Skagit County Clean Water District
Edison Subarea

Meeting Agenda – April 26, 2023

REGULAR BOARD MEETING

Held at Burlington Edison Elementary School

1. **Call to Order**

2. **Opening Public Comment**

3. **Consent Agenda:**
   A. Prior Meeting Minutes
   B. Fund 150 Invoices

4. **Communications:**
   A. March Commercial Site BOD & FOG Reading
   B. Commercial Site Tank Measurements
   C. YTD Pump Station Readings

5. **Old Business**
   A. Monthly Operator Report
   B. Monthly Maintenance Contractor Report

6. **New Business**
   A. Draft Gray & Osborne Capacity Study Results
   B. Report from Assessment Methodology Subcommittee

7. **Other Business**

8. **Closing Public Comment**

9. **Adjourn**

Edison Clean Water District

Meeting Minutes

Meeting of February 22, 2023

Call to Order: The meeting was called to order at 5:03 PM with the following board members present: Jeff Haddox, Scott Mangold, and Bernie Alonzo. Also present were Erin Langley from the County, Greg Young from Ravenhead Municipal Services, Mike Tamman from the Drain Doctor and Jess Hackler from the School District who may be replacing Jess Haddox as the School District representative to the Board when Mr. Haddox retires.

Public Comment: None

Consent Agenda: The minutes from the Board's March 22, 2023 regular meeting minutes and the below detailed vouchers were approved following a motion by Mr. Mangold and seconded by Mr. Alonzo:

3/22/23-1	Drain Doctor	$ 1,778.40
3/22/23-2	Ravenhead Municipal	$ 900.00
3/22/23-3	City of Burlington	$ 525.28
3/22/23-4	Edge Analytical	$ 101.00
3/22/23-5	Gray and Osborne	$ 725.45

Communications: Mr. Young covered the communications for tonight's meeting that included the most recent Lift Station, School, and Residential pump readings and a copy of the DOE Permit Calculation form.

The Board briefly discussed the revenue and expenditure information for 2022 included in the packets. It was noted that we had $106K in revenue and $80K in expenditures. It was agreed that we need to closely monitor expenditures through the year so we do not run up against our budget capacity to prevent the need for a budget extension which can delay payments to the vendors.

It was noticed that in the most recent pump cycle readings report, the pump cycles for one of the School District's pumps had not changed. Mike Tamman and Erin will meet on site and investigate.

Old Business: The most recent Operator's Report reflected that the system has run well since the last meeting. Mike Tamman reported that his personnel took samples recently and reported that some of the commercial site's tanks may be in need of pumping and that his crew was somewhat surprised by the levels and packed grease layers in selected commercial tanks.

New Business: - The Board then discussed the upcoming need to work on our annual assessment methodology to determine if a more equitable billing methodology can be developed which was a commitment the Board made following a request by some commercial sites who experience very large fluctuations in their annual charges.

The Board discussed and agreed that one approach would be to split the annual system charges in "fixed" charges (ones that do not change annually and should be shared amongst all users) and variable charges. So as to not run afoul of the Open Public Meetings Act, it was decided that no more than 2 Board members should undertake this work. It was also the consensus of the group that the results of this analysis would ideally be brought to the Board in April, discussed by the Board, possibly preliminarily adopted in May. This would give time for the Board to reach out to the community for feedback. The goal is to possibly adopt the new methodology in time for the fall rate setting meetings. This approach was adopted by a motion by Mr. Alonzo and a second by Mr. Haddox.

Other Business: - None

Adjourn: With no further business to be conducted, the meeting was conference call ended at 5:57PM.

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Committee Member

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Committee Member

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Committee Member

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Committee Member

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Committee Member

Report for April 26th meeting

Skagit County Edison Clean Water Disrtrict
CASH FLOW REPORT - 2023

Fund No. 150 - Operations and Maintenance

January 2023 Beginning Cash Balance	**$415,410.65**
2023 Revenues to Date	$0.00
Adjustment to County Treasurer Records	
2023 Expenditures to Date	$37,528.67
Adjustment to County Treasurer Records	
2023 Ending Cash Balance	**$377,881.98**

2023 Expenditure Detail by Vendor

	Operations	Capital	Permit Compliance
The Drain Doctor	**$18,441.84**	$0.00	$0.00
Ravenhead Municipal Services	**$3,600.00**	$0.00	$0.00
Edge Analytical	$0.00	$0.00	**$436.00**
Underground Utility Locate Service	**$2.58**	$0.00	$0.00
City of Burlington	$0.00	$0.00	**$2,572.04**
Burlington Edison School District	**$5,084.99**	**$4,574.23**	$0.00
Coast Controls	$0.00	$0.00	$0.00
State Department of Ecology	$0.00	$0.00	$0.00
Gray & Osborne	$0.00	$0.00	**$1,116.16**
Trojan UV	$0.00	$0.00	$0.00
Dahl Electric	**$1,700.83**	$0.00	$0.00
Subtotal	$28,830.24	$4,574.23	$4,124.20
TOTAL	**$37,528.67**		

Skagit County Clean Water District
Edison Subarea

YEAR 2023 Fund 150 Expenditure Tracking Sheet

Tracking Number	Payee	Amount	Total
1/11/23-1	Drain Doctor	$2,760.08	
1/11/23-2	Ravenhead Municipal	$ 900.00	
1/11/23-3	City of Burlington	$1,029.20	
1/11/23-4	Edge Analytical	$ 132.00	
1/11/23-5	Dahl Electric	$1,700.83	$6,522.11
2/22/23-1	Drain Doctor	$7,890.44	
2/22/23-2	Ravenhead Municipal	$ 900.00	
2/22/23-3	City of Burlington	$ 591.28	
2/22/23-4	Edge Analytical	$ 203.00	
2/22/23-5	BE School District	$4,355.31	
2/22/23-6	Gray & Osborne	$ 390.71	$14,330.74
		Total for Year	*$20,852.85*
3/22/23-1	Drain Doctor	$1,778.40	
3/22/23-2	Ravenhead Municipal	$ 900.00	
3/22/23-3	City of Burlington	$ 525.28	
3/22/23-4	Edge Analytical	$ 101.00	
3/22/23-5	Gray & Osborne	$ 725.45	$ 4,030.13
		Total for Year	*$24,882.98*
4/26/23-1	Drain Doctor	$6,012.92	
4/26/23-2	Ravenhead Municipal	$ 900.00	
4/26/23-3	City of Burlington	$ 426.28	
4/26/23-4	Underground Locate	$ 2.58	
4/26/23-5	BE School District	$5,303.91	$12,645.69
		Total for Year	*$37,528.67*

Skagit County Clean Water District
Edison Subarea

FUND 150

Tracking Number:
4/26/23-1

Voucher Cover Sheet

We, the undersigned members of the Edison Subarea Board do hereby recommend that the invoices destailed below be forwarded to the Skagit County Commissioners for consideration for payment. We have reviewed these costs and supporting materials and have determined that they are proper and accurate.

DATE	PAYEE	DESCRIPTION	BARS	AMOUNT
4/1/2023	Drain Doctor	Invoice #40196 - April Contract	150.582.00.41.10	$1,454.42
3/30/2023		Invoice #40203 - Locate		$79.50
3/31/2023		Invoice #40214 - Lab Fees		$935.00
3/30/2023		Invoice #40220 - Commercial Site Tank Pumping		$3,375.00
4/10/2023		Invoice #40031 - Pump Clarifier Tank		$169.00
			TOTAL	**$6,012.92**

Date: ______________________

Signed: ______________________

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THE DRAIN DOCTOR • Since 1979 •

40196

Licensed & Bonded

*14062 Hillwood Drive · Bow, WA 98232 · **(360) 757-3017** · Contractor Lic. #DRAIND*055DH*

- **Drain & Sewer Cleaning · Septic Tank Pumping**
- **Sewer Line Repair**
- **Video Pipeline Inspections**
- **Septic Inspections**
- **High Pressure Line Jetting**
- **Septic / Sewer Inspection**

Page ____ of ____

DATE OF ORDER	

CUSTOMER'S ORDER NO.	PHONE	E-MAIL	CELL	STARTING DATE 4/1/23
BILL TO Edison Sub Area				ORDER TAKEN BY
ADDRESS				TIME STARTED
CITY				TIME ENDED
JOB NAME & LOCATION				JOB PHONE
TECHNICIAN	TECHNICIAN ASSISTANT	OTHER		

DESCRIPTION OF WORK	PER UNIT	TOTAL
Contract C-20200737 April		1454.42
TOTAL MATERIALS		
TOTAL LABOR		
SUB TOTAL		1454.42
TAX		—
TOTAL AMOUNT	$	1454.42

DATE COMPLETED	WORK ORDERED BY

FINANCE CHARGE OF 1.5 % NET 30 DAYS

☐ No one home ☐ Total amount due for above work or: ☐ Total billing to be mailed after completion of work

Signature ______________________

I hereby acknowledge the satisfactory completion of the above described work.

40203

THE DRAIN DOCTOR • Since 1979 •

Licensed & Bonded

14062 Hillwood Drive · Bow, WA 98232 · ***(360) 757-3017*** *· Contractor Lic. #DRAIND*055DH*

- **Drain & Sewer Cleaning · Septic Tank Pumping**
- **Sewer Line Repair**
- **Video Pipeline Inspections**
- **Septic Inspections**
- **High Pressure Line Jetting**
- **Septic / Sewer Inspection**

Page ____ of ____

DATE OF ORDER	

CUSTOMER'S ORDER NO.	PHONE	E-MAIL	CELL	STARTING DATE
PO# 2316				3/30/23
BILL TO: Edison Sub Area				ORDER TAKEN BY
ADDRESS				TIME STARTED
CITY				TIME ENDED
JOB NAME & LOCATION: 14091 McTaggart Ave				JOB PHONE

TECHNICIAN	TECHNICIAN ASSISTANT	OTHER

DESCRIPTION OF WORK	PER UNIT	TOTAL
Locate # 23113114		79^{50}
TOTAL MATERIALS		
TOTAL LABOR		
SUB TOTAL		79^{50}
TAX		—
DATE COMPLETED / WORK ORDERED BY / TOTAL AMOUNT	$	79^{50}

FINANCE CHARGE OF 1.5 % NET 30 DAYS

- ☐ No one home
- ☐ Total amount due for above work or:
- ☐ Total billing to be mailed after completion of work

Signature ____________________

I hereby acknowledge the satisfactory completion of the above described work

THE DRAIN DOCTOR • Since 1979 •

40214

Licensed & Bonded

*14062 Hillwood Drive · Bow, WA 98232 · **(360) 757-3017** · Contractor Lic. #DRAIND*055DH*

- **Drain & Sewer Cleaning · Septic Tank Pumping**
- **Sewer Line Repair**
- **Video Pipeline Inspections**
- **Septic Inspections**
- **High Pressure Line Jetting**
- **Septic / Sewer Inspection**

Page ____ of ____

DATE OF ORDER	

CUSTOMER'S ORDER NO.	PHONE	E-MAIL	CELL	STARTING DATE
PO #2316				3/31/23

BILL TO: Edison Sub Area	ORDER TAKEN BY:
ADDRESS:	TIME STARTED:
CITY:	TIME ENDED:
JOB NAME & LOCATION:	JOB PHONE:

TECHNICIAN	TECHNICIAN ASSISTANT	OTHER

DESCRIPTION OF WORK	PER UNIT	TOTAL
Laboratory fees		935 —
TOTAL MATERIALS		
TOTAL LABOR		
SUB TOTAL		935 —
TAX		—
TOTAL AMOUNT	$	935 —

DATE COMPLETED	WORK ORDERED BY

FINANCE CHARGE OF 1.5 % NET 30 DAYS

☐ No one home ☐ Total amount due for above work or: ☐ Total billing to be mailed after completion of work

Signature ______________________________

I hereby acknowledge the satisfactory completion of the above described work.

40220

THE DRAIN DOCTOR • Since 1979 •

Licensed & Bonded

14062 Hillwood Drive · Bow, WA 98232 · ***(360) 757-3017*** *· Contractor Lic. #DRAIND*055DH*

- **Drain & Sewer Cleaning · Septic Tank Pumping**
- **Sewer Line Repair**
- **Video Pipeline Inspections**
- **Septic Inspections**
- **High Pressure Line Jetting**
- **Septic / Sewer Inspection**

Page ____ of ____

DATE OF ORDER:

CUSTOMER'S ORDER NO.	PHONE	E-MAIL	CELL	STARTING DATE
PO # 3216				3/30/23

BILL TO: Edisn Sub Area

ORDER TAKEN BY:

ADDRESS:

TIME STARTED:

CITY:

TIME ENDED:

JOB NAME & LOCATION:

JOB PHONE:

TECHNICIAN: | TECHNICIAN ASSISTANT: | OTHER:

DESCRIPTION OF WORK	PER UNIT	TOTAL
4/3/23 Mariposa - Septic Tank - 1000g		495 —
4/4/23 Mariposa - Grease Tank 1500g		720 —
4/4/23 Edisn Inn - Grease Tank 1500g		720.00
4/11/23 Long horn - Grease Tank 1500g		720 —
4/12/23 Long horn - Septic Tank 1500g		720 -
	TOTAL MATERIALS	
	TOTAL LABOR	
	SUB TOTAL	3375 -
	TAX	—
	TOTAL AMOUNT	$ 3375 —

DATE COMPLETED: | WORK ORDERED BY: Greg

FINANCE CHARGE OF 1.5 % NET 30 DAYS

☐ No one home ☐ Total amount due for above work or: ☐ Total billing to be mailed after completion of work

Signature ____________________

I hereby acknowledge the satisfactory completion of the above described work.

THE DRAIN DOCTOR • Since 1979 •

40031
Licensed & Bonded

*14062 Hillwood Drive · Bow, WA 98232 · (360) 757-3017 · Contractor Lic. #DRAIND*055DH*

- Drain & Sewer Cleaning · Septic Tank Pumping
- Sewer Line Repair
- Video Pipeline Inspections
- Septic Inspections
- High Pressure Line Jetting
- Septic / Sewer Inspection

Page 1 *of* 1

DATE OF ORDER: 4-10-23

CUSTOMER'S ORDER NO.	PHONE	E-MAIL	CELL	STARTING DATE
PO# 3316				

BILL TO: Edison sub-area

ORDER TAKEN BY: Mike

ADDRESS:

TIME STARTED: shop 2:30

CITY:

TIME ENDED: shop 4:30

JOB NAME & LOCATION: Clarifier tank

JOB PHONE:

TECHNICIAN	TECHNICIAN ASSISTANT	OTHER
Mike		

DESCRIPTION OF WORK	PER UNIT	TOTAL
Pumped clarifier tank back to the main tank		169-
TOTAL MATERIALS		
TOTAL LABOR		
SUB TOTAL		169-
TAX		—
TOTAL AMOUNT	$	169-

DATE COMPLETED: 4-10-23

WORK ORDERED BY: Bonnet

FINANCE CHARGE OF 1.5 % NET 30 DAYS

☐ No one home ☑ Total amount due for above work or: ☐ Total billing to be mailed after completion of work

Signature ______________________

I hereby acknowledge the satisfactory completion of the above described work.

Skagit County Clean Water District

Edison Subarea

FUND 150

Tracking Number:
4/26/23-2

Voucher Cover Sheet

We, the undersigned members of the Edison Subarea Board do hereby recommend that the invoices destailed below be forwarded to the Skagit County Commissioners for consideration for payment. We have reviewed these costs and supporting materials and have determined that they are proper and accurate.

DATE	PAYEE	DESCRIPTION	BARS	AMOUNT
4/23/2023	Ravenhead Municipal	Invoice #2023-05-4	150.582.00.41.10	$900.00
		April 2023 Contract		
			TOTAL	**$900.00**

Date: ______________________

Signed: ______________________

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Ravenhead Municipal Services
5 Sanwick Point Court
Bellingham WA 98229
360.410.8626
nges ncast.n

April 23, 2023

INVOICE NO.	2023-05-4

BILL TO:

Skagit County Permit and Planning
1800 Continental Place
Mount Vernon WA 98273

April 2023 Billing Summary

DESCRIPTION
April 2023 Contractual Service Fee $900.00

Thank You

BALANCE DUE $900.00

Skagit County Clean Water District
Edison Subarea

FUND 150

Tracking Number:
4/26/23-3

Voucher Cover Sheet

We, the undersigned members of the Edison Subarea Board do hereby recommend that the invoices destailed below be forwarded to the Skagit County Commissioners for consideration for payment. We have reviewed these costs and supporting materials and have determined that they are proper and accurate.

DATE	PAYEE	DESCRIPTION	BARS	AMOUNT
3/31/2023	City of Burlington	Monthly Operator Fee - March 2023	150.582.00.48.10	$426.28
			TOTAL	**$426.28**

Date: ______________________

Signed: ______________________

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Skagit County Contract #C20200272 Billing for Edison Sewer

Operator	Date	Hours of Service	Mileage	Description	Materials/Supplies	Service Fee	Mileage 2023	Administration Fee	Total
						$ 60.00	$ 0.655	10%	
Don Erickson						-	-	-	-
						-	-	-	-
						-	-	-	-
	3/6/2023	1		Review Lab data, Flow and DMR		60.00	-	6.00	66.00
						-	-	-	-
	3/31/2023	1.5	21	Cleaned UV System		90.00	13.76	10.38	114.14
						-	-	-	-
	3/1/2023	1.5	21	Sampled for Edge		90.00	13.76	10.38	114.14
						-	-	-	-
						-	-	-	-
						-	-	-	-
	3/1/23 to 3/31/23	2		Monitor SCADA System		120.00	-	12.00	132.00
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
Totals		6	42		$ -	$ 360.00	$ 27.52	$ 38.76	426.28

Skagit County Clean Water District
Edison Subarea

FUND 150

Tracking Number:
4/26/23-4

Voucher Cover Sheet

We, the undersigned members of the Edison Subarea Board do hereby recommend that the invoices destailed below be forwarded to the Skagit County Commissioners for consideration for payment. We have reviewed these costs and supporting materials and have determined that they are proper and accurate.

DATE	PAYEE	DESCRIPTION	BARS	AMOUNT
3/31/2023	Utilities Underground	Invoice #3030305	150.540.48.10	$2.58
			TOTAL	$2.58

Date: ______________________

Signed: ______________________

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UTILITIES UNDERGROUND LOCATION CENTER.
Remittance Address
P.O. Box 3701
Seattle, WA 98124-3701
(410) 712-0082

Invoice No.	3030305
Invoice Date	03/31/2023
Month of Service	March
Billing Code	CLNWTR1
Account Number	150800
PO #	

EDISON CLEAN WATER
GREG YOUNG
5 SANWICK POINT COURT
BELLINGHAM, WA 98229

Current Costs associated with your participation in UTILITIES UNDERGROUND LOCATION CENTER.

Description	Amount
Excavation Notifications for the month: 2	$2.58
Voice Ticket Delivery: 2 at $0.00	$0.00
TOTAL:	$2.58

District Code	Tickets		District Code	Tickets		District Code	Tickets		District Code	Tickets		District Code	Tickets	
CLNWTR01	2													

REMITTANCE COPY

Company Name:	EDISON CLEAN WATER
Account Number:	150800
Invoice Number:	3030305
Invoice Date:	03/31/2023
Amount Due:	$2.58

Make Check Payable to: **Utilities Underground Location Center**
PO Box 3701
Seattle, WA 98124-3701

Skagit County Clean Water District

Edison Subarea

FUND 150

Tracking Number:
4/26/23-5

Voucher Cover Sheet

We, the undersigned members of the Edison Subarea Board do hereby recommend that the invoices destailed below be forwarded to the Skagit County Commissioners for consideration for payment. We have reviewed these costs and supporting materials and have determined that they are proper and accurate.

DATE	PAYEE	DESCRIPTION	BARS	AMOUNT
4/11/2023	BE School District	Fence Insall - Edison Café Pump	150.540.48.10	$4,574.23
4/11/2023		Maintenance Services - 2023 Q1		$729.68
			TOTAL	**$5,303.91**

Date: ______________________

Signed: ______________________

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BURLINGTON-EDISON
SCHOOL DISTRICT

Invoice Detail

RAVENHEAD MUNICIPAL SERVICES
ATTN: GREG YOUNG
5 SANWICK POINT COURT
BELLINGHAM, WA 98229

Invoice #	2022000086
Invoice Date	04/11/2023
Due Date	05/11/2023
Invoice Total	4,574.23

	Qty.	Item Description	Unit Price	Extension
*	1.00	Please reimburse the Burlington-Edison School District for Countrywide Fence Center chain link fence installation.	4,574.2300	4,574.23

* = Tax not computed on item.

Invoice Subtotal:	**4,574.23**
Tax:	**0.00**
Total Extension:	**4,574.23**

REMIT TO:
BURLINGTON-EDISON SD #100
927 E FAIRHAVEN AVE
BURLINGTON WA 98233

Invoice #	2022000086
Invoice Date	04/11/2023
Payor	RAVENHEAD MUNICIPAL SERVICES
Due Date	05/11/2023 (RAVENHEA000)

Invoice Amount: **4,574.23**
Remit Amount:

Countrywide Fence Center

17793 State Route 536
Mount Vernon, WA 98273-9765

Invoice

Date	Invoice #
3/20/2023	3753

Bill To

EDISON ELEM. SCHOOL
5801 main ave. bow wa.
98232

Ship To

P.O. Number	Terms	Rep	Ship	Via	F.O.B.	Project
			3/20/2023	Customer Pick...		

Quantity	Item Code	Description	Price Each	Amount
1	4121	CHAIN LINK FENCE INSTALL	4,212.00	4,212.00T
		Sales Tax	8.60%	362.23

Phone #
360-428-2900

E-mail
info@countrywidefence.net

Total $4,574.23

Page: 1

BURLINGTON-EDISON
SCHOOL DISTRICT

Invoice Detail

RAVENHEAD MUNICIPAL SERVICES
ATTN: GREG YOUNG
5 SANWICK POINT COURT
BELLINGHAM, WA 98229

Invoice #	2022000085
Invoice Date	04/11/2023
Due Date	05/11/2023
Invoice Total	729.68

	Qty.	Item Description	Unit Price	Extension
*	1.00	Please reimburse the Burlington-Edison School District for power and mowing at sewage plant for quarter 1 of 2023.	729.6800	729.68

* = Tax not computed on item.

Invoice Subtotal:	**729.68**
Tax:	**0.00**
Total Extension:	**729.68**

REMIT TO:
BURLINGTON-EDISON SD #100
927 E FAIRHAVEN AVE
BURLINGTON WA 98233

Invoice #	2022000085
Invoice Date	04/11/2023
Payor	RAVENHEAD MUNICIPAL SERVICES
Due Date	05/11/2023 (RAVENHEA000)

Invoice Amount: **729.68**
Remit Amount:

1st Quarter, 2023 - Edison Mowing

Week	Hours	Wages	Total
3/31/2023	2.0 (Jeff R/Ryan M)	$56.92	$113.84
			$113.84

120 V

Week Ending	Peak Demand	Peak Time	Weekly Consumption
1/1/2023 11:00:00 PM	0	12/26/2022 12:25:00 AM	1
1/8/2023 11:00:00 PM	0	1/2/2023 12:40:00 AM	1
1/15/2023 11:00:00 PM	0	1/9/2023	1
1/22/2023 11:00:00 PM	0	1/16/2023 12:17:00 AM	1
1/29/2023 11:00:00 PM	0	1/23/2023 12:27:00 AM	1
2/5/2023 11:00:00 PM	0	1/30/2023 12:48:00 AM	1
2/12/2023 11:00:00 PM	0	2/6/2023 12:32:00 AM	1
2/19/2023 11:00:00 PM	0	2/15/2023 3:03:00 AM	1
2/26/2023 11:00:00 PM	0	2/20/2023 5:19:00 AM	1
3/5/2023 11:00:00 PM	0	2/27/2023 12:49:00 AM	1
3/12/2023 11:00:00 PM	0	3/6/2023 12:50:00 AM	1
3/19/2023 11:00:00 PM	0	3/13/2023 12:50:00 AM	1
3/26/2023 11:00:00 PM	0	3/20/2023	1

13 X $0.118 =
$1 53

Sewer Plant Usage

Week Ending	Peak Demand	Peak Time	Weekly Consumption
1/1/2023 11:00:00 PM	20	12/26/2022 1:01:00 AM	390
1/8/2023 11:00:00 PM	20	1/2/2023 12:04:00 AM	365
1/15/2023 11:00:00 PM	20	1/9/2023	365
1/22/2023 11:00:00 PM	20	1/16/2023	360
1/29/2023 11:00:00 PM	20	1/23/2023 1:12:00 AM	370
2/5/2023 11:00:00 PM	20	1/30/2023 1:26:00 AM	365
2/12/2023 11:00:00 PM	20	2/6/2023 12:20:00 AM	365
2/19/2023 11:00:00 PM	21	2/19/2023 10:13:00 PM	363
2/26/2023 11:00:00 PM	20	2/20/2023 4:52:00 AM	372
3/5/2023 11:00:00 PM	20	2/27/2023 12:54:00 AM	370
3/12/2023 11:00:00 PM	20	3/6/2023 1:35:00 AM	360
3/19/2023 11:00:00 PM	20	3/13/2023 2:35:00 AM	365
3/26/2023 11:00:00 PM	20	3/20/2023 1:59:00 AM	365

4,775 x $ 0.118 =

$ 563.45

EDGE ANALYTICAL

Burlington, WA *Corporate Laboratory (a)*
1620 S Walnut St - Burlington, WA 98233 - 800.755.9295 • 360.757.1400

Bellingham, WA *Microbiology (b)*
805 Orchard Dr Ste 4 - Bellingham, WA 98225 - 360.715.1212

Portland, OR *Microbiology/Chemistry (c)*
9725 SW Commerce Cr Ste A2 - Wilsonville, OR 97070 - 503.682.7802

Corvallis, OR *Microbiology/Chemistry (d)*
1100 NE Circle Blvd, Ste 130 - Corvallis, OR 97330 - 541.753.4946

Bend, OR *Microbiology (e)*
20332 Empire Blvd Ste 4 - Bend, OR 97701 - 541.639.8425

Data Report

Client Name: The Drain Doctor
14062 Hillwood Lane
Bow, WA 98232

Reference Number: 23-07753
Project: Edison

Report Date: 3/30/23

Date Received: 3/21/23
Approved by: bj
Authorized by: [signature]

Lawrence J Henderson, PhD
Director of Laboratories, Vice President

Sample Description: Longhorn Septic Outlet | Matrix WW | Sample Date: 3/21/23 9:00 am
Lab Number: 15395 | Sample Comment: | Collected By:

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
E-10140	**OIL AND GREASE**	617	25	13.	mg/L	10.0	1664	a	3/28/23	CJET	1664_230328	
E-10106	**5-Day BOD Test**	2050 N1	1.0		mg/L	1.0	SM5210 B/BOD	a	3/27/23	SPM2	BOD_230322	

Sample Description: Bread Farm Septic Outlet | Matrix WW | Sample Date: 3/21/23 9:00 am
Lab Number: 15396 | Sample Comment: | Collected By:

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
E-10140	**OIL AND GREASE**	51.8	2.5	1.3	mg/L	1.0	1664	a	3/28/23	CJET	1664_230328	
E-10106	**5-Day BOD Test**	576 N1	1.0		mg/L	1.0	SM5210 B/BOD	a	3/27/23	SPM2	BOD_230322	

Sample Description: Bread Farm Grease Oulet | Matrix WW | Sample Date: 3/21/23 9:00 am
Lab Number: 15397 | Sample Comment: | Collected By:

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
E-10140	**OIL AND GREASE**	66.6	2.5	1.3	mg/L	1.0	1664	a	3/28/23	CJET	1664_230328	
E-10106	**5-Day BOD Test**	1110 N1	1.0		mg/L	1.0	SM5210 B/BOD	a	3/27/23	SPM2	BOD_230322	

Sample Description: Mariposa Pump Chamber | Matrix WW | Sample Date: 3/21/23 9:20 am
Lab Number: 15398 | Sample Comment: | Collected By:

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
E-10140	**OIL AND GREASE**	20.8	2.5	1.3	mg/L	1.0	1664	a	3/28/23	CJET	1664_230328	
E-10106	**5-Day BOD Test**	252 N1	1.0		mg/L	1.0	SM5210 B/BOD	a	3/27/23	SPM2	BOD_230322	

Notes:
ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.
PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.
D.F. - Dilution Factor

If you have any questions concerning this report contact us at the above phone number.

