



# City of Sandy

## Agenda

### **City Council Work Session Meeting**

**Meeting Location:** City Hall- Council Chambers, 39250 Pioneer Blvd., Sandy, Oregon 97055

**Meeting Date:** Wednesday, February 13, 2019

**Meeting Time:** 6:30 PM

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Page

## **1. PRESENTATION**

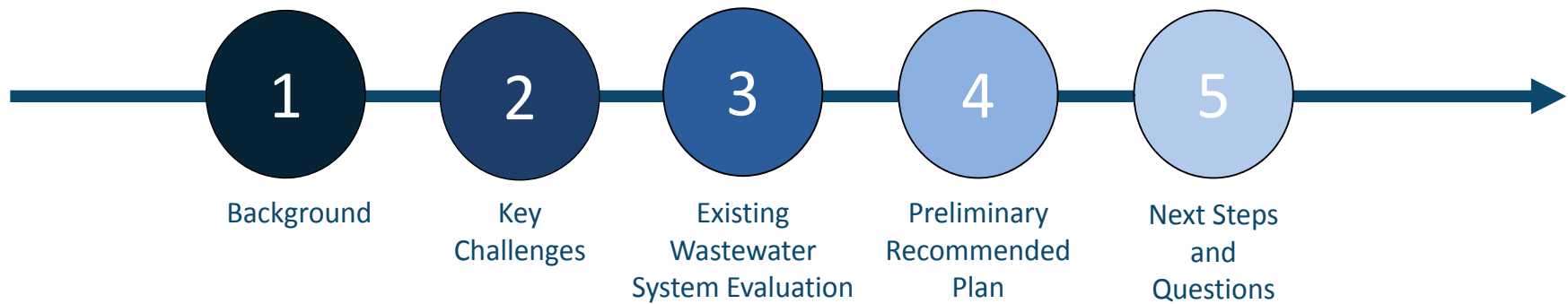
- 1.1. Introduction (Mayor Stan Pulliam) 2 - 66  
Waste Water Treatment Plant Presentation by MurraySmith  
[Sandy\\_WSFP\\_CityCouncil\\_2019.02](#)

# City of Sandy Wastewater System Facilities Plan Public Meeting

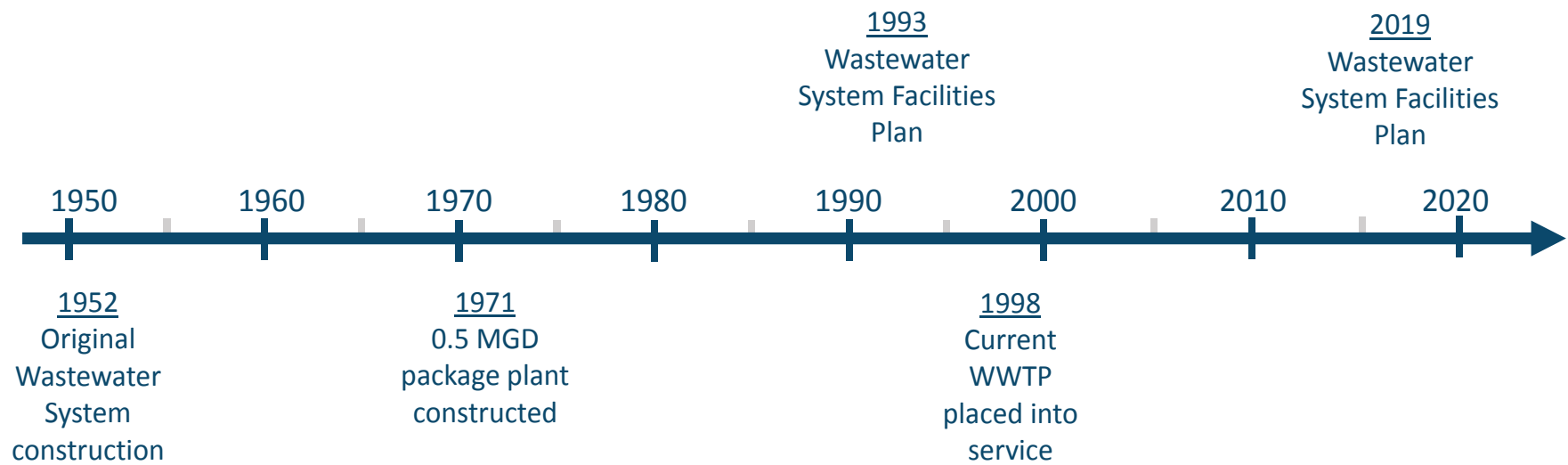


February 13, 2019

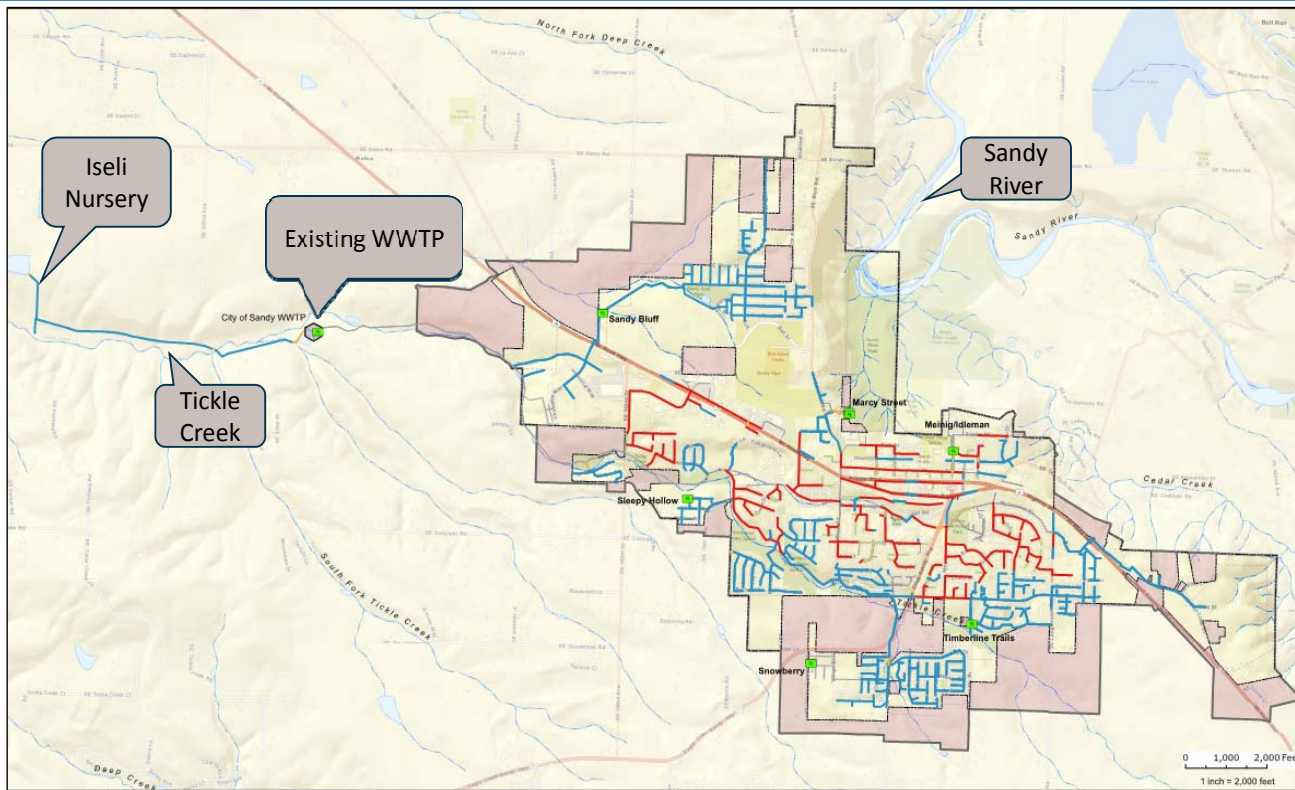
# Agenda



# WWTP Timeline



# Overview of Wastewater System

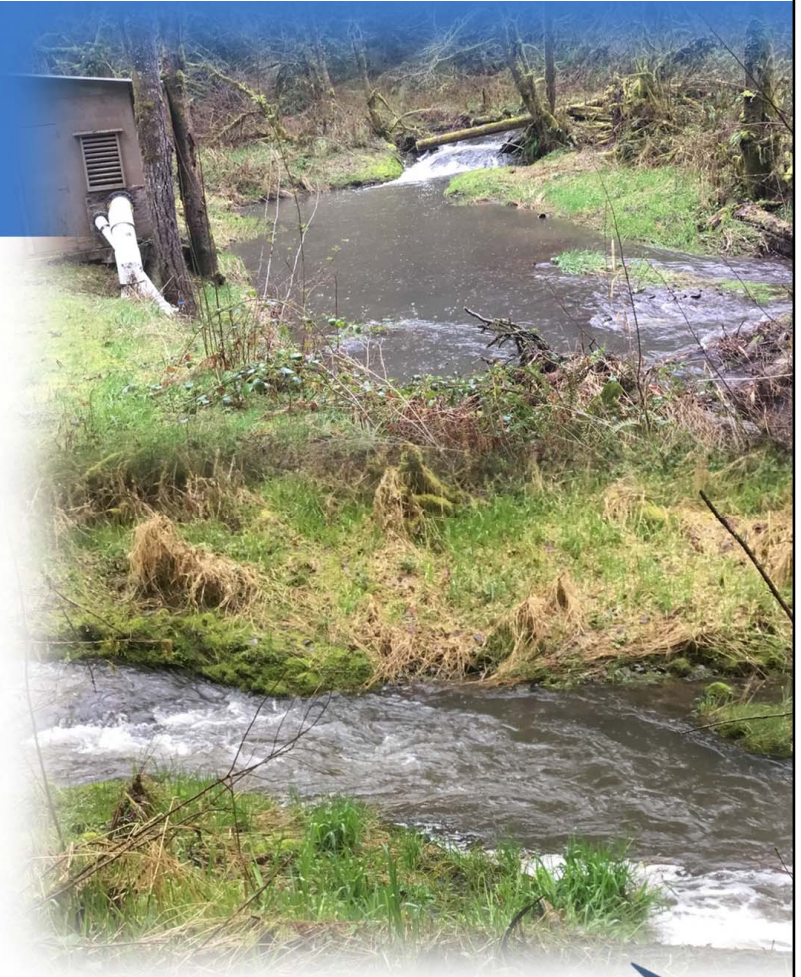


## Pipe Material

- Cast Iron (CI)
- Concrete (CSP)
- Ductile Iron (DI)
- Polyvinyl chloride (PVC)
- Unknown
- City Boundary
- Study Area
- UGB Expansion
- Water Body
- - - Stream
- Treatment Plant
- Pump Station

# Winter (Nov–Apr) Tickle Creek Discharge

- During the winter, treated wastewater from the WWTP is released to Tickle Creek, a small tributary of the Clackamas River Basin.
- Tickle Creek is a small stream and does not have the capacity to accept any more wastewater at the discharge location.





