



Sydney Water Supplement to Pressure Sewerage Code of Australia WSA-07 2007 V1.1

Table of Contents

Revision details		
Introduction4		
Scope	4	
Copyrig WSA-07 Part 0: G Part 1: D	9ht	
1.	GENERAL	
2.	CONCEPT DESIGN	
3.	GENERAL DESIGN	
4.	HYDRAULIC DESIGN	
5.	PRESSURE SEWER DESIGN	
6.	ON-PROPERTY DESIGN	
7.	COLLECTION/PUMP UNITS	
8.	SERVICE CONNECTION PIPE WORK	
APPENDICES		
10. Part 3: C	PRODUCTS AND MATERIALS OVERVIEW	
13.	GENERAL CONSTRUCTION	
14.	PRODUCT AND MATERIALS	
15.	ELECTRICAL WORKS	
16.	EXCAVATION	
17.	BEDDING FOR PIPES AND COLLECTION TANKS	
18.	SYSTEM INSTALLATION AND JOINTING	
19.	PIPE EMBEDMENT AND SUPPORT	
20.	FILL	
21.	INSPECTION AND ACCEPTANCE TESTING	
24. HANDOVER		

26.	LISTING OF STANDARD DRAWINGS	54
Owners	ship	56
Change	e history	56
Append	lices	56
Appendi	ix E - Flow Estimation	57

Revision details

Version No.	Clause	Description of revision
1	N/A	Original Issue
2	Clauses 6.2, 6.5, 6.6, 7.5, 7.6	Minor amendments
3	General	Merge requirements from Sydney Water's <i>Technical Specification – Pressure Sewerage Systems</i> with WSA07 Supplement
		Editorial changes throughout document
	Table 1.1	Insert design life of 25 years for alarm control panel and increase the design life of valves to 50 years as per Sydney Water's <i>Technical Specification - Mechanical</i> .
	2.5, 2.13.2.3	Replace generator connection on a switchboard with means of generator connection
	Table 3.2	Change risk of septicity for wastewater age less than 2 hours to low.
	3.6.6	Provide definition of 1% AEP as per Sydney Water's <i>Climate Change Adaption</i> <i>Guidebook</i>
	4.4.4.1, 4.5.2	Minimum diameter of pressure reticulation sewers to be DN63 as there is no branch saddle connecting DN40 lateral to DN50 pressure sewer available in the market
	4.5.3.4	Minimum velocities to achieve self-cleansing at all times and slime control velocities for a minimum cumulative duration of 15 minutes per day.
	5.5.1	Increase sealing pressure at air valve from 2 m to 5 m as per Sydney Water's <i>Technical Specification - Civil</i> .
	5.7	Change 'consider to install' to 'must be installed' for flowmeter in development with more than 100 properties on a pressure sewer branch to monitor inflow and infiltration.
	5.9	Operating protocol must now include monitoring and control requirements.
	6.3, Appendix B1.2	Install only boundary kits for vacant lots.
	6.6	Increase line-of sight distance of alarm control panel to the collection tank from 10 m to 15m with continuous (no joints) cable length.
		Provide space and power in the alarm control panel to interface with a modem.
	7.3	Reduce headroom over collection tank from 2.5 m to 2.4 m as per Sydney Water's <i>Technical Guidelines - Building over and adjacent to pipe assets</i> .
	8.1	Property discharge line to be within DN75 conduit if it is under driveway as per Sydney Water's Procedure – Pressure Sewerage Systems - Connections and Extensions.

Version No.	Clause	Description of revision	
	24.4	Update provision of maintenance equipment for land development	

Introduction

Sydney Water's Supplement to the WSAA Pressure Sewerage Code of Australia WSA 07-2007 V1.1 details where Sydney Water's requirements differ from WSA 07-2007 V1.1. Requirements from Sydney Water's *Technical Specification – Pressure Sewerage Systems* have been merged with the Supplement to streamline compliance. Requirements from the Supplement will be incorporated into the latest edition of WSA-07 to create a Sydney Water Edition in due time.

Deviation from WSAA Pressure Sewerage Code of Australia WSA 07-2007 V1.1 and this Supplement must be approved in accordance with Sydney Water's Procedure – Deviation from Standards D0001738.

In order to assist the reader, the tables include references and clause numbers, which are presented as they appear in *WSAA Pressure Sewerage Code of Australia WSA 07-2007 V1.1.* Only those clauses where changes have been made are shown in the Supplement. Associated clause headings are also provided for context to the modified clauses. Informative text that note Sydney Water's amendments to the Code are made in bold in this Supplement.

Sydney Water makes no warranties, express or implied, that compliance with the contents of this Supplement is sufficient to ensure safe systems or work or operation.

It is the user's sole responsibility to ensure that the copy of the Supplement is the current version that is in use by Sydney Water.

Sydney Water accepts no liability in relation to the use of this Supplement by any party. Sydney Water excludes any liability which arises in any manner by the use of this document.

For the purpose of this Supplement, 'Sydney Water' is the nominated person or organisation that has written authority to act on Sydney Water's behalf.

This document is uncontrolled once printed or downloaded.

Scope

The scope of this document includes the planning, design and construction of pressure sewerage systems for Sydney Water in its area of operation.

This Supplement is intended for Sydney Water staff, Water Servicing Coordinators, consultant engineers and contractors, that are engaged in the planning, design and construction of Sydney Water pressure sewerage systems and installation of on-property pressure sewerage equipment that will be owned and maintained by Sydney Water.

This Supplement is to be read in conjunction with WSA-07-2007 V1.1 Pressure Sewerage Code of Australia.

Copyright

The information in this document is protected by Copyright and no part of this document may be reproduced, altered, stored or transmitted by any person without the prior consent of Sydney Water.

WSA-07 Preface and Introduction

Code references	Amendments to WSA 07-2007 V1.1
INTRODUCTION	Insert at end of Page 10:
	Drawings and Figures
	In reading this amendment, reference is to be made to Sydney Water version of the WSA 07-2007 standard drawings.
	A suffix 'V' has been added to any WSAA Standard Drawing modified by Sydney Water.
	A suffix 'S' on the drawing number denotes an added or new Sydney Water drawing.
	In the event of inconsistency between details shown in standard drawings compared to figures within the body of the Code, Sydney Water must be consulted to confirm the appropriate interpretation.

Part 0: Glossary of Terms, Abbreviations and References

Code references	Amendments to WSA 07-2007 V1.1		
General	Replace the following terms throughout Code:		
	Current term	New term	
	boundary assembly	boundary kit	
	effluent/ sewage	wastewater	
	pressure sewer system	pressure sewerage system	

Code references	Amendments to WSA 07-2007 V1.1		
I GLOSSARY OF TERMS	Add or update the	following terms:	
	TERM	DEFINITION	
	connection point inspection shaft	A shaft at the connection point to allow inspection and maintenance of the sanitary drain. Also known as connection point inspection opening or inspection opening.	
	alarm control panel	The power and control panel that controls operation of the grinder pump and which contains audible and/or visual alarm components. The panel also contains a dedicated circuit breaker for power disconnection. Also known as control panel.	
	customer sanitary drain	A pipeline installed by a licensed plumber within the property boundary and operated by a property owner to convey sewage from buildings to the connection point; constructed to plumbing code standards; Also called house drain, house service line, house sewer, sanitary connection, property drain, sanitary drain, private wastewater system.	
	design life	The period adopted in design for which a product, equipment or component is required to perform its function within the specified parameters with periodic maintenance but without replacement or major overhaul.	
	pressure sewerage system	A complete system where macerated sewage is conveyed under pressure generated by pumping units located on each property to a sewage treatment facility, or another sewerage system.	
	switchboard	Also known as electrical distribution box	
	trench width	The clear width between the sides of an unsupported trench or the width inside the internal faces of a trench support system.	
	tank breather	Small vent holes provided in the tank lid which allow air to move in and out of the collection tank.	
	burial line	Indication mark embossed on the side of the collection tank. No backfill or landscaping should be placed above this line.	

Code references	Amendments to WSA 07-2007 V1.1			
II ABBREVIATIONS	Add the following abbreviations to the Code:			
	ABBREVIA		INTEPRETATION	
	AC		Asbestos Cement	
	ADWF		Average Dry Weather Flow	
	AEP		Annual Exceedance Probability	
	CDU		Chemical Dosing Unit	
	IICATS		Integrated Instrumentation, Control, Automation & Telemetry System	
	1/1		Inflow and Infiltration	
	PSS		Pressure Sewerage System	
	WHS		Work Health and Safety	
III REFERENCED	Add or rep	lace whe	re applicable the following WSAA Codes:	
DOCUMENTS	WSA 01	WSA 01 Polyethylene Pipeline Code of Australia		
	WSA 02	Sewera	ge Code of Australia Sydney Water Edition	
	WSA 03	Water S	upply Code of Australia Sydney Water Edition	
	WSA 201	Manual	for Selection and Application of Protective Coatings	

Code references	Amendments to WSA 07-2007 V1.1			
III REFERENCED	Insert the following Sydney Water Standards after WSAA Codes:			
DOCUMENTS	SYDNEY WATER STANDARDS AND PROCEDURES			
	D0002293	Sydney Water's Supplement to WSA06 Vacuum Sewerage Code of Australia		
	D0000666	Wastewater Network Planning Guideline		
	CPDMS00023	Technical Specification - Civil		
	BMIS0209	Technical Specification - Mechanical		
	CPDMS0022	Technical Specification – Electrical		
	EPS 500	Engineering Product Specification for Standard Pipes and Fittings for Networks		
	EPS 501	List of Approved Non-Standard Products for Networks		
	1041412	Specification – Management		
	ACP0002	Technical Specification – Chemical Dosing Unit		
	ACP0004	Technical Specification – Odour Control Unit		
	D0001440	Technical Specification - Commissioning		
	D0001441	Specification - Maintenance		
	D0000653	Safety in Design Procedure		
	DD_045774	Sydney Water Pressure Sewerage Systems – Connections and Extensions Procedure		
	CPDMS0021	Computer Aided Drafting CAD Standard for Engineering Drawings		
	D0002092	Position Statement Climate Change Adaptation		
	2999789	Climate Change Adaptation Guidebook		

Part 1: Design

Code references Amendments to WSA 07-2007 V1.1

1. GENERAL

1.2.3 Description of the System		Insert after the first paragraph:				
	Sydney Water only accepts grinder pumps for its pressure sewerage systems. STEP systems are not permitted.					
1.5.3 Design Responsibilities	Rep	lace item (iv) (H) with:				
	(H) odo	locations of cleanouts, flush ur control;	ing points, isolation valves, air valves and			
Table 1.1 NOMINAL ASSET DESIGN LIFE	Insert design life for alarm control panel and increase the design life of valves to:					
		Non-return and air release valves	Alarm control panel			
		50	25			
1.6.2 Objectives of the	Replace items (a), (e), (f), (n) and (o) with:					
System Design	(a) Least life cycle cost with acceptable risk					
	(e) Incorporate system overflow/ pressure relive system in the design while complying with environmental requirements					
	(f) Compliance with WHS requirements					
	(n) The ability to manage wet weather flows					
	(o) Sufficient hydraulic capacity for the ultimate service area of the scheme					
1.6.3	Replace the first sentence with:					
Design OutputThe design outputs must satisfy the requirementSupplement and Sydney Water's project specified		v the requirements of the Code, this 's project specific requirements.				
	Inse	ert in item (a) after 'pipe m	aterials':			
', air valves and odour control facilities'			acilities'			

Code references	Amendments to WSA 07-2007 V1.1			
2. CONCEPT	DESIGN			
2.1 LIFE CYCLE	Replace the first paragraph with:			
CONSIDERATIONS	Pressure sewerage systems must be planned and designed to optimise construction, operation and maintenance costs for the total life cycle of the infrastructure and equipment. The evaluation must also consider community costs (e.g. power costs to the customer) and, where known, environmental impacts and implications.			
	Replace item (f) with:			
	(f) operating and maintenance costs over the life of the system. Operating costs must include energy costs and any costs (such as additional flushing costs) associated with staging of the development.			
2.2 FUNCTIONALITY	Replace item (d) with:			
	(d) Pump design flows across the expected normal operating pressures.			
	Add to the last paragraph:			
	The ability to respond to widespread and lengthy power outages, and to system wide failure, must be evaluated as part of meeting the minimum standard for system functionality.			
2.3 MAINTAINABILITY	Add item (f) to the clause:			
	(f) Install the same pressure sewerage equipment that is used for other properties in a scheme, when the equipment will be owned and operated by Sydney Water. Sydney Water will advise the required brand and model of pressure sewerage equipment to be installed.			
2.4 RELIABILITY	Add at the end of the clause:			
	When planning pressure sewerage systems in areas where there is known power supply unreliability, the availability of dual network power supplies to the area being serviced must be investigated, to minimise the impact of widespread power outages and reliability of the system.			
2.5 DUE DILIGENCE	Replace (d) with:			
REQUIREMENTS	(d) means of connection for a mobile generator; and			

Code references	Amendments to WSA 07-2007 V1.1
2.6 MATERIALS DESIGN	Replace the second paragraph with:
	Sydney Water requires all pressure sewerage system products to comply with EPS 500 – Engineering Product Specification for Standard Pipes and Fittings for Networks or EPS 501-List of Approved Non-Standard Products for Networks.
2.7 STAGING	Replace clause with:
	Staging of the development must be considered during planning and design to ensure that the pressure sewerage system meets the performance requirements of the Code during all stages of development. There could be pipelines with small numbers of connections during early connection stages.
	Where operational flushing is needed to achieve the required performance, the flushing requirements (location, volume, duration and regularity) must be detailed in the planning and design documentation.
	Any other measures adopted to address hydraulic requirements during the staged development, including temporary connections, must be assessed and provided during the planning and design phases.
	The performance of the pressure sewerage system must be reviewed at various stages. The designer must:
	(a) use likely lot connection dates, rather than lot 'release' dates
	(b) coordinate the release of lots with upgrades to downstream wastewater infrastructure
	(c) minimise wastewater detention times and potential impacts on system odour and corrosion
	(d) achieve minimum pipe flow velocities
	(e) minimise dead-end sections of the wastewater system.
2.8.2 Sewage quality/ Trade waste management	Replace the first paragraph with: Any customer with trade waste discharges is required to contact Sydney Water and gain approval, prior to discharge of any trade waste to Sydney Water's wastewater system.

Code references	Amendments to WSA 07-2007 V1.1
2.9 ODOUR CONTROL	Add at the end of clause:
	The designer must provide evidence that potential wastewater odours and control measures have been considered. This include:
	(a) calculations to demonstrate odour generating potential
	(b) proposed ventilation and odour control measures
	(c) impact of any proposed development staging (refer to Clause 2.7).
	During concept design, the odour potential must be determined based on the detention time and Table 3.2 of WSA-07.
	During detailed design, the odour potential must be determined by modelling both sulphide generation and detention time.
	Potential odour control measures include:
	 (a) connecting air valve discharge to a vent shaft or, both a carbon canister and vent shaft
	(b) chemical dosing.
	Where chemical dosing is required, Sydney Water must be consulted to determine the appropriate chemical to use, as well as the method and the location of dosing.
	Chemical dosing units and odour control units must meet the requirements of Sydney Water's <i>Technical Specification - Chemical Dosing Unit</i> and <i>Technical Specification - Odour Control Unit</i> .
2.12.1 General	Insert at the end of clause:
	The design process and outputs must comply with Sydney Water's <i>Safety in Design Procedure</i> .
2.13.2.3 Schedule	Replace item (m) with: (m) Connection for the mobile generator functions correctly.