EDGE ANALYTICAL

Reference Number: 23-07753
Report Date: 3/30/23

Data Report

Sample Description: Tweets Septic Outlet — Matrix WW — Sample Date: 3/21/23 9:20 am
Lab Number: 15399 — Sample Comment: — Collected By:

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
E-10140	**OIL AND GREASE**	15.8	2.5	1.3	mg/L	1.0	1664	a	3/28/23	CJET	1664_230328	
E-10106	**5-Day BOD Test**	218 N1	1.0		mg/L	1.0	SM5210 B/BOD	a	3/27/23	SPM2	BOD_230322	

Sample Description: Edison Inn Septic Outlet — Matrix WW — Sample Date: 3/21/23 9:20 am
Lab Number: 15400 — Sample Comment: — Collected By:

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
E-10140	**OIL AND GREASE**	227	2.5	1.3	mg/L	1.0	1664	a	3/28/23	CJET	1664_230328	
E-10106	**5-Day BOD Test**	639 N1	1.0		mg/L	1.0	SM5210 B/BOD	a	3/27/23	SPM2	BOD_230322	

Sample Description: Edison School Pump Chamber — Matrix WW — Sample Date: 3/21/23 10:00 am
Lab Number: 15401 — Sample Comment: — Collected By:

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
E-10140	**OIL AND GREASE**	11.3	2.5	1.3	mg/L	1.0	1664	a	3/28/23	CJET	1664_230328	
E-10106	**5-Day BOD Test**	807 N1	1.0		mg/L	1.0	SM5210 B/BOD	a	3/27/23	SPM2	BOD_230322	

Sample Description: Edison Cafe Septic Outlet — Matrix WW — Sample Date: 3/21/23 10:00 am
Lab Number: 15402 — Sample Comment: — Collected By:

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Lab	Analyzed	Analyst	Batch	Comment
E-10140	**OIL AND GREASE**	19.9	2.5	1.3	mg/L	1.0	1664	a	3/28/23	CJET	1664_230328	
E-10106	**5-Day BOD Test**	1670 N1	1.0		mg/L	1.0	SM5210 B/BOD	a	3/27/23	SPM2	BOD_230322	

Notes:

ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.
PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.
D.F. - Dilution Factor

ANALYTICAL

SAMPLE INDEPENDENT QUALITY CONTROL REPORT

Reference Number: 23-07753
Report Date: 03/30/23

Batch	Analyte	Result	True Value	Units	Method	% Recovery	Limits*	QC Qualifier	QC Type	Comment
Laboratory Fortified Blank										
1664_230328	0 OIL AND GREASE	34.4	40.0	mg/L	1664	86	78-114		LFB	
Method Blank										
1664_230328	0 OIL AND GREASE	ND		mg/L	1664		0-1		MB	
BOD_230322	0 5-Day BOD Test	ND		mg/L	SM5210 B		0-0		MB	

*Notation:

% Recovery = (Result of Analysis)/(True Value) * 100

NA = Indicates % Recovery could not be calculated.

Limits are intended for water matrices only. These criteria are for guidance only when reported with soils/solids.

FORM: QCIndependent4.rpt

SAMPLE DEPENDENT
QUALITY CONTROL REPORT
Duplicate, Matrix Spike/Matrix Spike Duplicate and Confirmation Result Report

Duplicate

Batch	Sample	Analyte	Result	Duplicate Result	Units	%RPD	Limits	QC Qualifier	Type	Comments
BOD_230322										
E-10106	15400	5-Day BOD Test	639	258	mg/L	85.6	0-20	INH	DUP	
E-10106	15661	5-Day BOD Test	1200	1230	mg/L	2.5	0-20		DUP	

Laboratory Fortified Matrix (MS)

Batch/CAS	Sample	Analyte	Result	Spike Result	Duplicate Spike Result	Conc	Units	Percent Recovery MS	Percent Recovery MSD	Limits*	%RPD	Limits*	QC Qualifier	Type	Comments
1664_230328															
E-10140	14588	OIL AND GREASE	1.9	22.7		40.0	mg/L	[illegible]		70-130	NA	0-20	IM	LFM	

%RPD = Relative Percent Difference
NA = Indicates %RPD could not be calculated
Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of a analytical method in a given sample matrix. Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical batch.
Only Duplicate sample with detections are listed in this report
Limits are intended for water matrices only. These criteria are for guidance only when reported with soils/solids.
FORM: QC Dependent2.rpt

ANALYTICAL

Qualifier Definitions

Reference Number: 23-07753
Report Date: 03/30/23

Qualifier	Definition
IM	Matrix induced bias assumed
INH	The sample was non-homogeneous
N1	See case narrative.

Note: Some qualifier definitions found on this page may pertain to results or QC data which are not printed with this report.

EDGE ANALYTICAL

Burlington, WA	Corporate Laboratory (a)	1620 S Walnut St	Burlington, WA 98233	800 755 9295 • 360 757 1400
Bellingham, WA	Microbiology (b)	805 Orchard Dr Ste 4	Bellingham, WA 98225	360 715 1212
Portland, OR	Microbiology/Chemistry (c)	9725 SW Commerce Cr A2	Wilsonville, OR 97070	503 682 7802
Corvallis, OR	Microbiology/Chemistry (d)	540 SW Third Street	Corvallis, OR 97333	541 753 4946
Bend, OR	Microbiology/Chemistry (e)	20332 Empire Ave, Ste F4	Bend, OR 97703	541 639 8425

March 30, 2023

Case Narrative

Reference: **23-07753**

Project Notes

	Analytical Method	Notes	Created by
Project Note	SM5210 B	QCS Did not come in for the BOD run on 3/22/23. Possibly due to weak seed. Results may be lower than expected.	SPM2

..ain of Custody / Analysis Request (Please complete all app

23-07753

Page___ of___

EDGE ANALYTICAL
Main Lab (800-755-9295) 1620 South Walnut St. Burlington, WA 98233
Microbiology (888-725-1212) 805 W. Orchard Dr. Suite 4 Bellingham, WA 98225
Wilsonville Lab (503-682-7802) 9725 SW Commerce Cir. Ste A2 Wilsonville, OR 97070
Corvallis Lab (541-753-4946) 1100 NE Circle Blvd. Ste 130, Corvallis, OR 97330
Bend Lab (541-639-8425) 20332 Empire Ave Ste F4, Bend, OR 97703

Report to: Drain Doctor	Bill to: Drain Doctor DRA02	For Lab Use Only Ref #	
Ship Address: 14062 Hillwood Lane	Address: 14062 Hillwood Lane	Check Regulatory Program	
City: Bow St: WA Zip: 98232	City: Bow St: WA Zip: 98232	Safe Drinking Water Act	
Attn: Mr. Mike Tamman	Phone: FAX:	Clean Water Act	
Phone: 360.757-3017 FAX: 757-4881	P.O.#: Attn:	RCRA / CERCLA	
Email:	Visa M/C A/E Expires /	Other	
Project Edison	Card#:		

1. Use one line per sample Location.
2. Be specific in analysis requests.
3. List each metal individually
4. Check off analyses to be performed for each sample Location.
5. Enter number of containers.
6. (*NEW*) Report to __ MDL or __ PQL (*NEW*)

Turn Around Time Required
Standard
Half-time (50% surcharge)
Quickest (100% surcharge) Phone Call Req.
Emergency (Phone Call Req.)

Analyses Requested

CO055980

Field ID	Location	Grab/ Comp.	Sample Matrix*	Date	Time	BOD (ONLY)	O&G	Number of Containers	Special Instructions Conditions on Receipt
1 Longhorn	Septic Outlet				9:00	X	X		
2 Breadfarm	Septic Outlet				9:00	X	X		
3 Breadfarm	Grease Outlet				9:00	X	X		
4 Mariposa	Pump Chamber				9:20	X	X		
5 Tweets	Septic Outlet				9:20	X	X		
6 Edison Inn	Septic Outlet				9:20	X	X		
7 Edison School	Pump Chamber				10:00	X	X		
8 Edison Cafe	Septic Outlet				10:00	X	X		
9									

**Are there known hazardous or dangerous wastes in these samples? YES / NO If YES, indicate type on reverse of this form; samples may be returned to you. Total Containers

Sampled by: Phone: FAX: Email:

Sample Receipt Request (Must include FAX or Email)

*W - water; DW - drinking water; SW - surface water; ST - storm water; WW - waste water; S - soil; SL - salt water; OL - oil; Other:

**Relinquished by	Date	Time	Received by	Date	Time		Yes	No	N/A
			KRollerRear	3-21-23	1032	Custody seals intact			✓
						~~Sample temp 9.6 C satisfactory~~			
						Samples received intact			
						Chain of custody & labels agree			

FORM COC3-7-2022

Skagit Clean Water District
The Edison Sewer System
Commercial Site BOD and FOG Resdings
2023

Site Name	BOD		FOG	
	January 23, 2023	March 21, 2023	January 23, 2023	March 21, 2023
Breadfarm - Septic Outlet	438	576	40	52
Breadfarm - Grease Outlet	564	1,110	40	67
Longhorn Saloon	1,130	2,050	325	617
Mariposa	191	252	26	21
Tweets	175	218	17	16
Edison Inn	682	639	236	227
Edison School	286	807	20	11
Edison Café	266	1,670	16	20

Edison Sub-Area
Commercial Septic Tank Levels

Date: 3/21/23
Technicians: SC JS MT

Business/ Site #	Inlet Skum	Inlet Sludge	Outlet Skum	Outlet Sludge	Pumping Needed
Edison Café#20	2"	13"	1"	5"	NO
Longhorn Saloon#30	Skim	16"	Skim	8"	yes
East ~~West~~ The Bread Farm # 31	SCATT	17"	0	6"	no
Tweets#32	1"	3"	1"	3"	no
Mariposa#36	1"	18"	1"	6"	yes
Old Edison Inn #37	1"	12"	1"	12"	no

* Performed Quarterly - All levels in inches

emailed to pump 3/24/23

Edison Sub-Area
Grease Trap Levels

Date: 3/21/23
Technicians: SC JS MT

Business/ Site #	Inlet Skum	Inlet Sludge	Outlet Skum	Outlet Sludge	Pumping Needed
Edison Café#20	1"	15"	1"	15"	no
Longhorn Saloon#30	6"	12"	3"	12"	yes
WEST The Bread Farm#31	1/2"	12"	0	4"	no
Tweets#32	SCATT	3"	SKATT	3"	no
Mariposa#36	0	18"	0	6"	yes
Old Edison Inn #37	2"	14"	2"	12"	yes

#30 inlet plugged w/ grease/cleared.

*Performed Quarterly – All Levels in inches

Emailed to pump 3/24/23

Site# 74

Techs: MT

Date: 4-10-23

2# 48

Edison School

Panel Readings

#1

Hr: 1118.94

Events: 33997

Ordn: /

#2

Hr: 1172.45

Events: 34382

Ordn: /

scum:
sludge:

scum:
sludge:

scum:
sludge:

scum:
sludge:

scum:
sludge:

Access Lids.

3000 gal

basket Filters

filters cleaned ( )

1500 gal

basket filter

filter cleaned ( )

Pump vault

Comments:

Edison Lift Station

Date: 4-10-23

Tech: MT

Counter # 1

Events 41892

Run Time 2622.04

Counter # 2

Events 40986

Run Time 6161.62

Siemens Totalizer 128371

Comments: ground water in-flow around 6" town pipe/suggest re-grouting this summer
South pump has noisy bearing sound

Draw Downs ✓

North Pump ✓ Inches 1" Min

South Pump ✓ Inches 1" Min

ESCWD

Tank Lift Pumps - Cycles and Run Times

	PUMP STATION							
	Pump 1				Pump 2			
	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day
	4811	9.47	641.996	1.27	4811	9.46	803.5	1.59
DATE	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY
10/11/21	36788		1940.56		35885		5309	
11/08/21	37036	8.86	1972.06	1.13	36132	8.82	5347.64	1.38
12/13/21	37494	13.09	2037.77	1.88	36590	13.09	5434.5	2.48
01/10/22	37827	11.89	2085.07	1.69	36920	11.79	5493.83	2.12
02/07/22	38117	10.36	2121.94	1.32	37209	10.32	5538.9	1.61
03/07/22	38379	9.36	2155	1.18	37470	9.32	5579.07	1.43
05/09/22	38964	9.29	2229.94	1.19	38056	9.30	5671.41	1.47
06/06/22	39199	8.39	2261.15	1.11	38291	8.39	5710.37	1.39
07/11/22	39525	9.31	2305.43	1.27	38618	9.34	5765.48	1.57
08/11/22	39759	7.55	2338.08	1.05	38852	7.55	5807.22	1.35
09/08/22	40024	9.46	2375.01	1.32	39118	9.50	5854.65	1.69
11/07/22	40535	8.52	2441.82	1.11	39631	8.55	5938.06	1.39
12/12/22	40828	8.37	2479.62	1.08	39925	8.40	5984.83	1.34
01/09/23	41111	10.11	2517.7	1.36	40209	10.14	6032.37	1.70
02/06/23	41354	8.68	2549.8	1.15	40452	8.68	6071.91	1.41
03/06/23	41599	8.75	2582.56	1.17	40696	8.71	6112.5	1.45

ESCWD

Tank Lift Pumps - Cycles and Run Times

ESCWD

Tank Lift Pumps - Cycles and Run Times

	EDISON SCHOOL								MARIPOSA			
	Pump 1				Pump 2							
	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day
	1537	4.60	62.93	0.16	1652	4.24	64.94	0.15	0	1.97	0	0.15
DATE	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY
10/11/21	32460		1056.01		32579		1099.86					
11/08/21	32614	5.50	1059.82	0.14	32734	5.54	1103.61	0.13				
12/06/21	32725	3.96	1062.65	0.10	32850	4.14	1106.68	0.11				
12/07/21	32736	11.00	1062.93	0.28	32861	11.00	1106.93	0.25	46792	#N/A	883.73	#N/A
12/08/21	32747	11.00	1063.18	0.25	32872	11.00	1107.19	0.26	46792	0.00	883.73	0.00
12/09/21	32750	3.00	1063.26	0.08	32875	3.00	1107.25	0.06	46793	1.00	883.8	0.07
01/05/22	32950	7.41	1069.71	0.24	33075	7.41	1113.04	0.21	46816	0.85	884.98	0.04
01/07/22	32962	6.00	1070.04	0.16	33090	7.50	1113.49	0.23	46827	5.50	886.32	0.67
01/10/22	32972	3.33	1070.31	0.09	33099	3.00	1113.71	0.07				
2/7/2022	33086	4.07	1074.18	0.14	33201	3.64	1116.82	0.11				
3/7/2022	33241	5.54	1082.47	0.30	33219	0.64	1117.51	0.02	46911	1.42	891.43	0.09
5/9/2022	33493	4.00	1094.13	0.19	33339	1.90	1122.15	0.07				
5/31/2022	33556	2.86	1096.7	0.12	33434	4.32	1125.99	0.17	47117	2.42	905.07	0.16
6/1/2022	33564	8.00	1097.06	0.36	33436	2.00	1126.07	0.08	47118	1.00	905.12	0.05
6/2/2022	33568	4.00	1097.27	0.21	33437	1.00	1126.07	0.00	47119	1.00	905.18	0.06
7/11/2022	33665	2.49	1102.46	0.13	33437	0.00	1126.07	0.00				
8/8/2022	33672	0.25	1102.84	0.01	33438	0.04	1126.09	0.00				
9/8/2022	33688	0.52	1103.6	0.02	33519	2.61	1130	0.13	47386	2.72	919.4	0.15
11/7/2022	33764	1.27	1106.92	0.06	33719	3.33	1139.04	0.15	47500	1.90	926.13	0.11
12/12/2022	33835	2.03	1110.53	0.10	33906	5.34	1148.17	0.26				
1/9/2023	33997	5.79	1118.94	0.30	33922	0.57	1148.94	0.03				
2/6/2023	33997	0.00	1118.94	0.00	34057	4.82	1155.83	0.25				
3/6/2023	33997	0.00	1118.94	0.00	34231	6.21	1164.8	0.32	47725	1.89	939.86	0.12

pump 1 = same data

ESCWD

Tank Lift Pumps - Cycles and Run Times

RESIDENTIAL by Site #	2				3				4				5				6			
	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day
	348	0.77	27.25	0.12	1434	2.32	148.27	0.24	915	2.83	51.51	0.16	845	1.50	205.33	0.27	4	0.01	0.06	0.00
DATE	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY
06/08/21	6345		0	meter	95475		2206.54		24093		1324.49		2323		73.33		25		0.48	
11/08/21	6405	0.39	0	not	95737	1.71	2233.16	0.17	24300	1.35	1335.88	0.07	3021	4.56	263.2	1.24	26	0.01	0.49	0.00
12/06/21	6438	1.18	0	workin	95812	2.68	2240.78	0.27	24342	1.50	1338.41	0.09	3057	1.29	266.94	0.13	26	0.00	0.49	0.00
12/07/21	6439	1.00	0		95813	1.00	2240.88	0.10	24345	3.00	1338.61	0.20	3057	0.00	266.94	0.00	26	0.00	0.49	0.00
12/08/21	6439	0.00	0		95814	1.00	2240.99	0.11	24347	2.00	1338.73	0.12	3057	0.00	266.94	0.00	26	0.00	0.49	0.00
01/05/22	6464	0.89	0		95892	2.79	2249.1	0.29	24392	1.61	1341.61	0.10	3060	0.11	267.26	0.01	26	0.00	0.49	0.00
01/07/22	6467	1.50	0		95900	4.00	2249.9	0.40	24393	0.50	1341.67	0.03	3066	3.00	267.93	0.34	26	0.00	0.49	0.00
03/07/22	6507	0.68	0		96003	1.75	2260.58	0.18	24393	0.00	1341.67	0.00	3099	0.56	271.63	0.06	27	0.02	0.51	0.00
05/31/22	6562	0.65	3.03	0.04	96207	2.40	2282.08	0.25	24393	0.00	1341.67	0.00	3115	0.19	273.33	0.02	28	0.01	0.51	0.00
06/01/22	6563	1.00	3.32	0.29	96210	3.00	2282.36	0.28	24407	14.00	1342.42	0.75	3115	0.00	273.33	0.00	28	0.00	0.51	0.00
06/02/22	6563	0.00	3.32	0.00	96210	0.00	2282.36	0.00	24408	1.00	1342.47	0.05	3115	0.00	273.33	0.00	28	0.00	0.51	0.00
08/08/22	6589	0.39	8.26	0.07	96362	2.27	2297.78	0.23	24528	1.79	1348.76	0.09	3168	0.79	278.66	0.08	28	0.00	0.51	0.00
09/08/22	6608	0.61	11.71	0.11	96447	2.74	2306.12	0.27	24618	2.90	1353.54	0.15					28	0.00	0.51	0.00
11/07/22	6630	0.37	16.43	0.08	96557	1.83	2317.02	0.18	24743	2.08	1359.66	0.10					28	0.00	0.51	0.00
03/06/23	6693	0.53	30.28	0.12	96909	2.96	2354.81	0.32	25008	2.23	1376	0.14					29	0.01	0.54	0.00

ESCWD

Tank Lift Pumps - Cycles and Run Times

RESIDENTIAL by Site #

	7				8				9				10				11			
	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day
	574	3.85	47.82	0.33	1351	2.23	299.18	0.40	1298	2.37	128.51	0.24	3085	8.62	133.75	0.37	1050	1.76	121.56	0.21
DATE	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY
06/08/21	46983		1326.66		46630		1884.01		39069		2490.48		25165		1439.15		18844		1673.58	
11/08/21	47043	0.39	1330.53	0.03	46905	1.80	1905.37	0.14	39466	2.59	2529.57	0.26	25489	2.12	1455.77	0.11	18993	0.97	1690.81	0.11
12/06/21	47246	7.25	1349.56	0.68	46974	2.46	1910.74	0.19	39582	4.14	2541.06	0.41	25895	14.50	1474.74	0.68	19028	1.25	1695.04	0.15
12/07/21	47249	3.00	1349.63	0.07	46975	1.00	1910.82	0.08	39584	2.00	2541.24	0.18	25909	14.00	1475.39	0.65	19028	0.00	1695.04	0.00
12/08/21	47249	0.00	1349.63	0.00	46978	3.00	1911.0	0.22	39587	3.00	2541.54	0.30	25921	12.00	1476.0	0.57	19030	2.00	1695.27	0.23
01/05/22	47278	1.04	1351.35	0.06	47041	2.25	1916.03	0.18	39665	2.79	2549.03	0.27	26336	14.82	1493.89	0.64	19059	1.04	1698.75	0.12
01/07/22	47336	29.00	1356.83	2.74	47045	2.00	1916.34	0.15	39679	7.00	2550.5	0.73	26378	21.00	1495.56	0.83	19062	1.50	1699.13	0.19
03/07/22	47431	1.61	1363.38	0.11	47177	2.24	1925.77	0.16	39793	1.93	2561.63	0.19	27180	13.59	1527.35	0.54	19126	1.08	1706.81	0.13
05/31/22	47472	0.48	1365.81	0.03	47369	2.26	1939.8	0.17	39918	1.47	2573.79	0.14	27680	5.88	1546.51	0.23	19175	0.58	1712.44	0.07
06/01/22	47474	2.00	1365.9	0.09	47371	2.00	1939.93	0.13	39919	1.00	2573.9	0.11	27682	2.00	1546.59	0.08	19175	0.00	1712.44	0.00
06/02/22	47474	0.00	1365.9	0.00	47373	2.00	1940.07	0.14	39920	1.00	2574	0.10	27684	2.00	1546.65	0.06	19175	0.00	1712.44	0.00
08/08/22	47498	0.36	1368.37	0.04	47540	2.49	1949.91	0.15	40020	1.49	2583.65	0.14	27993	4.61	1559.58	0.19	19282	1.60	1724.03	0.17
09/08/22	47518	0.65	1370.2	0.06	47670	4.19	1956.81	0.22	40070	1.61	2589	0.17					19410	4.13	1739.03	0.48
11/07/22	47523	0.08	1371.07	0.01	47782	1.87	2169.88	3.55	40154	1.40	2597.15	0.14	28250	2.82	1572.9	0.15	19549	2.32	1755.47	0.27
03/06/23	47557	0.29	1374.48	0.03	47981	1.67	2183.19	0.11	40367	1.79	2618.99	0.18	28576	2.74	1590.46	0.15	19894	2.90	1795.14	0.33

ESCWD

Tank Lift Pumps - Cycles and Run Times

RESIDENTIAL by Site #

	Peggy McRae				28				29				63				65			
	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day
		4.71		0.11	1341	2.96	90.03		946	1.50	74.68	0.23	401	0.70	63.32	0.08	2	0.03	0.94	0.00
DATE					Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY
06/08/21					6212		370.41		13890		2249.02		6105		582.63		6050		758.11	
11/08/21					6408	1.28	382.7	0.08	13988	0.64	2255.78	0.04	6190	0.56	599.3	0.11	6050	0.00	758.77	0.00
12/06/21	3016	#N/A	89.69	#N/A	6577	6.04	393.72	0.39	14012	0.86	2260.63	0.17	6207	0.61	601.46	0.08	6051	0.04	758.92	0.01
12/07/21	3022	6.00	89.84	0.15	6580	3.00	393.91	0.19	14013	1.00	2260.93	0.30	6208	1.00	601.47	0.01	6051	0.00	758.92	0.00
12/08/21	3026	4.00	89.94	0.10	6583	3.00	394.04	0.13	14014	1.00	2260.93	0.00	6208	0.00	601.47	0.00	6051	0.00	758.92	0.00
01/05/22	3172	5.21	93.38	0.12	6660	2.75	399.18	0.18	14043	1.04	2265.97	0.18	6226	0.64	603.14	0.06	6051	0.00	758.92	0.00
01/07/22	3185	6.50	93.7	0.16	6678	9.00	401.06	0.94	14047	2.00	2267.86	0.95	6227	0.50	603.14	0.00	6051	0.00	758.92	0.00
03/07/22	3377	3.25	98.09	0.07	6825	2.49	410.95	0.17	14418	6.29	2282.16	0.24	6264	0.63	604.76	0.03	6052	0.02	759.05	0.00
05/31/22	3622	2.88	103.76	0.07	6945	1.41	418.68	0.09	14712	3.46	2301.55	0.23	6317	0.62	611.18	0.08	6052	0.00	759.05	0.00
06/01/22	3622	0.00	103.76	0.00	6947	2.00	418.8	0.12	14714	2.00	2301.95	0.40	6317	0.00	611.18	0.00	6052	0.00	759.05	0.00
06/02/22	3622	0.00	103.76	0.00	6950	3.00	418.92	0.12	14715	1.00	2302.14	0.19	6318	1.00	611.19	0.01	6052	0.00	759.05	0.00
08/08/22					7070	1.79	425.55	0.10	14753	0.57	2308.87	0.10	6375	0.85	617.09	0.09	6052	0.00	759.05	0.00
09/08/22	4125	5.13	115.61	0.12	7115	1.45	428.33	0.09	14767	0.45	2311.44	0.08	6403	0.90	622.8	0.18	6052	0.00	759.1	0.00
11/07/22					7188	1.22	433.17	0.08	14788	0.35	2315.26	0.06	6435	0.53	631.34	0.14	6052	0.00	759.05	0.00
03/06/23					7553	3.07	460.44	0.23	14836	0.40	2323.7	0.07	6506	0.60	645.95	0.12	6052	0.00	759.05	0.00

