



Engineering

# TS 0530 - Temporary sewage storage facilities

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**Government of  
South Australia**

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## Documents superseded by this standard

The following documents are superseded by TS 0530:

- a. TS 0520, Version 1.0
- b. Technical Bulletin – Supplement to TS 0520, Version 1.0


# Document controls

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# 1 Introduction

SA Water is responsible for an extensive amount of engineering infrastructure such that it is safe and functional.

This standard has been developed to assist in the planning, design, construction, operation, maintenance, decommissioning and management of this infrastructure.

Temporary Sewage Storage Facilities (TSSF), along with associated collection, transport, and disposal (tankering), may be considered by SA Water to support land development, particularly in line with the SA Government's Housing Roadmap. A TSSF may be provided at the downstream end or within a development where an upgrade or extension to the downstream sewerage network is planned and expected to be delivered in the foreseeable future.

Use of TSSF for other developments will be assessed by SA Water on a case-by-case basis.

A TSSF will only be considered if all non-tankering options have been investigated and found to be unviable. Temporary storage is only appropriate where no gravity or pumped transfer system with sufficient capacity is immediately available or can be installed within a timeframe agreed with SA Water.

TSSF may be unsuitable for developments in areas not connected or unlikely to be connected to an upgraded SA Water sewerage network within a reasonable timeframe, or where tankering services are not readily available or considered unreliable.

## 1.1 Purpose

The purpose of this standard is to detail minimum requirements to ensure that assets covered by the scope of this standard are designed, constructed, maintained, and operated to consistent standards and attain the required asset and service life as defined by SA Water.

This Technical Standard has been prepared to guide the design and construction of a temporary sewage storage facility.

## 1.2 Glossary

Terms and Abbreviations utilised in this Standard are included in the following sections. The definitions presented below are to be used when interpreting this Standard and actions undertaken in relation to this Standard. Where a conflict exists, clarification is to be sought from SA Water.

### 1.2.1 Terms and Definitions

The following is a list of Terms applicable to this document:

Term	Description
<b>Accepted</b>	Determined to be satisfactory by SA Water's Representative.
<b>Allow</b>	Means that the cost of the item referred to is the responsibility of the Constructor.
<b>Average Dry Weather Flow (ADWF)</b>	The total flow volume discharged from a unit, such as a Lot, over a period of dry weather, divided by 86,400 (such as the number of seconds in 24 hours). The unit of measure is L/s.
<b>Clean</b>	To undertake cleaning activities at a tankering site to ensure the facility does not pose a health or amenity risk to the surrounding communities.
<b>Cleaning</b>	Cleaning of the TSSF to ensure local amenity is maintained, and the facility can be operated in a safe and sustainable manner with minimal public nuisance.

Term	Description
<b>Commissioning</b>	The methodical approach to ensuring that all operational components of a project are functioning within the design tolerances and to achieve the design intent within normal operations.
<b>Constructor</b>	The organisation responsible for constructing and installing infrastructure.
<b>Contingency Storage Volume</b>	The contingency storage volume is the additional storage volume required to accommodate wet weather flow, interruptions to decanting operations, power failures, or unexpected surge events. This is a risk-based assessment. This is in addition to the Working Storage Volume.
<b>Contract</b>	A set of documents between two or more parties forming a binding agreement for the provision of good and or services.
<b>DAFI</b>	Developer Agreement Formal Instrument
<b>Dead Storage Volume</b>	The volume of a storage vessel which cannot, under normal operations, be emptied. Such as below the pump off level in a pump station.
<b>Decommissioning</b>	The methodical approach to ensuring that all operational components of a project are safely removed from service without negatively impacting on the function of the surrounding reticulation network.
<b>Demolition</b>	To tear down or break apart the facility, such as raze. Including the removal and disposal from site of all demolition materials and reinstate the site to agreed standards.
<b>Design</b>	To prepare the documentation to enable the construction, installation, commissioning and operation of infrastructure in line with the requirements of TS 0104.
<b>Designer</b>	The organisation responsible for designing infrastructure pertaining to this Technical Standard - whether it be a third party under contract to SA Water, or to a Constructor or Developer, or an SA Water in-house entity. A Designer is a person who effects design, produces designs or undertakes design activities as defined in the <i>Work Health and Safety Act 2012 (SA)</i> .
<b>Developer</b>	A Developer is defined as an individual or entity responsible for creating new residential, commercial, or industrial allotments. This includes determining and paying for the necessary water, wastewater, and recycled water infrastructure to support these new developments.
<b>Disconnection</b>	Permanent isolation and disconnection of the facility from the broader reticulation network in readiness for demolition and rehabilitation.
<b>Facility Owner</b>	The Facility Owner is defined as an individual or entity responsible for the design, construction, and maintenance of the TSSF.
<b>Informative</b>	Means "provided for information and guidance".
<b>Maintain</b>	Undertake preventative and reactive maintenance works at the facility to ensure continued operation of a site for the life of the asset.
<b>Maintenance</b>	The work of keeping the TSSF in working condition. This includes any proactive, preventative, and reactive activities as may be required for the life of the facility.
<b>Manufacturer</b>	A person, group, or company that owns and operates a manufacturing facility that provides materials for use in the infrastructure.
<b>Must</b>	Indicates a requirement that is to be adopted in order to comply with the Standard.
<b>Operate</b>	Run and manage the tanker fleet servicing a site, including collection and disposal of sewage

Term	Description
<b>Operation</b>	Operation refers to either the operation of the: <ul style="list-style-type: none"> <li>• Temporary sewage storage facility, or the</li> <li>• Tanker(s) to collect sewage from the TSSF, travelling to and from the disposal point, and disposal of the sewage to achieve the design intent of the facility.</li> </ul>
<b>Owner</b>	The person or legal entity that holds title over an area of land.
<b>Peak Dry Weather Flow (PDWF)</b>	This is the Average Dry Weather Flow, multiplied by a peaking factor, to account for the peak diurnal dry weather flowrate that (usually) occurs during the morning and evening peak usage time.
<b>Peak Wet Weather Flow (PWFF)</b>	This is the Peak Dry Weather Flow, multiplied by a peaking factor, to account for the peak flowrate derived due to surface water and ground water entering the sewer system during wet weather.
<b>Person/s</b>	Each word implying a person, or persons shall, where appropriate, also be construed as including corporations.
<b>Provide</b>	Means "supply and install".
<b>Rehabilitation</b>	To return the site at the end of its life to a condition suitable for its future use.
<b>Representative</b>	The Representative shall be either one of the following: <ul style="list-style-type: none"> <li>• For Works delivered under a Developer Agreement Formal Instrument (DAFI), this shall be the Approved Superintendent.</li> <li>• For works delivered directly for SA Water under a contract or other engagement, this shall be the SA Water Representative.</li> </ul>
<b>Responsible Discipline Lead</b>	The engineering discipline expert identified in the 'Approvers' table (via SA Water's Representative).
<b>SA Water Account Manager</b>	Manages the implementation of development applications by interfacing with developers and internal SA Water teams to deliver infrastructure solutions from concept to connection, for land development projects only.
<b>SA Water Representative</b>	The SA Water representative with delegated authority under a Contract or engagement, including (as applicable): <ol style="list-style-type: none"> <li>a. Superintendent's Representative (for example AS 4300 and AS 2124)</li> <li>b. SA Water Project Manager</li> <li>c. SA Water nominated contact person</li> </ol>
<b>Shall</b>	See 'must'
<b>Should</b>	Indicates practices which are advised or recommended but are not required.
<b>Supplier</b>	A person, group or company that provides goods for use in the infrastructure.
<b>Tank Full Level</b>	The highest level of the water surface of the storage (typically in m AHD).
<b>Tankering</b>	The collection of sewage from the TSSF, travelling to and from the disposal point, and disposal of the sewage to achieve the design intent of the facility.
<b>Tankering Operator</b>	The entity accountable for the collection and disposal of sewage from the TSSF including all operational responsibilities on the site
<b>Technical Dispensation Request Form</b>	The form that is part of SA Water's Technical Dispensation Request Procedure which details the process by which those required to comply, or ensure compliance, with SA Water's technical requirements may seek dispensation from those requirements.
<b>Temporary Sewage Storage Facility</b>	Physical infrastructure and site associated with the temporary storage of sewage.
<b>Total Storage</b>	The total storage of the facility = Useful storage + dead storage. It does not include any storage in bunds or within the reticulation network.

Term	Description
<b>Useful Storage</b>	Useful Storage = Working storage Volume + Contingency storage Volume. Useful storage does not include Dead Storage, storage within bunded areas, or storage within the reticulation system.
<b>Work</b>	Elements of a project which require design and/or construction.
<b>Working Storage Volume</b>	The working storage volume is the storage volume provided to accommodate 24hrs of ADFW for the proposed development.

