



## OWMP : Onsite Wastewater Management Programme

### technical guide 2 : routine maintenance of onsite treatment systems

#### SERVICE PROVIDER

The Service Provider’s role is critical in ensuring that onsite systems perform as designed. Too often, owners only call on Service Providers for reactive maintenance: something fails and they want it fixed. Reliance on reactive maintenance results in poor system performance; routine **Operation and Maintenance (O&M)** is needed. Routine maintenance minimizes more expensive, inconvenient corrective or emergency maintenance.

**Registration, training & certification of Service Providers** provides a level of assurance to System Owners that their investment, public health and the environment are being protected by competent practitioners. To begin the process, the Water Authority has established baseline standards of practice and quality control for **Registration of Service Providers:**

- Pass basic proficiency tests.
- Use the **Standard Service Report** as a guide and record for service visits.
- Carry out works in accordance with manufacturer and Water Authority best practices.
- Provide copies of the Report to the System Owner and Water Authority.

**The Water Authority’s Register of Service Providers will be maintained and provided to System Owners,** along with a Standard Service Report and information specific to their system.

The Water Authority seeks to facilitate training and continuing education to lead to Service Provider Certification through accredited Correspondence Courses.



#### ROUTINE MAINTENANCE

The **Standard Service Report** outlines a routine maintenance visit where the operational status of a system is assessed through observations and measurements, and system equipment is maintained/adjusted for proper operation. The need for less frequent activities such as solids removal (pumping) and repair or replacement of equipment is documented for follow up with the owner.

**Observations include:** noise and odour levels as well as visual checks of structures, equipment and wastewater liquids and solids.

**Tasks include:** testing of alarms, pumps and aeration equipment, cleaning/replacing filters, lubricating equipment, and measuring solids levels.

**Frequency of visits depends on** factors including system complexity, loading and capacity. In general, monthly visits are recommended. For simple installations with steady flows within design limits, and owners who make routine observations to identify any unusual or upset conditions, once every other month may be sufficient.

#### SYSTEM ACCESS

**Accessibility to system compartments and components is essential for effective maintenance.**

##### ACCESS COVERS SHOULD BE:

- At or above grade level with covers that one person can open and close with standard tools.
- Located over each compartment of the primary and secondary treatment sections to allow for monitoring and removal of accumulated solids.
- Located over inlet and outlet Ts to facilitate rodding and inspection.
- Located over any flow-splitting devices and pump stations.

##### ACCESS COVERS SHOULD NOT BE:

- Built over, paved over, planted over, or sealed with cement, caulk, silicone, spray foam, etc.

Proper access covers are designed to achieve a watertight seal with recessed covers that fit into frames or with lids fitted with gaskets and screws or clamps to tighten the lid.

In instances where safety or security requires locked access (such as at schools), a duplicate key shall be provided to the Water Authority.

If system access is insufficient to carry out routine maintenance tasks, note on the Standard Service Report and detail retrofit under “follow up services required”.



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**BE PREPARED**

**BEFORE YOU GO TO SERVICE A SYSTEM:**

1. Obtain & Review background info:
  - Manufacturer’s manuals for design, O&M and troubleshooting guidance.
  - OWMP references: WWTS ID Map, components list, photos, test results.
  - The Standard Service Report.
2. Ensure availability of basic tools and equipment needed to: access the system, test equipment, take measurements and make adjustments. A basic digital camera is useful tool to record conditions and repairs.
3. Ensure availability of basic personal protective equipment; e.g., gloves, sanitary wipes, bleach and rags to clean up after service visit.



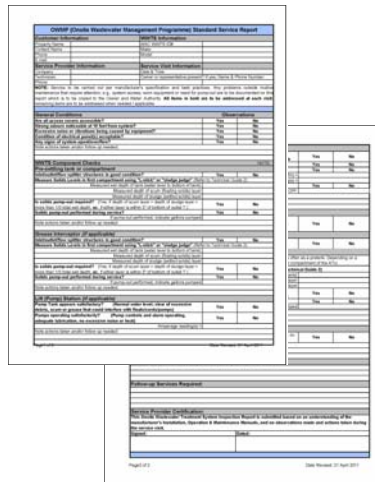
**Safety matters**

Service Providers must be conscious of hazards that exist when working around a wastewater treatment system.

Basic guidelines for safe practice include:

- Inspect the site to identify hazards.
- Practice good personal hygiene.
- Use the right tool for the right job.
- Lift properly.
- Do not enter confined spaces with insufficient ventilation to remove dangerous gases.
- Do not attempt tasks, such as electrical, that you are not qualified for.
- Attend employer’s safety meetings.

