass load limit on days in which the flow to the treatment facility exceeds 2.5 MGD from the weekly and monthly average mass loads.

3.0 Overview of upcoming projects

Table 2 contains a list of additional work to be completed by the City in 2022. These improvements will further improve the efficiency and capacity of the overall wastewater systems.

Work will continue on the collection system RDII program. The next stages of the collection system improvements include the rehabilitation of Basin 6 and 7, the next leakiest basins, as well as continued smoke testing and MH grouting in basins not already addressed. The City will also be implementing a Capacity, Management, Operation, and Maintenance (CMOM) Program for continued asset management of the collection system and recalibrating the collection system model. These improvements are estimated to reduce 1.2 MGD of the Peak Instantaneous Flow (PIF) to the treatment plant.

Construction of the WWTP Improvements project will be completed by the end of 2022. The project is expected to increase the WWTP PIF capacity by 3.4 MGD. Capacity improvements from the project will benefit the plant during the winter 2022/2023 season. The project was partially constructed during the winter 2021/2022 season providing process improvement, such as reduced filamentous bacteria formation, but construction was only partially completed. The key component of this project is the construction of the new UV and tertiary filter train, which is currently the hydraulic capacity bottleneck of the plant.

Additionally, the City has two more WWTP projects starting in 2022. The first has the goal to improve operations efficiency: the City has hired a consultant to work with operation staff to update standard procedures, complete an asset criticality and spare parts analysis, and provide operations support during construction and stress testing. The second project is to install fiber communications at the WWTP, this will improve data collection and increase operational control of the plant.

Table 2. 2022 planned improvement projects.

COMPONENT	PURPOSE	SCHEDULE
Existing WWTP		
Aeration Basin Improvements	Increase capacity, treatment efficiency, and operational control in the secondary treatment process	Summer/Fall 2022
New tertiary filter and UV Disinfection treatment train	Increase capacity in tertiary treatment process	Summer/Fall 2022
Clarifier 2 Rehabilitation	Increase clarifier treatment efficiency	Summer/Fall 2022
Equalization Basin Improvements	Increase operational control, increase return flow, and increases aeration basin treatment efficiency	Summer/Fall 2022
Aerated Sludge Storage Basin	Increase solids treatment capacity, increases operational control, and addresses health and safety issues	Summer/Fall 2022
Chemical Storage and Metering Facilities Improvements	Increases operational control and addresses health and safety issues	Summer/Fall 2022
Stormwater Control Site Improvements	Addresses site stormwater control issues	Summer/Fall 2022
Site Improvements - lighting	Addresses health and safety issues	Summer/Fall 2022
Electrical and Instrumentation and Control Improvements	Increases operational control and addresses health and safety issues	Summer/Fall 2022
Installing Sandy NET (fiber) to WWTP	Increase operational control	TBD
Operation efficiency Project	Increase operational efficiency	Summer-Winter 2022
Collection System		
Collection System Basins 6 and 7	Reduction of I/I contributing to peak flows that overwhelm WWTP	Summer-Winter 2022
Recalibration of H/H model	Assess I/I reductions in Basin 2 and 8	Spring 2022
Smoke Testing	Identify inflow sources beyond Basins 2, 6, 7, and 8	Summer 2022
Additional MH grouting	Address leaking MHs not in Basins 2, 6, 7, and 8	Fall/Winter 2022
Addressing non-City leaking catch basins (e.g., ODOT, etc.)	Basin 6	TBD – Communicating issue to ODOT
CMOM Plan	Asset management	Winter 2022

4.0 Summary of wastewater capacity

The capacity of the City's wastewater systems has increased due to the CWSIP projects completed. Capacities summarized in this section are based on engineering models. The City is currently working on recalibrating the Collection System Model with the completion of RDII Basin 2 and 8 construction and a WWTP stress test will be conducted during the winter 2022/2023 season after the completion of the WWTP Improvements Project. The result of these studies will provide more accurate data on observed capacities as well as projections of capacities with future buildout.