Code references	Amendments to WSA 07-2007 V1.1
3. GENERAL DESIGN	
3.2 DESIGN TOLERANCES	Replace item (a) with:
	(a) In plan to 0.01 m
	Replace the first sentence of the last paragraph with:
	Horizontal alignment must be referenced to the GDA94 (MGA Zone 56) coordinate system and, where possible, to local property boundaries.
3.6.4 Contaminated Sites	Replace item (a) with:
	(a) Need for site contamination assessment.
	Add item (h) after item (g):
	(h) Limitations, constraints or considerations with respect to the works, identified from enquiries with the Environmental Regulator.

Code references	Amendments to WSA 07-2007 V1.1
3.6.6 Climate Change – New Clause	Insert new clause after Clause 3.6.5:
	3.6.6 Climate Change
	Sydney Water uses Representative Concentration Pathway (RCP) 4.5 (or medium emissions pathway equivalent) as the standard adaptation level. The designer must obtain information on climate risks relevant to the site including flooding, storms, bushfires, heatwaves, and rising sea levels. Refer to Sydney Water's <i>Climate Change Adaptation Guidebook</i> for details.
	1% AEP must be taken from Council mapping using Australian Rainfall and Runoff flood estimation method based on RCP 4.5. In the event where such information is not available and 0.5% AEP is higher than the finished surface level, the designer must carry out a flood study using Australian Rainfall and Runoff method to determine 1% AEP based on RCP 4.5.
	Refer to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for best practice guidance on incorporating climate change implications on rainfall intensity and effects on flood events, (<i>Australian Rainfall And Runoff Climate Change Considerations</i> (DCCEEW, 2024)).
	Where the pressure sewerage system is deemed critical, high value or high risk, the climate risk assessment and 1% AEP must be carried out for RCP 8.5 (or high emissions scenario). Adaptation actions must be identified and implemented during design if they add no additional cost at inception or define pathway for actions if adaptation is required in future (refer to Sydney Water's <i>Position Statement Climate Change Adaptation</i>).
	Seawater ingress from rising sea levels must be considered in addition to 1% AEP flood levels. Refer to Coast Adapt for site specific vertical allowances to account for RCP 8.5, and Sydney Water's <i>Climate Change Adaptation Guidebook</i> .
	Collection tanks must be located so that the top of the tank is a minimum of 300 mm above the 1% AEP level.
3.10 MECHANICAL	Add at the end of item (c):
PROTECTION OF PIPELINES	Installation of all pressure sewer laterals crossing roads must be located within a PN16 PVC or PN16 PE100 conduit with a minimum 50 mm annular clearance.
Table 3.1 CLEARANCES	Add note (6) to Table 3.1:
BETWEEN PIPELINES AND UNDERGROUND SERVICES	(6) Water mains include drinking and recycled water mains.

Code references	Amendments to WSA 07-200	7 V1.1	
3.14 DISUSED OR REDUNDANT PIPELINES	Replace item (a) with:		
	 (a) Pipelines must be designated as 'disused' rather than 'abandoned' pipelines. 		
	Insert items (d) and (e) to the list:		
	(d) Where it is necessary to fill a disuse grout (≤5 MPa) or similar material must	d or redundant pip be used.	peline, low strength
	(e) Where AC pipelines are to be disuse Sydney Water must be sought for any a	ed or made redund dditional requirem	lant, advice from ients.
TABLE 3.2 RISK OF SEPTICITY	Replace Table 3.2 with the table below.		
	Maximum wastewater age*	Risk of septicity	
	Less than 2 hours	Low	
	2 to 8 hours	Medium	
	More than 8 hours	High	
	NOTE: *The weighted average age of the additional indication of the risk of septic	ne wastewater ma ity.	y provide an

Code references	Amendments to WSA 07-2007 V1.1	
4. HYDRAULIC DESIGN		
4.1 INTRODUCTION	Add at the end of clause:	
	Modelling software must:	
	(a) be based on Sydney Water's 'MOUSE' modelling software, used as a planning tool and build the model	
	(b) have functionality to assess pressure sewerage systems - for example, not using an adapted solution based on generic flow/ pressure software	
	(c) be able to model based on various diurnal patterns.	
4.3 DESIGN INPUTS AND	Replace first six paragraphs with:	
OUTPUTS	Hydraulic design assessments must be completed to ensure that the system will deliver acceptable pressures and flows under design flow conditions.	
	Required design inputs include:	
	 (a) Approved design methodology – for example, modelling and/or default pipe sizes for small developments (refer Clause 4.4.4.1) 	
	(b) Wastewater flows as detailed in Appendix E - Flow Estimation	
	(c) Wastewater flow diurnal patterns	
	(d) Wet weather flow allowance as detailed in Clause 4.4.2	
	(e) Pump and alarm control panels to be used for the project	
	(f) Details of the nominated discharge point, including any limitations on the flow rate at the point of discharge	
	(g) Duration of the power outages that will be used for power outage recovery assessments, where historical records cannot be obtained from the local power authority.	
	The hydraulic design must comply with Sydney Water's <i>Wastewater Network Planning Guideline</i> .	

Code references	Amendments to WSA 07-2007 V1.1
	During planning and concept design stages, system analysis must be completed to ensure that the system is robust. System analysis must include assessment of these scenarios:
	(a) Dry weather operation
	(b) Dry weather sensitivity (20% higher and lower flows)
	(c) Wet weather operation
	(d) Power outage recovery
	It is possible that pumps may run against closed valves (intentionally or otherwise). The designer must ensure the wastewater system can withstand the potential pressures associated with this type of event. The assessment must be based on the maximum pressure that the pumps can generate.
4.4.1 Sanitary Flows	Replace clause (including heading) with:
	4.4.1 Wastewater flows
	Wastewater flows must be determined as outlined in Appendix E of this Code and WSA-02 Sewerage Code of Australia Sydney Water Edition for the strategic and concept design.
4.4.2 Infiltration and Inflows	Replace clause with:
	The extent of inflow and infiltration (I/I) into the wastewater system depend on a range of factors, which include:
	(a) compliance of plumbing standards before/during/after construction
	(b) illegal connections
	(c) incorrect stormwater connections
	(d) swimming pool discharge or backwash processes etc.
	The impact of wet weather inflows on the wastewater system's performance must be investigated as part of the design.
	MOUSE modelling must be completed, based on 1% I/I for all types of developments (residential, commercial, industrial etc) as per Sydney Water's <i>Wastewater Network Planning Guideline</i> .

Code references	Amendments to WSA 07-2007 V1.1
4.4.3 Peak flows from	Replace clause with:
homes and required pumping rates	Properties must not connect their stormwater pipes or stormwater drainage to their private sanitary pipes or the pressure sewerage equipment.
	If the Local Government Authority (Council) requests properties to discharge a pool or spa water or backwash into the wastewater system, (rather than the stormwater system), properties must limit discharge flows from their pool and/or spa to less than 0.5 L/s.
	To do this, they must limit the flow by engaging a licensed plumber to install:
	(a) a separate holding tank, or
	(b) an additional pump between the pool or spa and a property drain, or
	(c) a flow limiting valve.
4.4.4.1 General	Add at the end of clause:
	Unless specified otherwise, the probability method can be used for small systems, (maximum 100 EP), and where pipe lengths are no greater than 200 m. The system must have a free discharge to the receiving sewer and the downstream system has adequate capacity.
4.4.4.2 Simplified design flow equation	Delete clause. Not used.
4.5.2 Minimum pipe sizes	Replace second paragraph with:
	Pressure reticulation sewers must be \ge DN 63 for residential, industrial and commercial zones unless Clause 4.5.3.4 requires a smaller size.
4.5.3.1 General	Add at the end of clause:
	Pipe sizes may need to be increased to reduce head loss during wet weather, so that collection tanks do not overflow. Increasing pipe sizes to mitigate the risk of an overflow at the collection tank does not mitigate the need to satisfy other hydraulic requirements.
4.5.3.3 Hydraulic Roughness Values	Replace 'of 0.75' in the first sentence with: 'as per WSA 04 SW Edition Drawing SPS-1608-S'.

Code references	Amendments to WSA 07-2007 V1.1
4.5.3.4 Required flow velocities in pressure sewers	Replace the second and third paragraphs with: All pressure sewers must achieve self-cleansing velocities at all times, and slime control velocities for a minimum cumulative duration of 15 minutes per day. Refer to <i>WSA 04 Sewage Pumping Station Code of Australia Sydney Water Edition</i> for minimum self-cleansing and slime control velocities.
	For pressure sewers considered high risk, the flushing velocity must occur for a sufficient duration to move particles at the lowest point in the pipe to the downstream end. This must occur in a single flushing event at least once a day. Refer to WSA04 Sewage Pumping Station Code of Australia Sydney Water Edition for minimum self-cleansing velocity in inverted syphons for flushing velocity calculation.
	Pressure sewers (with diameters over DN63 or lengths exceeding 100 m) are considered high risk if they:
	(a) cross under rivers, obstructions, or railways, or
	(b) have a 'U' shaped profile.

Code references Amendments to WSA 07-2007 V1.1

5. PRESSURE SEWER DESIGN

5.1.3 Location of Network	Replace item (b) with:	
Systems	(b) as detailed in the <i>Guide to Codes and Practices for Streets Opening</i> (www.streetsopening.com.au).	
5.1.4 Alignment of	Add items (d) and (e) to the list:	
Pressure Sewers	(d) located to avoid 90° bends. Alternatives to 90° bends include:	
	(i) long radius bends for small diameter pipes, or	
	 (ii) two 45° bends with a minimum length of 300 mm straight pipe between them. 	
	(e) designed so that pressure reticulation branch sewers are connected to the pressure reticulation main sewers using electrofusion 45° junctions and long radius electrofusion 45° bends.	
5.2.1 Profile Design	Insert after the first paragraph:	
	Standard minimum pipe cover is as shown on Drawing PSS-1000-V. The depth and alignment of the pressure sewers must be engineered to ensure that the system remains fully pressurised at all times to prevent siphoning and minimise air valves.	
	The designer must consider multi-catchment PSS layouts, or alternative hydraulic control systems, (e.g. barometric loops) to avoid draining down sections of pipework.	
5.3.1 Valves Design	In item (c), replace 'Reflux' with:	
	'Non-return'.	
5.4.1 General	Replace the first sentence with:	
	Isolation valves on pressure sewers must be minimum PN16 and comply with Sydney Water's <i>Technical Specification - Mechanical</i> .	
	Replace 'WSA PS–274' in the last sentence of the third paragraph with: 'Sydney Water's <i>Technical Specification - Mechanical</i> '.	
5.4.2 Isolation Valve	Add items (d) and (e) to the clause:	
Locations	(d) at interconnecting pressure sewers, (excluding property laterals)	
	(e) upstream and downstream of scour valves, when the system volume between the scour points exceeds 9 m ³ .	

Code references	Amendments to WSA 07-2007 V1.1
5.4.3 Isolation Valve Covers and Surrounds	Replace the clause with:
	Buried stop valves must be located in surface boxes, with engraved stainless steel nameplates affixed on the underside of the surface fittings covers as described in Sydney Water's <i>Technical Specification – Mechanical</i> .
	The surface box and top of spindle cap must be orange colour (X15) to AS 2700.
5.5.1 Installation Design	Add at the end of clause:
Criteria	Air release valves must have a minimum 5 m sealing pressure at the valve at all times.
	Equal tees with the same DN size as the pressure sewer must be provided, allowing air to accumulate at these points for effective removal from the pressure sewers. A flange plate must be connected to the tee, with the centre of the flange drilled to suit the size of air valve assembly.
5.5.2 Types	Insert at the beginning of this clause:
	Automatic air release/ vacuum break valves must comply with Sydney Water's <i>Technical Specification - Mechanical</i> .
	Manual air valves are subject to Sydney Water's approval and will only be considered if the valve is specifically used for air movement associated with pipe filling/ draining activities during maintenance.
	Where Sydney Water accepts that manual air valves can be used:
	(a) The valve must consist of an equal tee connection to the pressure sewer, with a vertical riser to a surface fitting.
	(b) All fittings must be grade 316 stainless steel.
	(c) The approved manual air valve must be located in a pit. Flushing point pits with pressure gauge connections may be used where appropriate.
	(d) Adequate clearance around any part of the manual air value, (to the nearest point of the pit), must be provided to permit operation of the value.
	(e) The manual air valve must be no greater than DN25 and have a discharge pipe directed downward towards the floor of the pit.
	Depending on the potential for wastewater odours to be emitted from the air valves, odour control facilities may be required. Refer to Clause 2.9 for details.

Code references	Amendments to WSA 07-2007 V1.1
5.5.4 Locations	Insert at the end of clause:
	In addition to the above requirements, the following factors must be considered in the design and installation of automatic air valves:
	(a) proximity to properties
	(b) venting requirements and the potential of odours that may impact surrounding residents (both existing and potential future residents)
	(c) aesthetics and safety requirements of odour control infrastructure required, including venting and carbon odour filters
	(d) visual impact on the surrounding residents (both existing and potential future residents).
	Vent shafts are required at all automatic air valve locations.
	Where odour treatment is required before air is discharged from the vent shaft, suitably sized carbon canisters with interconnecting pipework between the air valve, canister and a vent shaft must be provided. Refer to Sydney Water's <i>Technical Specification - Odour Control Unit</i> for requirements on carbon canisters.

Code references	Amendments to WSA 07-2007 V1.1
5.6.2 Flushing points and	Replace clause with:
SCOURS	A flushing point must consist of a SS316 pipe, a tapping point on a vertical riser for temporary or permanent transmitter, and a male Camlock connection.
	The flushing point must be installed in a pit with a Class D frame and solid cover. The size of the pit must allow minimum 150 mm between any part of the fitting and the pit, (including the sampling valve), to facilitate maintenance.
	The flushing point must connect to the pressure sewers with two stop valves and a 45° 'Y' junction (if along the length of the pipeline), or a 90° bend (for the end of the pipeline).
	All dead ends of pressure sewers must be provided with end flushing points.
	Flushing points must be provided along the pressure sewers:
	(a) downstream of stop valves, (except where there is a downstream flushing point within 100 m)
	(b) where there is more than one upstream connecting pipe
	(c) at intervals not exceeding 200 m
	(d) upstream of features such as major road, rail or creek crossings
	(e) where flow or pressure measurement is required
	(f) where sampling is required
	 (g) upstream and downstream of a CDU (with pressure transmitters installed at both locations and connected to Sydney Water's IICATS for monitoring)
	(h) as required by Sydney Water.
	Flushing points must not be located within roadways.
	The designer must assess the need to flush the pressure sewers during construction and staged connections to the pressure sewerage system. Flushing points for interim or progressing development must be positioned to allow cleaning of the pressure sewers, to minimise potential blockages and wastewater odours.
	The transmitters and their installation must be in accordance with the Sydney Water's Instrumentation and Control Standards.
	Reference: PSS-1007-V.

Code references	Amendments to WSA 07-2007 V1.1
5.7 FLOWMETERS	Replace from the second paragraph to the end of clause with:
	The flowmeter must comply with the Sydney Water's Instrumentation and Control Standards.
	The designer must consult Sydney Water Operational Technology about the proposed design and location of flowmeters. Flowmeters must not be located at high points.
	Flowmeters (with pressure transmitter connected to IICATS) must be installed to monitor the pressure sewerage system where there are more than 100 properties connected through a pressure reticulation branch sewer to the pressure reticulation main sewer, or where required by Sydney Water.
	The designer must consider to install the flowmeters to monitor the pressure sewerage system where:
	(a) there are commercial or industrial properties, or
	(b) the properties are greater than 1.5 hectares in size, or
	(c) it is required by Sydney Water.