# Summer (May-Oct) Water Recycling/Storage @ Iseli Nursery



*Image Source: Iseli Nursery*

## 2. Key Challenges

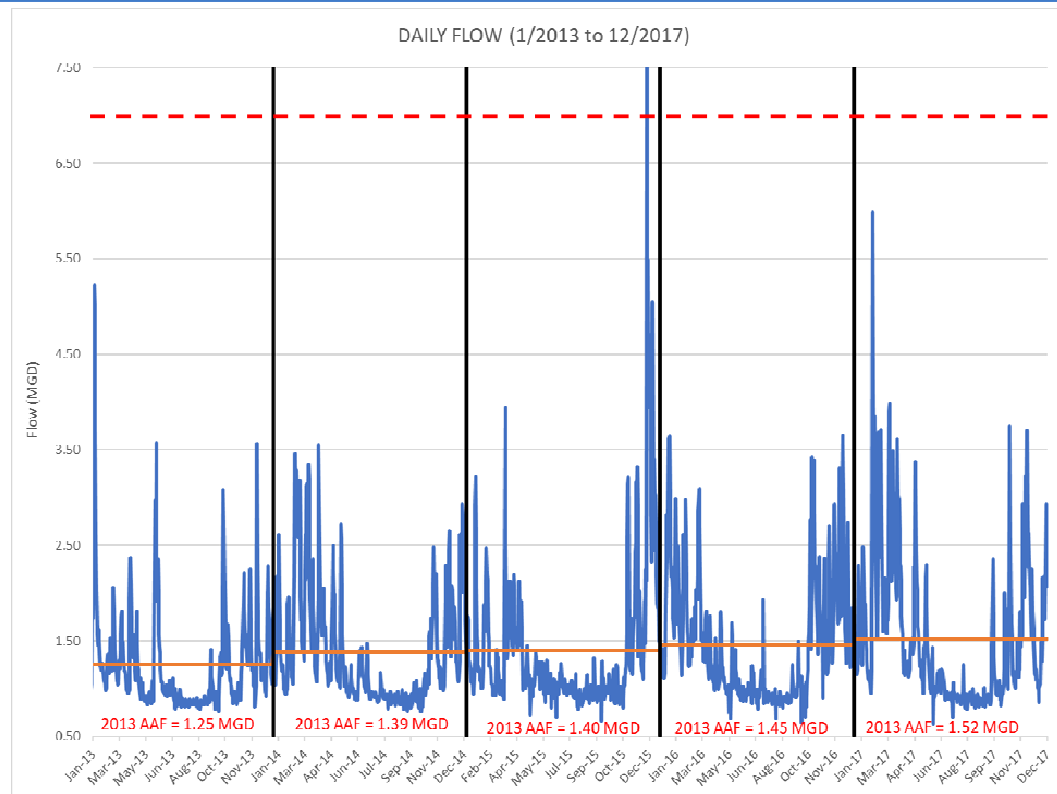


# Key Challenges

1. “Leaky” Wastewater Collection System
2. WWTP Capacity and Footprint
3. Community Growth
4. Limitations of Oregon Laws and Regulations

# Key Challenge: “Leaky” Wastewater Collection System

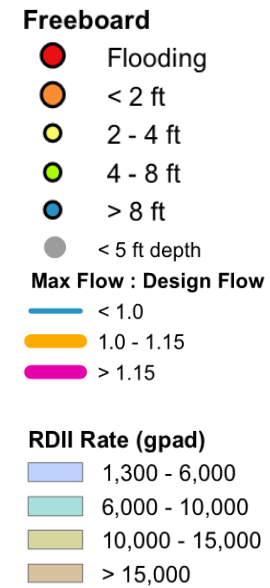
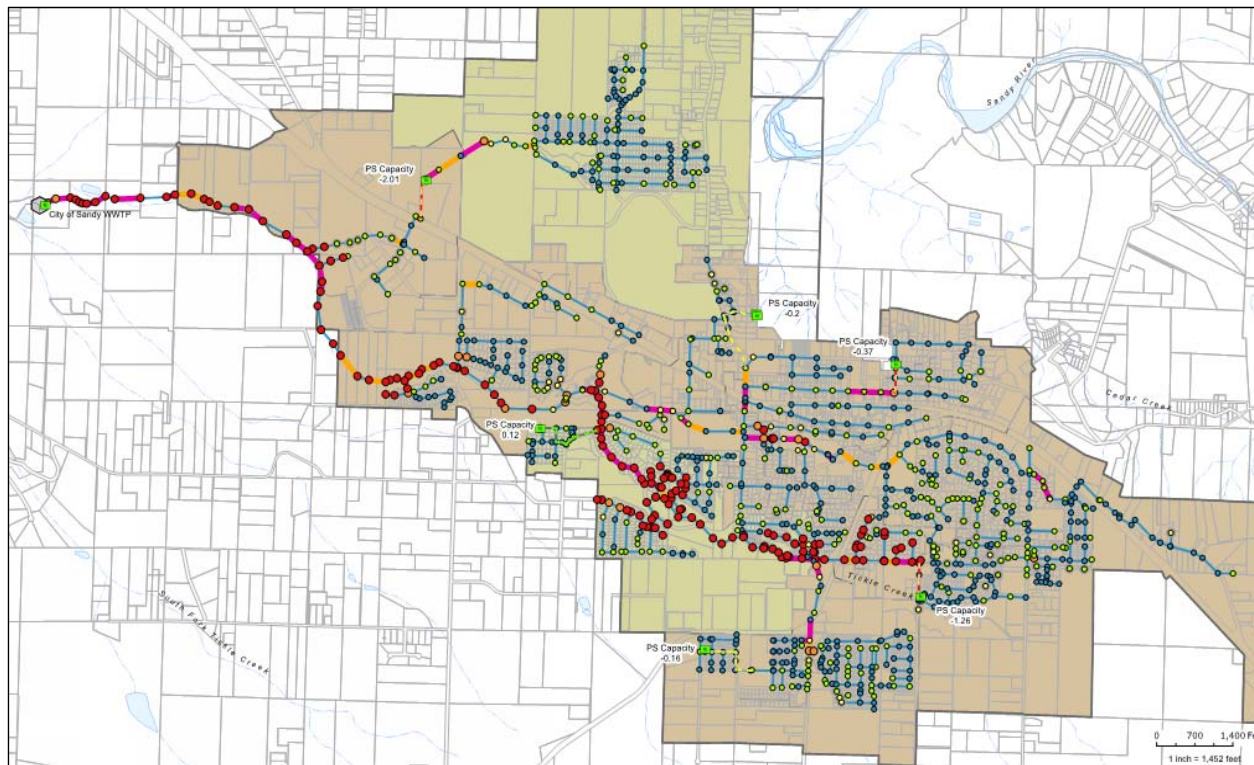
Peaking Factor  
(PIF/AAF):  
9/1 average  
15/1 worst  
  
5/1 is typical



WWTP  
Capacity 7.0  
MGD



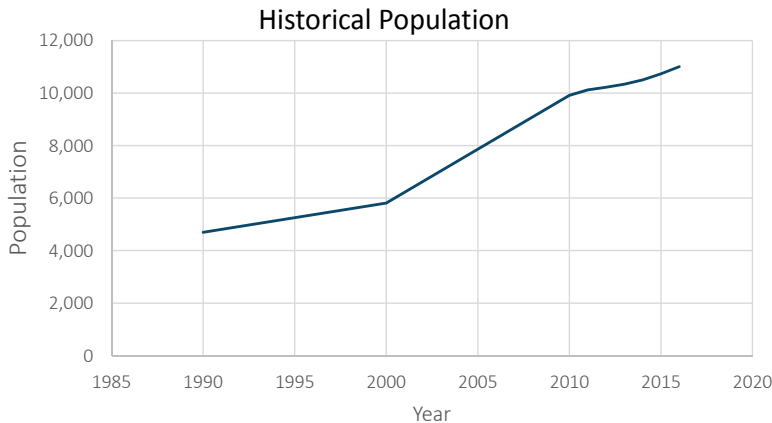
# Key Challenge: “Leaky” Wastewater Collection System



# Key Challenge: WWTP Capacity and Footprint



# Key Challenge: Community Growth



Population Forecast

Year	Population	Employees
2014	10,908	5,044
2024	14,377	6,648
2034	18,980	8,763
2040	22,400	10,342

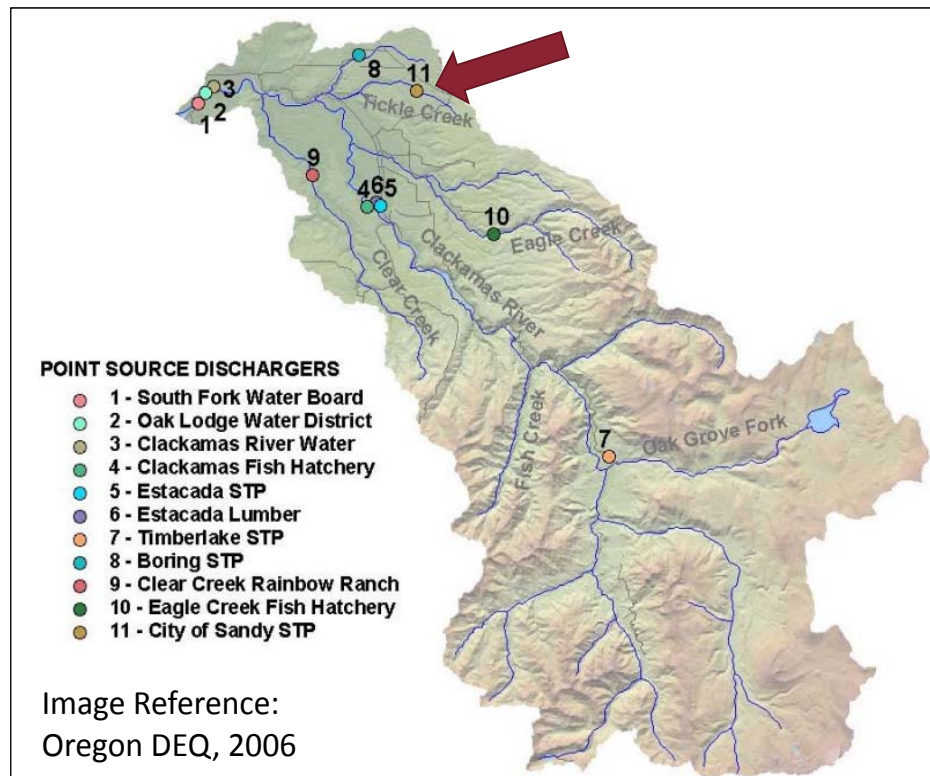
Projected population based on an 2.8% annual growth rate as stated in the 2015 Sandy Urbanization Study.

- Sandy is one of the fastest growing communities in Clackamas County & Oregon.
- Population has doubled in past 20 years, and will double again in the next 20!





# Key Challenge: Limitations of Oregon Laws and Regulations



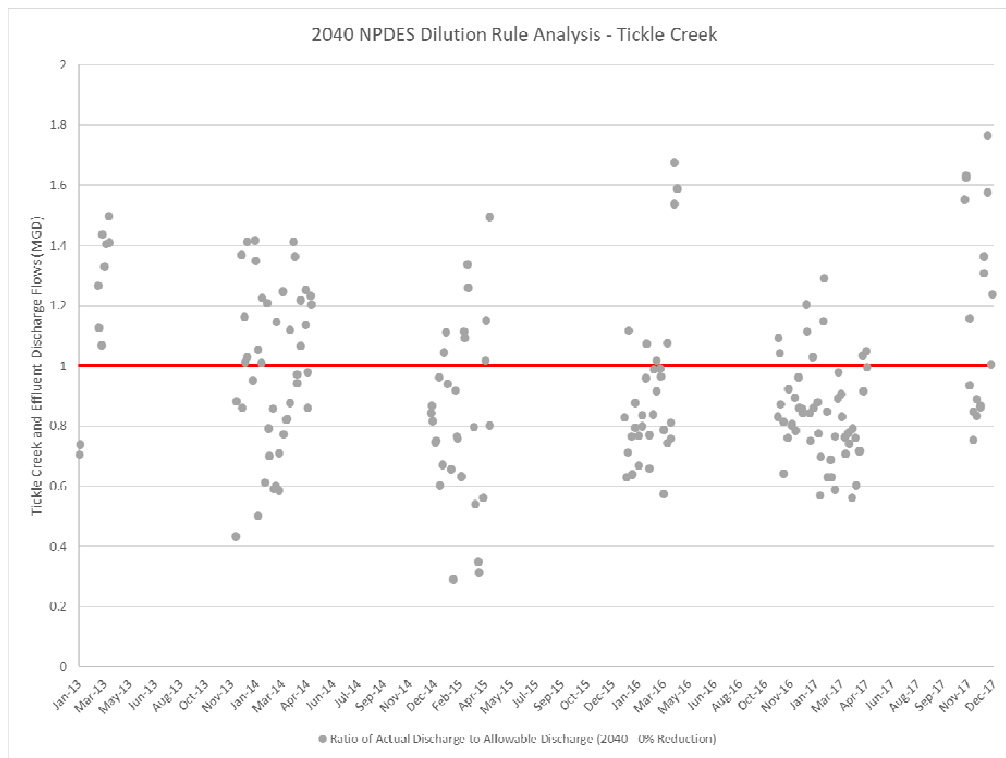
- Three Basin Rule
- NPDES Permit
- Oregon Dilution Rule
- Recycled Water Irrigation

# Current NPDES Permit

Parameter	Average Effluent Concentrations		Monthly* Average lb/day	Weekly* Average lb/day	Daily* Maximum lbs
	Monthly	Weekly			
BOD <sub>5</sub>	10 mg/L	15 mg/L	125	187	250
TSS	10 mg/L	15 mg/L	125	187	250

- Tickle Creek discharge November through April Only
- No Tickle Creek discharge May through October – Water recycling at Iseli Nursery
- Three Basin Rule (OAR 340-041-0350) does not allow mass load limits increase in the Clackamas River Sub-basin.

