

# Nature Flow<sup>®</sup> Mark II

Premier Wastewater Treatment System  
With Patented Self-Cleaning Ultra Violet Technology.



## Owner's Manual

The Nature Flow<sup>®</sup> Mark II Premier Wastewater Treatment System with patented self-cleaning ultra violet technology requires minimal intervention by the owner.

The system should be serviced annually or as per your maintenance agreement by qualified service personnel as advised by the supplier/installer of the equipment.

The purpose of this leaflet is to introduce the operation of the controls and indicators on the system control unit and their use in the initial diagnosis and correction of problems if the unit alarms.

The Nature Flow<sup>®</sup> Mk II Premier HSTP has Department of Local Government, Planning, Sport and Recreation Approval (DLGPSR No 514). A full copy of our approval can be requested from the the Team Leader Standards and Onsite Sewerage at the DLGPSR or by contacting Nature Flow Systems P/L.

## CONTENTS

PAGE	SUBJECT
3	Precautions & Disclaimer
4	Care of the System by the Owner
5	Do I have to use any special type of cleaners?
6	Nature Flow® UV HSTP - Layout
7	Ultra Violet Sterilisation
7	Alarm System – UV Unit
7	Servicing
8	Pictorial Depiction of Components – UV Unit
9	Power Connection
10	Alarm System and Control Unit
10	Operation
11	Maintenance - Householder
12	Maintenance – Service Agent
13	How to replace UV lamp
13	How to test light sensor and alarms.
14	How to replace light sensor.
14	How to replace quartz thimble.
15	Fig 1 Schematic of UV Cylinder Assembly
16	How to service turbine cleaner
16	If turbine cleaner becomes lodged...
17	Replacement Parts – UV Unit
17	Maintenance – UV Unit
17	Testing/Sampling Wastewater
18	Test Switch
18	Trouble Shooting - General
19	Trouble Shooting – UV Unit
20	Trouble Shooting – High Level Wastewater Alarm
22	What is subsidence?
23	Warning – UV Radiation is harmful to skin and eyes.
24	Material Safety Data Sheet – Ultra Violet Lamps
26	Warranty
27	Service Contract
28	Change of Ownership
29	Proof of Purchase

## PLEASE READ THROUGH THIS SECTION FIRST.

### Precautions

- It is strongly recommended that the Owner purchase a spare ultra violet lamp and service kit when the unit is purchased.
- Servicing by service agent is recommended and may be mandatory by State/Local Authority.
- Maintain the highest regard for your personal safety at all times.
- **NEVER look at ultra-violet lamp (when turned on) with unprotected eyes. Avoid exposure of any unprotected body part to ultra violet light emitted from UV lamp when turned on.**

### Disclaimer

- This information booklet is provided as a guide only.
- While every effort has been made to ensure that the information contained in this guide is accurate and complete, no liability can be accepted for any errors or omissions. Nature Flow Systems Pty Ltd reserves the right to change the specifications of the products and procedures described herein at any time without notice.
- No part of this guide may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form, by any means, without the prior written permission of Nature Flow Systems Pty Ltd.
- Nature Flow Systems Pty Ltd makes no warranties for damages resulting from use of this guide. Nature Flow Systems Pty Ltd accepts no liability for damages of any nature resulting from use of this guide.

Nature Flow is a registered trademark of Waterpac Patents Pty Ltd.

The “environmentally friendly system” tick logo is a registered trademark of Waterpac Patents Pty Ltd.

Other names and products not mentioned above may be registered trademarks or trademarks of their respective companies.

## CARE OF THE SYSTEM – BY THE OWNERS

The Nature Flow® Wastewater Treatment System is an ON-SITE treatment system. The system has adequate capacity to accept the usual household products, such as soaps and detergents, provided they are used in moderate quantities. However, the householder is responsible for the continued safe and efficient management of the system and undertakes to avoid practices and products that are harmful to the biological treatment processes.

GOOD PRACTICE	AVOID or MINIMIZE
<p><b>Use phosphate free</b> or low phosphate detergents and cleaners.</p>	<ul style="list-style-type: none"> <li>• <b>Strong</b> acid cleaners / <b>ammonia</b> products</li> <li>• <b>Chlorinated</b> products / <b>sterilizing</b> agents</li> <li>• Antibiotics (as much as possible)</li> <li>• <b>Hobby and home industry chemicals</b></li> </ul> <p><b>These products may destroy the anaerobic efficiency of the system.</b></p>
<p><b>Stagger wash days</b> to avoid heavy and continuous hydraulic loads.</p>	<p><b>Fats and greases</b> which are extremely slow to decompose – these materials are best disposed of by some other means.</p>
<p><b>Primary Tank</b> – De-sludge when required.</p>	<p><b>Irrigation areas</b></p> <ul style="list-style-type: none"> <li>• As per AS 1547 – 1994 Section 2.6.4</li> <li>• Effluent shall not be used for irrigation of fruit or vegetables.</li> <li>• The Owner undertakes not to use the irrigation areas for active recreation whilst there is any surface effluent evident.</li> </ul>
<p><b>Sand Filter</b></p> <ul style="list-style-type: none"> <li>• Keep air vents clean.</li> <li>• No motor vehicles over sand filter to avoid crushing of distribution pipes which are close to the surface.</li> <li>• Do not plant shrubs/trees with invasive roots near ASF.</li> </ul>	
<p><b>Pump Sump</b> – Maintain water-tightness to prevent water and grass entry.</p>	
<p><b>Annual Inspections</b> – As per council requirements.</p>	

**WARNING:** Some insects, such as small ants, find electrical devices attractive for various reasons. If your site or enclosure is susceptible to insect infestation you should implement a suitable pest control plan.

## **DO I HAVE TO USE ANY SPECIAL TYPE OF DETERGENTS AND WASHING POWDERS?**

To protect the environment and ensure the longevity and optimal performance of your Nature Flow® HSTP we recommend that you use environment friendly detergents and cleaners.

The Nature Flow® System uses natural bacteria to break down effluent prior to final disinfection through either an online chlorinator or ultra violet sterilisation. Anaerobic bacteria are used in the primary chamber of the treatment system to break down the solids. Wastewater passes through a suspended solids filter and is pumped through a poly raft inside the sand media filter bed. Natural aerobic bacteria are present in the sand media filtration bed and are used to treat the fine suspended solids. Wastewater flows back into the fourth chamber of the tank where it is clear and is pumped through the final disinfection method (chlorine or UV) out to the dispersal field.

Using cleaners and detergents that contain high levels of ammonia (eg bleach) and/or phosphorus are hazardous to the biological health of your HSTP. These types of cleaners kill off the natural bacteria and micro-organisms used to treat the primary effluent. Reduction of the natural bacteria of your HSTP will result in a much lower level of primary treatment and may produce unpleasant "septic" odours. High levels of nitrogen and phosphorus also contribute to the growth of algae and other less desirable micro-organisms in the environment eg algal growth in waterways.

