

PROJECT OVERVIEW AND SCALE BUDGET

Date : June. 23, 2011

Object : Wastewater Treatment of the Sands located in the Turks and Caicos Islands.

Find in this proposal a preliminary design of the BIONEST^{MC} Treatment Unit as well as a budget cost.

The BIONEST^{MC} system is an advanced generation of onsite wastewater treatment systems. It combines all the advantages of a durable and simple natural system as well as the peace of mind provided by a permanent unit that never needs replacement. The biological process consists in a submerged fixed film bioreactor. The biomass develops and firmly attaches to both sides of the « ribbon shaped » plastic media. With a tremendous amount of bacterial growth, that gives the reactor its high performances and resistance to hydraulic shocks. Constant aeration of the first 2/3 of the reactor with warm air from a building assures constant and optimal biological activity independently from the outside temperature. The last section has no aeration but still enough dissolved oxygen to complete nitrification. While other biological treatment systems require settling tanks and sludge handling, the relatively low food/microorganism ratio as well as high detention time in the BIONEST^{MC} reactor create low sludge production. In fact, the sludge produced does not require more than one removal per year and it is performed by our service technician and part of our maintenance contract. A key factor in the system is the constant recirculation of the treated water back to the septic tank. While the reactor provides almost complete nitrification, recirculation in the septic tank completes the nitrogen cycle by denitrifying the effluent. The recirculation ratio can be adjusted for an optimal nitrogen removal.

Bionest final effluent is easily combined with UV disinfection, tablet chlorination, chemical phosphorus removal or polishing field depending on level of treatment needed and site characteristics.

The Bionest major advantages are:

- ✓ High level of treatment ;
- ✓ Clear and odourless effluent;
- ✓ Organic and hydraulic chock resistant ;
- ✓ Small footprint, buried and usually no need of technical building;
- ✓ **Media never to be replaced** ;
- ✓ Reliable and long-lasting components;
- ✓ **Low operation and maintenance costs** ;

The Treatment Quality of the final effluent will equal or exceed NSF Standard 40 Class 1 at all times.

DESIGN CRITERIA:

- Design flow rate:* 20,000 US Gallons (design flow provided by others)
- Temperature:* normal (above 12 °C)
- Type of waste:* Domestic Quality Effluent.
- Existing System:* Activated sludge system designed by Marolf Environmental Inc of New Port Richey Florida comprising 7 stages of Treatment not including sludge drying. The existing tanks are closed top. The existing tanks offer sufficient volume when redesigned and modified to be used for the Bionest System with minor modifications.
- Septic tank:* Wastewater is sent to several modified existing tanks offering an effective volume of 30,000 gallons approximately. The tanks shall be equipped with effluent filters at the exit of the tanks prior to entering the Bio reactor. Modification will need to be done to the existing openings into each of the existing tanks as well as water and air passages.
- Bionest reactor:* The remainder of the existing tanks with an effective volume of 30,000 gallons approximately will be required. The first set of these tanks are aerated with the fine bubble diffusers while last section of the tanks are not aerated. The Bionest media is evenly distributed in the tanks, linear air pumps will provide aeration to the fine bubble diffusers. Concrete covers and hatches will need to be modified on the top of these tanks.
- Water re-use tank:* A water re-use tank of 8,000 gallons for the re-use of the treated water will be required;
- Building and location:* Air pumps and electrical service should be installed inside the enclosure close to the treatment system.
- Bionest components:* Media, air pumps, diffusers, recirculation pump, effluent filters, tablet chlorination, installation, supervision, misc. equipment. etc.
- Modification Design:* Bionest will provide the necessary designs for the modification of the existing tanks, so that they can be re-used to accommodate the Bionest Advanced waste water Treatment System
- Excavation, backfill, pipes, connections, re construction and modification of the existing concrete tanks, electrical and site work* **By Others.**
- Total :** **\$160,000.00 for the Bionest portion of the project**

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