4.1 Collection system capacity

Table 3 contains a summary of exiting and projected influent flow rates to the WWTP based on the PIF of the collections system. These projections are conservative and assume only RDII reductions completed in Basins 2 and 8 by the end of 2021 and Basins 6 and 7 by the end of 2022. The reductions below do not include the additional work the City is planning with the MH grouting in Basin 5, discovery and disconnection of additional inflow sources, and the installation of manhole dishes.

Table 3. Summary of estimated WWTP influent PIF.

END OF YEAR	WITHOUT RDII (MGD)	POST-RDII (MGD)*
2021	10.6	8.6
2022	11	7.4

**assumes the majority of Basin 2 and 8 rehabilitation was complete by the end of 2021 and the majority of Basin 6 and 7 rehabilitation is complete by the end of 2022.*

From the analysis completed on storm events this year, RDII rehabilitation results are meeting expectations. the relative performance of the entire collection system before and after the rehabilitation of Basins 2 and 8 has resulted in a reduction of approximately 20% in PIF during a 1-2 inch 24-hour rainfall event, with a greater reduction for larger storms. The modeled PIF is based on a five-year storm event and while there was not a storm of this magnitude in the 2021/2022 wet season, the maximum PIF observed at the WWTP this past winter was 6.3 MGD which was well under the modeled PIF of 8.6 MGD.

4.2 Existing wastewater treatment plant capacity

The modeled capacity of the treatment plant before and after the WWTP Improvements Project is listed in *Table 4*. Project improvements are anticipated to increase the Peak Day Flow (PDF) capacity by 1.8 MGD and PIF capacity by 3.4 MGD.

Table 4. Summary of WWTP Improvements Project Design Capacity

Design Loading	*Pre-Improvements*	*Post-Improvements (December 2022)*
Maximum Monthly Dry Weather Flow (MMDWF)	1.25 MGD	1.5 MGD
Maximum Monthly Wet Weather Flow (MMWWF)	1.85 MGD	1.9 MGD
Peak Day Flow (PDF)	3.7 MGD	5.5 MGD
Peak Instantaneous Flow (PIF)	6.5 MGD	9.9 MGD

Comparing the collection system estimated PIF with treatment plant design capacities, as shown in *Figure 7,* by the end of 2022 the existing WWTP will be operating under the maximum design capacity for the facility.

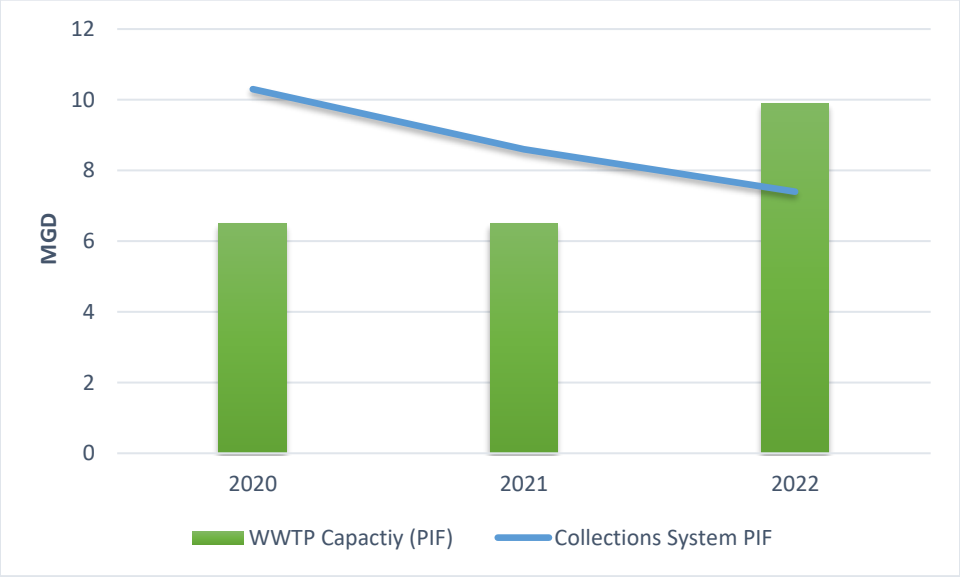


Figure 7. Anticipated PIF comparison to WWTP PIF capacity.