Environment friendly cleaners are those cleaners that either use no chemicals or reduced levels of chemicals. Conventional cleaning products may use labelling that indicated the phosphorus level of the product. Look for the following symbols on the packaging of cleaning products:

### **P**

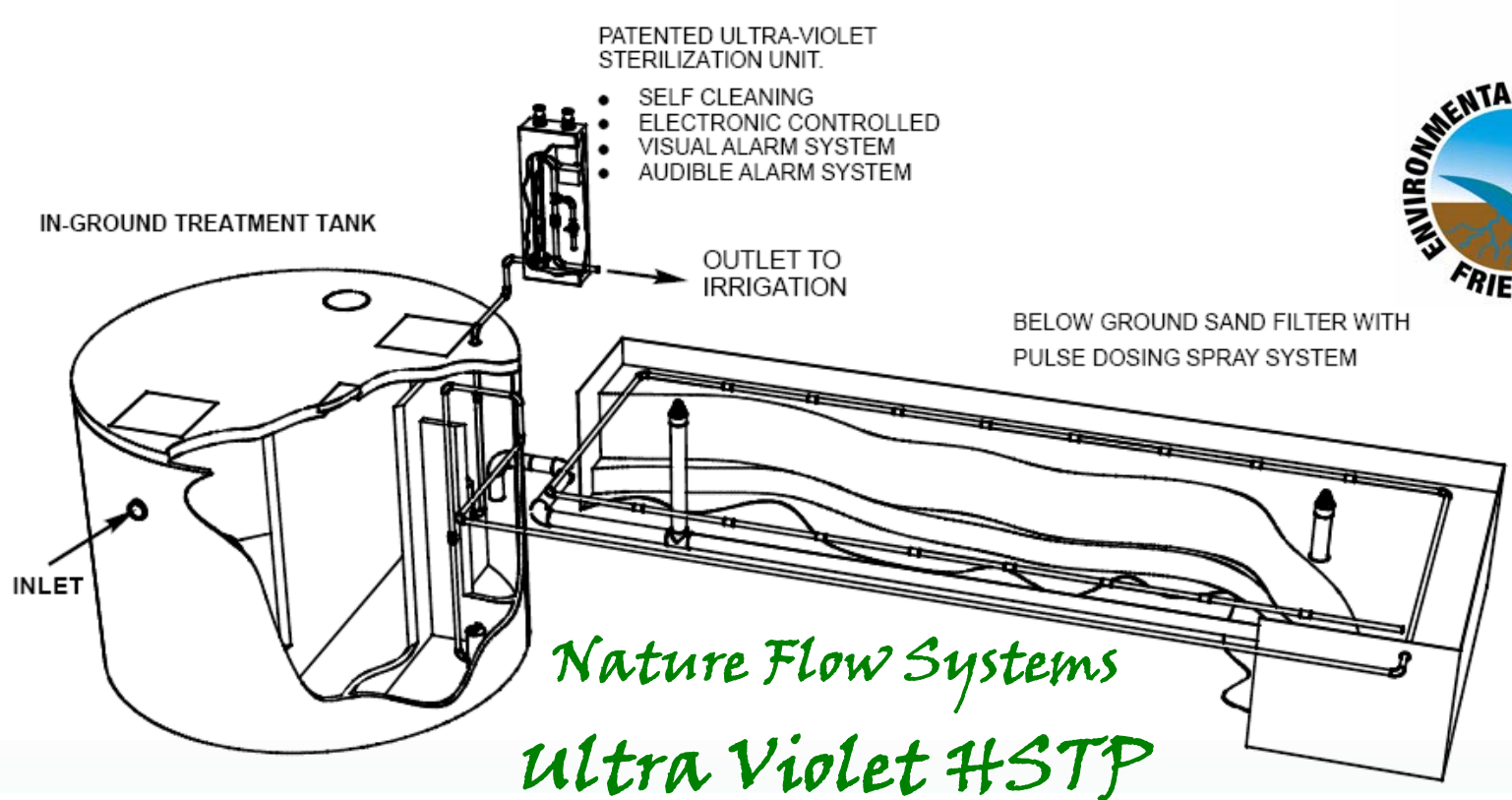
This symbol lets you know that the product complies with the agreed Australian industry standard on phosphorus, which imposes a maximum content of 7.8 grams per wash. The standard is designed to reduce the amount of phosphorus entering Australian waterways.

### **NP**

This symbol lets you know that the product contains no added phosphorus. Levels of 0.5% may be present.

There are an increasing number of "green" cleaners and detergents available including products that are chemical free and made from all natural ingredients. Other cleaning products do not require the use of any chemical-based cleaning substances such as Enjo\*. There are also "homemade" natural cleaning alternatives such as vinegar, bi-carb etc. (The internet has many websites dedicated to alternative cleaners.)

\*Referral to individual products does not imply endorsement or otherwise by the Nature Flow Systems P/L.



- ✓ **Low maintenance.** Only ONE service a year NOT four! The Nature Flow HSTP only requires annual servicing compared with most other systems on the market today that require up to four services a year to maintain. Servicing is a local authority requirement that must be undertaken by a suitably licensed person.
- ✓ Provides you with **high quality recycled wastewater** suitable for irrigation to lawns and gardens. (Subject to your local authority requirements and site assessment.)
- ✓ **Energy efficient.** The system uses two small submersible pumps that on average operate for 25 minutes a day. Electricity consumption is minimal compared with aerated systems.
- ✓ Rated at 10EP (10 person system standard). A large operating capacity treatment tank (8 000L) and large media filter bed (approx 8m long x 2.4m wide x 1.2m deep) ensures a Nature Flow HSTP will handle peak loads comfortably. This larger design capacity means effluent stays in the treatment plant longer and thus increases the quality of the treated effluent at disposal.
- ✓ Pipe raft located inside the filter bed ensures that the whole of the filter bed is used. Effluent is pressure fed via a small submersible pump through this pipe raft ensuring even dispersion of the effluent throughout the whole bed (i.e. minimizing potential for channelling).
- ✓ **CHEMICAL FREE!** The Nature Flow UV HSTP uses patented self-cleaning ultra violet (UV) technology as a final disinfection method. **Environmentally responsible.** Effective, efficient and reliable.

[www.natureflow.com.au](http://www.natureflow.com.au)

## ULTRA VIOLET STERILISATION

UV treatment is Nature's own method of sterilisation. It is unique in its mode of action, in that it does not necessarily kill the target micro-organism. Instead, UV treatment alters the DNA strands so that the micro-organism is sterilised, thus inactivating the pathogen so that it cannot proliferate and cause disease. A bug that can't reproduce simply dies.