# Oregon Dilution Rule



By 2040, WWTP discharge will exceed allowable discharge in Tickle Creek about half the time.

***Need more streamflow!***

# Recycled Water Irrigation

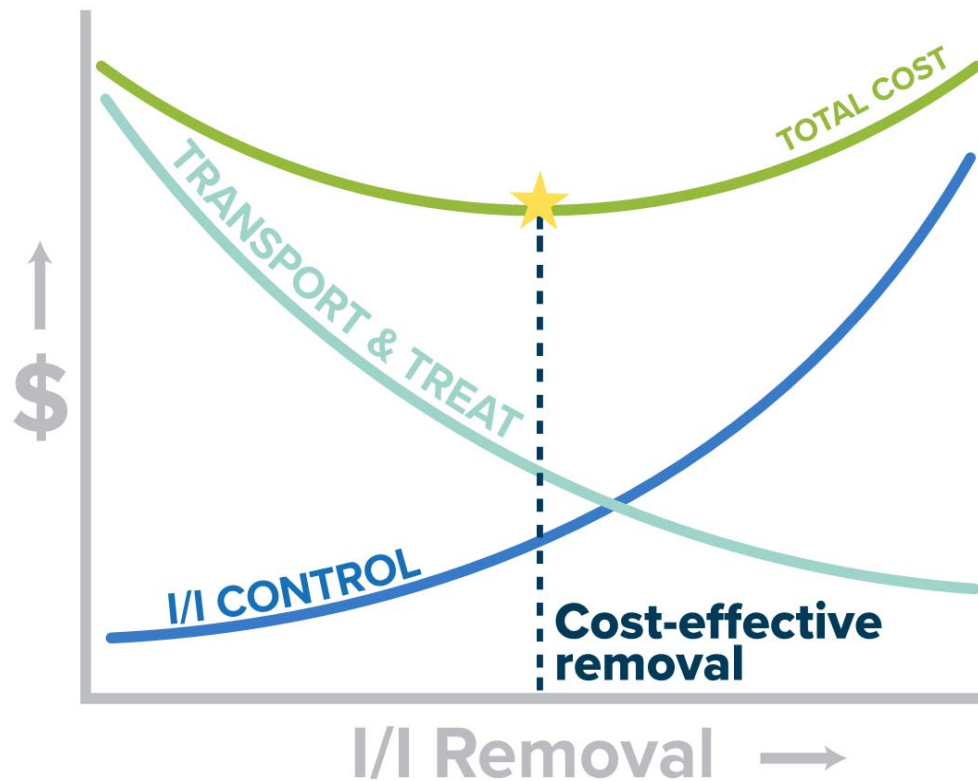
- Oregon regulations limit recycled water irrigation to agronomic uptake.
- For the potted plants, Iseli irrigates when dry soils are observed.
- Often low agronomic demands in May and October when no Tickle Creek discharge allowed.
- Need significantly more offsite RW storage to continue current discharge.



# 3. Existing WW System Evaluation



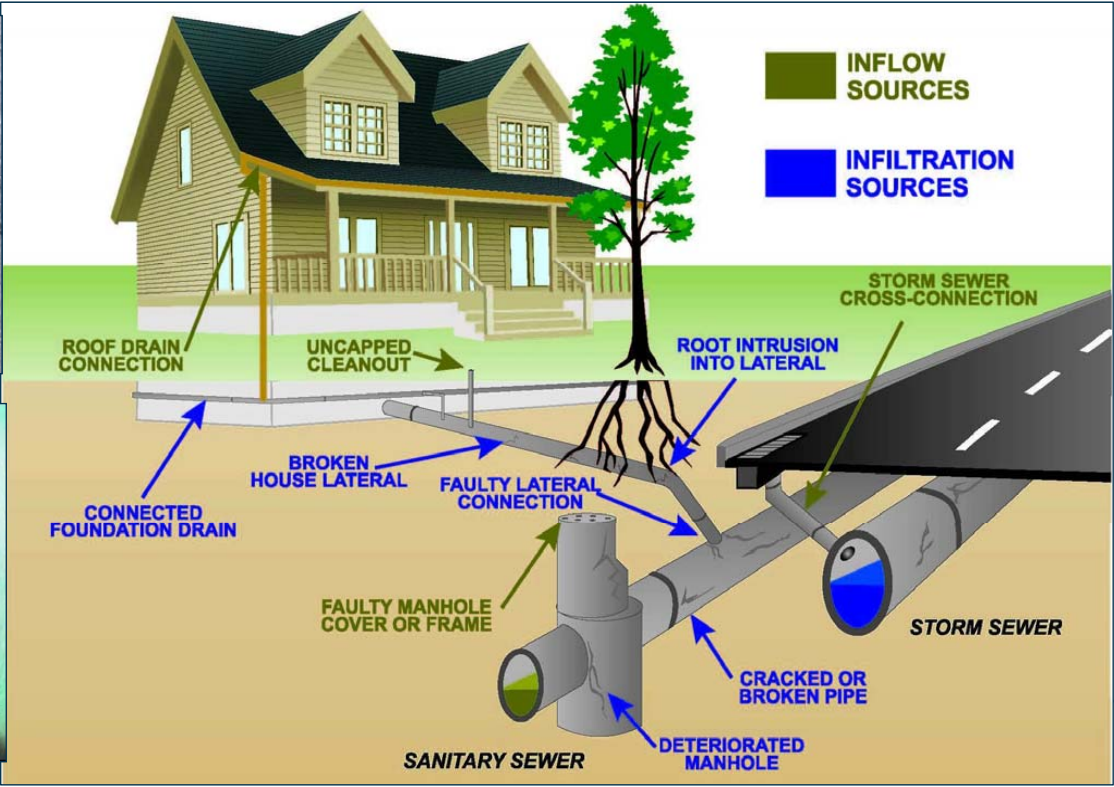
# Overall Approach: Balanced WW System Investments



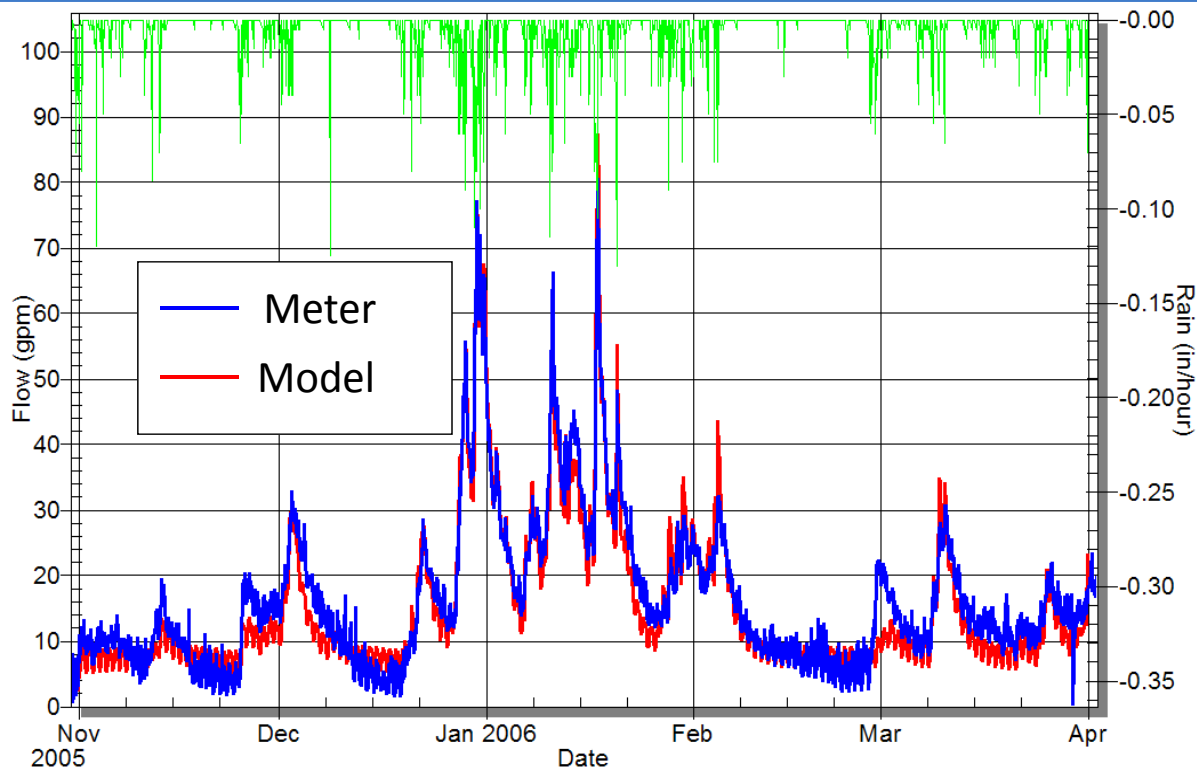
## Three Parts:

- A. Collection System Rehabilitation
- B. WWTP Capacity Expansion
- C. Discharge/Storage/Reuse

# Collection System Rehab Approach: Rainfall Derived Infiltration and Inflow (RDII)



# Collection System Rehab Approach: Flow Monitoring and Modeling



# Collection System Rehab Approach: Cost-effectiveness of Rehabilitation Strategies

Method	% Peak I/I Removal
Mains and Laterals	65 to 88%
Mains and ROW Laterals Only	40%
Mainlines Only	12 to 16%

Method	\$/gallons removed
Mains and Laterals	0.41
Laterals Only	26.40
Mainlines Only	27.79

## Collection System Rehab Approach: Initial Phases Generally Most Effective

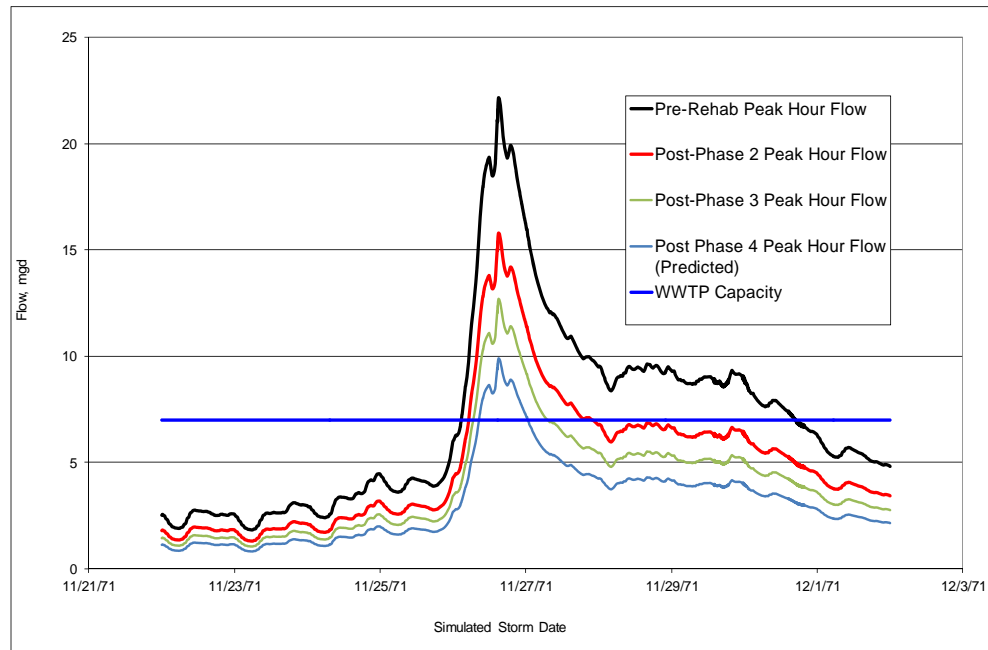
Phase	Cost	I/I reduction	\$/gallons removed
<b>1 and 2</b>	\$3.0M	6.4 mgd	<b>0.47</b>
<b>3</b>	\$3.1M	2.2 mgd	<b>1.41</b>
<b>4</b>	\$6.0M	2.1 mgd	<b>2.86</b>

Example:

City of Sweet Home, Oregon

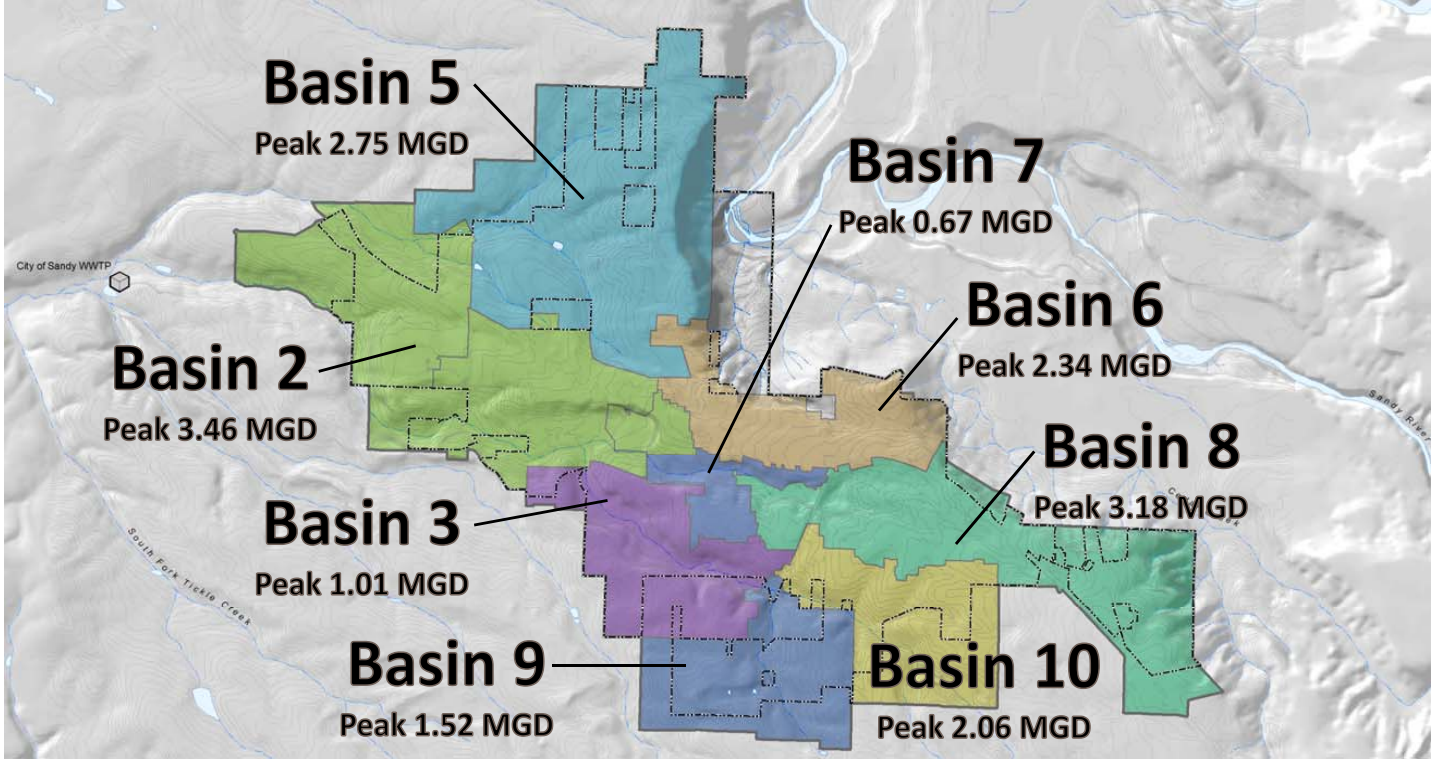


# Collection System Rehab Approach: Long-Term Commitment to Program



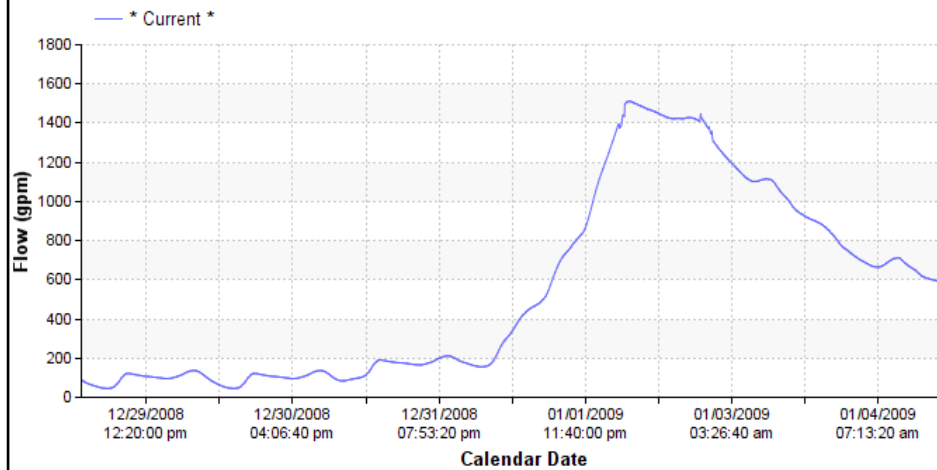
Example:  
City of Sweet Home, Oregon

# Collection System Rehab Approach: Sewer Basin Delineation

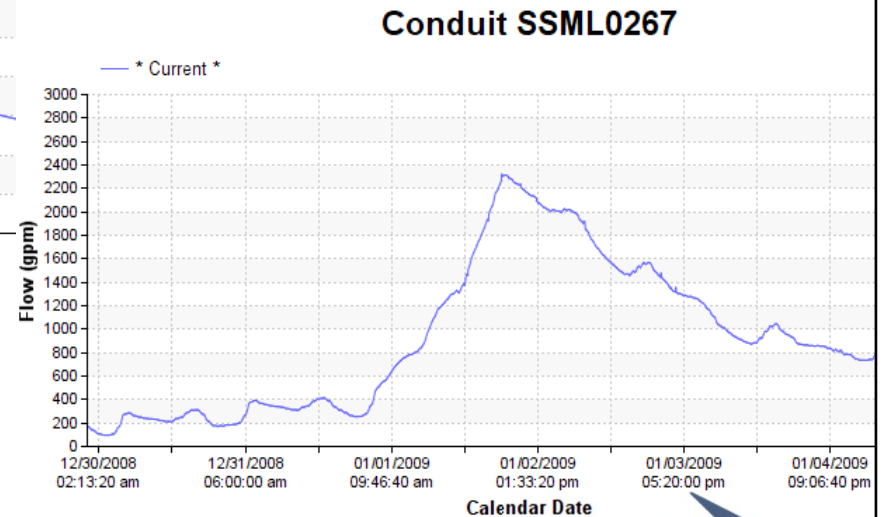


# Collection System Rehab Approach: Basin 8 Wet-Weather Response

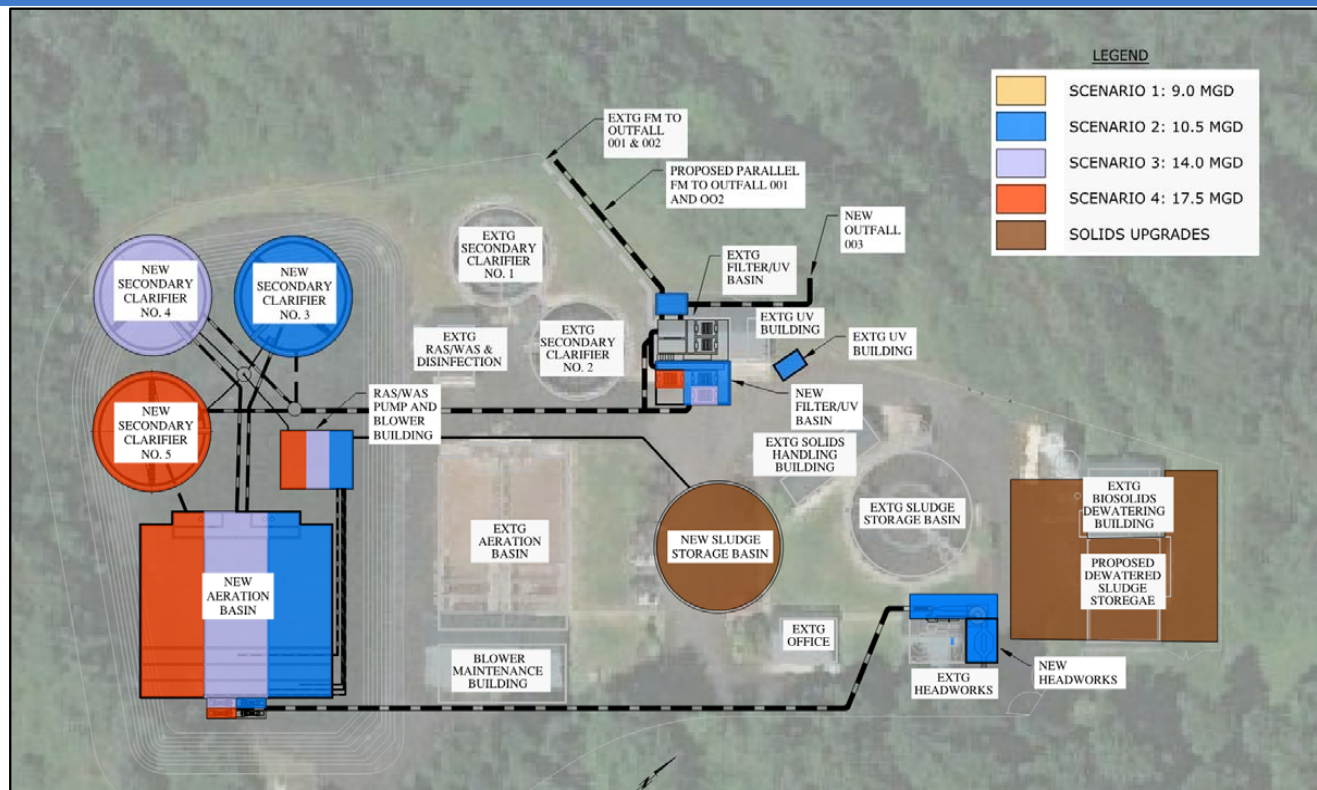
Conduit SSML0267



- 15:1 peaking factor
- Flows remain elevated



# Existing WWTP Upgrades: 4 Scenarios based on peak flows



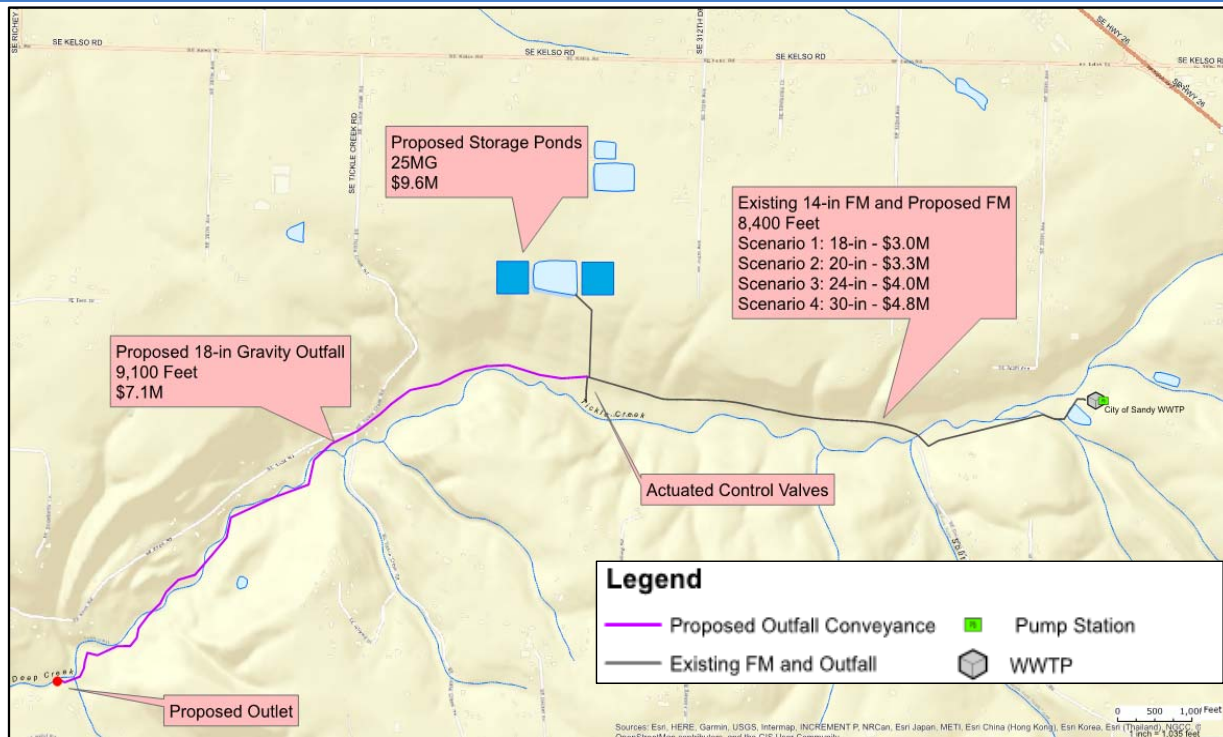
# Discharge/Storage/Reuse: Additional Offsite RW Storage