## 1.2.2 Abbreviations

The following is a list of Abbreviations, Acronyms and Initialisms used in this document:

Abbreviation	Description
<b>ADWF</b>	Average Dry Weather Flow
<b>AEP</b>	Average Exceedance Probability
<b>AHD</b>	Australian Height Datum
<b>ARI</b>	Average Recurrence Interval
<b>DAFI</b>	Developer Agreement Formal Instrument
<b>EPA</b>	Environment Protection Authority
<b>GRP</b>	Glass Reinforced Plastic
<b>ID</b>	Internal Diameter
<b>MH</b>	Maintenance hole
<b>MLD</b>	Major Land Development
<b>NPSH</b>	Net Positive Suction Head
<b>O&amp;M</b>	Operation and Maintenance
<b>OCU</b>	Odour Control Unit
<b>OD</b>	Outside Diameter
<b>ORA</b>	Odour Risk Assessment
<b>P&amp;ID</b>	Piping and Instrumentation Diagram
<b>PDWF</b>	Peak Dry Weather Flow
<b>PE</b>	Polyethylene
<b>PWWF</b>	Peak Wet Weather Flow
<b>RA</b>	Risk Assessment
<b>RPZ</b>	Reduced Pressure Zone device
<b>S<sup>3</sup></b>	Safety, Security, and Sustainability
<b>SA Water</b>	South Australian Water Corporation
<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>SCM</b>	Sewer Construction Manual
<b>SID</b>	Safety in Design
<b>SPS</b>	Sewer Pumping Station
<b>SRA</b>	Security Risk Assessment
<b>SuiD</b>	Sustainability in Design
<b>TDRF</b>	Technical Dispensation Request Form

Abbreviation	Description
<b>TG</b>	SA Water Technical Guideline
<b>TS</b>	SA Water Technical Standard
<b>TSSF</b>	Temporary Sewage Storage Facility
<b>TWL</b>	Top Water Level
<b>WHS</b>	Work Health and Safety

### 1.2.3 Terminology

The following is a list of specific interpretations for Terminology used in this standard.

- Where an obligation is given and it is not stated who is to undertake these obligations, they are to be undertaken by the Constructor.
- Directions, instructions and the like, whether or not they include the expression "the Constructor shall" or equivalent, shall be directions to the Constructor, unless otherwise specifically stated.
- Where a submission, request, proposal is required and it is not stated who the recipient should be, it is to be provided to SA Water's Representative for review.
- Each word imparting the plural shall be construed as if the said word were preceded by the word "all".
- "Authorised", "approval", "approved", "selected", "directed" and similar words shall be construed as referring to the authorisation, approval, selection or direction of SA Water's Representative in writing.
- "Submit" mean "submit to the SA Water Representative or their nominated delegate".

## 1.3 References

### 1.3.1 Australian and international

The following table identifies Australian and International standards and other similar documents referenced in this document:

Reference	Title
	Bunding and Spill Management (EPA 080/12)
	Environment Protection (Air Quality) Policy 2016
	Environment Protection (Commercial and Industrial Noise) Policy 2023
	Environment Protection (Water Quality) Policy 2015
	Environment Protection Regulations 2023 (SA)
	Environmental Protection Act 1993 (SA)
	South Australian Public Health (General) Regulations 2013
	Water Industry Act 2012 (SA)
	Water Industry Regulations 2012 (SA)
	Work Health and Safety Act 2012 (SA)
<b>AS 3600</b>	Concrete structures
<b>AS/NZS 2638.2</b>	Gate valves for waterworks purposes - resilient seated

### 1.3.2 SA Water documents

The following table identifies the SA Water standards and other similar documents referenced in this document:

Reference	Title
<b>SCM</b>	Sewer Construction Manual – a term generally used to mean the standard drawing set, available from SA Water's website, covering the requirements for sewer construction
<b>TG 0531</b>	Gravity network ventilation design
<b>TS 0101</b>	Safety in design
<b>TS 0103</b>	Survey requirements specification
<b>TS 0104</b>	Design quality management
<b>TS 0105</b>	Quality requirements
<b>TS 0107</b>	Sustainability by design
<b>TS 0109</b>	Infrastructure design
<b>TS 0110</b>	Durability design
<b>TS 0120</b>	Electronic security systems
<b>TS 0121</b>	Physical security site standards general definitions. Includes amendment 1 relating to door and steel cladding thickness
<b>TS 0220</b>	Requirements for pump specification, procurement and testing and the preparation of pump datasheets
<b>TS 0300</b>	Supply and installation of low voltage electrical equipment
<b>TS 0302</b>	Stand-alone solar power supply systems

Reference	Title
TS 0350	SCADA systems
TS 0351	IoT/IloT systems
TS 0360	PLC and HMI systems
TS 0502	Authorised products – gravity sewer and pressure pumping main systems
TS 0523	Preparation of design drawings for reticulation infrastructure
TS 0632	Minimum requirements of geotechnical investigations and reports
TS 0720	Access infrastructure for water tanks

## 2 Scope

### 2.1 Scope and application of this Technical Standard

This technical standard specifies SA Water's minimum requirements for the planning, design, construction, cutover and decommissioning of a TSSF (irrespective of the land/facility owner or tankering operator), which services land intended for residential development and:

- a. is downstream of the SA Water reticulation network that it serves, and
- b. is unable to currently be serviced by the existing external sewer reticulation / trunk network, either due to existing proximity, or due to existing network capacity, and
- c. is identified for future service by an extended / augmented SA Water sewer reticulation / trunk network within an agreed timeframe.

This standard is primarily intended to provide direction for the design and construction of temporary sewage storage and tankering facilities, where the facility services an SA Water network.

This Standard is applicable for both Land Development works and SA Water capital projects, as defined in TS 0104.

### 2.2 Work not in scope

Temporary Sewage Storage Facilities that:

- are located on private property and only serve that site, or
- are receiving SA Water wastewater and will be short term, low inflow, low volume and low risk.

### 2.3 Technical dispensation

Departure from any requirement of this Technical Standard shall require the submission of Technical Dispensation Request Form (TDRF) for the review and approval (or otherwise) of SA Water Responsible Discipline Lead listed in Page 4, on a case-by-case basis.

The Designer shall not proceed to document/incorporate the non-conforming work before the Responsible Discipline Lead has approved of the proposed action in writing via the Technical Dispensation Request Form (TDRF).

SA Water requires sufficient information to assess dispensation requests and their potential impact. The onus is therefore on the proponent to justify dispensation request submissions and provide suitable evidence to support them.

Design works that are carried out without being appropriately sanctioned by SA Water shall be liable to rejection by SA Water and retrospective rectification by the Designer/Constructor.

### 2.4 Safety in design

When designing a TSSF, a safety in design risk assessment and mitigation process shall be conducted in compliance with the Work Health and Safety Act 2012 (SA) and SA Water's requirements.

Safety in Design assessments, as outlined in TS 0101 are to be adhered to. The subprocess as outlined by the MLD Safe Design Management Plan and associated templates are not applicable for TSSF designs.

## 2.5 Hazards

Specific hazards/risks and their proposed controls relating to the temporary sewage storage facilities and associated products / operations, shall be included within the design reports. These hazards are to be addressed in the SiD workshops and shall be used to inform the design, the constructor, and the facility maintenance and operational providers.

SA Water has provided a preliminary list, below, of known hazards associated with the storage of sewage and associated products, nominated in this Technical Standard, for reference by users of this document.

Hazards/risks associated with the operation of Temporary Sewage Storage Facilities may include, and are not limited to, the following:

- Biological hazard associated with human and trade waste.
- Buried or overhead services.
- Confined Spaces.
- Corrosive environments due to acids derived from hydrogen sulphide.
- Electricity.
- Ergonomic risks associated with workers interacting with valves, stairs, ladders, instrumentation, and similar.
- Gas and odour
- Impact of a spill on:
  - Aquatic ecosystems
  - Biodiversity
  - Macroinvertebrate communities
  - Threatened flora and fauna
  - Recreational use of the affected areas
  - Water extraction from affected waters
- Interaction with the public on the approach to, from and within the TSSF.
- Lifting.
- Mechanical plant
- Proximity to sensitive receptors.
- Safe manoeuvring of heavy vehicles.
- Slips, trips and falls.
- Toxic and/or explosive atmospheres.
- Trenches and other excavations.
- Vehicle/human interaction.
- Working at height.
- Working next to water.

## 2.6 Sustainability in design

When designing a TSSF, designers are encouraged to consider the temporary nature of the facility and opportunities to minimise the impact on the environment during design, construction, operation, demolition, and rehabilitation.

Where possible the opportunities to salvage, reuse, or repurpose assets should be considered.

The design of the TSSF together with the facility operations and tankering operations shall consider the whole of life cost and management of risk to users and the environment and safety.

## 2.7 Security assessment

When designing a TSSF, a security assessment must be completed for the site. This will consider the security of the personnel required to operate at the site, such as tanker operators and maintenance personnel, and the security of the infrastructure at the site.