Manufactured UV is concentrated in the 254-nm wavelength as this is the wavelength most effective for sterilisation of waterborne pathogens. Factors limiting the effectiveness of UV treatment are suspended solids, some minerals (eg Iron), the clarity (turbidity) of the source water and the reduction of transmission rate due to fouling of the UV thimble. Suspended solids and mineral content can be mitigated using pre-filtration and the problem of dirty thimbles has been overcome using Nature Flow® patented self-cleaning technology.

Nature Flow® Water Treatment Systems use patented self-cleaning UV technology. The self-cleaning device is neither a mechanical wiper nor a chemical coating. It is a unique cleaner that uses the natural movement of water through the cylinder to clean the thimble that contains the UV lamp thus removing problems associated with the thimble becoming dirty. Should the thimble become fouled, the transmission rate may be reduced such that disinfection is ineffective. Nature Flow's self-cleaning technology has removed this limitation.

Ultra violet sterilisation is an effective and safe method of wastewater treatment. It has a 99% kill rate for waterborne bacteria and viruses.\*

\*Subject to source water and compliance with manufacturer's recommendations.

### Alarm System – UV Unit

Alarm activation (blue flashing light and audible buzzer) may indicate ultra-violet lamp failure, sensor degradation or high wastewater level alarm (refer to Troubleshooting – General for further details).

The ultraviolet lamp must be replaced as soon as possible as the system will not produce treated wastewater while the lamp is inactive. Call your service agent to arrange for lamp replacement.

### Servicing

Units should be serviced annually (unless otherwise recommended). Refer to maintenance section of this manual.

# Pictorial Depiction of Components – Nature Flow® UV Unit



## POWER CONNECTION

**Your Nature Flow® HSTP is NOT to be hardwired.** Standard installations will require a minimum of three (3) weatherproof GPO's located at the tank.

The ASF (sand filter) pump will be plugged into one of these GPO's. The control box will also be plugged into one of these GPO's. The disposal pump may be plugged into one of these GPO's or alternatively may be plugged into a socket on the control box. **Variations of the aforementioned connections may exist subject to site and age of system.** Please refer to your supplier/installer or service agent should you have any questions regarding power connection and your HSTP.

**Warning:** When servicing or attending your Nature Flow®, always ensure power is switched off and lead unplugged. Electrical connections should be serviced only by qualified persons.

**Do not use long extension leads as they cause substantial voltage drop and/or poor UV lamp performance.**

Caution: The supply cord is necessary for UV lamp changing. The three-pin supply plug must remain accessible after installation.

The Nature Flow System has a blue strobe light (to be mounted in a visible location near the unit). This light will be illuminated whenever the control box senses UV lamp failure or high wastewater alarm. There is also an audible alarm (a "buzzing" sound) in the event of UV lamp failure or high wastewater level alarm. These alarms will only work when unit is connected to the correct electrical supply. 240VAC mains power required at the unit. Approx dimensions 1060 (H) x 160 (W) x 60 (Diam) excluding stand.

Ensure the UV unit is installed in the **vertical orientation**. Allow room for removal of the UV lamp and thimble during servicing. Leave a stainless steel cylinder length (approx one metre) space at the UV lamp connector end (top of unit) for UV lamp removal. Leave 200mm free at the other end for access to the end nut.

**WARNING:** Some insects, such as small ants, find electrical devices attractive for various reasons. If your site or enclosure is susceptible to insect infestation you should implement a suitable pest control plan.

### Electrical Power Surge Protection

An electrical power surge or spike can travel on the supply lines and cause serious damage to your electrical equipment. If the installation is subject to electrical power surges or lightning we strongly recommend the use of suitable surge protection devices on ALL electrical equipment.

**Nature Flow also recommend the use of an RCD or earth leakage circuit breaker (safety switch) on the power supply of your unit.**

## ALARM SYSTEM AND CONTROL UNIT

If an alarm condition is detected an audible alarm is produced and the blue strobe (flashing) light mounted on the outside of the PE cabinet will activate.

**Switching the power off at the GPO silences the alarm.**

Switching the main power at the GPO off and on will return the system to normal operation. Permanent faults will cause the system to alarm again.

Faults of a temporary nature (eg temporary pump blockages or power "outs") can be cleared by switching power at the GPO off, wait 10 seconds and then switch back on.

**High Level Alarms** indicate a possible pump failure. Refer to Troubleshooting section of this manual for further details.

## OPERATION

**Primary 1** – Used to collect all black and grey water. The large size of primary collection increases the retention time and the quality of the treated wastewater. A large proportion of the solids settle to the bottom of this chamber prior to the effluent flowing to the second primary.

**Primary 2** – This second primary chamber/tank allows the effluent to settle further before it passes through a suspended solids filter to the media filter pump well.

**Pump Well** – A submersible pump with high level alarm is used to pump wastewater through the media filter and returned via the drainback to the clear water pump well.

**Media Filter (Aerobic Sand Filter - ASF)** – The use of in-ground media filter provides a significant surface area increasing the quality of the wastewater treatment. Wastewater is pressure fed through PVC rafts (slotted) to ensure that the whole of the media bed is effectively used and to avoid channelling. The type of media filter varies depending on the installation – standard domestic systems use slow sand filtration.

**Clear Water Pump Well** – wastewater is relatively clear. A submersible pump with high level alarm is used to pump wastewater through the final disinfection method.

**Nature Flow® UV Unit** – ultra violet sterilisation used for final disinfection prior to dispersal.

**Dispersal:** Site dependant – surface or subsurface as per site assessment and/or State/Local Authority requirements.

## MAINTENANCE – HOUSEHOLDER

1. Ensure your system is serviced as per the manufacturer's recommendations and State/Local authority requirements. Most domestic installations require annual servicing by an appropriately qualified person. This is a local authority (council) requirement and will be enforced.
2. Follow the guidelines outlined in Care of the System by the Owners section of this manual. Maintain awareness of cleaning agents used. NEVER drive any type of vehicle (ride-on mowers excluded) over your sand filter as this may result in damage to underground pipework.
3. Keep the area around the tank and sand filter mown. Do not allow grass to become overgrown.
4. Maintain access to the top of the tank. Manhole lids MUST be accessible at all times.
5. Do not plant trees or shrubs in or close to the sand filter bed. Do not plant trees or shrubs with invasive root systems close to the tank.
6. Maintain your dispersal field. NEVER drive any type of vehicle (ride-on mowers excluded) over your dispersal field as this may result in damage to underground pipework.
  - a. Where surface irrigation is used, ensure that the area is regularly mown, maintain vegetation (ie no bare patches of ground only) and regularly alternate sprinkler between irrigation areas.
  - b. Where subsurface irrigation is used, ensure use of non-invasive plants, maintain mulch cover of pipework at all times.
7. Ensure landscaping does not divert groundwater in the vicinity of the sand filter and preferably not in the dispersal field. Maintain or construct (if required) retention and diversion mounds to ensure run-off is guided appropriately. Contact your supplier/installer or service agent should you require any further information.
8. UV lamp is guaranteed (pro-rata) for 8 600 hours of continuous use or one year whichever comes first. UV lamps in domestic wastewater applications do not operate continuously (only when the system is pumping to the dispersal field) and as such customers can expect UV lamps to have a longer life expectancy of approx 4-5 years.
9. The turbine cleaner requires annual servicing at which time, the cleaning felts shall be replaced.
10. The UV thimble should be replaced as required. On annual inspection check for cracks, crazing and general degradation.
11. O'Rings are to be replaced on annual service. When installing (whether a replacement or reinstall) ensure the O'Ring is greased with food grade lubricant.