Additional Offsite RW Storage:  
25 Million Gallons (MG)



# Discharge/Storage/Reuse: Outfall Relocation downstream





# Existing WW System Evaluation: Combined Alternative Costs

Item	RDII REDUCTION LEVEL			
	9.0 MGD	10.5 MGD	14.0 MGD	17.5 MGD
Collection System Upgrades	\$35.5M	\$23.3M	\$16.2M	\$11.9M
WWTP Upgrades	\$16.2M	\$19.3M	\$25.1M	\$31.7M
Storage/Discharge Upgrades	\$19.7M	\$20M	\$20.7M	\$21.5M
Total	<b>\$71.4M</b>	<b>\$62.6M</b>	<b>\$62.0M</b>	<b>\$65.1M</b>

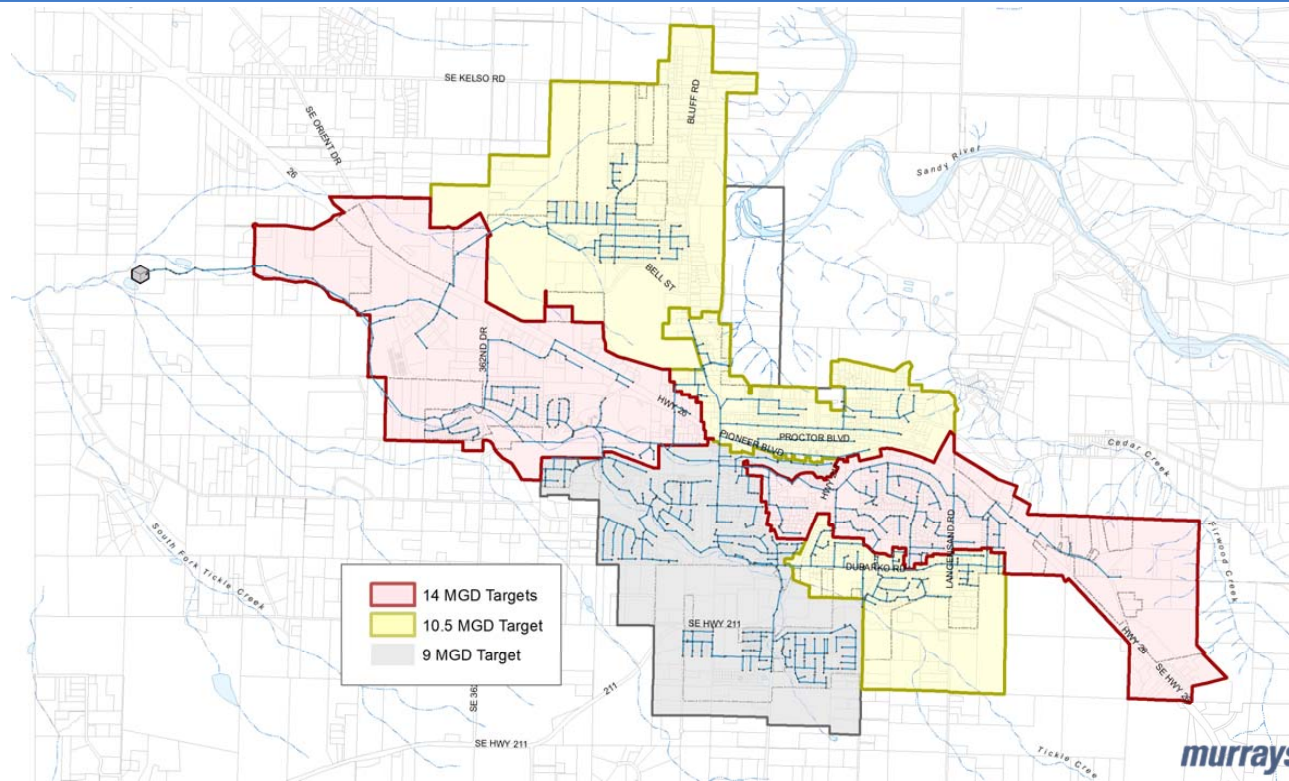
# Existing WW System Evaluation: Key Consideration

Item	Estimated Cost
Collection System Rehabilitation (14.0 MGD Peak Flow)	\$16.2M
Existing WWTP Upgrades	\$25.1M
Storage/Discharge/Retention <b>“Limited Return on Investment (ROI)”</b>	\$20.7M
<b>Total</b>	<b>\$62.0M</b>

# 4. Preliminary Recommended Plan

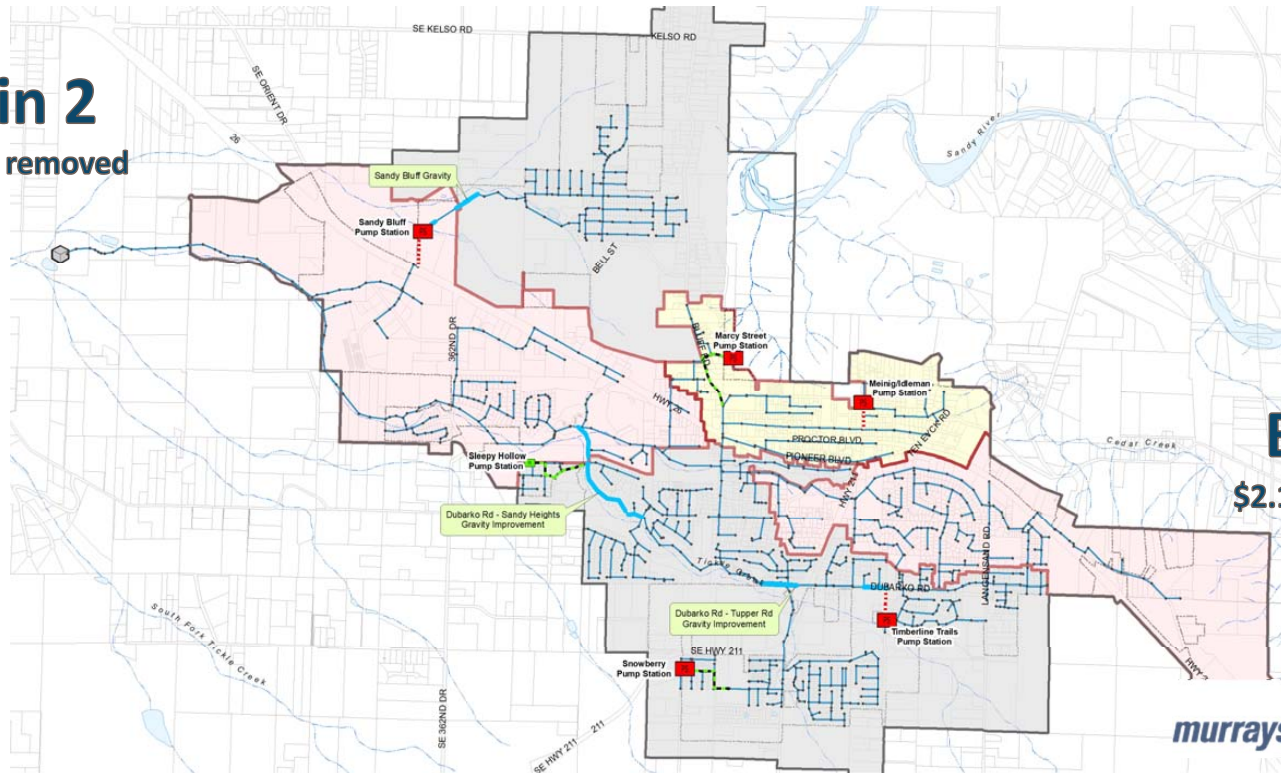
Collection System Improvements  
Effluent Discharge Improvements  
Treatment Improvements

# Collection System Improvements: Phased Approach



# Collection System Improvements: Target Cost/Gallon removed

**Basin 2**  
\$1.90/gal removed



**Basin 8**  
\$2.10/gal removed



# Collection System Improvements Near-term Efforts

- Smoke Testing (City-wide)
- Flow Monitoring
- CCTV (Basins 2 and 8)
- Develop Private I/I Policy
- Remove Inflow Sources

*Initial Inflow reduction steps  
could be very cost-effective in  
reducing WWTP peak flows*





# Effluent Discharge Improvements: Looking to the Sandy River

1993 WSFP evaluated four discharge alternatives

1. Tickle Creek/Iseli Nursery
2. Sandy River
3. Clackamas River
4. Export to Gresham

**Sandy River discharge was a close second in 1993 alternatives evaluation.**



Image Reference: The Freshwater Trust

# Treatment Improvements: Four Alternatives Considered

- **Alternative A** – Existing WWTP site with existing process approach and effluent pump station to the Sandy River
- **Alternative B** – Existing WWTP site with partial MBR conversion and effluent pump station to the Sandy River
- **Alternative C** – Existing WWTP site with primary clarifiers, anaerobic digestion, and effluent pump station to the Sandy River
- **Alternative D** – Existing WWTP site with primary clarifiers and anaerobic digestion. Satellite MBR WW Facility

# Treatment Improvements: Four Alternatives Considered

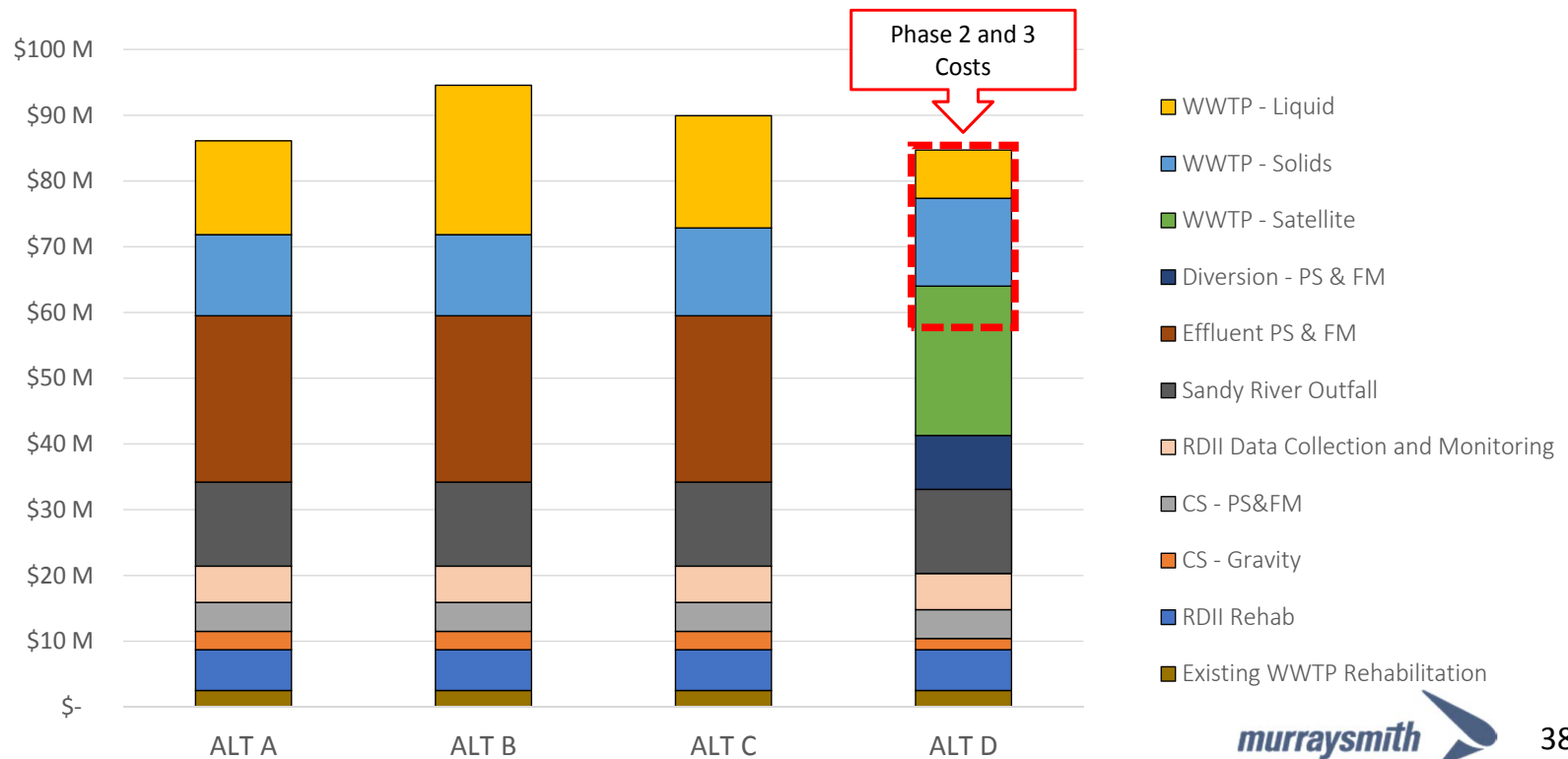
- **Alternative A** – Existing WWTP site with existing process approach and effluent pump station to the Sandy River

