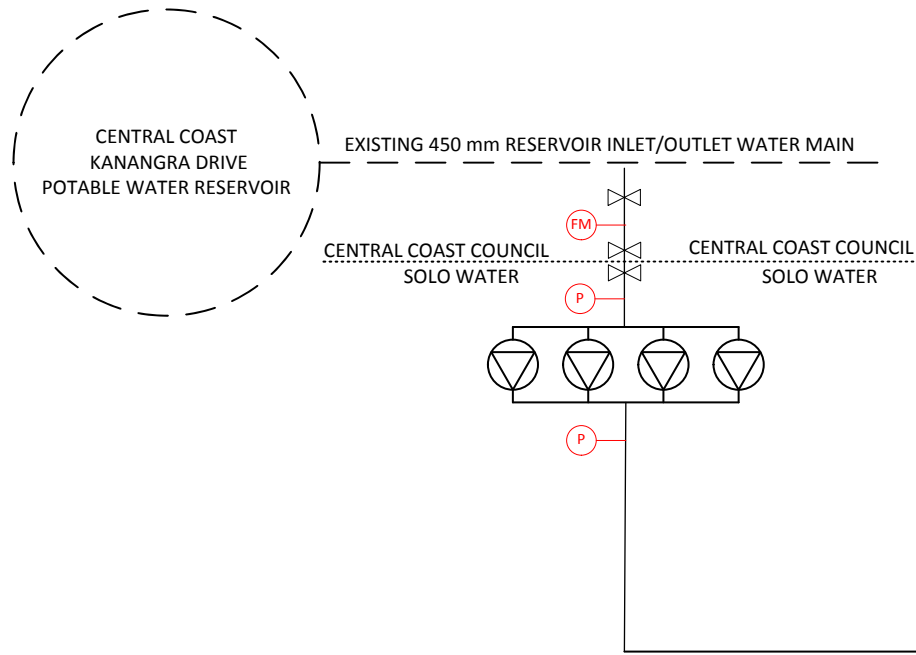


PROCESS FLOW DIAGRAM DRINKING WATER STAGE 3



**CATHERINE HILL BAY
BULK WATER TRANSFER PUMP STATION**

VARIABLE SPEED DRIVE PUMPS OPERATE BASED ON PRESSURE OR FLOW SET POINT.

DESIGN CAPACITY:
INTERIM: 0-15 L/s.
FUTURE STAGE: 0-20 L/s
ULTIMATE 23 L/s

LOCATED AT THE EXISTING CENTRAL COAST COUNCIL KANANGRA RESERVOIR SITE.

THERE IS A RESERVE PUMP IN THE SET SO ONE PUMP CAN FAIL WITHOUT IMPACTING PERFORMANCE.

PUMP STATION SWITCHBOARD INCLUDES PLUG FOR CONNECTION OF GENERATOR IS REQUIRED DUE TO EXTENDED POWER OUTAGE.

BULK WATER TRANSFER MAIN
» 7 km X DN200 mm HDPE

DRINKING WATER SUPPLY BOOSTER PUMP STATION

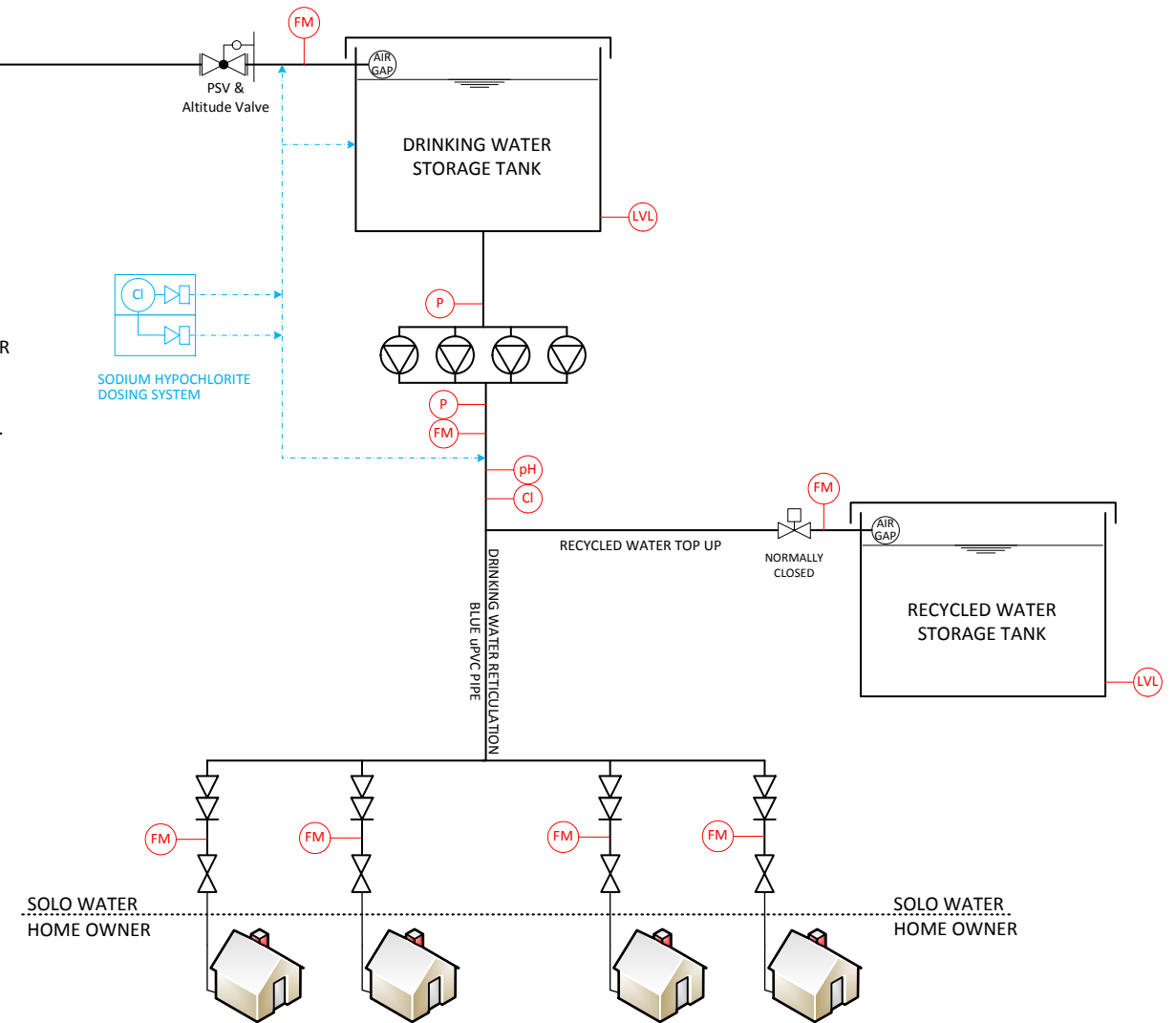
VARIABLE SPEED DRIVE CONTROLLED TO MAINTAIN WATER PRESSURE IN THE DOWNSTREAM RETICULATION NETWORK.

