STEVENSON WASTE WATER CLARIFIERS

Big Improvements • Better Bottom Lines

Meeting Agenda

Date: Thursday, August 31st, 2017
Time: 5:00 PM to 6:30 PM
Location: Stevenson City Hall

> "We can no longer afford to consider air and water common property, free to be abused by anyone without regard to the consequences. Instead, we should begin now to treat them as scarce resources, which we are no more free to contaminate than we are free to throw garbage into our neighbor's yard."
>
> -Richard Nixon
> 1970 State of the Union Address

Preliminary Matters

1. INTRODUCE YOURSELF:
    a. Who you are
    b. What your interest is
2. FLUSH IT DOWN:
    a. Identify clogs, past successes, past failures, continued grievances

Today's Work

3. DEFINE WASTE WATER CLARIFIERS' SUCCESS:
    a. Who we are
    b. Why we are here
    c. What we will accomplish
    d. What we will avoid
4. JUMP DOWN THE MANHOLE:
    a. INTRODUCE KEY ASSUMPTIONS, DESIGN CRITERIA, DECISIONS ETC.:

Upcoming Work

5. BEFORE THE NEXT MEETING:
    a. Review City Website www.ci.stevenson.wa.us/cleanwater
6. AT THE NEXT MEETING (TENTATIVELY):
    a. Agree on Clarifier Ground Rules
    b. Describe Information Gaps on Website Discuss Key Assumptions, Design Criteria, Decisions
    c. Introduce Preliminary Funding Strategy
    d. Identify Next Steps

Adjourn

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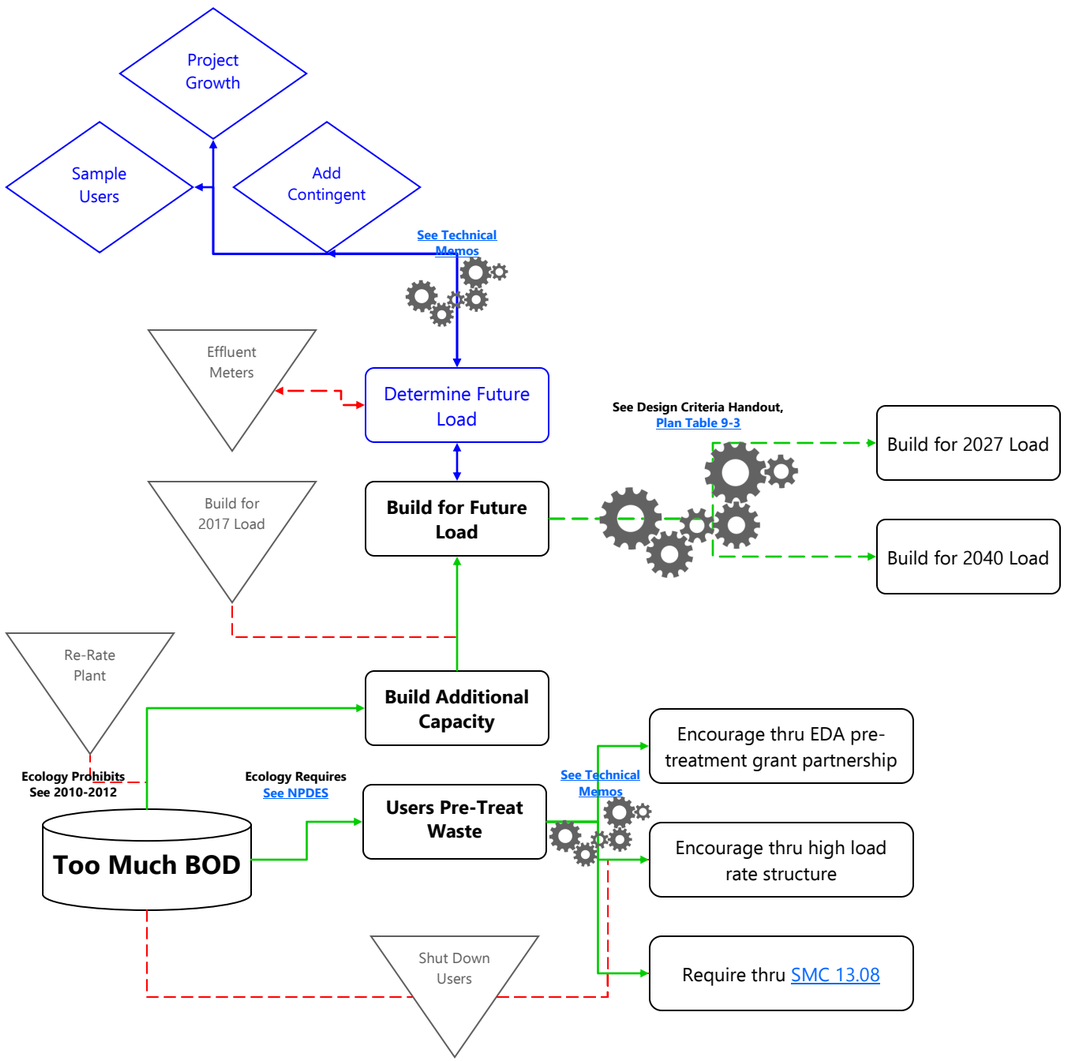
KEY ASSUMPTIONS, DESIGN CRITERIA, DECISIONS



NOTES, ACTION ITEMS, ETC.