Code references	Amendments to WSA 07-2007 V1.1
5.8 DISCHARGE MAINTENANCE HOLES – New Clause	Insert new clause after Clause 5.7:
	5.8 DISCHARGE MAINTENANCE HOLES
	The pressure sewerage system must connect to a dedicated gravity sewer discharge maintenance hole. No incoming gravity connections, other than the pressure sewer can be made to the discharge maintenance hole. However, if future duplication of the pressure sewer is expected, provisions can be made for it.
	The proposed discharge rate must not exceed two-thirds of the receiving sewer capacity.
	Turbulent discharge of wastewater from the pressure sewerage system into the downstream sewerage system must be avoided. Connection to the discharge maintenance hole must be made by:
	 (a) grading the incoming pipework over a sufficient distance (no less than 6 m), and/or
	(b) increasing the diameter of the pressure sewer so that the flow does not become turbulent when transitioning into gravity flow.
	Pressure sewer drop inlets to discharge maintenance holes are not permitted.
	A vent shaft must be constructed at discharge maintenance hole, where the diameter of the incoming pressure sewer is DN75 or larger. Vent shafts must have a diameter equal to the diameter of the outgoing gravity sewer they ventilate, up to a maximum vent size of DN300. The vent shaft must comply with the <i>WSA-02 Sewerage Code of Australia Sydney Water Edition</i> .
	The discharge maintenance hole, and two downstream maintenance holes, (including the underside of the covers), must be lined with a protective surface coating complying with WSA 201 Manual for Selection and Application of Protective Coatings.

Code references	Amendments to WSA 07-2007 V1.1
5.9 OPERATING PROTOCOL – New	Insert new clause after Clause 5.8:
Clause	5.9 OPERATING PROTOCOL
	Operational protocols must be determined when designing a pressure sewerage system. These protocols must include:
	(a) controlling the operation of the pump/s to reduce peak flows
	(b) proactive pumping prior to wet weather periods, to minimise the impact of wet weather flows downstream
	(c) a wet weather operating protocol, and being able to change operating parameters for properties not experiencing inflow/infiltration
	(d) staged pumping during recovery of power after outages
	 (e) limitation on pumping duration to protect pumps during wet weather periods, or unintended valve closure
	(f) flushing requirements (if required).
	Some of these requirements involve operation of the alarm control panels (refer to Clause 6.6) and remote monitoring and control. Refer to Sydney Water's Instrumentation and Control Standards for details.
	All privately owned pressure sewerage equipment that discharge wastewater to Sydney Water's pressure sewerage system must have remote monitoring capability, compatible with Sydney Water's Instrumentation and Control Standards.

Code references	Amendments to WSA 07-200)7 V1.1		
6. ON-PROPERTY DESIGN				
6.2 CLEARANCES	Add at the end of clause:			
	Electrical equipment, (including alarm points (if any), isolation switches and p the following gas safety clearances:	control panels, g oumps/ collectior	generator conne n tanks), must m	ction aintain
	(a) Minimum of 1 m to any natur	al gas meter; ar	nd	
	(b) Outside gas cylinder hazardo (Table 6.1).	ous area as per	AS/NZS 3000	
	Table 6.1 Gas Cylinder Hazardous A	rea		
	Gas cylinder hazardous area details	Gas cylinder exchanges	Gas cylinder refills	
	Horizontal clearance zone - from the centre of the gas cylinder valve	500 mm	1500 mm	
	Vertical clearance zone - from the top of the gas cylinder valve	500 mm	500 mm	
	Horizontal clearance zone - at ground level from the centre of the gas cylinder	1500 mm	3500 mm	
	For zone of influence requirements, ref <i>Guidelines - Building Over and Adjace</i>	fer to Sydney W nt to Pipe Asset	ater's <i>Technical</i> s.	1

Code references	Amendments to WSA 07-2007 V1.1
6.3 VACANT LOTS	Replace clause with:
	Each vacant lot must be provided with a pressure sewer lateral and boundary kit at the time of constructing the reticulation system.
	Pressure sewer laterals must terminate with the buried property boundary kit, (in chamber), as shown in Figure 6.1. The location of the lateral must be identified with detectable marking tape secured to the boundary kit and terminated near to FSL.
	Collection tanks, pumps, alarm control panels and property discharge lines must not be installed on vacant lots. This equipment can only be installed when:
	(a) the new building or structure is at lock-up stage, and
	(b) a permanent electricity supply is available and connected at the property, and
	(c) after the use of heavy machinery has finished for the main construction of the building or structure.
	The pressure sewerage equipment needs to be protected during construction of new buildings or structures.
6.4 EXISTING PROPERTY	Add item (q) to the list:
DATA COLLECTION	(q) Electrical distribution box material (potential for asbestos). If the electrical distribution box contains asbestos, an Asbestos Management Plan is required for the site.
6.4 DESIGN AND	Add at the end of clause:
LAYOUT OF NEW ON- PROPERTY COMPONENTS	All individual dwellings on a property, (including granny flats), must have their own separate connection point and set of on-property PSS equipment.
	The on-property PSS equipment, including the alarm control panel, must not be behind locked gates. 24 hour unrestricted access must be provided to the on-property equipment.

Code references	Amendments to WSA 07-2007 V1.1
6.6 ALARM CONTROL PANELS (Renamed clause)	Rename the title of this clause to:
	'ALARM CONTROL PANELS'
	Replace the first and second paragraphs with:
	The alarm control panel must be within 15 m and direct line-of-sight of the collection tank, and supplied with continuous (no joints) cable length. A longer distance is allowed if longer cable lengths (no joints) can be supplied.
	The alarm control panel must be attached to the external wall of the main building on the property being serviced, close to the electrical distribution box.
	Where this is not possible, the alarm control panel is to be mounted on a free-standing, fully galvanised post, located within 4 m from the centre of the collection tank.
	The alarm control panel must be installed at a height between 1.2 m and 1.5 m, (measured from the finished surface level to the bottom of the alarm control panel). Alarm control panels and their installation must comply with the current requirements of <i>AS/NZS 3000</i> .
	All gas cylinders/hazardous areas, (including potential zones), must be identified on design drawings. Alarm control panels are not permitted in these zones (Refer to Clause 6.2).
	An IP56 rated, double pole local lockable isolation switch must be installed at a distance no greater than 300 mm from the alarm control panel. The location of the isolation switch must be shown on the property plan.
	The electrical cables, (one for the pump, one for the level sensor and one for the auxiliary float switch where fitted), must be installed in the conduits between the collection tank and the alarm control panel. A 600 mm to 800 mm length of electrical cable must remain inside the tank to facilitate maintenance.
	The electrical cables must be connected to the alarm control panel using the manufacturer's pre-fabricated conduit cable entries, located at the bottom of the alarm control panel. No drilling or modification of the alarm control panel is allowed. Conduits entering the alarm control panel must be of corrugated type with a suitable watertight gland, to prevent moisture entering the alarm control panel.

Code references	Amendments to WSA 07-2007 V1.1
	As a minimum, all alarm control panels must contain pump protection features as follows:
	(a) Pump shut-off due to high pressure.
	(b) Pump shut-off head to be adjustable.
	 (c) Limit continuous pump run time to 15 minutes (approximately 1 day's usage) (adjustable function), and switch off of the pump for 45 minutes (adjustable function) before pump re-start.
	(d) Pump shut-off after three consecutive '15 minute run cycles' in a 3 hour period and raise critical alarm.
	(e) Limit the maximum number of pump starts to 10 per hour (adjustable function).
	(f) Capable of operating via a level controller.
	(g) Equip with CVC mode or flood protection mode.
	(h) Provide space and power in the alarm control panel for interfacing with a modem (by Sydney Water) for telemetry connectivity.
	Refer to Sydney Water's Instrumentation and Control Standards for more details.
	Reference: PSS-1101-V, PSS-1156-S
6.7 SIGNAGE	Add at the end of the clause:
	A Sydney Water approved sticker identifying the property specific asset number and Sydney Water's emergency contact details must be located on the outside door of the alarm control panel.
	Consult Sydney Water for sticker details.

Code references	Amendments to WSA 07-2007 V1.1
7. COLLECT	ION/PUMP UNITS
7.1 GENERAL DESIGN REQUIREMENTS	Insert at the end of clause:
	The tank depth must be sufficient to allow sanitary pipes to be connected, without backup in the pipes, during normal operation.
	Details of the collection tank type, (manufacturer, size and depth), and concrete anchors, must be specified on the design drawings.
	The collection tank must be installed in accordance with the manufacturer's recommended installation instructions.
	A minimum path width of 1200 mm is required at all times to access the collection tank for maintenance. This minimum width needs to take into account gates, water tanks or other structures along the access path.
	There must be a minimum 1 m level clear working area around the outer edge of the tank. The working area must be sloped at a maximum 1% slope away from the tank to prevent ponding.
7.2 EMERGENCY	Include at the beginning of the clause:
STORAGE	Emergency storage volume must be the volume contained in the collection tank and incoming sanitary pipes, from the high level alarm to the lowest ground level at any point of system relief (e.g. overflow relief gully, collection tank vent). A minimum emergency storage of 24 hours is required in the collection tank for residential, commercial and industrial properties.
7.3 LOCATION	Replace second paragraph with:
	The collection tank must be installed in a location and at a level that facilitates effective collection of wastewater from all existing or future private sanitary pipes on a property. This includes existing and future building(s) on the site, as required by current codes and standards.
	Collection tanks must be within 5 m of the front (main) access property boundary.
	Where the collection tank cannot be located at the front of the property, the designer must consult with Sydney Water and demonstrate why the collection tank needs to be located in a different location. The designer is expected to consider regrading of land and the use of terraced lots to overcome this problem.

Code references	Amendments to WSA 07-2007 V1.1
	The location of the collection tank must also comply with the following requirements:
	(a) Minimum of 1 m from the outer edge of the tank to any property boundary.
	(b) Minimum of 1 m from the outer edge of the tank to the edge of driveways and paths.
	 (c) Minimum of 2 m from the outer edge of the tank to building walls, (nearest point of the approved building envelope), or other structures (including retaining walls), to clear the 45° zone of influence on the foundation of the building or structure. This is based on a collection tank depth of 2 m. The minimum distance to be increased for deeper tanks or non-standard installations.
	(d) Minimum 3 m from the outer edge of the tank to the nearest opening window, to facilitate maintenance and minimise noise impacts or odour issues to occupiers.
	(e) Minimum headroom of 2.4 m above the top of tanks. Collection tanks must not be located within or under buildings or other enclosed areas.
	(f) Clear of local ground depressions, flood prone areas, overland drainage paths or in areas which are prone to local flooding.
	The top of the collection tank must be a minimum of:
	(a) 300 mm above 1% AEP (refer Clause 3.6.6)
	(b) 150 mm above finished surface level (includes landscaping).
	Tanks installed before landscaping must ensure the surface level is a minimum of 150 mm below the tank burial line to allow for future landscaping.
	Reference: PSS-1150-S, PSS-1151-S.
7.5 FLOTATION	Replace clause with:
	Empty collection tanks must be designed to prevent floatation with a safety factor of at least 1.5. Design calculations must be based on the ground water level being at FSL.
	This may be achieved with a concrete ballast. Concrete anchor ballast must extend a minimum of 180 mm above the base of the tank, or as per the manufacturer's specifications, (whichever is higher), to achieve the safety factor.

Code references	Amendments to WSA 07-2007 V1.1
7.6 COVERS AND	In first paragraph, replace '150 mm' with:
FRAMES	'300 mm'.
	Replace second paragraph with:
	Ventilation must be provided through the lid so that sewage can fill and empty without causing pressure build-up, or negative pressure in the tank.
	The tank lid must be orientated to locate the vent on the low side of the slope to prevent water from entering the tank. If this is not possible, the supplied tank vent must be sealed and a new vent point positioned near the top of the tank sidewall, with a vent pipe routed to the building wall and up to a vent point above the existing roofline, in accordance with <i>AS/NZS 3500.2</i> .
	Where there are two or more tanks installed on a single lot, each tank lid must be identified with the asset number provided by Sydney Water. The number must be permanently inscribed onto the lid at the time of manufacture and located in a position that can be read after installation.
	The tank lid must be environmental green in colour, lightweight (one person lift), lockable and secured to the tank body in such a way that it cannot be removed without special tools. Removal of the lid from the tank must provide easy access to the pumps and associated equipment.
	In bushfire prone areas, the tank lid must be constructed in, or encased in, a more fire-resistant material. Details of the lid design and materials must be specified on the design drawings.
7.8 GRINDER PUMP (Renamed Clause)	Replace clause (including heading) with:
	7.8 GRINDER PUMP
	7.8.1 General
	A pump with integral grinder unit must be supplied for each pump well.
	The pump must be supplied with all necessary internal pipework, valving (minimum PN16 pressure rating), level sensing equipment and installed as per manufacturer's instructions.
	The pump must be fitted with a permanently fixed lifting chain or equivalent to facilitate lifting. Discharge pipework must not be used as a lifting mechanism.
	As pump unit wear is partially related to the operating pressure, the maximum design head for each pump must be no more than 75% of the manufacturers' recommended maximum normal operating pressure in dry weather. The pump must not operate for more than 15 min continuously or 30 min total in any one day.

Code references	Amendments to WSA 07-2007 V1.1
	The pumps must:
	(a) be current models which have been in successful operation under similar conditions
	(b) be of one make
	(c) be suitable for operating in and transferring raw domestic sewage
	(d) have a maximum speed of 1500 rpm
	(e) have a flowrate not less than 0.45 L/s at maximum design head.
	Chemicals in industrial / trade waste may adversely affect the rubber stators in the pumps causing premature failure. When determining an appropriate pump for properties with potential industrial / trade waste, the designer must consider the impact of this waste on the pump.
	7.8.2 Pump Protection
	As a minimum, the pumps must have the following features:
	(a) Run dry protection.
	(b) Thermal overload protection.
	(c) Over pressure protection via current or voltage sensing.
	(d) Continuous pump run time protection.
	(e) Maximum 10 starts per hour.
	(f) Alarm control panel circuitry inside the pump control panel, (not the motor housing).
	7.8.3 Pump Materials
	The pump materials must be as follows:
	Rotor: Stainless steel 316
	Shaft: Stainless steel 316
	Casing: Cast Iron or Stainless steel
	Stator: Nitrile or Buna-N rubber
	Mechanical Seal: Silicon Carbide: Silicone Carbide

Code references	Amendments to WSA 07-2007 V1.1
	7.8.4 Grinder Units
	The grinder must be a single stage unit installed on the suction side of the pump. The grinder assembly must:
	(a) Have 440 Grade stainless steel rotating and stationary cutters.
	(b) Have rotating cutters positively secured to the pump/motor shaft.
	(c) Be dynamically balanced and operate without excessive noise or vibration over the manufacturer's recommended operating range.
	(d) Be constructed to eliminate clogging and jamming under all normal operating conditions, including starting.
	(e) Be capable of reducing all components in normal domestic sewage, including a reasonable amount of 'foreign objects', such as paper, wood, plastic, glass, rubber and the like, to finely-divided particles that will pass freely through the passages of the pump and the discharge pipework.
	7.8.5 Pump Motors
	Electric motors must be squirrel cage induction type with a low starting current.
	Inherent protection against overloads or locked rotor conditions must be provided with an automatic-reset, integral thermal overload protector incorporated into the motor.
	The electric motor must be a minimum IP68 for permanent submergence to a depth of 6 metres, with an equally rated IP68 cable disconnection that allows for simple plug and play without potential for moisture entry.
	7.8.6 Identification
	Each pump must be fitted with an engraved stainless steel nameplate and attached using stainless steel drive screws. The nameplate must not be painted.
	Nameplate details must include:
	(a) manufacturer's name
	(b) motor kW
	(c) model number
	(d) serial number
	(e) speed
	(f) year of manufacture
Code references	Amendments to WSA 07-2007 V1.1
------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
8. SERVICE CO	NNECTION PIPE WORK
8.1 PROPERTY DISCHARGE	Replace the word '(Optional)' in the first sentence with:
LINE	'(fitted with pressure relief mechanism)'.
	Add at the end of clause:
	The length of the property discharge line must be a maximum of 100 m.
	The property discharge line must not cross on to any adjacent property or collect discharge from any other property. Exceptions will be allowed where the property discharge line crosses a common area, (owned jointly by properties served), such as townhouse developments.
	Where property is accessible only via easement for access, laying the property discharge line through that easement is acceptable.
	If the property discharge line is under a driveway, the property discharge line must be within a minimum DN75 PVC conduit.
	The property discharge line must be a minimum of:
	(a) 450 mm from the property side boundary
	(b) 1000 mm from building walls and structures (excluding fences).
8.2 LATERALS	Add at the end of clause:
	Pressure sewer laterals must only be directly connected to pressure sewers that are less than or equal to DN160. Where connection to a pressure sewer greater than DN160 is necessary, a separate smaller reticulation pressure sewer main, (rider main), will be required to reduce the need to shut off a large pressure sewer main if maintenance is required on laterals or the boundary kit.
	Laterals crossing a retaining wall must be protected by a carrier pipe.