ESCWD

Tank Lift Pumps - Cycles and Run Times

RESIDENTIAL by Site #	66				68				69				71				72			
	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day	TOTAL Cycles	AVG Cycl/Day	TOT (hrs) RunTime	AVG (hrs) RT/Day
	2553	4.71	303.61	0.67	234	0.54	618.84	0.50	709	1.13	36.96	0.06	696	1.37	38.78	0.07	1425	2.70	148.96	0.29
DATE	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY	Cycles	Cycl/DAY	Hours	hrs/DAY
06/08/21	15371		978.47		41803		1667.99		18554		2112.39		0		4.67		9835		957.58	
11/08/21	16176	5.26	1045.9	0.44	41848	0.29	2211.4	3.55	18716	1.06	2122.04	0.06	78	0.51	13.48	0.06	10114	1.82	985.92	0.19
12/06/21	16390	7.64	1057.34	0.41	41867	0.68	2214.45	0.11	18749	1.18	2123.43	0.05	117	1.39	15.4	0.07	10204	3.21	995.3	0.34
12/07/21	16398	8.00	1057.88	0.54	41868	1.00	2214.61	0.16	18750	1.00	2123.46	0.03	120	3.00	15.54	0.14	10209	5.00	995.81	0.51
12/08/21	16408	10.00	1058.39	0.51	41868	0.00	2214.61	0.00	18751	1.00	2123.49	0.03	120	0.00	15.54	0.00	10214	5.00	996.32	0.51
01/05/22	16583	6.25	1163.13	3.74	41882	0.50	2216.84	0.08	18791	1.43	2125.19	0.06	156	1.29	17.31	0.06	10292	2.79	1004.54	0.29
01/07/22	16590	3.50	1163.47	0.17	41883	0.50	2217	0.08	18793	1.00	2125.27	0.04	158	1.00	17.43	0.06	10298	3.00	1005.13	0.30
03/07/22	16782	3.25	1178.09	0.25	41908	0.42	2220.91	0.07	18861	1.15	2127.95	0.05	242	1.42	21.46	0.07	10443	2.46	1020.16	0.25
05/31/22	17038	3.01	1201.13	0.27	41941	0.39	2226.04	0.06	18958	1.14	2133.43	0.06	350	1.27	26.67	0.06	10651	2.45	1041.24	0.25
06/01/22	17041	3.00	1202.52	1.39	41942	1.00	2226.19	0.15	18959	1.00	2133.51	0.08	350	0.00	26.67	0.00	10653	2.00	1041.47	0.23
06/02/22	17044	3.00	1202.89	0.37	41942	0.00	2226.19	0.00	18959	0.00	2133.51	0.00	350	0.00	26.67	0.00	10654	1.00	1041.59	0.12
08/08/22	17241	2.94	1225.93	0.34	41954	0.18	2229.4	0.05	19037	1.16	2137.93	0.07	431	1.21	30.57	0.06	10816	2.42	1058.16	0.25
09/08/22	17366	4.03	1239	0.42	41983	0.94	2276.9	1.53	19086	1.58	2140.69	0.09	484	1.71	33.15	0.08	10900	2.71	1067.42	0.30
11/07/22	17523	2.62	1253.68	0.24	42000	0.28	2280.09	0.05	19145	0.98	2143.73	0.05	547	1.05	36.15	0.05	11010	1.83	1089.52	0.37
03/06/23	17924	3.37	1282.08	0.24	42037	0.31	2286.83	0.06	19263	0.99	2149.35	0.05	696	1.25	43.45	0.06	11260	2.10	1106.54	0.14

ESCWD - Equipment Inventory Replacement

PUMPS

Item	Location	Status	Purchase Date	In Use Date	Life Span (yr)	Rebuild Date	Model	S/N	Purchase Price	Est. Replace Cost	Date of Est.	Est. Replace Date
Disposal Pump 1	Plant	In Use	1996	1996	30		S4PX750DC	S28373		$ 10,160.00	2021	2026
Disposal Pump 2	Plant	In Use	1996	1996	30	Aug-18	S4PX750DC	S28372		$ 10,160.00	2021	2026
Recirc. Pump 1	Plant	In Use	1996	1996	30		S3HX300DC	S28374		$ 6,326.67	2021	2026
Recirc. Pump 2	Plant	In Use	1996	1996	30	Aug-18	S3HX300DC	S28375		$ 6,326.67	2021	2026
Recirc. Pump 3	Plant	In Use	1996	1996	30		S3HX300DC	S28376		$ 6,326.67	2021	2026
Recirc. Pump 4	Plant	In Use	1996	1996	30		S3HX300DC	S28377		$ 6,326.67	2021	2026
Pump X	*Lift Station*	*In Use*										
Pump Y	*Lift Station*	*In Use*										
Pump X Replacement	*Storage*	*idle*	*2021*									
Pump Y Replacement	*Storage*	*idle*	*2021*									

METERS

Item	Location	Status	Purchase Date	In Use Date	Life Span (yr)	Rebuild Date	Model	S/N	Purchase Price	Est. Replace Cost	Date of Est.	Est. Replace Date

COMPUTERS/PANELS

Item	Location	Status	Purchase Date	Purchase Date	Life span (yr)	Rebuild Date	Model	S/N	Purchase Price	Est. Replace Cost	Date of Est.	Est. Replace Date
UV Disinfection Panel	*Plant*	*Faulty*										
Computer (interface)	*Bus Barn*	*In Use*										

March 31, 2023

Edison WWTF Operators Report

March 1st, Erin and I collected monthly samples for analysis at Edge Analytical. The flow was 6792 gallons and the return rate was 6.32:1. The recirculating tank pH was 6.7, and effluent pH was 6.4. I inspected the site and was unable to observe any ponding on the gravel filters by sight or smell and could hear the recirculating gravel filter pumps cycle. A visual inspection of the recirculating ball appeared to be functioning correctly and the facility appears to be clean and well-kept.

March 8th, The Edge analytical report showed a Fecal count of 4.5 MPN/100ml and an 87% reduction in TSS and a 95% reduction in BOD, all found to be within the expected range.

March 31st, Erin and I cleaned the UV lamps, recirculating ball valve and a visual inspection of both appeared to be functioning correctly. The flow was 5196 gallons and the return rate was 8.26:1, I was unable to observe any ponding on the gravel filters by sight or smell and could hear the recirculating gravel filter pumps cycle.

Sincerely,

Don Erickson
Sewer Department Supervisor

Sewer Department
900 S. Section St, Burlington, WA 98233 • Phone (360) 757-0485 • Email done@burlingtonwa.gov

SKAGIT COUNTY EDISON CLEAN WATER DISTRICT

SKAGIT COUNTY **WASHINGTON**

DRAFT

WASTEWATER CAPACITY PLAN

G&O #22596
APRIL 2023

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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CHAPTER 2 – REGULATORY REQUIREMENTS

CHAPTER 3 – ANALYSIS OF EXISTING WASTEWATER SYSTEM

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LIST OF FIGURES

No.	Figure	Follows Page

APPENDICES

CHAPTER 1

INTRODUCTION

This Edison Wastewater Capacity Plan ("Plan") was developed for the Skagit County Edison Clean Water District to address capacity issues experienced at the Edison wastewater system, likely caused by excessive groundwater infiltration and stormwater inflow (I/I). This excessive I/I may be caused by a high groundwater table as a result of high tides and storm events, and stormwater entering into the gravity system through leaky pipes, roof drain connections, and/ or other drain connections. This I/I causes the influent flow to the Edison Wastewater Treatment Facility (WWTF) and effluent disposal system to exceed their hydraulic capacities. This Plan evaluates the potential to reduce I/I to address the capacity issue. Modifications to and expansion of the wastewater treatment system and effluent disposal system, are also considered as a solution to the capacity issues. The Capacity Plan is required by the District's State Waste Discharge Permit and must be submitted to Ecology by March 1, 2024.

The following tasks are documented in the Wastewater Capacity Plan:

1. Data Collection and analysis of WWTF DMRs, pump station run time data, updated sewer base map information, water use information, and sewer connection information, etc.
2. Development of alternatives for modifications to the wastewater collection and treatment system to provide adequate capacity to accommodate the wastewater flows from Edison.
3. Evaluation of alternatives including impacts, costs and effectiveness.
4. Selection of alternatives.

The plan is organized into the follow chapters:

1. Chapter 1 Introduction – Describe the purpose and need for the Plan and background related to the issues and Plan.
2. Chapter 2 Regulatory Requirements – Summarize existing permits, agreements and regulations affecting the Plan.
3. Chapter 3 Analysis of Existing Wastewater System – Analyze available pump runtime data, WWTF DMRs, weather data, wastewater sampling data, design documents, operating reports, etc. Evaluate the performance of the collection and treatment system, and determine the magnitude, cause and impact of excessive I/I.

4. Chapter 4 Evaluation of Compliance Alternatives – Identify and evaluate wastewater collection and treatment system alternatives, and recommend improvements to provide adequate capacity.

STATE WASTE DISCHARGE PERMIT

As stated previously, Ecology implements the Groundwater Standards through issuance of a State Waste Discharge Permit. The permit details the effluent limits, monitoring requirements, and special conditions. Procedures for issuance of a State Waste Discharge Permit are presented in Chapter 173-216 WAC.

The current Edison WWTF State Waste Discharge Permit ST0045515 and fact sheet are attached as Appendix A. The permit was issued in January 31, 2020 and will expire on February 28, 2025. The City's current ST permit effluent limitations are summarized in Table 2-3.

TABLE 2-3

Summary of Edison WWTF ST Permit Effluent Limits

Parameter	Average Monthly	
Carbonaceous Biochemical Oxygen Demand (5-day) (BOD_5)	30 milligrams/liter (mg/L)	
Total Suspended Solids (TSS)	30 milligrams/liter (mg/L)	
Parameter	**Monthly Geometric Mean**	
Fecal Coliform Bacteria	200/100 milliliter (mL)	
Parameter	**Minimum**	**Maximum**
pH	6.0 standard units	9.0 standard units

The permit specifies the following limits for influent flow and loadings:

- Maximum Day Flow – 24,000 gpd
- Maximum Day BOD_5 loading – 56 lbs/day
- Maximum Day TSS loading – 56 lbs/day

Flows to the drainfields must not exceed the following design criteria:

- Drainfield 1 Maximum Day Flow – 1,650 gpd
- Drainfield 2 Maximum Day Flow – 18,000 gpd
- Emergency Upflow Trench – 1,846 gpd

STATE ENVIRONMENTAL POLICY ACT

It is anticipated that this Wastewater Capacity Plan will be followed up by an Engineering Report to provide detailed recommendations for improvements. As required by WAC 173-240-050, projects proposed in the Engineering Report will need to be evaluated through a State Environmental Policy Act (SEPA) checklist and the State

CHAPTER 3

ANALYSIS OF EXISTING WASTEWATER SYSTEM

This chapter provides a description of the existing facilities, assessment of flows and loadings, evaluation of system condition and performance, and discussion of recent concerns.

EXISTING FACILITIES

The District installed a small diameter combined gravity and pressure STEP (septic tank effluent pump) collection system and wastewater treatment facility in 1997. The Edison sewer collection system can be divided into three tributary areas. The overall sewer system (including the sheet numbers of the record drawings included in Appendix B) obtained from the Collection System Operation and Maintenance Manual is shown in Figure 3-1.

COLLECTION SYSTEM

The collection system conveys septic tank effluent from homes and restaurants to the treatment plant, serving approximately 74 connections, including six food service establishments (FSEs) and one school (without cooking cafeteria). There are no industrial users connected to the system. There are eleven stubs remaining for future connections. The system's only lift station pumps wastewater from the central and south tributary areas. The north tributary area is served by the north STEP system and the flow is conveyed to the lift station discharge force main. The combined flow including flow from Edison school is sent to the wastewater treatment facility. Sewer connections are summarized in Table 3-1.

Infiltration and Inflow (I/I)

Wastewater flow rates that are much higher during wet-weather periods than during dry-weather periods indicate the presence of infiltration and/or inflow (I/I). Infiltration is groundwater that enters a sewer system through sites such as cracks in pipes and manholes, loose pipe joints, foundation drains, and basement sump pumps. It is often assumed to be relatively constant throughout the wet weather periods due to the saturation of the soil surrounding the sewer pipes. Inflow is surface water that enters the system through sites such as cross connections with storm drains and downspouts, area drains, unplugged and leaking cleanouts, and ponding on manhole covers. It is assumed to vary significantly based on rainfall rates. High volumes of I/I, for example, coming from the gravity connection between the house and septic tank, the septic tank, the gravity line from lift station or tide intrusion, consume the capacity of pipes, lift stations, and treatment facilities, requiring that larger facilities be designed to accommodate the increased flow in the wastewater system.

TABLE 3-1

Sewer Connections

Site No.	Tributary Area	Sheet No.	Site Address	Residential		Commercial	School	Stubout
				Pump	Gravity	Gravity	Pump	
1	S	1	5864 Farm to Market Road					X
2	S	21	5852 Farm to Market Road	X				
3	S	4	5936 Farm to Market Road	X				
4	S	4	6030 Farm to Market Road	X				
5	S	4	5848 Farm to Market Road	X				
6	S	4	5987 Farm to Market Road	X				
7	S	4	5979 Farm to Market Road	X				
8	S	4	5941 Farm to Market Road	X				
9	S	5	5927 Farm to Market Road	X				
10	S	5	5885 Farm to Market Road	X				
11	S	5	14032 Gilmore Avenue	X				
12	S	6	14058 Gilmore Avenue		X			
13	S	6	14068 Gilmore Avenue		X			
14	S	6	14096 Gilmore Avenue		X			
15	S	7	Gilmore Avenue					X
16	S	7	5847 Main Avenue		X			
17	S	7	5848 Main Avenue					X
18	S	8	5819 Main Avenue		X			
19	S	8	5811 Main Avenue		X			
20	S	11	5797 Main Avenue			X		
PM	S	4	6058 Main Avenue	X				
21	C	10	14119 McTaggart Avenue		X			
22	C	10	14091 McTaggart Avenue		X			
23	C	10	14075 McTaggart Avenue		X			
24	C	10	14059 McTaggart Avenue		X			
25	C	10	14051 McTaggart Avenue					X
26	C	10	14033 McTaggart Avenue		X			
27	C	9	14011 McTaggart Avenue		X			
28	C	9	5717 Gilkey Avenue	X				
29	C	9	5742 Gilkey Avenue	X				

TABLE 3-1 – (continued)

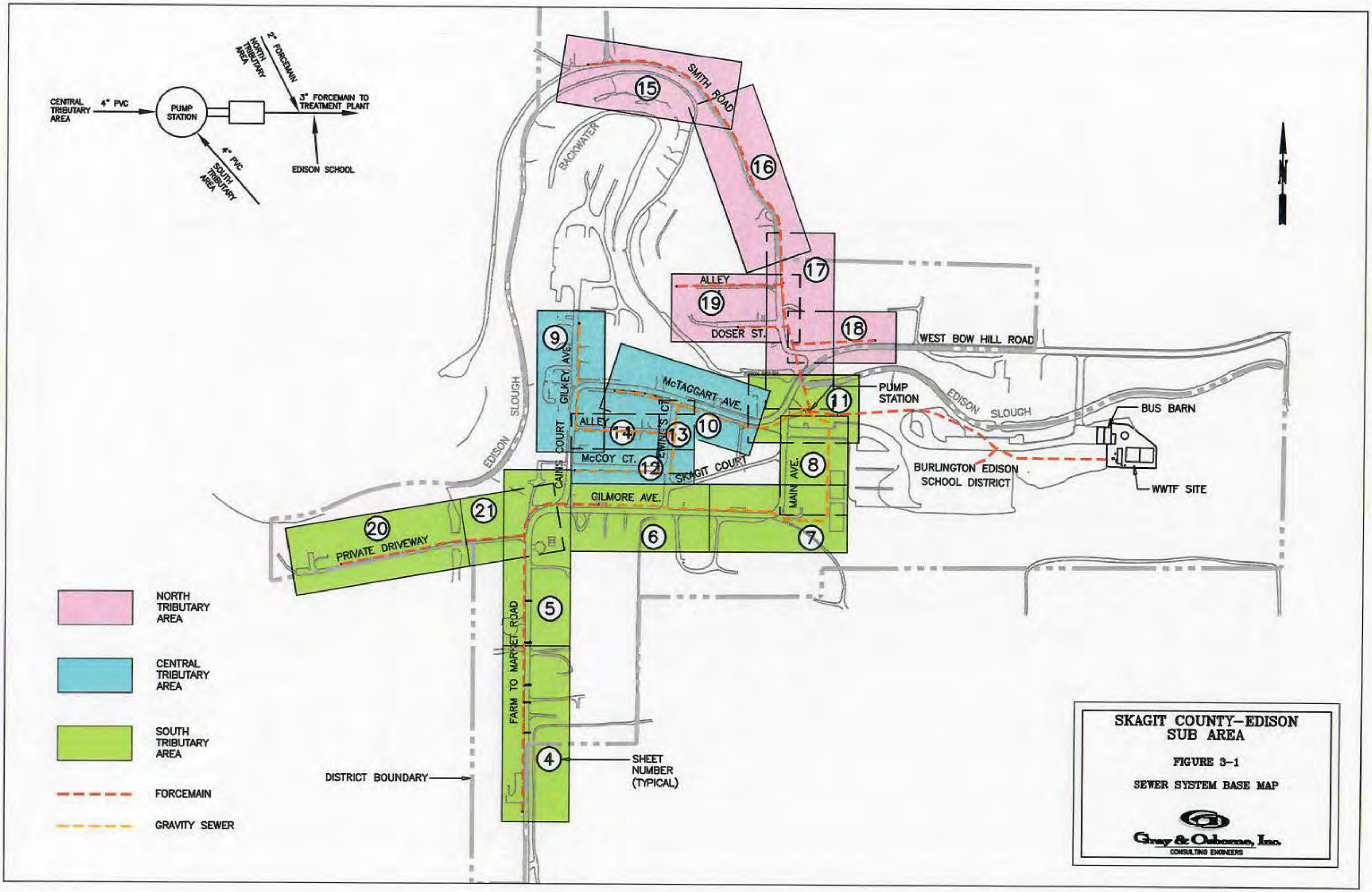
Sewer Connections

Site No.	Tributary Area	Sheet No.	Site Address	Residential		Commercial	School	Stubout
				Pump	Gravity	Gravity	Pump	
30	C	9	5754 Cain's Court			X		
31	C	9	5766 Cain's Court			X		
32	C	9	5778 Cain's Court		X			
33	C	9	5782 Cain's Court		X			
34	C	9	5800 Cain's Court			X		
35	C	12	5800 Cain's Court		X			
36	S	5	14003 Gilmore Avenue			X		
36a	S	5	5848 Farm to Market Road	X				
37	S	6	5829 Cain's Court			X		
38	S	6	5821 Cain's Court		X			
39	C	12	14061 Gilmore Avenue		X			
40	C	12	14073 Gilmore Avenue		X			
41	S	6	14083 Gilmore Avenue		X			
42	S	6	5841 Ewing's Court		X			
43	S	7	14137 Gilmore Avenue					X
44	S	7	14137 Gilmore Avenue					X
45	C	10	5836 Main Avenue		X			
46	C	10	14118 McTaggart Avenue		X			
47	C	10	14108 McTaggart Avenue		X			
48	C	10	14090 McTaggart Avenue					X
49	C	13	14078 McTaggart Avenue		X			
50	C	10	5815 Ewing's Court		X			
51	C	10	14064 McTaggart Avenue		X			
52	C	10	14050 McTaggart Avenue		X			
53	C	10	5718 Gilkey Avenue					X
54	C	10	14034 McTaggart Avenue		X			
55	C	14	14022 McTaggart Avenue		X			
56	C	14	14010 McTaggart Avenue		X			
57	C	14	5787 Cain's Court					X
58	C	14	14023 McCoy's Court		X			

TABLE 3-1 – (continued)

Sewer Connections

Site No.	Tributary Area	Sheet No.	Site Address	Residential		Commercial Gravity	School Pump	Stubout
				Pump	Gravity			
59	C	14	14037 McCoy's Court		X			
60	C	14	14043 McCoy's Court		X			
61	C	13	14057 McCoy's Court		X			
62	N	15	5800 Ewing's Court		X			
63	N	16	5548 Smith Road	X				
64	N	19	5557 Smith Road					X
65	N	19	5694 Smith Road	X				
66	N	19	14095 Doser Street	X				
67	N	19	Non-Connection					
68	N	19	14119 Doser Street	X				
69	N	19	14129 Doser Street	X				
70	N	19	14114 Doser Street					X
71	N	17	5722 Smith Road	X				
72	N	18	14239 West Bow Hill Road	X				
School			5801 Main Avenue				X	
Totals				**21**	**35**	**6**	**1**	**11**


CENTRAL TRIBUTARY AREA
4" PVC
PUMP STATION
2" FORCEMAIN
NORTH TRIBUTARY AREA
3" FORCEMAIN TO TREATMENT PLANT
4" PVC
SOUTH TRIBUTARY AREA
EDISON SCHOOL
SMITH ROAD
BACKWATER
ALLEY
DOSER ST.
WEST BOW HILL ROAD
GILKEY AVE.
McTAGGART AVE.
PUMP STATION
EDISON SLOUGH
BUS BARN
ALLEY
COURT
McCOY CT.
EWING'S CT
SKAGIT COURT
CAINS
GILMORE AVE.
MAIN AVE.
BURLINGTON EDISON SCHOOL DISTRICT
WWTF SITE
PRIVATE DRIVEWAY
FARM TO MARKET ROAD
NORTH TRIBUTARY AREA
CENTRAL TRIBUTARY AREA
SOUTH TRIBUTARY AREA
FORCEMAIN
GRAVITY SEWER
DISTRICT BOUNDARY
SHEET NUMBER (TYPICAL)
SKAGIT COUNTY–EDISON SUB AREA
FIGURE 3-1
SEWER SYSTEM BASE MAP
Gray & Osborne, Inc.
CONSULTING ENGINEERS

Collection System Evaluation

The individual household septic tank effluent (STEP) pumps that are located in most of the north tributary area (Sheets 15,17,18,19 on the maps in Appendix B, as referenced on Figure 3-1), middle of the south tributary area along the Farm to Market Road (Sheets 4,5,21) and western part of central tributary area (Sheet 9) are equipped with runtime meters. I/I has reportedly been observed entering into some of the fiberglass septic tanks through the tank covers. The run time data were evaluated to determine the magnitude of I/I upstream of the individual STEP pumps. Table 3-2 summarizes the pump runtime data provided by the District, including pump runtime during storm events and the dry weather season. The ratios of maximum daily pump runtime to dry weather season pump runtime were calculated to identify the connections with the highest upstream I/I, which are shown in **bold** in the table. Further inspection of those sites is recommended.

As presented in Table 3-2, pump runtime was converted to the corresponding flows using the fixed average design flow of 8.125 gpm for each STEP pump. (The pumps are Environment One (E-1) pumps, for which the flow does not generally vary significantly with head.) WWTF influent during the same period was compared to the total STEP pump flow to assess the impact of the STEP pump flow during both wet and dry season. The top ten storm events (over the study period from March 2020 through December 2022) based on the four-day average daily rainfall (to take into account the impact of extended rainfall on saturated soil) are summarized in Table 3-3. The January 5-7, 2022 storm event, an estimated 0.2-year storm event, which was not among the top ten storm events, was selected to represent the wet season condition since relatively complete runtime data were available for that event. The results show the STEP pumps contributed 50 percent of the WWTF influent during that wet season storm event, while only 22 percent during the dry weather season. It is estimated that 2,887 gpd (4,169 gpd - 1,282 gpd), equivalent to 69 percent of the STEP flow in that wet season storm event, was from I/I. That demonstrates that the areas with STEP pumps contribute to I/I and should be a focus of future I/I control.

The properties on each type of service as well as the properties with high I/I upstream of the STEP pumps are indicated in Figure 3-2.

TABLE 3-2

Residential STEP Runtime and Flow Summary

Residential Pump, Site	Sewer Base Map Sheet No.	Storm Event		Dry Season	Max Daily Runtime (hr)	Max Daily Runtime/ Avg Dry Season Run Time	Storm Event	Dry Season
		12/6-8, 2021	1/5-7, 2022	5/31-6/2,2022			1/5-7, 2022	5/31-6/2,2022
		Average Daily Runtime (hr)					Average Daily Flow (gpd)	
2	21	0.29	0.44	0.15	0.44	3.0	215	71
3	4	0.10	0.40	0.14	0.40	2.86	195	68
4	4	0.16	0.03	0.40	0.16	0.40	15	195
5	4	NA	0.34	NA	0.34	NA	163	NA
6	4	NA	NA	NA	NA	NA	NA	NA
7	**4**	**0.04**	**2.74**	**0.05**	**2.74**	**60.89**	1,336	22
8	4	0.15	0.15	0.13	0.15	1.15	76	66
9	**5**	**0.24**	**0.73**	**0.11**	**0.73**	**7.00**	358	51
10	**5**	**0.61**	**0.83**	**0.07**	**0.83**	**11.93**	407	34
11	5	0.12	0.19	NA	0.23	NA	93	NA
PM	NA	0.13	0.16	NA	0.16	NA	78	NA
28	**9**	**0.16**	**0.94**	**0.12**	**0.94**	**7.83**	458	59
29	**9**	**0.15**	**0.95**	**0.29**	**0.95**	**3.20**	461	144
63	**15**	**0.005**	**NA**	**0.005**	**0.077**	**15.43**	NA	2
65	19	NA	NA	NA	NA	NA	NA	NA
66	**19**	**0.53**	**0.17**	**0.88**	**3.74**	**4.25**	83	429
68	19	0.08	0.08	0.08	0.16	2.1	39	37
69	17	0.03	0.04	0.04	0.06	1.5	19	20
71	17	0.07	0.06	NA	0.14	NA	29	NA
72	18	0.51	0.30	0.17	0.51	2.9	144	85
Average							245	92
Total							4,169	1,282
WWTF Influent							8,396	5,708
Percent of STEP Pump Flow to WWTF Influent							50%	22%

(1) **Bold** sites are residents with high ratio of maximum daily runtime to dry weather season runtime, identified as having high upstream I/I.

