



SUBMERGED AERATION SYSTEM WITH RAS TECHNOLOGY

INTRODUCTION

The modern type of sewage plants is normally associated with intricate processes, technology and requiring skilled labour and equipment.

The costs involved in this type of operation are just too costly. With the current restructuring of the old municipalities to form a super city type structure, it is often very difficult to provide basic services to all the people in its region.

Bearing this in mind and the huge costs involved in providing sewage connections to all communities, it is not surprising that the authorities often cannot afford to provide the necessary services.

In most cases the authorities cannot afford new outfall sewage lines to connect remote areas to the existing waste water treatment plants (WWTP).

GES ANSWER TO THESE PROBLEMS

GES accepted the challenge, researched this science and came up with the following system to treat domestic as well as industrial effluent.

TECHNOLOGY USED BY GES

The technology used for this plant includes the SAM submerged aerated media, as well as RAS (Re-Activated Sludge) technology. RAS technology is used to seed the raw sewage with sludge rich in bacteria. LMP - Low Maintenance Plant, the unique system of using anaerobic as well as aerobic zones are included.

The Biological treatment products used in the plant is imported from a company in the USA that has won the "BEST EXPORTER OF THE YEAR FOR ENVIRONMENTAL TECHNOLOGIES" award.

ADVANTAGES OF THE GES PLANTS

GES provides a very affordable service to build WWTP's. These plants are not only affordable but also provide final effluent to comply with the strict standards set out by the Department of Water and Forestry (DWAF). These plants are easy to operate and do not need permanent staff on site. There are no moving parts in the plant and the whole plant is built underground. In the majority of the cases grass is planted on top of the plant and only five manhole covers are visible. These plants are also very safe for people, especially children, and animals because there are no open dams. There are also no foul odours and unsightly pits.

ADVANTAGES

- Very affordable
- Low or no maintenance
- Very low electricity usage
- No water usage other than cleaning
- No open dams or pits
- No unwanted foul smells
- No flies
- Final effluent can be used for irrigation purposes
- Highly recommended

PRINCIPLE OF THE GES WWTP SYSTEM

Sewage will be collected through a network of sewage pipes on the grounds. The sewage will then be routed to the Waste Water Treatment Plant (WWTP) for treatment.

SOLID HANDLING AND SCREENING

Solid handling, separation and primary settling takes in the first phase. The floatable solids will move to the surface of the facility and the settleable solids will precipitate to the bottom of the facility. No solid screening takes place in this phase or prior to entering the facility. The reason for handling the effluent in this manner is necessary because of the applications of some of the treatment plants. These plants are normally built very near housing developments or the presence of people. The presence of a screen attracts flies and unwanted odours and you have to have a permanent operator to rake all solids into a skip. GES has designed the plant in such a way that we have a "storage capacity". This enables the client to clean out the first chamber at longer intervals. GES projects an interval between one and three years, depending on the volume and load of un-digestible materials (Example plastics, metals, sand and grid). All other organic materials will be biodegraded. The intervals between cleaning operations can be drastically prolonged. By adding biological additives the solids will be biodegraded quicker and the plant performance will be influenced positively. If however the need arise for a screen to be included for pre-screening of solids, it can be done with ease. Fats oils and greases is one of the worst enemies of any biological plant. GES strongly recommend the physical removal of fats, oils and greases before it enters the facility.

FIRST PHASE

This is the primary settling phase. This phase operates totally in an anaerobic condition. The design of the primary settling phase separate the floating solids and the settle-able solids. This phase also initiates the anaerobic digestion. The middle cut will be routed through to the secondary settling phase. GES have designed the system with a holding capacity for solids. This eliminates the need for a manual or automatic screening.



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SECOND PHASE
Secondary Settling - Anaerobic Digestion

The second phase facilitates the secondary settling and biodegrading and operates in an anoxic condition. The digesting phase is very important, as the solids are biodegraded into smaller parts. These smaller solids are passed on to the next phase.

THIRD PHASE - Aerobic Digestion

In this phase the digestion takes place in an aerated environment. This phase is called aerobic digestion. This phase takes the smaller solids and bio-degrade them further. This phase is also called the "polishing phase".

The type of bacteria that operates in this environment is called aerobic bacteria. It is very important to aerate this phase with a very fine air bubble so that the oxygen can be absorbed in the liquid. The bacteria performs at their optimum in an oxygen enrich environment.