Code references	Amendments to WSA 07-2007 V1.1
8.6 PROPERTY BOUNDARY KIT (New clause)	Insert new clause after Clause 8.5.
	8.6 PROPERTY BOUNDARY KIT
	Property boundary kits must include a ball valve, swing check non-return valve and inspection tee, all in stainless steel 316 and installed in a polyethylene access box. The inspection tee must be fitted with a threaded hex plug that incorporates a pressure relief mechanism or a small screw, to allow slow release of pressure before removing the plug. This is to prevent the plug from rapidly ejecting when under pressure.
	The boundary kit must:
	(a) be minimum of 600 mm to a maximum of 1000 mm from the edge of the boundary kit to both the nearest side and front property boundaries. For battle-axe lots, it must be close to the street.
	(b) be a minimum of 1000 mm from the edge of the boundary kit to the edge of driveways / trafficable areas and paths.
	(c) not be installed in a depression subject to water inundation and silt deposition
	(d) be aligned perpendicular to the pressure sewers
	(e) be installed with two 45° vertical bends upstream and downstream of the boundary kit, to maintain minimum pipe cover for the property discharge line
	(f) be constructed in fire-resistant material if installed in bushfire prone areas. Details of the access box design/materials must be specified on the design drawings.
	(g) be accessible at all times. No landscaping is allowed to cover or bury it.
	Reference: Drawing PSS-1102-V

Code references

Amendments to WSA 07-2007 V1.1

APPENDICES

Appendix A - A3 Required Flow Velocities	Replace 'S is the grade of the pipe in %' with: 'S is the grade of the pipe in m/m'.
Appendix B - B1.1 Easements	Replace clause with: Easements must be obtained in accordance with requirements set out in: (a) Asset Creation Developer Process (b) Instructions to Water Service Co-ordinators (Major Works) Easement Guidelines available at www.sydneywater.com.au
Appendix B - B1.2 Vacant Lots	Replace clause with: The on-property pressure sewerage equipment (alarm control panel, collection tank, pump, electrical lines and pipework), must not be installed until the dwelling is at lock up stage with a permanent electrical supply connection. Only the boundary kit can be installed for vacant lots.
Appendix E (new Appendix)	Add Appendix E - Flow Estimation after Appendix D.

Part 2: Products and Materials

Code references	Amendments to WSA 07-2007 V1.1
10. PRODUC	TS AND MATERIALS OVERVIEW
10.3.3 Constructor	Replace clause with:
	Contractors must use only products that are nominated in the design, Sydney Water's <i>EPS-500 -Engineering Product Specification for Standard</i> <i>Pipes and Fittings for Networks</i> and Sydney Water's <i>EPS-501 - List of</i> <i>Approved Non-Standard Products for Networks</i> .
	Sydney Water will advise if specific pumps, alarm control panels or tanks are to be used for any specific project.
10.7.2 Polyethylene (PE)	Replace clause with:
pipes and fittings	Refer to Sydney Water's <i>Technical Specifications</i> – <i>Civil</i> for PE pipes, fittings, pipe joints and flanges requirements.
	Polyethylene (PE) pipes must be minimum PE100 PN16 with minimum PN16 fittings unless a higher class is specified.
10.7.3 Pipeline Identification	Replace clause including Table 10.2 with:
	PE pipes must have cream stripes and comply with AS/NZS 4130. PE fittings must be black PE100 electrofusion fittings or fabricated fittings suitable for butt welding, complying with WSA PS-208.
	Mechanical fittings are only to be used for connection of property boundary assemblies and must be PE100 complying with WSA PS-208.
10.7.4 PE for directional drilling	Insert at the end of clause:
	Refer to Sydney Water's <i>Technical Specification – Civil</i> for horizontal directional drilling requirements.
	For the horizontal directional drilling section, PE pipes and fittings must be minimum one class higher than the rest of the pipeline rating.

Part 3: Construction

Code references Amendments to WSA 07-2007 V1.1

13. GENERAL CONSTRUCTION

13.5.2 Protection of other services	Replace first paragraph with:
	Prior to excavation, Before You Dig Australia is the initial step for those needing to identify owners and obtain plans of underground assets in the vicinity of a proposed dig site (visit www.byda.com.au). Trace wires must not be relied on for locating services, as some bored services do not have trace wires. Hand excavation, (pot-holing), is recommended to determine the exact location and depth of underground obstructions during design and immediately prior to excavation for laying the mains.
	All underground household services in the vicinity of the construction areas must also be located. This includes any existing sanitary lines, storm water, water supply, electrical, telecommunications and gas.

14. PRODUCT AND MATERIALS

14.2 AUTHORISED PRODUCT AND MATERIALS

Replace clause with:

Only those products listed on Sydney Water's *EPS-500- Engineering Product Specification for Standard Pipes and Fittings for Networks* and *EPS-501 - List of Approved Non-Standard Products for Networks* suitable for use with pressure sewerage systems can be used.

15. ELECTRICAL WORKS

15.1 COMPLIANCE WITH AUTHORITIES, STATUTES, REGULATIONS AND STANDARDS

Insert at the end of clause:

A licenced electrician (subcontracted by Sydney Water accredited constructor to do PSS connections) must check that the dwelling's following electrical works comply with WSA07 Pressure Sewerage Code of Australia, Sydney Water's Supplement to WSA07 and AS/NZS 3000:

- (a) electrical distribution box
- (b) isolation switch
- (c) alarm control panel
- (d) power cable from switchboard to isolation switch, alarm control panel and collection tank
- (e) control cables from alarm control panel to collection tank.

A copy of the certificate of compliance of electrical work to prove that the licenced electrician (subcontracted by Sydney Water accredited constructor

Code references	Amendments to WSA 07-2007 V1.1
	to do PSS connections) has performed the necessary safety checks and relevant photos must be provided to Sydney Water.
15.3 ELECTRICAL	Insert at the end of clause:
DISTRIBUTION BOX	For prior installation of on-property PSS equipment, the Contractor must check:
	 (a) if the electrical distribution box contains any asbestos (if applicable). If the electrical distribution box does contain asbestos, the Contractor must prepare an Asbestos Management Plan for the site.
	(b) that a separate, dedicated residual current device protected circuit has been provided in the electrical distribution box, with a traffolyte label 'PSS Pump Unit'. The size of the circuit must be in accordance with the manufacturer's requirements. This circuit must not be used for other property power supplies.
	(c) that draw wires are installed in all conduits provided and that the conduits are clear of any debris, or other materials. Electrical conduits must be minimum of 500 mm deep, and not share trenches with the house service line or discharge line. Above ground conduits must be mechanically protected with galvanised steel pipes or cover as per Sydney Water's <i>Technical Specification - Electrical</i> .
	(d) the electricity distribution box is connected to a permanent electricity supply.

16. EXCAVATION

16.2 LIMITS OF EXCAVATION	Insert at the end of clause: Minimum trench widths and depths must be in accordance with Standard Drawing PSS-1000-V. Where required, the Contractor must make an allowance for widening of the trench at PE pipe weld locations and for concrete encasement.
16.9 SURPLUS EXCAVATED MATERIALS	Insert at the end of clause: Surplus material and excess spoil must be stockpiled, tested, classified (in accordance with Schedule 1 of the <i>Protection of Environment Operations Act</i> <i>1997</i> and disposed of in accordance with the waste classification requirements.

Code references	Amendments to WSA 07-2007 V1.1
17. BEDDING	FOR PIPES AND COLLECTION TANKS
17.2 BEDDING MATERIALS	Replace clause with: Refer to Sydney Water's <i>Technical Specification – Civil</i> for embedment (including bedding) of pipes.
17.3 PLACEMENT OF BEDDING	Insert after the second paragraph: Keep all dewatering systems operating during backfilling so that no fill material is placed or compacted under water. Ensure that the pipes are not damaged or moved during placement and compaction of fill. Where the pipe is supported on concrete or is concrete encased, do not place overlay material until the concrete has attained its initial set and a minimum of 24 hours after pouring.
	Minimum 75 mm thick gravel bedding must be placed under collection tank. Replace reference drawing with: Reference: Standard Drawing PSS-1000-V

000 - 1/4

18. SYSTEM INSTALLATION AND JOINTING

18.3 PE WELDING PRE- QUALIFICATION	Add at the start of clause:
	All welding must be undertaken by trained and certified welders in accordance with WSA 01 and the manufacturer's welding requirements and recommendations. Training courses must be Plastic Industry Pipe Association (PIPA) approved. Test welds must be conducted at the commencement of the works and at frequent intervals throughout the works for both electrofusion welding and butt welding to confirm both weld procedures and personnel.
	If the PE pipe is to be pulled through HDD bores, electrofusion welding will only be permitted if it can be demonstrated that deformations of the pipe are within the allowable range for electrofusion welding.
18.4 OPEN TRENCH INSTALLATION	Replace the third paragraph with: Where curvature of the pipe is to be achieved by cold bending, cold bend the pipe with a uniform radius along the length of the pipe in accordance with manufacturer's instructions. Refer to Plastics Industry Association of Australia Limited <i>POP202 – PVC, PP, and PE Pipe Installation on Curved Alignment</i> for minimum bending radii. Under no circumstances is the bending radius of a pipe to be less than 25 times the outside diameter of the pipe.

Code references	Amendments to WSA 07-2007 V1.1
	Bends are not to be achieved by using multiple butt welds.
	90° bends must be accomplished by installing two 45° bends with a minimum separation of 300 mm between them, or by installing a long radius bend.
	Minimum pipe cover must be in accordance with Standard Drawing PSS-1000-V.
	Pipe trenches must not be excavated using a chain-trencher unless a minimum trench width of 150 mm is maintained.
	For small diameter (DN40) property pipework connections where pipes are laid in a trench rather than installed using trenchless techniques, an acceptable installation methodology is set out below:
	(a) Excavate 150 mm wide trench using a chain trencher.
	(b) Place bedding and lay pipe (DN40 PN16 PE100) centrally within the trench.
	(c) Backfill with compaction sand in accordance with WSA PS-350 to the sides of pipe. Compact using handheld 'horseshoe' tamper to allow simultaneous compaction of the fill on both sides of the pipe.
	(d) Backfill to minimum required overlay of pipe crown with compaction sand and compact using handheld tamper across entire width of trench.
	(e) Backfill to underside of topsoil level with trench fill and compact using petrol powered rammer with modified narrow foot to complete compaction.
18.6 JOINTING	Replace clause with:
	18.6.1 Electrofusion and Butt Fusion Jointing Methods
	All installation of PE pipe fittings and jointing must be undertaken in accordance with Sydney Water's <i>Technical Specification – Civil and AS/NZS 4129 Fittings for PE Pipes for Pressure Applications</i> . For pipe sizes up to and including DN90, joints are to be of electrofusion type complying with AS/NZS 4129, or flanged connections.
	The weld test requirements for butt and electrofusion welding, including destructive testing, must comply with WSAA Polyethylene Pipeline Code WSA 01.
	For sizes greater than DN90, butt welding or electrofusion jointing must be used. Where butt-welding is used, the internal weld bead must be removed and transition between sizes must be made using tapered connections.

Code references	Amendments to WSA 07-2007 V1.1
	During pipe laying, all open ends of pipes must be capped off to prevent entry of foreign matter into the pipework:
	(a) at the end of each day
	(b) during inclement weather conditions
	(c) where there is a likelihood of water charged soils entering the pipe during periods of non-work.
	18.6.2 Compression Fittings
	Compression fittings are only acceptable for on-property works:
	(a) where the property discharge line connects to the threaded BSP fitting on the external face of the collection tank wall
	(b) on the upstream side of the property boundary kit.
	The pressure rating of the fittings must be PN16 as a minimum, or to match the class of the associated pipework (whichever is higher). The fittings must be installed and tightened to the manufacturers' recommendations.
18.7 THRUST AND	Add at the end of clause:
ANCHOR BLOCKS AND RESTRAINED JOINTS	Refer to Sydney Water's <i>Technical Specification – Civil</i> for thrust block installation.
18.9 ON-PROPERTY	Insert before clause 18.9.1:
ITEMS	For installation of on-property pressure sewerage equipment, the Contractor is responsible for the following activities:
	(a) Pre-installation photographic records.
	(b) Check for plumbing compliance (Clause 18.9.2).
	(c) Check for the dwelling's electrical works (Clauses 15.3).
	(d) Installation of the isolation switch, alarm control panel and electrical cables (Clauses 6.6 and 6.7).
	(e) Installation of the collection tank, pump unit and property discharge line (Clause 18.9.1).
	(f) Obtain certificates of compliance for electrical, and for plumbing and drainage work.
	(g) Test and commission the pump unit as per the manufacturer's instructions (Clause 21.7).
	(h) Restore the site and take post installation photographic records.
	(i) Submit handover documentation.