Security requirements identified by the Security Assessment shall be incorporated into the facilities design and operational plans.

An initial security assessment shall be completed to inform the site planning and design. Refinement of the Security Assessment shall be carried out generally in accordance with TS 0101, TS 0120, and TS 0121.

## 3 Hold points and witness points

### 3.1 Hold points

Please refer to TS 0105 for further detail on hold points.

### 3.2 Witness points

Please refer to TS 0105 for further detail on witness points.

### 3.3 Non-conformance

Please refer to TS 0105 for the requirements relating to non-conformance.

## 4 Planning and concept development

### 4.1 General

This section outlines the design inputs that **must** be agreed with the SA Water Representative or SA Water Account Manager (for SA Water Capital Works and Land Development projects respectively) prior to finalising the design of a Temporary Sewage Storage Facility (TSSF), in accordance with the requirements of this Standard. Documentation and evidence confirming agreement on these parameters **must** be included in any design package submitted to SA Water, as required by TS 0104.

### 4.2 Required design inputs

Table 1 shows the information that must be confirmed and provided to SA Water along with any TSSF design package, to ensure the design can be assessed for technical fitness-for-purpose against the requirements of this Standard. Where relevant, section references are provided in the description to direct users to related requirements in this document.

General requirement	Design parameter	Description
<b>Performance &amp; functional requirements</b>	Service scope	Ultimate and staged number of allotments to be serviced by the TSSF (section 5).
	Design inflows	ADWF assumptions, including any non-residential contributions and upstream flows (sections 6 and 19).
	Minimum useful storage	Refer section 6.
	Minimum contingency storage	Refer section 6.
	Dead storage constraints	Refer section 6.
	Staging and design life	Expected facility life and any staging assumptions that affect storage, pumps, controls or monitoring (refer section 5).
	Number of tanker fill points	Number of tanker fill points required to meet peak service demand and parallel operations, as applicable (refer sections 7 and 11).
	Instrumentation, alarms, communications/telemetry	Monitoring philosophy, interfaces and responsibilities (who monitors and who responds), including the alarms, communication and instrumentation requirements (refer section 10)
	Odour management provisions	Odour mitigation approach (for example, separation distances, educt vents, or active mitigation if warranted by risk), including consideration of dead storage and septicity (refer sections 6 and 18)
<b>Access</b>	Legal access	Confirmation of legal access to the site including any easements, encumbrances, rights of way or other instruments, to be provided for the life of the facility (refer section 13)
	Tanker discharge location	SA Water facility that tanker will discharge at

General requirement	Design parameter	Description
	Design vehicle	Nominate the vehicle(s) proposed to service the site (refer section 13)
	Hours of operation	Expected operating window(s) for tanker collections
	Daily vehicle movements	Expected collection frequency and any peak conditions requiring concurrent tanker operations (and holding/queuing provisions where > 1 tanker/hour) (refer section 13).
	Access route management	Planned route for tankers to and from the TSSF and discharge location, including proposed line marking, signage, parking controls, and any one-way routing to minimise exposure to adjacent dwellings (refer sections 13).
	Vehicle manoeuvring	Provide swept paths for design and check vehicles (refer sections 5 and 13).
	On-site safety	Provision for safe pedestrian interfaces, adequate hardstand width and passing areas where multiple fill points operate concurrently, lighting (refer sections 13 and 17)
<b>Risk Management</b>	Risk assessment	Evidence of a risk assessment
<b>Legal</b>	Legal arrangements	Provide legal rights of entry to the site to undertake tankering and any necessary operational or maintenance requirements for the life of the facility.
<b>Stakeholder management</b>	Council /DIT endorsement	Council / DIT endorsement of proposed access route (refer section 13)
	Council / EPA approvals	Necessary development approvals are received
	Nuisance assessment	Assessment of noise and odour impacts on nearby sensitive receivers at ultimate stage (refer sections 5, 13, and 18).

Table 1: Design inputs required

## 5 Design, operational, and environmental requirements

To ensure the design, operational, and environmental requirements are satisfied, the following general topics shall be addressed and provided to SA Water as part of the design process.

### 5.1 Site design

The site for the TSSF shall be selected considering the topography and ability to collect and store the sewage, access for operations and maintenance, nuisance to existing and future development via noise, traffic and odours and site amenity. Requirements of the local Council and EPA in regard to separation distances and land use zoning shall be met.

The following site design information shall be provided to SA Water's for review and acceptance as part of the approval process:

1. A plan of division and schedule that indicates the staging of the development, the progress of its construction, and the associated number of allotments planned, and number of allotments occupied, over time.
2. Relevant development approval as required
3. A scaled locality development plan drawing that identifies:
  - a. The land parcels and proposed allotments
  - b. Adjacent dwellings and buildings
  - c. Adjacent land use
  - d. Site Flood levels (1% AEP) and access road flood levels (5% AEP)
  - e. Site access
  - f. Contours / Engineering survey and proposed site grading.
4. Scaled site plans:
  - a. Design Vehicle Swept paths accessing the site and all fill points, also showing the interaction of tankers at sites with multiple fill points
  - b. Local area traffic management (line marking, signage, and parking controls)
  - c. Access route traffic management (line marking, signage, and parking controls). The access and traffic route should ensure that access for this essential collection service is always available and will not be obstructed by future development, dwelling construction on narrow roads or other significant natural or man-made delays (more than 2 hours) that prevent the design collection vehicle accessing the site.
5. Detailed layout plan(s), calculations and sections details showing the TSSF including:
  - a. Tank capacity, interconnectivity, and construction details
  - b. Pump:
    - Design calculations including, duty flow, rising main sizing, minimum submergence, and vortex management.
    - Arrangements and details.
    - Operation and control details
  - c. Extent and capacity of bunded area(s)
  - d. Layout of sewage mains and pipes including a P&ID
  - e. Tanker loading bay(s)
  - f. Site grading and drainage

- g. Bund volumes
  - h. Gates and fencing (as required)
    - Gate widths
    - Swing paths and hold open positions and mechanisms
    - Pedestrian Access arrangements
    - Gate Operation Mechanism, such as automatic/manual, swing/sliding
    - Opening and closing speeds
    - Gate controls if required.
  - i. Wash water system (as required)
  - j. Odour management (as required)
  - k. Lighting (as required)
  - l. Telemetry and alarms (as required)
  - m. CCTV and Security (as required)
  - n. Site Signage (including emergency contacts).
6. Design calculations.

Design and documentation undertaken by third parties are to be audited by SA Water's Reticulation Team in line with the criteria set out in TS 0104.

## 5.2 Staged developments

Whilst the preference is to construct the TSSF for the fully developed site initially, if a development is to be staged, storage volume may be staged and designed and constructed as part of the reticulation network for that stage.

However, should staged construction be considered, only the storage and pump sizing may be staged. The TSSF land allocation, relevant approvals, access roads, traffic controls, pump stations and other infrastructure will be required as part of the initial construction. A construction staging plan demonstrating the augmentation of the storage and other upgrades for future stages will be required.

If construction of the storage is staged, storage volumes in latter stages may be reviewed by SA Water based on measured flow rates and the performance of the TSSF.

## 5.3 Design life

All infrastructure that will be permanently utilised within SA Water's network shall meet the requirements of SA Water's Technical Standards including, but not limited to, TS 0109 and TS 0110.

Other temporary infrastructure that will be utilised for the nominated design life shall be designed to achieve the nominated service life, with specific maintenance requirements for temporary infrastructure to be provided.

Designers are expected to consider principles of sustainability and circular economy.

## 5.4 Site survey and investigations

Supporting information to be provided with the Design Documentation shall include:

1. Topographic and feature survey (refer TS 0103)
2. Geotechnical investigation including water table location (refer TS 0632).

## 5.5 Other parties

Notwithstanding the contents of this Standard, the designer is to ensure that the requirements of the DIT, EPA, SA Health, WHS legislation, and the relevant local councils are adhered to for the proposed design. The Designer is responsible for liaising with these entities and ensuring compliance with their requirements. SA Water may request evidence of agreement where appropriate in support of the proposed development.

## 6 Temporary storage of sewage

### 6.1 Storage volumes

Unless alternative clear written direction is given by SA Water the minimum storage volumes shall be provided on the following basis:

1. **Dead storage** Comprises two volumes which cannot be utilised for either working or contingency purposes:
  1. The portion of storage below the Minimum Pump Level and
  2. The storage above the System Overflow
2. **Contingency storage volume** The contingency storage volume is the storage provided to accommodate wet weather flow, planned or unplanned interruptions to decanting operations, or unexpected surge events. The contingency storage volume is based on risk and site location and will be agreed to by SA Water and will be a minimum of 12 hours of ADWF. Contingency storage volume is in addition to the Working Storage Volume.
3. **Working storage volume** The working volume is the storage provided to accommodate 24hrs of ADWF for the proposed development.
4. **Useful storage** Is the sum of the Working and Contingency storages.
5. **Total storage** Is the sum of the Useful and Dead storages but does not include any storage in bunds or the wastewater reticulation system.