PRESSURE SET POINT OF DRINKING WATER PUMPS TO BE MAINTAINED AT 35 METERS, WHICH IS 5 METRES HIGHER THAN RECYCLED WATER SUPPLY BOOSTER PUMPS SET POINT.

PUMP STATION CAPACITY APPROXIMATELY 0 - 27 L/s @ 35 METERS.

PRESSURE VESSEL TO MINMISE PUMP STARTS DURING LOW DEMAND PERIODS.

STANDBY GENERATOR WITH AUTO CHANGEOVER SWITCH TO ENSURE PUMPS OPERATE DURING POWER OUTAGE.



LEGEND

--- EXISTING INFRASTRUCTURE
— NEW INFRASTRUCTURE

PROCESS MONITORING

— FM FLOW
— P PRESSURE
— pH pH
— Cl FREE CHLORINE RESIDUAL
— LVL WATER LEVEL

PROCESS EQUIPMENT

Variable speed drive pump station
Backflow prevention dual check valve
Stop valve

ALL POTABLE WATER USES INCLUDING:

- Drinking water
- Bathroom taps & shower
- Kitchen taps and dishwasher
- Laundry taps
- Hot water service
- Pool top-up
- Fire hydrants

CLIENT: ROSE PROPERTY GROUP PTY LTD	PROJECT: BEACHES CATHERINE HILL BAY RESIDENTIAL SUBDIVISION MONTEFIORE STREET, CATHERINE HILL BAY	PHASE: STAGE 3	PRIVATE WATER UTILITY: CATHERINE HILL BAY WATER UTILITY PTY LTD	DRAWING TITLE: PROCESS FLOW DIAGRAM DRINKING WATER STAGE 3	REVISION REV 1 DATE: 12/01/2017	DRAWING NUMBER: 56-PW-PFD-ST3-1
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Project: Catherine Hill Bay Water Utility
Client: Rose Group
Title: Surplus Recycled Water Release Preliminary Risk Assessment
Author: BI
Date (Revision): 25/01/2018 (Revision 1)
Risk Criteria: As per Tables 2.5, 2.6 & 2.7: Australian Guidelines for Water Recycling: Managing Health and Environmental Risks-phase 1 (2006)