Code references	Amendments to WSA 07-2007 V1.1
	In performing these tasks, the Contractor is responsible for:
	(a) Managing the delivery of pumps and alarm control panels from the supplier.
	(b) Obtaining all necessary statutory, Workplace Health & Safety and Environmental approvals.
	(c) Completing all pre-installation documentation.
	(d) Preparing and submitting all Work as Executed documentation.
18.9.1 Collection/Pump Units	Add new clauses after '18.9.1 Collection/ Pump Units':
	18.9.1.1 General
	Install the collection/pump units in accordance with the design drawings and the manufacturer's recommended installation instructions.
	To prevent surface water from collecting around the tank, ensure the finished surface level slopes away gradually from the collection tank.
	Prior to pouring of the concrete ballast, the tank must be filled with water to the invert level of inlet pipe, to ensure floatation of the tank does not occur.
	The lid must be on the tank before pouring concrete or backfilling the hole. The tank lid must be orientated to ensure the vent is located on the low side of any slope (Refer to Clause 7.6).
	The tank must not be dropped or rolled at any point during the shipping, unloading, storing, or installation process.
	18.9.1.2 Tank Material
	The tank must be constructed from PE as per WSA 129 – Industry Standard for plastic collection tanks for pressure and vacuum sewers.
	The tank material is sensitive to ultraviolet radiation and must be protected from sunlight during storage and after installation. Only the lids are exposed after installation.
	All metalwork and fasteners within the tank must be stainless steel Grade 316.
	18.9.1.3 Tank Construction
	The tank must:
	 (a) have provisions for lifting and moving such as lifting lugs to allow installation using lifting equipment in areas of minimal access for construction equipment

Code references	Amendments to WSA 07-2007 V1.1	
	(b) be shaped and ribbed to bond well with any concrete or other backfill material	
	(c) be of leak-proof design using proven materials and manufacturing techniques with a design service life of not less than 100 years	
	(d) be benched to minimise sewage retention at pump cut-out and to assist in solids removal	
	(e) be designed (including lid) to withstand a 500 kg live load from a slow-moving vehicle	
	(f) have a 'burial line' mark embossed on the external wall minimum 150 mm from the top of the tank.	
	Except for the pump connection point, the pump must be able to be removed and reinstalled without the need to dismantle any other equipment, or risk damaging any other equipment during the process. It must be possible to properly reinstall the pumps while the tank is near full, but below the level of the pump connection point.	
	The pump connection point must be located as high as possible, and in an easily accessible location.	
	18.9.1.4 Tank Inlet	
	The tank must be delivered as a complete pre-fabricated unit, complete with all connection accessories including factory connected stubs for the discharge pipe and electrical conduits. The gravity inlet connection stub pipe must be site fitted in accordance with the manufacturer's installation instructions, extend no more than 90 mm into tank and be located above the alarm level. It must be PVC pipe (SN8) and have the same diameter as the property sanitary line, but as a minimum DN100.	
	All penetrations must be factory sealed with a watertight seal through the tank wall, including electrical conduits (minimum 2 x DN25), to ensure there is no leakage of groundwater into the tank.	
	The tank penetrations must be sealed on the exterior of the tank with water-repellent silicon sealant, in addition to the manufacturer's requirements, to prevent groundwater infiltration.	
	The gravity inlet pipe must have solvent-welded joints and comply with <i>AS/NZS 3500.2</i> . The gravity inlet pipe must be installed at the same time as the collection tank. The inlet pipe must be securely and firmly supported with stabilized sand (refer WSA PS-352) to ensure no deflection at the inlet pipe/ tank interface.	

Code references	Amendments to WSA 07-2007 V1.1		
	18.9.1.5 Install Pump		
	Prior to installation of the pump, the sanitary line must be flushed, and any debris washed into the collection tank must be removed.		
	Only pipes and fittings provided by the pump manufacturer must be used to make the connection between the pump unit and the discharge connection in the collection tank.		
18.9.2 Customer sanitary	Add at the end of clause:		
drains	The Contractor must undertake a visual inspection to confirm that the property's overflow relief gully complies with <i>AS/NZS 3500.2</i> . This includes checking:		
	(a) That the top of the overflow relief gully is a minimum of 75 mm above the finished surface level.		
	(b) The overflow relief gully is not located in an area that may be inundated by overland water flow.		
18.10 PIPELINE TRACER	Add at the end of clause:		
WIRES AND DETECTABLE MARKING TAPES	The detectable marking tape with a stainless steel 316 tracer wire, (in accordance with WSA PS-318), must be installed a minimum of 150 mm above the top of the pipe.		
	Bare wires from the tape are to be connected by a 316 SS 'U Clamp' to the next available termination feature. Splicing of two ends of tracer wire by hand twisting alone, or "twitching," is not acceptable.		
	Termination points for the tracer wire must be located at in-line fittings and features such as isolation valves, air valves, flushing points, collection tank, property boundary kit, etc and must be readily accessible at these points to allow energising of the trace wire for location purposes. Different tracer tapes are required for pipelines with different uses.		
18.15 LOCATION	Add at the end of clause:		
MARKERS	Location markers are also required where pressure sewers are installed at varying offsets or in locations that may make it difficult to locate the pipes in the future. Location markers are required at changes of direction, valves, fittings and at maximum 200 m centres.		
18.16 CONNECTION TO EXISTING SYSTEM - New Clause	Add new clause after Clause 18.15:		
	18.16 CONNECTION TO EXISTING SYSTEM		
	Refer to Sydney Water's <i>Technical Specification – Civil</i> for connection details to existing pipelines.		

Code references	Amendments to WSA 07-2007 V1.1	
	18.16.1 Live Connections to Existing Pressure Sewers	
	Connections to live pressure sewers must not take place unless approved by Sydney Water.	
	All tappings must be clean with no damage occurring to the surrounding structures.	
	To connect into existing pressure sewers, hot tapping via branch saddle with minimum DN40 offtake must be used. The branch saddle must be an electrofusion polyethene fitting with a tee connection to the side of the main. 90° bend or connection to the top of main is not acceptable. A stop valve must also be located on the branch line at no more than 400 mm from the tee connection.	
	All electrofusion welds must be pressure tested prior to tapping into the existing main. For property discharge lines, installation must be complete prior to pressure testing. This includes the installation of the collection tank, property discharge line, boundary kit and pressure sewer lateral (without the tapping). Only after the pressure testing has passed, can the final tapping into the main proceed.	
	Tapping of the main will be undertaken by drilling through the open bore of the isolation valve with an appropriate tapping machine/too, ensuring no discharge leakage from the existing main. Ensure a clean hole is made through the existing main to form the connection and there is no damage to the existing main.	
	Where a branch saddle for DN50 is not available, the main must be cut in with an electrofusion tee with minimum DN40 offtake. If the main cannot be isolated, squeeze-off method as per WSA07 and WSA01 is acceptable.	
	18.16.2 Connection to Gravity Mains	
	The pressure sewers must discharge to the gravity mains via a discharge maintenance hole.	
	The discharge maintenance hole, and the following two downstream maintenance holes, must be protected from corrosive gases. This must be achieved by lining the maintenance hole, (including cover), with a protective surface coating complying with <i>WSA 201 Manual for Selection and Application of Protective Coatings</i> . Preparation of the surface and application of the coating must be undertaken by qualified and experienced personnel, and in accordance with the coating manufacturer's instructions.	

Code references	Amendments to WSA 07-2	007 V1.1
19. PIPE EMB	EDMENT AND SUPP	ORT
19.2 EMBEDMENT MATERIALS	Replace item (b) <i>with:</i>	
	(b) Comply with Sydney Water's Tec	hnical Specification - Civil.
	In Table 19.1 replace the line:	
	≤100	10
	with	
	≤63	7
	>63 to <100	10

20. FILL

20 FILL	Replace clause with:
	Trench fill and embankment fill must be in accordance with Sydney Water's <i>Technical Specification – Civil.</i>

21. INSPECTION AND ACCEPTANCE TESTING

21.4.2 System test pressure	Add at end of clause:	
	Test the reticulation and property service lines to the manual isolation valve (property boundary kit) to a pressure of 1600 kPa, and from the collection tank to the manual isolation valve at a pressure of 1000 kPa.	
	The details of the system test procedure including the system test pressure and the specific sections to be isolated to allow progressive testing of the system must be detailed in the Commissioning Plan.	
21.7 COLLECTION/PUMP UNITS	Add at the end of clause:	
	All operational tests are to be conducted using potable or recycled water. The tests include, but are not limited to:	
	(a) Liquid leakage test	
	(b) A time-based operational test to confirm pump performance including maximum pump run time limit	
	(c) Liquid levels test (on, off and alarm)	
	(d) A pump protection test (e.g. over pressure protection test)	

Code references	Amendments to WSA 07-2007 V1.1		
(e) Visual Inspection			
	The alarm control panel must be tested for normal operation of the pump and for the alarm modes, including over pressure, maximum run time and maximum starts per hour.		
21.9 ELECTRICAL/ ALARM CONTROL PANEL SYSTEM – New Clause	Insert new clause after clause 21.8: 21.9 ELECTRICAL/ ALARM CONTROL PANEL SYSTEM The following tests must be carried out to ensure correct installation and proper functionality of the electrical/alarm control panel system.		
	Test Items	Method	Acceptance Criteria
	Conduits and cables installed in accordance with AS 3000	Inspect by licensed electrician	AS 3000
	Terminations tight and as per connection diagrams	Inspection and Test	
	Insulation Resistance Supply Cable	500 V Test	>2 Meg ohms
	Insulation Resistance Motor Cable	500 V Test	>2 Meg ohms
	Confirm voltage at pump connection point under load conditions	Voltmeter on Simulation Box	216-264 Volts

Code references

Amendments to WSA 07-2007 V1.1

24. HANDOVER

24. ASSET DOCUMENTATION AND WORK AS CONSTRUCTED DETAILS	Replace clause heading with: 'HANDOVER'.		
24.1 ASSET DOCUMENTATION	Add at the end of clause:		
	Upon receiving acceptance from Sydney Water, the Contractor must provide Sydney Water, as a minimum:		
	(a) Work-as-constructed drawings.		
	(b) Signed Inspection and Test Plan.		
	(c) Signed inspection checklists.		
	(d) Signed testing and commissioning forms.		
	(e) Certificate of Compliance for Plumbing and Drainage Work.		
	(f) Certificate of Compliance for Electrical Work.		
	(g) Asset Management Handover Documentation .		
	(h) Site photos, (to be uploaded to Sydney Water's Maximo system), showing on-property items including sanitary lines, and the pressure sewerage collection tank, boundary kit and alarm control panel.		
	 Written confirmation of delivery of maintenance equipment (if required by Sydney Water) (Refer to Clause 24.4). 		
24.2 WORK AS	Replace first sentence with:		
CONSTRUCTED DETAILS	Work-as-constructed drawings including Property Plan must comply with WSA 02 Sewerage Code of Australia (Sydney Water Edition) and Sydney Water's Computer Aided Drafting CAD Standard for Engineering Drawings.		
	Replace (a) with:		
	(a) Facility number for collection tank		
	Replace (i) with:		
	 (i) Electrical design/ installation plans including locations of alarm control panel, electrical and control cabling, and isolation switch 		
	Add at the end of clause:		
	Where pipelines are installed by directional drilling, the contractor must supply copies of the borehole profiles recorded by the drilling rigs. The borehole profiles must form part of the as-constructed information, recording depths along the main. For property discharge lines, this information is not required.		

Code references	Amendments to WSA 07-2007 V1.1
	If the drilling rig is not equipped with a system for producing these profiles, the contractor must take depth readings to the "sonde" at a maximum of 20 m intervals and include the depths and chainages on the as-constructed information.
24.4 PROVISION OF MAINTAINENCE EQUIPMENT – New clause	Insert new clause after Clause 24.3.
	24.4 PROVISION OF MAINTAINENCE EQUIPMENT FOR LAND DEVELOPMENTS
	As a minimum, the Contractor must provide the following to Sydney Water prior to project handover:
	(a) Electrical setting/diagnostic equipment (one per 50 sets).
	(b) Any specialist tools recommended by the pump, collection tank or alarm control panel manufacturer (one per 50 sets).
	 (c) Complete sets of pressure sewerage system equipment(including collection tank, boundary kits, pump(s), alarm control panel) (10% of the number of sets used on the project).
	(d) Level sensors and assembly (10% of the number of sets).
	(e) Auxiliary float switch (10% of the number of sets).
	The Contractor must deliver these to Sydney Water's Potts Hill office and provide written confirmation of delivery, to be signed off by Commissioning or Operations as part of the handover documentation.

Part 4: Standard Drawings

Code References Amendments to WSA 07-2007 V1.1

26.LISTING OF STANDARD DRAWINGS

Replace list of drawings with:

Drawing Number	Activity	Title	
PRESSURE SEWERA	GE NETWORK		
PSS-1000-V	Embedment and Trench Fill	Typical Arrangement	
PSS-1001-V	Special Embedments	Concrete and Cement Stabilised Systems	
PSS-1002-V	Buried Crossings	Major Roadways	
PSS-1003-V	Buried Crossings	Under Obstructions	
PSS-1004-V	Buried Crossings	Railways	
PSS-1005-V	Typical Valve Installation	Isolation Valve Details	
PSS-1006	Not Used		
PSS-1007-V	Typical Appurtenances	Flushing Point	
PSS-1050-S	Marking Systems	Indicator Plates for Locating Appurtenances	
ON-PROPERTY COMP	PONENTS		
PSS-1100-V	Design Layout	Typical Locality and Site Plan	
PSS-1101-V	On-Property Layout	Typical Arrangement and Sanitary Drainage Detail	
PSS-1102-V	Property Boundary Kit	Typical Installation	
PSS-1150-S	Typical Residential On-Lot	Layout Plan	
	Infrastructure		
PSS-1151-S	Typical Residential On-Lot Infrastructure	Sloping Lots - Tank in Front of Property	
PSS-1152-S	Not Used		
PSS-1153-S	Not Used		
PSS-1154-S	Property Sewerage Servicing	Non-Residential and Non-Standard Residential General Arrangement	
PSS-1155-S	Property Sewerage Servicing	Super Lot Connection Detail	
PSS-1156-S	Alarm Control Panel Support Post	Typical Installation	
PIPELINE LAYOUT			
WAT-1102-V	Typical Mains Construction	Reticulation Main Arrangements	
WAT-1106-V	Property Services	Single Service Main to Meter	
EMBEDMENT / TRENC	CHFILL AND RESTRAINTS		
WAT-1200	Soil Classification Guidelines	Allowable Bearing Pressures for Anchors and Thrust Blocks	
WAT-1205	Thrust Block Details	Concrete Blocks	
WAT-1207-V	Thrust and Anchor Blocks	Gate Valves and Vertical Bends	
WAT-1208-V	Restrained Joint System	DN 100 to DN 375 DI Mains	
WAT-1209	Trench Drainage	Bulkheads and Trenchstop	
WAT-1210	Trench Drainage	Typical Systems	
	_		

Code References	Amendments to WSA 07-2007 V1.1		
INSTALLATION PRACTICES / STRUCTURE			
WAT-1307-V	Typical Appurtenance Installation	Scour Arrangements	
WAT-1312	Aerial Crossings	Bridge Crossing Concepts	
FABRICATION DETAI	LS		
WAT-1409	Hydrant Installation Fittings	PE Assemblies	
HYDRAULIC DESIGN			
SPS-1608-S	Hydraulic Design	Pipe Absolute Roughness Versus Mean Velocity Chart	

Ownership

Role	Title
Author	Pressure System Solutions - Craig Kennedy, Wayne Kennedy
Controller	Nana Keong (Senior Engineer, ETS)
Owner	Norbert Schaeper (Engineering Modernisation Manager, ETS)

Change history

Version No.	Prepared by	Date	Approved by	Issue date
1	Craig Kennedy, Wayne Kennedy (Pressure Sewer Solutions)	18/05/2021	Norbert Schaeper (Manager Engineering, ETS)	18/05/2021
2	Nana Keong	30/06/2021	Norbert Schaeper (Manager Engineering, ETS)	30/06/2021
3	Nana Keong	31/10/2024	Norbert Schaeper (Engineering Modernisation Manager, ETS)	31/10/2024

