

**PRESSURE SEWER
SYSTEMS
PLANNING AND DESIGN
GUIDELINE
JUNE 2018**



VERSION: 2.0



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1 General

1.1 Introduction

This document compiles Hunter Water's requirements on a range of issues associated with the planning and design of Pressure Sewer Systems (PSS). Topics covered in this document include:

- When pressure sewer servicing is permissible
- The design process for pressure sewer systems
- Ownership and responsibility for pressure sewer assets
- Pressure sewer odour and corrosion assessment and management
- Guidelines for the layout of on-property pressure sewer infrastructure

This document is to be read alongside the following design standards:

- Water Services Association Australia (WSAA) Pressure Sewerage Code of Australia Design (WSA-07-1.1 2007)
- The Hunter Water Addendum to WSA 07-2007
- The Hunter Water Pressure Sewer Systems – Hydraulic Design Guideline

If there is an inconsistency between this document and those listed above, the Accredited Design Consultant is to seek resolution from Hunter Water.

1.2 Background

Hunter Water's traditional approach to providing wastewater services to new developments is by conventional gravity sewer. However, with the improvements to pressure sewer technology and industry capability Hunter Water now also supports the servicing of new single lot residential developments with pressure sewer where it is demonstrated to be the preferred servicing option. This may be for servicing the full development, or part(s) of the development in combination with conventional gravity sewer. Hunter Water's policy is to own and maintain residential on-lot pressure sewer units where it is designed and constructed to comply with Hunter Water standards (refer Section 0).

This guideline applies to PSS for single lot residential applications. Commercial, industrial and higher density residential development applications may be possible; however, these are to be negotiated with Hunter Water on a project by project basis.

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2 Can pressure sewer be investigated?

2.1 General

The key factors considered in determining whether pressure sewer is appropriate for a particular site are:

- Does pressure sewer servicing align with the overall strategy for the region?
- Is there a high-level of certainty associated with system loads in terms of:
 - The number and type of properties planned to connect
 - The timing of each connection
 - The loading from each non-residential property, both initially and into the future
- Will pressure sewer disadvantage servicing of surrounding developments, or provide unreasonable constraints for connections of future developments?
- Can pressure sewer tanks be located in accordance with Hunter Water requirements whilst providing an acceptable drainable area to the lot?

If these questions can be satisfactorily answered, then Hunter Water may consider pressure sewer as a potential servicing option.

Hunter Water will provide confirmation to the Designer as to the scope of the Developer Servicing Strategy, including whether pressure sewer can be investigated as a servicing option, following the Servicing Strategy inception meeting.

2.2 Assessing pressure sewer servicing options

In order for a pressure sewer system to be considered the preferred servicing option, it must satisfy all of the following requirements:

- Lowest lifecycle cost.
- Demonstrate the system will satisfy all key technical requirements of WSA 07 (including Hunter Water Supplement) and requirements of Hunter Water's Pressure Sewer Hydraulic Design Guideline.
- That the pressure sewer servicing option has an acceptable environmental and social impact compared to the alternate servicing options.
- Demonstrate performance and technical design requirements can be achieved.

As a guide, these key technical design requirements include:

- The system remains under pressure (i.e. no part of the systems drains or syphons under gravity).
- Minimum pipe self-cleansing velocities of 0.6 m/s can be achieved and for a sufficient period of time in accordance with Hunter Water guidance.
- That in general, collection tanks can be located in accordance with Hunter Water requirements whilst providing an acceptable drainable area for each lot.
- Each individual on-site pump will not experience a pump head exceeding 50 m under dry weather conditions and as a general rule, no pump shall operate for more than 30min in any one day
- That pipeline detention times are calculated and odour and septicity management requirements are established and costed
- The requirements for on-site emergency storage can be reasonably accommodated

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- Assessment of system operation at each foreseeable stage of development and demonstration that development staging constraints will not make implementation of pressure sewer impractical.
- Establish that system performance remains within acceptable limits with sensitivity testing of key assumptions (scenarios to be agreed with Hunter Water).