Scheme Component	Hazard	Hazardous Event	Impact	Unmitigated Risk					Control Strategy	Mitigated Risk				
				Likelihood		Consequence		Risk		Likelihood		Consequence		Risk
Source Water	Potential chemical contaminants in source water	Trace contaminants present in wetland feed water	Potential release of contaminant at release points	C	Possible	2	Minor	Moderate	1. Recycled water is used as the source water. 2. Residential catchment with no industrial inputs and low potential for trace contaminants. 3. Constructed wetland with 5 to 7 days HRT are effective at removing contaminants by natural processes. 4. Customer education and homeowner manual to inform customers of what can not be disposed of to sewer.	A	Rare	2	Minor	Low
	Potential pathogens in source water	Pathogen present in wetland feed water	Potential release of pathogens at the release point	C	Possible	3	Moderate	High	1. Recycled water is used as the source water hence there is no significant risk of pathogen exposure. 2. Constructed wetlands with 5 to 7 days HRT are effective at pathogen removal by natural processes.	A	Rare	2	Minor	Low
Constructed Wetland	Treatment performance	Loss of treatment performance	Non-compliant discharge water	C	Possible	3	Moderate	High	1. Purpose built subsurface flow constructed wetland sized with 5 to 7 days hydraulic retention time. 2. Wetland design to minimise short circuiting. 3. Wetland design provides access for ongoing maintenance of vegetation. 4. Detailed design and quality assurance of wetland construction by suitably qualified person/organisation. 5. Wetland Management Plan to be developed that will outline the maintenance and renewal plan for the wetland.	B	Unlikely	3	Moderate	Moderate
	Mosquito growth	Potential disease vector	Potential public health impacts	D	Likely	3	Moderate	High	1. Subsurface flow constructed wetland avoids open water surface for mosquito growth to occur. 2. Feed water to the wetland is recycled water, hence there are no human pathogens in the source water.	B	Unlikely	2	Minor	Low
	Odours	Stagnant low oxygen areas in wetland	Potential odour impacts on nearby residents	D	Likely	3	Moderate	High	1. Wetland designed to avoid short circuiting and dead zones. 2. Subsurface flow wetland minimises the potential for odour release from the wetland system as the water surface is below ground in the gravel matrix. 3. The feed water to the wetland is recycled water with no organic load and hence will not directly contribute to odour formation. 4. Wetlands provide natural oxygenation of the subsurface water through their root systems. 5. Wetland management plan will include biomass harvesting to avoid excessive accumulation and breakdown of organic matter inside the wetland. 6. Replacing the existing approved RO Reject Evaporation Ponds with a constructed wetland will reduce the potential for odour formation from the area, primarily due to the avoidance of algae growth in the wetland, hence this is a reduction in risk compared to the existing approved scenario.	B	Unlikely	2	Minor	Low
	Accumulation of nutrients and carbon in the wetland	Build up of organic matter and nutrients in the wetland	Export of nutrient and organic carbon from the wetland	D	Likely	3	Moderate	High	1. Biomass harvesting will be undertaken to remove nutrients and carbon from the system. 2. Wetland Management Plan to be developed that will outline the maintenance and renewal plan for the wetland.	B	Unlikely	3	Moderate	Moderate
	Potential seepage	Seepage through the base of the wetland	Potential groundwater contamination	D	Likely	3	Moderate	High	1. Wetland to be designed with an impervious HDPE liner. 2. Wetland feed water is high quality recycled water. 3. Replacing the approved RO reject evaporation ponds with a wetland reduces the risk of groundwater contamination. 4. Level sensors will be installed in the wetland to assist with identification of liner breaks.	B	Unlikely	3	Moderate	Moderate
	Potential Overflow	High rainfall events	Uncontrolled overflow from the wetland system.	D	Likely	3	Moderate	High	1. 500 mm freeboard designed into the wetland system. 2. Recycled water used as feed water to the wetland. 3. Wetland modelling allowed for rainwater/stormwater inputs. 4. Water level monitoring in the wetland system to alert the operator of any high water level events so that appropriate action can be taken. 5. Replacing the RO Reject evaporation ponds with a wetland reduces the risk of overflow by significantly reducing the pollutant concentrations in stored water and increasing evapotranspiration rates from the area.	B	Unlikely	2	Minor	Low
	Unintended contact with recycled water inside the wetland system	Unintended human access to wetland system	Potential health impacts	C	Possible	3	Moderate	High	1. The wetland lot is fenced to prevent public access. 2. Subsurface flow wetland has no open water surface for human contact to occur. 3. Feed water to the wetland is recycled water hence there is no significant risk associated with human contact.	B	Unlikely	2	Minor	Low
Release Control Storage Tanks	Water quality decline in storage	Changes in water chemical and physical properties by natural processes	Potential for contaminants in release water	C	Possible	3	Moderate	High	1. Recycled water is used as the feed water to the wetland, hence there is no significant human pathogen regrowth risk. 2. Closed tanks to eliminate vermin access with mosquito screens on all tank openings and overflows. 3. Storage tank materials prevent sunlight access and hence prevents algae growth. 4. Ongoing monitoring of water quality in the release control storage tanks. 5. If required an aerator will be installed into the tank to maintain aerobic conditions.	B	Unlikely	2	Minor	Low
	Water quality decline in storage	Pathogen regrowth	Potential pathogen contamination of release water	B	Unlikely	4	Major	High	1. Stored water is wetland treated recycled water, hence there is no significant human pathogen regrowth risk.	B	Unlikely	2	Minor	Low
	Tank Materials	Dissolution of trace metals into recycled water	Dissolved metals and other contaminants in release water	C	Possible	3	Moderate	High	1. Tank materials to be compatible for use with potable water. 2. Metallic tanks to be lined with a potable water grade polymer liner to avoid dissolution of metals.	B	Unlikely	2	Minor	Low