Appendices

Attachment	Title
Appendix E	Flow Estimation

Appendix E - Flow Estimation

Residential Dwellings

	Residential Development Type						
	Single Dwelling	Single Dwelling plus Granny Flat in a single lot	Duplex/Triplex Dwellings	Terrace lots	Townhouse Development	Unit Development Medium Density	Unit Development High Density
Estimate of Sanitary Flows - ADWF (L/d)	3.5 EP/lot	5 EP/lot	3 EP/dwelling unit	3 EP/dwelling unit	3 EP/dwelling unit	3 EP/dwelling unit	2.5 EP/dwelling
@ 150L/EP/day	Residential Flow Curve (Appropriate residen	tial flow pattern to be adopted)					
Wet Weather Flow Contribution	Refer Clause 4.4.2 of Sydney Water's Supple	ment to WSA-07					
Swimming Pool/ Swim Spas							
Backwash	Assumed to be included in sanitary flows estimation	Not applicable due to size constraints	Not applicable due to size constraints	Not Applicable	Not Applicable	Assumed to be included in sanitary flows es	timation
Discharge pump down	Included in general wet weather allowance					An additional flow equivalent to 0.5 l/s shall weather	be added to the collection tank during wet
Typical Collection Tank Type	Standard Single Tank	Standard Duplex Tank (1 pump)	Standard Single Tank per Dwelling	Standard Single Tank per Dwelling	Development specific design	Development specific design	Development specific design
Storage Size (based on ADWF)	Min 24 hours of Emergency Storage						
Pump Performance ¹	Standard Pump	Standard Pump	Standard Pump	Standard Pump	Generally based on SWC version of WSA- 04. Two Standard Pumps minimum	Generally based on SWC version of WSA- 04. Two Standard Pumps minimum	Generally based on SWC version of WSA- 04. Two Standard Pumps minimum
Operating Volume ²	Designer to determine (nominally 100 L)	Designer to determine (nominally 100 L)	Designer to determine (nominally 100 L)	Designer to determine (nominally 100 L)	Based on minimising volume and limiting pump starts	Based on minimising volume and limiting pump starts	Based on minimising volume and limiting pump starts

Notes

Standard pumps to be identified as part of a assessment/procurement process.
 Control volume between pump start and stop

Non-Residential Dwellings

	Non-Residential Development Type									
	Commercial	High Density Commerceial	Schools	Educational Institutions	Clubs	Hospitals and Nursing Homes	Mixed Commercial/Residential	Light Industrial	Heavy Industrial	Recreational Areas
Estimate of Sanitary Flows - ADWF (L/d)	75 EP/GHa	300-800 EP/ Gha	0.2 EP/student	0.2 EP/student	0.25 EP/max occupants	3.4 EP/bed	Use combined Commercial and Residential	30-50 EP/ GHa	150 EP/GHa	20 EP/Ha
@150L/EP/day	Commercial Flow Curve	Commercial Flow Curve	Commercial Flow Curve	Commercial Flow Curve	Commercial Flow Curve	Hospital Flow Curve	Residential or Commercial Flow Curve, depending on which is dominant	Industrial Curve	Industrial Curve	Commercial or Industrial Flow Curve (dependent on type of reserve)
	Appropriate commercial flow pattern to be adopted based on usage (eg restaurant/café/office) and allowable densities	Appropriate commercial flow pattern to be adopted based on usage (eg restaurant/café/office) and allowable densities	Appropriate commercial flow pattern to be adopted	Appropriate commercial flow pattern to be adopted	Appropriate commercial flow pattern to b adopted	e Appropriate hospital flow pattern to be adopted	Appropriate residential or commercial flow pattern to be adopted, depending on which is dominant	Appropriate industrial flow pattern to be adopted	Appropriate industrial flow pattern to be adopted	Appropriate commercial or industrial flow pattern to be adopted based on proposed facilities
Wet Weather Flow Contribution	Refer Clause 4.4.2 of Sydney Water's Supp	lement to WSA-07				•				
Typical Collection Tank Type	Development specific design		*			÷	-	•	-	
Storage Size (based on ADWF)	Min 24 hours of Emergency Storage									
Operating Volume	Based on SWC version of WSA-04	Based on SWC version of WSA-D4	Based on SWC version of WSA-04	Based on SWC version of WSA-04	Based on SWC version of WSA-04	Based on SWC version of WSA-04	Based on SWC version of WSA-04	Based on SWC version of WSA-04	Based on SWC version of WSA-04	For relatively small facilities (eg flows less than 1000 L/day adopt duplex units, otherwise a specific design is required
Dump Desformance	Dumps to be cominacitius dislacement our	one or opicial on flow /hond characteristics								

Pumps to be semi positive diplacement pumps or equi Pump Performance

Notes:

1. Privately owned units will be required to have monitoring capability so that SWC can remotely access data on agreed basis.



MINIMUM PIPE COVER					
LOCATION	MINIMUM COVER				
PRIVATE PROPERTY					
	450				
NON-VEHICULAR					
LOADING	SEE NOTE 4				
PRIVATE					
PROPERTY	600				
VEHICULAR					
LOADING	SEE NOTE 4				
FOOTWAYS,					
PUBLIC					
PROPERTY,					
SEALED ROADS					
MAJOR ROADWAYS/					
EMBANKMENTS AND	750				
SEALED ROADS					
FREEWAYS, STATE					
& NATIONAL	1200				
HIGHWAYS					

SPRING LINE TRENCH CLEARANCE						
NOMINAL SIZE (DN)	MINIMUM CLEARANCE "Lc" TO AS/NZS 2566.1	"L _b "				
≤75	60	75				
>75, ≤110	70	75				
>110, ≤140	100	75				
>140, ≤ 315	150	100				
≥315	200	100				

TRENCH WIDTH TO BE SUFFICIENT TO SAFELY LAY PIPE AND COMPACT SIDE SUPPORT ZONE (SEE NOTE 5) POCKETS PROVIDED IN BEDDING, AT JOINTS PRIOR TO LAYING PIPES. VOID FILLED DURING PLACEMENT OF EMBEDMENT



Sydney	WITH ACKNOWLEDGMENT TO	APPROVED NORBERT SCHAEPER					PRESSURE SEWERAGE CO
WAT&R	WATER SERVICES ASSOCIATION of Australia	ENGINEERING MODERNISATION MANAGER PREPARED BY					EMBEDMENT AND TREN
COPYRIGHT		ENGINEERING &	B	REVISED TITLE BLOCK	NS	16/09/24	TYPICAL ARRANGEM
STATE OF NEW SOUTH WALES THROUGH SYDNEY WATER CORPORATION. ALL RIGHTS RESERVED		TECHNICAL SUPPORT	A LETTER	DETAILS OF VERSION / AMENDMENT	APP'D	DATE	

NOTES:						
1. ALL DIMENSIC OTHERWISE N	ONS IN MILLIMETRES U IOTED.	INLESS				
2. BEDDING DESIGNER TO CONDITIONS I • IRREGUL/ • ALLOWAE (SEE SEW • BEEN DIS WATER.	SPECIFY SPECIAL BEDDING TO SUIT F TRENCH FLOOR HAS: AR OUTCROPS OF ROCK. BLE BEARING PRESSURE OF <50kPA, /-1200) OR TURBED BY UNCONTROLLED GROUND					
3. KEEP SIDES C 150 ABOVE PIF	PF EXCAVATION VERTI PE.	CAL TO AT LEAST				
4. FOR PRIVATE REDUCED TO WHEN IN ROC	PROPERTY MINIMUM 300 WITH MECHANICA K.	COVER MAY BE L PROTECTION				
5. ALTERNATE T TRENCHING U SHALL BE SUE CONSIDERATI SHOULD ADDF THE EMBEDM	RENCHING TECHNIQU ISING "DITCHWITCH" T BMITTED TO WATER AN ON AND ACCEPTANCE RESS THE METHOD OF ENT SUPPORT ZONE.	IES E.G. NARROW YPE EXCAVATORS GENCY FOR E. PROPOSALS F COMPACTION OF				
6. MATERIAL ANI WITH SYDNEY PRODUCT SPE TAPE WITH SS TOP OF PIPE.	D PRODUCT TO BE IN WATERS EPS500 ACC ECIFICATIONS. DETEC 316 TRACER WIRE MI	ACCORDANCE CEPTABLE TABLE MARKING N 150mm ABOVE				
7. MAXIMUM AGO	GREGATE SIZE 7mm.					
JOINT BEDDING PC	DCKETS IS	- 25-50				
DE WSA 07	NOT TO	SCALE				
CH FILL	PSS-1	000-V				
ENT	ISSUE: B	DATE: 16/09/24				



1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

UNREINFORCED CONCRETE TO BE CLASS N20 AND REINFORCED CONCRETE TO BE N25. FOR AGGRESSIVE CONDITIONS, USE SPECIAL CLASS CONCRETE.

CENTRALLY PLACE STEEL REINFORCEMENT OF 0.4 % OF CONCRETE CROSS SECTION AND WITH MINIMUM COVER OF 65 TO EXTERNAL FACE. SPECIFY REINFORCEMENT FOR APPLICABLE LOADING IN DESIGN DRAWINGS.

CEMENT STABILISED GRANULAR FILL TO HAVE MINIMUM 5 % CEMENT (BY

RESTRAIN PIPES DURING ENCASEMENT TO PREVENT MOVEMENT AND/OR

MATERIAL AND PRODUCT TO BE IN ACCORDANCE WITH SYDNEY WATERS EPS

DDE WSA 07	NOT TO	SCALE
TS =NT	PSS-1	001-V
//S	issue: B	DATE: 16/09/24



Sydney	WITH ACKNOWLEDGMENT TO	APPROVED NORBERT SCHAEPER				PRESSURE SEWERAGE CODE WSA 07	NOT T	O SCALE
WATER	WATER SERVICES ASSOCIATION of Australia	ENGINEERING MODERNISATION MANAGER PREPARED BY				BURIED CROSSING	PSS-	-1002-V
COCOPYRIGHT STATE OF NEW SOUTH WALES THROUGH SYDNEY WATER CORPORATION. ALL RIGHTS RESERVED		ENGINEERING & TECHNICAL SUPPORT	B REVISED TITLE BLOCK A ORIGINAL ISSUE LETTER DETAILS OF VERSION / AMENDMEI	NS NS NT APP'D	16/09/24 16/04/21 DATE	MAJOR ROADWAYS	ISSUE: B	DATE: 16/09/24

NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

2. ADOPT METHODS OF INSTALLATION, AS SHOWN, FOR ALL STATE ROADS, MAIN THOROUGHFARES AND OTHER ROADS WHERE REQUIRED BY THE WATER AGENCY.

REINFORCED CONCRETE CLASS 4 BUTT JOINTED WITH STEEL LOCATING

ANNULAR SPACE (SPACE BETWEEN BOREHOLE & SLEEVE (IF SLEEVED) OR BETWEEN BOREHOLE & CARRIER PIPE (IF NOT SLEEVED) AND GROUTING

WHERE REQUIRED, INSTALL PLASTIC SPACERS AT 1000mm MAX SPACING, IT IS PREFERRED THE OVERCUT DIAMETER DOES NOT EXCEED 30mm. WHEN ANNULUS EXCEEDS THIS LIMIT, GROUT THE ANNULUS (I.E USE A FLOWABLE GROUT, E.G. LIQUAFILL OR BENTONITE OR EQUIVALENT). GROUTING SHOULD COMMENCE AS SOON AS POSSIBLE AFTER PIPE INSTALLATION (TO PREVENT MATERIAL COLLAPSING INTO THE ANNULUS). e. ENSURE GROUTING PRESSURES DO NOT EXCEED THE BUCKLING CAPABILITY

5. INSTALL AIR RELIEF AND ISOLATION VALVES WHERE SHOWN IN DESIGN DRAWINGS.



TYPICAL CREEK, STORMWATER/CULVERT AND BURIED SERVICES CROSSING USING TRENCHLESS TECHNOLOGY



- NOTES:

- DESIGN DRAWINGS.

Sydney	WITH ACKNOWLEDGMENT TO	APPROVED NORBERT SCHAEPER				PRESSURE SEWERAGE CODE WSA 07	NOT TO	SCALE
WATER	WATER SERVICES ASSOCIATION of Australia	ENGINEERING MODERNISATION MANAGER PREPARED BY				BURIED CROSSING	PSS-1	003-V
COPYRIGHT STATE OF NEW SOUTH WALES THROUGH SYDNEY WATER CORPORATION, ALL RIGHTS RESERVED		ENGINEERING & TECHNICAL SUPPORT	B REVISED TITLE BLOCK A ORIGINAL ISSUE	NS NS	16/09/24 16/04/21	UNDER OBSTRUCTIONS	issue: B	DATE: 16/09/24

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

2. DIMENSIONS L1, W, X1, X2, TO BE AS SHOWN IN DESIGN DRAWINGS.

3. WHERE REQUIRED, PROVIDE SCOUR OR PUMP-OUT BRANCH AS DETAILED IN DESIGN DRAWINGS.

4. FOR SIGNIFICANT WATERWAYS AND THOSE SUBJECT TO DREDGING OR NAVIGATION, INCREASE COVER BASED ON CONSULTATION WITH WATERWAYS AUTHORITY.

5. NO JOINTS PERMITTED IN PIPE SECTION UNDER THE OBSTRUCTION WITHOUT WATER AGENCY APPROVAL.

6. INSTALL AIR RELIEF AND ISOLATION VALVES IN ACCORDANCE WITH

7. PROVIDE THRUST RESTRAINTS WHERE PIPEWORK IS CONNECTED TO RRJ PIPEWORK (SEE WAT-1205).



1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

BORED OR JACKED ENCASING PIPE METHOD.

HORIZONTAL BORING.

REINFORCED CONCRETE CLASS 4 BUTT JOINTED WITH STEEL LOCATING BAND, GRP, AS APPROVED BY RAILWAY OWNER.

PE100 WITHOUT JOINTS TO WSA PS-207S JACKING.

REINFORCED CONCRETE CLASS 4 BUTT JOINTED WITH STEEL LOCATING BAND OR GRP, AS APPROVED BY RAILWAY OWNER.

PE100 WITHOUT JOINTS TO WSA PS-207S.

LOCATE ISOLATION VALVES AT LEAST 6 000 FROM TOE OF EMBANKMENT OR TOP OF CUT AND AT LEAST 1000 OUTSIDE RAILWAY PROPERTY.

PLACE MARKERS ABOVE BURIED PIPELINE AT THE POINTS WHERE IT ENTERS AND LEAVES RAILWAY PROPERTY.

PROVIDE ADDITIONAL STRAY CURRENT PROTECTION AS DIRECTED BY RAILWAY OWNER. ELECTRICAL CONTINUITY AND INSULATION TO BE AS SPECIFIED IN DESIGN DRAWINGS.

6. DESIGN TO BE IN ACCORDANCE WITH AS 4799.

MINIMUM COVER FOR ALL PIPELINES BELOW RAILWAY LINES NOT LESS THAN 1600 BELOW RAIL LEVEL; NOT LESS THAN 600 BELOW FORMATION LEVEL

ie THE GROUND LEVEL IMMEDIATELY BELOW THE RAILWAY BALLAST.

ANNULAR SPACE (SPACE BETWEEN BOREHOLE & ENCASING PIPE (IF ENCASED) OR BETWEEN BOREHOLE & CARRIER PIPE (IF NOT ENCASED) AND **GROUTING REQUIREMENTS;-**

GROUTING BETWEEN ENCASING PIPE & CARRIER PIPE IS GENERALLY NOT REQUIRED.