Note that Hunter Water's endorsement of pressure sewer as the optimal servicing option at completion of the Strategy does not guarantee final approval. If during the development of the design the basis for selection of pressure sewer does not hold true, then Hunter Water may request an alternate servicing option be re-investigated and possibly implemented.

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3 Pressure sewer system design process

3.1 General

Pressure sewer system (PSS) design is only to be undertaken by Accredited Design Consultants register with Hunter Water with this specific design capability. Details of the accreditation process can be sought through contacting Hunter Water at www.hunterwater.com.au.

The two main phases of the pressure sewer design process are the [Developer Servicing Strategy](#) phase, where the preliminary hydraulic design is completed, and the [Complex Works](#) design phase where the Detailed Hydraulic Design is completed.

3.2 Developer Servicing strategy phase

3.2.1 Introduction

A Servicing Strategy is to be developed using Hunter Water's *Developer Servicing Strategy Template*, and following the requirements of this document and Hunter Water's *Pressure Sewer Systems - Hydraulic Design Guidelines*.

Within the strategy phase, the pressure sewer strategy is to be developed via a two-step process:

1. Conceptual review of pressure sewer
2. Preliminary hydraulic design

For all pressure sewer options a 'Conceptual Review' will be required. Only when a pressure sewer option has potential to be recommended as the optimal option, is then a 'Preliminary Hydraulic Design' needed.

At the Servicing Strategy Progress Meeting the Designer will discuss the results of the conceptual pressure sewer review with Hunter Water. If pressure sewer has potential to be recommended as the optimal option, then the Preliminary Hydraulic Design can be prepared.

In addition, reporting in the Servicing Strategy is to address:

- The requirements in the Planning and Design Approach Table 1.3 of WSA-02.
- The requirements for odour and corrosion assessment as described in Section 0 of this document.

3.2.2 Step 1: Concept assessment and preliminary cost estimate

The Concept Assessment involves characterising the key elements of the system, and establishing a preliminary pipe network layout. The level of detail required is to be sufficient such that the technical feasibility of a pressure sewer system can be assessed, any system risks identified, and adequate detail of the scheme is developed for comparative pricing with other servicing options.

Tasks which are to be investigated and reported on for a concept level assessment include:

- Review and discussion of system topography and outlet location
- Preliminary drainage envelope assessment: General review of lot slope and assessment of fall either toward the street, the front half of the side of the property, or toward the back of the property.
- Preliminary pipe network layout plan, including total length of pipe required

A preliminary cost estimate is to be prepared as part of the concept assessment. To provide an equitable cost comparison between pressure sewer servicing and the optimal gravity option, the cost

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estimate for the optimal gravity servicing option is to include the cost of the local gravity reticulation (in addition to the cost of trunk gravity infrastructure).

The optimal gravity and pressure sewer servicing options are also to include the costs (capital and O&M) of any downstream upgrades required as a result of receiving loads from the development, specifically if this is a differentiator between the two options.

Hunter Water has a template for pressure sewer cost estimation and this template is to be used as a basis for developing costings. This template covers the following cost elements for pressure sewer:

- Capital cost estimate
- Operating cost estimate
- NPV estimate

At the start of each Servicing Strategy, the Designer is to contact Hunter Water and request the latest copy of the *Pressure sewer cost estimation* template.

3.2.3 Step 2: Preliminary hydraulic design and review of cost estimate

If an option involving pressure sewer has potential to be recommended as the optimal option, then a “Preliminary Hydraulic Design” is required. The requirements for Preliminary Hydraulic Design are described in Hunter Water’s *Pressure Sewer Systems - Hydraulic Design Guidelines*, and includes a modelling assessment of pipe flow and pump heads, wastewater age calculation, air movement assessment, and a review of lot drainage envelopes.