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Scheme Component	Hazard	Hazardous Event	Impact	Unmitigated Risk			Control Strategy	Mitigated Risk						
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk				
	Unintended contact with recycled water in storage	Human access to storage	Potential public health impacts	D	Likely	3	Moderate	High	1. Storage located inside the fenced and secure WWTP site. 2. Warning signage around the perimeter of the site and on each storage tank. 3. CCTV recording at the WWTP site. 4. Lockable access points on all tanks.	B	Unlikely	3	Moderate	Moderate
	Mosquitos and vectors	Mosquito or vermin access to storage	Potential pathogen contamination of water in storage	D	Likely	3	Moderate	High	1. Storage tank constructed to potable water storage standards with mosquito screens on all tank openings and overflows. 2. Regular monitoring and inspection for evidence of vermin or mosquito access. 3. If observed contaminated water will be wasted or, if appropriate, chemical treatment of the storage will be undertaken by addition of chlorine tablets, hydrogen peroxide or similar.	B	Unlikely	3	Moderate	Moderate
	Tank overfilled	Infrequent climatic conditions that result in the tank filling with no release events	Uncontrolled overflow from storage tank	D	Likely	3	Moderate	High	1. Tank sized modelled to maximise efficiency and reliability so release of wetland treated recycled water will coincide with rainfall. 2. Emergency release point for infrequent release during extended dry weather. 3. Continuous water level monitoring and alarms to provide early warning the operator of any potential overflow so that appropriate action can be taken.	B	Unlikely	2	Minor	Low
	Structural integrity	Tank failure	Uncontrolled release	D	Likely	3	Moderate	High	1. Tank constructed from steel panel tanks (or approved alternative) with civil/structural engineer certification for tank and footings. 2. Quality assurance in construction and use reputable tank supplier. 3. Bollards or access restrictions around tanks if there is a risk of vehicular or machinery damage.	B	Unlikely	3	Moderate	Moderate
Controlled release of wetland polished recycled water to the environment.	Pathogens	Potential human contact with release water in downstream environment	Potential public health impacts	C	Possible	3	Moderate	High	1. Water released to the environment is wetland polished recycled water, hence there is no significant risk of human pathogens exposure. 2. Release event are scheduled to coincide with rainfall events when there are less potential for human contact and high amount of dillution. 3. The approved irrigation system used a lower quality recyceld water and relied on site controls to achieve the log reductions in the Australian Guidelines for Water Recycling, whereas the proposed release system uses treated recycled water as the feed water to the wetland, which then further poolishes the water, hence the risk of pathogen exposure is lower in the proposed release system than the approved irrigation system.	B	Unlikely	2	Minor	Low
	Nutrients	Increased nutrient loads on downstream environment	Potential nutrient impacts on downstream surface waters	C	Possible	3	Moderate	High	1. The constructed wetland with HRT>5 days is effective at removing nitrogen via primarily via denitrification and other natural processes. Wetland performance was modelled/simulated by specialists to confirm performance, as outlined in the REF. 2. Wetland treated recycled water is reelease during wet weather to maximise dillution and flushing of the downstream environment. 3. The REF and specialist studies determined that the small increase in nutrient load will not have a significant impact on the downstream ecosystem. 4. Ongoing environmental monitoring will be undertaken in the downstream environment during operations to verify performance. 5. Following approval of the licence variation the Recycled Water Quality Management Plan and Infrastructure Operating Plan will be updated to include the requirements of the proposed release system. 6. Removal of the existing approved RO Reject Evaporation ponds removes a nutrient release hazard from the scheme, thus resulting in an overall risk reduction of the scheme.	B	Unlikely	2	Minor	Low
	Salinity	Increased salt load on downstream environment	Potential salinity impacts on downstream environment.	C	Possible	3	Moderate	High	1. The proposed release system was assessed based on a conservative TDS of 1000 mg/L and the REF and specialist studies demonstrated this salinity will not have a significant impact on the receiving environment. 2. Releases are timed to coincide with rainfall events to maximise dillution of TDS with stormwater. 3. The downstream receiving environment and ICOL is impacted by natural salinity through salt water ingress from coastal wave action during storms. The ICOL is open to the ocean frequently. 4. The expected TDS of raw wastewater coming from the residential catchment is expected to be approximately 600 mg/L on average. 5. Replacement of the existing approved RO Reject Evaporation ponds removes a salinty/salt hazard from the scheme, thus resulting in an overall risk reduction of the scheme. 6. Replacement of the irrigation system with the release system will reduce the overall salinity risk of the scheme by avoiding all salinity and sodicity risks on soils and groundwater through irrigation.	B	Unlikely	2	Minor	Low
	pH	Release of low or high pH water to the environment	Potential impacts on sensitive aquatic organisms	C	Possible	3	Moderate	High	1. Release water pH will be between 6.5 and 8.5 as per the recycled water fed into the wetland system. 2. The wetland is not expected to significant alter the pH of the water, however if required an automated pH monitoring and control system will be installed on the release system. 3. The REF and specialist studies have demonstrated there are no significant impacts on the downstream environment due to proposed pH of the release water.	B	Unlikely	2	Minor	Low
	Chlorine	Release of water containing free chlorine to the environment	Potential impacts on sensitive aquatic organisms	D	Likely	3	Moderate	High	1. Maximum free residual chlorine residual in recyceld water feed to the wetland will be <2 to 3 mg/L. 2. Constructed wetlands are an effective natural dechlorination process hence there will be no free chlorine residual in wetland treated water hence no free chlorine will be released to the environment. 3. REF and specialist studies demsontrated no significant impacts of the proposal.	B	Unlikely	2	Minor	Low

Scheme Component	Hazard	Hazardous Event	Impact	Unmitigated Risk			Control Strategy	Mitigated Risk						
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk				
	Trace metals, organic chemicals and other potential trace contaminants.	Trace contaminants present	Potential impacts on downstream environment	C	Possible	3	Moderate	High	1. Majority residential catchment hence there is a low likelihood of significant trace contaminants being present in recycled water. 2. Customer education via customer contract, home owners manual, website and information panel on each water bill provides ongoing awareness and education on the appropriate substances to dispose to sewer. 3. Subsurface flow constructed wetlands provide treatment via natural processes and provides a adsorbitive buffer to the natural environment. 4. Detailed annual water quality monitoring of release water for trace contaminants. 5. Replacing the irrigation system with the constructed wetland and controlled release system reduces the potential risk of contamination with trace contaminants, as the pollutants that would other wise be bound up in the natural soils in the irrigation area will instead be bound up in the matrix of the wetland where they can be more easily managed in the long term by wetland media replacement if required.	B	Unlikely	2	Minor	Low
	Hydrological regimes	Release of water during dry weather	Potential impact on ecosystem wetting and drying cycles	D	Likely	4	Major	Very high	1. The system has been designed to maximise release events to coincide with rainfall events to mimic the natural hydrological regime of the downstream environment. 2. No release from the wet weather controlled release point will occur during dry weather. 3. The release control storage has been sized based on local climate data so that controlled wet weather releases account for the vast majority of release events, less than 1% of all wastewater generated is managed by dry weather releases of recycled water. 4. An emergency dry weather release point has been included in the design so that in the rare event of a dry weather release, there are no impacts as the dry weather release point is directly into the ICOL that is always wet, hence the small and infrequent dry weather releases have no impact on hydrological processes.	A	Rare	2	Minor	Low
	Soils	Potential for release water to interact with soils	Potential soil impacts	C	Possible	3	Moderate	High	1. Replacing the approved irrigation system with the proposed release system will reduce the potential for impacts on soils as all surplus water is managed by controlled release to the stormwater system during rainwater events. 2. No release from the wet weather release point during dry weather.	A	Rare	2	Minor	Low
	Groundwater	Potential for release water to interact with groundwater	Potential groundwater impacts	C	Possible	3	Moderate	High	1. Replacing the approved irrigation system with the proposed release system will reduce the potential for impacts on groundwater as all surplus water is managed by controlled release to the stormwater system during rainwater events. 2. No release from the wet weather release point during dry weather.	B	Unlikely	2	Minor	Low
Corporate/ Business Risks	Environmental	Environmental incidents	Additional costs of clean up and rectification and potential litigation	C	Possible	4	Major	Very high	1. The release system will be operated under the authority of and in compliance with the Environmental Protection Licence issued by NSW EPA. 2. The REF and specialist studies has demonstrated there are no significant impacts from the proposed release system. 3. The site will be operated in compliance with the IOP, RWMP and EPA licence. 4. SCADA online monitoring system with alarms and operator inspections will help detect potential faults and incidents. 5. Ongoing monitoring of the downstream environment. 6. Environmental incidents are insured events. 7. The total quantum of environmental risks associated with the proposed release system is not significantly different from the approved irrigation system, hence there is no significant difference to the current <u>environmental risk exposure under the existing approved licence.</u>	B	Unlikely	2	Minor	Low
	Public Health	Public health incidents	Additional costs of clean up and rectification and potential litigation	C	Possible	4	Major	Very high	1. The release system will be operated under the authority of and in compliance with the Environmental Protection Licence issued by NSW EPA. 2. The source water for the release system is recycled water, hence there is no significant public health risk associated with the proposed release system. 3. The REF and specialist studies have demonstrated there are no significant health impacts of the proposed release system. 4. NSW Health were consulted during the REF preparation and had no concerns provided that recycled water is used as the source water for the release system. 5. The site will be operated in compliance with the IOP, RWMP and EPA licence. 6. SCADA online monitoring system with alarms and operator inspections. 7. Ongoing monitoring of the downstream environment. 8. Public health incidents are insured events.	B	Unlikely	2	Minor	Low
	Operation & Maintenance costs	O&M cost increase	Increase in rates to customers	C	Possible	3	Moderate	High	1. The proposed release system will reduce the risk of O&M cost blow out for the scheme because the customer base will increase from 470 to 550 with no significant difference in scheme operational costs. 2. The proposed release system will avoid the significant expense associated with the operation, maintenance and management of the 8.5 ha irrigation system. 3. The proposed release system will have a similar or lower operating cost that the existing approved irrigation system.	B	Unlikely	2	Minor	Low