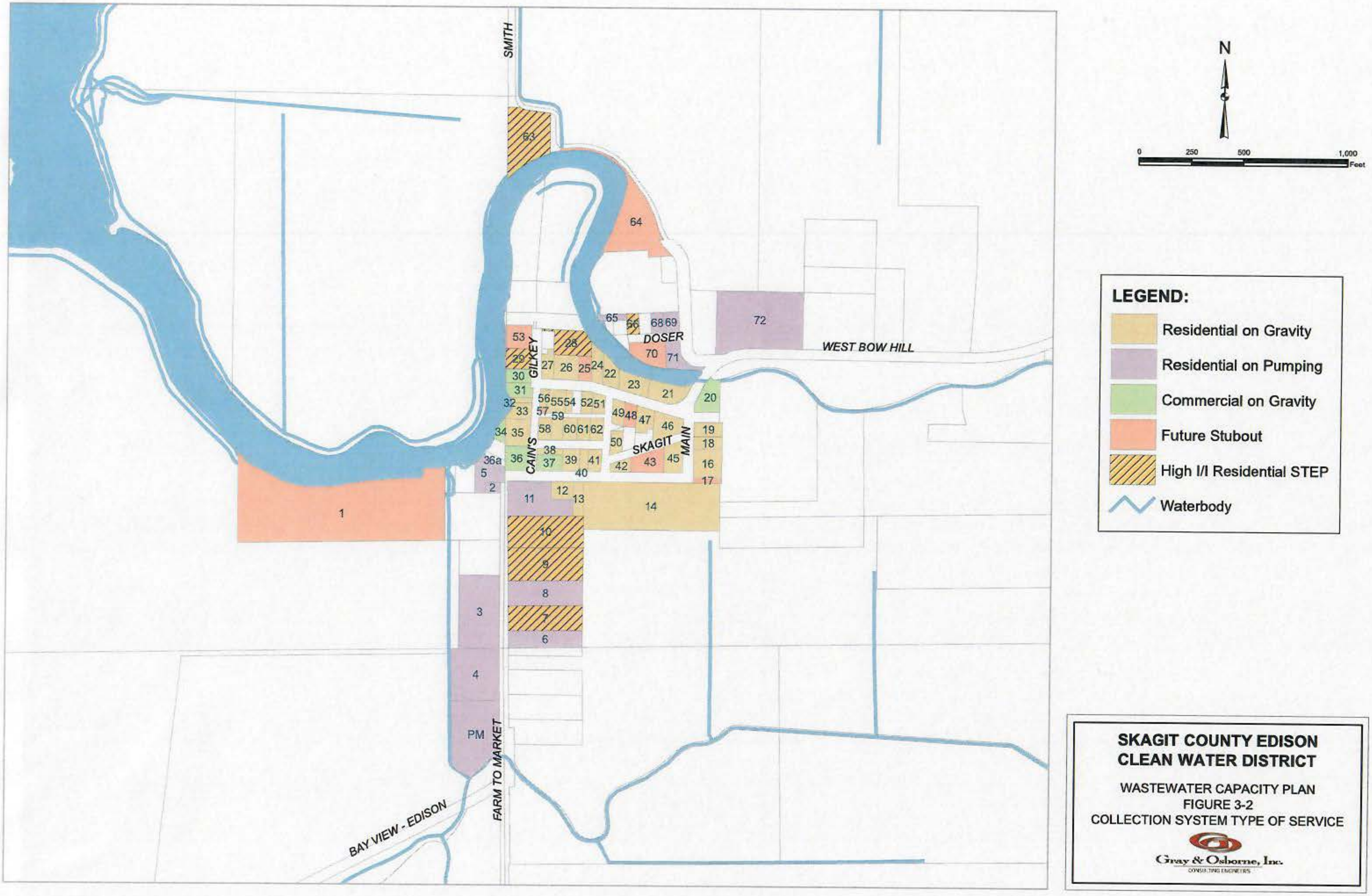

N
0
250
500
1,000
Feet
SMITH
DOSER
WEST BOW HILL
GILKEY
CAIN'S
SKAGIT
MAIN
FARM TO MARKET
BAY VIEW - EDISON
LEGEND:
Residential on Gravity
Residential on Pumping
Commercial on Gravity
Future Stubout
High I/I Residential STEP
Waterbody
SKAGIT COUNTY EDISON
CLEAN WATER DISTRICT
WASTEWATER CAPACITY PLAN
FIGURE 3-2
COLLECTION SYSTEM TYPE OF SERVICE
Gray & Osborne, Inc.

TABLE 3-3

Top Ten Storm Events (March 2020 through December 2022)

Date	Storm Event Ranking	4-Day[(1)] Avg. Rainfall (in)	Influent (gpd)	Influent Flow Ranking
11/14/2021	1	0.97	9,360	8
11/15/2021	2	0.90	24,684	1
11/5/2022	3	0.79	10,056	7
11/28/2021	4	0.66	12,048	6
10/29/2021	5	0.64	7,872	9
2/5/2021	6	0.60	13,740	5
11/29/2021	7	0.54	20,844	3
2/1/2021	8	0.52	21,396	2
9/18/2021	9	0.51	7,452	10
12/22/2020	10	0.50	17,292	4

(1) Average daily rainfall between a day prior and 2 days after the peak rainfall day

The lift station pump runtime and north tributary area flow totalizer data are summarized and compared with WWTF influent in Table 3-4. The data were recorded every couple of months, and the average daily flows were calculated for each of those intervals. The sum of the lift station and north tributary area flow should be less than the WWTF influent, since additional flow from Edison school discharges directly to the force main to the WWTF. Only limited totalizer data were available since the calibration in August 2022, so the run time based lift station flow is mainly utilized for the analysis. Flow from the lift station is estimated based on the nominal 25-gpm pump design capacity. Since the lift station has centrifugal pumps, the discharge from these pumps is impacted by the north tributary area flow to the common force main. Therefore, runtime based lift station flow might be overestimated. Edison school pump capacity was not available during the time of study to quantify the school flow rates.

Based on the pump run time data, it was observed the central and south tributary areas, which convey flow to the lift station, contribute approximately 73 percent of the WWTF influent during the July-September dry season. The percent of the flow is decreased to 60 percent during the November – February wet season, indicating the proportion of the north tributary area flow is increased during the wet season, due to higher I/I compared to the central and south tributary area.

The central and south tributary areas wet season includes approximately 1,049 gpd I/I (LS wet season flow 5,067 gpd – LS dry season flow 4,018 gpd), the north tributary area wet season includes approximately 1,800 gpd I/I (WWTF wet season flow 8,331 gpd – WWTF dry season flow 5,482 gpd – central and south tributary areas I/I 1,049 gpd), assuming negligible I/I from Edison School. As shown in Figure 3-2, the north tributary area is mostly served by STEP pumps due to its low elevation along the Edison Slough. The results further confirmed that these areas with STEP pumps have high I/I.

TABLE 3-4

Lift Station Flow Summary

Start Record Date	End Record Date	Lift Station Average Daily Run Time (hr)	Lift Station Average Daily Flow Based on Run Time (gpd)	North Tributary Area Flow by Totalizer (gpd)	Lift Station Flow + North Tributary Area Flow (gpd)	WWTF Average Daily Influent (gpd)	Lift Station Flow/ WWTF Influent
01/11/21	04/13/21	2.81	4,208	NA	NA	6,985	60%
04/13/21	05/11/21	2.30	3,446	NA	NA	5,717	60%
05/11/21	06/14/21	2.60	3,904	NA	NA	6,132	64%
06/14/21	07/12/21	2.72	4,076	NA	NA	5,808	70%
07/12/21	09/13/21	2.62	3,928	NA	NA	5,665	69%
09/13/21	10/11/21	2.33	3,502	NA	NA	5,733	61%
10/11/21	11/08/21	2.51	3,758	NA	NA	6,329	59%
11/08/21	12/13/21	4.36	6,539	NA	NA	10,081	65%
12/13/21	01/10/22	3.81	5,712	NA	NA	9,089	63%
01/10/22	02/07/22	2.93	4,390	NA	NA	7,535	58%
02/07/22	03/07/22	2.62	3,923	NA	NA	7,065	56%
03/07/22	04/11/22	2.69	4,038	NA	NA	7,126	57%
04/11/22	05/09/22	2.61	3,914	NA	NA	6,680	59%
05/09/22	06/06/22	2.51	3,759	NA	NA	6,004	63%
06/06/22	07/11/22	2.84	4,260	NA	NA	6,464	66%
07/11/22	08/08/22	2.66	3,985	NA	NA	5,071	79%
08/08/22	09/08/22	2.72	4,082	466	4,548	5,382	76%
09/08/22	11/07/22	2.50	3,756	537	4,293	6,060	62%
11/07/22	12/12/22	2.42	3,627	519	4,146	6,620	55%
Yearly Average		**2.77**	**4,148**	**507**	**4,329**	**6,608**	**63%**
Dry Season (Jul-Sept) Average		**2.68**	**4,018**	**466**	**4,548**	**5,482**	**73%**
Wet Season (Nov-Feb) Average		**3.38**	**5,067**	**519**	**4,146**	**8,331**	**60%**

WASTEWATER TREATMENT FACILITY

As noted in the State Waste Discharge (SWD) Permit Fact Sheet, the treatment process includes the individual septic tanks, a recirculating gravel filter, and UV disinfection prior to disposal to drainfields.

Most of the individual septic tanks are 1,000-gallon fiberglass-reinforced plastic (FRP) tanks that provide primary sedimentation, floating solids removal, oil and grease removal, anaerobic decomposition of solids, and physical filtration of non-settleable particles. Septic tanks remove a majority of the BOD5 and TSS from the wastewater prior to conveyance through the collection system. The septic tanks serve as sedimentation tanks and prevent solid material from being pumped to the WWTF which could ultimately plug the filters. Solids accumulate in the tanks over time and are hauled by a contractor to the Burlington WWTF. In addition, septage from the residents not connected to the collection system is also hauled by contractor to the Burlington WWTF.

The commercial restaurants and other FSEs have 1,500-gallon FRP septic tanks. All restaurants have grease traps installed to remove fats, oil and grease (FOG) prior to being introduced into the collection system.

The recirculating gravel filtration system further removes TSS, BOD, and some nitrogen, using physical, chemical, and biological processes. The filtration system has four zones, two for each of the two gravel filters. Four recirculation chamber pumps deliver wastewater to each of the four quadrants of the recirculating gravel filters. The pumps are operated sequentially to rotate bed dosing. Wastewater passes through the filters and recollects in the recirculation tanks on average five times before flowing from the gravel filters through the main settling tank, to a smaller secondary settling tank, and finally through the UV disinfection system and out to the disposal fields. The recirculation tank is cleaned about every 2 years and the settled solids are hauled off to the Burlington WWTF.

The Trojan UV system sits in a stainless steel channel and consists of three modules in parallel with two lamps per module. Figure 3-3 shows the WWTF process schematic.

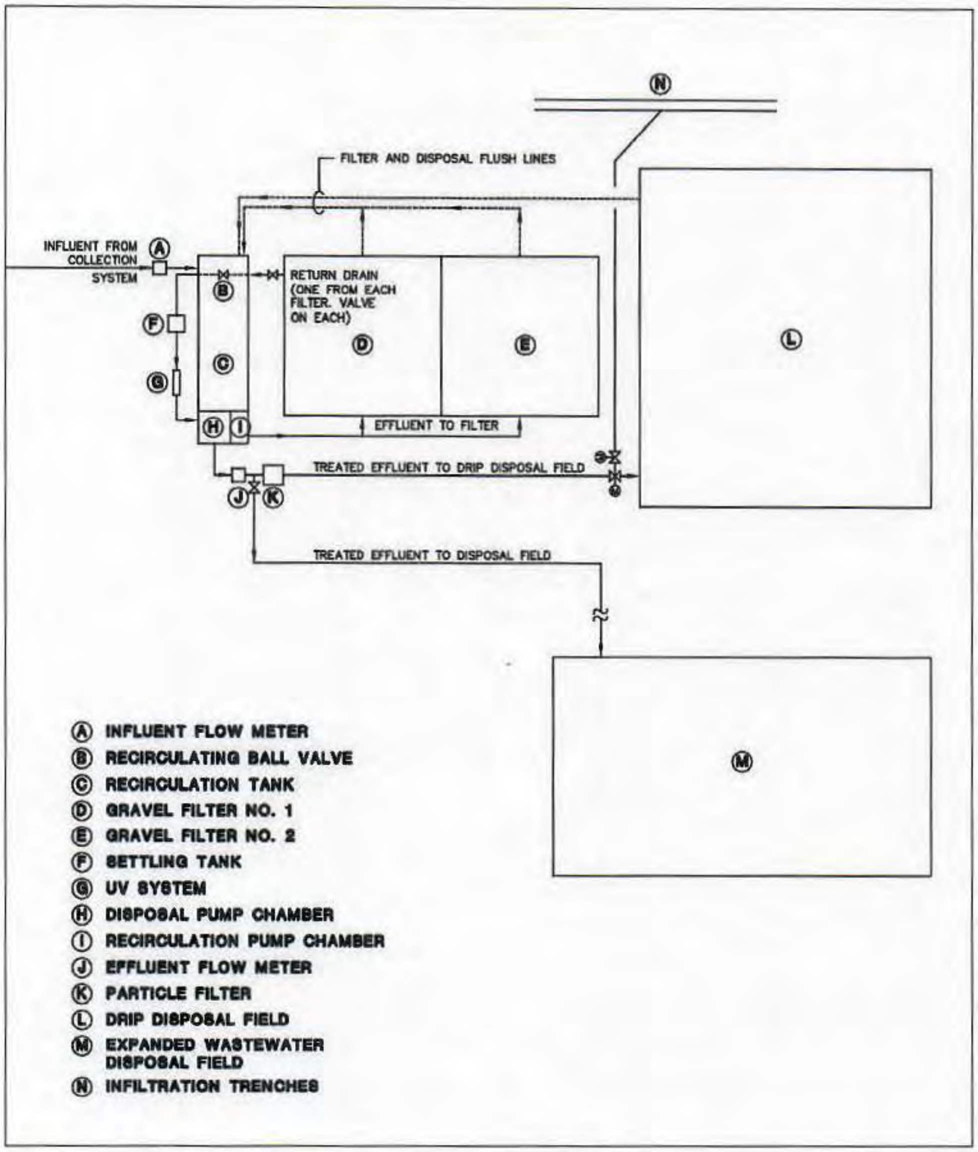


FIGURE 3-3

WWTF Process Schematic

The WWTF has a backup diesel generator on-site that is capable of running the entire process, including the lift station, in the event of a power outage. This generator is owned, tested, and maintained by the school. The school tests the generator under load every week.

DISPOSAL SYSTEM

As noted in the SWD Permit Fact Sheet, the District originally installed a subsurface drip irrigation disposal field, Drainfield 1, directly east of the recirculating gravel filter and approximately 200 feet south of Edison Slough. Drainfield 1 contains two irrigation zones. Drainfield 1 operated satisfactorily with the school as the only contributor in the first year of operation. However, when the entire community came online, the District noticed that the treated wastewater sent to the drainfield tended to surface and flow overland toward Edison Slough. The Emergency Upflow Trench was installed as a quick measure to add additional disposal area until another drainfield could be planned and installed. The trench, also with two dosing zones, is located 90 feet north of Drainfield 1 between the drainfield and Edison Slough. In planning for Drainfield 2, in 2002, an investigation was conducted by HWA Geoscience, Inc to evaluate the infiltration/disposal capacity of the Edison WWTF drainfield and disposal trench. It was found that the Drainfield 1 area has poor infiltration due to an impervious layer of very fine material that lies just below the emitters. In addition, the Emergency Upflow Trench did not have the assimilative capacity as originally anticipated.

The findings were summarized in the *2002 Edison WWTF Drainfield Hydrogeological Evaluation* as follows:

- The existing drain field (Drainfield 1) accommodated approximately 1,650 gpd, due to low permeability soils, high ground water table, and shallow ground water gradient.
- The disposal trench installed north of the drainfield accommodated less than 2,000 gpd, for the reasons listed above. The disposal trench received approximately 10,000 gpd actual flows, most of which surfaced and discharged to the slough.
- It was determined that increasing the size of the existing drain field or adding disposal trenches would not accommodate design flows (24,000 gpd) in the area available near the existing drainfield.
- Conditions south of the existing drainfield (Drainfield 1) area appeared more favorable for infiltration, due to the larger area available, sandier soils, and slightly lower ground water table.
- Approximately 1,100 lineal feet of trench extending below all low permeability layers was required to accommodate 12,000 gpd.
- Any infiltration at this site occurred mostly below the ground water table, under saturated flow conditions. Infiltration facilities that expose the greatest cross sectional area to flow (i.e., linear trenches) would maximize infiltration capacity.

The District installed a second, 1,500 ft long chambered drainfield set on pea gravel in 2003. Drainfield 2 consists of six distribution zones. The District now uses both drainfields, with an average flow of 1,000 gallons per day (gpd) being sent to Drainfield 1 and the remaining flow being sent to Drainfield 2. The Emergency Upflow Trench is intended to be used in emergency situations when flow to Drainfields 1 and 2 is limited or restricted.

Groundwater Assessment and Monitoring

To evaluate the effect of the Edison WWTF effluent on groundwater and surface water quality, Ecology conducted a groundwater assessment between September 2014 and April 2016. The results, published in 2018, concluded, with respect to groundwater flow across the site at the Edison WWTF, the following:

- Horizontal groundwater flow in the shallow subsurface zone (generally 0 to 10 feet below ground surface) was inconsistent during the year depending on precipitation levels, generally coinciding with the dry period of June to October and the wet period of November to May.
- Groundwater flow was from the east toward the southwest during the wet period of November to May with monitoring well AKY472 identified as a suitable upgradient location, and monitoring wells AHT085 and AHT090 identified as suitable downgradient locations during this period.
- Groundwater flow was from the south toward the north during the dry period of June to October, and no suitable background monitoring well was identified.
- The highest groundwater level was measured during the wet period of November to May at 0.35 feet above ground surface, and the lowest groundwater level was measured during the dry period at 5.84 feet below ground surface.
- In October, after months of dry weather (low groundwater levels), the start of the school year and corresponding increase in effluent from the WWTF produced a mounding effect causing groundwater flow to radiate from the middle of the site.

The conclusions of the assessment with respect to groundwater quality at the site in proximity to the Edison WWTF include:

- Groundwater sample results at four monitoring wells (AKY469, AHT085, AHT090, and AKY472) indicated that the WWTF effluent may be diluting rather than degrading groundwater quality in the shallow subsurface adjacent to the two drainfields.

- Groundwater sample results at three monitoring wells (AHT089, AHT087, and AHT088) indicated that high concentrations of ions including chloride, bromide, potassium and ammonium may have been a result of salt water intrusion in the southern portion of the site.

- Groundwater sample results for Fecal Coliform and Total Coliform were typically below detection limits except for a period of high precipitation suggesting mixing of groundwater and runoff from adjacent pasture land.

Based on the conclusions and recommendations of the *2014-2016 Ecology Groundwater Assessment of the Edison WWTF*, Skagit County proposed utilizing existing onsite groundwater monitoring wells as the groundwater monitoring well network in the *2021 Proposed Edison Monitoring Well Network Evaluation,* which was submitted in accordance with Condition S8.1 Groundwater Monitoring of the State Waste Discharge Permit for the Edison WWTF. The monitoring would include:

- Groundwater Elevation Monitoring – Water levels at each monitoring well would be measured to within 0.01 foot. The equipment and procedures for measuring the depth to groundwater and calculating groundwater elevations for the site would be put forth in a detailed groundwater monitoring plan.

- Groundwater Quality Monitoring – Quarterly water quality sampling would be used to determine if any water quality impacts are present from the WWTF. Wells are proposed for low-flow sampling to optimize the water quality sampling results and minimize groundwater perturbation that could result in more saline water influencing the results. Skagit County would propose a specific analytical suite or suites with the groundwater sampling work plan.

- Surface Water Quality Monitoring – Skagit County performs routine surface water monitoring at the Edison Slough adjacent to the Edison WWTF. Skagit County proposes including these surface water locations and an additional location at the tributary agricultural drains.

- WWTF Effluent Monitoring – The WWTF effluent would be sampled for fecal coliform prior to cleaning the UV bulbs to ensure that monthly bulb cleaning is sufficient for consistent monthly permit compliance. The effluent flow meters would be calibrated on an annual basis to ensure accurate discharge estimates.

A major issue with the capacity of the drainfields is the settling of the trenches. The trenches have settled such that they no longer have the necessary distance between the distribution pipe and the surface. (There should be 12 inches of clearance and there is now only 3 to 4 inches.). It is recommended that this is addressed in the near future.

Table 3-5 and Figure 3-4 compare Groundwater Monitoring Data from March 2013 to December 2014 to the effluent flow to the drainfields. As shown, high groundwater (low depth from surface) for Drainfield 2 coincided with high effluent flow to Drainfield 2. The effluent flow to Drainfield 2 exceeded the 18,000 gpd design criteria during the periods of the highest ground water level (lowest depth from surface). Drainfield 2 is set up such that it automatically shuts off when the groundwater is high; thus, settling of infiltration trenches causes more frequent shutoff of flows to Drainfield 2 even during situations when the flow is below the design criteria.

TABLE 3-5

Groundwater Level vs. Effluent Flow to Drainfields

Date	Sample Location P10 Depth to Surface (ft)	Sample Location P11 Depth to Surface (ft)	Sample Location P8 Depth to Surface (ft)	Average Depth (ft)	Drainfield 1 Mo, Ave (gpd)	Drainfield 1 Daily Max (gpd)	Drainfield 2 Mo. Ave. (gpd)	Drainfield 2 Daily Max. (gpd)
Mar-13	2.91	4.19	3.51	3.54	1,128	1,370	4,552	9,420
Apr-13	3.33	1.64	2.51	2.49	1,148	1,360	3,636	11,420
May-13	4.66	2.79	3.72	3.72	1,161	1,370	3,888	8,830
Jun-13	3.56	4.83	4.29	4.23	1,263	1,370	4,552	10,450
Jul-13	3.89	5.19	4.56	4.55	1,298	1,360	5,810	8,380
Aug-13	4.13	5.48	4.83	4.81	1,271	1,370	5,562	7,990
Sep-13	3.64	5.56	4.77	4.66	1,318	1,370	6,221	10,770
Oct-13	3.03	5.18	4.05	4.09	1,285	1,360	5,971	8,060
Nov-13	2.69	4.53	3.46	3.56	1,297	1,370	7,419	18,810
Dec-13	2.6	4.46	3.47	3.51	1,308	1,370	6,460	13,290
Jan-14	1.35	3.26	2.14	2.25	1,209	1,370	5,236	13,700
Feb-14	2.05	3.91	2.83	2.93	1,131	1,370	6,055	15,000
Mar-14	0.3	2.04	0.54	0.96	1,103	1,370	5,188	18,850
Apr-14	2.25	4.13	3.03	3.14	1,116	1,370	4,162	10,100
May-14	2.05	3.9	2.88	2.94	1,263	1,370	5,556	18,800
Jun-14	3.00	4.87	4.00	3.96	1,033	1,370	4,836	11,200
Jul-14	3.50	5.44	4.54	4.49	1,258	1,380	4,016	8,510
Aug-14	3.89	5.29	4.63	4.60	1,288	1,370	3,806	8,260
Sep-14	3.89	5.26	4.65	4.60	1,214	1,370	3,246	7,200
Oct-14	2.91	4.9	4.03	3.95	1,122	1,370	5,363	13,920

FIGURE 3-4

Comparison of Groundwater to Surface Depth with Max Daily Effluent Flow to Drainfield 2

WASTEWATER FLOWS AND LOADING

WWTF records for the 3-year period from March 2020 through Dec 2022 were reviewed and analyzed to determine current wastewater characteristics and influent loadings.

WASTEWATER FLOWS

Table 3-6 summarizes reported WWTF flows for the 3-year period of 2020 to 2022. The average dry weather flow was relatively stable over that period. The peak day flow (PDF) typically occurs between December and March. The comparison of plant influent and rainfall in Figure 3-5 shows that wastewater flow is strongly influenced by rainfall. The peak day flow of 30,228 gpd occurred during a major storm event on November 16, 2021. Without hourly flow records available to measure peak hour flows (PHF), a typical peaking factor of 1.3 times the PDF was used to estimate the PHF. Historical peaking factors are presented in Table 3-7.

TABLE 3-6

Historical WWTF Influent Flows (2020 to 2022)

Year	Average Dry Weather Flow (gpd)(1)	Annual Average Flow (gpd)	Maximum Monthly Flow (gpd)	Peak Day Flow (gpd)	Peak Hour Flow (gpd)(2)	Annual Rainfall (in.)
2020	5,421	5,543	6,774	17,292	22,480	35.9
2021	5,703	6,752	10,180	30,228	39,296	54.4
2022	5,539	6,611	9,177	28,080	36,504	39.7
Average	5,555	6,302	8,710	25,200	32,760	43.3
Maximum	5,703	6,752	10,180	30,228	39,296	54.4

(1) Average of July, August, September.
(2) Not measured. Estimated using PHF = 1.3*PDF.

TABLE 3-7

WWTF Influent Flow Historical Peaking Factors (2020 to 2022)

Flow Type(1)	2020	2021	2022
Average Dry Weather Flow	1.0	1.0	1.0
Annual Average Flow	1.0	1.2	1.2
Maximum Monthly Flow	1.2	1.8	1.7
Peak Day Flow	3.2	5.3	5.1
Peak Hour Flow(2)	4.1	6.9	6.6

(1) Peak Factors are based on average dry weather flow.
(2) Peak hour factors assume PHF = 1.3*PDF.

Monthly discharge monitoring reports (DMR) data for this period are provided in Appendix C and summarized in Table 3-8. Flows are measured every day while loadings are sampled once every month.

Graphical representations of daily and average month WWTF flows for the period from March 2020 through December 2022 are shown in Figures 3-5 and 3-6. As shown in the Figure 3-7, the daily permit limit of 24,000 gpd has been exceeded several times during the 2021/2022 winter season.