Note that dead storage comprising the portion of storage below the Minimum Pump Level and the storage above the System Overflow cannot be utilised for either working or contingency purposes.

A typical arrangement for a below ground storage solution is shown in Figure 1. A typical arrangement for an above ground storage solution is shown in Figure 2.

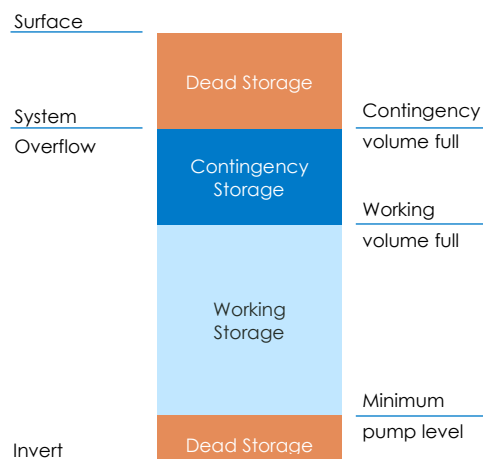


Figure 1: Typical below ground storage arrangement

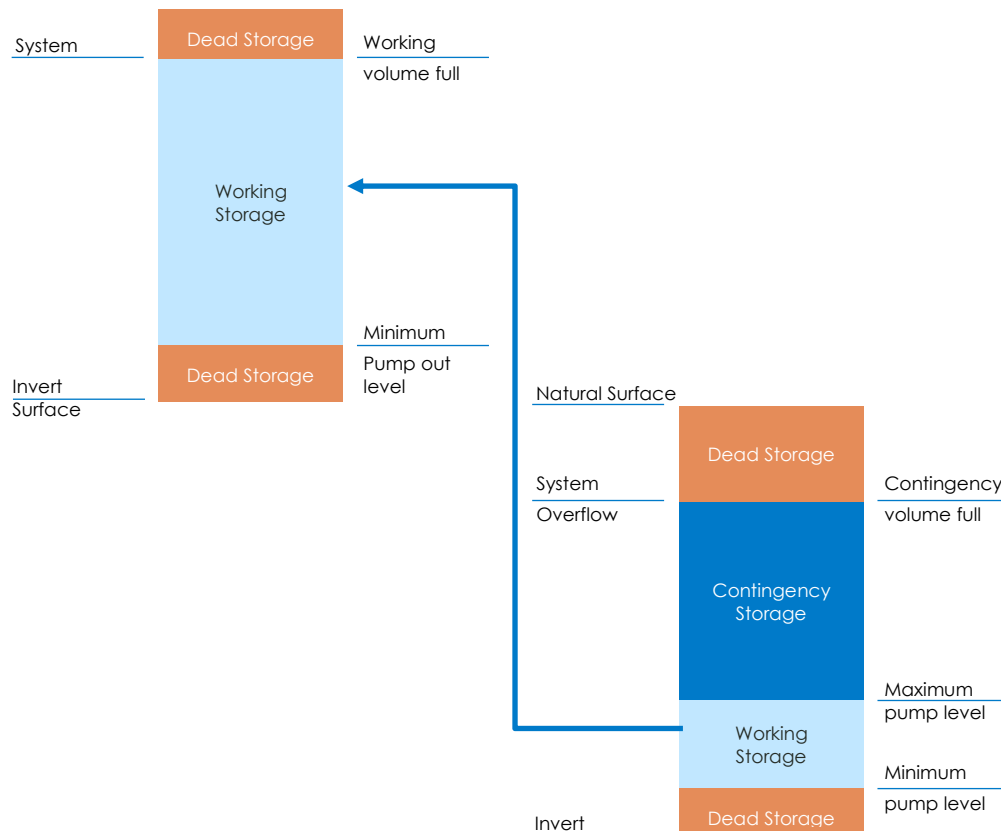


Figure 2: Typical above ground or combined above and below storage arrangement

### 6.1.1 Dead storage

Dead storage is the part of the storage volume which cannot be pumped out as part of the collection system (below the minimum pump out level of the facility for a below ground system or below the maximum pump level for the above ground system); or would overflow from the storage system, above the contingency storage.

Careful consideration of dead storage must be given to minimise the production of odours by the facility. Sewage left in the tanks too long will generate odours which may impact on residents and businesses operating in the vicinity of the facility.

Odours will need to be managed under the Maintenance and Cleaning regime for the facility. If odours cannot be controlled in this manner through cleaning and/or chemical dosing, then supplementary measures such as active odour control units may be required.

### 6.1.2 Working storage

Working storage is nominally determined based on:

1. A minimum useful volume equivalent to 24-hours of Average Dry Weather Flow (ADWF), derived from the upstream catchment(s), shall be provided. For typical residential dwellings, this shall be nominally calculated based on an average of 0.5kL per residential dwelling per 24-hours.
2. Where applicable, additional non-residential dry weather volume per day allowance(s) shall be based on WSA 02 and are to be agreed with SA Water.

3. Tankering management solution considering the remoteness of the site, the distance and turnaround time to the nominated disposal point, the availability of collection vehicles, nominated tanker vehicle size proposed to service the facility, risk and consequence of failure and number of fill points at the facility.
4. For above ground facilities (Figure 1), the working storage will include above ground and below ground storage. The below ground portion should only be the volume required to facilitate efficient operation of the lift pumps. The balance of working storage shall be in the above ground storage tanks. The volume of working storage held below ground shall not exceed 10% of the total working storage unless it is designed to be emptied or transferred to the above ground tanks.
5. The bottom elevation of the working storage should be set as low as reasonably practicable, to minimise dead storage.
6. Working storage shall be below the wastewater reticulation network inlet and not include any volume held within the wastewater reticulation network
7. The maximum reliable lift depth to achieve the target pump out rates (refer section 6.2) and the minimum depth of wastewater to prevent:
  - a. Vortexes developing at the inlet to the Storage Suction Outlet Pipe.
  - b. Cavitation developing in the pump suction line and pump.
  - c. Blockage of the inlet, to the Storage Suction Outlet Pipe, by sludge and debris.This shall designate the minimum pump level.

### 6.1.3 Contingency storage

Contingency Storage is provided at a site, to mitigate interruptions to the normal operation of a facility, such as temporary loss of power to pumps, breakdown or delay of tanker vehicles, or any incident which prevents the removal of sewage from the site or for unexpected wet weather flow infiltration/inflow or unexpected inflow. Under normal operations this portion of the storage shall not be used. For the contingency volume:

1. A minimum volume equivalent to 12hrs of ADWF, shall be provided for contingency storage. Contingency storage may be increased in areas where limitations on emergency response or monitoring are expected. The contingency storage will be nominated on the design following a risk based assessment.
2. The contingency storage volume shall not include any volume held within the wastewater reticulation network.
3. The contingency storage volume shall be accommodated between the top of the working storage level (Figure 1) or maximum pump level (Figure 2) and the lower elevation/level of the following:
  - a. The wastewater reticulation system Invert level of the lowest Inspection Point (IP), or
  - b. An allowance of a minimum of 1 metre of freeboard at the lowest ground level in the wastewater reticulation system.
4. For above ground facilities, all contingency storage shall be provided upstream of the lift pumps.

## 6.2 Storage depth limitations

The maximum depth shall be the lesser of:

- For vacuum tanker operations, shall be 4.3m to the bottom of the working storage, relative to the design final ground surface level where the tanker wheels are parked, when the tanker is loading.

- For all installations (systems using submersible pumps) the maximum depth to tank invert shall be the lesser of 8.0m below finished surface level, or the safe structural depth for the selected storage tank.

## 7 Storage suction outlet

The following considerations apply to the Storage Suction Outlet(s).

### 7.1 Outlet vortex mitigation

The Designer shall take due care to ensure that vortices do not develop at the suction inlet. Designers shall undertake all necessary precautions and calculations to confirm that the minimum submergence of the suction inlet is appropriate for the facility.

Designers shall consider the limitations of the vacuum trucks where below ground facilities are to be used.

### 7.2 Outlet cavitation mitigation

Cavitation caused by the Net Positive Suction Head (NPSH) available being less than the NPSH required by the suction pumps must be considered. Designers shall prepare calculations to confirm this requirement in line with service pumps or vacuum trucks.

### 7.3 Outlet sludge blockage mitigation

To assist in preventing the tank outlet from becoming blocked, it is necessary to ensure that minimum cleansing velocities are achieved to scour the area around the outlet pipe clear of debris.

The Designer shall ensure that fluid velocities in the vicinity of the tank suction outlet are appropriate to ensure the buildup of debris does not occur. The designer shall prepare calculations to:

- Confirm minimum cleansing velocities are achieved at the outlet, and
- A schedule for the cleanout of sludge is understood to facilitate a maintenance strategy.