## MAINTENANCE – SERVICE AGENT

Primary tank	Clean suspended solids filters on outlet. Hose any matter off the filters back into the second primary chamber of the tank.
Pump Chamber (ASF)	Check operation of alarm by pressurising clear alarm tube connected to control box. Check pump & high level alarm operation.
Sand Media Filters	Check for ponding. Check drainback to pump chamber. Check air venturi – ensure carbon filter in good condition. Advise owner on general state of maintenance around treatment plant (i.e. mowing, weed control, fencing, signage etc).
Pump Chamber (Disposal)	Check operation of pump & high level alarm.
Nature Flow UV Disinfection Unit	Check unit operation. Service every 12 months. Replace cleaning felts and o’rings. Replace UV lamps as required (intermittent operation). Replace UV thimble as required.
Disposal Field	Check and service rotary valves (if applicable). Check for ponding. Advise owner on general state of maintenance around disposal field (i.e. mowing, weed control, fencing, signage etc). Check sprinklers for blockage.
Diversion/retention mounds	Check condition of mounds and advise owner of any maintenance requirements.

**Refer also to “Service Contract” in this manual.**

### TESTING

**Samples are to be taken from the disposal line after UV disinfection.**

## Refer to Figure 1 and pictorial depiction of components

Servicing by service agent is recommended.

### HOW TO REPLACE UV LAMP

1. Switch off power and unplug from powerpoint.
2. Lift top cap.
3. Disconnect 4-pin fitting from UV lamp. Care should be taken when handling UV lamp, **hold by white ceramic ends only**.
4. Gently pull UV lamp upwards and remove from thimble.
5. Carefully lower replacement UV lamp GENTLY into the thimble with pins at the top - **hold by white ceramic ends only**. Do not touch the clear parts of the UV lamp as it will become contaminated. Remove any marks from the UV lamp with a cloth soaked in methylated spirit. Any deposit on the UV lamp, such as fingerprints can affect the output and rated life of the UV lamp. **DO NOT DROP UV LAMP INTO UNIT AS THIS WILL RESULT IN DAMAGE**. Make sure the 4-pin plug is attached to the lamp before completely lowering the UV lamp into the unit. As the lamp is lowered into the unit ensure that the UV sensor is also inserted into thimble just below ceramic end of lamp with metal circuit facing towards the lamp.
6. Replace o'ring at top of thimbleholder, ensuring it is lubricated prior to placement. Push top cap back into place on thimbleholder.
7. Plug leads back into powerpoint and switch on.
8. For a new lamp allow 5-10 minutes for the UV lamp to establish germicidal output. Note that system utilises a 2 minute time delay. Dispersal pump will not activate until 2 minutes after UV lamp operation.

### HOW TO TEST LIGHT SENSOR AND ALARMS

1. Follow steps 1-4 above.
2. Replace top cap on cylinder pressing down firmly. (This will ensure that the 4-pin plug and light sensor is lowered into the cylinder without the UV lamp attached).
3. Connect 3-pin supply plug to powerpoint.
4. Turn unit on.
5. Listen for audible buzzer and watch for blue strobe. If light sensor is operating correctly both alarms should activate.
6. Turn off unit. Disconnect from power supply and follow steps 5-8 above to reinstall lamp.
7. Once lamp has been installed and the system is again operational there should be no active alarms.
8. If alarms are active then disconnect power and check lamp connection and placement of light sensor (light sensor should be facing lamp). If lamp and sensor installation is confirmed correct then assume light sensor requires replacement.

## HOW TO REPLACE LIGHT SENSOR

1. Follow steps 1-4 in "How to replace UV Lamp".
2. Identify type of lamp sensor – hardwired Type A or plug-in Type B. Type A will require installation by a licensed electrician. Type B may be replaced by a suitably competent person. We recommend that those installations with Type A sensors be upgraded at time of replacement with the new Type B sensors. These are available in kit form from Nature Flow Systems.

### Type A Sensor

- a) Cut old sensor wires from lamp loom leaving as much length as possible.
- b) Place 5mm heat shrink over both sensor wires.
- c) Place 3mm heat shrink over individual sensor wires.
- d) Solder new sensor leads to sensor wires (Core 5 & 6).
- e) Shrink 3mm heat shrink in place over soldered joints and 5 mm heat shrink over both joints to provide further protection.

### Type B Sensor

- a) Unplug old sensor from lamp lead. Take care not to force connection.
- b) Press release latch on plug to facilitate disconnection.
- c) Connect new sensor ensuring plug and socket mate firmly together.
- d) If plug and socket do not go together easily check orientation of plug and socket.

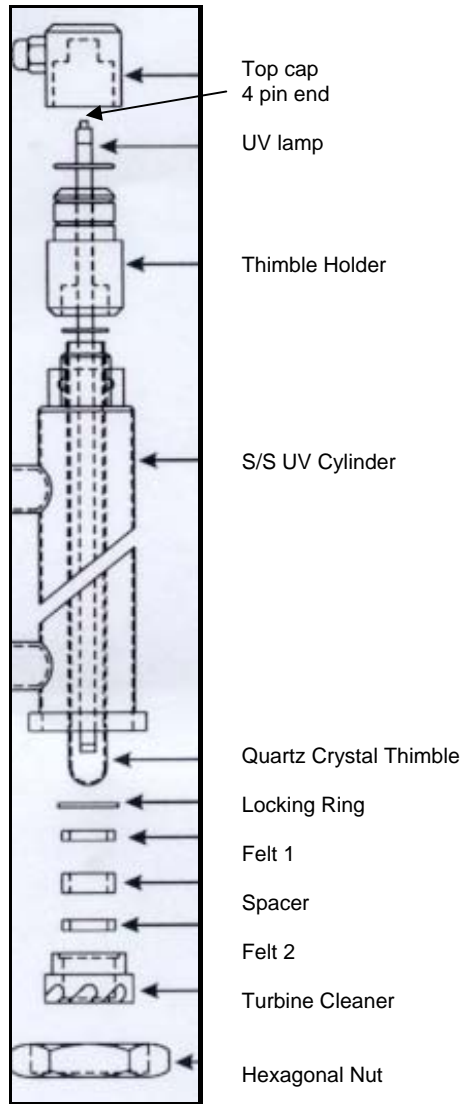
3. Follow steps 5-8 in "How to replace UV Lamp".