IT IS PREFERRED THE OVERCUT DIAMETER DOES NOT EXCEED 30mm. WHEN ANNULUS EXCEEDS THIS LIMIT, GROUT THE ANNULUS i.e USE A FLOWABLE GROUT, eg, LIQUAFILL OR BENTONITE OR EQUIVALENT). GROUTING SHOULD COMMENCE AS SOON AS POSSIBLE AFTER PIPE INSTALLATION (TO PREVENT MATERIAL COLLAPSING INTO THE

ENSURE GROUTING PRESSURES DO NOT EXCEED THE BUCKLING CAPABILITY OF THE ENCASING PIPE/CARRIER PIPE WHEN EMPTY.

JACKED ENCASING PIPE SIZED TO PERMIT PERSON ENTRY TO CONFINED SPACE FOR MAINTENANCE.

11. ALL DETAILS SUBJECT TO ACCEPTANCE BY RAILWAY OWNER.

PROVIDE SCOUR OR PUMP OUT BRANCH AS DETAILED ON THE DESIGN DRAWINGS. SCOURS TO BE LOCATED OUTSIDE RAIL CORRIDOR.

DDE WSA 07	NOT TO	SCALE
IG	PSS-1	004-V
	ISSUE: B	DATE: 16/09/24



DE WSA 07	NOT TO SCALE
ATION	PSS-1005-V
AILS	ISSUE: DATE: B 16/09/24
AILS	ISSUE: DATE: B 16/09/24





	MAIN SIZE	FLUSHING KIT SIZE
	≤ 125	63 PE TO 50 NB SS 316
NOTE:	140 - 160	90 PE TO 80 NB SS 316
	180 - 225	125 PE TO 100 NB SS 316
ALL FLUSHING POINTS TO BE OFFSET WHERE POSSIBLE TO AVOID VEHICLE LOADING		180 PE TO 150 NB SS 316

Sydney	WITH ACKNOWLEDGMENT TO	APPROVED NORBERT SCHAEPER					PRESSURE SEWERAGE CO
WATER	WATER SERVICES	ENGINEERING MODERNISATION MANAGER					
	ASSOCIATION of Australia	PREPARED BY					ITPICAL APPORTENA
(C)COPYRIGHT		ENGINEERING &	В	REMOVED TOP HAT DIMENSION	NS	16/09/24	FLUSHING POIN
STATE OF NEW SOUTH WALES THROUGH SYDNEY		TECHNICAL SUPPORT	A	ORIGINAL ISSUE	NS	16/04/21	
WATER CORPORATION. ALL RIGHTS RESERVED			LETTER	DETAILS OF VERSION / AMENDMENT	APP'D	DATE	



1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

THE PROCEDURES DETAILED APPLY TO INDICATOR PLATES FOR STOP VALVES, SCOUR VALVES, AIR VALVES AND FLUSHING POINTS.

MARKING OF SURFACE FITTINGS IN AREAS WITH POLES:

PLACE INDICATOR PLATE SUCH THAT IT FACES DIRECTION OF THE APPURTENANCE.

PRIMARY INDICATORS.

PUNCH PRIMARY INDICATOR PLATES WITH TWO SETS OF NUMBERS. TOP NUMBER TO GIVE DISTANCE IN METRES FROM PLATE TO APPURTENANCE AND THE BOTTOM NUMBER TO GIVE NOMINAL SIZE OF MAIN ON WHICH THE APPURTENANCE IS LOCATED.

APPLY SELF ADHESIVE BLACK TAPE TO PLATE BETWEEN THE TWO PUNCHED NUMBERS IF APPURTENANCE IS ON OPPOSITE SIDE OF ROAD TO PLATE. RETURN INDICATOR TAPE AROUND EDGES OF PLATE WHERE PRACTICABLE.

PLACE INDICATOR PLATES 2.1m ABOVE GROUND LEVEL. POSITION INDICATORS ABOVE RATHER THAN BELOW 2.1m IF AN OBSTACLE PREVENTS FIXING AT SPECIFIED HEIGHT. ALL INDICATORS ON ONE POLE TO BE AT ONE HEIGHT.

PUNCH PLATES ON HARD METAL SURFACE WITH 12 HIGH DIE STAMPS BEFORE PLATES ARE ATTACHED TO POLE. TAKE CARE NOT TO PUNCH STAMP THROUGH PAINTED SURFACE OF PLATE TO BARE METAL.

WHERE IT IS NOT POSSIBLE TO USE METAL PLATE INDICATORS, USE APPROVED SELF ADHESIVE INDICATORS.

4. IN AREAS WHERE APPURTENANCE INDICATORS CANNOT BE PLACED ON POLES, PLACE A PRIMARY INDICATOR DIRECTLY OPPOSITE THE APPURTENANCE ON A PROPERTY BOUNDARY FENCE OR FACE OF A BUILDING ON THE PROPERTY BOUNDARY, SUBJECT TO AGREEMENT WITH THE PROPERTY OWNER AND SYDNEY WATER.

5. MARKING OF SURFACE FITTINGS IN AREAS WITH KERBS.

PROVIDE KERB MARKINGS ETCHED ON THE FACE OF NEAREST KERB, DIRECTLY OPPOSITE THE APPURTENANCE. USE LETTERS AS PER INDICATOR PLATES TO INDICATE APPURTENANCE TYPE . "SV" MAY BE MARKED AS "V".

KERB MARKINGS TO BE IN LETTERS OF APPROXIMATELY 100 HIGH, NEATLY CHASED (CUT) INTO KERB AND PAINTED USING AN APPROVED ROAD MARKING PAINT. LETTER GROOVES TO BE AT LEAST 3 DEEP AND 5 WIDE. PAINTED LETTERS TO BE 80 HIGH x 80WIDE x 15 STROKE WIDTH.

DDE WSA 07	NOT TO	SCALE
/IS	PSS-1	050-S
ES ENANCES	ISSUE:	DATE:
	D	16/09/24



PRESSURE SEWER LAID AT STANDARD DEPTH TO PSS-1000-V EXCEPT WHERE OTHERWISE SHOWN.

THIS PLAN SHOWS TYPICAL DETAILS THAT SHOULD BE INCLUDED IN "WORK AS CONSTRUCTED" DRAWINGS. SEE THE WATER AGENCY FOR WORK AS CONSTRUCTED REQUIREMENTS.

- FLUSHING POINT
- ISOLATION VALVE
- PROPERTY BOUNDARY ASSEMBLY
- COLLECTION TANK
- MAIN SWITCH BOARD
- - PUMP CONTROL / POWER CABLE
 - PRESSURE RETICULATION SEWER / LATERAL CONNECTION POINT
 - PRESSURE RETICULATION SEWER
 - PRESSURE SEWER LATERAL
 - PROPERTY DISCHARGE LINE

DDE WSA 07	NOT TO	SCALE
г	PSS-1	100-V
SITE PLAN	ISSUE:	DATE:
	B	16/09/24





|--|

ITEM	DESCRIPTION	QTY	MATERIAL	COMMENTS
1	BALL VALVE	1	SS 316	FULL BORE, FITTED WITH VALVE KEY SPINDLE
2	INSPECTION TEE	1	SS 316	FITTED WITH HEX PLUG AND PRESSURE RELIEF MECHANISM
3	NON RETURN VALVE	1	SS 316	SWING CHECK TYPE

- SPECIFICATIONS.
- GRADED AWAY FROM LID.
- WSA-07.
- 6.

Sydney	WITH ACKNOWLEDGMENT TO	APPROVED NORBERT SCHAEPER					PRESSURE SEWERAGE CO
WATER	WATER SERVICES ASSOCIATION of Australia	ENGINEERING MODERNISATION MANAGER PREPARED BY					PROPERTY BOUNDARY
COCOPYRIGHT		ENGINEERING &	В	REVISED TITLE BLOCK	NS	16/09/24	TYPICAL INSTALLAT
STATE OF NEW SOUTH WALES THROUGH SYDNEY WATER CORPORATION. ALL RIGHTS RESERVED		TECHNICAL SUPPORT	A LETTER	ORIGINAL ISSUE DETAILS OF VERSION / AMENDMENT	NS APP'D	16/04/21 DATE	



1. BOUNDARY KIT TO BE INSTALLED IN 'NON-TRAFFICABLE' AREA.

2. ENSURE THAT LID OF BOUNDARY KIT IS MARKED AS SHOWN. WHERE THE WARNING/NAME PLATE IS NOT CAST OR MOULDED INTO THE LID AFFIX AN ENGRAVED SS NAMEPLATE USING SS FASTENERS.

3. PREPARE BEDDING UNDER BOUNDARY KIT TO SYDNEY WATER TECHNICAL

4. INSTALL BOUNDARY KIT 10mm PROUD OF SURFACE SO THAT FSL CAN BE

5. TEST ASSEMBLY AND CONNECTING PRESSURE SEWERS HYDROSTATICALLY AFTER INSTALLATION IN ACCORDANCE WITH PRESSURE SEWER CODE

ALL PRESSURE PIPEWORK ITEMS TO BE PE100 PN 16.

7. ALL STAINLESS STEEL VALVES & FITTINGS TO BE GRADE 316, MIN PN16.

8. ALL PE JOINTS TO BE ELECTROFUSION WELDED.

9. CONNECTION FROM STREET MAINS TO BOUNDARY KIT TO BE AT 90°

DDE WSA 07	NOT TO	SCALE
	PSS-1	102-V
ΓΙΟΝ	issue: B	DATE: 16/09/24

NOTES:



GER				
	В	REVISED TITLE BLOCK	NS	16/09/24
г	Α	ORIGINAL ISSUE	NS	16/04/21
	LETTER	DETAILS OF VERSION / AMENDMENT	APP'D	DATE



- LOCALISED FILLING AROUND TANK AND BOUNDARY KIT TO BURIAL LINE

BOUNDARY KIT

BURIAL LINE MARK ON WASTEWATER TANK TO COINCIDE WITH FINISHED TOP LEVEL OF RETAINING WALL

FINISHED LOT LEVEL AROUND TANK APPROX 150mm BELOW BURIAL LINE (BY DEVELOPER) - SEE NOTE 1

- RETAINING WALL - SEE NOTE 5 AND 6

WASTEWATER COLLECTION TANK

- SEE NOTE 5

WASTEWATER COLLECTION TANK

APPROX 200 PROPERTY DISCHARGE MAIN

BOUNDARY KIT

- PRESSURE SEWER LATERAL

WHERE TANK RISERS ARE FITTED, FINISHED LOT LEVELS SHALL BE ADJUSTED TO SUIT RISER DEPTH. FINISH LOT LEVELS (BY DEVELOPER) ARE PROVIDED TO ALLOW FLEXIBILITY IN

WHERE THERE ARE TWO RETAINING WALLS AT DIFFERENT LEVELS THE SHALLOWER OF THE

DIAGRAMS ARE INDICATIVE ONLY. RETAINING WALL AND BATTER DETAILS SHALL COMPLY WITH RELEVANT LOCAL COUNCIL REQUIREMENTS, CODES & WHS REQUIREMENTS. BATTER

4. SLEEVE PIPE: PN16 PVC OR PN16 PE100. INTERNAL DIAMETER TO ENSURE MIN 30mm

MIN DISTANCE TO WALL BASED ON COLLECTION TANK OF 2m DEPTH AND SHOULD BE

SEE SYDNEY WATERS TECHNICAL GUIDELINES - BUILDING OVER AND ADJACENT TO PIPE ASSETS, INCLUDING ZONE OF INFLUENCE REQUIREMENTS IF RETAINING WALL IS

DE WSA 07	NOT TO	SCALE
DN-LOT E	PSS-1	151-S
OPERTY	issue: B	DATE: 16/09/24




ESSURE SEWER MAIN		
DDE WSA 07	NOT TO	SCALE
ERVICING	PSS-1	155-S
AIL	ISSUE: B	DATE: 16/09/24

PROPERTY

LOCATE NEAR MOST APPROPRIATE PROPERTY CORNER BOUNDARY

ROADWAY

- LOCATE NEAR MOST APPROPRIATE PROPERTY CORNER BOUNDARY - SEE FIGURE 1



TO UNDERSIDE OF CONT	ROL PANEL	
	CKING PLATE - 6mm T ELDED TO POST - SIZE	HICK, TO SUIT
DDE WSA 07	NOT TO	SCALE
RT POST	PSS-1	156-S DATE: 16/09/24



1. ALL DIMENSIONS IN MILLIMETRES.

2. INSTALL PIPEWORK PARALLEL TO PROPERTY BOUNDARIES.

3. STAINLESS STEEL AND FBE COATED TAPPING BANDS DO NOT REQUIRE ADDITIONAL CORROSION PROTECTION.

4. WRAP BOLTED CONNECTIONS USING OTHER THAN FBE COATED FITTINGS AND STAINLESS STEEL BOLTS WITH A PETROLATUM TAPE SYSTEM IN ACCORDANCE WITH WAT-1313.

5. DUCTILE IRON FITTINGS SHALL BE USED WITH DI & PVC PIPE. FITTINGS MAY BE FBE COATED AND LINED OR CEMENT LINED WITH A BITUMINOUS EXTERNAL COATING.

6. PE SLEEVING REQUIRED ON ALL BITUMINOUS COATED DI PIPE AND FITTINGS APPLIED IN ACCORDANCE WITH AS 3681. TWO THICKNESSES REQUIRED BETWEEN FITTINGS AND THRUST BLOCK. REINSTATE ANY DAMAGED SLEEVING AS PER MANUFACTURER'S SPECIFICATIONS.

7. USE PRE-TAPPED CONNECTORS ON DN 100 & DN 150 NEW MAIN INSTALLATIONS (UNLESS SPECIFIED OTHERWISE BY SYDNEY WATER).

8. USE TAPPING BANDS FOR CONNECTIONS TO EXISTING MAINS AND NEW MAINS >DN 150.

9. ELECTRICALLY ISOLATE COPPER SERVICES FROM DICL PIPE.

PVC PIPES SHALL BE MINIMUM PN16 (UNLESS SPECIFIED OTHERWISE BY SYDNEY WATER)

11. TAPPING BANDS ON PVC PIPE TO BE FULL CIRCLE CLAMPING.

12. MAXIMUM SIZE OF DRILLED HOLES FOR SERVICE CONNECTIONS IN PVC PIPE TO BE 30% DN OR 50 (LOWER VALUE TO BE USED) LARGER HOLES CAN BE USED FOR UNDER PRESSURE CUT IN CONNECTIONS.

13. DIRECT TAPPING OF >DN 200 DICL MAY BE AUTHORISED BY WATER AGENCIES

14. PE PIPES SHALL BE MINIMUM PN16 (UNLESS SPECIFIED OTHERWISE BY SYDNEY WATER).

15. PE PIPE MAY BE COLD BENT TO MINIMUM RADIUS OF 25 x (OD). STAKES OR OTHER SOURCES OF POINT LOADS SHALL NOT BE USED TO ASSIST IN BENDING THE PIPE.

MAKE ALLOWANCE DURING CONSTRUCTION FOR EXPANSION AND CONTRACTION OF PE PIPE DUE TO TEMPERATURE CHANGES.