For schemes greater than 15 lots, dynamic system modelling will be required, otherwise the designer may adopt an approach of either static or dynamic modelling.

A stand-alone *Preliminary Hydraulic Design Report* is to be attached as an appendix to the *Developer Servicing Strategy* and a summary of key outcomes documented within the *Developer Servicing Strategy*.

The Designer is to update the cost estimate for the pressure sewer option, with any new information available on the option. Where a standard cost unit rate in the template is adjusted the Consultant is to highlight and justify the change.

3.3 Complex works phase

3.3.1 Introduction

Following approval of the Servicing Strategy Report, the concept and detailed design of pressure sewer can progress. This is to be delivered following Hunter Water’s Complex Developer Works process.

Pressure sewer design shall include the requirements of the following documents:

- Water Services Association Australia (WSAA) Pressure Sewerage Code of Australia Design (WSA-07-1.1 2007)
- The Hunter Water Addendum to WSA 07-2007
- The Hunter Water Pressure Sewer Systems Planning and Design Guideline (*this document*)
- The Hunter Water Pressure Sewer Systems – Hydraulic Design Guidelines

Prior to submission of designs, Hunter Water requires the Designer to review the PSS design and complete the Hunter Water design checklist (appropriate to the design phase).

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3.3.2 Detailed hydraulic design

The Detailed Hydraulic Design forms part of the Concept Design phase of work. The requirements are described in Hunter Water's *Pressure Sewer System - Hydraulic Design Guidelines*. Reporting of these investigations is through submission of a *Detailed Hydraulic Design Report*.

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4 Ownership and responsibility for pressure sewer assets

4.1 Classification of pressure sewer components

A pressure sewer system can be divided into two distinct parts, being:

On property works – infrastructure works within private property for the purpose of servicing that specific property. These are sewer assets between the house and the individual property boundary kit.

Reticulation works – infrastructure downstream from individual property boundary kits all the way to the pressure sewer system discharge.

On property works can be sub-divided as being either private works and the responsibility of the property owner, or Hunter Water works and the responsibility of Hunter Water.

4.2 Ownership responsibility

4.2.1 On property works

4.2.1.1 *Single residential dwellings*

Hunter Water will own and maintain all pressure sewer units compliant with Hunter Water's standards which are servicing single residential dwellings. The distinction between on-property works that are private and the responsibility of the owner, versus on-property works owned by Hunter Water are as follows:

Private

Electrical works from the house up to and including the IP56 rated isolation switch (to be installed within 300mm of the agreed location of the pump unit control panel).

Plumbing works from the house up to and including the connection to the vertical riser on the inlet side of the pressure sewer tank, including venting if remote from pressure sewer tank.

The main components captured are as follows:

- Customer sanitary drain to collection tank
- Switchboard and IP56 isolation switch
- Power supply to switchboard
- Venting (if remote from the collection tank)

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Electrical works from the IP56 rated isolation switch including the control panel and cabling to the pump unit.

Plumbing works from the vertical riser on the inlet side of the pressure sewer tank, including the pressure sewer pump unit (tank and pump) and discharge pipework up to and including the property boundary kit.

The main components captured are as follows:

- Collection tank and concrete surround
- Pump
- Control panel
- Electrical cabling from the collection tank to the control panel

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- Electrical cabling from the control panel to the IP56 switch
- Property discharge line (pressure pipe from the pump to the boundary kit)
- Property boundary kit assembly
- Pressure sewer laterals (pressure pipe from the boundary kit to the street network)

The distinction between private property works and Hunter Water works can be seen on PSS-1101-V and in Appendix A.

4.2.1.2 **Commercial/Industrial development and other types of dwellings**

All on property works servicing dwellings other than single residential dwellings (**including commercial, industrial, and higher density residential**) are private property works. For these developments, the property owner owns, operates and maintains all on-property pressure sewer components.