- **Alternative B** – Existing WWTP site with primary clarifiers, anaerobic digestion, and effluent pump station to the Sandy River
- ALTS A-C REQUIRE PUMPING FROM  
EXISTING WWTP TO SANDY RIVER***

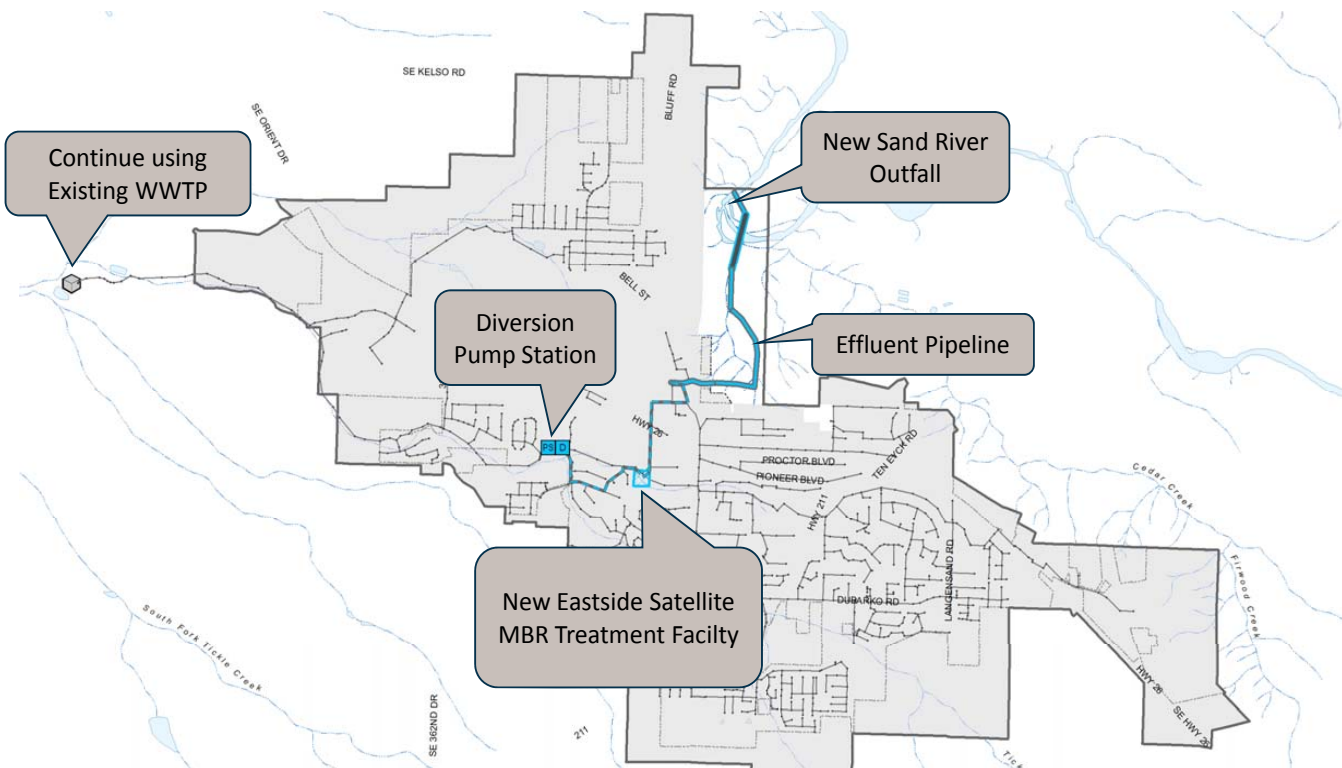
- **Alternative C** – Existing WWTP site with primary clarifiers, anaerobic digestion, and effluent pump station to the Sandy River

- **Alternative D** – Existing WWTP site with primary clarifiers and anaerobic digestion. Satellite MBR WW Facility

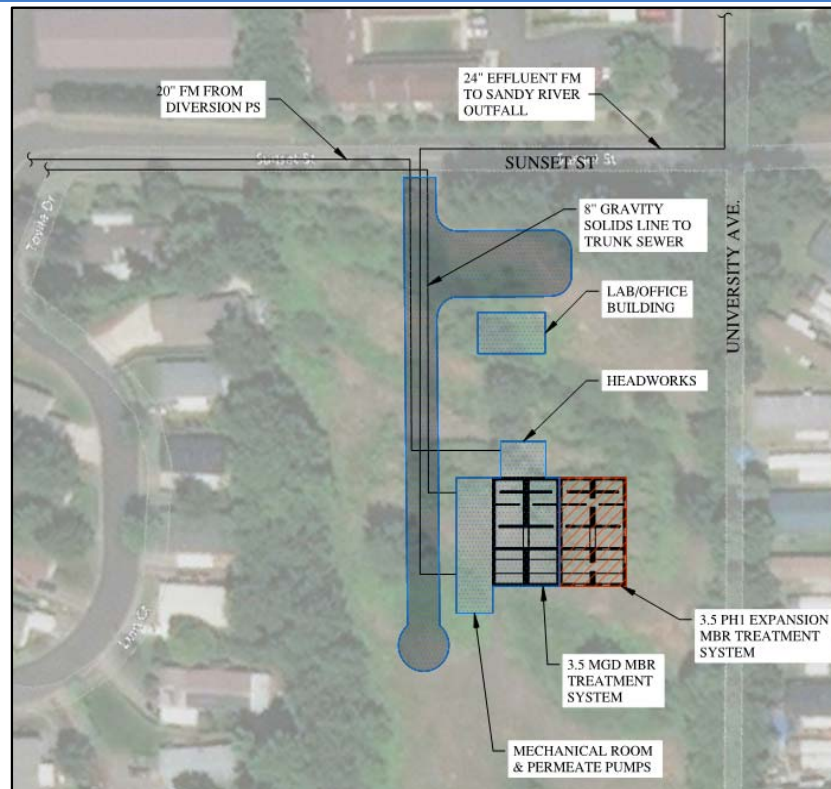
# Alternative Cost Summary



# Recommended Plan Overview

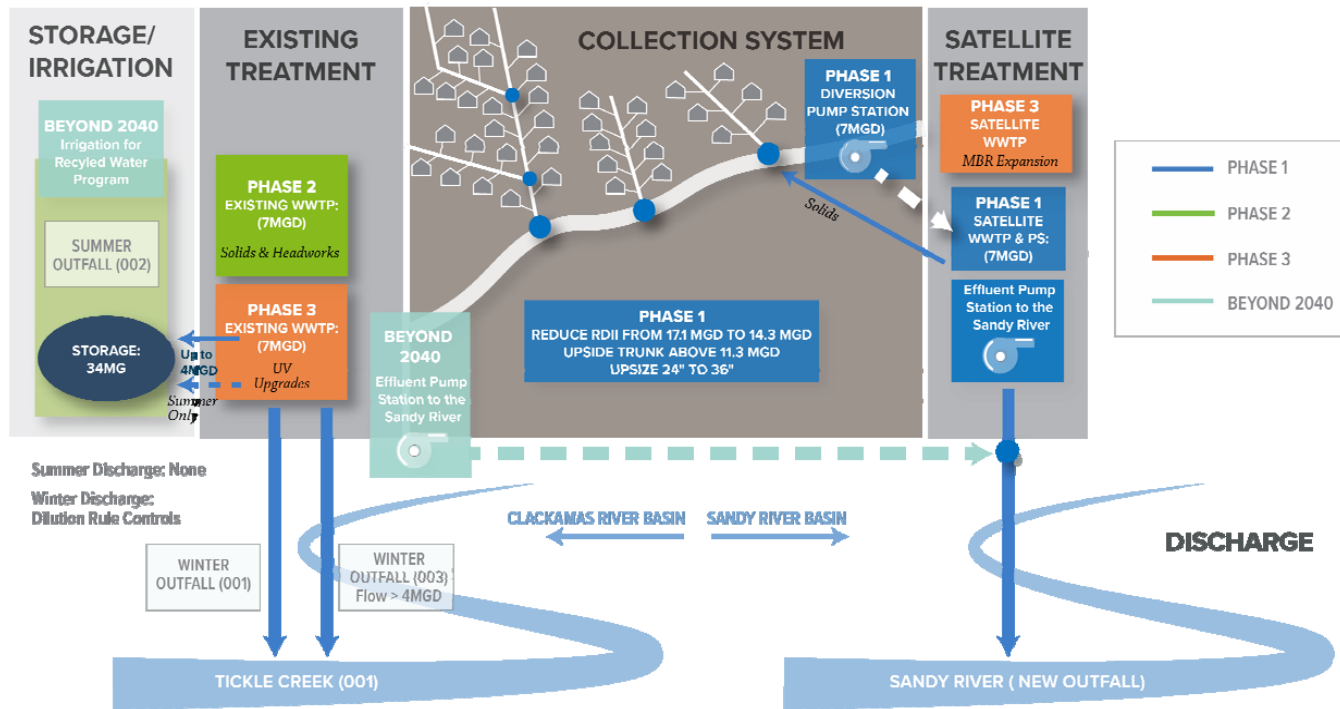


# Eastside Satellite MBR Facility Layout





# Overview of Recommended Improvements



**THE PLAN PROVIDES FOR:**

- Avoids new trunkline to existing WWTP
- Delays major upgrades at existing WWTP and new effluent pump station and force main
- Greatest ability to phase improvements
- Long-term river discharge to support community growth



# Alternative D: Phased Implementation Plan

Wastewater System Improvements	Phase 1 (2018-2025)	Phase 2 (2025-2032)	Phase 3 (2032-2040)	Beyond 2040
Collection System Capacity Upgrades	\$ 4.30 M	\$ 0.90 M	\$ 0.9 M	-
Collection System RDII Reduction Program	\$ 8.34 M	\$ 1.60 M	\$ 1.80 M	\$ 12.00 M
Existing WWTP Improvements	\$ 2.50 M	\$ 19.80 M	\$ 1.40 M	-
Eastside Satellite Treatment Facility	\$ 19.20 M		\$ 3.50 M	-
Diversion Pump Station	\$ 7.20 M			
Force main to Sandy Outfall	\$ 1.00 M			
Sandy River Outfall	\$ 12.80 M			
Iseli Pump Station Upgrades/ Effluent Pump Station & Force Main to Sandy River	\$ 1.40 M			\$ 25.30 M
<b>Total</b>	<b>\$ 56.74 M</b>	<b>\$ 22.30 M</b>	<b>\$ 7.60 M</b>	<b>\$ 37.30 M</b>



# 5. Next Steps and Questions

# Next Steps

- Continue with public process & Plan adoption
- Renegotiate MAO schedule with Oregon DEQ
- Prepare Letter of Interest (LOI) for potential WIFIA funding
- Site visits to reference OR/WA MBR WWTP facilities
- Prepare Conceptual layouts for the Diversion PS and Satellite MBR Facility
- Sandy River outfall alignment study
- Sandy River temperature evaluation
- Conduct Kaizen permitting meeting with local, state and federal agencies