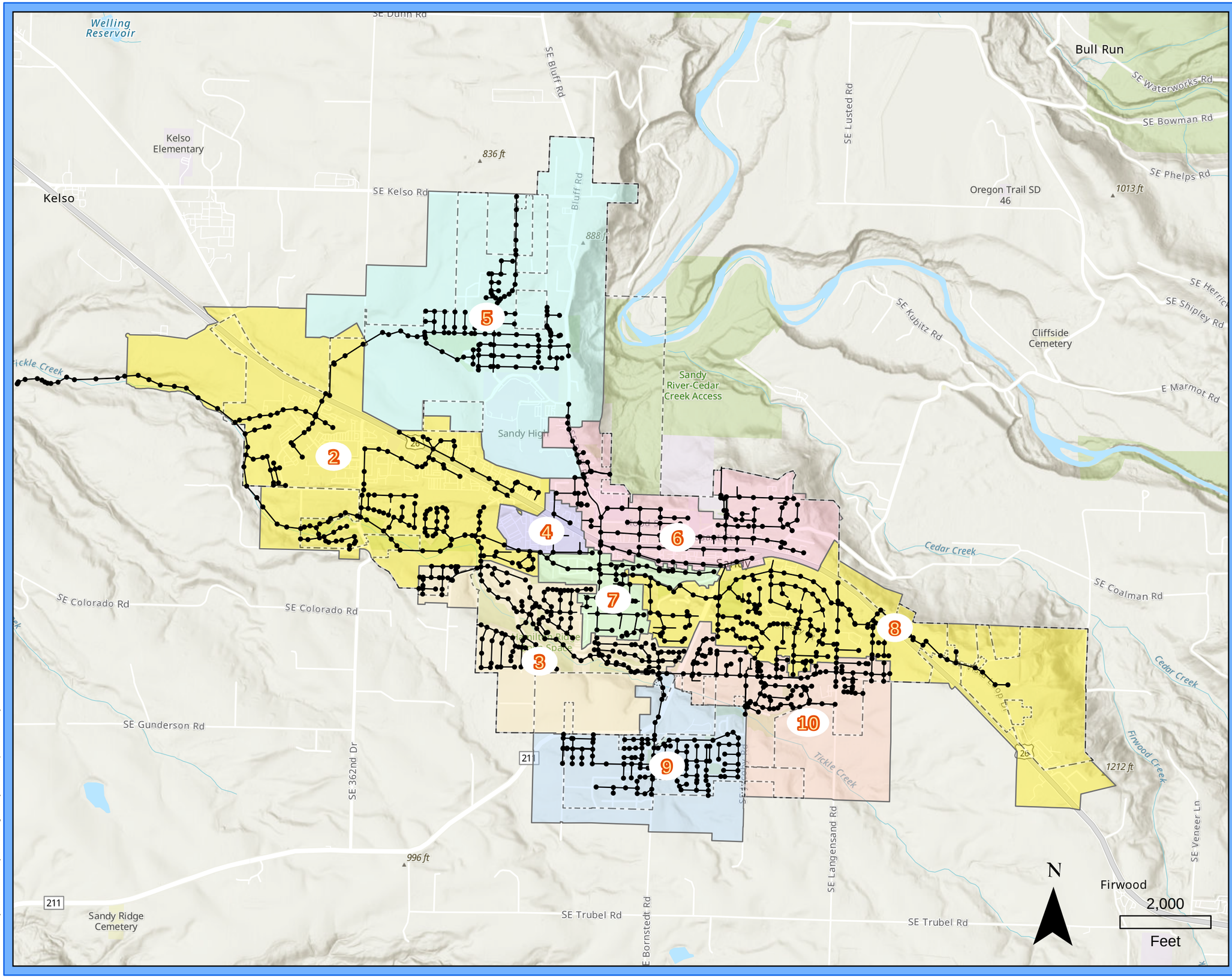
5.0 Conclusion

The initial assessment of the ongoing work and the expected capacity improvement and RDII reduction are trending toward providing the needed capacity for current conditions. The technical memo provided analysis that supports the following points:

- The City is rehabilitating a significant portion of its wastewater collection system to reduce excessive RDII and wet-weather flows to the WWTP. Initial estimations on work completed has reduced PIF by 2 MGD and another 1.2 MGD will be removed by the end of 2022.