## HOW TO REPLACE QUARTZ THIMBLE

1. Switch off power and disconnect from GPO.
2. Remove top cap.
3. Disconnect UV lamp from 4-pin fitting. Place UV lamp carefully to one side on a clean surface.
4. Loosen hexagon nut at bottom of cylinder to allow water to drain. Do not remove nut entirely.
5. Unscrew black thimble holder.
6. Gently lift thimble holder up. Thimble should remain attached to holder.
7. Grasp thimble and support as thimble holder is raised to allow for removal.
8. Remove the thimble holder from the thimble.
9. Completely remove hexagon nut and thimble seat from bottom of cylinder. Clean thimble seat, replace o'ring (lubricate first) and reinstall thimble seat and hexagon nut.
10. Place replacement thimble (6) gently into the top of the stainless steel cylinder ensuring to locate centre of turbine and thimble seat.
11. Next lubricate the O'Ring in the Thimble Holder using a food grade grease eg Vinoleo WT90, then screw the thimble holder (2) onto the cylinder firmly.  
**DO NOT OVERTIGHTEN!**
12. Switch on power at GPO.
13. Perform leak checks on the system.
14. Once leak checks have been performed, switch off power and disconnect from GPO.
15. Replace Ultraviolet lamp (follow steps 5-8 in "How to replace UV Lamp").

NOTE: When withdrawing thimble take care not to let the end drop into the stainless steel cylinder as it could break.

**FIGURE 1 SCHEMATIC OF UV CYLINDER ASSEMBLY**



**Refer to Figure 1 and pictorial depiction of components.  
Servicing by service agent is recommended.**

## **HOW TO SERVICE TURBINE CLEANER**

1. Switch off power and disconnect from GPO.
2. Loosen hexagon nut at bottom of UV cylinder to allow water to drain.
3. When drained completely remove hexagonal nut at bottom of UV cylinder.
4. Thimble seat will drop from cylinder. Move to one side until reassembly required.
5. Turbine cleaner will also drop down from UV cylinder. If turbine cleaner does not drop out see instructions for dislodging.
6. Remove used felts (2).
7. Snap out locking ring by laying turbine on its side, pulling spacer away from locking ring, place screwdriver through centre hole of turbine and tap gently to remove locking ring.
8. Remove spacer.
9. Wet new felts. Insert first felt. Replace spacer. Insert second felt.
10. Replace locking ring.
11. Remove and replace thimble seat o'ring. This is located in recess at bottom of cylinder (on cylinder end). Lubricate o'ring with valve lubricant prior to placement.
12. Re-insert cleaning turbine into UV cylinder with locking ring to the top.
13. Clean thimble seat and re-insert - hold in place.
14. Screw hexagonal nut back into place at bottom of UV cylinder.
15. Plug leads into powerpoint and turn system on.
16. Check pipework for leaks.
17. If leaking check where leak is coming from – check o'ring seal and check tension on hexagonal nut.

## **IF TURBINE CLEANER BECOMES LODGED IN UV CYLINDER AND WILL NOT DROP OUT**

1. Switch off power and disconnect from GPO.
2. Loosen hexagon nut at bottom of cylinder to allow water to drain. Do not remove nut entirely.
3. Remove top cap.
4. Disconnect UV lamp from 4-pin fitting. Place UV lamp carefully to one side on a clean surface.
5. Unscrew black thimble holder.
6. Gently lift thimble holder up. Thimble should remain attached to holder.
7. Grasp thimble and support as thimble holder is raised to allow for removal. Place thimble and holder to one side.
8. Continue as per Steps 2-14 of "How to service the turbine cleaner".
9. After completing all steps in "How to service the turbine cleaner", carefully and gently replace thimble and screw on black thimble holder.
10. Perform leak checks on the system.
11. Once leak checks have been performed, switch off power and disconnect from GPO.
12. Replace Ultraviolet lamp (see instructions steps 5-8).

## STANDARD REPLACEMENT PARTS – UV UNIT

UV lamp size may vary between individual installations. Please check with your supplier/installer to confirm the size lamp in your system. Most standard domestic Nature Flow® HSTP's use 40 watt UV lamps.

Ultra Violet Lamp 20 watt  
Ultra Violet Lamp 30 watt  
Ultra Violet Lamp 40 watt  
Ultra Violet Lamp 58 watt  
Ultra Violet Lamp 75 watt  
Quartz Thimble 20 watt  
Quartz Thimble 30/58 watt  
Quartz Thimble 40/75 watt  
Food Grade Lubricant 20mL tube  
Service kit (o'rings & cleaning felts only)  
Light Sensor Type A (hardwire type)  
Light Sensor Type B (plug-in type)

All prices subject to change without notice. Excludes packaging and freight.

### Maintenance – UV Unit

Maintenance for the UV unit only is detailed below. Additional maintenance may be required for those systems including pre-filtration and/or other options. Refer to your supplier/installer.

1. UV lamp is warranted (pro-rata) for 8 600 hours of continuous use or one year whichever is the sooner and should be replaced as required (intermittent operation).
2. The turbine cleaner requires annual servicing at which time, the cleaning felts and o'rings shall be replaced.
3. The UV thimble should be replaced as required. Intermittent operations should be checked for cracks, crazing and general degradation on annual inspection and replaced as required.
4. O'Rings are to be replaced on annual service. When installing glassware (whether a replacement or reinstall) ensure the O'Rings are greased with food grade lubricant.
5. We recommend light sensors are replaced as required. Older units with the hardwired light sensor may wish to upgrade to the new "push-in" plug type light sensor now available.

### Testing/Sampling of Wastewater

Samples are to be taken from the line after UV disinfection and as close to the point of disinfection as possible. Where available use test tap if installed. Ensure correct sampling procedures are followed (flush test tap prior to taking sample).

### Test Switch

Toggle Switch located on control box. Note: Some models may not have this function. When switched to "on" position (facing the box switch to left) this switch will activate the UV lamp. Following a 2 minute time delay the dispersal pump will also activate. May be used to take a test sample or to check UV lamp operation.

**The Troubleshooting sections of this manual are to provide assistance with initial diagnostics only.**

**Servicing by your service agent or other suitably qualified person is recommended and may be a State or Local Authority requirement.**

**Refer to Precautions & Disclaimer at start of this manual.**

## **TROUBLESHOOTING- GENERAL**

A visual (blue flashing light) and audible alarm (buzzing sound) will activate to notify householders of a fault with their treatment system. (Be aware that these alarms will not activate in times of power loss/disturbance.)

The alarms will activate in response to two main possible areas of fault – the UV disinfection unit (eg lamp failure, sensor degradation) or as a result of a high level of wastewater in the tank (possibly caused due to pump failure/sprinkler hoses blocked etc).

Your first step is to identify which fault area the alarm is responding to.

