Pressure Sewer Systems

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An example of a pressure sewer unit (new type)

Pressure Sewer Systems

Pressure sewer systems are to be used in smaller, remote villages and where it is impractical or uneconomical to use a gravity sewer system.

Council is utilising the pressure sewer systems in backlog sewerage schemes: Conjola Regional, Tabourie Lake, Currarong and Kangaroo Valley and may use them in Woollamia and other small villages.

Pressure sewerage systems have been used extensively throughout the USA and Europe for about 30 years. These systems are now in operation in many locations in Australia, including Melbourne, Sydney, Wagga Wagga, Cobargo, Stanwell Park and Jamberoo. The systems are an effective solution for small areas and where conventional systems are impractical such as rocky, hilly and/or water charged terrain or other circumstances considered warranted. This system requires only shallow trenches and relatively smaller 40mm diameter piping, within the property boundary and up to 160mm diameter in the street. The system can be economically installed at any site, regardless of the terrain.

Description of the System

At the heart of the system is a prefabricated plastic pit that provides wastewater storage, grinding and pumping in a single self-contained unit (see page 4 of this document). This is called a pressure system unit (unit). The unit is installed in a property in consultation with the owner, but must be downhill from the existing septic tank. The house plumbing is redirected from the septic tank to connect into the unit. Shoalhaven Water would own and operate the unit and the pipework between the unit and reticulation system. A small diameter discharge pipe goes from the unit to the pressure sewer pipe into the street. A small box (boundary kit) is installed just inside the property on the discharge pipe. A non-return valve (to prevent backflow from the pressure sewer) and isolation valve is housed in this kit. The unit is wired to the household power supply and controlled by a small panel located near the unit (control panel), either on a wall, fence or pole.

Shoalhaven Water would own and maintain the system including the control panel, unit, discharge pipes and boundary kit. Installation of this type of system significantly reduces disruption to the property and the surrounding landscape.

Installation

The location of the unit will be arranged with the property owner immediately prior to installation. When considering the location the owner should take into account such things as proximity to the septic tank, serving any future additions to the house, landscaping, allowance for gravity flows from the house etc. Consideration also needs to be given to installation of the 40mm poly pipe connecting the unit to the main pressure sewer (in most cases located in the street). Minor obstacles such as paths can be underbored, if necessary. A plan of the pump unit and pipe location will be drawn up by the contractor and a copy provided to the owner and Council for their records (see Pressure Sewerage System Policy for an example). An isolation and non return (check) valve will be located in the boundary kit just inside the property for maintenance purposes.

Frequently Asked Questions

Q – How does the pressure system operate?	All wastewater generated from a property would be directed to the unit. When the volume in the unit reaches a preset level (see page 4 of this document), a switch activates the grinder pump. The pump operates until the level is reduced to a cut-off point. The amount of pump operation varies with the waste flows from the house. Generally, it is higher in the mornings and evenings. All units pump into a pressure sewer collection system generally located out in the street and then transferred to the treatment plant.
Q – How will I know if the unit needs maintenance?	Should something go wrong with the unit or the collection system, the water level in the unit would reach an alert trigger that sets off both a visible and audible alarm (see page 4 of this document). The audible alarm can be manually turned off at the control panel. The property owner would then contact Shoalhaven Water and service personnel would assess the problem. If it was an emergency that could not wait until the next day they would attend to fix the problem. Should the pump require repairs, it can be readily removed and replaced with another pump by the service personnel.
Q – What level of odour/noise can be expected fro the pump unit?	Experience has shown that the noise and odour levels associated with the unit are negligible. The ground surrounding the buried unit absorbs the majority of noise levels. Some minor odours may be noticed for a short period following a holiday house being left vacant for long periods but is similar to a conventional gravity system. By comparison, odours emanating from septic tanks caused by shock loading when the house is occupied after a long vacancy would be significantly reduced.
Q – How are the pumps protected from unauthorised access?	The unit and the control panel are secured against unauthorised access. Shoalhaven Water employees and contractors would be the only people authorised for access.
Q – What is the likelihood of blockages in the smaller pipes?	As all the solids in the wastewater would be ground to a slurry there is a very low likelihood of a blockage beyond the unit. The likelihood of a blockage in the household plumbing would remain the same as your existing septic system.
Q – What input do owners have into the location of the pumping unit?	Each property owner would be able to have input into the location of the unit. There would be some limitation in locating of the unit as it has to be put into a spot that would allow gravity connection of all waste flows from the house.
Q – Who is responsible for the power supply cabling?	The control panel and cable to the pump is considered part of the asset to be owned and operated by Shoalhaven Water. All connecting electrical cable work would be installed within the required protective conduit. Particular care would be taken to ensure that all buried cables are easily identified to prevent any future disturbance.
Q – Would the ability of the unit to pump into the reticulation system vary from property to property?	The pressure within the reticulation pipe at the particular point into which it is pumping affects the unit's capability. The pressure in the reticulation would vary depending on its position in the network. Consequently, the flow rate of each individual unit throughout the system would vary by small amounts. The variation in performance is likely to be less than 10% throughout the system.
Q – What is the average annual power cost to run the pump units?	Based on current power tariffs the estimated annual cost to operate the pump units is between $25 and $35 for an average family household. These costs would be offset by the householder avoiding connection costs that would be required for a gravity system.
Q –What is the guarantee that in the long term, Shoalhaven Water would remain responsible for the maintenance of the unit?	Shoalhaven Water would be legally responsible for the unit. Any change from this arrangement would require some form of negotiation and agreement with the whole community. This is very unlikely to occur.
Q – What is the guarantee that pump parts would be available in the future?	The responsibility for maintaining the pumps would always remain with Shoalhaven Water. It is possible to alter the pump units should the selected supplier not be available in the future.