- The City is in mid-construction on the WWTP Improvements Project. The treatment plant is trending in the positive direction for the number of violations and by the end of 2022, the treatment facility will have an additional 3.4 MGD hydraulic PIF capacity and 1.8 PDF capacity.
- The combined RDII program and WWTP Improvement Projects are expected to result in wastewater systems that have adequate capacity to serve the City of Sandy population by the end of 2022.

Attachment A – Map of Collection System Meter Basins



Legend

- City Boundary
- Sewer Junctions
- Sewer Mains

Meter Basin

- 2 and 8 (I/I reduction)
- 3
- 4
- 5
- 6
- 7
- 9
- 10

CITY OF SANDY OREGON 1911

LEEWAY engineering solutions

This map published for the City of Sandy, Oregon by Leeway Engineering Solutions on 8/18/2021. Leeway makes no claims about the map's accuracy, which is based on the source data. Data sources include the City of Sandy, Clackamas County and ESRI World Maps.

Attachment A

Collection System RDII Reduction Program

Path: Y:\5 - GIS\Projects\112.20 Sandy CS Predesign\Sandy Basin 6 7.aprx Produced by: Administrator Date: 8/18/2021

Attachment B – Map of Sandy Existing WWTP

LIMITS OF TREATMENT PLANT CONTRACT
PAY ITEM 14" FORCE MAIN CONSTRUCTION
TO AND INCLUDING 45° MJ EL AND 14"
COMPRESSION COUPLING 100' OUTSIDE FENCE LINE.

LIMITS OF
PIPELINE
PAY ITEM
STA 69+00

NEW FENCE

14" FM
TO OUTFALL 01 AND 02

R=30'

R=30'

SECONDARY
CLARIFIER
NO. 1

6" DRAIN

1" PW

20" SE

10" PE
FOUNDATION
DRAIN

Proposed Filter & UV
expansion

EFFLUENT
PUMPING
STATION

24" SE

18" D.I. OVERFLOW
TO OUTFALL 003

18" PE TO DAYLIGHT

6" DRAIN

[" CHLORINE SOLUTION LINE (CLS)
TAP INTO SE LINE AT 24"x20" TEE

1" PW

4" WAS

8" RAS

SECONDARY
SLUDGE
PUMPING

SEE SCUM
PUMP STATION

SECONDARY
CLARIFIER
NO. 2

DISINFECTION
FILTRATION
BASIN

20'

6" PVC
TYP

1" PVC WP
1" PVC PW

1" Cu AHP

8" PE
FOUNDATION
DRAIN

8" D.I. RAS

6" D.I. WAS

20" D.I. SURGE RETURN

Proposed Chemical Storage

1" PW

6" ROOF DRAIN

8" D.I. SURGE RETURN

6" DRAIN

CATCH BASIN
RIM 517.50
INV. 514.5

2" PVC WP

Cu AHP

SS MH ②
CONSTRUCT 48" MH
INV. IN = 515.5

SD MH ③
INV. = 512.7

SEE SOLIDS HANDLING BUILDING
MECHANICAL PLAN FOR SLUDGE
PIPING DETAILS

8" PVC

RECONNECT TO EXISTING CATCH BASIN
AT WEST SLUDGE LOADOUT. GROUT
FLOOR TO PROVIDE SMOOTH INVERT
TO NEW 8" DRAIN. PLUG EXISTING