Hunter Water will only permit connection to its reticulation network where the pressure sewer system is designed and operated in accordance with Hunter Water requirements. Pump selection criteria will be provided along with any requirements on how the pump is to interface with the wider pressure sewer collection system (e.g. discharge pressure, flow rate (minimum/maximum), pump type).

4.2.2 **Reticulation works**

Hunter Water will own and maintain all pressure sewer reticulation works downstream of the property boundary kit.

4.3 **Construction responsibilities**

Pressure sewer systems will either be Developer or Hunter Water delivered projects. Dependent on this, the responsibility for design, supply of materials, construction, and commissioning will differ.

4.3.1 **Developer projects**

The Developer is responsible for compliant design, supply and installation of both on-property and reticulation works.

The Developer installs all on-property assets (for single residential dwellings) owned by Hunter Water, with the exception of the pump/s and control panel. The Developer will provide Hunter Water with a bond for the pump and control panel installation. Hunter Water will install and commission pump/s and control panel at a later date once the lot owner is ready to connect.

The Developer is responsible for the compliant design, supply, construction, and commissioning of all reticulation works and all on-property works for servicing development other than- single-residential, **including commercial, industrial, and higher density residential dwellings**.

4.3.2 **Hunter Water projects**

Hunter Water Projects are those included on the capital works portfolio or are part of a priority sewer scheme. For these projects Hunter Water will be responsible for the compliant design, supply and installation and commissioning of all reticulation works and on-property works that are not private assets.

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4.3.3 Private property works

The property owner (residential/non-residential) is responsible for the design, supply and construction of all private property works compliant with current Australian design standards, and Hunter Water's requirements for connection.

4.4 Public positive covenant

A Public Positive Covenant (PPC) on the land is required for all properties serviced by pressure sewer. The Developer is to register the PPC prior to the sub-division of the initial lot, or in the case of backlog prior to the connection to the sewerage system.

PPC's are required to identify the lot as being serviced by a non-standard sewerage connection and to detail the type of connection (pressure sewer), and responsibilities of property owners and Hunter Water in regard to the operation and maintenance of the pressure sewer system.

Easements may also be required dependant on the operation and maintenance requirements of a particular arrangement, and this will be established with Hunter Water prior to approval of the design.

The steps to initially register the PPC over the land are as follows:

- Developer has an 88B Instrument that is used to register easements, rights of carriageway and covenants.
- Hunter Water will lodge the PPC with Australian Registry Investments (ARI) with the 88E Instrument (Memorandum), which must include the Developer's consent in writing to the instrument, which is via the 88E and the approved form (Form 13PC). Hunter Water may permit the Developer to do this on Hunter Water's behalf.

4.5 Access requirements for maintenance of pressure sewer

Where a pressure sewer unit and associated on-property works are to be owned and maintained by Hunter Water, it is the responsibility of the property owner to provide acceptable ongoing access to these assets and protect the assets from damage. The details of this responsibility is described in Section 25 of the Hunter Water Act 1991. A summary of the key requirements is as follows:

- Any assets or structures owned by Hunter Water is not to be wilfully or negligently destroyed, damaged or interfered with.
- Hunter Water and other authorised persons must not be delayed or obstructed in relation to accessing the assets
- No structure is to be placed in, or near the assets in a manner that interferes with the operation of maintenance of the asset
- That ground is not opened to expose any pipe or any other asset without reason.

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5 Management of odour and corrosion

5.1.1 Introduction

Pressure sewer systems are to be designed so that, where possible, the need to implement odour and corrosion management measures are minimised. The potential for a proposed pressure sewer scheme to have problems with nuisance odour release and to cause asset corrosion is an important system design consideration. Investigation is required to understand these issues, considering septicity of wastewater at the discharge point(s) from the scheme, and issues of odour from air release at system discharge and other points within the scheme.

An initial assessment is required at the strategy phase of project development and shall be further detailed in the concept and detailed design phases. Odour and septicity investigations are to be undertaken by expert(s) in the field, who have suitable qualifications and relevant experience.