TABLE 3-8

Summary of Discharge Monitoring Reports (DMRs) WWTF Influent and Effluent Monthly Averages

	Influent						Effluent					
Year	Avg. Monthly Flow (gpd)	Max. Daily Flow (gpd)	BOD_5 (mg/L)	BOD_5 (lb/d)	TSS (mg/L)	TSS (lb/d)	Avg. Monthly Flow (gpd)	Max. Daily Flow (gpd)	BOD_5 (mg/L)	BOD_5 (lb/d)	TSS (mg/L)	TSS (lb/d)
Mar-20	5,906	8,892	21	1.70	8	0.60	5,150	8,240	3	0.13	22	0.94
Apr-20	4,913	6,396	13	1.00	18	1.40	4,043	4,910	2	0.07	8	0.27
May-20	5,055	6,960	8	0.60	16	1.30	4,358	5,600	3	0.11	6	0.22
Jun-20	5,556	7,452	16	1.30	44	3.50	4,785	6,010	2	0.08	12	0.48
Jul-20	5,690	7,428	15	0.75	14	0.70	4,639	6,010	4	0.15	6	0.23
Aug-20	5,197	6,888	6	0.30	13	0.66	4,354	5,620	1	0.04	6	0.22
Sep-20	5,377	7,524	8	0.30	12	0.47	4,934	7,490	2	0.08	4	0.16
Oct-20	5,068	6,490	25	1.10	21	0.90	4,952	9,860	2	0.08	5	0.21
Nov-20	5,896	7,104	61	3.17	39	1.88	5,042	11,030	5	0.21	6	0.25
Dec-20	6,774	17,292	15	0.69	8	0.37	6,450	16,760	3	0.16	5	0.27
Jan-21	7,068	11,184	16	0.95	29	1.70	6,354	17,020	6	0.32	4	0.21
Feb-21	9,393	21,396	20	1.40	11	0.77	8,685	19,640	3	0.22	2	0.14
Mar-21	5,869	12,492	20	0.85	12	0.51	5,268	9,600	3	0.13	3	0.13
Apr-21	5,473	6,900	15	0.71	28	1.32	4,730	6,420	4	0.16	3	0.12
May-21	6,081	7,542	29	1.30	50	2.30	5,194	6,400	4	0.17	8	0.35
Jun-21	6,125	7,392	19	0.97	90	4.60	4,911	5,980	4	0.16	15	0.61
Jul-21	5,819	8,532	6	0.29	16	0.79	4,525	5,380	3	0.11	7	0.26
Aug-21	5,313	7,944	26	1.30	17	0.90	4,858	5,740	5	0.18	2	0.08
Sep-21	5,977	7,452	23	1.20	15	0.79	5,568	7,510	5	0.23	3	0.14
Oct-21	5,748	7,872	23	1.10	13	0.60	5,615	7,700	2	0.09	20	0.94
Nov-21	10,180	30,228	32	1.92	10	0.60	9,479	36,869	2	0.16	3	0.24
Dec-21	7,94	15,456	19	0.95	12	0.60	7,917	18,830	6	0.40	4	0.26
Jan-22	9,177	28,080	48	2.84	23	1.52	8,478	26,250	4	0.28	5	0.35
Feb-22	6,647	9,180	14	0.77	9	0.50	5,312	8,000	2	0.09	4	0.18
Mar-22	7,516	11,004	12	0.72	6	0.36	6,106	9,020	2	0.10	3	0.15

TABLE 3-8 – (continued)

Summary of Discharge Monitoring Reports (DMRs) WWTF Influent and Effluent Monthly Averages

	Influent						Effluent					
Year	Avg. Monthly Flow (gpd)	Max. Daily Flow (gpd)	BOD_5 (mg/L)	BOD_5 (lb/d)	TSS (mg/L)	TSS (lb/d)	Avg. Monthly Flow (gpd)	Max. Daily Flow (gpd)	BOD_5 (mg/L)	BOD_5 (lb/d)	TSS (mg/L)	TSS (lb/d)
Apr-22	6,593	10,944	16	0.70	13	0.57	5,274	7,970	3	0.13	3	0.13
May-22	6,150	7,608	18	0.81	44	1.97	6,357	10,360	6	0.32	11	0.58
Jun-22	6,593	10,836	25	1.38	30	1.59	5,734	10,370	5	0.24	7	0.35
Jul-22	5,374	7,992	91	4.40	40	1.90	4,706	6,790	3	0.12	15	0.59
Aug-22	4,999	6,612	123	4.70	56	2.10	4,342	5,620	4	0.13	8	0.29
Sep-22	6,246	7,956	86	4.20	59	2.90	5,399	6,640	4	0.17	13	0.59
Oct-22	5,810	7,356	49	2.40	29	1.50	4,979	6,220	4	0.18	6	0.25
Nov-22	6,419	10,056	30	1.13	32	1.09	5,385	8,250	4	0.18	5	0.22
Dec-22	7,809	13,992	41	2.10	43	2.20	6,630	12,300	10	0.55	7	0.39
Average	**6,302**	**10,438**	**29**	**1.45**	**25**	**1.31**	**5,603**	**10,189**	**4**	**0.17**	**7**	**0.32**
Maximum	**10,180**	**30,228**	**123**	**4.70**	**90**	**4.60**	**9,479**	**36,869**	**6**	**0.40**	**22**	**0.94**
Minimum	**4,913**	**6,396**	**6**	**0.29**	**6**	**0.36**	**4,043**	**4,910**	**1**	**0.04**	**2**	**0.08**

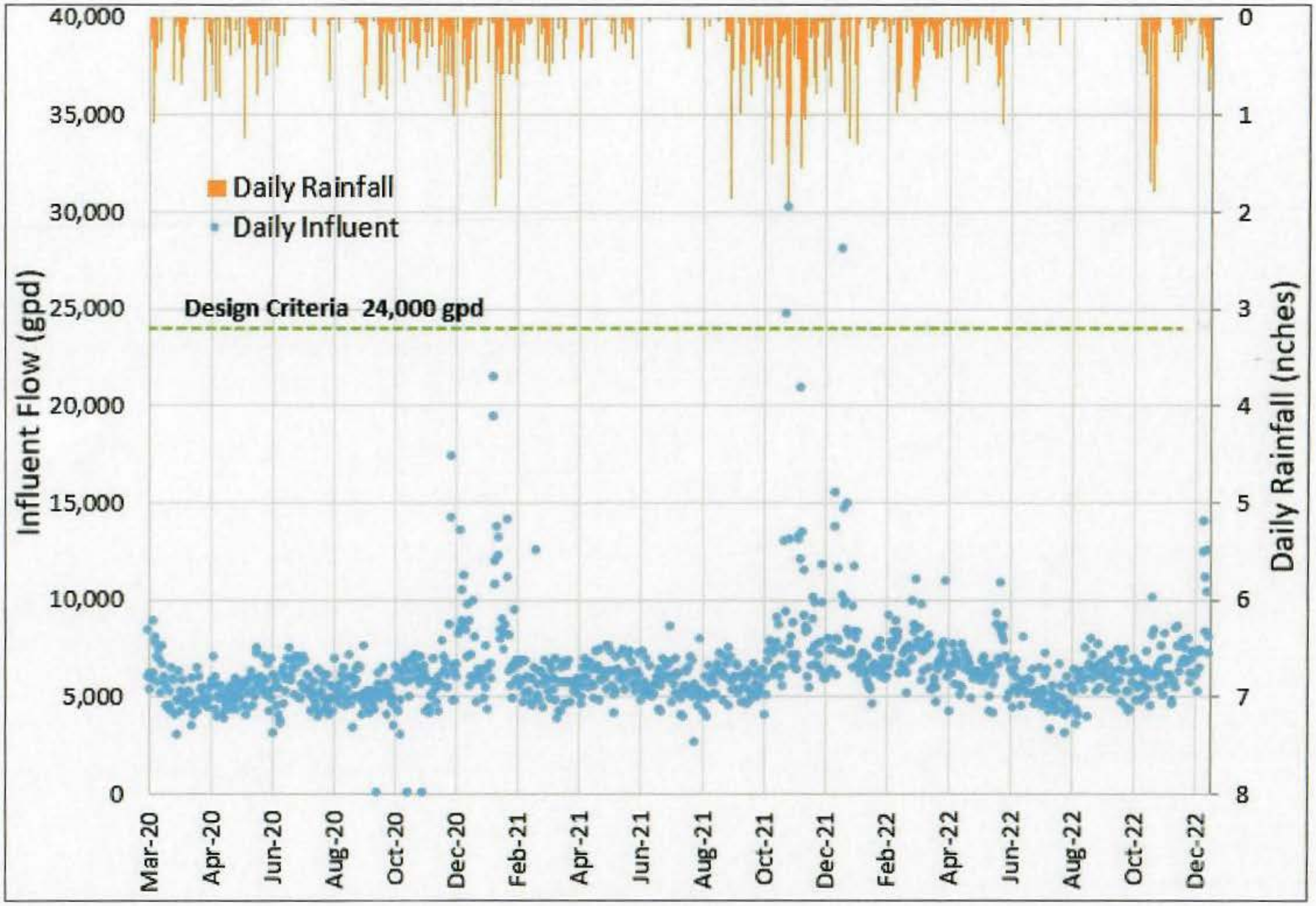


FIGURE 3-5

WWTF Daily Influent Flow

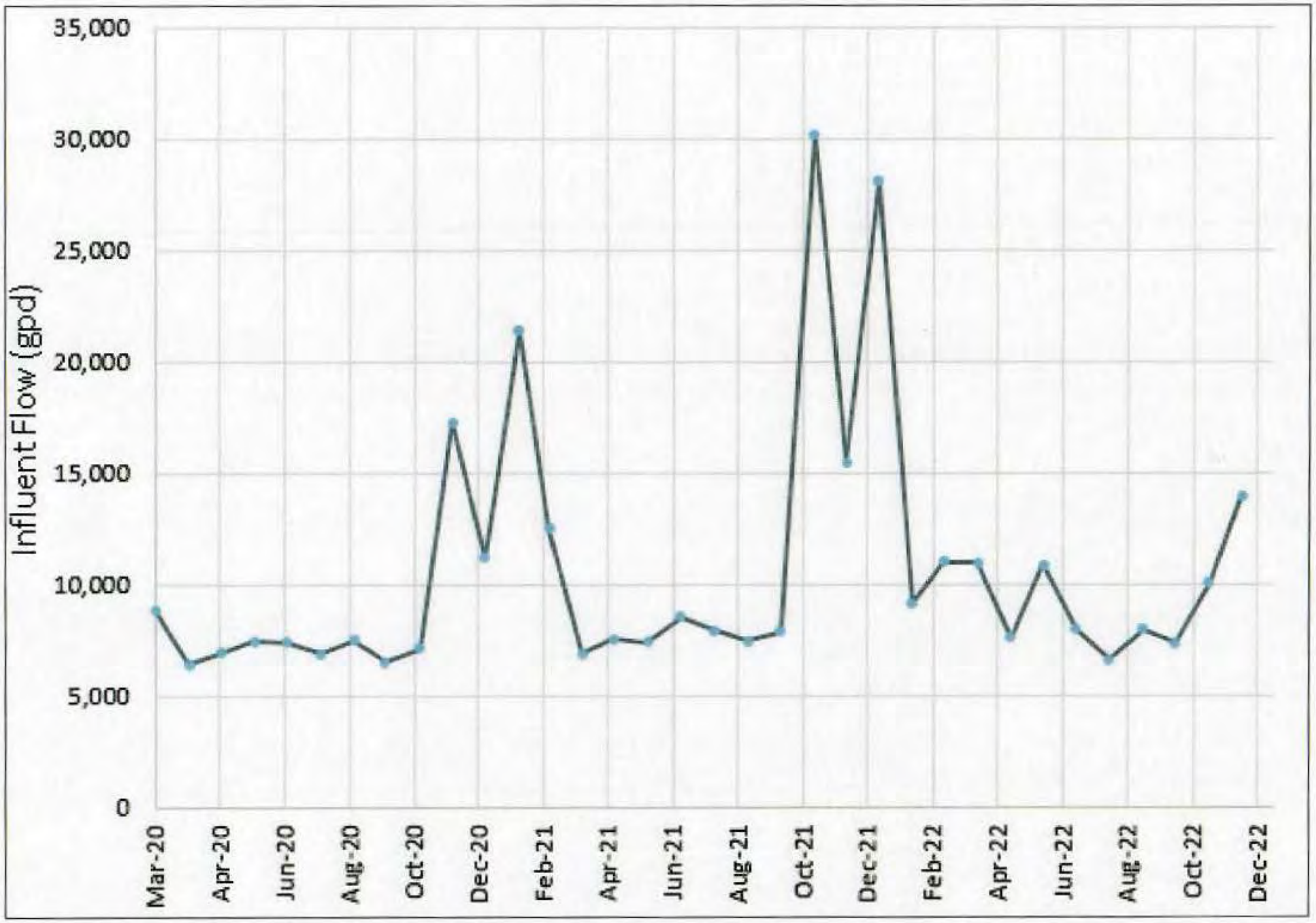


FIGURE 3-6

WWTF Monthly Maximum Daily Influent Flow

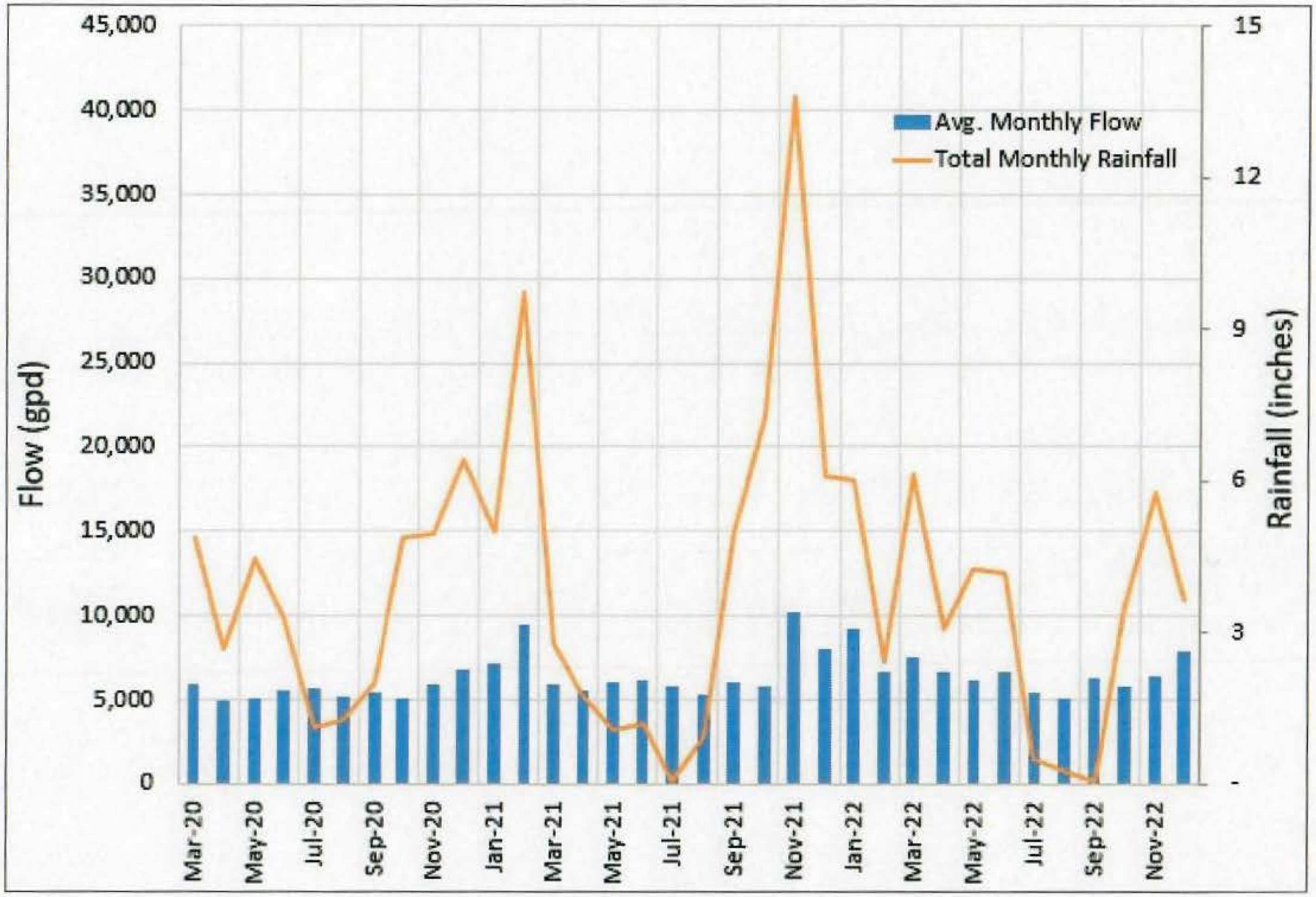


FIGURE 3-7

WWTF Monthly Average Influent Flow

WASTEWATER LOADING

Influent BOD_5 and TSS loadings as sampled for the period from March 2020 through December 2022 are shown in Figure 3-8 through 3-11. The annual average, maximum month, and peak day BOD_5 and TSS loadings for 2020 through 2022 are summarized in Table 3-9. As shown in this table, the annual average loadings have increased over this period (despite the fact that dry weather flows have stayed relatively stable). Historical peaking factors are presented in Table 3-10.

TABLE 3-9

WWTF Influent Annual Average Loadings

Year	Annual Average		Max. Month		Peak Day	
	BOD_5 (lb/d)	TSS (lb/d)	BOD_5 (lb/d)	TSS (lb/d)	BOD_5 (lb/d)	TSS (lb/d)
2020	1.09	1.18	3.17	3.50	3.17	3.50
2021	1.08	1.29	1.92	4.60	1.92	4.60
2022	2.18	1.52	4.70	2.90	4.70	2.90
Average	1.45	1.33	3.26	3.67	3.26	3.67

TABLE 3-10

WWTF Influent Loading Historical Peaking Factors (2020 to 2022)

Loading Type	2020	2021	2022
BOD Loading			
Annual Average	1.0	1.0	1.0
Max. Month	2.9	1.8	2.2
Peak Day	2.9	1.8	2.2
TSS Loading			
Annual Average	1.0	1.0	1.0
Max. Month	3.0	3.6	1.9
Peak Day	3.0	3.6	1.9

BOD_5 Loading

Influent BOD_5 concentrations ranged from 6 mg/L to 123 mg/L. As illustrated in Figure 3-8, the average monthly BOD_5 concentration appears to correlate inversely with rainfall. This provides further evidence of significant inflow and infiltration in the District's wastewater collection system.

Monthly average influent BOD_5 loadings ranged from 0.29 lb/d to 4.7 lb/d for the period of analysis, with no apparent correlation with season or rainfall, as shown in Figure 3-7.

As shown in Figure 3-9, the NPDES permitted monthly average influent BOD_5 loading limit of 56 lb/d has not been exceeded during the period of analysis; loadings, in fact, the values have not exceeded 10 percent of the limit.

The average influent BOD_5 concentration for the 3-year period is 29 mg/L, which would be considered very low strength domestic wastewater, even for STEP flows, indicating the high degree of BOD removal in the septic tanks and some dilution from I/I. The average BOD_5 loading between 2020 and 2022, is summarized in Table 3-8 and was 1.45 lb/d.

Total Suspended Solids Loading

Daily influent TSS concentrations from March 2020 through December 2022 ranged from 6 mg/L to 90 mg/L. As shown in Figure 3-10, the average monthly concentration of TSS, like that of BOD_5, appears to correlate inversely with rainfall.

The monthly average TSS loadings ranged from 0.36 lb/d to 4.6 lb/d. Similar to BOD_5, the mass loading of TSS appears to be more consistent than concentrations on a monthly basis, as shown in Figure 3-11. The loadings have been far below the permit limit of 56 lb/d during the period of analysis.

The average influent TSS concentration is 25 mg/L, which would be considered very low strength domestic wastewater. As summarized in Table 3-8, the average TSS loading during 2020 to 2022 was 1.31 lb/d.