Table 9-3. Design Criteria for Treatment Plant Facilities

Process/Equipment Description	Existing Design	Recommended Design
Treatment Plant Rated Capacity		
Flow		
Base (Dry Weather Average)	0.24 mgd	0.48 mgd
Maximum Month	0.45 mgd	0.90 mgd
Peak Day	1.0 mgd	2.0 mgd
Peak Hourly	1.5 mgd	2.7 mgd
Pollutant Loadings		
Maximum-Month Biochemical Oxygen Demand	611 ppd	2,000 ppd
Maximum-Month Total Suspended Solids	611 ppd	2,000 ppd
Headworks		
Mechanical Fine Screen		
Number	1 + manual screen bypass	1 + manual screen bypass
Type	Automatic bar screen	6 mm automatic fine screen
Peak Flow Capacity per Screen	1.5 mgd	2.7 mgd
Washer Compactor (matched with mechanical fine screen)		
Number	None	1
Screenings Volume Reduction	n/a	80%
Organic Constituents Removal from Screenings	n/a	95%
Grit Chambers		
Type	None	Vortex
Number	n/a	1 + bypass
Grit Pumps		
Type	None	Horizontal recessed impeller
Number	n/a	1
Grit Washing / Transport		
Type	None	Cyclone / classifier
Number	n/a	1
Secondary Treatment		
Biological Reactors		
Type	Oxidation ditch	Conventional activated sludge
Number	1	2
Volume (each)	300,000 gallons	300,000 gallons
Dimensions (each)	103 feet long 39 feet wide 12-foot side water depth	80 feet long 25 feet wide 20-foot side water depth
Detention Time (total, maximum month)	16 hours	16 hours
Type	selector zone inside oxidation ditch	Selector basins
Number	1	2
Volume	Included in oxidation ditch	100,000 gallons
Depth	12-foot side water depth	12-foot side water depth
Detention Time (maximum month)	Included in oxidation ditch detention time	5 hours
Total biological reactor volume	300,000 gallons	800,000 gallons
Total biological reactor detention time (max month)	16 hours	21 hours
Mixed Liquor Suspended Solids (max month)	3,000 mg/L	3,000 mg/L

Process/Equipment Description	Existing Design	Recommended Design
Mixed Liquor Volatile Solids Concentration (max month)	2550mg/L	2600 mg/L
Mixed Liquor Volatile Solids % of Total (max month)	85%	87%
F/M (max month)	0.10 pounds BOD per pound MLVSS	0.11 pounds BOD per pound MLVSS
Sludge Age (max month)	15 days	10 days
Aeration		
Type	Brush aerators	Blowers and fine bubble diffusers
Number	2 (1 active, 1 standby)	3 (2 active, 1 standby)
Duty HP	40	50
Total HP	80	75
Capacity cfm (each)		400 cfm
Anoxic Mixers		
Number per reactor anoxic zone		1
HP each		4
HP total		8
Recirculation pumps		
Number per reactor		1
HP each		5
HP total		10
Clarifiers		
Number	2	2 existing + 1 new
Diameter	35 feet	2 @ 35 feet + 1 @ 50 feet
Depth	14 feet	14 feet
Area (total)	1,924 square feet	3,887 square feet
Overflow Rate		
Maximum month	230 gallons/day/square foot	230 gallons/day/square foot
Peak Day	520 gallons/day/square foot	510 gallons/day/square foot
Peak Hour	780 gallons/day/square foot	700 gallons/day/square foot
Solids Loading Rate		
Maximum month + RAS @ 100% of MM	12	12
Peak Day + RAS @ 100% of MM	19	19
Peak Hour + RAS @ 100% of MM	25	23
Return Activated Sludge Pumping		
Type	Non-clog, centrifugal	Non-clog, centrifugal
Number	3	3 existing + 2 new
Capacity (each)	350 gpm	500 gpm (new pumps only)
Drive	Variable frequency drives	Variable frequency drives
Disinfection		
Reactor Type	Open channel	Open channel
Number	1	2
Peak Flow Capacity (each)	1.5 mgd	2.7mgd
Light transmittance	65%	65%
Minimum UV dose	—	30 mJ per square cm
Lamp type	Low-pressure, low-output	Low-pressure, high-output

Process/Equipment Description	Existing Design	Recommended Design
Solids Handling		
Sludge Thickening		
Type	Gravity Decant	Rotary drum screen
Number	1	1
Capacity	n/a	150 gpm
Sludge Pumps		
Thickener feed pumps	n/a	
Type		Progressive Cavity w/ variable frequency drive
Number		2
Capacity		150 gpm
HP each		10
Thickened sludge pumps		
Type		Progressive Cavity w/ variable frequency drive
Number		2
Capacity each		60 gpm
HP each		5 HP
Sludge Holding Tank (Thickener Feed Tank)		
Thickener Feed Tank		
Tank depth	14.25 feet	14.25 feet
Volume	33,000 gallons	33,000 gallons
Hydraulic Detention time (MM)	2.8 days	0.7 days
Solids concentration	5,000 mg/L	5,000 mg/L
Sludge Digester		
Tank Depth	14.25 feet	14.25 feet
Volume	134,000 gallons	134,000 gallons
Hydraulic Detention Time	31 days	34 days
Solids concentration	1,400 mg/L	3,000 mg/L
Total sludge tank volume	134,000 gallons	134,000 gallons
Sludge Tank Aeration System		
Type	Sock diffusers	Porous diffusers
Aeration blowers		
Number	1 duty + 1 standby	2 duty + 1 standby
Capacity each	—	400
HP each	20 hp	20 hp
HP total	40 hp	60 hp

Notes: MLVSS = mixed-liquor volatile suspended solids