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Scheme Component	Hazard	Hazardous Event	Impact	Unmitigated Risk			Control Strategy	Mitigated Risk						
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk				
	Natural disasters	Natural disasters like fire, earthquake, flooding, cyclone, tsunami etc	Damage to release system infrastructure	C	Possible	4	Major	Very high	1. The release system infrastructure is located inside the footprint of the approved subdivision, which is designed to minimise impacts of natural events like flooding, bushfires etc. 2. Insurance policies include coverage for damage to infrastructure caused by insurable natural disasters like flooding, tsunamis, earthquake, fire etc. 3. Business continuity insurance will cover the additional costs to deliver services until the damaged infrastructure is repaired, e.g. the cost to truck out surplus recycled water when the release infrastructure is being repaired.	B	Unlikely	3	Moderate	Moderate
	Human resources and organisation capacity	Loss of key staff due to illness or leaving the organisation	Inability to operate release system	C	Possible	4	Major	Very high	1. Solo Water has depth of staff and support contractors across both operations and management and handle short term loss of staff. 2. Staff employment contracts require notice to be given. 3. Solo Water has documented work systems that makes it quicker to train new staff and to utilise contractors in performing operational tasks. 4. Support contractors normally used for operational emergencies can be utilised more during such periods to cover positions while HR processes occur.	B	Unlikely	3	Moderate	Moderate
	Community & Customers	Community concern over release system	Customer complaints and dissatisfaction.	C	Possible	3	Moderate	High	1. A community awareness and education campaign explaining the change from the approved irrigation system to proposed release system will be run following approval of the licence variation. 2. The proposed release system is best practice and includes the use of high quality recycled water, wetland polishing, buffer storage, wet weather release with emergency dry weather release point.	B	Unlikely	3	Moderate	Moderate

RECYCLED WATER

QUALITATIVE ENVIRONMENTAL AND PUBLIC HEALTH RISK ASSESSMENT CRITERIA

From tables 2.5, 2.6 and 2.7 on Page 39 of the Australian Guidelines for Water Recycling Managing Health & Environmental Risks Phase 1 (2006)

Qualitative measures of likelihood

Level	Descriptor	Example Description from AGWR
A	Rare	May occur only in exceptional circumstances. May occur once in 100 years
B	Unlikely	Could occur within 20 years or in unusual circumstances
C	Possible	Might occur or should be expected to occur within a 5- to 10-year period
D	Likely	Will probably occur within a 1-to 5-year period
E	Almost certain	Is expected to occur with a probability of multiple occurrences within a year