10" D.I. SURGE

SEE SHEET C9 FOR
POND UNDERDRAIN LAYOUT

LI

Level
Sensor

STORAGE POND
2.4 MG

Floating
Aerators

3" PVC

6" D.I. WAS

6" D.I. SURGE

6" D.I. POND
OVERFLOW

AERATION BASIN

(SEE MECHANICAL PLAN FOR
STRUCTURE DRAINS AND
PIPING DETAILS)

1" PW

SD MH ②
GRATED COVER
RIM 520.00
INV. 514.00

12" PE

15" PE MIN. 2%

12" PE
MIN. 2%

SOLIDS HANDLING
BUILDING

SHED TO
DRAIN

SLUDGE
STORAGE
BASIN

6" FOUNDATION
DRAINS

1" PVC

PLUG
EXISTING
OUTLET

1" PVC

1" Cu AHP

1" PVC PW

6" D.I. WAS

1" PVC

8" D.I. RAS

8" D.I. SURGE RETURN

CV2

STUB PVC
& PLUG

RS MH ④
CONSTRUCT 48" MH
INV. IN = 521.46
INV. OUT = 520.06
24" STUB OUT N.=521.26

6" PVC SS

4" D.I. FORCE MAIN

4" PVC FORCE MAIN

MIN S=2%

EXISTING CB(2) TO
REMAIN. ADJUST TO
FINISH GRADE AND
INSTALL NEW TOP
SECTION AND GRATE.
SLOPE LANDSCAPE
AREAS TO DRAIN.

2" PVC
DECANT

6" D.I.
LPA

CV1

6" PE FOUNDATION DRAIN

2" PVC

1" PVC

1" PVC PW

STUB PVC
& PLUG

OFFICE/LAB
BUILDING

33 LF 24" D.I.
@ S=0.3%

10'

HEADWORKS

30 LF 24" D.I.
@ S=0.6%

5 LF 24" D.I.
@ S=0.6%

PAVED POND SURFACE

SEE POND CONSTRUCTION SHEET C9

R=20'

R=20'

CONNECT DOWNSPOUTS
AND FOUNDATION 6"
DRAINS TO STORM SYSTEM

24" D.I. RS

2" PVC WP

3" PVC PW

1" Cu AHP

BLOWER/MAINTENANCE
BUILDING

WP

PW

6" PVC SS

80 LF 24" D.I. @ 0.3%

3" PVC PW

1" Cu AHP

1\" PVC PW

1" Cu AHP

12" P.E. STORM MIN. 2%

2" PVC

3" PVC PW

1" Cu AHP

2" PVC
CB

SD MH ①
GRATED COVER
RIM 524.50;
INV. 516.8;

SS MH ①
CONSTRUCT 48" MH
INV. IN = 517.0
INV. OUT = 516.80

RS MH ③
CONSTRUCT 48" MH
INV. IN = 521.90
INV. OUT = 521.70

RS MH ②
CONSTRUCT 48" MH
INV. IN = 524.35
INV. OUT = 524.15

RS MH ①
CONSTRUCT 48" MH OVER
EXISTING 21" CONCRETE
INFLUENT SEWER, 40.5
LF FROM EXISTING MH
EXIST INV. = 524.63
INV. OUT = 524.53

TOE DRAIN,
6" PERFORATED PE
DRAIN TO SD MH ①

SCALE 1" = 20'

1 / C8 COMPOSITE PIPING PLAN
SCALE 1" = 20'

NOTE:

CONTRACTOR TO PROVIDE ALL ELBOWS AND VALVES AS SHOWN SCHEMATICALLY ON THIS DRAWING WHETHER SPECIFICALLY IDENTIFIED OR NOT. ALL SMALL DIAMETER PIPING SHALL BE RELOCATED IF REQUIRED TO RESOLVE CONFLICTS CONTRACTOR SHALL POTHOLE LARGE DIAMETER PIPELINES TO ADJUST GRADE AS REQUIRED TO AVOID CONFLICTS. ALL PIPING SHALL HAVE NOMINAL 30" MINIMUM COVER UNLESS APPROVED ON A CASE BY CASE BASIS.