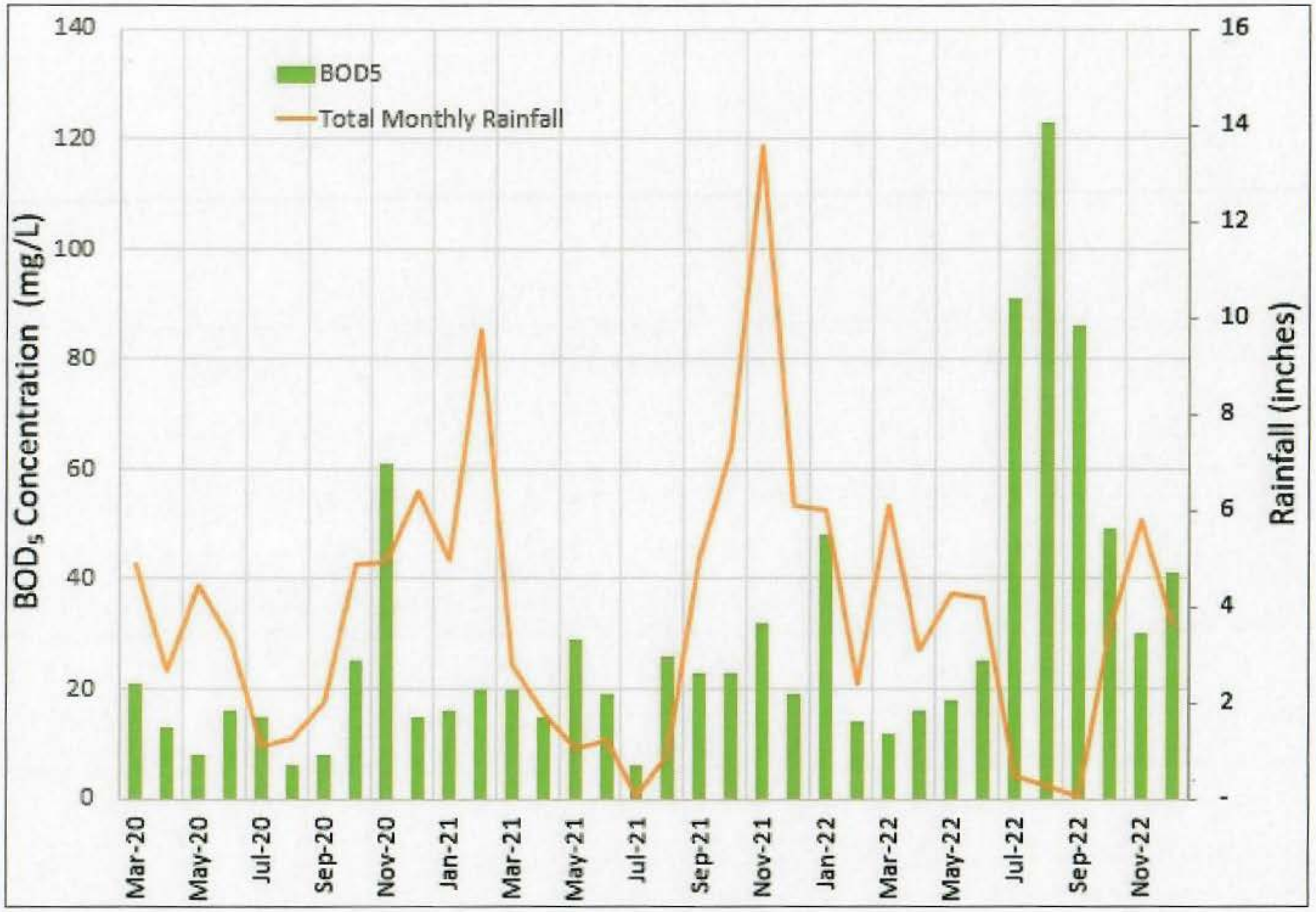


FIGURE 3-8

WWTF Influent BOD_5 Concentrations

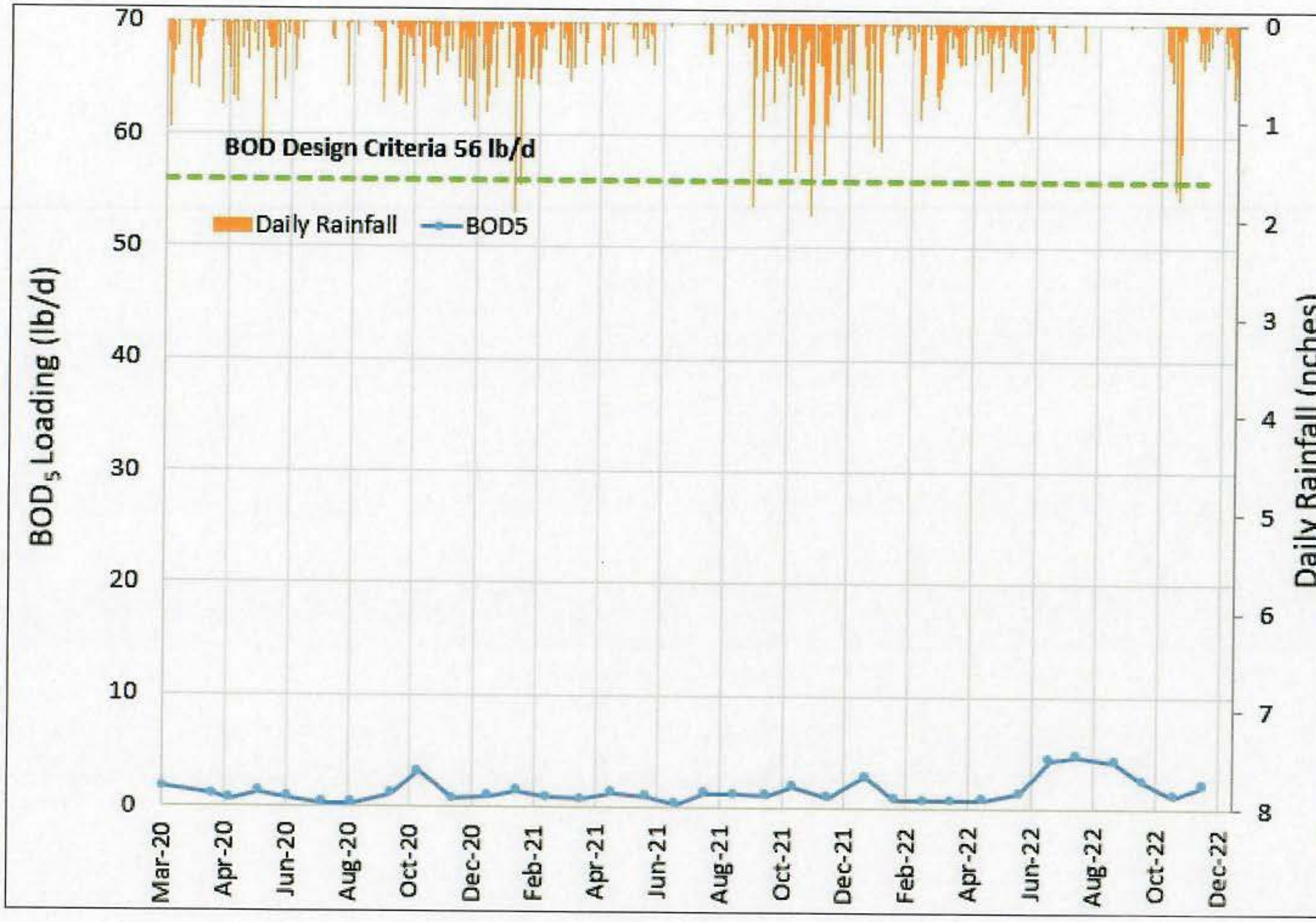


FIGURE 3-9

WWTF Influent BOD_5 Loadings

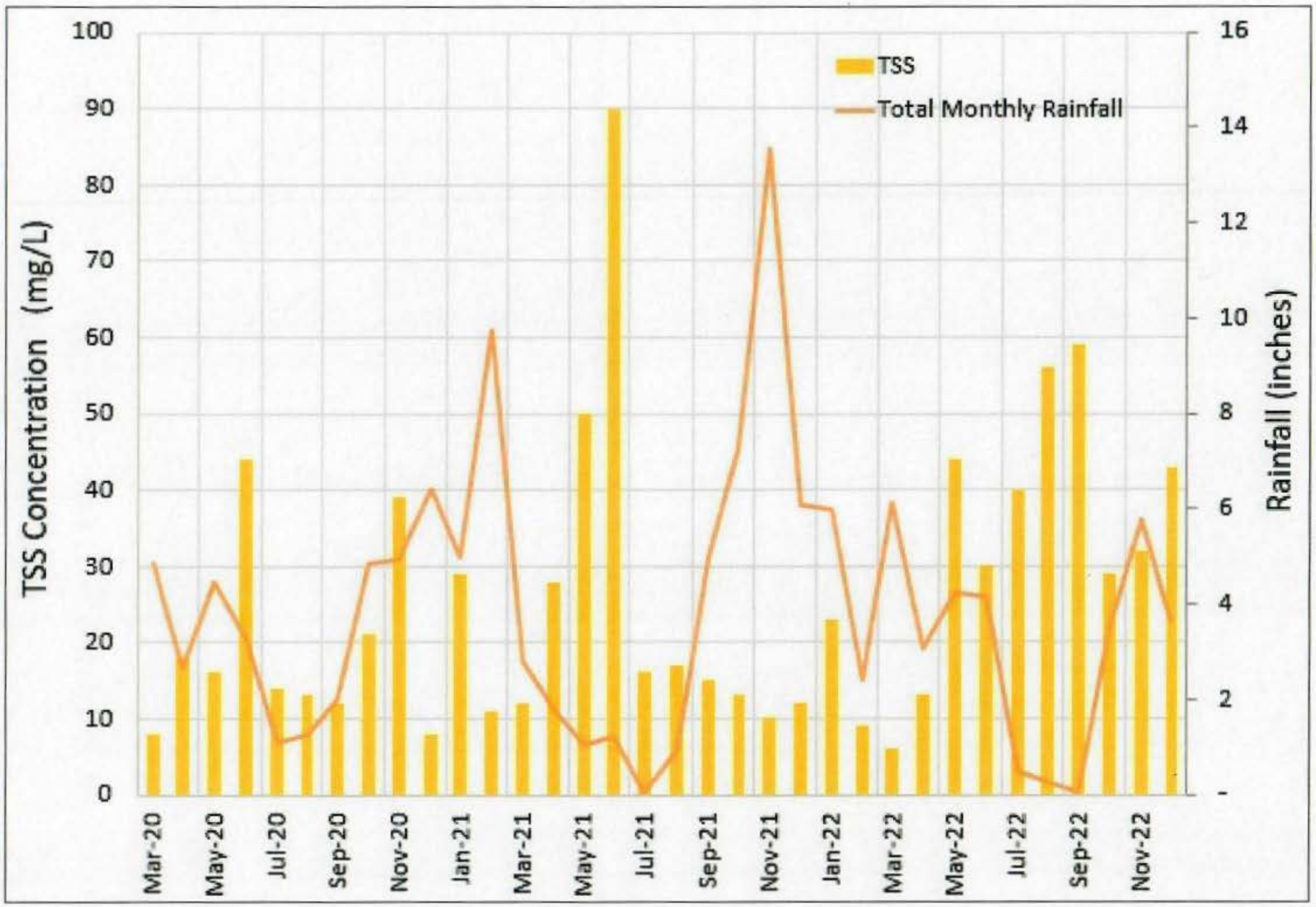


FIGURE 3-10

WWTF Influent TSS Concentrations

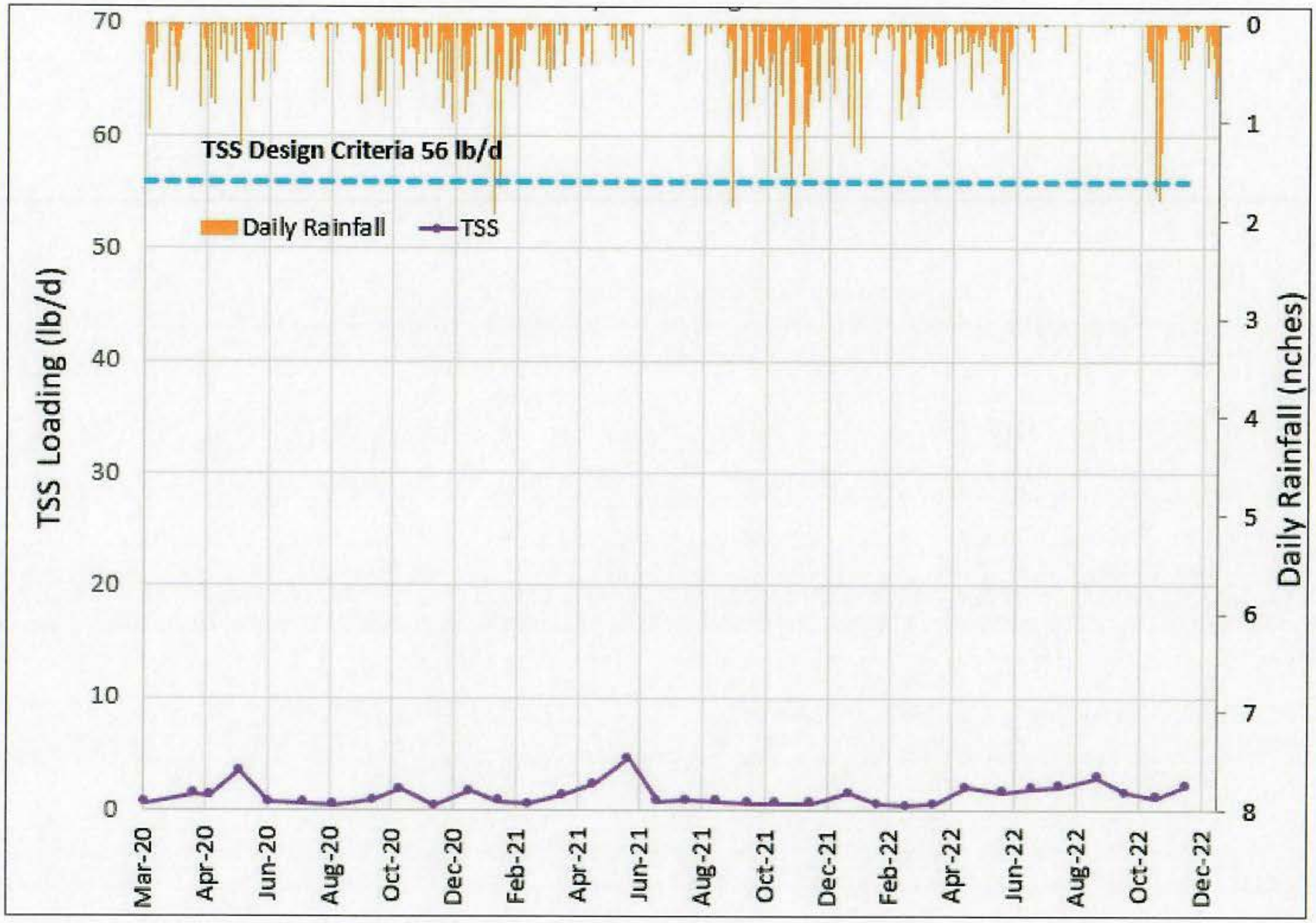


FIGURE 3-11

WWTF Influent TSS Loadings

STATE WASTE DISCHARGE PERMIT FLOW AND LOADING LIMITS

Tables 3-11 presents a summary of current flows and loadings compared to the current State Waste Discharge permit.

The maximum value of the last 3 years was used for comparisons of influent flows and loadings. The highest flow rate was approximately 126 percent of the permit limit; BOD and TSS loadings were both about 8 percent of their respective permit limits. This indicates that the WWTF has exceeded its hydraulic capacity, while is well below the loading capacity.

TABLE 3-11

WWTF Influent Flow and Loading Limits

Parameter	Units	Current Influent Value	NPDES Permit Limit	Percent of Current NPDES Permit Limit
Max. Day Flow	gpd	30,228	24,000	126%
Max. Day BOD	lb/d	4.7	56	8%
Max. Day TSS	lb/d	4.6	56	8%

INFILTRATION AND INFLOW

Figure 3-12 shows average monthly influent flows from 2020 through 2022 as a function of total monthly rainfall during the wet season months of November through April.

The increase of the extrapolated y- intercept value, which represents the "no rain" day flow, from 2020 to 2022, suggests that base flow and perhaps dry weather infiltration have increased over the period. The similarity of slopes of the linear regression lines throughout the years indicates the I/I condition has been stable in the collection system.

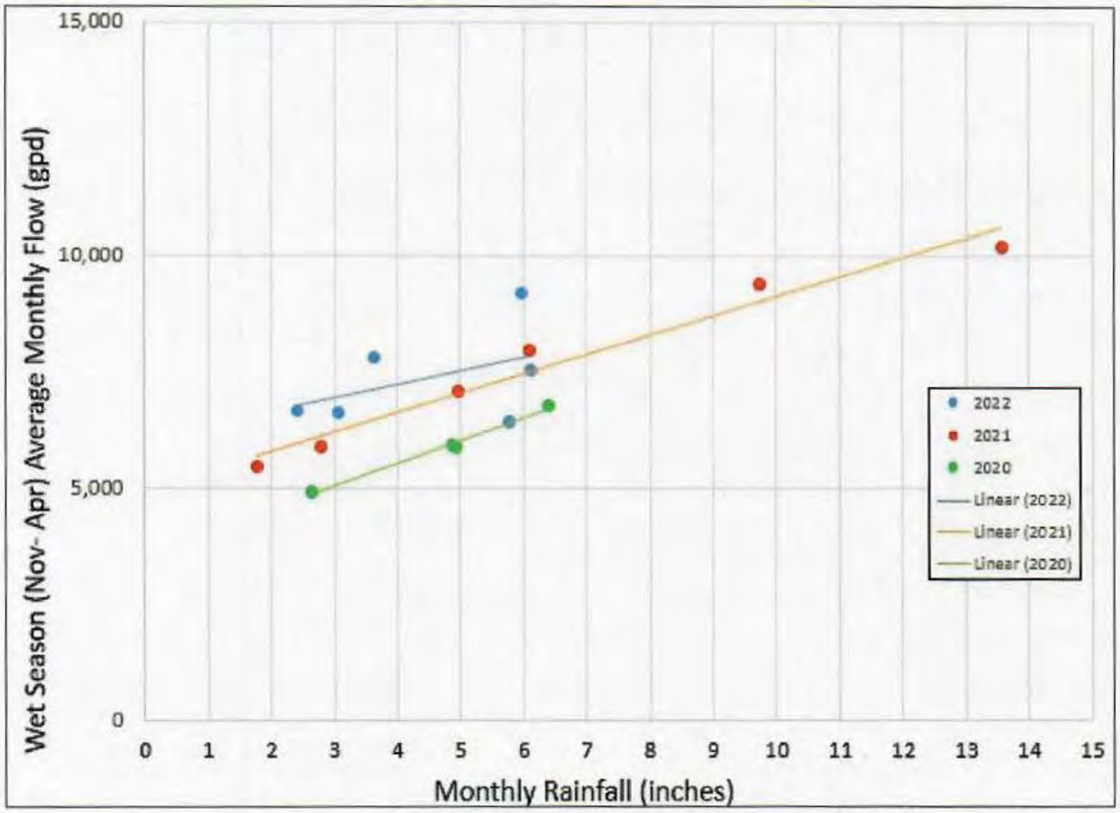


FIGURE 3-12

WWTF Monthly Influent Flow as a Function of Monthly Rainfall during Wet Season

EFFECT OF PRECIPITATION ON WASTEWATER FLOWS

Based on the analysis of existing flows and loadings presented earlier in the chapter, it was concluded that precipitation levels correlate with wastewater flows. Figure 3-13 shows influent flow from 2020 through 2022 as a function of precipitation, which also indicates the trend of increasing flow with increasing precipitation.

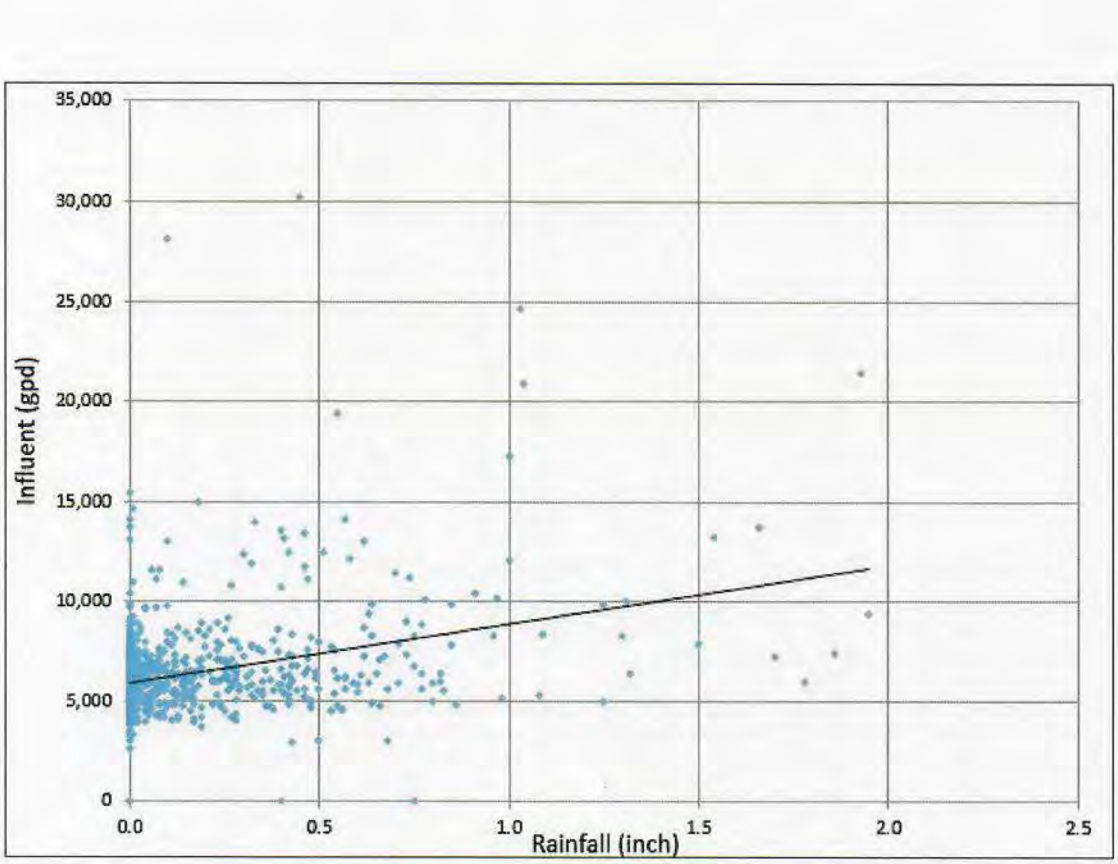


FIGURE 3-13

Daily WWTF Influent Flow as a Function of Precipitation

EFFECT OF TIDES ON WASTEWATER FLOWS

An evaluation of the impact on tides on wastewater collection flows was completed for this plan, as the District has indicated that tidal water could be entering the wastewater collection system and contributing to I/I. One of the methods used in making this assessment was to compare flows against the tide depth near Samish Bay. This was done during the dry weather period to see if increased flow coincided with high tides, while excluding the influence of rainfall. Figure 3-14 through 3-16 show the wastewater flows plotted against tide levels during the dry weather period in year 2020 through 2022.

Salinity in the influent was measured to assess the impact of the tide water on the wastewater. An influent sample collected on January 11, 2022 was measured the salinity of 0.78 PSS (Practical Salinity Scale), which is much lower than the average sea surface salinity of about 35 PSS, indicating a relatively minor impact from the tide intrusion. However, on January 11, 2022, there was only moderate tide, precipitation and wastewater influent, it is not clear based on the available sampling data whether there is tidal water impact under extreme high tide conditions.

Based on the evaluation, it is concluded that tides have, at the most, only a minor *direct* impact on wastewater flows. However, it is possible that tide levels have some influence on wastewater flows; high tides that occur during peak precipitation periods of major storms, causing backups at storm water outfalls, can exacerbate flooding and increase the probability of I/I in the sewage collection system particularly in manholes. Figure 3-17 shows influent from 2020 through 2022 as a function of high tide. It was found the highest flow days usually coincided with both high tide and high precipitation. All the influent exceeding the plant capacity of 24,000 gpd occurred when the tide level is above 8.5 feet.

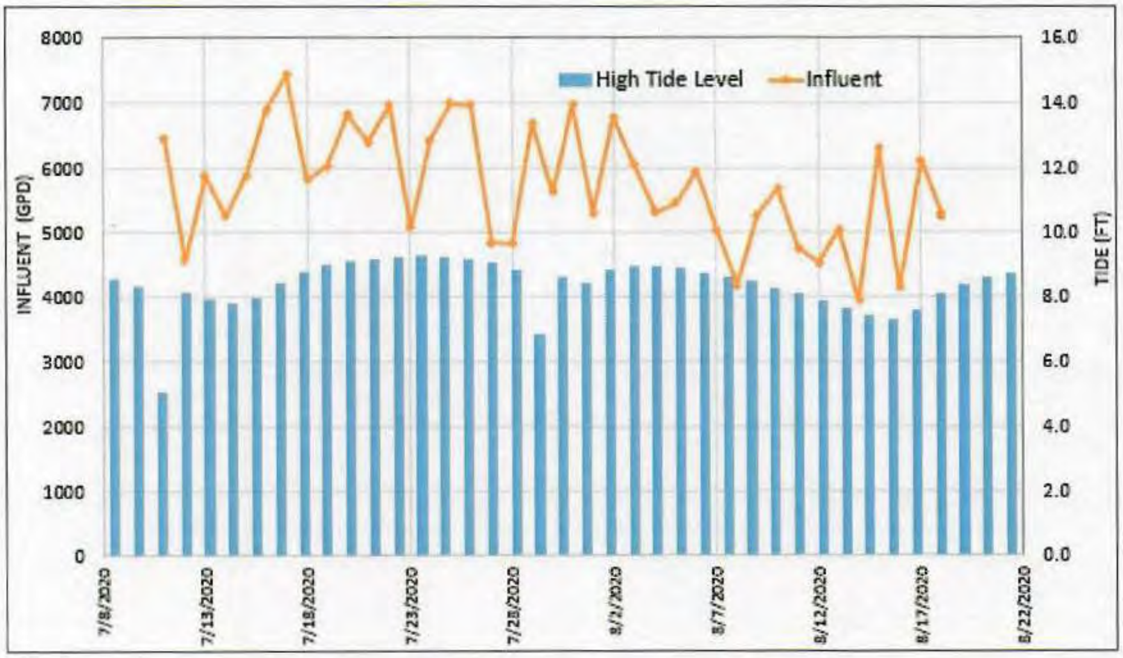


FIGURE 3-14

Tide vs. Flow during Dry Weather Period in 2020

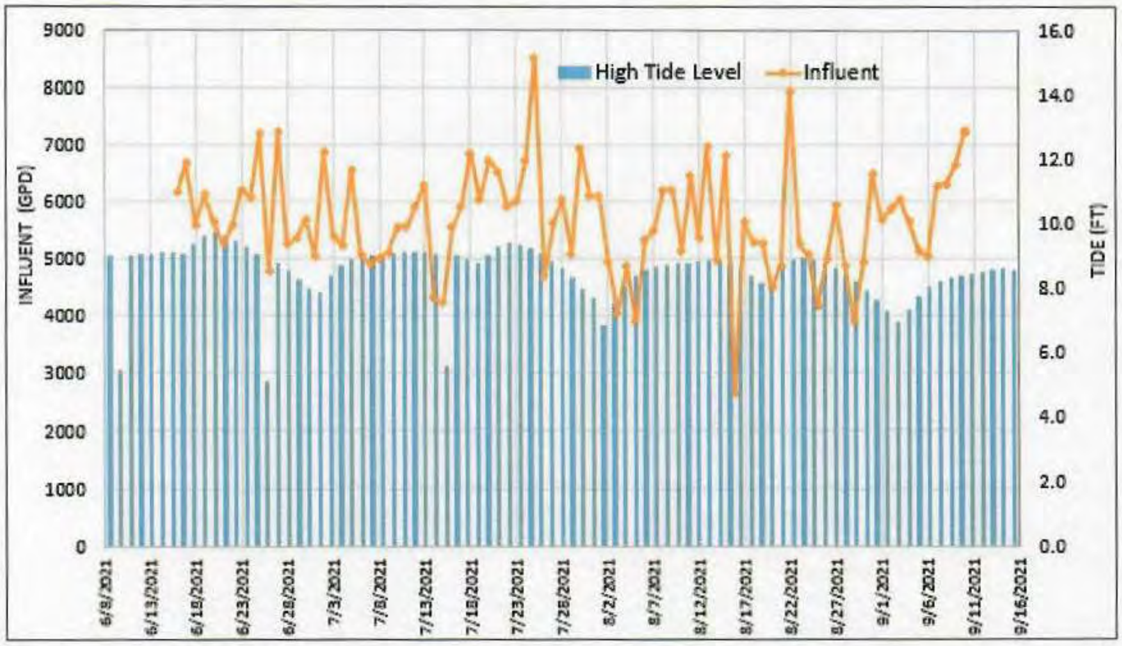


FIGURE 3-15

Tide vs. Flow during Dry Weather Period in 2021

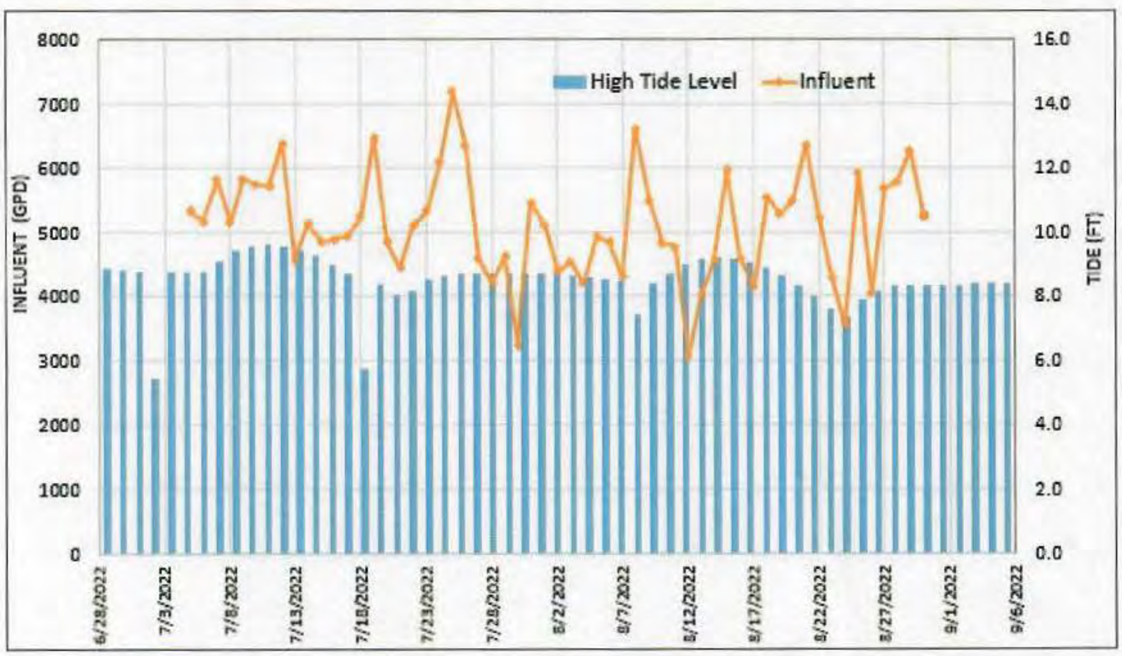


FIGURE 3-16

Tide vs. Flow during Dry Weather Period in 2022

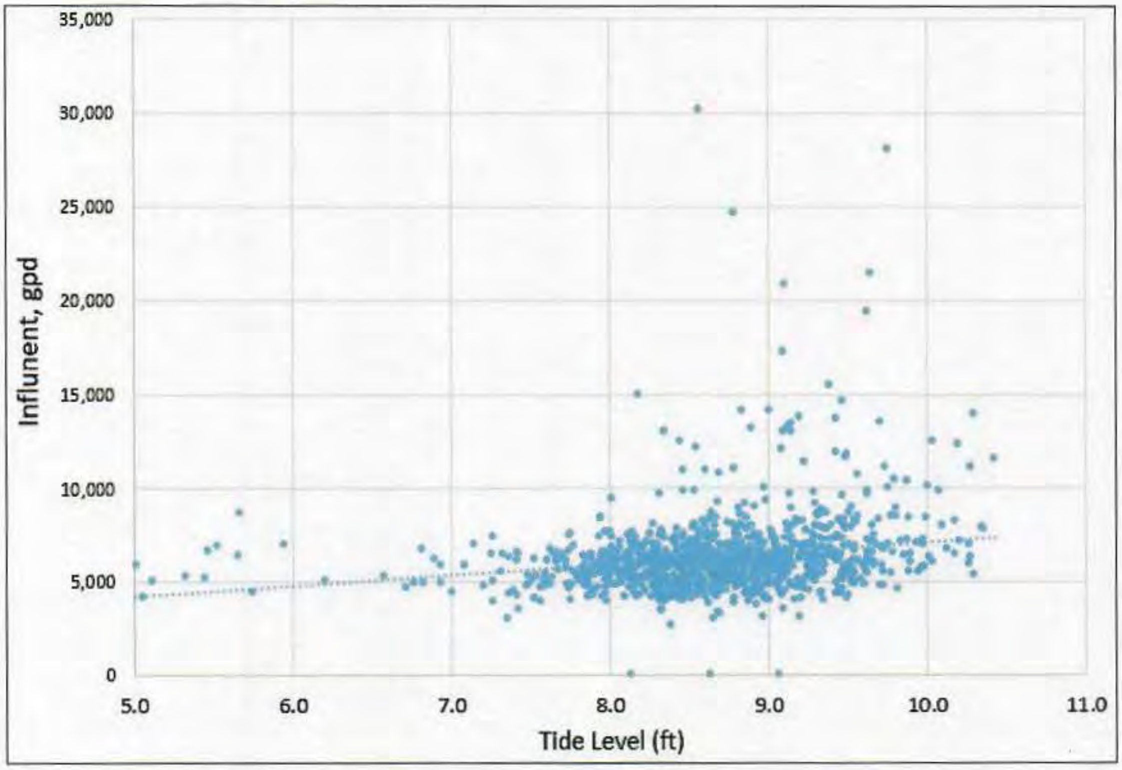


FIGURE 3-17

WWTF Influent Flow as a Function of Tide

WWTF PERFORMANCE

WWTF Discharge Monitoring Reports (DMRs) from 2020 through 2022 were evaluated to assess the ability of the WWTF to meet its treatment objectives. The WWTF effluent quality must meet the projected limits in the State Waste Discharge permit. Recommended improvements to meet treatment objectives, to increase the operational efficiency or performance of the WWTF, and to replace aging infrastructure are provided in later sections.

There have been several violations reported by Ecology during the past three years, mostly regarding the exceedance of design criteria of discharge flow.

DISCHARGE FLOW

As shown in Figures 3-18 through 3-20, the discharges to Drainfields 1 and 2 have been mostly in compliance with permit limits between 2020 and 2022.

The Emergency Upflow Trench was utilized 27 times from March 2020 to December 2022, for emergency situations, which were mostly in the wet weather season (one time in September 2020, two times in December 2020, two times in January 2021, and seven times in February 2021, eight times in November 2021, one time in December 2021, four times in January 2022, two times in December 2022). Among those situations, the Upflow Trench discharge limit of 1,846 gpd was exceeded 24 times.

The Drainfield 2 inlet valve was closed during the utilization of the Emergency Upflow Trench.