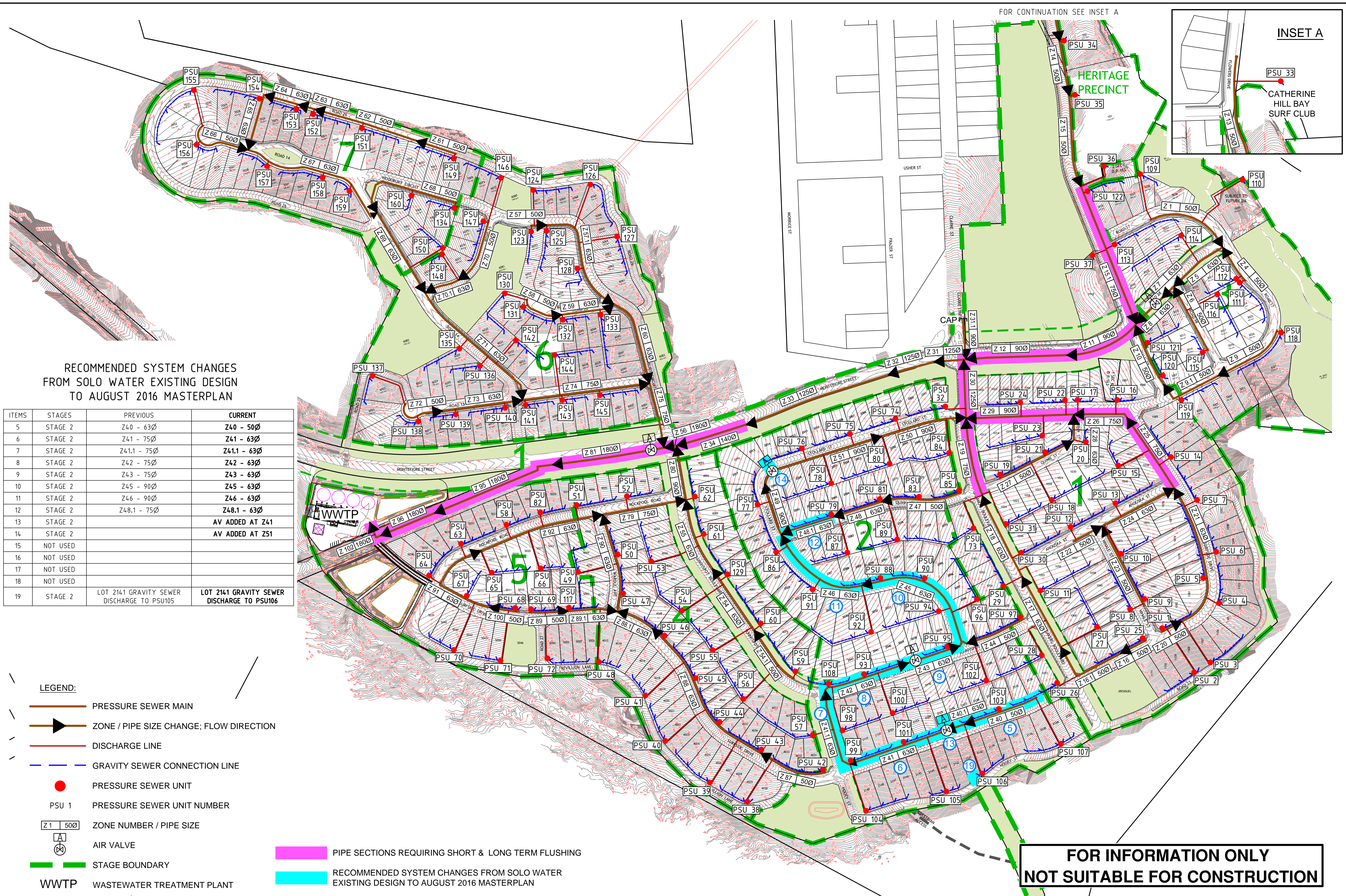
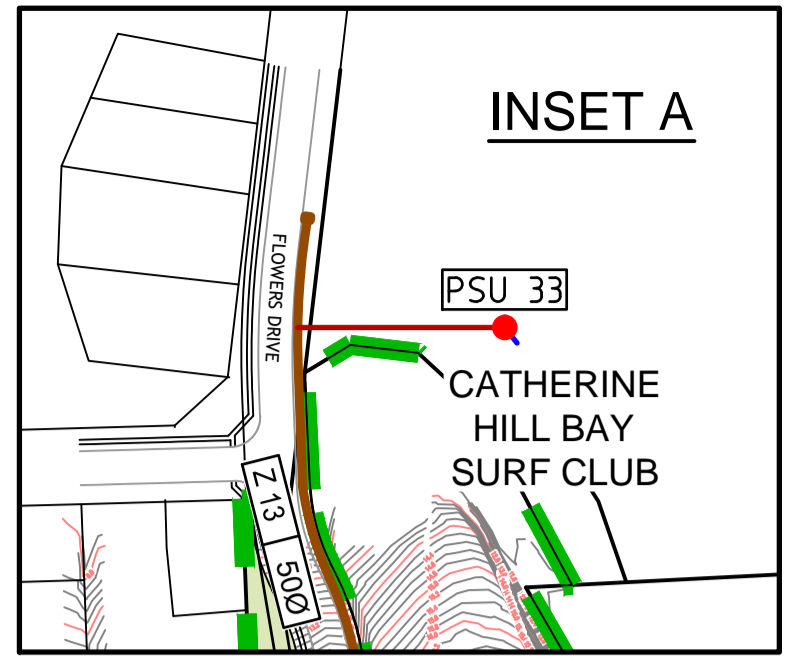
Qualitative measures of consequence or impact

Level	Descriptor	Example Description from AGWR
1	Insignificant	Insignificant impact or not detectable
2	Minor	Health — Minor impact for small population Environment — Potentially harmful to local ecosystem with local impacts contained to site
3	Moderate	Health — Minor impact for large population Environment — Potentially harmful to regional ecosystem with local impacts primarily contained to on-site
4	Major	Health — Major impact for small population Environment — Potentially lethal to local ecosystem; predominantly local, but potential for off-site impacts
5	Catastrophic	Health — Major impact for large population Environment — Potentially lethal to regional ecosystem or threatened species; widespread on-site and off-site impacts

Qualitative risk analysis matrix: Level of risk

Likelihood		Consequences				
		1	2	3	4	5
		Insignificant	Minor	Moderate	Major	Catastrophic
A	Rare	Low	Low	Low	High	High
B	Unlikely	Low	Low	Moderate	High	Very high
C	Possible	Low	Moderate	High	Very high	Very high
D	Likely	Low	Moderate	High	Very high	Very high
E	Almost certain	Low	Moderate	High	Very high	Very high

