Project Name: Harestua Wastewater Treatment Plant
Location: Oppland County, Norway
Type of Plant: Municipal - Retrofit
Technology Used: CFAS®
Biomedia Used: Biowater BWT-X®
Operational Since: 2011

The Challenge
The Harestua STP plant was a traditional Norwegian STP with headworks (screen and sandtrap), primary settling, chemical precipitation of Phosphorous and a final clarifier. The municipality was upgrading to accommodate increased load and new requirements for BOD/COD removal. The plant had space constraints and wanted to use their existing tankage.

The Design
Harestua decided on the Biowater CFAS® Combined Fixed Film Activated Sludge system. The CFAS® was chosen because Harestua could use their existing tankage and still meet and/or exceed treatment requirements for the plant. In addition, this process offered room for additional expansion in the future. The primary settling tanks were used for the biological CFAS® stage and the final clarifier was used for the Lamella and DAF as well as sludge storage.

Achievements
A turnkey project was delivered. The Harestua contract was split into three different projects, M1, M2 & M3. M1 is all of the mechanical installations for the primary works, sludge dewatering and storage. The M2 project is the biological CFAS® stage and M3 is the lamella DAF with chemical precipitation of phosphorus.
### Inlet

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Design Flow</th>
<th>COD</th>
<th>BOD₅</th>
<th>Total Phosphorus</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.167 MGD</td>
<td>1162 lbs/d</td>
<td>433 lbs/d</td>
<td>12.9 lbs/d</td>
<td>39-68°F 4-20°C</td>
</tr>
<tr>
<td></td>
<td>631.0 m³/d</td>
<td>837 mg/l</td>
<td>312 mg/l</td>
<td>9.29 mg/l</td>
<td></td>
</tr>
</tbody>
</table>

### Outlet

<table>
<thead>
<tr>
<th>Parameter</th>
<th>COD</th>
<th>BOD₅</th>
<th>Total Phosphorus</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63 lbs/d</td>
<td>5.6 lbs/d</td>
<td>0.27 lbs/d</td>
<td>46°F 8°C</td>
</tr>
<tr>
<td></td>
<td>45 mg/l</td>
<td>4 mg/l</td>
<td>0.2 mg/l</td>
<td></td>
</tr>
</tbody>
</table>

---

**Diagram:**
- **Grit Removal**
- **Sludge Storage**
- **DAF**
- **Sludge Pump**
- **Chemical Dosing**
- **Sludge Water 1**
- **Sludge Water 2**
- **Sludge Water 3**
- **Reactor 1**
- **Reactor 2**

---

**Images:**
- Grit Removal
- Sieves
- Aeration Systems

**Website:** www.biowatertech.com