

Hadleyville WWTP Case Study TSS Violations July 2020

Background - Hadleyville WWTP

Older Extended Aeration WWTP

Preliminary Treatment

- Comminutor
- De-grit channel
- Flow measurement

Primary treatment – none

Return sludge Pumps w/VFD controls

Positive Displacement Blowers

- with coarse bubble diffusers

Design Information – Hadleyville WWTP

Monthly Average Flow – 0.400 MGD

Influent (Monthly) Data

- TSS - 260 mg/L (867 ppd)
- BOD - 240 mg/L (800 ppd)
- Ammonia Nitrogen – 45 mg/L (150 ppd)

One - Aeration Capacity – 400,000 gallons or 53,476 ft³

Two - Circular Secondary Clarifiers

- Capacity – 68,000 gallons (each)
- 34 foot inside diameter
- 28 foot weir diameter
- 10 foot SWD

Hadleyville WWTP NPDES Permit Limitations

Average Monthly Flow 0.400 MGD

Winter Monthly Average

- TSS – 20 mg/L / 67 ppd
- CBOD – 20 mg/L / 67 ppd
- Ammonia Nitrogen – 8 mg/L / 27 ppd

Summer Monthly Average

- TSS – 20 mg/L / 67 ppd
- CBOD – 15 mg/L / 50 ppd
- Ammonia Nitrogen – 3 mg/L / 10 ppd

Hadleyville WWTP July 2020 Effluent Data

Based on 24 hour composite samples

Average monthly flow 0.360 MGD

TSS – 26 mg/L / 78 ppd

CBOD – 12 mg/L / 36 ppd

Ammonia Nitrogen 2.8 mg/L / 8.4 ppd

**Highlighted Values are used in
calculations in for the Case Study.**

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Hadleyville WWTP July 2020 Operational Data

Monthly Average Flow – 0.360 MGD

Peak Hourly Flow – 0.720 MGD

1 Final Clarifier in service

Return and Waste Activated Sludge -- 7140 mg/L

MLSS 3800 mg/L

- VSS 85%

Monthly Influent Averages

- TSS 290 mg/L 871 ppd
- BOD 243 mg/L 730 ppd
- Ammonia 35 mg/L 105 ppd
- Alkalinity 250 mg/L as CaCO₃ (751 ppd)

Return Sludge Flow Rate – 120% of influent flow

Wasting rate – 12 gpm (17,280 gpd)

Aeration D.O. levels 2.0 mg/L to 5.0 mg/L

Higher D.O. experiences early AM

Aeration pH – 6.5 to 6.8

Lower pH experienced early AM

Mixed Liquor Quality

- Settleometer Test – 600 ml (60%) in 30 minutes
- Clarifier Sludge Blanked (typical 10 AM readings)
 - 2 to 3 feet sludge
 - 3 to 5 feet of interface
- Microscopic Exam
 - Healthy Indicators
 - Fair to good floc structure
 - Moderate amount of filamentous organism
- Effluent Alkalinity range 50 to 80 mg/L (based on from 24-hour composite samples)

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calculations in for the Case Study.**