### 7.4 Sludge removal and disposal

The facility shall be designed to enable cleanout, removal and disposal of sludge from the storage tanks. This shall be able to be completed safely and with minimum impact on the operation of the facility. Cleanout operations shall consider the requirements for ventilation of tanks, isolation of tanks, access, egress, and emergency recovery.

### 7.5 Below ground storage suction outlets

Unless requested otherwise by SA Water, for below ground outlets, the piping shall:

1. have a minimum internal diameter of 100mm.
2. be rated for full vacuum.
3. minimise the use of bends as much as possible, and when used, they shall have the largest radius available. 90° degree elbows shall not be used.
4. be sized to facilitate self-cleansing.

### 7.6 Above ground storage outlets

In addition to any relevant details listed for the below ground storage, a gate valve is required immediately upstream of the camlock as the storage tank will provide positive head. The valve is to be selected to ensure that snagging and buildup on the valve is minimised.

## 7.7 General considerations

To facilitate efficient operation of a site, tanker fill rates are typically in the range 15L/s to 25L/s, equating to respective velocities in an internal diameter of 100mm suction pipe of 2m/s to 3m/s.

The Designer shall take due consideration of the need to wash-down (and drain away), using the tanker's water supply, the local area under and around the camlock.

For sites catering for greater than 100 residential lots it is increasingly likely that facilities will be required allowing for the loading of two or more tankers at the same time.

## 8 Stormwater management and tank bunding

The Designer shall consult with the Local Council to agree upon any appropriate stormwater management, quantity and quality controls or requirements for the site. Flow paths shall be designated and designed, and information provided as to where the locations of spills risk may be.

The TSSF site shall be protected from a 1% AEP flood and any access roads protected in the event of a 20% AEP flood, except if the inundation is expected to last more than 8 hours or the road not passable after the event in which case the access roads should be designed for a 1% AEP flood event.

If above ground tanks are to be used then sewage overflow containment shall be into a lined, non-permeable bund, with a fall and sump in one accessible corner for collection, and to aid pump out.

The bund should include a drain to enable stormwater emptying. No instrumentation is needed in the bund.

The storage bund's volume shall be equivalent to 120% of total tank volume, unless varied by EPA guidance, with 200mm of freeboard provided above the 120% volume full level, and a suitable drainage point for emptying rainwater.

Designers shall also cater for drainage for the frequent cleaning at the camlock interface with tankers.

The facility must have a preprepared response plan for the site in the event of the failure of an above ground tank and spillage into the bunded area. This response plan needs to consider immediate response, and the return to normal operations.

## 9 Tanks

The preferred storage arrangement is a single, gravity fed, buried tank. Multiple below ground tanks, whilst not preferable, are acceptable.

Above ground installations requiring pumped assistance are to be considered on a case-by-case basis considering the risks associated with pump failure, power failure, site security, and overflow conditions – both in the upstream gravity collection catchment and at the storage tanks.

### 9.1 Below ground storage

Below ground tanks are preferred which offer the following benefits:

- A temporary sewage pumping station is not required.
- Tank bunding to mitigate tank overflow and spills is not required.
- Security to protect assets from theft and vandalism is reduced.
- Improved amenity and manoeuvring space for vehicles.

#### 9.1.1 Tank materials

Buried tanks shall be structurally designed including for lateral loading, especially when adjacent tanks, at ground level, are full and the storage tanks are empty.

Various storage tank types may be considered providing due consideration is provided to the effects of hydrogen sulphide gas (H<sub>2</sub>S) and other chemical or biological attack caused by the raw sewage, and the design life is met.

Consideration is to be made to internal linings or coatings for concrete tanks, as well as the longevity requirements for internal fixtures and fittings. These shall, as a minimum, be selected in line with the expected facility design life.

#### 9.1.2 Tank sewage transfer pipes

Sewage transfer pipes between buried tanks shall be minimum DN225 to allow for cleaning. Transfer pipes shall be sized to accommodate the design inflow to the TSSF, to ensure that the flow through the tank(s) is graded to the outlet point(s), and to allow for the minimum velocities/grades for sewerage lines.

Pipework and valves where provided shall be buried, leaving spindles accessible beneath lockable lids where possible. Where above ground pipework and fittings are proposed, then this shall be investigated as part of a Site Security Assessment.

#### 9.1.3 Tank maintenance access

In addition to ventilation requirements, individual tanks should have not less than two maintenance openings, a single DN600 maintenance access point, and DN300 inspection hatch(es) as required.

Maintenance access into a tank should be via the DN600 opening. The DN600 shall have fall protection provided, including an internal safety grid which would be removed only when required.

DN300 inspection hatch(es) shall be provided to aid cleaning of inlets or outlets; ideally, the DN600 and DN300 openings should be opposite each other, and each over an inlet or outlet pipe - to aid its cleaning from the surface.

Tank access should be designed in accordance with TS 0720, with access commensurate to the life of the facility and the safety in design assessment.

## 9.1.4 Sludge management

A suitable solution to deal with sludge settling within tanks is required, for example by designing the shape of the tank base to drain to the discharge point (section 7) and to mitigate build-up of sludge by frequent emptying.

The Designer shall nominate the minimum fall to ensure sludge cleanout is minimised.

## 9.1.5 Buoyancy

Consideration shall be given to the risk of a local water table's impact on buried structures. Structures shall be designed to resist uplift actions caused by high water tables when tanks are empty. Designers shall note that in some cases ground water levels may be seasonal.

Buoyancy mitigation for tanks can be provided by securely attached concrete collars sized to counteract the uplift of the tanks. The water level shall be assessed based on the requirements of each site. Locations subject to flooding or tidal inundation shall account for the water levels expected during design events affecting the site.

## 9.2 Above ground storage

Above ground tanks typically create the need for:

- a. A temporary sewage pumping station to lift the sewage into the storage (or modifications to a future permanent pump station to suit the TSSF)
- b. Tank bunding to mitigate tank overflow and spills
- c. Fencing and security to protect assets from theft and vandalism
- d. Consideration of site amenity and development approvals

The risks associated with above ground tanks include, but are not limited to:

1. Security of above ground assets from theft and vandalism.
2. Loss of power to the temporary lift pumps.
3. Confined spaces.
4. Clean out sludge and debris.

Typically, arrangements where a permanent pump station is part of the wastewater reticulation network lend themselves to an above ground tank solution, as the pump station, electrical supply, and monitoring have already been absorbed in the costs for the site.

Amenity of above ground tanks should be considered as part of the planning and design process, particularly where the tanks are located adjacent residential areas or in high profile locations. Development and buildings approvals may be required and are to be sought by the applicant with evidence of approval provided to SA Water.

### 9.2.1 Tank materials

Above ground tanks are typically poly, GRP, or lined steel tanks as they are resistant to chemical attack by the raw sewage.

Varied storage tank types may be considered providing the interior surface is adequately impervious to the effects of hydrogen sulphide gas (H<sub>2</sub>S) and other chemical or biological attack caused by the raw sewage, and the design life is met. Consideration is to be made to internal linings or coatings for concrete tanks, as well as the longevity requirements for internal fixtures and fittings.

## 9.2.2 Tank transfer pipes

For above ground tanks, the interconnecting pipework, being relatively temporary in nature, should not be buried. This is to aid in maintenance of the connecting lines and in the operation of valves. However, this needs to be balanced against the requirements for security at the site to protect the assets from interference and vandalism together with site safety.

Sewage transfer pipes between above ground tanks shall be minimum DN150.

Transfer pipe materials shall be selected considering:

1. Tank materials.
2. Tank connection details.
3. Valve work.
4. Environmental exposure conditions, including UV degradation and thermal expansion/contraction.
5. Maintenance access for personnel and vehicles.
6. Site security and vandalism.

## 9.2.3 Above ground tank maintenance access

In addition to the requirements stipulated in section 9.1.3, access to above ground tanks shall be made following a risk assessment. Temporary and relocatable scaffolding located onsite may be suitable.

Tank access shall be generally designed in accordance with the requirements of TS 0720.

## 9.2.4 Sludge management

In addition to the requirements stipulated in section 9.1.4, consideration shall be made for flush out points on the above ground tanks to assist in sludge removal.

## 9.2.5 Tank wind resistance

Above ground tanks shall consider the impacts of high winds. These include:

1. Movement (overturning and sliding) especially when empty
2. Buckling when empty or partially filled.
3. Designs shall consider anchoring, restraining, and ballasting the tanks as appropriate to resist movement in high winds.

Designers shall take suitable steps to ensure that the above criteria are assessed and managed appropriately for the life of the facility.

## 10 Alarms, communication and instrumentation requirements

All temporary sewage storage sites facilities connected to the SA Water sewage reticulation network shall be monitored.

The Designer shall liaise with SA Water to confirm the requirements of the monitoring system based on the agreement around operation of the site.

### 10.1 Technology requirements

The system shall be based on IIoT technology to service and provide an A3 availability assurance.