Key:

GMP-1 = Improvements to Red Highlighted Areas
GMP-2 = Improvements to Blue Highlighted Areas
GMP-3 = Improvements to Purple Highlighted

⚠ AS CONSTRUCTED SEPTEMBER 1998

NOT FOR CONSTRUCTION

THIS LINE IS 1 INCH
AT FULL SCALE
IF NOT SCALE ACCORDINGLY

SCALE : AS SHOWN
DRAWN BY : SMB
DESIGNED BY : WJS
PROJ. MGR. : PVM

No.	ZONE	REVISIONS	BY	DATE

WEST YOST
Water. Engineered.

SANDY
WHERE INNOVATION MEETS ELEVATION

CITY OF SANDY
WASTE WATER TREATMENT FACILITY IMPROVEMENTS
Attachment B

JOB NUMBER 964-50-20-01
DRAWING NUMBER C001
SHEET NUMBER X OF XX
REVISION

P:\Clients\964 City of Sandy\50-20-01 WWTP Cond Assmnt\CAD\Production\964-50-20-01-C001.dwg 2/9/2021 2:20 PM sbarber

Attachment C – List of Violations

2021/2022

#	*General Description of Violation*	*Cause of Violation*	*category*
1	Discharged effluent with BOD (mg/l) max weekly average concentration exceedance in November 2021	Not enough time to prepare plant for wet weather discharge. Construction schedule conflict	maintenance
2	Discharged effluent with NH3 (mg/l) daily max concentration exceedance on 11/4/2021	We had a daily exceedance for ammonia due to the lack of MLSS return pumps at startup which prevented the plant from operating in nutrient removal	maintenance
3	Discharged effluent with E Coli Max (MPN) concentration exceedance on 11/8/2021	We also had a daily exceedance for total coliforms due to the failure of the primary coolant pump and the backup coolant pump relay in the UV disinfection system	maintenance
4	Discharged effluent with TSS (mg/l) max weekly average concentration exceedance in December 2021	Internal Recycle pump out of service	maintenance
5	Discharged effluent with TSS (lb/day) monthly average mass loading exceedance in December	from 12/28/2021 exceedance	maintenance
6	Discharged effluent with TSS (lb/day) monthly average mass loading exceedance in December	from 12/28/2021 exceedance	maintenance
7	Discharged effluent with TSS (lb/day) max daily mass loading exceedance on 12/28/2021 of 376.9 lbs/day	Internal Recycle pump out of service	maintenance
8	High flows (5-6 mgd) on 12/20/202, partial by-pass of AB	Trash pumps employed to pump from end of AB to secondary clarifiers	capacity
9	Discharged effluent with BOD (mg/l) max weekly average concentration exceedance in	High flows; Tertiary filters under capacity.	Capacity - filters
10	Discharged effluent with TSS (mg/l) monthly average concentration exceedance in January	High flows; Tertiary filters under capacity.	Capacity - filters
11	Discharged effluent with TSS (mg/l) max weekly average concentration exceedance in January	High flows; Tertiary filters under capacity.	Capacity - filters
12	Discharged effluent with NH3 (mg/l) daily max concentration exceedance on 1/18/2022 of 13.1 mg/L	high flows	maintenance
13	Discharged effluent with NH3 (mg/l) daily max concentration exceedance on 1/17/2022 of 12.3 mg/L	high flows	maintenance