5.1.2 Septicity in pressure sewer systems

A discussion on septicity of flow from pressure sewer systems is presented in Section 3.15 of WSA 07. The formation of hydrogen sulphide (H_2S) (a key indicator of septicity) can cause problems of corrosion and odour. Formation of H_2S is affected by a number of factors including pH, temperature, available oxygen, chemistry of the effluent, and retention time. Approaches to minimise the formation of H_2S , its release to the atmosphere and impacts include:

- Minimising retention time in the pressure sewer system
- Placing the system discharge in a location where odour complaints are least expected
- Placing the system discharge in a location where corrosion impacts are least expected
- Constructing a duplicate gravity line to receive discharge
- Designing for non-turbulent discharges
- Design for sufficient pipe self-cleansing velocities to minimise the formation of a slime layer that can promote the formation of H_2S
- Addition of chemicals (e.g. iron salts (ferrous chloride) etc.)
- Providing specific ventilation infrastructure designed to minimise odour impacts (e.g. vent stacks, placement consideration, gas phase odour control units).

As a minimum, Hunter Water already requires for all systems that turbulent discharge to the receiving system is avoided through a smooth connection design, and the ventilation and corrosion protection of the receiving maintenance hole. Refer to Hunter Water drawing PSS-1008-V for the general arrangement for connection of pressure sewer to a gravity network.

Hunter Water also requires that a vent stack is installed at the transition of a pressure sewer to a gravity network. Refer to Hunter Water drawing PSS-1006-V for the general arrangement of this.

The need to implement further measures (e.g. from the list above) is to be investigated as part of system design and, if required, the most appropriate combination of solutions identified.

5.1.3 Servicing strategy phase

5.1.3.1 General

Odour and corrosion shall be assessed at the strategy/optioneering phase and is to be documented as either a chapter in the Servicing Strategy, or added as an Appendix to the report with a summary of the assessment included within the report body.

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The need to implement chemical dosing for a pressure sewer system has the potential to add significantly to the capital and operating costs of a system. Therefore, it needs to be assessed at the strategy stage to ensure the full costs and practicalities are captured for fair comparison with alternative servicing solutions.

Assessment of H₂S potential

As a preliminary assessment of septicity potential, the wastewater age of discharges from the system is to be estimated and assessed against the requirements of Table 3.2 of WSA 07.

Wastewater age is to be estimated as per the methodology set-out in Hunter Water's *Pressure Sewer Systems - Hydraulic Design Guidelines*. This methodology includes requirement to consider both the average and range of wastewater age from the system. It also requires wastewater age to be calculated for the ultimate system, and also for various key interim stages of development.

If wastewater age is assessed against Table 3.2 of WSA 07 as having either 'Medium' or 'High' risk of septicity, then predictive equations are to be applied to quantify the formation of H₂S in the pressure sewer system and inform development of mitigation options.

Modelling for sulphide generation in the receiving sewer network may also be required. Hunter Water shall advise of this requirement following presentation of initial wastewater age calculation and system flow results.

Assessment of odour potential

Expected locations of air release from the pressure sewer system include vent stacks, air valves, and customer house vents, and tank vents. Air released from vent stacks and air valves will have the greater odour potential due to the older age of wastewater at these locations within the system.

Where there is a risk of odorous air being released in the vicinity of buildings or dwellings expected to have frequent human visitation, a carbon canister odour control unit may be required to be included in the design in addition to a mandatory vent shaft.

Risk factors to be considered

The servicing strategy phase odour and corrosion assessment is to consider (and document) the following risk factors / variables in assessing potential for H₂S formation, nuisance odour, and corrosion impacts.