**STANDARD SERVICE REPORT**



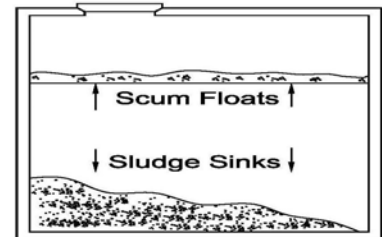
The Standard Service Report provides a guide and record for service visits. Its layout follows the general sequence of a service visit: observations of general conditions followed by checks of each component starting at the beginning of the system (lift station or primary tank), through to the end of the system (disposal well).

Recording details of service visits is critical for service providers to monitor the system’s performance over time. Each system serviced varies in its layout, equipment and loading. Over time, records will show what conditions and adjustments are required for optimal system performance.

For detailed maintenance procedures, the technician should refer to the manufacturer’s Operation & Maintenance Manuals. Most manuals include a troubleshooting section to interpret observations of unusual or upset conditions and adjustments to address the problem. Additional resources from trade organizations also provide insight into problems encountered. Reference links on OWMP webpage.

**WASTEWATER SOLIDS MANAGEMENT**

All onsite wastewater treatment systems accumulate excess solids that require periodic removal to maintain system performance. It is necessary to periodically measure the levels of accumulated solids to know when to have them pumped out.



Sludge refers to heavier solids that sink and accumulate at the bottom of a tank. Scum refers to lighter solids that float and accumulate on the water’s surface.

Wastewater solids accumulate in both the primary (pre-tank), and secondary (aerobic treatment unit) sections of an onsite system.

Solids in the primary section (pre-tank) accumulate at a faster rate and therefore must be monitored more frequently than solids that accumulate in the secondary section. Primary solids are more dense and more offensive than solids in the secondary section and are best measured using the “solids stick” procedure detailed on page 3.

Solids in the secondary section (aerobic treatment unit) consist of stabilized organic matter and excess biomass (a mass made up of microorganisms that feed on wastes, dead microorganisms and fine solids). Secondary solids are less dense and less offensive than primary solids and are best measured using the “core sampler” procedure detailed on page 4.

### MEASURING SOLIDS IN PRIMARY TREATMENT TANK/SECTION

A primary treatment tank / compartment is one that relies on gravity alone to separate solid from liquid matter. In an onsite treatment system this can be a **grease interceptor, a septic tank, or an ATU pre-tank.**

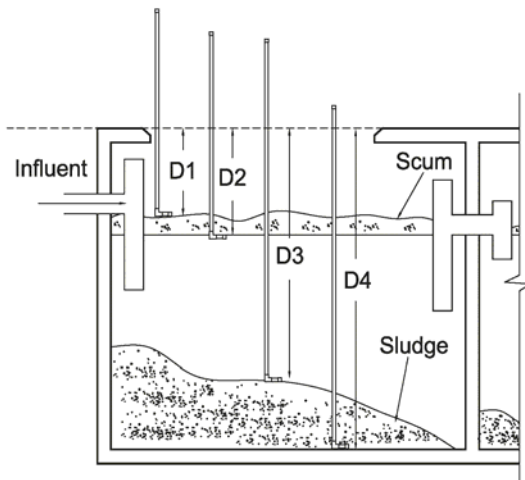
**To establish a predictable pumping schedule, solids levels should be checked every three months.**

**It is good practice for the service provider to observe/supervise the pump out service to ensure that:**

- the correct tanks/compartments are pumped at the correct frequency and to the proper level,
- the inlet and outlet structures are not damaged during the service, and
- “before and after” levels can be measured to verify established frequency and adequacy of pump-out service.

**A “solids stick” is an effective tool for measuring scum and sludge levels in a primary tank. It can easily be made from a 10 foot length of 1/2 inch PVC pipe, two end caps and one 90° elbow:** Cut a 6 inch section for the bottom of the “L”; join it to a length of 6 or more feet using a 90° elbow, place end caps on open ends; use blue PVC cement to glue elbow and end caps. Use a waterproof marker to mark 1 foot increments from bottom to top of stick. To use the “solids stick”:

- Open access cover over inlet end of pre-tank.
- Refer to Diagram below and record reading at level of dotted line for:
  - D1 : Lower solids stick, leading with elbow end, until it rests on top of the scum.
  - D2: Gently push the solids stick through the scum layer, turn it 1/2 a turn and gently pull the stick up until you feel the bottom of the scum layer.
  - D3: Continue lowering the stick until you feel the top of the sludge layer.
  - D4: Gently push down, through the sludge, until you feel the bottom of the tank.
- Extract the stick using a disposable rag to wipe the stick as you withdraw it. Sanitary wipes or another rag with bleach can be used to disinfect the stick for storage. Place used rags/wipes in a plastic bag for disposal in a waste bin.
- Calculate Depth of Scum (SC), Depth of Sludge (SL) and Wet Depth (WD) of tank as shown in the text box to the right of the Diagram below.
- Document results on Standard Service Report and indicate whether solids removal is required.