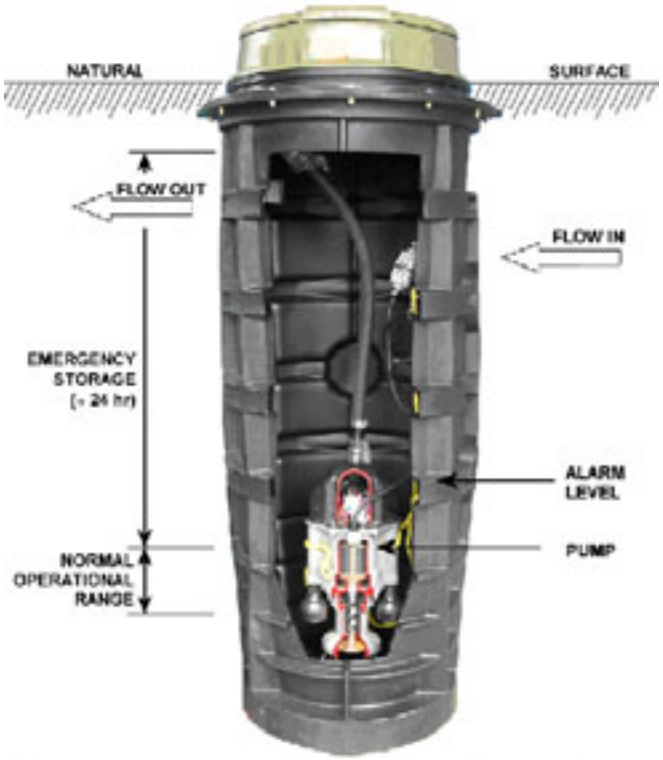
Q – What happens when the power goes off?	The unit has in-built storage that would allow for the restricted use of wastewater facilities during the power outage. During a power outage, high wastewater generating appliances such as washing machines and dishwashers would not be able to operate. In the worst case scenario where the power went off just as the "pump on" level was reached, approximately 400 litres of storage would be available. This would allow for about one day of average household use or up to two days with modified water use behaviour.
Q – What happens when the property is left unattended for long periods of time?	It is recommended that the power to the unit be left on during times when the house is vacant. The electrical system installation would be designed with a separate mains switch to allow the unit power to be left on whilst power to the rest of the house can be turned off. It is also recommended to flush the unit (such as with half a laundry tub of water) to reduce potential for odours when leaving a property unattended.
Q - How much would it cost to connect to the pressure sewer system?	For a residential property if the unit is located within 5 metres of the inlet to the septic tank then the drainage and electrical connection will be included in the scheme cost. If the unit is greater than 5 metres, if requested by the resident, then any additional cost will be charged to the resident. If the existing house plumbing and/or power board does not meet current regulations or standards, they will have to be upgraded by the resident, at their cost (including any fees and inspections) before connection can be made.
Q – What happens if I have a number of septic tanks?	Only one pump unit will be provided for each residential property. Some properties such as motels and caravan parks would need larger pumping units.
Q - What potential is there for overflows?	The unit is fully sealed against storm, ground or flood water ingress. The only potential is misuse by the occupants during periods of long power outages or if they connect their roof drains to the sewer.
Q – What about discharges from swimming pools or spas?	Pumps from pools and spas are of much larger capacity than the pumping unit. A balance tank would need to be installed by the resident to limit discharge into the pressure sewer unit.