14	Discharged effluent with BOD (lb/day) weekly average mass loading exceedance in January 2022	Monthly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	Three Basin Rule
15	Discharged effluent with BOD (lb/day) monthly average mass loading exceedance in January 2022	Monthly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	Three Basin Rule
16	Discharged effluent with TSS (lb/day) monthly average mass loading exceedance in January 2022	Monthly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	Three Basin Rule
17	Discharged effluent with TSS (lb/day) weekly average mass loading exceedance in January 2022	Monthly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	Three Basin Rule
18	Heavy raifall and partial by-pass of disc filters on 1/3/2022 through 1/4/2022	Due to heavy hydraulic loading	Capacity - filters
19	Discharged effluent with TSS (mg/l) monthly average concentration exceedance in February	High flows; Tertiary filters under capacity	Capacity - filters
20	Discharged effluent with TSS (lb/day) monthly average mass loading exceedance in February 2022	Overage From Lab QA/QC issue on 2/21/2022.	Lab QA/QC
21	Discharged effluent with TSS (lb/day) max weekly average mass loading exceedance in February 2022	Overage From Lab QA/QC issue on 2/21/2022.	Lab QA/QC
22	Discharged effluent with TSS (lb/day) daily max mass loading exceedance on 2/21/2022	Lab QA/QC issue. TSS was 4 mg/L and BOD was 59 mg/L from same sample. Plant was operating well	Lab QA/QC
23	Discharged effluent with weekly TSS concentration of 11.3 mg/l for week ending 2/25/2021	Overage From Lab QA/QC issue on 2/21/2022.	Lab QA/QC
24	Discharged effluent with montly average TSS concentration of 34.5 mg/l for week ending 2/25/2021	Overage From Lab QA/QC issue on 2/21/2022.	Lab QA/QC
25	Discharged effluent with E Coli Max (MPN) concentration exceedance on 3/28/2021	UV control logic fail	maintenance

2020/2021

#	*General Description of Violation*	*Cause of Violation*	*category*
1	Discharged effluent with weekly TSS concentration of 16.5 mg/l for week ending 12/26/2020	Weekly average includes high on 12/21&22. when influent was 5.11 & 3.8 MGD. Partial by-pass disc filters	Capacity - filters
2	Discharged effluent with weekly BOD5 concentration of 16 mg/l for week ending 12/26/2020	Weekly average includes high on 12/21&22. when influent was 5.11 & 3.8 MGD	three basin rule
3	Discharged effluent with daily TSS mass loading of 350 lbs/day on 12/17/2020	Should not be a violation. Influent on 12/17 was 2.75 MG; Mass load suspended> 2.5 MGD	should not be a violation
4	Discharged effluent with daily TSS mass loading of 623 lbs/day on 12/21/2020	Should not be a violation. Influent on 12/21 was 5.11 MG; Mass load suspended> 2.5 MGD	should not be a violation
5	Discharged effluent with daily TSS mass loading of 459 lbs/day on 12/22/2020	Should not be a violation. Influent on 12/22 was 3.8 MG; Mass load suspended> 2.5 MGD	should not be a violation
6	Discharged effluent with daily BOD5 mass loading of 368 lbs/day on 12/17/2020	Should not be a violation. Influent on 12/17 was 2.75 MG; Mass load suspended> 2.5 MGD	should not be a violation
7	Discharged effluent with daily BOD5 mass loading of 368 lbs/day on 12/21/2020	Should not be a violation. Influent on 12/21 was 5.11 MG; Mass load suspended> 2.5 MGD	should not be a violation
8	Discharged effluent with daily BOD5 mass loading of 368 lbs/day on 12/22/2020	Should not be a violation. Influent on 12/22 was 3.8 MG; Mass load suspended> 2.5 MGD	should not be a violation
9	Discharged effluent with monthly avg. TSS mass loading of 176 lbs/day in Dec. 2020	Monthly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	three basin rule
10	Discharged effluent with monthly avg. BOD5 mass loading of 181 lbs/day in Dec. 2020	Monthly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	three basin rule
11	Discharged effluent with weekly TSS mass loading of 204 lbs/day for week ending 12/19/2020	Weekly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	three basin rule
12	Discharged effluent with weekly TSS mass loading of 541 lbs/day for week ending 12/26/2020	Weekly average includes high mass loads on 12/21&22. when influent was 5.11 & 3.8 MGD	three basin rule