FOR CONTINUATION SEE INSET A



RECOMMENDED SYSTEM CHANGES FROM SOLO WATER EXISTING DESIGN TO AUGUST 2016 MASTERPLAN

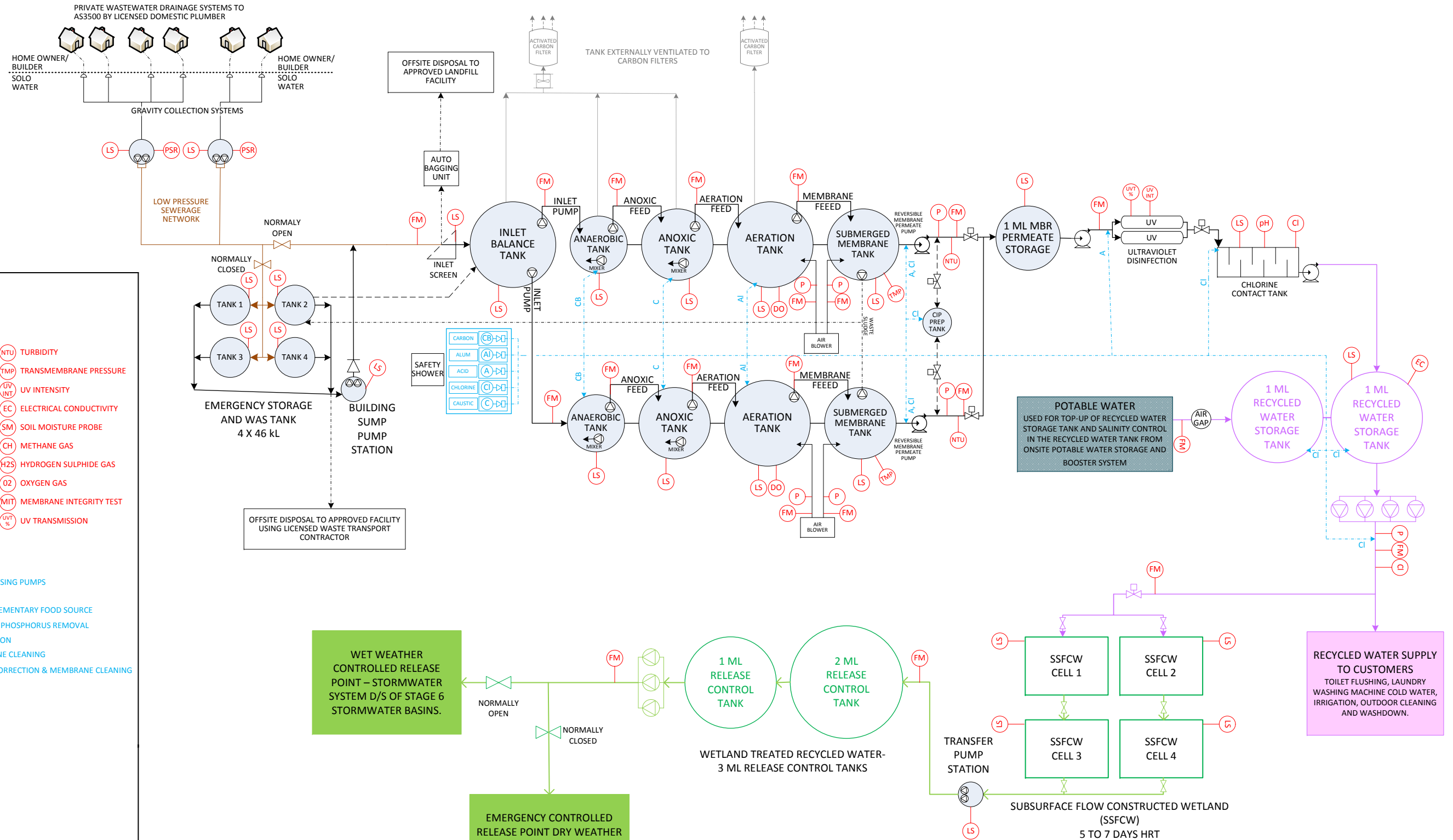
ITEMS	STAGES	PREVIOUS	CURRENT
5	STAGE 2	Z40 - 63Ø	Z40 - 50Ø
6	STAGE 2	Z41 - 75Ø	Z41 - 63Ø
7	STAGE 2	Z41.1 - 63Ø	Z41.1 - 63Ø
8	STAGE 2	Z42 - 75Ø	Z42 - 63Ø
9	STAGE 2	Z43 - 75Ø	Z43 - 63Ø
10	STAGE 2	Z45 - 90Ø	Z45 - 63Ø
11	STAGE 2	Z46 - 90Ø	Z46 - 63Ø
12	STAGE 2	Z48.1 - 75Ø	Z48.1 - 63Ø
13	STAGE 2		AV ADDED AT Z41
14	STAGE 2		AV ADDED AT Z51
15	NOT USED		
16	NOT USED		
17	NOT USED		
18	NOT USED		
19	STAGE 2	LOT 2141 GRAVITY SEWER DISCHARGE TO PSU105	LOT 2141 GRAVITY SEWER DISCHARGE TO PSU106

- LEGEND:**
- PRESSURE SEWER MAIN
 - ZONE / PIPE SIZE CHANGE; FLOW DIRECTION
 - DISCHARGE LINE
 - GRAVITY SEWER CONNECTION LINE
 - PRESSURE SEWER UNIT
 - PSU 1 PRESSURE SEWER UNIT NUMBER
 - Z1 | 50Ø ZONE NUMBER / PIPE SIZE
 - AIR VALVE
 - STAGE BOUNDARY
 - WWTP WASTEWATER TREATMENT PLANT
 - PIPE SECTIONS REQUIRING SHORT & LONG TERM FLUSHING
 - RECOMMENDED SYSTEM CHANGES FROM SOLO WATER EXISTING DESIGN TO AUGUST 2016 MASTERPLAN