# Near-Term Schedule

- January 16, 2019 – Revise Draft Facilities Plan per DEQ comments and re-submit
- January 18, 2019 – Draft available to the public and solicit comments
- February 1, 2019 – DEQ comments on updated Draft Facilities Plan
- **February 13, 2019 – Public Meeting #2**
- March 2019 – Close of Public Comment Period
- April/May 2019 – Respond to Public Comments & Renegotiate MAO
- June/July 2019 – Finalize Wastewater System Facilities Plan for City Council Adoption
- Summer/Fall 2019 – Begin Adopted Plan Implementation

## For more information

Wastewater System Facility Plan link on City webpage:

- <https://www.ci.sandy.or.us/sewer-wastewater-system-facilities-plan>

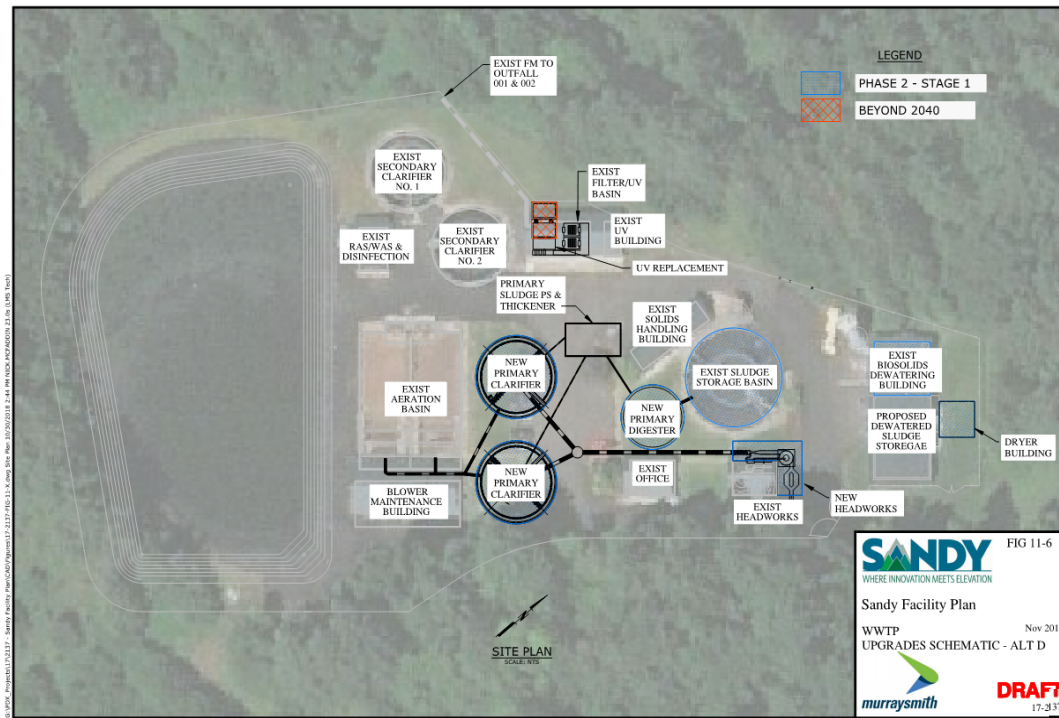


# Questions

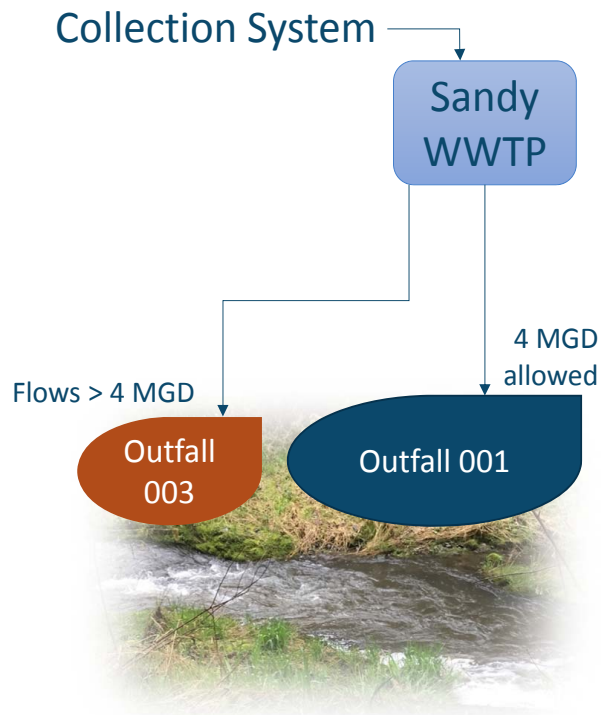
# Overview of Wastewater System



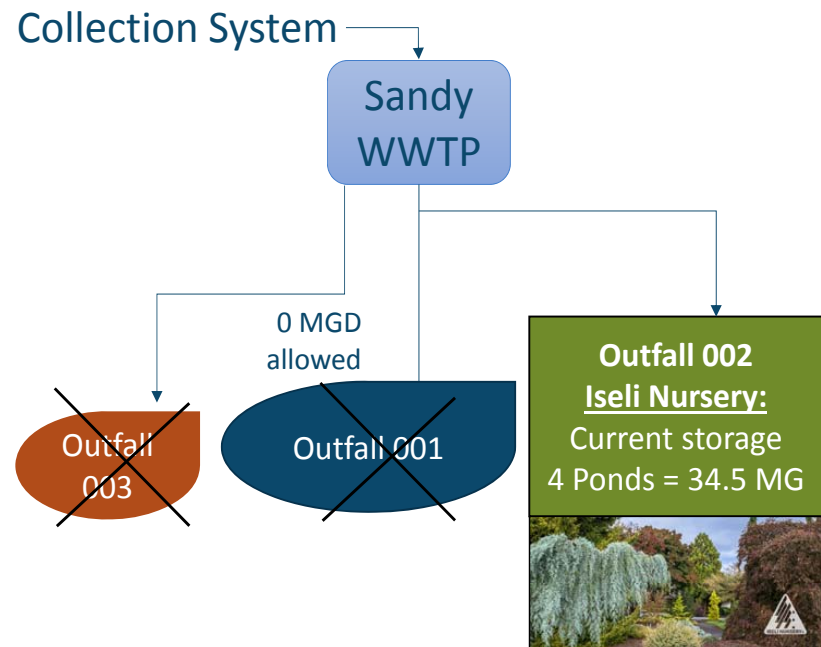
# Existing WWTP



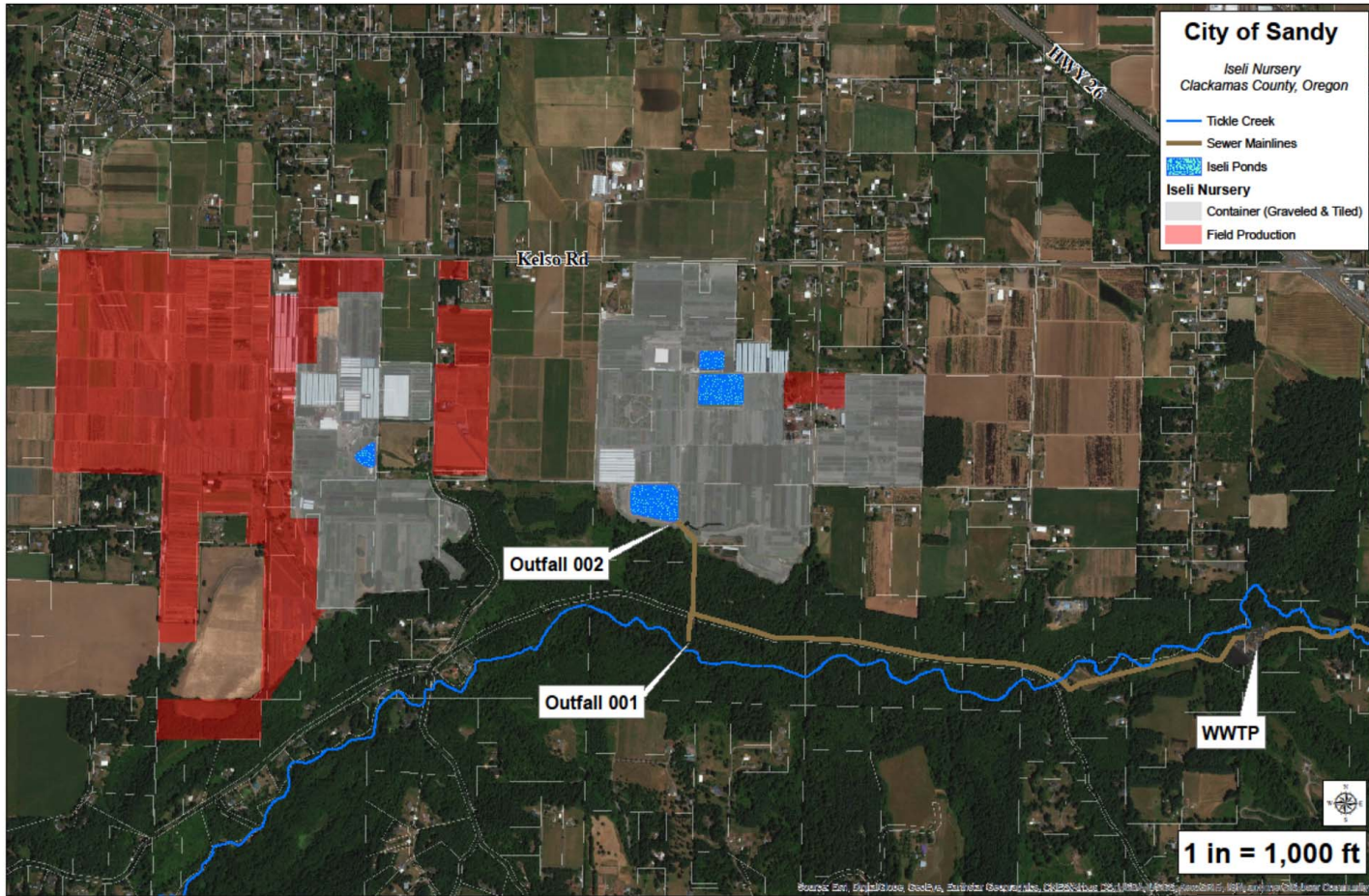
## Winter Discharge (November - April)



## Summer Reuse (May-October)







# Collection System Recommendations

Component and Phase	Cost
RDII Reduction – Phase 1: Includes monitoring, inspection and repair of priority gravity mainlines and laterals, correcting stormwater connections	\$8.3 M
Capacity Improvements – Phase 1: Upsizing infrastructure (pump stations, pressure and gravity mainlines)	\$4.3 M
Capacity Improvements – Phase 2 and Phase 3	\$1.8 M
RDII Reduction – Phase 2 and Phase 3	\$3.4 M

# Princeton Sewer Operating Committee, New Jersey

I/I reduction method	Effectiveness at reducing I/I <sup>1</sup>
Sewer mains and manholes	20 – 25%
Add lower laterals	40 – 45%
Add upper laterals	70 – 75%