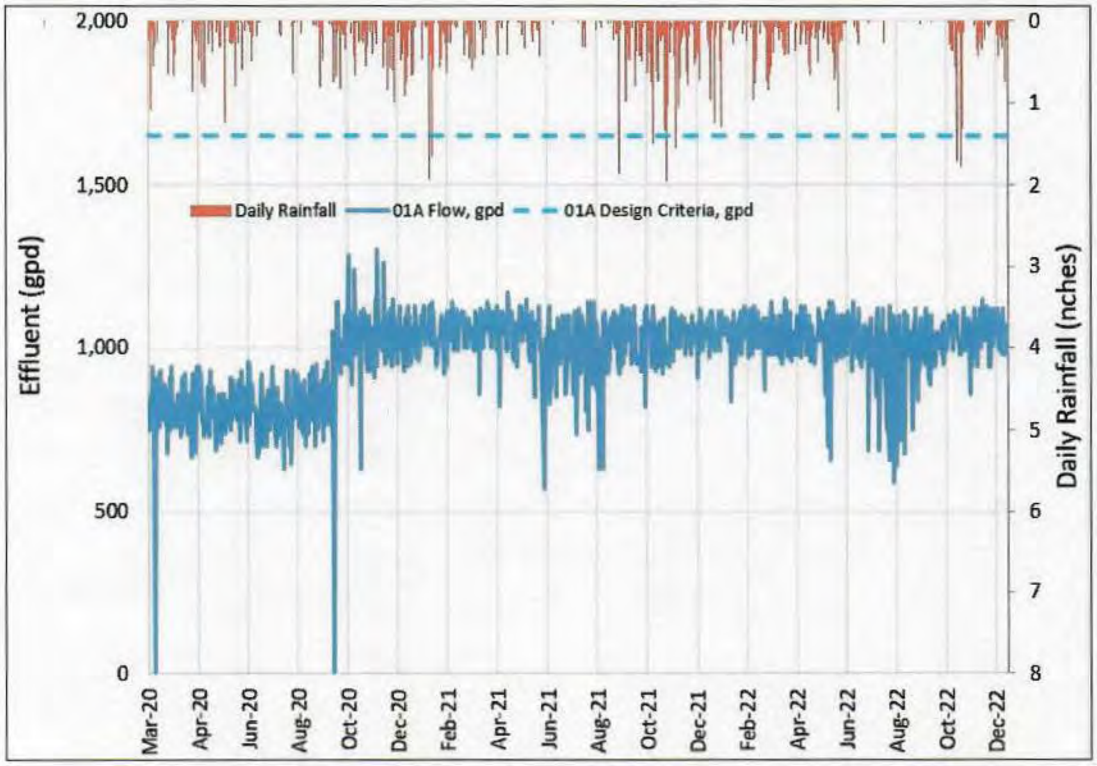


FIGURE 3-18

Effluent Flow to Drainfield 1

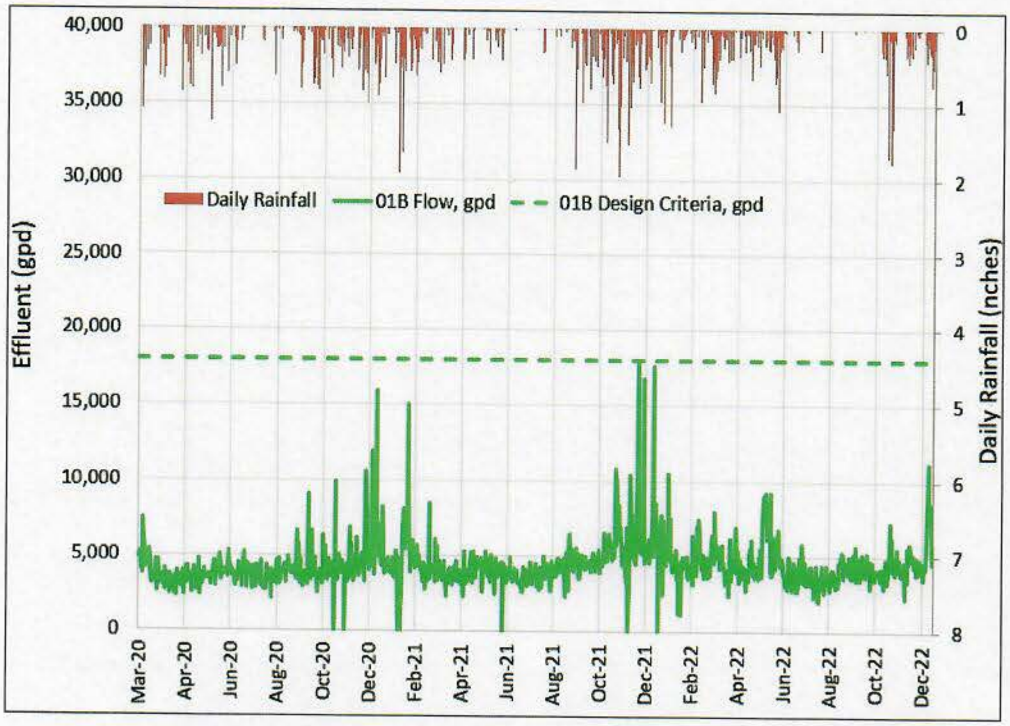


FIGURE 3-19

Effluent Flow to Drainfield 2

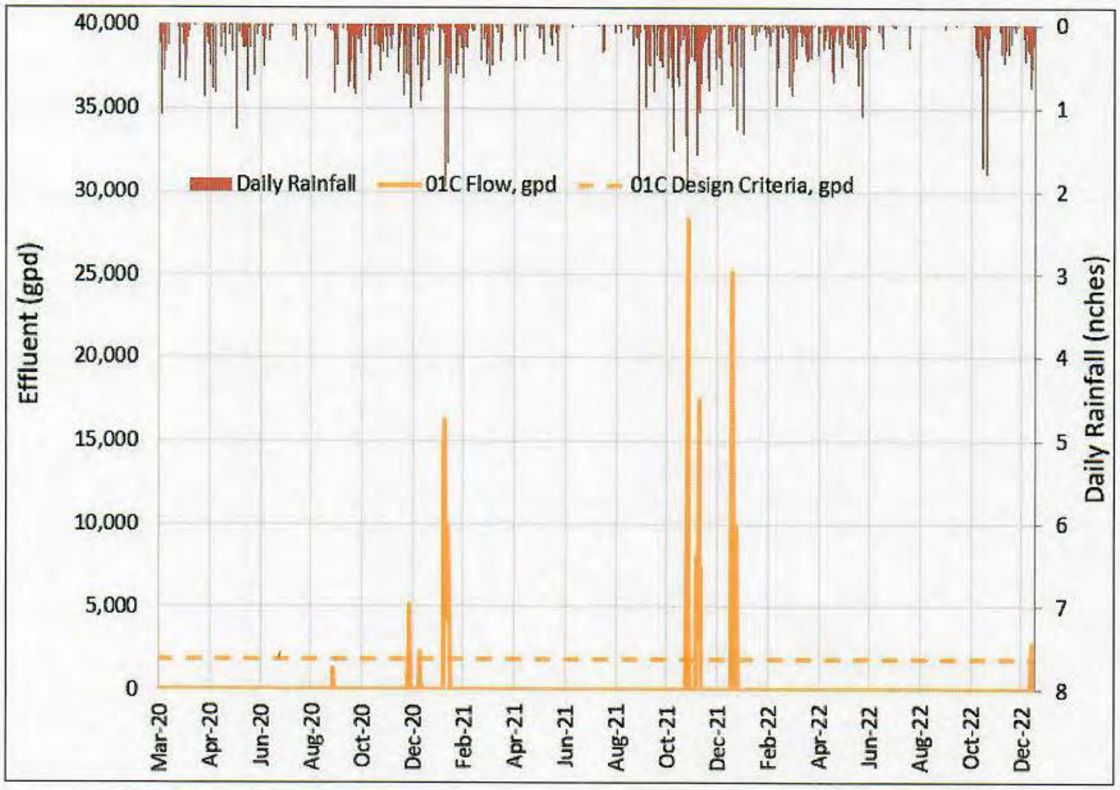


FIGURE 3-20

Effluent Flow to Emergency Upflow Trench

EFFLUENT BOD AND TSS

As shown in Figure 3-21, effluent BOD and TSS concentrations have been compliant with permit limits over the 3 years of record from 2020 through 2022.

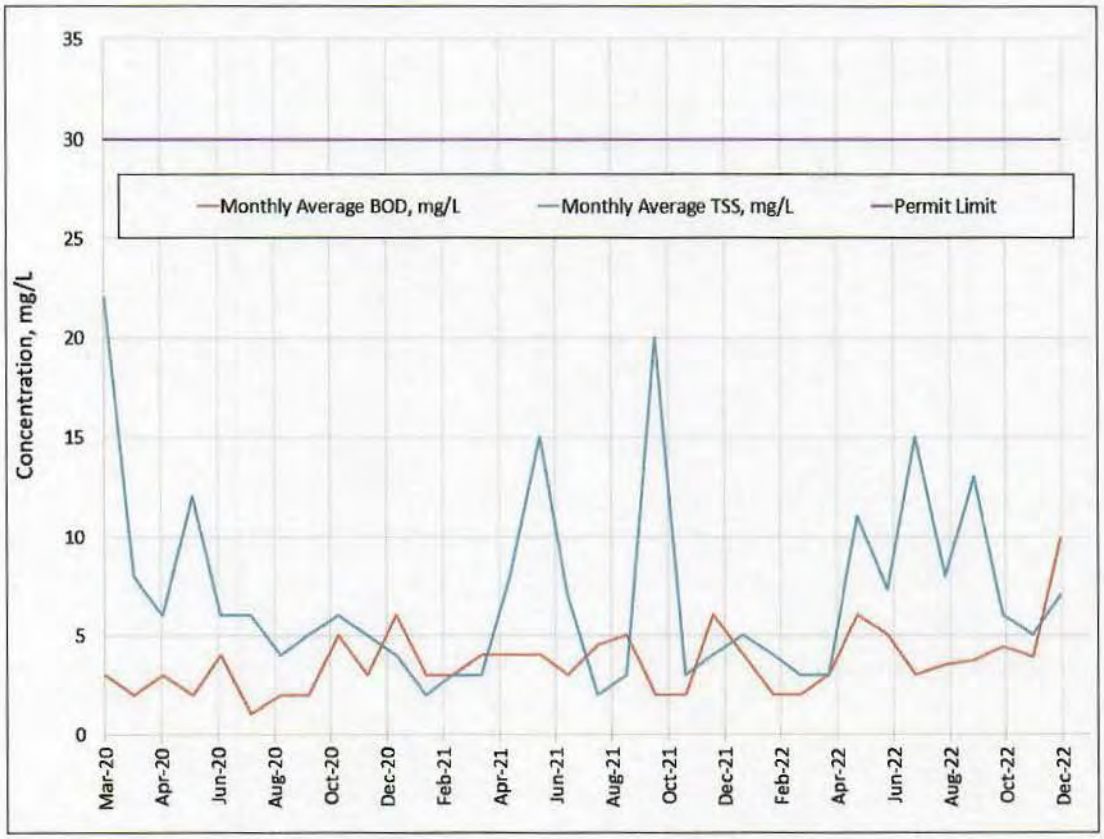


FIGURE 3-21

Monthly Average Effluent Concentrations

Figures 3-22 and 3-23 shows daily BOD and TSS removal, respectively, as a percentage of influent values from 2020 through 2022. This provides further evidence of the degree of the impact of inflow and infiltration in the District's WWTF performance.

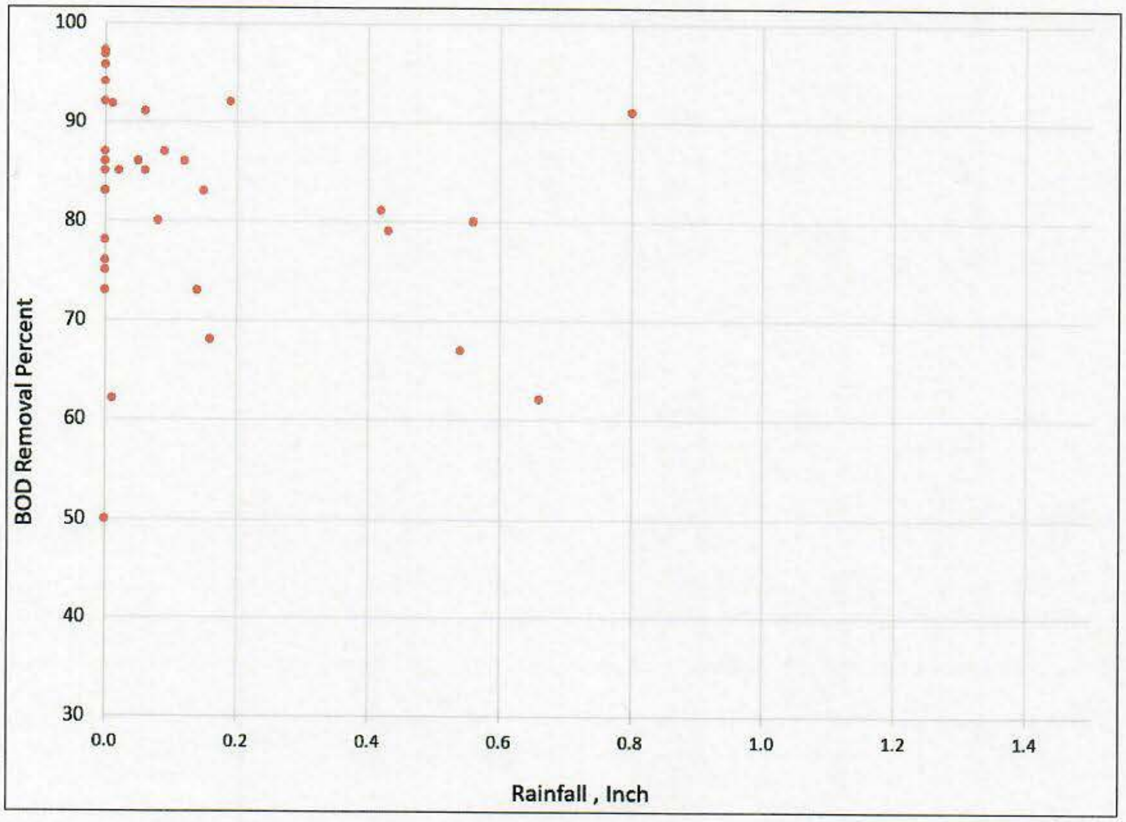


FIGURE 3-22

Daily BOD Removal Percentages vs. Rainfall

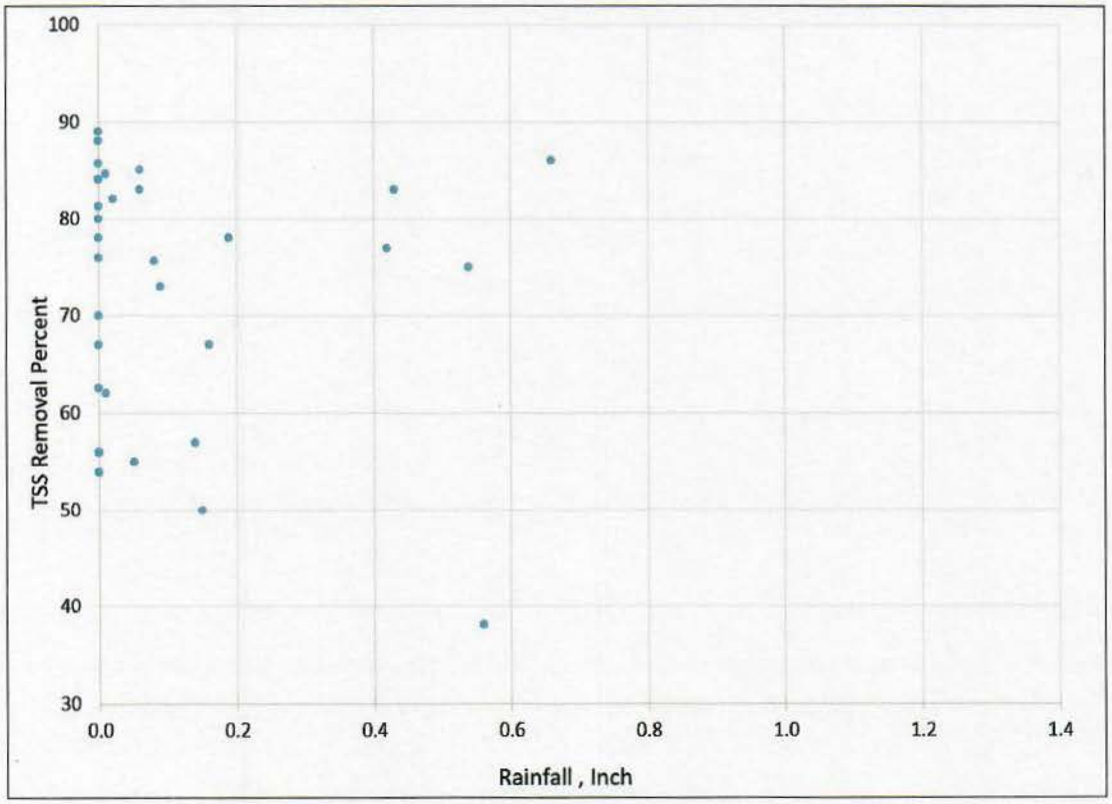


FIGURE 3-23

Daily TSS Removal Percentages vs. Rainfall

Figure 3-24 and 3-25 indicate the daily BOD and TSS removal is correlated with its influent concentration. The high removal occurs when the influent concentration is high.

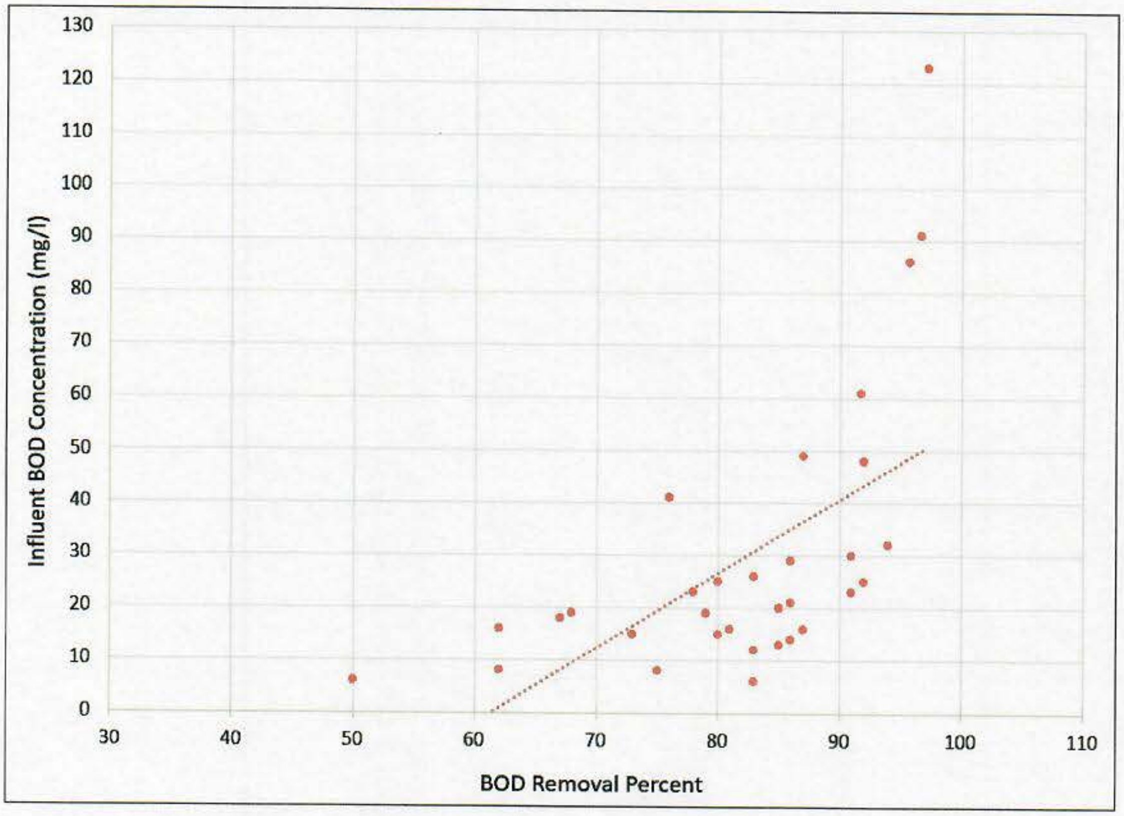


FIGURE 3-24

Daily BOD Removal Percentages vs. BOD Concentration

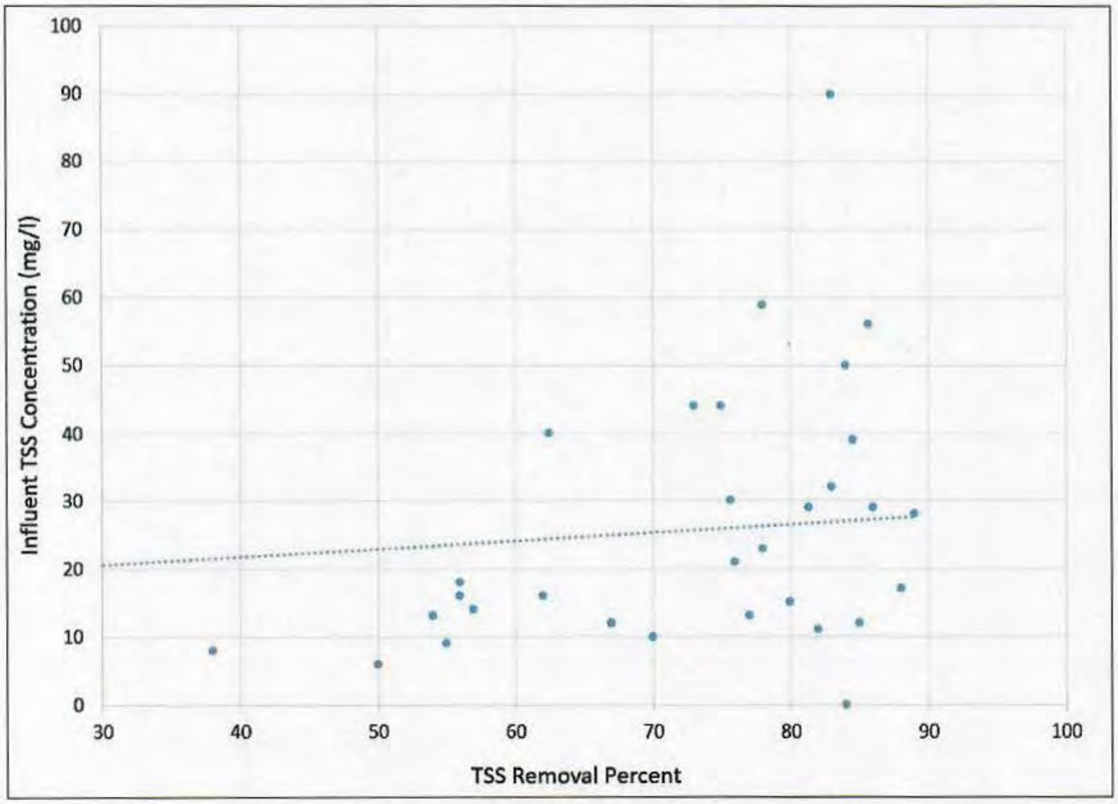


FIGURE 3-25

Daily TSS Removal Percentages vs. TSS Concentration

FECAL COLIFORM

The permit limits for fecal coliform bacteria are 200 per 100 ml on a monthly average basis. Effluent records for 2020 through 2022 are shown in Figure 3-26. The existing UV disinfection system, a Trojan PTP in-channel package system, was installed in 1996. The plant has been in compliance with the permit limits, except in April 2020. However, effluent fecal coliform levels have frequently approached the permit limits, and the system is approaching the end of its useful life.

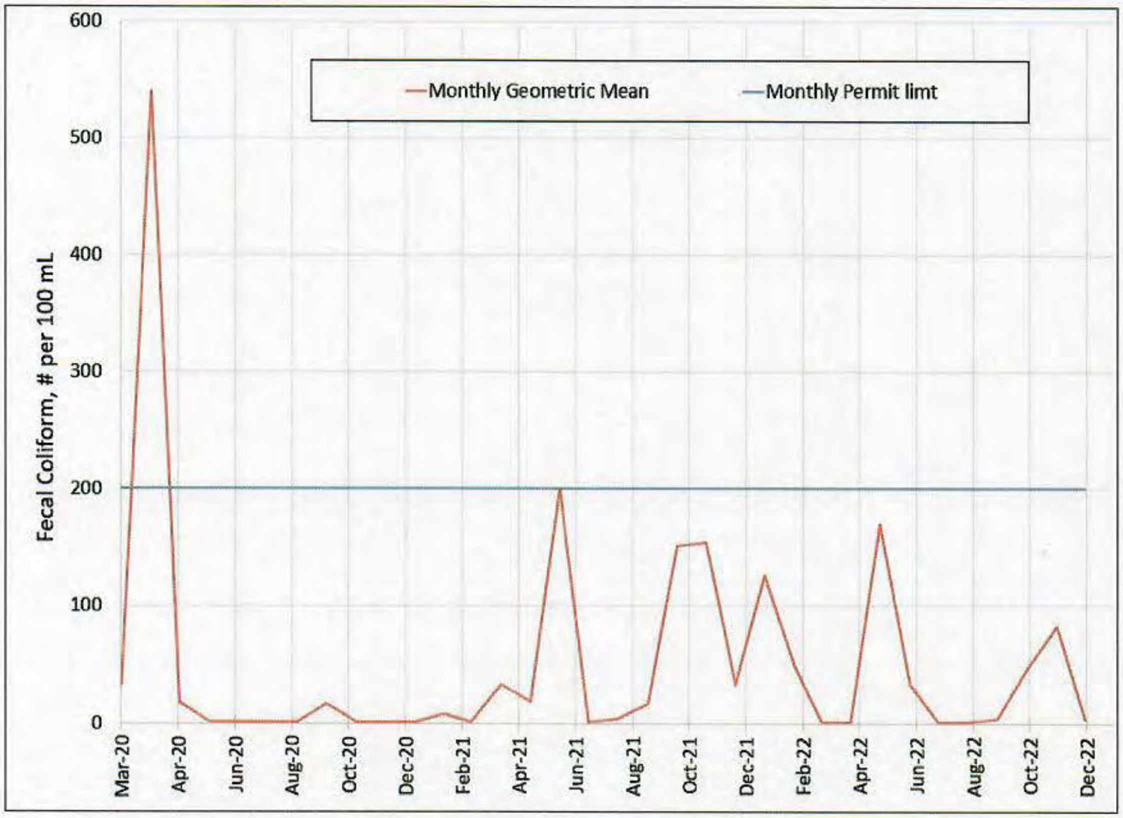


FIGURE 3-26

Effluent Fecal Coliform History – Monthly Geometric Means

pH

Figure 3-27 shows that effluent pH has been in compliance with the permit range of 6 to 9, except in May and June 2020. Low effluent pH may be a result of nitrification combined with low alkalinity in the wastewater.

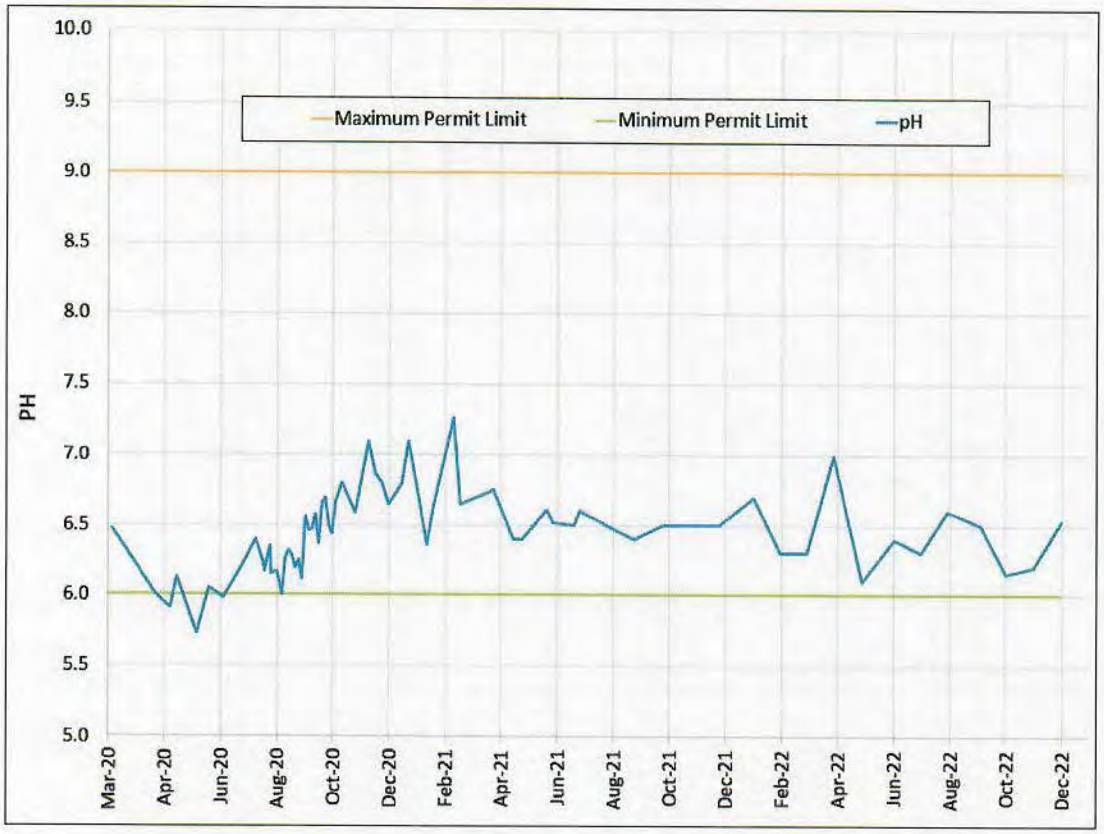


FIGURE 3-27

Effluent pH

OVERALL TREATMENT PLANT PERFORMANCE

Table 3-12 summarizes effluent data for four main performance parameters for the WWTF: BOD, TSS, Fecal Coliform, and pH.