Installing pressure discharge pipe in private property

A pressure sewer unit being installed (older type)

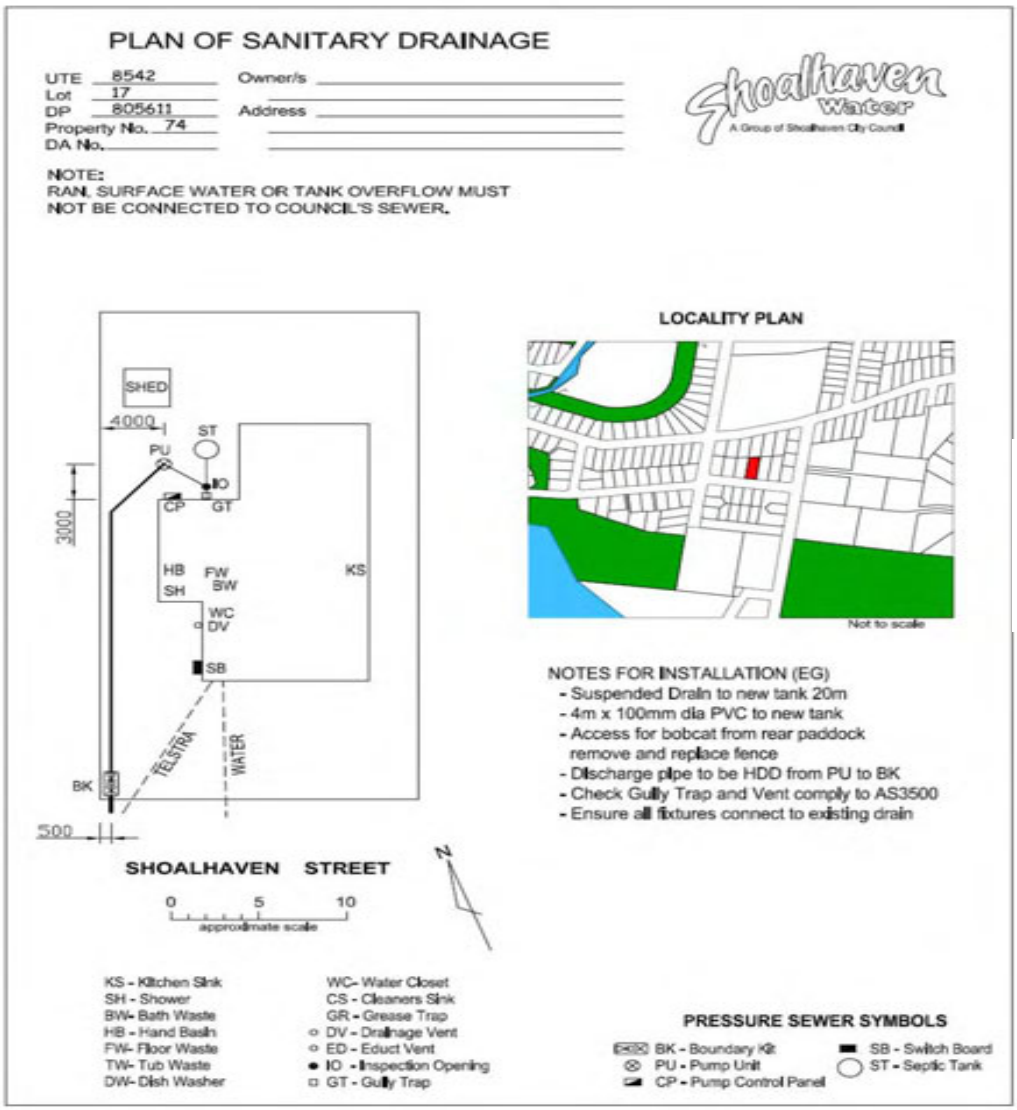
Pressure Sewer Unit Installed

Pressure Sewer Unit – Flow Control



Pressure Sewer Unit – Control Pane

Pressure Sewer Unit – House Plan



Comparison of a Pressure Sewerage System to a Conventional Gravity System

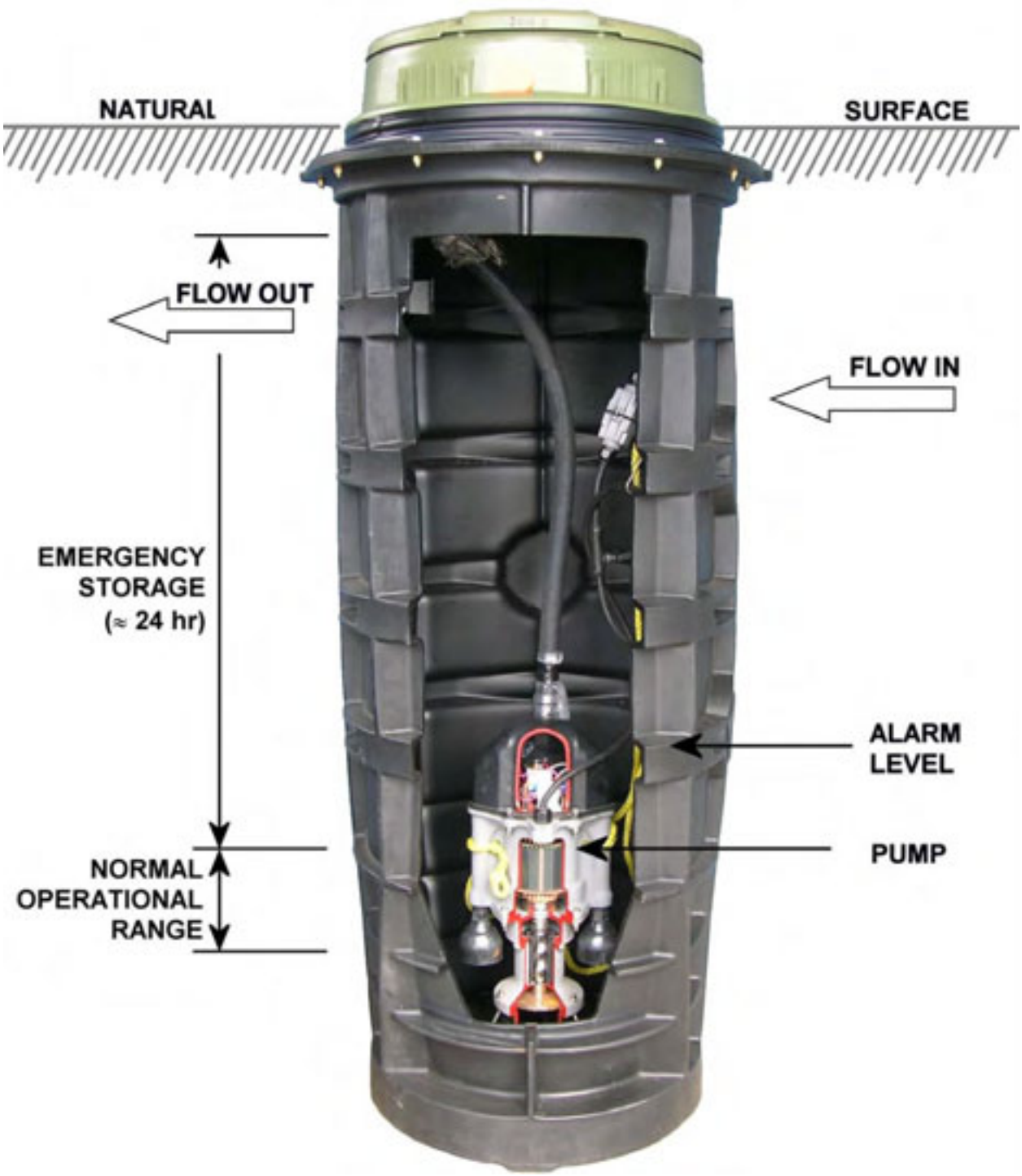
Installing a low pressure grinder pump rising main in private property.

Installing a conventional gravity main.

Conventional Gravity Sewer	Pressure Sewerage System
Reliable technology with extensive experience in Australia.	Reliable technology. Limited but growing practical experience in Australia but growing rapidly.
Shoalhaven Water personnel have extensive operational experience	Shoalhaven Water personnel do not have operational experience but minimal training would be required. Shoalhaven Water have extensive experience in operating pumps and pipeline systems.
Difficult to construct in water charged sandy ground as found in Lake Conjola village and Tabourie Lake	Minimal excavation depth required for pressure mains hence minimal difficulty for construction in water charged ground.
Subject to stormwater and groundwater ingress leading to possible overflows, higher pumping and treatment costs.	Not subject to stormwater or groundwater ingress.
Potential overflows from manholes due to root intrusion and/or ingress from extreme storms.	Significantly reduced potential for overflows as it is not susceptible to stormwater ingress or root intrusion.
Cost to connect from the house to the junction between $1,000 and $2,500.	If the unit is within 5 metres of the inlet to the septic tank the connection to the house drain will be included in the backlog sewerage scheme cost.
Electricity for pumping responsibility of Shoalhaven Water.	Owners cost for power to the pumping unit between $25 and $30 per annum for an average permanent household.