A request shall be submitted to the SA Water Operations (Trade Waste) to define the solution requirements for the monitoring system.

### 10.2 Site infrastructure

SA Water Operations (Trade Waste) will commission, monitor, decommission, and remove the monitoring equipment only at each site at SA Water cost.

The Facility Owner shall provide at each site:

1. Instrumentation Connection paths and conduits back to the site's communications cabinet
2. A communications cabinet and plinth to the satisfaction of SA Water for installation of the instrumentation monitoring equipment and communications devices.
3. Power as agreed with SA Water to operate the communications and monitoring equipment installed at each site.

SA Water shall provide the nominated operational and maintenance service providers with monitoring and alarm telemetry to assist in management of the site.

### 10.3 Multiple storage tanks

If there are two or more tanks, hydraulically connected, the Designer shall carefully consider the implication, in terms of level measurement and alarms, of the location of instrumentation port(s).

The instrumentation connection to the storage tank shall be via a DN150 DWV bolted trap screw cover cast in the vertical plane, penetrating not less than 100mm past the underside of the lid. a plastic tank is being used as the storage, the flange/spigot element may be plastic, as an alternative.

## 11 Tanker fill points

Each TSSF will be provided with the number of tanker fill points to enable operation of the TSSF at ultimate flow. Each fill point shall be designed to:

- a. Be able to operate in parallel with all the other fill points.
- b. Service different tankers.
- c. Not impact on other fill points.

Each tanker fill point shall:

1. Allow the nominated tanker to park clear of traffic and allow safe operation of the fill point by the tanker operator.
2. Not impact on the operation of adjacent fill points when in use.
3. Allow level, safe, and unobstructed access to the nominated fill point by the tanker operators to facilitate connection of the suction pipes.
4. Be safe and secure to allow for operation by the tanker crew in line with the Security Assessment's requirements.
5. Provide a lockable stainless steel DN100 PN16 flanged camlock fitting:
  - a. with dust cap
  - b. placed, in the horizontal plane, at the Outlet/tanker interface point. This shall be located 0.50m to 0.70m above local ground level.
  - c. shall be adequately tied/strutted to the ground using pipe supports to ensure safe and efficient operation of the fitting for the life of the station.
  - d. An HDPE eccentric taper (installed 'flat on top') may be required to transition from DN125 to DN110 immediately upstream of the DN100 camlock.
  - e. The camlock fitting shall be keyed to an SA Water approved lock.
  - f. If the camlock is subject to positive pressures upstream of the fill point such as found in above ground tanks, a gate valve will be fitted upstream of the camlock.
6. Fill point risers shall be protected by bollards spaced to protect the riser from accidental vehicle damage whilst allowing unrestricted access to the camlock by operators.
7. Each fill point shall be designed to operate between:
  - a. Maximum flow rate                      30L/s
  - b. Target flow rate                            20L/s
  - c. Minimum flow rate                        15L/s
8. The Designer shall consider the implications of solutions which preferentially adopt the minimum flow rates to the operational cost of running the facility. This shall be reflected in the number of fill points required at a site and may necessitate an increase in the number of tankers servicing a site.

## 12 Site signage

As a minimum, each facility shall have a clearly visible sign which identifies the following:

- Type of facility.
- Owner/operator details.
- Relevant contact details in case of emergency.
- Hazards such as Confined Spaces.

Refer to TS 0121 for details.

The Facility Owner is responsible for providing adequate and relevant signage.

## 13 Site selection

The TSSF site shall be selected based on topography relative to the collection network, amenity for existing and future residents and businesses and for safe, convenient and unrestricted access for maintenance and operations.

As a guide, for every 100 allotments connected requires 2 to 3 semi-trailer tankers per day or 6 to 7 single unit tankers per day.

### 13.1 Public exposure

Access to the site shall consider exposure of residents to tanker operations within the site and vehicle movements to and from the site. The design shall ensure that a single dwelling has the minimum reasonable number of exposures to tanker operations. Ideally, tankers shall only pass any single dwelling once on its way to access and egress the tanker site.

### 13.2 Design vehicle

The design vehicle selected to service the site shall be based on the information contained in section 4. Unless stated to the contrary, and demonstrated not to be necessary even at ultimate flows, the design vehicle shall be a 19m semi-trailer.

Site access shall be assessed to ensure that the design vehicle can safely and freely access the site with a minimum of impact on the local community.

In the case where a 12.5m vehicle is the design vehicle, a check using a 19m semi-trailer shall be undertaken to allow for emergency access in addition to future maintenance, decommissioning and demolition.

Table 2: Design service vehicles

Vehicle	Austrroads Design Vehicle	Reversing into facility
Maintenance Vehicle	12.5m Single Unit Truck	Assessed via SiD / Road safety audit
<8,000L	12.5m Single Unit Truck	Assessed via SiD / Road safety audit
20,000L	19.0m Prime Mover Semi Trailer	No

### 13.3 Access route

The designer is responsible for ensuring that traffic controls facilitating access to and from the site are suitable for the design life of the facility.

Traffic controls are to be agreed with the relevant road authorities having been given full understanding of the lifespan of the facility and the access requirements required by the facility.

Access to the site should be from an unrestricted constructed public road designed to accommodate the design vehicle.

Traffic controls which may be considered are:

- Parking restrictions on one side of the road to ensure trucks have free access.
- No parking in the vicinity of the site access point to allow for vehicles manoeuvring into and out of the site.
- Indented vehicle bays to allow for passing and holding of tankers.
- Safe pedestrian access whilst tankering in progress.
- No restrictions to access whilst tankering in progress.

The designer shall be responsible for obtaining endorsement and approval by the relevant road authority (local council, DIT, or both) for the proposed TSSF agreeing:

1. Proposed access routes to and from the tankering site (to the arterial road). To minimise disturbance to adjacent properties, it is recommended that this be a one-way access route, so each tanker operation only passes a dwelling once. To reduce risk of obstructed access, tankering sites should not be placed in cul-de-sacs.
2. The location and construction of proposed crossovers and access points at the site. These shall be arranged to allow vehicles to be able to freely access the site
3. The road pavements capacity to accommodate the traffic loads generated by the temporary facility.
4. Proposed hard stands and holding bays as required by the local road authority to facilitate passing of tankers and construction traffic.
5. Parking and signage:
  - a. Consideration for the life of the facility should be made to pavement markings and signage. Designers in their discussions with Council and/or DIT shall consider parking restrictions on the access route to the facility to ensure that roads are not blocked by vehicles legally parked on both sides of the road.
  - b. Consideration during the estate development should also be given to temporary and/or illegal parking of construction traffic.
  - c. Gazetted signage and markings should be in place at the time the facility comes into operation.

## 13.4 Site access

In areas adjacent to residences, or likely to have exposure to pedestrians, cyclists, and local traffic for the life of the facility, access to the site shall ensure that the safety of pedestrians, cyclists, and motorists are a key consideration. Tankers shall be planned; where possible, to drive forwards into and out of the designated filling bay(s).

Consideration should be given to indented tanker bays in; or adjacent to, the road reserve. This is to remove the need for reversing vehicles in residential streets.

Tanker fill bays, constructed similarly to indented bus bays, parallel to the road, may be considered. This will allow trucks to park off the side of the road without allocating unnecessary room to manoeuvring within an allotment. This will also allow the tanker to enter and exit traffic in a safe and predictable manner. This may be discussed with the relevant road authority and council.

Allowance for all fill points to be utilised at the same time, and for tankers to pass each other on site, shall be provided at sites requiring more than one tanker filling operation per hour.

## Manoeuvring

SA Water's preference is for a one-way drive-through access track. This is for safety reasons and is required to accommodate the nominated design vehicle. Where possible manoeuvres shall be completed within the temporary sewage storage facilities site to minimise impact on the public.

Following decommissioning of the TSSF, site access for facilities with a permeant pumping station shall comply with the requirements of the pump station typical drawings and Technical Standard.

Reversing into a TSSF for:

- a. A single unit vehicle may be considered, subject to a road safety audit risk assessment and SID assessment confirming that this is a low-risk solution for the fully operational site. This will only be considered in a low traffic volume and very low pedestrian / cyclist area with a low number of daily vehicle movements. Reversing out of a site will not be accepted.
- b. An articulated vehicle (such as truck and dog, or 19.0m semi-trailer) will not be accepted.

The hardstand area is to be of an adequate width for safe access into and out of the tanker's cab by its driver.

Allowance for all fill points to be utilised at the same time, and for tankers to pass each other on site, shall be provided at sites requiring more than one tanker filling operation per hour.

### 13.4.1 Site access road

Site access roads are roadways off the public road reserves. SA Water must have legal, safe and unrestricted access to and from the TSSF. Site access roads must be well maintained including pavement maintenance and grading, drainage and dust suppression.