Depth of Scum (SC) = D2 – D1 = \_\_\_ inches  
 Depth of Sludge (SL) = D4 – D3 = \_\_\_ inches  
 Wet Depth of Tank (WD) = D4 – D2 = \_\_\_ inches

#### WHEN TO PUMP

**Pump the tank when (SC + SL) is greater than (WD / 3)**

**For example, if:**

depth of scum (SC) = 8 inches and  
 depth of sludge (SL) = 10 inches and  
 wet depth of tank (WD) = 48 inches, then

**(SC + SL) = 8 + 10 = 18 & (WD / 3) = 48 / 3 = 16**

Since 18 is greater than 16, it is time to have accumulated solids pumped from both compartments.

### MEASURING SOLIDS IN SECONDARY (AEROBIC) TREATMENT UNIT / SECTION

A secondary treatment unit / section is one that incorporates aeration and mixing to achieve biological stabilization of dissolved organic matter. **Given the variety of ATU technologies and designs** (Reference OWMP Technical Guide: Wastewater Basics), **it is important to consult the manufacturer's Operation & Maintenance (O&M) Manual** to determine the locations for measuring / removing solids as well as for the levels of accumulation that indicate pump out is required.

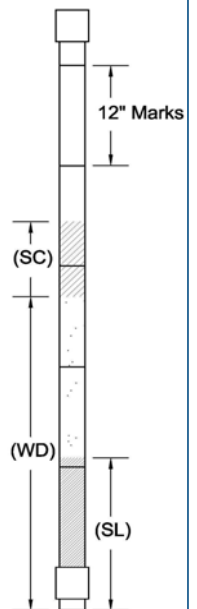
Secondary solids accumulate at a slower rate than primary solids; therefore, their **levels should be checked every six months** to establish a predictable pumping schedule.

A "core sampler" (often referred to as a Sludge Judge®, which is one brand of core sampler) is an effective tool for measuring solids levels in a secondary treatment unit/compartment tank.

*NOTE: A "solids stick", used in the primary compartment, is not effective for measuring secondary solids which are less dense ("fluffier") than primary solids. Likewise, a "core sampler" is not preferred for measuring primary solids because they are dense (thick) and can interfere with the ball valve and/or be difficult to clean out of the core.*

A core sampler is made of clear plastic tubing with marks at one-foot increments. The bottom section has a ball check valve that floats up as the sampler is lowered down through the water column to the tank bottom. As the sampler is raised, the ball settles to the bottom of the tube forming a seal. To use:

1. Locate the correct access for measuring solids by reviewing the manufacturer's O&M Manual.
2. Slowly lower the sampler straight down (not at an angle) to the bottom of the tank. Do not 'plunge' it, as that will cause the contents of the core to mix and give you a false reading.
3. When the sampler has reached the bottom, slowly raise the sampler.
4. Record the depths indicated in the diagram to the right for Wet Depth of Tank (WD), depth of Scum (SC) and depth of sludge (SD) on the Standard Service Report. **Refer to Manufacturer's O&M Manual to determine whether solids removal is required.**



In addition to measuring the levels of solids, a core sampler gives you a look at the quality of solids. Scum levels should be minimal. Sludge should be medium to dark brown and less dense or compacted than sludge found in a primary tank. Visual observations, along with monitoring levels over time will allow you to predict the frequency and volume of solids removal from the aerobic treatment unit.

**When solids are pumped out of an aerobic treatment unit, it is important not to remove too much.** Removing too much at once can upset the F:M ratio or balance which is the amount of food supply (wastewater) and the amount of biomass (microorganisms) available to stabilize it. The F:M balance is critical to the system's performance.

To make the most efficient use of pump-out service, solids can be removed from both the primary and secondary unit on the same visit, or from the secondary unit every other time the primary tank is pumped. **However the frequency of pump-out is arranged, the volume removed from both should be determined and monitored by the Service Provider.** This is important to maintain a healthy F:M in the secondary unit, to ensure that inlets, outlets and baffles are not damaged during service and that water levels are not lowered to a point that risks floating the tank(s) up due to pressure from surrounding groundwater. A floating tank can cause extensive damage to plumbing, landscaping and the system itself.