13	Discharged effluent with weekly BOD5 mass loading of 198 lbs/day for week ending 12/19/2020	Weekly average includes days when flow was > 2.5 MGD	three basin rule
14	Discharged effluent with weekly BOD5 mass loading of 540 lbs/day for week ending 12/26/2020	Weekly average includes high mass loads on 12/21&22. when influent was 5.11 & 3.8 MGD	three basin rule
15	Discharged effluent with monthly avg. BOD5 concentration of 10.6 mg/l in Jan. 2021	Monthly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	three basin rule
16	Discharged effluent with monthly avg. TSS concentration of 22.1 mg/l in Jan. 2021	Monthly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	three basin rule
17	Discharged effluent with weekly TSS concentration of 60.5 mg/l for week ending 1/9/2021	Weekly concentration from 1/5 & 2/6; flows were 2.69 & 2.68. partial by-pass of tertiary filters.	Capacity - filters
18	Discharged effluent with weekly TSS concentration of 18.5 mg/l for week ending 1/23/2021	No high flows or out-of-normal conditions. BOD same day was 10 mg/L.	Operations
19	Discharged effluent with weekly BOD5 concentration of 26 mg/l for week ending 1/9/2021	4 days prior to sampling flows all in excess of 2.5 MGD	Capacity - filters
20	Discharged effluent with daily TSS mass loading of 2,129 lbs/day on 1/5/2021	Should not be a violation. Influent on 1/5/21 was 2.69 MG; Mass load suspended> 2.5 MGD	should not be a violation
21	Discharged effluent with daily TSS mass loading of 322 lbs/day on 1/20/2021	Anomalous lab result. Flows normal; BOD on this day reported by lab @ 0 mg/L. TSS result 33mg/L same sample?	lab QA/QC
22	Discharged effluent with daily BOD5 mass loading of 870 lbs/day on 1/5/2021	Should not be a violation. Influent on 1/5/21 was 2.69 MG; Mass load suspended> 2.5 MGD	should not be a violation
23	Discharged effluent with monthly avg. TSS mass loading of 358 lbs/day in Jan. 2021	Monthly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	three basin rule
24	Discharged effluent with monthly avg. BOD5 mass loading of 163 lbs/day in Jan. 2021	Monthly average includes mass loads w/influent > 2.5 MGD. "Suspended" daily loads are part of weekly & monthly ave	three basin rule

25	Discharged effluent with weekly TSS mass loading of 1,122 lbs/day for week ending 1/9/2021	Weekly average includes high mass loads on 1/5 & 1/6. when influent was > 2.5 MGD	three basin rule
26	Discharged effluent with weekly BOD5 mass loading of 483 lbs/day for week ending 1/9/2021	Weekly average includes high mass loads on 1/5 & 1/6. when influent was > 2.5 MGD	three basin rule
27	Discharged effluent with monthly NH3-N concentration of 5.1 mg/l in Jan. 2021	Internal recycle pump out intermittently this month. There were no daily exceedances	maintenance
28	Discharged effluent with daily TSS mass loading of 254 lbs/day on 2/18/2021	Should not be a violation. Influent on 2/18/21 was 3.56 MG; Mass load suspended> 2.5 MGD	should not be a violation
29	Discharged effluent with daily TSS mass loading of 257 lbs/day on 2/19/2021	Should not be a violation. Influent on 2/19/21 was 3.95 MG; Mass load suspended> 2.5 MGD	should not be a violation
30	Discharged effluent with weekly TSS mass loading of 255 lbs/day for week ending 2/20/2021	Averaged from 2/18 & 2/19 w/flows @ 3.56&3.95.	three basin rule
31	Discharged effluent with weekly BOD5 mass loading of 214 lbs/day for week ending 2/20/2021	Should not be a violation. Influent on 2/20/21 was 2.97 MG; Mass load suspended> 2.5 MGD	should not be a violation
32	Discharged effluent with monthly NH3-N concentration of 4.0 mg/l in Feb. 2021	Note that monthly limit is 3.7. his may not be a significant violation	operations
33	TSS monthly average and max weekly average exceedance in April 2021	Tertiary filters' fabric is ripped w/voids. Needs new fabric. Replaced after April and discharge season	maintenance