Low Pressure Grinder Pump Systems

DESTINATION ROTORUA
ROTORUA DISTRICT COUNCIL

Basic Facts

What is a Low Pressure Grinder Pump System?

Low Pressure Grinder Pump (LPGP) systems are used to collect and convey wastewater from properties that generate relatively low flows, to a discharge location some distance away from the source of the wastewater. They are used as an alternative to more conventional drainage systems.

The system consists of a polyethylene or fibreglass chamber into which a single electric grinder pump is installed (Figure 1). The grinder pump has the function of grinding up any solids entering the pump, with a resulting liquid slurry being pumped through the pressure main which can be reduced to as small as 40mm. The chamber is 2m in height, all of which is buried underground except for the access lid. The access lid protrudes up to 100mm above ground level, is 700mm in diameter and green in colour.
(figure 2)

Figure 2: Access lids in property settings.

When are LPGP Systems a viable alternative?

LPGP Systems becomes viable:

- When the cost of installing a gravity system would be high due to engineering constraints, e.g. high groundwater table, unfavourable topography.
- When environmental risk of deep gravity excavations is significant e.g. at high value ecological areas.

How long has the technology been used?

Pressure sewer technology using grinder pumps was first adopted early in the 1970's by American engineers and regulatory agencies. The technology has been utilised extensively over the last 30 years, particularly within the United States, and there are currently more than 60,000 pressure sewer units in operation worldwide. Sydney Water of Australia has installed this type of system in five major sewerage schemes. This technology has also been used in New Zealand recently at a smaller scale..

How does the system work?

Pressure sewerage systems differ from conventional gravity systems in that they depend on a pumping unit to move sewage off the property. A small pumping unit is installed on the property to pump the household sewage into council's sewerage network.

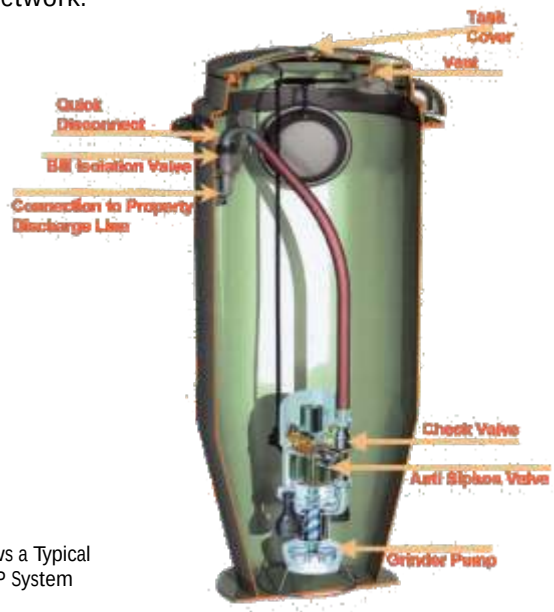

Figure 1: Shows a Typical LPGP System

Who is responsible for construction, operation and maintenance of Low Pressure Grinder Systems?

A Council policy is being developed to cover the construction maintenance and operation of the system. The current proposal is:

- The construction of systems on individual properties will be included as part of the whole sewerage scheme for the particular area.
- Maintenance of the systems to be undertaken by Council and the cost recovered through annual rates.
- Operation (power cost) to be paid for by the property owner as part of their domestic power bill.

It will be the property owner's responsibility to connect their private drainage system (house service line) to the inlet of the constructed low pressure grinder pump systems.

How will it impact me?

The low pressure grinder pump systems will have no discernable odour, as the pumps will operate once wastewater enters into the system, triggers the pumping level control and pumps it out into the main line.

The access lid of the low pressure grinder pump stations will protrude above ground, although the edges can be covered with bark where situated within gardens, or have non-permanent structures placed over them e.g. rocks, garden furniture.

The low pressure grinder pump station alarm will need to be monitored by the property owner and/or neighbours. Telemetry monitoring systems are not technologically advanced enough to replace the need for human intervention.

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How does the pumping unit work?

- The pump has a small grinder that grinds up any solids in the tank so they can be passed through the pump discharge line to the community network.
- The collection tank will store household sewage until its level reaches the “pump-on” level. When this occurs the pump will automatically turn on, and pump the sewage to the community network
- When the level falls to another pre-set level, the pump will automatically switch off.
- Typically a pumping cycle will take one to two minutes, and will occur several times per day.
- If the pump fails to operate, the level of sewage will continue to increase until it reaches an 'alarm level' where both an audible (sound) and visual (light) alarm will automatically turn on. This level is about one third of the total capacity after the alarm has been activated.
- The alarm may also be activated as a result of power returning after a power service interruption. In all cases the alarm will automatically shut off when the storage level drops below the alarm level. The alarm is in the small locked box that will be attached to the house. The alarm can be switched off by pressing the small button under the alarm panel.
- The collection tank has a minimum capacity of at least 660 litres and when combined with household drains should give at least 750 litres of total storage. Much of this storage capacity is above the alarm level activation point. Therefore the property can continue to use essential services after alarm sounds, although it is strongly recommended that you keep water use to a minimum and avoid activities which are heavy water users until the system is repaired.