Tanker access ways, roadways, holding bays or manoeuvring bays must be all-weather and of a standard that will allow multiple, concentrated vehicle movements without degradation of the pavement surface. Site access roads shall be protected in the event of a 5% AEP flood, except if access is expected to be restricted (including as a result of damage) for more than 8 hours.

#### Pavement

Public road pavements are to be approved with the relevant road authority prior to construction to ensure that maintenance, and access to the nominated roadways is in place prior to operation of the facility.

Pavements are to be designed to accommodate the design vehicle and the number of daily operations for the life of the facility.

The designer shall assess the impact of the site on adjacent land users to determine if a seal is required to manage dust in dry weather, and the tracking of mud onto roadways during wet weather.

## 13.4.2 Documentation

To support the design, the following traffic details should be provided:

1. Swept paths shall be prepared to demonstrate safe and effective manoeuvring is possible to access and egress the site, for the design and check vehicle subject to predictable constraints within the roadside environment.
2. For a site with more than one fill point, show safe passing of tankers to allow free access to all fill points
3. Expected number of operations per day
4. Vehicle access routes originating and terminating at the sub-arterial road servicing the site with movements per day along the access and egress routes
5. Parking configuration at gates
6. Sight lines for vehicles accessing and egressing the site:
  - a. Pavement marking and signage highlighting traffic controls around the entrance to the site, and along the access and egress routes as necessary for the design vehicle.
7. Given the potential large number of vehicle movements and traffic pavement loading, advice from the road authority accepting the proposed access route and manoeuvring requirements at the proposed facility which nominates the movements per day expected and the anticipated facility life is required.

## 13.4.3 Road safety assessment

A traffic engineer should assess the impacts the operation of the TSSF may have on the local road network and community and ensure safe and convenient access is available to the site. This should initially be undertaken as part of site selection or concept design.

If identified via a SID, or requested by SA Water via the audit process, a two-stage process to assess the safety of the roadside environment as a result of the operation of the TSSF will be required. These are a:

- Road Safety Risk Assessment, and
- Road Safety Audit (if required).

### **Road Safety Risk Assessment**

A suitably qualified and experienced Road Safety Auditor to prepare a Road Safety Risk Assessment is required. This risk assessment shall be prepared with the concept design for the site and shall be submitted to SA Water for acceptance with the design. The risk assessment shall determine if a Road Safety Audit is required for the proposed facility, and shall consider:

1. Roadside environment such as speed, traffic, and geometry.
2. Design vehicles accessing the site
3. Access route to and from the site
4. Manoeuvring of vehicles into and out of traffic
5. Manoeuvring of vehicles adjacent to other road users including pedestrians and cyclists
6. Development phasing.

**Road Safety Audit**

If recommended by the Road Safety Risk Assessment, the designer shall engage an independent Road Safety Auditor to conduct a Road Safety Audit in accordance with AGRS06-22, the *Austroads Guide to Road Safety Part 6: Road Safety Audit*. The intention is to identify foreseeable road safety issues and risks which may lead to vehicle collisions because of the facilities design and operation.

A copy of the road safety audit shall be submitted to SA Water as part of the design audit process.

## 14 Site security

The Designer shall obtain details of requirements for site security from SA Water Security ([security@sawater.com.au](mailto:security@sawater.com.au)) by sending the security team relevant details of the proposed TSSF (such as site plans and details), along with Clause 1 of the Security Risk Assessment (SRA) template duly filled out. Refer to TS 0101 for further details.

The requirements specified on the returned security risk assessment shall be provided. It must be used in conjunction with TS 0120 – Electronic Security Systems, and TS 0121 – Installation Standards for Physical Security.

Fencing will be required for sites containing a pump station and may be required for a TSSF.

If fencing and gates are required then the camlock tanker connection and valve could, subject to the risk assessment and design, be brought to a point outside of the fence, subject to hydraulic checks being acceptable, and it shall be lockable and vandal resistant.

Holding bays for tanker vehicles to open and close gates will be required unless automatic gates are provided.

A duplicate copy of keys to locked gates (fencing) is to be provided to SA Water.

## 15 Wash water

Unless required by SA Water, wash water shall not be provided at the tankering site, as the tankers will have on-board water.

The Designer shall ask SA Water Operations whether on-site wash water is required, and whether it is available from the local reticulation network.

If wash water is required on site, a dedicated metered wash water supply is to be provided (with a minimum OD 40mm service). The upstream public water supply shall be protected by an approved backflow prevention device located on the tankering site.

Refer to the SA Water's Sewer Construction Manual (SCM) for typical details. The cage is not required if the backflow prevention assembly is located within a secure (such as fenced) site. More than one connection may be required to service multiple storage tanks. The connection should be up to 10m away from the tank and be able to service the tank's DN600 and DN300 openings for cleaning via hoses.

## 16 Site power

Typically, site power will not be required at a gravity fed below ground tankering site. These facilities do not require power unless there is a security or operational need for lighting or remote monitoring.

For above ground facilities, where a pump set forms part of the installation, assessments for risk, capital cost, and operating cost, shall be carried out by the Designer in consultation with SA Water Operations to establish the site power requirements. Site power options may include:

1. Mains and backup generator connection point
2. Mains and backup generator
3. Generator (standalone) for very short duration facilities
4. Generator and backup generator
5. Generator and backup generator connection point.

For sites supporting a permanent pump station, it is required that the power configuration of the permanent installation be utilised; where possible, to offset the cost of a separate power supply.

If an independent power supply is required in line with the requirements of the Risk Assessment, then this shall be provided appropriate for the temporary nature of the proposed facility and:

- a. compliant with Australian Standards
- b. to offer a safe, secure, and reliable operating environment
- c. For sites with low power requirements, solar and battery or battery only could be used.

## 17 Site lighting

### 17.1 Task lighting

Typically, task lighting shall not be provided at the tankering fill point as the tankers are to have on board task lighting.

Where above ground infrastructure such as valves, pumps, or control panels are required, task lighting shall be determined on a case-by-case basis. Task lighting shall be reviewed in line with the operational requirements and risks identified in the Safety in Design Hazard Register.

### 17.2 Area lighting

Notwithstanding the above, the need for area lighting shall be based on the requirements of the Security Risk Assessment carried out for the site. Areas designated as requiring lighting shall be lit appropriately to achieve security outcomes. Lighting is to be designed to turn off automatically via a timer.

Refer to pump station typical drawings and Technical Standards for sites with pump stations.

## 18 Odour control

The Designer is required to identify a suitable solution for control of odours to meet Environment Protection (Air Quality) Policy requirements. Installations shall be designed to mitigate and minimise odour production to reduce as far as reasonably practicable the need for odour mitigation infrastructure such as Odour Control Units.

The Designer shall apply to SA Water (Treatment Expertise Team) for an Odour Risk Assessment (ORA) to be undertaken, of which the resulting recommendations shall be used in the design.

Potential odour control solutions include:

- Buffer/separation distances from receptors
- Educt vents
- Odour Control Units (Active)
- Chemical Dosing.

Information required to assist in the preparation of an Odour Risk Assessment may include:

1. Location of the proposed TSSF
2. Surrounding land use
3. Proximity to sensitive receptors
4. Facility layout
5. Predicted detention times of sewage within the facility
6. Refer to TG 0531 for background information.

### 18.1 General requirements

The general requirements for all facilities shall be that:

1. The storage shall be fully emptied regularly to prevent septicity and to limit odour
2. Pump out tanker exhaust be captured for treatment before exhaust to the environment.

Storage tanks are to be sealed to prevent uncontrolled odour leakage, but the Designer is to provide appropriate ventilation to control odours and to supply vacuum relief to the tank. If more than one buried tank is to be installed, consideration is to be made for mutual venting such as by DN150 buried pipes (diameter to be confirmed by the Designer) interconnecting the tanks - but set at a level as high as possible above the stored volumes.

If an educt vent is to be installed the Designer shall apply the design as set out in SA Water's SCM.

Depending on staging of the provision of housing, provision of odour control may be required later in the development; if this is the case, the mitigation requirements shall be designed but may be provided later if space is allocated, on site, to safely and efficiently install the infrastructure in the future.

## 19 Temporary sewage pumping station

Where a Sewage Pumping Station is to be permanently part of the network infrastructure at the site, this shall be designed in accordance with SA Water's Typical Drawings and Technical Standards.

Where a Temporary Sewage Pumping Station is required to service the site, this shall be designed to comply with the requirements of this section.

SA Water will not take over the operation of any Sewage Pumping Station (Temporary or Permanent) unless the station meets SA Water's minimum requirements.

If a permanent pump station is required on the site and is to be used to pump to above ground tanks, adjustments to pumps and level sensors and alarms, or alternate pumps may be required. Prior to decommissioning the site, the pump station to be fitted out for final use.

### 19.1 Pump station type

The temporary sewage pumping station shall be a below-ground station with submersible pumps type installed in a specifically designed wet well. Maintenance holes and below ground tanks shall not be used for temporary pump stations.