Variance in age of wastewater leaving the system, and the impact this has on the septicity. Consider variance due to factors such as:

- The staged take-up of customers in the scheme, and the impact this has on sewage age. In the initial stages of the scheme when fewer customers are connected detention times may be much longer.
- Seasonal and diurnal variations in flow
- Other factors that may result in detention times varying considerably

The composition of wastewater and its septicity generation potential, including:

- Presence of high-strength/trade waste in the catchment

The arrangement of the receiving system and how this may impact on H₂S release and problems of corrosion and odour potential, including;

- The degree of turbulence generated in downstream sewerage network (e.g. are there large drops or steep grades)

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- Upstream infrastructure and the potential for nuisance odours to move through the system
- History of odour complaints for the existing system in the vicinity of where the pressure scheme will discharge
- Asset condition of existing sewerage system, and material of assets
- Existing flow in the receiving system and the potential to dilute discharge received from the PSS.
- Locations of sensitive receptors (residences, schools, hospitals, etc.) relative to likely points of air release (vent stacks, air valves, etc.)
- Expected concentrations of H₂S.
- Estimates of methane and other gases and how this will be managed from a safety perspective. This is to include an assessment of the risk of explosive atmospheres.

Assessment of risks and management options

If the risk of network issues associated with odour or corrosion is considered medium or high (as per Table 3.2 of WSA 07) then preliminary management options shall be investigated and presented.

The space and location requirements for odour control infrastructure (or at least provision for future retrofit if required) shall also be discussed.

Any management options presented shall be discussed with Hunter Water at the “Odour and Corrosion Risk Meeting” (*refer 5.1.4.2*) to be held at the commencement of the Complex Works design phase. Any preferred option shall then be further detailed with concept and detailed design drawings and revised (if necessary) following the detailed hydraulic design of the pressure sewer system.

5.1.3.2 Strategy phase reporting

The above information shall be compiled as an input into the Servicing Strategy report as a separate Odour and Corrosion Report attached as an appendix, with a summary of key information within the report. All calculations are to be included as report appendices.

If the odour and septicity assessment concludes that specific mitigation measures are required, then a capital and operating costs estimate for these measures is to be captured in the overall cost review of the scheme. This costing is to be incorporated into the Servicing Strategy Report.

5.1.4 Complex works design phase

5.1.4.1 General

The odour and corrosion assessment submitted as part of the Strategy shall be updated in the Complex Works Design Phase to take into account:

- outcomes from the “Odour and Corrosion Risk Meeting”
- development of the detailed hydraulic design of the pressure sewer system (this is to include revising estimates of H₂S production, and dispersion of odours)

If formalised odour or septicity control measures have been identified, then concept and detailed design investigation, reporting and drawings will be required.

5.1.4.2 Odour and corrosion risk assessment meeting

At commencement of the Complex Works Design phase, the need for septicity and odour control works will be discussed based on information provided at the Strategy phase. The following consultants are to be present at the meeting:

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- Odour expert
- Pressure sewer network hydraulic designer
- Hunter Water representatives from Development Services, Planning, Operations, and Asset Management teams

The Odour and Corrosion Report is to be updated following the outcomes of the meeting, and the further development of the hydraulic design of the pressure sewer network. This is to include revising estimates of H₂S production, and dispersion of odours.

5.1.4.3 Detailed design

Detailed design information is to include:

- Location and land requirements for any chemical dosing units required
- Size/capacity of ventilation requirements (if applicable)
- Redundancy and operability considerations (including communication requirements)
- Access for maintenance to the asset (e.g. for chemical delivery)
- Connection of necessary services (power, water, telemetry, etc.)
- How odour/corrosion will be managed in the interim period over which the site is progressively developed (i.e. when the asset will be constructed, staging considerations, any interim operating requirements)
- Environmental assessments
- Safety-in-design elements associated (such as chemical handling, maintenance and access).
- Expected concentrations of H₂S, methane and other gases and how this will be managed from a safety perspective.