What are the parts of the system installed within the property?

Pressure sewerage systems essentially comprise five main elements (figure 3):

- A boundary valve assembly to prevent backflow.
- A pumping unit in a collection tank, the LPGP tank and grinder pump.
- A pump discharge line goes from the tank to the street main.
- The electrical power controls and alarm located on the outside of the house.
- The house service line, the waste from your toilet and other sanitary fittings and drains, to the collection tank.

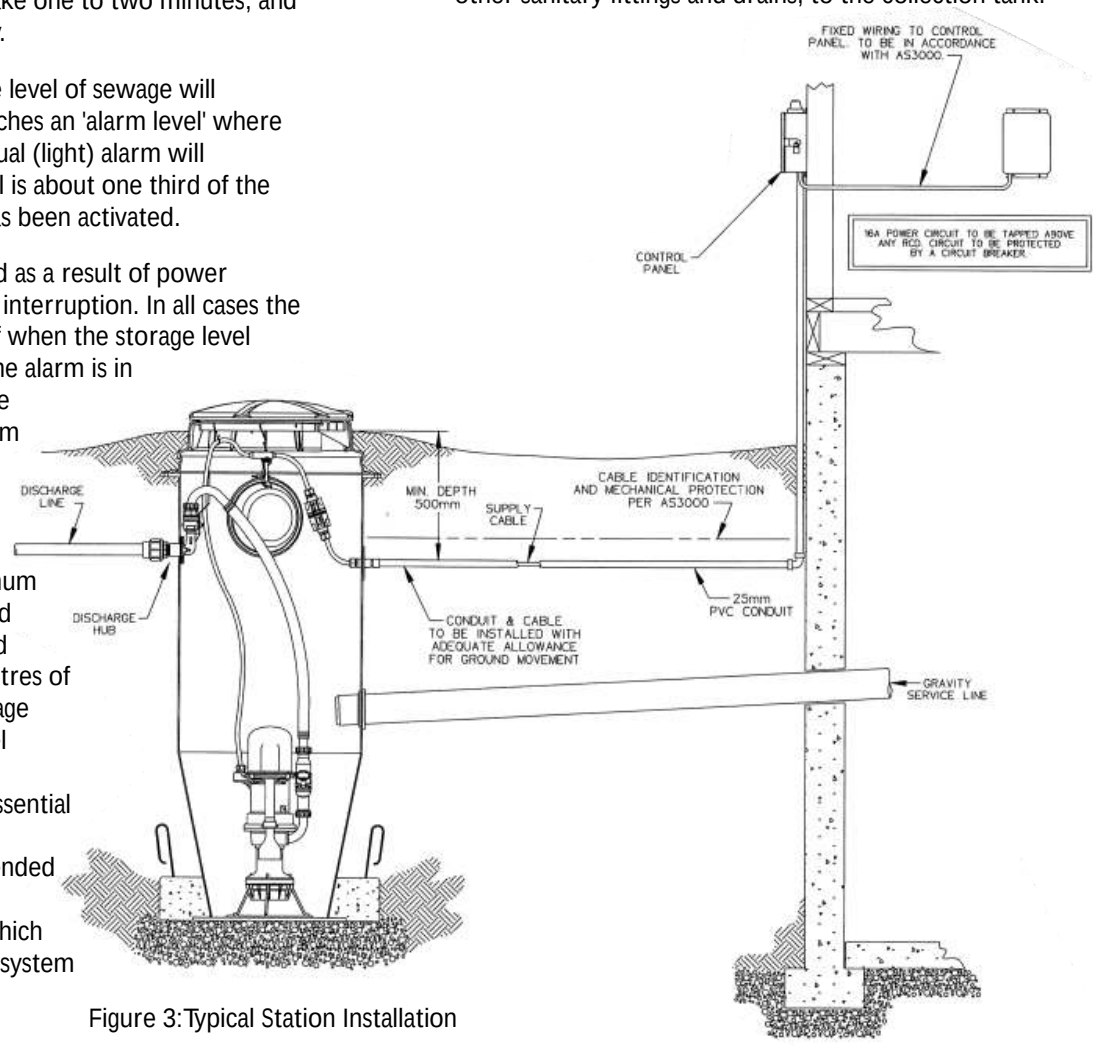

Figure 3:Typical Station Installation