Identify the two manhole lids that contain the pump chambers. Stand at the green control box on the ground facing the tank. At this position the first two manhole lids on the left hand side are the ones containing the pump chambers. Check level of wastewater in the treatment tank by carefully sliding the manhole lid aside and visually inspecting the chamber. Take care not to catch fingers or other body parts when removing the manhole lid. Ensure that chamber is allowed to ventilate. Do not place head or other body parts into tank. Do not breathe in vapours or fumes from tank.

If wastewater is at correct level the pump float switch and/or the pump should be visible. If wastewater is above this level then fault is most likely to be a high level alarm. Refer to section on Troubleshooting – High Level Alarm in this manual.

If wastewater is at correct level (i.e. you can see the pump float switch and/or the pump) then the fault is most likely associated with the UV Unit. Refer to section on Troubleshooting – UV Unit in this manual.

## TROUBLE SHOOTING – UV UNIT

Principle. The basic electrical circuit is like a fluorescent light. Advanced electronic ballast (choke) provides the correct voltage and current for UV lamps. A starter is not required as the electronic ballast allows for a “soft-start” providing protection for the UV lamp. The circuit board monitors the light from the UV lamp and if it is not present, illuminates the blue strobe light and sounds the alarm buzzer (a “buzzing” noise).

1. UV LAMP OUT, NO ALARM
  - No mains voltage.
  - Check mains power connections inside power supply.
2. UV LAMP FLICKERING, ALARM ON
  - Failed UV lamp.
  - Incorrect UV lamp or ballast fitted.
3. UV LAMP OUT, ALARM ON
  - UV lamp failed.
  - Poor connection to UV lamp (check/clean connector/UV lamp pins).
  - Ballast failed (unlikely).
4. UV LAMP ON, ALARM ON
  - Faulty circuit board, loose connection or lamp sensor. Lamp sensor incorrectly installed. Lamp sensor degraded and needs replacing.
5. VIBRATION THROUGH UNIT ON OPERATION
  - Check adjustment of solenoid valve to ensure flow/pressure is regulated appropriately for application. Refer to manual for solenoid valve adjustment procedure.

**WARNING: When servicing or attending your Nature Flow® System always ensure power is switched off and lead unplugged. Electrical connections should be serviced only by qualified persons.**

**Care should also be taken when servicing or disassembling the unit and associated pipework to avoid possible injury from pressurized water. Unplug power, relieve pressure by opening a tap on the discharge (outlet) of the unit and allow any water in the unit to cool before attempting to dismantle.**

Please contact your service agent or installer should you have any questions or require further information.

## TROUBLE SHOOTING – HIGH LEVEL WASTEWATER ALARM

**The blue strobe light is flashing.** Inspection of tank chambers confirms high level of wastewater in tank. This indicates a high level alarm. A high level may be caused due a number of reasons including pump failure, irrigation sprinkler/hose blockages, power failure or groundwater entering the system during rain.

**Is this the first time you have turned the system on?** If the sprinkler is operating the high level is probably caused from the initial volume of water placed in the tank at installation to prevent uplift. Once this initial volume reduces to the appropriate level the alarm should cease.

**Has there been a power outage?** The fault may be caused due to the build-up of treated effluent in the tank due to pumps not operating from power failure. Once power supply is re-established check irrigation area to see if system is pumping out. If the sprinkler is still pumping out then the fault is probably due to a build-up of effluent. The blue light will continue to flash until the high level float has dropped to the prescribed level.

**Has it rained during the period prior to the alarm activating?** The fault may be caused due to groundwater entering the system during rain. Check that the sprinkler is pumping out. If the sprinkler is still pumping out then the fault is probably due to groundwater. The blue light will continue to flash until the high level float has dropped to the prescribed level. Please note that this alarm condition may continue until some time after the rain ceases as the pumps continue to operate to reduce the high level (keeping in mind that it is not only the groundwater but also the everyday production of effluent that must be treated).

### **Is the sprinkler pumping out?**

No – Possible pump failure or blocked sprinkler/hose.

#### *1. Check if the sprinkler/hose is blocked or kinked.*

- a. Check that hose is uncoiled, straight, un-kinked and that the sprinkler key is correctly clicked into place. Turn the system off at the powerpoint. Wait 10 seconds and then turn back on. Wait 2 minutes for time delay to pass and then check if pumping out. Is the sprinkler pumping out? Yes - the fault has been cleared - the blue light will continue to flash until the high level float has dropped to the prescribed level.
- b. Remove sprinkler head from hose. Turn the system off at the powerpoint. Wait 10 seconds and then turn back on. Is treated effluent being pumped out through hose? Yes – blockage has been removed. Turn the system off at the powerpoint. Replace sprinkler head on hose. Wait 10 seconds and then turn back on. Wait 2 minutes for time delay to pass and then check if pumping out. Is the sprinkler pumping out? Yes - the fault has been cleared - the blue light will continue to flash until the high level float has dropped to the prescribed level.

## *2. Check if the submersible pumps are operating.*

- a. Listen to hear if the pump motors can be heard working.
- b. Lift the inspection covers and check the levels in the pump chambers.  
CAUTION: Always take care of your personal safety and that of others. NEVER leave the inspection holes uncovered. ALWAYS replace the covers immediately after inspection. Take care not to catch fingers or other parts of the body when removing or replacing the covers.
- c. While the inspection hole is uncovered, visually inspect the location of the floats. Are they hanging freely? Are they hooked up on the pump/pipework/tank wall? Always take care of your personal safety and that of others. NEVER stick your head or any other part of your body into the septic tank. Potentially dangerous gases may be produced in septic tanks. The effect of these gases can overcome you very quickly.

### **Is the sprinkler pumping out?**

Yes - Possible sand filter pump failure. Contact your supplier/installer or your service agent.

## SUBSIDENCE

### 1. What is subsidence?

Subsidence and/or ground movement is an event caused by Nature – it is unpredictable and extremely difficult to avoid. The degree of subsidence is dependent on individual site conditions including, but not limited to, weather (prior to, during and after installation), soil type and location of installation.

**It is an event not covered by warranty.**

### 2. What kinds of problems result from subsidence?

Subsidence around tanks installed in-ground may result in increased pressure on any pipework connected to the tank. Sometimes this increased pressure will result in the pipework/fitting becoming “sheared off”, stretched or split (leaking) or broken.

**Defects arising from subsidence are not covered by warranty.** Generally subsidence only occurs in the first instance of changed weather conditions (i.e. after rain) however it may occur under other circumstances. Usually after the first instance the ground (and consequently the tank and other componentry) “finds it level” and you should not experience any further problems from this phenomenon. In very reactive soils or other unstable conditions, subsidence may occur again.

Defects caused by subsidence are possible in any installation involving tankage and pipework being placed in and below ground.

#### **Common minor defects are:**

- Shearing, leaking or breakage at the poly dispersal line from the HSTP tank to irrigation.
- Shearing, leaking or breakage at the PVC pipes between the ASF and HSTP tank.
- Shearing, leaking or breakage at the stormwater pipe into the rainwater tank.