Specifically if chemical dosing is proposed:

- Chemicals to be used and quantity required
- Frequency of chemical deliveries (if applicable)
- Document the downstream impacts of chemical dosing, such as; the impact of chemical reaction with concrete, any expected impacts at the downstream wastewater treatment works, any expected impacts at downstream pump stations, (incl. corrosion of metal fittings and pump impellers).

Note that Council consent/approval may be required for the installation of the chemical dosing facilities and/or other odour/corrosion mitigating assets. It is the responsibility of the Developer to obtain approval from all appropriate authorities on this matter.

If during the detailing phase significant changes to the initial suggested mitigation measures are identified, then this is to be discussed with Hunter Water prior to commencement of further work.

5.1.4.4 Final reporting

The Designer shall describe the detailing of any odour/corrosion mitigation assets in sections in the Concept and Detail design reports. This is to include:

- a summary of key information from the strategy phase reporting and any subsequent approved changes
- asset descriptions
- design requirements
- operating requirements

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- key assumptions
- design calculations
- detailed design information as noted in Section 5.1.4.3

Design drawings are to be submitted alongside the Concept and Detail design reports. Final detailed drawings are to be sufficiently detailed such that they are suitable for construction. Hunter Water requirements for chemical dosing units are detailed in STS 670.

An operating plan detailing the O&M requirements of and specific odour/corrosion control assets (e.g. chemical dosing units) is also to be submitted.

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6 Layout of on-property infrastructure

6.1 Introduction

For properties serviced by pressure sewer the following components are installed within each lot:

- Sanitary drain line
- Collection tank / pump unit
- Control / alarm panel
- Property discharge line
- Boundary kit

This section summarises Hunter Water's requirements for the placement and layout of the above assets, as detailed in WSA 07-1.1 2007, and the Hunter Water addendum.

Prior to construction, the intended layout for each individual property is to be submitted to Hunter Water on a Property Sewer Service Diagram (refer to Section 0).

6.2 Collection tank placement

Hunter Water's standard configuration requirement is that on-site pressure sewer collection tanks are located at the street frontage of the lot to facilitate ongoing access for operation and maintenance activities.

The collection tank is to be located a maximum distance of 3 m (to the centre of the tank) from the council approved front building setback ('setback' being defined as the minimum distance a building or other structure must be set back from the front property boundary). Refer to standard drawing PSS-1100-V.

The collection tank is to be located on a nominated side of the property, and at a minimum distance of 1.5m (to the outer edge of the tank) from the side boundary and a maximum distance of 5m from the side boundary. For corner lots, the tank may also be positioned on the street corner (instead of the side boundary) with positioning following the same rule of a maximum distance of 3m past the property set-back (set-back as applicable to corner blocks).

Within these bounds, the collection tank shall be positioned:

- On the side of the property (or corner, for corner lots) that maximises the area of the lot able to drain to the tank.
- At least 2m separation from buildings and other structures including retaining walls, or a greater distance as required to clear a 45-degree foundation zone of influence.
- At least 3m from any windows.
- Outside of any drainage path or depression which may become flooded in wet-weather. If unavoidable, then the tank lid is to be sealed and a new vent pipe from near the side wall of the tank routed to the building wall to a vent point above the roofline (refer to AS 3500).
- Outside of any tidal zone (King Tide), or recorded storm surge zone.
- Outside of any buildings or other enclosed area.
- With a clear 3m vertical clearance from the top of the tank inclusive of the concrete work apron width.

If positioning of the collection tank to meet all the above requirements is not practical, then consult with Hunter Water. These placement requirements should be considered in developing sub-division

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lot layouts, particularly with regard to implementing arrangements such that rear drainage to lots is eliminated.

Landscaping around the collection tank

To facilitate ongoing access for maintenance, the tank cover is to be surrounded by a 100mm wide moat of 20mm 'Blue Metal' gravel contained by a 500mm wide concrete apron ring sloping away from the collection tank.