Conventional Gravity Sewer	Pressure Sewerage System
Can be disruptive during construction – large excavators working in back or front yards.	Minimal disruption – small construction equipment only used on properties.
Limited opportunity for owners to site the connection junction. The junction must be located on the lower side of the property at the back or front.	More discretion for owners in siting the pumping unit, but still must be on the lower side of the property. Can be within 1.0m of a building.
Pipework varies from 150 mm to 225 mm in diameter and must be accurately placed in trenching along a continuous downward grade.	Requires only shallow trenches and relatively smaller 40mm diameter piping in the property and can be installed at most sites regardless of the terrain.
Installations can severely disrupt the surrounding landscape including lawns, driveways and gardens.	Installation significantly reduces disruption to the surrounding landscape.
Shoalhaven Water's reinstatement program ensures that properties are restored as near as is practical to their preconstruction condition.	Same as for conventional gravity system, however, reinstatement would be easier and quicker to carry out and would less likely to have trench settlement issues after construction.
Construction time would be longer with higher levels of traffic disruption and potential for impact on the local environment	Construction period significantly shorter with reduced levels of disruption and potential for impact on the local environment
Shoalhaven Water has complete responsibility for operation of the system.	Owners required to report pump alarms so remedial action can be promptly taken.
Less mechanical equipment to maintain.	More mechanical equipment to maintain, but on breakdown only.
Extended power blackouts could lead to overflows in major pumping stations. (System storage 8 hours)	Extended power blackouts less likely to overflow (system storage 24 hours).
Portable generators can provide back up power.	Portable generators can provide back up power.

Pressure Sewer Unit – Flow Control



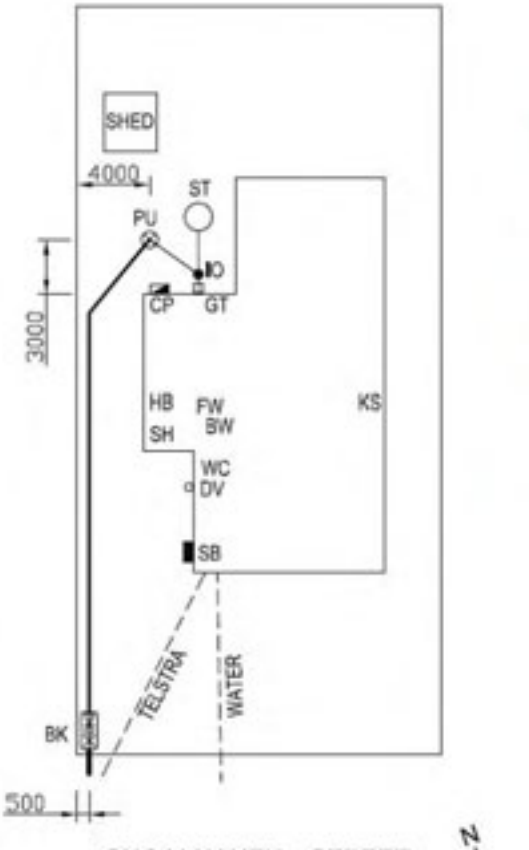
Pressure Sewer – House Plan

PLAN OF SANITARY DRAINAGE

UTE 8542 Owner/s _____
Lot 17 _____
DP 805611 Address _____
Property No. 74 _____
DA No. _____ _____

Shoalhaven Water
A Group of Shoalhaven City Council

NOTE:
RAIN, SURFACE WATER OR TANK OVERFLOW MUST NOT BE CONNECTED TO COUNCIL'S SEWER.



LOCALITY PLAN

NOTES FOR INSTALLATION (EG)
- Suspended Drain to new tank 20m
- 4m x 100mm dia PVC to new tank
- Access for bobcat from rear paddock remove and replace fence
- Discharge pipe to be HDD from PU to BK
- Check Gully Trap and Vent comply to AS3500
- Ensure all fixtures connect to existing drain

KS - Kitchen Sink
SH - Shower
BW- Bath Waste
HB - Hand Basin
FW- Floor Waste
TW- Tub Waste
DW- Dish Washer

WC- Water Closet
CS - Cleaners Sink
GR - Grease Trap
DV - Drainage Vent
ED - Educt Vent
IO - Inspection Opening
GT - Gully Trap

PRESSURE SEWER SYMBOLS

BK - Boundary Kit
PU - Pump Unit
CP - Pump Control Panel
SB - Switch Board
ST - Septic Tank