TABLE 3-12

Monthly Effluent Concentration Data

Description	BOD (mg/L)	TSS (mg/L)	Fecal Coliform (#/100 ml)	pH
Permit Requirement	30	30	200	6-9
Average	3.5	7.1	51.9	6.5
Minimum	1.0	2.0	1.8	5.7
Maximum	9.9	22.0	540	7.3
2020 Average	2.7	8.0	61.8	6.3
2021 Average	3.9	6.2	52.1	6.6
2022 Average	3.8	7.3	43.5	6.4

CHAPTER 4

EVALUATION OF COMPLIANCE ALTERNATIVES

In this chapter, alternatives for modifications to the wastewater collection and treatment systems to provide adequate capacity to accommodate the wastewater flows from Edison are developed and evaluated.

EVALUATION OF ALTERNATIVES

BASIS OF DESIGN

For the purposes of this Capacity Analysis, the maximum daily flow is conservatively projected to be 40,000 gpd by the end of planning period, about 30 percent higher than the current maximum daily flow of 30,228 gpd, based on aerial maps that show the potential properties to be serviced in the area. Loadings are not of particular concern due to the low WWTF influent concentrations, which result in loadings well below design limits. The maximum month flowrate is projected to be 13,300 gpd based on the 3:1 peaking factor (max day to max month) derived from the flow data.

The alternatives considered for improvements include:

- Alternative 1 – Collection System I/I Control
- Alternative 2 – Wastewater Conveyance to Burlington WWTF for Treatment
- Alternative 3a – Expand Wastewater Treatment and Disposal Systems (Drainfield at Sportsfield)
- Alternative 3b – Expand Wastewater Treatment and Disposal Systems (Drainfield at New Land)
- Alternative 4 – Expand Wastewater Treatment and Convert Existing Drainfield to Mound System
- Alternative 5 – Expand Wastewater Treatment and Discharge to Surface Water

An effluent equalization lagoon is another option that was rejected due to space constraints and odor concern. However, it could be further considered in the follow-up Engineering Report.

Alternative 1 – Collection System I/I Control

As indicated in Chapter 3, data from the lift station and the STEP pumps showed that the low elevation areas close to the Edison slough appear to contribute high I/I to the Edison WWTF, especially the residents identified in Figure 3-2. Average wet season I/I is about 1,049 gpd from the central and south tributary area and about 1,800 gpd from the rest of the service area. STEP pumps contributed 50 percent of the WWTF influent in an estimated 0.2-year storm event compared to only 22 percent during the dry weather season, and about 69 percent of STEP flow in that storm event is from I/I. Runtime data for STEP pumps is not available for the any of the peak flow events, which might indicate higher I/I from other areas or tidal intrusion. Additional investigation would be necessary to identify potential I/I reduction efforts. If there are obvious sources of I/I that can be controlled relatively inexpensively, implementation of I/I reduction could reduce the cost of WWTF and disposal system improvements or obviate those improvements. Sources of I/I should be investigated through smoke testing, flow monitoring and/or sewer video inspections.

- Smoke Testing – Stormwater inflow often enters sewer systems through roof drains and area drains. These inflow sources are normally identified through smoke testing by introducing smoke into the gravity sewer system and observing where smoke appears. Normally, smoke would exit through building vents. However, if roof drains or area drains are directly connected to the sewer system, smoke will appear at these locations. Smoke may also appear on the ground where shallow sewers may be damaged. The amount of stormwater inflow can be estimated by precipitation records and drainage areas. It is recommended that smoke testing be performed at the properties identified as having a high maximum daily pump run time to average daily pump run time ratio, as shown in Table 3-2, and where there are gravity connections to the sewer system. Pump run times for additional properties may reveal additional sources of I/I. Since the system does not have manholes, conventional smoke testing equipment would likely not be feasible for this work. Modifications to conventional equipment or methods would be necessary in order to complete this work.

- Sewer Video Inspections – Sources of groundwater infiltration can be identified by inserting a TV camera in the two 4-inch diameter gravity sewers serving the southern area of the town. If this inspection is done when there is negligible sewage flow from the household (say, between midnight and 5:00 a.m.), infiltration into the gravity sewer could be readily identified. TV inspection of gravity sewers will require access to the sewer in the form of manholes or cleanouts. The gravity sewers in Edison are only equipped with pigging ports at the upstream ends and free discharges into the pump station wet well at the downstream ends. These locations could be used for TV camera access. However, the two gravity lines are approximately 1,200 feet and 600 feet long, respectively. The reach of a TV camera in a 4-inch line is only on the order of 150 to 200 feet, limiting the usefulness of this method to the upper and lower reaches of these sewer lines. The use of nonstandard inspection equipment or the installation of manholes or cleanouts for access at appropriate intervals would make TV inspection more beneficial.

Depending on the results of that investigation, potential I/I control efforts could include: (1) implementing and monitoring corrective actions for any identified drain system connections; (2) manhole and STEP tank rehabilitation through grouting and epoxy lining; (3) replacement of damaged sewer sections, and hydro-cleaning.

Installation of flow meters in the Edison Lift Station and School Lift Station, performance of drawdown testing in the Edison Lift Station and School Lift Station are recommended to improve the monitoring of collection system flows and facilitate future evaluation.

2022 WWTF influent flows are summarized in Table 4-1. As shown, 16 percent, 40 percent, 80 percent and 85 percent of the AAF, MMF, PDF and PHF, respectively, are estimated to be from I/I, suggesting the WWTF influent can be significantly reduced through some I/I control efforts.

TABLE 4-1

2022 WWTF Influent Flows

	Average Dry Weather Flow[1]	Annual Average Flow (AAF)	Maximum Monthly Flow (MMF)	Peak Day Flow (PDF)	Peak Hour Flow[2] (PHF)
WWTF Influent (gpd)	5,539	6,611	9,177	28,080	36,504
I/I[3] (gpd)	-	1,072	3,637	22,541	30,965
I/I percent	-	16%	40%	80%	85%

(1) Average of July, August, September.
(2) PHF = 1.3*PDF.
(3) I/I = flow – average dry weather flow.

To be conservative, the following treatment and discharge alternatives would assume no reduction of I/I to the system.

Alternative 2 – Pump Wastewater Direct to Burlington WWTF for Treatment

In this alternative, Edison wastewater would be routed to a pump station at the existing Edison WWTF and conveyed to the Burlington WWTF for treatment. The force mains for the wastewater conveyance system would be expected to cover a distance of about 11 miles between the existing Edison WWTF and the Burlington WWTF.

The Burlington WWTF, a secondary wastewater treatment facility permitted for a maximum month treatment capacity of 3.78 mgd, is projected to receive maximum month flows of 2.78 mgd from its current service area by 2040. Thus, the Burlington WWTF would have sufficient capacity to accommodate the Edison wastewater flow. It should be noted that a higher sewer rate might be requested by the City of Burlington since the Edison area is outside of the City Limit.

This alternative would eliminate the need for wastewater treatment and disposal system expansion for the Edison Subarea. It would also free up the use of the properties presently used for wastewater treatment and disposal.

A proposed route for the conveyance line directly to the Burlington WWTF is presented in Figure 4-1. The force main may could also connect to the Burlington collection system instead to the Burlington WWTF.

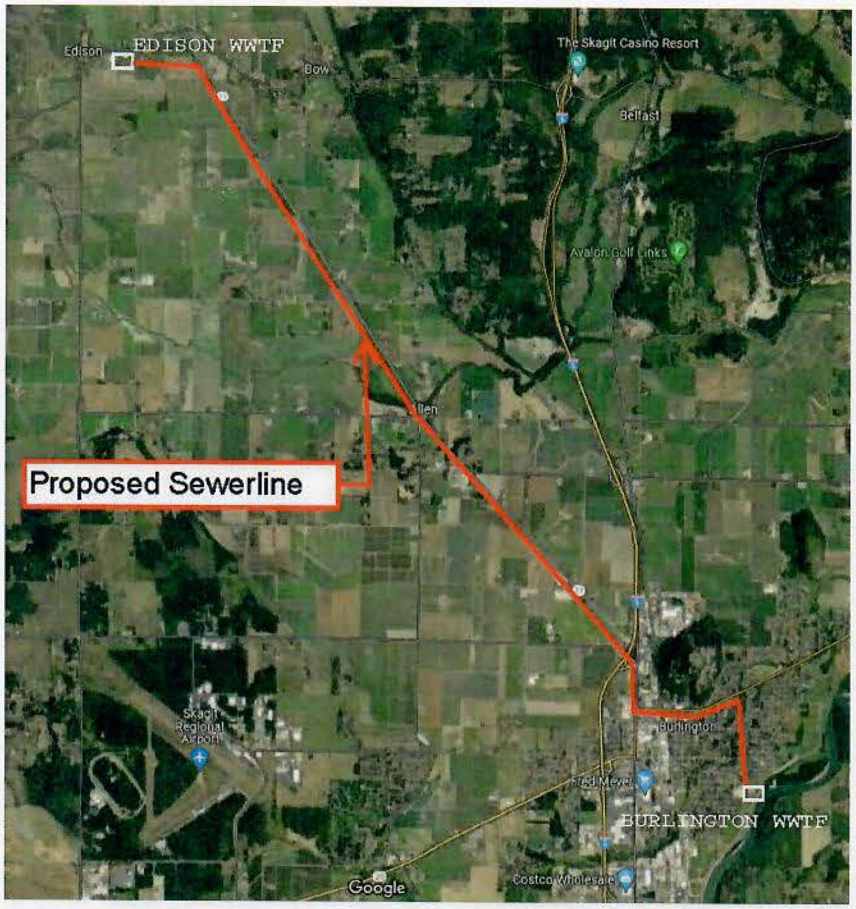


FIGURE 4-1

Alternative 2 – Proposed Conveyance Route to Burlington WWTF

Table 4-2 presents a preliminary cost estimate of the project including 11 miles of 6-inch force main and three 120 gpm capacity transfer lift station (120 gpm ≈ (40,000 gpd * 4.0 peaking factor)/1440).

TABLE 4-2

Alternative 2 – Wastewater Direct to Burlington WWTF for Treatment – Cost Estimates

Description	Quantity	Unit Cost (1)	Cost
6-Inch Force Main	58,000 ft (11 miles)	$ 364/ft	$21,112,000
120 gpm Capacity Lift Station	3	$1,200,000	$3,600,000
Burlington Connection	1	$50,000	$50,000
Total Project Cost			**$24,762,000**

(1) Cost based on the project cost of similar improvements.

Alternative 3a – Expand Wastewater Treatment and Disposal Systems (Drainfield at Sports Field)

This alternative would expand the Edison wastewater treatment and disposal systems to provide adequate capacity for projected flows. The existing drainfields would be refurbished to retrieve the original condition/capacity by cleaning the drainage trenches, replacing the gravel and piping, etc.

For the treatment facilities, the influent flow meter, the recirculation gravel filter (RGF) system, UV system and effluent discharge pumps were preliminarily evaluated to determine the need for upgrades either to increase the capacity or to replace the aging equipment. Further evaluation should be provided in a follow-up Engineering Report.

Influent Flow Meter

The ultrasonic flow meter is currently calibrated for a maximum flow of 75,000 gpd. Data is not available for this study to precisely project the future peak hour flow. Therefore, it is recommended that flow meter to be replaced if the WWTF observes flows approaching 75,000 gpd

Recirculation Tank

Design standards for recirculating sand bed systems in the State of Washington are published by the Department of Health and provided in *Recommended Standards and Guidance for Performance, Application, Design, and Operation and Maintenance – Recirculating Gravel Filter Systems* (RGF Guidelines). It should be noted the RGF Guidelines were generally written for conventional wastewater, which has much higher concentrations of BOD and TSS and other constituents compared to the STEP flows generated in the Edison sub area. Per the RGF Guidelines, the volume of the recirculation tank should be designed for a hydraulic retention time at a design maximum flow of 1.5 days. Because the total volume of the recirculation tank is 24,000 gallons, the hydraulic retention time at projected maximum day flow is 14.4 hours (24,000 gal ÷

40,000 gal/d * 24 hr/d). Therefore, the total volume of the existing recycle tanks is less than the recommended volume for the 20-year planning period.

The recommendation for an extended hydraulic retention time is primarily intended to allow recycled flow to adequately mix with fresh influent and prevent short-circuiting, as well as to provide storage during short term emergencies. Storage for short term emergencies is not as necessary for the Edison WWTF as other facilities because the WWTF has a backup generator that would allow the recirculation pumps to continue operating during a power outage, and the four recirculation pumps provide sufficient redundancy to operate the WWTF effectively if one or more pumps were damaged or removed from service for maintenance. As far as short-circuiting and mixing are concerned, historical treatment performance suggests that effluent quality is not being negatively affected by the reduced recirculation tank size. Future flows are projected to be approximately 25 percent higher, which could degrade effluent quality. However, the design of the system is such that even when influent flow increases, the recirculation rate is maintained and wastewater still undergoes an average of five passes through the treatment system prior to being discharged in the effluent. It was mentioned by the plant operator that there are currently no signs of poor performance, short-circuiting or overflowing of the recirculation tank even during the peak flow event that the flow exceeded the design capacity of 24,000 gpd. The recirculation tank acts as a buffer to maintain a stable inflow to the gravel filter system. In the future, the County will need to clean the recirculation tanks on a more frequent basis due to increased solids deposition, but otherwise the recirculation tanks should continue to operate similarly to existing conditions, and they are considered to be sufficient for the 20-year planning period.

<u>Recirculation Pumps</u>

The recirculation pumps each have a capacity of 125 gpm. Based on the design, for 10 minutes out of 30 minutes, no pumps are in operation, and the system is designed to recirculate up to 80 percent of the pumped flow. Therefore, the actual flowrate exiting the facility is calculated as follows:

Hourly Pumped Flow = Pump Capacity * 40 min = 125 gpm * 40 min
= 5,000 gal/hr

Effluent Flowrate = Hourly Pumped Flow * (1- Recirculation Rate)
= 5,000 gal/hr * (1-0.8)
= 1,000 gal/hr
= 24,000 gpd

The effluent flowrate of 24,000 gpd is greater than the projected maximum month flowrate of 13.300 gpd, but less than the maximum day flowrate of 40,000 gpd. If the recirculation rate can be reduced to 67 percent of the pumped flow, the effluent flow rate can be increased to 40,000 gpd. This would allow the WWTF to hydraulically pass the maximum projected flow, although the quality of treatment would be reduced, and it would require that the County anticipate the high flows and adjust the splitter box weirs accordingly. Furthermore, the timer controls can be modified to reduce the length of the 10 minute rest interval between pump cycles and expand the hydraulic capacity of the filters. Reducing the rest interval to 3 minutes (6 minutes per hour) would increase the hydraulic capacity to 40,000 gpd when operating at a recirculation rate of 75 percent.

<u>Gravel Filters</u>

The RGF Guidelines recommend a maximum day hydraulic loading rate of 5 gpd/ft2 and the gravel filters have a total surface area of 4,800 ft2. Based upon these values, the gravel beds are sized for a maximum daily flow of 24,000 gpd. Since the maximum day design flow is 40,000 gpd, the gravel beds are undersized for the projected flows, as well as the existing maximum day flow of 30,228 gpd. However, the design is based on RGF Guidance recommended hydraulic loading rate of 5 gpd/ft2, which is based upon an assumed residential septic tank effluent wastewater strength of 230 mg/L. As described above, the RGF Guidelines do not discuss a recommended hydraulic loading rate for facilities that have an influent wastewater strength below 230 mg/L, but a maximum solids loading rate of 0.0096 lb/ft2/d can be calculated using the various assumptions provided in the RGF Guidelines. This design value is confirmed as a typical wastewater industry loading rate for RGFs in *Recirculating Media Filter Technology Assessment and Design Guidance (Iowa Department of Natural Resources, 2007) (Iowa Guidelines).*

The measured wastewater strength for each of the past three years has been between 6 mg/L and 91 mg/L, with the exception of a maximum value of 123 mg/L in August 2022. It would be overly conservative to assume that this maximum value is representative of the anticipated future influent concentrations to the WWTF, as it was a significant outlier. Furthermore, the continuous dilution and mixing of fresh influent with filter effluent is likely to reduce the impact of peak loading and equalize the loading to the filters. Based upon the total gravel bed area of 4,800 ft2, a maximum day design flow of 40,000 gpd, and an assumed maximum solids loading rate of 0.0096 lb/ft2/d, the gravel beds will have sufficient capacity for an influent strength of 138 mg/L. Therefore, it is likely that the gravel beds will have sufficient BOD5 treatment capacity through the planning year.

<u>UV System</u>

The current UV system has sufficient nominal capacity (75,000 gpd). However, actual capacity is a function not only of flow but also ultraviolet transmittance (ability of water to transmit UV light). Additionally, the existing Trojan PTP in-channel package UV system has been reported to have performance issues in recent years, and with an age of more than 25 years is past its useful life span. Collection of effluent ultraviolet transmittance data is recommended to aid in the design of a replacement system. (The Burlington WWTF has an ultraviolet transmittance meter that could be used for this purpose.)

Discharge Pumps

The discharge pump capacity of 180,000 gpd or 125 gpm is sufficient for the 20-year planning period.

The WWTF upgrades would be the same for the following alternatives. The difference would be for the effluent disposal system.

In this alternative, to increase the effluent disposal capacity, constructing a similar drainfield as the existing Drainfield 2 of 18,000 gpad capacity would bring the total capacity to 40,000 gpd together with the current discharge to Drainfield 1, Drainfield 2 and the Emergency Upflow Trench. The site for the new drainfield would be the sports field adjacent to the WWTF and north of the current Drainfield 2. The new drainfield would be located on a portion of the existing sports fields.

The drainfields are subsurface wastewater infiltration systems. The effluent is piped to a shallow underground trench containing stone or gravel. A geofabric or similar material is typically placed on top of the trench so sand, dirt, and other contaminants do not enter the clean stone. Figure 4-2 shows the schematic of the drainfield.

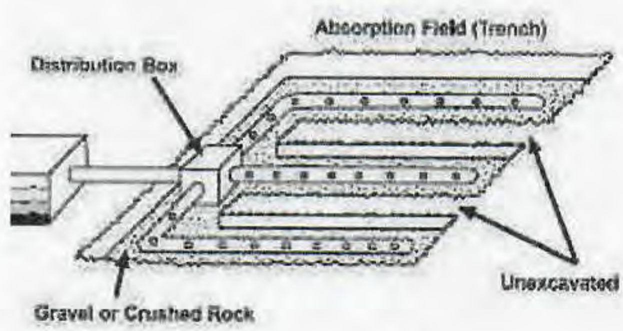


FIGURE 4-2

Typical Schematic of Drainfield

Alternative 3b – Expand Wastewater Treatment and Disposal Systems (Drainfield at New Land)

This alternative is similar to Alternative 3A, except instead of constructing the new discharge drainfield on the current sports field, the County would utilize similar size vacant land either owned by the School District or purchased from a neighboring private owner.

Alternative 4 – Expand Wastewater Treatment and Convert Existing Drainfield to Mound System

This alternative is similar to Alternative 3A, except the existing drainfield would be converted to a mound system. A mound system is an option in areas of high groundwater, shallow soil over bedrock, or slowly permeable soils such as the type of soil in the area of the existing drainfield. Instead of infiltrating the effluent directly into the ground, in this alternative, a mound is constructed from sand and gravel above a section of the yard to provide proper filtration. The flow would enter the pump chamber where it would be pumped to the mound in prescribed doses through pressurized piping system in the drainfield trench. Figure 4-3 shows the schematic of a mound system.

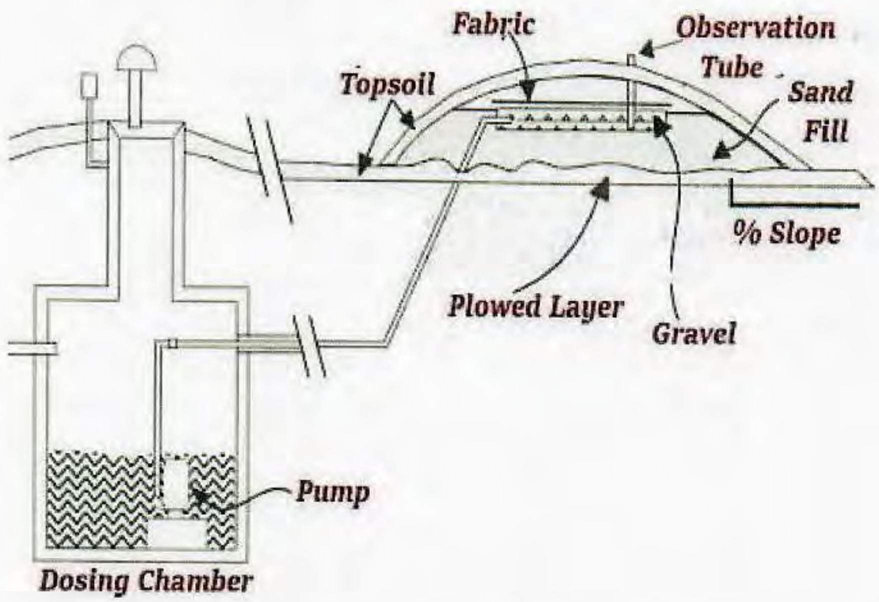


FIGURE 4-3

Typical Schematic of Mound System

The mound systems are more costly due to the amount of work necessary to construct the mound. They also need yearly cleaning to ensure they work efficiently. A mound system is considered suitable for application when both treatment and disposal are required. However, for Edison WWTF, the only application needed is disposal of treated effluent, which the mound system might not be suitable for.

In some situations, mound systems can be a solution for unsuitable onsite disposal conditions by increasing the capacity through utilizing more permeable topsoil. Per discussion with the Department of Ecology, a mound system is not suitable for Edison WWTF:

> *"Surface soils are very tight lahar, and the consensus was that a mound system would have the same surface infiltration issues that the drip was having, and then have breakout at the perimeter; so that would just be a continuing problem."*

The content in the *Drainfield Soil Study Report* was referred to confirm the opinion:

> *"Use of sand filtration as an integral part of a pressure mound disposal system was thoroughly considered and rejected. The consensus of the agencies and Dr. Tchobanoglous was that "breakout" could occur as a result of improper construction of the sand filter/pressure mound. The ability of a contractor to place two feet of ASTM C- 33 sand without altering the permeability of the subsoil was thought to be too risky."*

Alternative 5 – Expand Wastewater Treatment and Discharge to Surface Water

This alternative would require construction (in addition to the WWTF improvements) of a new effluent pumping system, and discharge force main and outfall to allow discharge effluent into the adjacent Edison Slough or Samish Bay. Since this alternative would change the discharge type from groundwater infiltration to surface water discharge, a NPDES Permit would need to be acquired from Ecology to replace the current State Waste Discharge Permit. However, it is unlikely that the surface water discharge would be acceptable to the various stakeholders (e.g., Departments of Health and Ecology and others).

RECOMMENDED ALTERNATIVE

Evaluations of the alternatives discussed above are summarized in a decision matrix in Table 4-3, which shows that Alternative 3a – Expand Wastewater Treatment and Disposal Systems (Drainfield at Sportsfield) is the preferred to the other alternatives. The evaluation includes the following criteria:

1. **Capital Costs** – Anticipated relative initial total project capital cost.
2. **Life Cycle Costs** – Anticipated relative 20-year life cycle costs, including capital costs and net present value of operation and maintenance costs.
3. **Community Benefit** – Anticipated benefit, as well as impact of the treatment operation, expansion of disposal site and change on sewer rate.

4. **Reliable Permit Compliance/Environmental Impacts** – Sustainability of alternative reflecting the reliability of permit compliance and the impact of discharge to environment.

5. **Complexity of Operation** – Operation and maintenance needs for the technology, factoring both anticipated labor hours and operational complexity.

6. **Site Footprint** – Relative area needed for the alternative. Ability of facilities to fit within the footprint of existing site.

7. **Future Flexibility** – Ability of the facilities to be expanded or modified for changing regulations or end uses.

TABLE 4-3

Alternative Decision Matrix

Criteria	Weighting Factor	Alternative 1 - Collection System I/I Control		Alternative 2 – Wastewater Direct To Burlington WWTF for Treatment		Alternative 3a - Expand Wastewater Treatment and Disposal Systems (Drainfield at Sportsfield)		Alternative 3b - Expand Wastewater Treatment and Disposal Systems (Drainfield at New Land)		Alternative 4 - Expand Wastewater Treatment and Convert Existing Drainfield to Mound System		Alternative 5 - Expand Wastewater Treatment and Discharge to Surface Water	
		Rating[(1)]	Score	Rating[(1)]	Score	Rating[(1)]	Score	Rating[(1)]	Score	Rating[(1)]	Score	Rating[(1)]	Score
Capital Cost	20	5	100	1	20	5	100	4	80	3	60	3	60
Lifecycle Cost	20	5	100	1	20	5	100	4	80	4	80	3	60
Community Benefit	15	4	60	5	75	4	60	4	60	3	45	2	30
Reliable Permit Compliance/ Environmental Impacts	15	2	30	4	60	4	60	4	60	1	15	1	15
Complexity of Operation	10	5	50	3	30	5	50	5	50	4	40	3	30
Site Footprint	10	5	50	5	50	4	40	4	40	5	50	4	40
Future Flexibility	10	3	30	3	30	4	40	4	40	4	40	4	40
Total Score	100		420		285		450		410		330		275

(1) Five is the best rating and one is the worst rating.

The estimated capital costs are presented in Table 4-4 below. Detail estimates is included in Appendix B. Life cycle costs will be evaluated in a follow-up Engineering Report.

TABLE 4-4

Alternative 3a – Expand Wastewater Treatment and Disposal Systems (Drainfield at Sports Field) – Cost Estimates

Improvement Project	Capital Cost
WWTF Improvements	$285,000
Discharge Drainfield Improvements	$995,000
Total	$1,280,000

It is recommended that the improvements implemented in the follow sequence:

1. Conduct an I/I evaluation including property inspection (such as checking the presence of storm drain, roof connection, and septic tank leakage), gravity system assessment, smoke testing, etc. (Also, conduct drawdown tests and install flow meters at the Edison and school pump stations, and incorporate this information into the evaluation.) Then, based on the evaluation, implement the corresponding I/I control actions.

2. Rehabilitate the existing drainfields including replacing the aging equipment and piping, fixing the settling trenches, etc.; upgrade the WWTF UV disinfection system.

3. Expand the drainfield at suitable site for additional WWTF effluent disposal capacity.

The data should be reevaluated after each step to establish design flows for the next step, and/or to determine if the next step is warranted in light of the new information.