The landscaping surrounding the tank is to be sympathetic to requirements for future access to the tank for maintenance activities, and a clear pathway from the street to the tank, and the tank to the control panel is to be maintained.

6.3 Control and alarm panel

The combined control/alarm panel is to be located in a clearly visible location in a direct line-of-site and within 10m of the collection tank. It is preferable that the panel is attached to the external wall of the building on the property being serviced, at a height of between 1.2 and 1.5m above the ground.

Where this is not possible, the control panel is to be mounted on a free-standing fully galvanised post at a height between 1.2 and 1.5m as per AS 3000, and positioned within 4 m of the centre of the collection tank.

For all installations, an IP56 rated local isolation switch is to be installed at a distance no greater than 300mm from the control panel.

6.4 Property boundary kit

The property boundary kit is to be located 1m from the front property boundary line, and in alignment with the collection tank location, and perpendicular to the street reticulation pipework.

6.5 Property discharge line

The property discharge line is the pressurised pipe that connects the collection tank to the boundary kit assembly. The property discharge line shall run parallel to the property boundary. It shall be aligned wholly within the lot of the property being serviced.



7 Property sewer service diagrams

7.1 General

The Property Sewer Service Diagram is a drawing that is to be produced for each property that captures the following on-property pressure sewer components:

- Electrical/mechanical works: works from the isolation switch on the switchboard to the pump unit.
- Pipe works: from the property over-flow gully trap (upstream of the collection tank) to the street reticulation connection.

Service Diagrams are to be submitted to Hunter Water regardless of whether the unit is to be owned/operated by Hunter Water or privately owned/operated.

The preparation of the Property Sewer Service Diagrams are to comply with Hunter Water's *STS 911 Preparation of Civil, Structural and Mechanical Engineering Drawings*.

7.2 New connections

The Developer is to submit a work-as-constructed Property Service Diagram clearly showing all measurements and features relevant to the PSS for each property served, including:

- Lot boundary, including measurements
- Collection Tank: Direct measurement from the nearest corner and off-set from side and front property lid to the centre of the collection tank.
- Boundary Kit: Direct measurement from the nearest corner and off-set from side and front property line to the centre of the boundary kit.
- Pipework: Alignment of pipework from the collection tank to the street reticulation, pipe size and material.

When a lot-owner is ready to plan their pressure sewer connections, they are to obtain the Property Sewer Service Diagram for the lot from Hunter Water and accurately mark-up their intended location of the following items:

- Outline of the house and any other significant structure proposed for the site
- Pipework: Alignment of pipework from the house gully trap to the collection tank. Pipe size and material, pipe size and material.
- Control/Alarm Panel: Direct measurement from the centre of the collection tank to the control panel. If located on the side of a building, include off-set from the building corner. If located on a free-standing pole, off-sets from boundaries such that location can be determined by a contractor in the field.
- Cable routing: Layout of the electrical cable from the switchboard to the control/alarm panel. Layout of the electrical cable from the control/alarm panel to the pumping unit.
- Any known obstructions or constraints to the locating of PSS infrastructure on the property (e.g. other services, retaining walls).

Along with submission of the marked-up Property Sewer Service Diagram, the submission to Hunter Water shall also include evidence of the following:

- The residence is able to drain to the collection tank.
- That the tank is able to provide the required emergency storage volume prior to sewer surcharge/overflow.

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Following approval and construction of on-property works, a final work-as-constructed Property Sewer Service Diagram is to be submitted to Hunter Water.

7.3 Commercial/industrial connections

For commercial, industrial and higher density residential developments, the on-property information listed above shall be provided to Hunter Water.

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8 Document control

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Document owner	Mandatory reviewers	Document approver
Manager Investment & Asset Planning	Asset Standards & Strategy Engineer	Chief Investment Officer

Document version history

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1.0	S Groves	Initial Release	01/03/2018	D. Cleary	2 years
2.0	S Groves	Initial Release	13/06/2018	S Horvath	2 years

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