<sup>1</sup>Based on 2010 WEFTEC proceedings





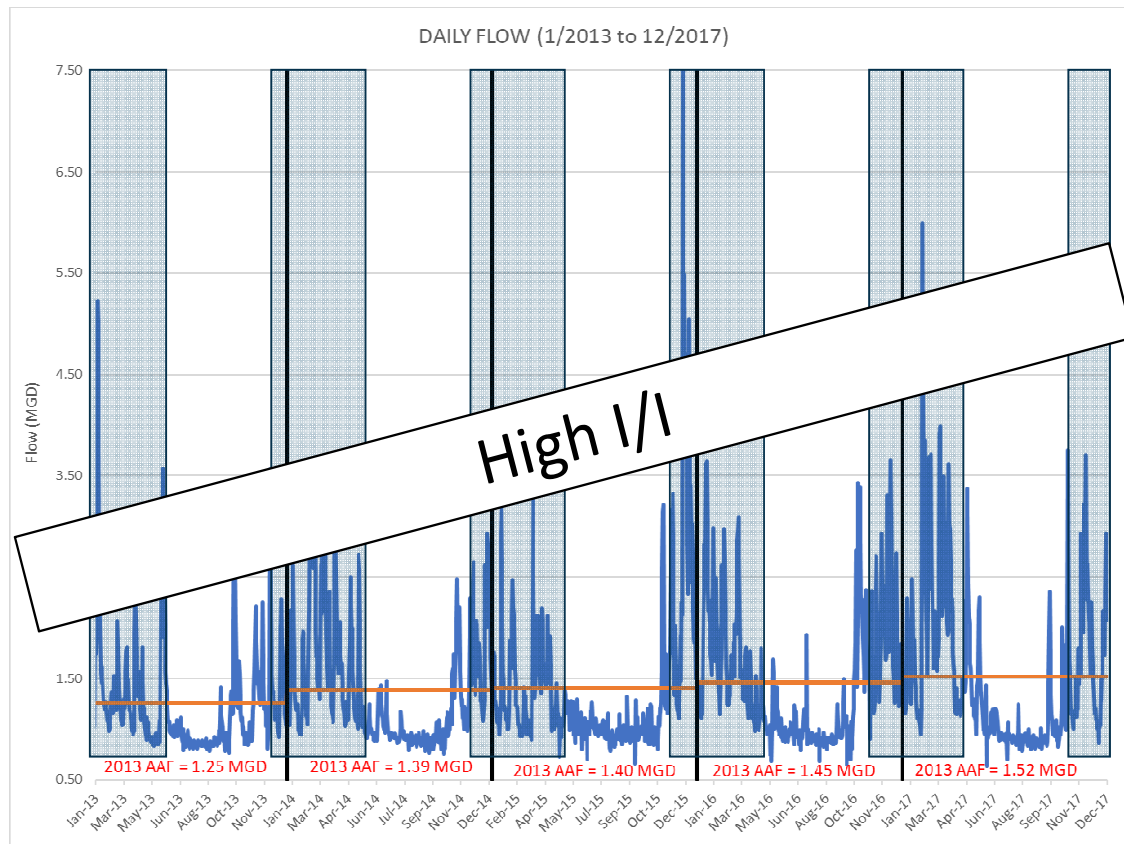
# Other Success Stories

- Johnson County Wastewater District, Kansas
  - 40 percent of peak RDII attributed to private laterals
- New Castle County Department of Special Services, Delaware
  - 55 percent peak RDII reduction if private laterals are addressed
- South Palos Township, Illinois
  - 40 to 60 percent peak RDII reduction if private laterals are addressed
- Other Northwest programs?



**Winter**

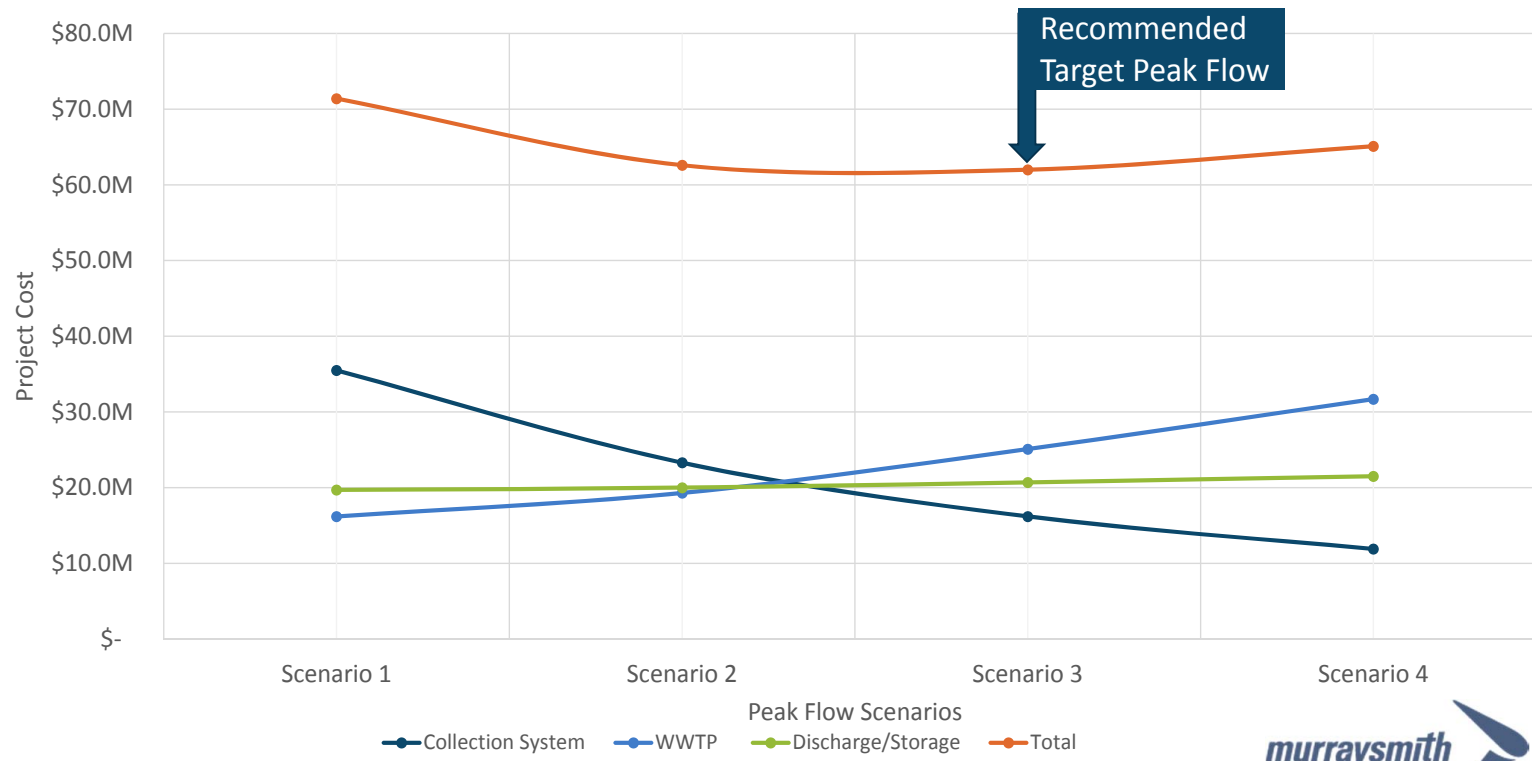
**Peaking Factor (PIF/AAF):**  
9/1 average  
15/1 worst  
5/1 is typical



# Summary of Costs for WWTP Upgrades for Peak Flow Scenarios

Item	9.0 MGD	10.5 MGD	14.0 MGD	17.5 MGD
Liquid Stream Upgrades	\$ 9.24 M	\$ 12.38 M	\$ 17.45 M	\$ 24.11 M
Solids Stream Upgrades	\$ 6.93 M	\$ 6.93 M	\$ 7.62 M	\$ 7.62 M
<b>Total</b>	<b>\$ 16.17 M</b>	<b>\$ 19.31 M</b>	<b>\$ 25.07 M</b>	<b>\$ 31.73 M</b>

# RDII Reduction Optimized at 14.0 MGD



# Sandy River Discharge Alts

## A. – Existing WWTP site with existing process approach and effluent pump station to the Sandy River

- Upgrade existing treatment plant with existing processes
- Rehab 2 basins
- New effluent pump station to Sandy River Outfall

Item	Cost
WWTP Upgrades	\$30.5M
Collection System Upgrades	\$13.4M
Effluent Infrastructure	\$38.1M
<b>Total</b>	<b>\$82.0M</b>

## B. – Existing WWTP site with partial MBR conversion and effluent pump station to the Sandy River

- Upgrade existing treatment plant with advanced treatment technology
- Rehab 2 basins
- New effluent pump station to Sandy River Outfall

Item	Cost
WWTP Upgrades	\$39.0M
Collection System Upgrades	\$13.4M
Effluent Infrastructure	\$38.1M
<b>Total</b>	<b>\$90.5M</b>



## C. – Existing WWTP site with primary clarifiers, anaerobic digestion, and effluent pump station to the Sandy River

- Upgrade existing treatment plant and improve solids handling
- Rehab 2 basins
- New effluent pump station to Sandy River Outfall

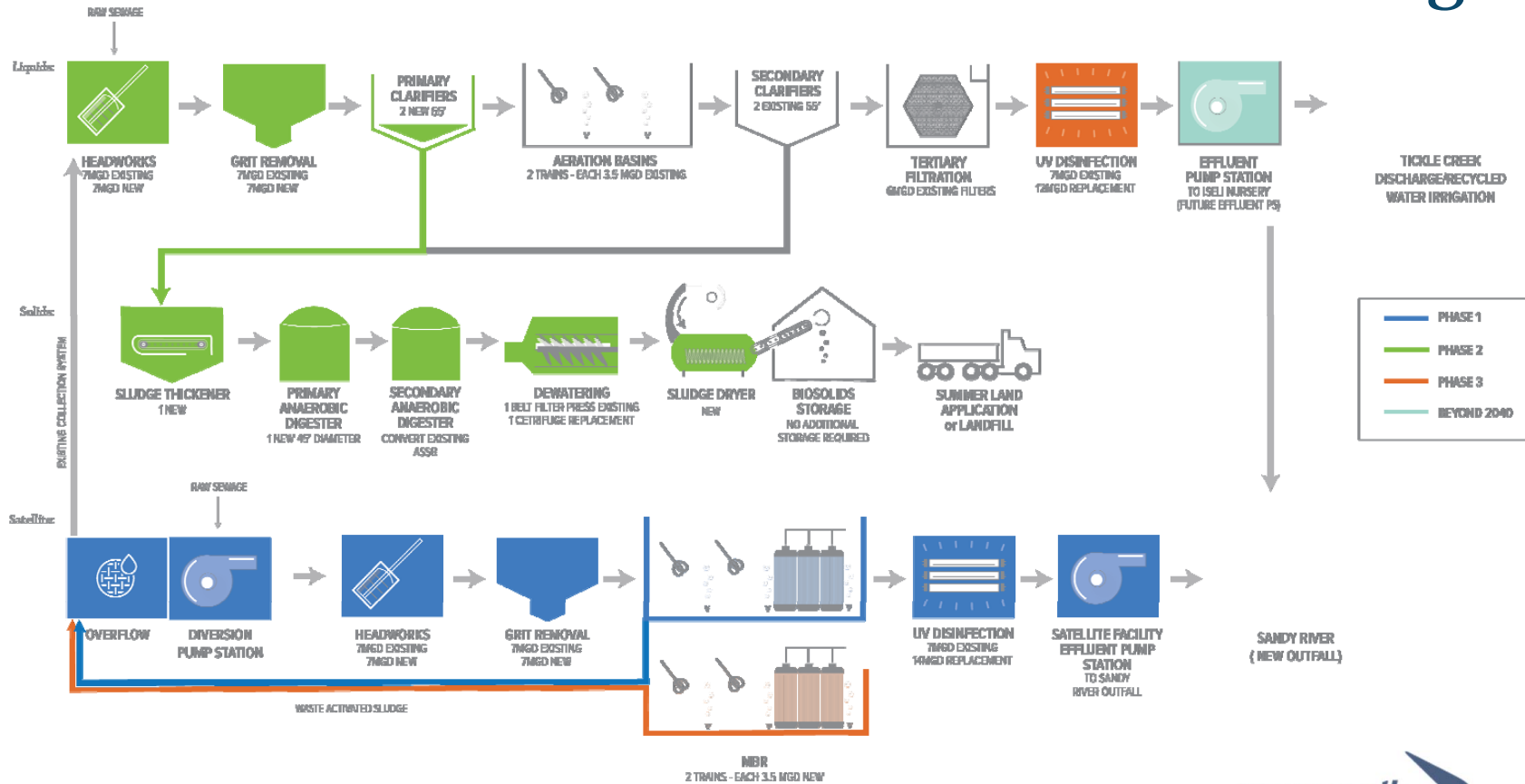
Item	Cost
WWTP Upgrades	\$34.3M
Collection System Upgrades	\$13.4M
Effluent Infrastructure	\$38.1M
<b>Total</b>	<b>\$85.8M</b>

## D. – Existing WWTP site with primary clarifiers and anaerobic digestion. Satellite MBR WWR

- Split treatment with Existing WWTP and New Eastside satellite treatment facility construction
- Rehab 2 basin
- Satellite treatment facility effluent pump station and New Sandy River Outfall

Item	Cost
WWTP Upgrades	\$47.3M
Collection System Upgrades	\$12.3M
Effluent Infrastructure	\$21.0M
<b>Total</b>	<b>\$80.6M</b>

# Alternative D – Process Schematic/Phasing





# Inflow Sources

- Cross-connected storm drains
- Roof leaders
- Driveway drains
- Submerged manhole covers



Basin 7 Run 13 Incident 22



Basin 7 Run 14 Incident 27