**FOR INFORMATION ONLY
NOT SUITABLE FOR CONSTRUCTION**

	This drawing & the design it covers are the property of PRESSURE SYSTEM SOLUTIONS PTY LTD. They are furnished on a confidential basis. The receipt of this drawing shall constitute an agreement by the recipient thereof that neither the drawing nor the design will be reproduced, copied, exhibited, loaned or given to others, nor used in any manner whatsoever, except in the limited way and private use permitted by any written consent given by PRESSURE SYSTEM SOLUTIONS PTY LTD.	J PSU 85, 97 & 98 DISCHARGE POINTS AMENDED AS PER CLIENT'S COMMENTS CK 10/08/16	DESIGN BY:	DRAWN KG DATE 22/07/16	CLIENT:	TITLE: PRESSURE SEWER MASTER PLAN
		I GRAVITY SEWER LINE AMENDED IN STAGES 4, 5 & 6 CK 05/08/16	H AMENDED AS PER SOLO WATER'S COMMENTS CK 03/08/16	G AMENDED AS PER SOLO WATER'S COMMENTS CK 29/07/16	F AMENDED AS PER SOLO WATER'S COMMENTS CK 28/07/16	E UPDATED AS PER NEW CONTOURS & IRRIGATION AREA REMOVED CK 25/07/16
SIZE A1	Plotted by: Kgao Date: 2016-08-10 2:12:39 PM Cad File No: J:\700-Projects\702-Current projects\160722 Catherine Hill Bay\720-Design\721-Drawings\730-Street mains\Catherine Hill Bay_S001 Pressure Sewer Masterplan.dwg	REV DESCRIPTION BY DATE	Pressure System Solutions Pty Ltd Unit 1/47-51 Lorraine Street Peakhurst NSW 2210 Sydney Australia T: +61 2 9584 1177 F: +61 2 9584 1477 E: admin@pssolutions.net.au www.pssolutions.net.au	SCALE 1:2000 AT A1	PROJECT: CATHERINE HILL BAY SEWERAGE SCHEME	REV J

PROCESS FLOW DIAGRAM STAGE 3 RECYCLED WATER RELEASE



LEGEND

PROCESS MONITORING

- | | | | |
|-------|-------------------------------|--------------------|-------------------------|
| (FM) | FLOW METER | (NTU) | TURBIDITY |
| (P) | PRESSURE | (TMP) | TRANSMEMBRANE PRESSURE |
| (PSR) | PUMP STARTS AND RUN HOURS | (UV INT) | UV INTENSITY |
| (LS) | WATER LEVEL | (EC) | ELECTRICAL CONDUCTIVITY |
| (DO) | DISSOLVED OXYGEN | (SM) | SOIL MOISTURE PROBE |
| (SS) | MIXED LIQUOR SUSPENDED SOLIDS | (CH) | METHANE GAS |
| (pH) | pH | (H ₂ S) | HYDROGEN SULPHIDE GAS |
| (Cl) | FREE CHLORINE RESIDUAL | (O ₂) | OXYGEN GAS |
| (WS) | WEATHER STATION | (MIT) | MEMBRANE INTEGRITY TEST |
| | | (UV %) | UV TRANSMISSION |

PROCESS CHEMICALS

- BUNDED CHEMICAL STORAGE AREA
- BUNDED CHEMICAL CONTAINERS AND DOSING PUMPS
- CHEMICAL DELIVERY LINES
- CB ACETIC ACID (CARBON) DOSING AS SUPPLEMENTARY FOOD SOURCE
- AI POLYALUMINIUM CHLORIDE DOSING FOR PHOSPHORUS REMOVAL
- Cl SODIUM HYPOCHLORITE FOR CHLORINATION
- A ACID FOR pH CORRECTION AND MEMBRANE CLEANING
- C SODIUM HYDROXIDE (CAUSTIC) FOR pH CORRECTION & MEMBRANE CLEANING

PROCESS EQUIPMENT

- INLET SCREEN
- MEMBRANE BIOREACTOR PROCESS TANKS
- SUBMERSIBLE PUMP
- DRY-MOUNTED PUMP
- MIXING PUMP
- MOTORISED VALVE
- HOUSEHOLD SEWERAGE CONNECTION POINT
- MANUAL VALVE
- VARIABLE SPEED DRIVE PUMP SET

ULTRAVIOLET DISINFECTION SYSTEM
SELF CLEANING SYSTEM WITH UV INTENSITY MONITORING
UV TRANSMISSION OF 50%
USEPA ACCREDITED UV DISINFECTION SYSTEM

CHLORINE CONTACT TANK
CONTACT TANK TO BE DESIGNED TO USEPA GUIDELINES TO ACHIEVE CT VALUES FOR THE REQUIRED LOG REMOVAL TARGETS

NOTES

1. PRELIMINARY PROCESS FLOW DIAGRAM FOR IPART LICENCE VARIATION ONLY. NOT FOR CONSTRUCTION.
2. NOT TO SCALE.
3. SUBJECT TO MINOR CHANGES DURING DETAILED DESIGN.
4. TO BE READ IN CONJUNCTION WITH THE REF PREPARED BY ADW JOHNSON.

CLIENT: ROSE PROPERTY GROUP PTY LTD	PROJECT: CATHERINE HILL BAY RESIDENTIAL SUBDIVISION MONTEFIORE STREET, CATHERINE HILL BAY	PHASE: IPART LICENSE VARIATION – STAGE 3	PRIVATE WATER UTILITY: CATHERINE HILL BAY WATER UTILITY PTY LTD	 Water Utility Solutions	DRAWING TITLE: PROCESS FLOW DIAGRAM STAGE 3 RECYCLED WATER RELEASE	DRAWING NUMBER: 56-RW-PFD-ST3-1A DATE: 10/08/2017
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