These defects can be rectified by a suitably licensed person.

### 3. Can anything be done to prevent subsidence?

Unless otherwise agreed, all installations are for “loose” backfill only. Compacted backfill cannot be completed around concrete tanks as the uneven pressure created when backfilling will result in movement between mouldings. It is also exorbitantly expensive and will not guarantee that subsidence will not occur.

The use of sand and other bedding materials will also not guarantee the prevention of subsidence. Often the sand will simply be pushed out of the trench or cavity by the flow of water leaving a depression that places strain on the pipework.

The best prevention of defects caused by subsidence is simply to be aware of the possibility and to maintain vigilance in ensuring depressions are “topped up” and/or breakages etc are repaired in a timely manner.

### 4. Questions?

Please do not hesitate to contact us on [info@natureflow.com.au](mailto:info@natureflow.com.au) should you have any questions or require further information.

**WARNING: ULTRA-VIOLET RADIATION IS HARMFUL TO SKIN AND EYES.**

**EYES**

Switch off UV system before removing covers. If working within line of sight of UV light, ensure that a suitable full face plastic facemask is worn.

**SKIN**

It is recommended that exposed skin is covered to prevent sunburn, possibly severe, if working within the line of sight of operating UV system. NOTE: exposure to UV light results in symptoms that develop slowly, the exposure cannot be felt at the time.

**SYMPTOMS**

EYES: Mild exposure – irritation developing several hours later.

Severe exposure – sore, red eyes, sensitive to light, painful to keep eyes open.

SKIN: Mild exposure – slight reddening, tenderness, mild sunburn symptoms.

Severe exposure – skin sloughing (peeling), weeping area, severe sunburn symptoms.

**FIRST AID**

EYES: In mild cases, if in doubt seek medical attention.

Severe cases cover eyes with gauze or clean cloth, seek medical attention.

SKIN: In mild cases removal from exposure may be sufficient. If in doubt seek medical attention.

In severe cases, cover affected area loosely with a clean bandage or cloth. Seek medical attention. Do not apply fat, butter or oil to skin.

The above notes are intended to highlight the dangers of exposure to UV radiation. With sensible precautions any hazard may be eliminated. Germicidal UV cannot pass through clothing or other opaque materials or clear materials such as plastics or even window glass.

**Refer to MSDS.**

Keep the inside of the quartz thimble dry and clean.



THE STANDARD OF EXCELLENCE IN ULTRAVIOLET

Manufacturers / Engineers / Sales / Service

375 Marcus Boulevard  
Hauppauge, New York 11788

Tel: 631.273.0500

Fax: 631.273.0771  
631.273.0780

[www.ultraviolet.com](http://www.ultraviolet.com)  
email: [info@atlanticuv.com](mailto:info@atlanticuv.com)

## PRODUCT DATA SHEET

PRODUCT: Germicidal Ultraviolet Lamps including ozone-producing types

### SECTION 1 MANUFACTURER

**Manufacturer's Name and Address:**

Atlantic Ultraviolet Corporation  
375 Marcus Boulevard  
Hauppauge, NY 11788  
Telephone (631) 273-0500  
Fax: (631) 273-0771  
Email: [info@ultraviolet.com](mailto:info@ultraviolet.com)  
Website: [www.ultraviolet.com](http://www.ultraviolet.com)

### SECTION 2 HAZARDOUS INGREDIENTS

OSHA PEL	ACGIH TLV	PERCENTAGE
----------	-----------	------------

Inert ingredients

(glass, tungsten, molybdenum, copper) approx. 99.95% by wt

Mercury	.05 mg/m <sup>3</sup>	.05 mg.m <sup>3</sup>	approx. .05% by wt.
---------	-----------------------	-----------------------	---------------------

### SECTION 3 PHYSICAL CHEMICAL CHARACTERISTICS

Not applicable. This item is an ultraviolet lamp. Up to 6 foot long and up to 1.5 inches in

### SECTION 4 FIRE AND EXPLOSION DATA

Fire and explosion data not applicable. Under extreme heat, glass envelope might melt or crack; plastic base may burn.

### SECTION 5 REACTIVITY DATA

Stability: Lamp is stable  
Incompatibility: Glass will react with Hydrofluoric Acid  
Polymerization: Not applicable

GERMICIDAL LAMPS & FIXTURES / AIR PURIFICATION EQUIPMENT / WATER PURIFICATION EQUIPMENT / LIQUID DISINFECTION EQUIPMENT  
OZONE GENERATORS / WASTE WATER DISINFECTION SYSTEMS / PHOTOTHERAPY EQUIPMENT / BLACK LIGHT LAMPS & EQUIPMENT



## SECTION 6 HEALTH HAZARD DATA

### Ultraviolet Rays

This product (germicidal lamps) is intended for applications only where humans will not be intentionally exposed to the ultraviolet rays. Avoid exposure of persons to direct or reflected germicidal ultraviolet rays. If it is desired to operate germicidal lamps in such a way that persons will or may be exposed to the germicidal ultraviolet rays, adequate eye, face and skin protection must be worn by all exposed persons. Overexposure to direct or reflected rays will cause painful eye irritation and reddening of the skin (TLV = 8.0 mJ/cm<sup>2</sup> at 254 nm).

### Ozone

Some germicidal lamps (ozone producing types), in addition to producing ultraviolet rays, will also produce substantial quantities of ozone when operated in air. Care should be exercised in design and installation of equipment so that ozone concentration will not exceed .05 parts per million in areas occupied by people. Provide adequate ventilation in all areas where equipment utilizing ozone producing lamps are employed.

Breakage of the lamp may result in some exposure to elemental mercury vapor. No adverse affects are expected from occasional exposure to broken lamps, but as a matter of good practice, prolonged or frequent exposure should be avoided through the use of adequate ventilation during disposal of large quantities of lamps.

## SECTION 7 PRECAUTIONS FOR SAFE HANDLING AND USE

See *Section 6*

Normal precautions should be taken for collection of broken glass.

**WASTE DISPOSAL METHOD:** Dispose in accordance with applicable Federal, State and local regulations.

## SECTION 8 CONTROL MEASURES

Appropriate eye, skin and face protection should be worn by all persons exposed to germicidal ultraviolet rays.

Adequate ventilation will tend to prevent excessive accumulation of ozone.

*Respiratory Protection:* Appropriate dust mask should be used if large volumes of lamps are being broken for disposal.

*Ventilation:* Avoid inhalation of any airborne dust.  
Provide local exhaust when disposing large quantities of lamps.

*Hand and Eye Protection:* Appropriate hand and eye protection should be worn when disposing of lamps or handling broken glass.

## **WARRANTY GENERAL**

Parts supplied directly by Nature Flow® (either to the end-user or to our authorised agents) are guaranteed for a period of one year from the date of original installation to be free of materials or manufacturing defects. Should any part fail as a result of such defects within this period, the part will be repaired or replaced at Nature Flow's discretion. Pumps, tank(s) & UV Lamps are covered by their manufacturer's parts only warranty commencing from the date of original installation. (Duration and type of warranty varies – please check with supplier/installer for specific warranty details for your installation.) Please check with your supplier/installer for any other materials used in your installation as to their warranty conditions.