17. BUTT WELDING IN ACCORDANCE WITH WSA-01 (POLYETHYLENE CODE). BUTT WELDING IN TRENCHES IS NOT PERMITTED.

18. ALL MECHANICAL COUPLINGS TO BE SELF-RESTRAINING.

-03	Sydney	<u>WAT&R</u>
I NTS	WAT-1102	
	ISSUED 2012	VERSION 3



PREPARING THE TEST AREA:

CONDUCT ALL NATIVE SOIL IDENTIFICATION TESTS ON A FRESHLY EXPOSED, DAMP, HAND-TRIMMED AREA OF THE TRENCH WALL IN THE PIPE ZONE. TAKE CARE THAT THE SOIL IN THE EXPOSED TEST AREA IS NOT COMPACTED OR LOOSENED DURING TRENCH EXCAVATION. IF THE SOIL IN THE TRENCH FLOOR AND WALL IS VERY DRY AT THE TIME THE TRENCH IS OPENED THEN FLOOD THE TEST AREA AND ALLOW TIME FOR THE WATER TO BE ABSORBED BY THE SOIL BEFORE IT IS TRIMMED AND TESTED.

IDENTIFYING CLAY SOILS:

A LUMP OF CLAY SOIL WILL BE DIFFICULT TO BREAK WHEN DRY. IT WILL BE STICKY AND NEED SOME EFFORT TO MOULD WITH THE FINGERS WHEN WET. CLAY WILL NOT WASH OFF EASILY. INDIVIDUAL CLAY PARTICLES ARE HARD TO SEE.

TESTING CLAY SOILS:

CLAY SOILS ARE BEST TESTED IN THE WALL OF THE TRENCH. THE FIST, THE THUMB OR THE THUMBNAIL ARE USED TO DETERMINE THE CONSISTENCY (STRENGTH) OF THE CLAY (SEE TABLE.)

IDENTIFYING CLEAN SAND SOILS:

THE INDIVIDUAL GRAINS OF SAND WILL BE VISIBLE TO THE EYE. A LUMP OF CLEAN SAND, IF IT CAN BE PICKED UP AT ALL, WILL CRUMBLE WITH VERY LITTLE EFFORT. CLEAN SAND WASHES OFF EASILY.

TESTING CLEAN SAND SOILS:

CLEAN SAND SOILS ARE BEST TESTED IN THE FLOOR OF THE TRENCH BY PUSHING WITH THE WHOLE BODY WEIGHT ON ONE FOOT. THE DEPTH OF THE DEPRESSION LEFT BY THE BOOT IS RELATED TO THE DENSITY OF THE SAND (SEE TABLE). TAKE CARE TO ENSURE THAT THE SAND IN THE TRENCH FLOOR WAS NOT COMPACTED OR LOOSENED DURING THE EXCAVATION OF THE TRENCH OR THE TRIMMING OF THE TEST AREA.

TESTING ROCK:

THE RECOMMENDED FIELD IDENTIFICATION TESTS FOR ROCK RELY ON OBSERVING THE EASE WITH WHICH THE ROCK CAN BE DUG WITH A PICK, AND ESTIMATING THE SPACING OF THE JOINTS IN THE ROCK. (JOINTS ARE COMMONLY CALLED CRACKS OR BREAKS). THE SPACING BETWEEN JOINTS IS IMPORTANT BECAUSE THE ALLOWABLE BEARING PRESSURE ON ROCK IS USUALLY CONTROLLED BY THE JOINTS IN IT, RATHER THAN THE INHERENT STRENGTH OF A FRAGMENT OF ROCK. JOINTS MAY BE TIGHTLY CLOSED (LIKE HAIRLINE CRACKS), BUT CAN ALSO BE OPEN (FILLED WITH AIR) OR FILLED WITH SOFT CLAY OR OTHER SOIL.

SOI	_ CLASSIFICATION	FIELD IDENT
SOILS	VERY SOFT	EASILY PENETRATED 4
	SOFT	EASILY PENETRATED 4
	FIRM	MODERATE EFFORT NE 30 mm WITH THUMB.
СLAY	STIFF	READILY INDENTED WIT PENETRATED ONLY WIT
U	VERY STIFF	READILY INDENTED WIT
	HARD	INDENTED WITH DIFFIC
(0)	LOOSE CLEAN SAND	TAKES FOOTPRINT MOI
SANDS	MEDIUM-DENSE CLEAN SAND	TAKES FOOTPRINT 3 n
	DENSE CLEAN SAND OR GRAVEL	TAKES FOOTPRINT LES
ROCK	BROKEN OR DECOMPOSED ROCK	DIGGABLE. HAMMER BL JOINTS (BREAKS IN RO THAN 300 mm APART
	SOUND ROCK	NOT DIGGABLE WITH P HAMMER BLOW "RINGS JOINTS (BREAK IN ROO THAN 300 mm APART
	UNCOMPACTED FILL DOMESTIC REFUSE	OBSERVATION AND KN OF THE SITE HISTORY.

LEGEND

🔺 AHBP	ALLOWABLE HORIZONTAL BEARING PRESSURE FO
	– 10 mm MOVEMENT.
	- CENTRE OF THRUST 800 mm BELOW THE NA
	– HIGH WATER TABLE.
*	SPECIAL GEOTECHNICAL ASSESSMENT REQUIRED



ADDITIONAL INFORMATION PROVIDED IN WAT-1200 SERIES COMMENTARY

FICATION TEST	AHBP kPa 🔺
0 mm WITH FIST.	< 50 *
0 mm WITH THUMB.	< 50 *
EDED TO PENETRATE	< 50 *
H THUMB BUT H GREAT EFFORT.	50
H THUMBNAIL.	100
JLTY BY THUMBNAIL.	200
RE THAN 10 mm DEEP.	< 50 *
nm TO 10 mm DEEP.	50
S THAN 3 mm DEEP.	100
.OW "THUDS". DCK) SPACED AT LESS	100
ICK. " CK) SPACED MORE	200
OWLEDGE	< 50 *
NC DRESSURE FOR	

RING PRESSURE FOR:

IM BELOW THE NATURAL SURFACE LEVEL.

NOT TO SCALE

WAT-1200

© WSAA. 2002 V2.1





MINIMUM BLOCK VOLUME FOR ANCHORAGE				
(OF VERTICAL	COMPONENT (OF THRUST	
VERTICAL BENDS FOR TEST PRESSURE OF 1000 kPa (SEE NOTE 2)				
PE	TYPICAL PIPE	CONCRETE VOLUME m ³		
N	OD	11.25° BEND	22.5° BEND	45° BEND
)0	122	0.1	0.2	0.35
50	177	0.2	0.4	0.75
)0	232	0.35	0.7	1.25
25	259	0.45	0.85	1.6
50	286	0.55	1.05	1.95
)0	345	0.75	1.5	2.8
75	426	1.2	2.3	4.3
50	507			
)0	560	RE	EQUIRED	
00	667	(ALTERN	NVE METHON	DS
50	826			



IN CALCULATING THE CONCRETE VOLUME NO CONTRIBUTION FROM THE PIPELINE SELF WEIGHT HAS BEEN INCLUDED





ANCHOR BLOCK CONSTRUCTION NOTES:

- LOCATE ANCHOR BLOCK CENTRALLY AROUND BEND.
- KEY ANCHOR BLOCK INTO BASE OF TRENCH A MINIMUM DEPTH OF 250.
- POUR CONCRETE AGAINST A SOLID EXCAVATION FACE.
- USE GRADE N20 CONCRETE.



KEEP CONCRETE CLEAR OF ALL BOLTS, NUTS AND PIPE JOINTS.



NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

2. ALL RESTRAINED LENGTHS ARE APPLICABLE FOR BURIED PIPELINES ONLY. THE MINIMUM LENGTH OF PIPELINE REQUIRED TO BE RESTRAINED IS CALCULATED FROM THE PIPE DIAMETER, FITTING TYPE, STANDARD TRENCH CONDITIONS AND A PIPELINE PRESSURE OF 122 m HEAD.

 THE LENGTH OF RESTRAINT REQUIRED IS THE AMOUNT OF PIPELINE THAT MUST BE RESTRAINED EITHER SIDE OF THE FITTING, INCLUDING THE FITTING JOINTS.

4. SPECIAL CONSIDERATION IS REQUIRED IF THE DESIGNATED RESTRAINED LENGTH FOR A FITTING ENCROACHES, OR OVERLAPS THE DESIGNATED RESTRAINED LENGTH FOR ANOTHER FITTING. SEEK MANUFACTURER'S OR DESIGNER'S GUIDANCE.

5. THE LENGTH OF RESTRAINT REQUIRED FOR TEES APPLIES TO 'B' (BRANCH) ONLY. THE `MINIMUM DISTANCE 'A' BETWEEN JOINTS IS THE MINIMUM DISTANCE BETWEEN THE NEAREST UNRESTRAINED JOINT EITHER SIDE OF THE TEE, NOT INCLUDING THE TEE. RESTRAINT IS NOT REQUIRED IN THE MAIN LINE SOCKETS OR MECHANICAL COUPLINGS, UNLESS ENCROACHING (SEE NOTE 4). HYDRANT TEES AND OTHER NON-THRUST BEARING FITTINGS DO NOT REQUIRE RESTRAINT.

6. FOR TAPERS, IF THE MINIMUM LENGTH OF THE ADJACENT SMALL PIPE SIZE OCCURS, WITHOUT ENCROACHING ANOTHER FITTING'S RESTRAINT, THEN ONLY ONE RESTRAINED JOINT IS REQUIRED IN THE LARGE SOCKET OF THE TAPER. IF THE MINIMUM LENGTH OF SMALL PIPE DOES NOT OCCUR THEN, FULL RESTRAINT IS REQUIRED OF JOINTS IN THE LARGE PIPE, WITHIN THE LENGTH INDICATED.

7. TREAT FLUSHING BENDS AS A DEAD END.

8. SPECIAL DESIGN REQUIRED FOR 90 DEGREE VERTICAL BENDS.

9. PLACE MARKING TAPE FOR IDENTIFICATION OF RESTRAINED SECTIONS OF THE PIPELINE ALONG THE TOP OF THE RESTRAINED PIPE LENGTHS AND FASTEN TO THE PIPE AT NOT LESS THAN 3 m CENTRES. MARKING TAPE TO BE PINK COLOURED POLYETHYLENE TAPE APPROXIMATELY 100 WIDE, WITH THE INSCRIPTION:

WARNING - RESTRAINED PIPELINE - USE RESTRAINED FITTINGS ONLY'.

10. WHEN MAINTAINING OR CUTTING RESTRAINED SECTIONS OF PIPELINE IT IS ADVISABLE THAT EFFECTIVE LENGTHS OF FITTINGS BE MEASURED ON SITE TO CONFIRM THEIR COMPLIANCE WITH THIS DRAWING.

11. RESTRAINED JOINTS MAY BE ASSUMED TO ACT THE SAME AS A FLANGED JOINT.

ASSEMBLY

A. JOINTING TO BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

B. RESTRAINT VIA LOCKING GASKETS IS ONLY TO BE USED WITH DI PIPES AND FITTINGS FEATURING THE AUTHORISED SOCKET PROFILE.
DO NOT USE WITH OTHER DI SOCKET PROFILES OR OTHER PIPE MATERIALS.
C. IF MAXIMUM JOINT DEFLECTION IS DESIRED, PUSH THE SPIGOT TO THE FIRST WITNESS MARK ONLY AND THEN DEFLECT THE JOINT.
THE JOINT WILL NOT DEFLECT AFTER INSERTING THE SPIGOT ALL THE WAY HOME.

DISASSEMBLY

 A. JOINTS TO BE DISASSEMBLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 B. DO NOT REUSE RESTRAINED JOINT GASKETS.

\-03	Sydney WATER	
	WAT-1208-V	
	ISSUED 2012	VERSION 3



ADDITIONAL INFORMATION PROVIDED IN WAT-1200 SERIES COMMENTARY

<u>A</u>		
KERB	OAD SURFACE	
COMPR MEMBR SEE N	ESSIBLE IANE AROUND PIPE IOTE 10.)	
GROUND ISO MIN FILTER M	WATER DRAIN THROUGH AD (2 x DN 75 PVC MIN) JPSTREAM OPENING WITH IEMBRANE.	
D CROSSI	NG BULKHEAD	
SIONS IN MILLIMETRES.		
I CONCRETE BULKHEA DNS SPECIFIED IN DES	DS AND TRENCH STOPS IGN DRAWINGS.	
F BULKEAD ADJACENT TO KERB AND GUTTER OF SEALED ROADS.		
AT A RETAINING WALL TO BE UNDER THE WALL.		
RETE BULKHEADS INTO SIDES AND BOTTOM OF GAINST A BEARING SURFACE OF UNDISTURBED SOIL.		
TO BE CLASS N25.		
FORM PIPES DURING PLACEMENT OF CONCRETE.		
5 TO PREVENT LEAKAGE OF CONTAINED MATERIAL.		
CONTINUOUS DRAINAGE PATH DUGH BULKHEADS AND TRENCHSTOPS JND VALVE CHAMBERS. RENCH EXCAVATIONS ACROSS ROADWAYS. RAINAGE TO BE IN ACCORDANCE		
BLE MEMBRANE AROUND PIPE TO BE 10 THICK NE FOR BULKHEADS ADJACENT TO KERBS AND JBBER FOR BULKHEADS AND TRENCHSTOPS ON		
S >30% CONTINUOUSLY ENCASE THE PIPE IT MOVEMENT AND TRANSFER OF GROUND WATER. TS TO PREVENT DAMAGE TO RRJ.		
AUSTRALIA	NOT TO SCALE	
TOD	WAT-1209	
IOP	© WSAA. 2002 V2.1	



ADDITIONAL INFORMATION PROVIDED IN WAT-1200 SERIES COMMENTARY

ETRES. ARGE INTO AUTHOR OWN IN DESIGN DR/ BRIC IN TRENCH SU AGE MATERIAL (CO/ LAP AT ALL FILTER INAGE PATH: SONS ACROSS ROAD ED LOCATE DRAIN IN NCREASED TO COMP	ISED WATER AWINGS). JCH THAT IT FULLY ARSE AGGREGATE). FABRIC JOINTS. WAY. NSIDE THE REINFORCING. PENSATE.
AUSTRALIA	NOT TO SCALE
	WAT-1210 © WSAA. 2002 V2.1





ADDITIONAL INFORMATION PROVIDED IN WAT-1300 SERIES COMMENTARY

FLUSHING HYDRANTS



ELECTROFUSED OR BUTT WELDED



ELECTROFUSED WITH SUB MAIN BRANCH



ELECTROFUSED OR BUTT WELDED



ELECTROFUSED WITH STRAIGHT THROUGH SUBMAIN CONNECTION





LEGEND

(3)

5

(8)

- (1) FULL FACE FLANGE ADAPTOR
- (2)90 DUCK FOOT BEND
 - 125x90 REDUCER, ELONGATED SPIGOT
- (4)125 EF COUPLER
 - EXTENDED FULL FACE FLANGE ADAPTOR

(6) BACKING RING

- (7) 90 EF ELBOW 90 deg.
 - 90x50 BSP EF TRANSITION SADDLE
- (9) (10) (11 (12) (13 (14 (15
- 63x50 BSP MALE ADAPTOR COMPRESSION FITTING
 - 90 EF TEE
 - 90 EF COUPLER
 - 90x63 REDUCER, ELONGATED SPIGOT
 - 63 COMPRESSION COUPLING
 - 125x90 EF SADDLE TEE
 - 125x90 EF TEE
 - (16) 125x90 TEE, ELONGATED SPIGOT
 - (17 125×90 TEE, BUTT WELDED



WATER SERVICES ASSOCIATION of Australia

ADDITIONAL INFORMATION PROVIDED IN WAT-1400 SERIES COMMENTARY