### 19.2 Temporary sewage pump station design

The design of a temporary sewage pumping stations shall be suitable for the intended design life and cover the following points:

1. Design to accommodate the gradual increase in design flow over the life of the facility. The design shall identify any pump changes or level sensor changes to ensure the pumps and pump station operate within agreed design parameters.
2. Duty / standby pumps designed to TS 0220 for a maximum of 15 starts per hour within manufacturers guidelines.
3. The pumps are likely to experience variable back pressure as the preference is a low-level inlet to the sewage storage tanks to assist in minimising H<sub>2</sub>S stripping. The variable back pressure will be caused by the changing sewage levels in the tanks during sewage pumped transfer.
4. The pressure main is to be sized as per WSA 04 with a minimum internal diameter of 80mm.
5. The minimum pumping rate should be based on a factor of 4.2 x ultimate ADWF (unless agreed otherwise). The start level in the wet-well may be varied over time to account for the increasing incoming flow rates as the development progresses.
6. Provision of pump protections such as low and high-water level sensors/alarms, flow switches, motor over temperature, etc as per sections 10 and 16.
7. Provision of power and backup power as per section 16.
8. A minimum wet well internal diameter of not less than 1.8m.
9. Wet well to, as a minimum, accommodate the selected pumps and station internal furniture.
10. Provision of fall protection and a safe means of removing the pumps or other equipment.
11. Identification of sewage overflows location and paths.

## 20 Decommissioning of temporary sewage storage facilities

The Designer is responsible for considering and planning the transfer of sewage services from the temporary to the permanent solution. The Designer shall prepare a construction staging plan to allow cut-over and commissioning to the permanent solution with minimum impact to customer services levels. This plan shall also identify the construction and connection plans for the permanent solutions, and the demolition plans for the temporary facility and how this will impact on the surrounding site.

SA Water will provide an estimated date for the completion of the permanent solution. The cutover shall be undertaken as soon as reasonably practicable following advice from SA Water that the permanent solution is available. A detailed cutover strategy shall be provided to SA Water for approval prior to the estimated cutover date.

Decommissioning activities shall only be undertaken following completion and commissioning of the new connection point and include a method to safely:

1. Divert flows into the permanent wastewater reticulation system and empty (and clean) storage tanks
2. Flush upstream reticulation mains where inundated as part of the TSSF storage
3. Isolate the TSSF from the permanent wastewater reticulation system
4. Safely demolish the temporary facilities without impacting on the permanent system
5. Provide a list and sequence of activities to facilitate decommissioning and demolition.

The TSSF is to remain in place until the permanent facilities have been installed, commissioned, and are fully operational. This includes the upstream wastewater reticulation network being jetted, flushed and CCTV undertaken as a check for their condition if inundated as part of the TSSF storage. Final decommissioning and remediation will need to account for the transition to connect the reticulation to ultimate infrastructure. Temporary on-site storage, treatment and disposal facilities shall be decommissioned, demolished and the site rehabilitated when it is no longer required.

Permanent pump stations are to be modified as necessary to suit the permanent reticulation system and the approved design and commissioned in accordance with current requirements.

Following connection of the wastewater reticulation to the permanent infrastructure and decommissioning of the site to the SA Water reasonable satisfaction, any SA Water caveats over the land no longer required by SA Water will be removed.

## A Site and operational considerations

This appendix provides suggested guidance for site and operational considerations to be documented as part of effective TSSF management.

### **The following list provides guidance on day-to-day operational considerations**

- Tankering and ensuring tanks are emptied based on agreed program
- Opening and closing and locking of all gates to access the fill point
- Washdown of spilt sewage at the fill point
- Sewer overflows inside the facility
- Odour Mitigation
- Sewer overflows outside the facility (associated with the TSSF)
- Blockages inside the facility or as part of the temporary works
- Blockages and spills upstream of the temporary facility within the SA Water wastewater reticulation network
- Liaison with road authority for access - public Infrastructure
- Managing access to the site including temporary delays (such as roadwork, breakdowns etc.)
- Responding to complaints and emergencies as a result of operations at the TSSF
- Monitoring site alarms (security, pump stations, tank levels)
- Reporting and notifications including spills and emergencies
- Communications and telemetry (joint responsibility)
- Dust suppression and management
- Usage fees - telemetry
- Usage fee - electricity
- Usage fee – water
- Maintain site in a clean, neat and safe condition
- General site safety and condition assessment
- Stormwater clearing debris and blocked lines
- Managing planned and unplanned power outages
- Sludge cleaning and disposal.

### **The following list provides guidance on asset management requirements**

- Electrical services including cables, conduits, switchboards, etc.
- Fences & gates
- Lighting poles, lamps, globes, etc.
- Odour management and control gear
- Pumps and control gear
- Operational valves and pipework
- Internal Roads and pavements (Private Infrastructure)
- Tanks and liners
- Telecommunications gear

- Water services
- Safety and inspection equipment
- Graffiti (removal)
- Damage as a result of sewage collection
- Maintenance of safety equipment
- Adjustments or expansion of the facility (for example temporary pumps and pump station, odour control units etc.) to accommodate the changing / increasing flows arriving at the site
- Decommissioning and cut over.

**The following list provides guidance on inclusions for an operations document**

1. Site information:
  - a. Facility Description
  - b. Facility Site address
  - c. Land Owner
  - d. Facility Owner
  - e. Allotment details or title details including any easements, encumbrances or access rights
  - f. Evidence of legal site access.
  - g. Maintenance Contact: Phone:
  - h. Facility Owner Contact: Phone:
  - i. Tankering Operator Contact: Phone:
  - j. Location of and route to discharge point for tanker's load.
  - k. Address of the location of the discharge point for the tankers.
  - l. EPA licence details for transport of wastewater
  - m. Grid Reference of tanker discharge point.
2. Approvals including:
  - a. Development approval / EPA approval and any conditions.
  - b. SA Water approval and any conditions.
  - c. Landowner approvals and legal agreement.
  - d. DIT / Council support for tanker access routes.
3. Plans including:
  - a. Location plan.
  - b. Wastewater reticulation layout connected to the TSSF
  - c. Nearby existing or proposed sensitive receptors (within 100 metre buffer)
4. TSSF design including:
  - a. Instrumentation details.
  - b. Telemetry details.
  - c. Incoming power supply voltage.
  - d. Connection type and diameter of tank extraction pipe.

- e. Storage tanks and pipework.
  - f. Level monitoring, alarms, telemetry.
  - g. Pumps.
5. Useful Storage volume provided, including contingency storage:
  6. Maximum Equivalent number of residential lots connected or proposed:
  7. Proposed construction staging of the development and release of allotments to market and construction staging (if proposed) of the TSSF:
  8. Emergency Management:
    - a. Lowest point in the network that may overflow.
    - b. Spill response plan including reporting and emergency contacts.
    - c. Location of overflows and provision of safe storage of overflows.
    - d. Power failure.
    - e. Provision of an environmental incident management and emergency response plan including details of roles and responsibilities and including a matrix of twenty-four (24) hour contact information. Identify methods of dealing with spills of sewage that represents a risk to human health or could cause environmental harm.
    - f. Reporting and notification procedure including EPA.
  9. A risk assessment for the proposed temporary sewage storage facility. The risk assessment is to identify risks and propose mitigation measures. Risks may include equipment breakdown (site and tankering vehicles), tankering delays or lack of availability, access issues, significant inclement weather, spill, odour, noise, stormwater and flooding, sludge, damage (accidental and vandalism) and security.
  10. Access and Egress
    - a. A Plan drawing showing the design tanker route from the temporary sewage storage facility site to the discharge point and the return journey.
    - b. Location of fill points within the site and tanker parking location.
    - c. Location of tanker holding off site for sites with multiple tanker collections.
    - d. Manoeuvring into and within the site for single or multiple tankers.
    - e. Maximum vehicle sizes.
  11. Expected hours of operation of the Facility. Hours are generally understood to be daylight hours, but after hours including nighttime work may on occasion be required.
  12. Required scheduled maintenance, including equipment maintenance, desludging and cleaning
  13. Unplanned (reactive maintenance) – for damage, graffiti, equipment failure etc.
  14. Site lighting (if required)
  15. Power requirements, including provision for standby power (if required)
  16. Operations:
    - a. Collection frequency.
    - b. Tanker fill rates – Target 15-25 l/s and flow velocity of 2-3 m/s. Checks to verify that the tankers to be used can provide enough suction to reliably achieve these flow rates and velocities.
    - c. Collection methodology to be followed by tankering operator.
    - d. Wash water system and associated RPZ, if any.

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- e. Security details including fencing and gates. This should be based on the Security Risk Assessment obtained from SA Water (section 14).
  - f. Nuisance minimisation (Noise and odour management / minimisation).
  - g. Emptying stormwater from bunds (if applicable).
  - h. Reporting – volumes collected, site issues.