## **TERMS AND CONDITIONS**

1. This guarantee applies to all states and territories of Australia only and is subject to the provisions of the Trades Practices Act (Aust) and the Goods and Consumer Protection Legislation of the various Australian states as applicable.
2. The guarantee period commences on the date of original installation of the equipment. Evidence of this date of original installation must be provided when claiming repairs under this guarantee. It is recommended you retain all receipts in a safe place.
3. This guarantee is extended to those Nature Flow® HSTP's installed by Nature Flow Systems P/L or our authorised (written) representatives only and is subject to the standard conditions of sale. Nature Flow® HSTP's installed (whole or part) by third parties are excluded. Assembly &/or workmanship associated with the actual installation is warranted by the party performing the work. Please confirm details with your supplier/installer.
4. Subsidence is excluded. Please refer to the subsidence section in this manual for further information.
5. This guarantee covers parts and labour only – travel is excluded. Faulty parts are to be returned freight paid to Nature Flow Systems P/L for examination and if applicable repair or replace at Nature Flow's sole discretion.
6. This guarantee is subject to due compliance by the original purchaser with our standard terms and conditions of sale, our supplementary standard conditions and our Privacy Policy.
7. This guarantee is subject to due compliance by the original purchaser with all directions and conditions set out in the Owners and Maintenance Manuals. Failure to comply with these instructions, damage or breakdown by fair wear and tear, negligence, misuse, incorrect installation, chemical or additives in the water, lightning or high voltage spikes or through unauthorized persons attempting repairs are not covered under this guarantee. The product must only be connected to 240VAC mains power unless otherwise specified by the manufacturer in writing.
8. Without limiting the original purchaser's entitlements under the Trade Practices Act (Aust.) and the Goods & Consumer Protection Legislation of the various Australian states. Nature Flow Systems and/or its authorised agents shall not be liable for any loss of profits or any consequential, indirect or special loss, damage or injury of any kind whatsoever arising directly or indirectly from the product or any defect.
9. Where the Trade Practices Act (Aust.) and the Goods and Consumer Protection Legislation of the various Australian states does not apply, Nature Flow Systems and/or its authorised agents shall not be liable for any loss of profits or any consequential, indirect or special loss, damage or injury of any kind whatsoever arising directly or indirectly from the product or any defect and the purchaser shall indemnify Nature Flow Systems and/or its authorised agents against any claim by any other person whatsoever in respect of any such loss, damage or injury.
10. Nothing in this guarantee is intended to have the effect of contracting out of the provisions of the Trade Practices Act (Aust.) and the Goods and Consumer Protection Legislation of various Australian states except to the extent necessary to give effect to that intention.
11. Nature Flow Systems and/or its authorised agents may be collecting personal information only to use this information in accordance with the Provisions of the Privacy Act 1988 (Cth).

# Nature Flow<sup>®</sup> Wastewater Treatment System SERVICE CONTRACT

This Agreement is made between (Owner/Occupier) \_\_\_\_\_

of (Address) \_\_\_\_\_

and Nature Flow Systems P/L or their duly appointed agent.

The duration of the Agreement is for a period of twelve calendar months.

Nature Flow Systems P/L or their agent, upon payment of **\$125 per year plus travel & consumables (where applicable)** and the signature of the afore-named person at the place indicated below, and upon acceptance of this application by a duly authorised employee of Nature Flow Systems P/L, agrees, for the period indicated to the following:

- 1 Annual field service inspection will be made by a trained employee at approximately one year from the date this Agreement is signed (or if the first service after installation then approx one year after the date of commissioning). Inspections include the following checks:
  - a) Annual service of ultra violet cylinder.
  - b) Check irrigation and recirculating pumps are operational
  - c) Amount of sludge accumulation in the septic chamber
  - d) Zabel filter/or equivalent
  - e) Media filter vents checked for damage and mosquito proofing
  - f) Drainback to final effluent chamber is running freely
  - g) Visual inspection for ponding above filter
  - h) Condition of all hoses and irrigation sprays
  - i) Condition of irrigation areaInspection includes the following tests:
  - a) pH level of effluent
  - b) Level of dissolved oxygen
  - c) Temperature of effluent
  - d) High water level alarms
  - e) Clarity of water
- 2 This maintenance agreement does NOT include the maintenance of the irrigation area or repairs to any part of the treatment system, ultra violet sterilisation unit or pumps. The cost of replacing ultra violet thimbles or globes is NOT included in this maintenance agreement.
- 3 Both labour and materials will be charged for any emergency service call outside the annual service call specified above.
- 4 All repairs are strictly on a COD basis.
- 5 This Agreement does not bind Nature Flow Systems P/L or its duly appointed agent to be responsible for the quality of the effluent. However, it will at all times wherever possible, recommend how the effluent quality can be maintained at its maximum and alter and adjust the system during annual service to obtain the best possible effluent standards.

In applying for this Agreement, the undersigned acknowledges that this Agreement is binding while they are the owner/occupier of the premises. Nature Flow Systems P/L will transfer the unexpired portion of this contract to any new owner/occupier to comply with the relevant health legislation.

I hereby apply for the above Agreement and agree to the annual service fee payable of \$125 plus travel & consumables (where applicable).

\_\_\_\_\_  
(Owner/Occupier's signature)

Accepted the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

By: \_\_\_\_\_

## CHANGE OF OWNERSHIP

**It is a requirement as part of the standard conditions of supply of a Nature Flow® Sewerage Treatment Plant that you notify Nature Flow Systems Pty Ltd of any change to ownership.**

STP Site Address	
Name of Current Owner	
Name of New Owner	
Postal Address of New Owner	
Contact Numbers of New Owner (if known) Landline	
Fax	
Mobile	
Date Effective from	

Please forward the completed form to:

Nature Flow Systems Pty Ltd  
PO Box 2009  
Hervey Bay QLD 4655.

Thank you.

**Please attach Proof of Purchase (receipt) here.**

Purchased from:	
Address:	
Date of Purchase:	

Nature Flow® UV Wastewater Treatment Systems are manufactured by:

*Nature Flow Systems Pty Ltd*

Ph: 07 4128 8019

Fax: 07 4128 8171

Email: [info@natureflow.com.au](mailto:info@natureflow.com.au)

Web Address: [www.natureflow.com.au](http://www.natureflow.com.au)

Postal Address: PO Box 2009 Hervey Bay QLD 4655

**Your system was supplied/installed by**

Contact your supplier/installer or Nature Flow Systems Pty Ltd should you have any questions or require further information, or to arrange for annual servicing of your system to ensure its high level of performance is maintained.

**This information booklet should be kept in an accessible area at all times.**