The Dixie Drain Phosphorus Removal Facility

OWEA Nutrient Conference | November 2018 | Don Bloomquist
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What is the Dixie Drain Phosphorus Removal Facility?

- Surface water treatment offsetting NPDES permit requirements
- Non-point source
- Outside of Boise city limits
The Driver

- Lower Boise River Impaired Beneficial Uses:
  - Cold-water Aquatic Life
  - Salmonid-Spawning
  - Direct-contact Recreation
- TMDL-established limits
  - POTWs: 0.07 mg/L TP
The Alternatives

- Remove TP down to 0.07 mg/L
- Lower Q to treat
- Higher Capital; Lower O&M

Coagulation/Settling on Ag Drain
- Remove TP load at least equivalent loading that would be from WWTP
- Higher Q to treat
- Lower Capital; Higher O&M
- Design Targets:
  - 200 cfs
  - 70% TP Removal
The Decision

• Non-point source Dixie Drain Facility

• Why?
  • Lower capital cost
  • Greater environmental Benefit
    • Treatment D/S of agricultural diversion
    • 1.5:1 TP offset ratio
    • Phosphorus otherwise untouched
The Treatment Process

1. Inlet Diversion and Screening
2. Intake Pump Station
3. Sedimentation Basin
4. Flash Mix Facility
5. Settling Pond
6. Outlet Structure
7. Floc Management Area
The Results

<table>
<thead>
<tr>
<th></th>
<th>Average TP Removed per Day (lb)</th>
<th>Total TP Removed per Season</th>
<th>Average Coagulant Dose (mg-Al/L)</th>
<th>Overall TP Removed (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>98</td>
<td>64%</td>
<td>4.4</td>
<td>~4,100</td>
</tr>
<tr>
<td>2017</td>
<td>79</td>
<td>80%</td>
<td>4.7</td>
<td>~4,900</td>
</tr>
<tr>
<td>Target</td>
<td>25</td>
<td>70%</td>
<td>5.0</td>
<td>3,825</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2017 by month</th>
<th>Influent TP Concentration (mg/L)</th>
<th>Effluent TP Concentration (mg/L)</th>
<th>Percent Removal</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>0.51</td>
<td>0.11</td>
<td>78%</td>
</tr>
<tr>
<td>June</td>
<td>0.40</td>
<td>0.08</td>
<td>84%</td>
</tr>
<tr>
<td>July</td>
<td>0.38</td>
<td>0.08</td>
<td>80%</td>
</tr>
<tr>
<td>August</td>
<td>0.37</td>
<td>0.08</td>
<td>80%</td>
</tr>
<tr>
<td>September</td>
<td>0.31</td>
<td>0.06</td>
<td>82%</td>
</tr>
</tbody>
</table>
The Results

• Overall Turbidity Removal
  • 2016: Average Out = 2.3 NTU; 86% Removed
    • ~700 tons of solids removed
  • 2017: Average Out = 1.8 NTU; 94% Removed
Offset/Trading Considerations

• Environmental Benefit
  • Otherwise untreated sources
  • Coincidental treatment of other pollutants
  • Offset Requirements

• Potential for Trading/Flexibility

• No control over influent stream

• Large Flowrate/Footprint

• Significant Regulatory & Stakeholder involvement
  • Water Rights

• Jar testing and Piloting

• Costs
  • Tertiary Filtration – Primarily Capital
  • Coagulation & Settling – Capital + Chemical
Thank you.

Questions?

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CASHFLOW

Capital and Annual O&M Costs ($ Millions)

- Dixie Drain
- WB WWTF
Solids