

A Biorock® treatment plant should only be installed by a qualified on-site system installer (i.e.: BCOSSA Certified Installer) who is experienced with siting and installing trickling-type treatment plant systems. The installer is encouraged to discuss the installation procedure/requirements with both the *On Site System Designer* and Biorock® distributor to clarify system specific requirements.

The standard Biorock treatment plant system will be designed within a manufactured polyethylene-type septic/effluent tank chamber. Note however, that the basic septic tank will be significantly internally modified in order to facilitate the Biorock treatment system requirements and therefore, specific installation criteria must be followed to ensure a long trouble free service life of both the Biorock vessel and the internal components.

Failure to adhere to the installation considerations listed herein voids any warrantee, whether expressed or implied. In no event shall Biorock®, Advanced Environmental Inc., its agents, dealers or manufacturers be held liable for any consequential damages.

Surface Installation

If the Biorock® is to be installed in an above ground setting, the Biorock® plant must be protected from environmental impacts including: weather, temperature, physical damage, vandalism, electrical hazards, etc.. Normally, the Biorock® would be housed in a heated, lockable building or structure to adequately protect against the treatment plant from the basic environmental hazards.

Underground Installation

In many cases the Biorock® system will be installed below surface in order to facilitate gravity flow of wastewater from the primary septic holding tank(s). In this case, it is particularly important to ensure that the following conditions are met or exceeded:

- i) ***High Water Table:*** The Biorock ® unit must be protected from high water tables. This includes periodic high water tables that occur during rare high precipitation events. Normally, a type of perimeter or ‘French’ drainage system is required to be installed within the excavation created for the Biorock system. The installer/designer should ensure that water table is permanently controlled to the elevation of the bottom-most

portion of the Biorock® treatment plant prior to installing/commissioning any Biorock system.

- ii) ***Soil Conditions:*** subsurface soil conditions should be fully understood prior to installing a Biorock® unit. Excavated native soil may not be adequate for use a backfill materials, particularly, if there are significant components of clays, silts, organic materials or any other soil type that would either preclude the free-draining of the soils surrounding the Biorock® or in any way cause or promote subsidence.

- iii) ***Recommended Installation Procedure:*** the following is a standard recommended approach to installing a Biorock® treatment plant in a below ground setting. Note that site specific conditions may dictate significantly different installation procedure/requirements. The System Designer and Biorock® Distributor should be consulted to confirm site specific installation requirements.

1 Always ensure that the excavation is excavated to a depth that the ground water will flow by gravity to the inlet of the Biorock® treatment plant. The excavation when completed and backfilled should allow for a minimum of 6” [150mm] cover at top of the tank and a maximum of 30” [760mm] cover over the tank. Normal construction includes the installation and supply of 30” risers Provide a perimeter drain around the base of the excavation and direct all flows to an area away from the tank to control normal precipitation.

2 Ensure that when excavating the area sufficient room is left to place clean back fill around the tank [see item 3]. This “ over-excavation” is normally 24” [600mm] on both sides of the tank and around the ball tanks and 12” [300mm] below the finished grade.

3 The bed of the Biorock® rectangular tank system requires 12” [300mm] of clean level sand below the base of the tank. A ball tank treatment system requires 6” [150mm] of clean level sand at the base and 6” [150mm] minimum around the sides of the tank. The rectangular tank system requires 24” [600mm] of sand/gravel mix around the sides around the sides. Ideally the max should be a 50% mix of C-33 sand and 50% > 1.5” [>37mm] drain rock

4 Place the back fill in 12” [300mm] layers is recommended with light compaction of each layer. Always backfill the ends of a rectangular unit first and then proceed to backfill the sides.

5 Backfill above the tank may be of native soil or free draining sand. No use must be made of clays or other impervious soils. DO NOT install any tank in a high water table area which cannot be adequately and permanently controlled.

Failure to comply with the points listed above voids warranty.