In this aerobic phase another very important function is performed. This function is called the nitrification cycle. This function is responsible for the breaking down of nitrites, nitrate and ammonia. It is very difficult to establish this function. The bacterium needed to perform this function needs a very special environment. To provide these bacteria with their homes we have designed a very effective aerobic zone.

FOURTH PHASE - Final Settling

Secondary settling takes place in the fourth phase. The cell material and settleable solids settles in this phase and forms the so-called "sludge blanket". The sludge blanket is very important in the whole process. When the blanket matures it is re-circulated to the primary settling tank in phase one to "seed" or inoculate the raw sewerage entering into the plant. This cycle is called the re-activated sludge cycle. This technology improves the efficiency of the whole plant.

FIFTH PHASE - Sterilise / Dis-infection

In the fifth and final phase the final effluent is prepared for final discharge. The effluent is dis-infected or sterilised to prevent any dangerous or harmful bacteria to enter our natural water resources.

COMPLIANCE WITH SPECIFICATION AS SET OUT BY THE DEPARTMENT OF WATER & FORESTRY (DWAF)

GES have worked together with the Department of Water and Forestry (DWAF) on a number of waste water treatment plants. These plants include domestic effluent as well as industrial effluent. DWAF accept our system as being efficient as well as environmentally friendly. We encourage clients to re-use their treated water for irrigation purposes, thus reducing the usage of potable water for irrigation. This will save money as well as preserving water, South Africa's most precious commodity. An added bonus to the above is that no fertiliser is needed for gardens or grass. All of Mother Nature's nutrients are present in the treated effluent and no chemical fertiliser is needed.

IMPACT ON ENVIRONMENT

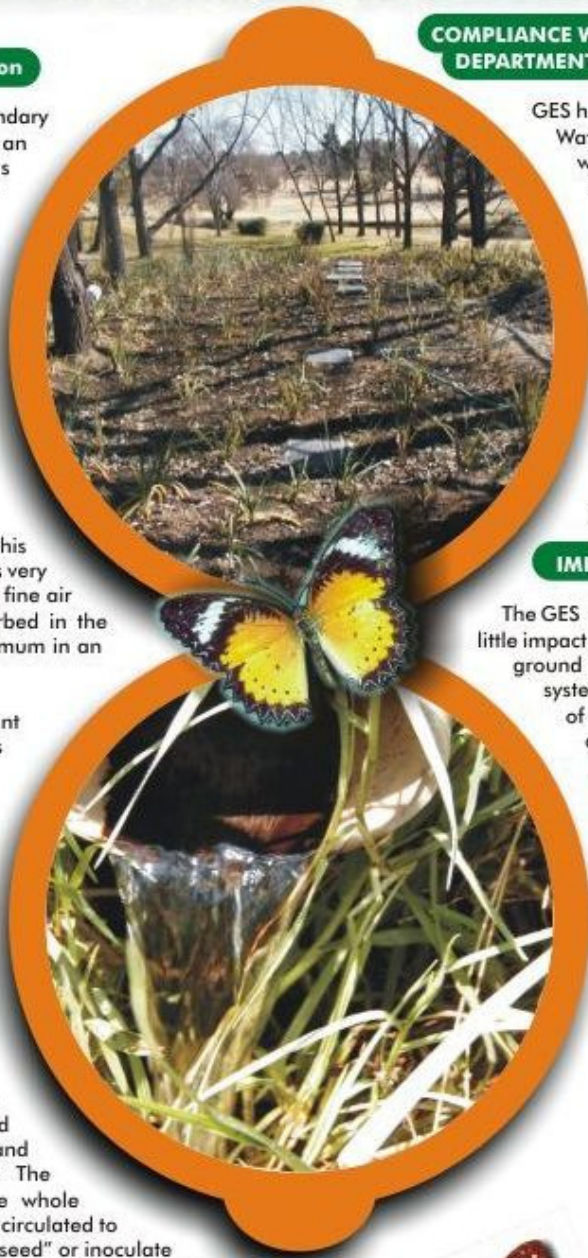
The GES SAM RAS system was designed to have no or little impact on the environment. The system is below the ground level and have no open dams or pits. The system was designed to cope with a power failure of up to 8 hours with no significant quality changes.

CLOSING

It is recommended but also mandatory by law to take regular samples to do analyses, to determine if the quality of water complies with the standards as set out by the Department of Water and Forestry (DWAF).

TYPICAL APPLICATIONS

- Small communities
- Large communities
- Municipalities
- Hotels
- Motels
- Flats
- Caravan parks
- Schools
- New Developments
- Game Farms
- Holiday Resorts
- Plantations



For more information contact
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