Preliminary Risk Assessment Summary for Shepherds Bay

Purpose

The purpose of undertaking the preliminary risk assessment was to:

- Identify potential risks that may impact the safe and reliable operation of the facility (and associated components), specifically focused on risks associated with the following:
  - Potential impacts to public health and/or water quality
  - Environmental impacts including noise, odour and general environmental impacts
  - Operational reliability and process performance
  - Financial viability
  - Customer service
- Identify early, potential risk mitigation/control measures that can be incorporated into the design, construction and operation of the facility to sufficiently mitigate these risks
- Facilitate further dialogue with all key stakeholders to ensure all key risks associate with the project are identified and effectively controlled.

Methodology

A risk assessment was conducted for provision of the following services:

- Sewage
- Recycled water
- Drinking water

The assessment approach adopted for conducting the sewage and recycled water preliminary risk assessments was consistent with the recommendations in the Australian Guidelines for Water Recycling (AGWR). The assessment criteria are provided in Attachment A.

The assessment approach adopted for conducting the drinking water preliminary risk assessment was consistent with the recommendations in the Australian Drinking Water Guidelines (ADWG). The assessment criteria are provided in Attachment B.

Business risks, or risks leading to a loss of service or complaints, were assessed using the Flow assessment criteria provided in Attachment C.

The preliminary risk assessment process included the following activities:

- **Risk Identification** – The identification of a range of risks related to the project (what might happen?)
- **Risk Categorisation** – The categorization of the risks into various types to aid understanding and to provide context.
- **Risk Assessment** – Determination of the likelihood and consequence of the unmitigated/uncontrolled risk (what is the likelihood and impact/consequence?)
- **Managing the Risk/Risk Mitigation** – the identification of appropriate controls to be further developed and implemented as appropriate should the project be approved to process (what can be done to stop it happening?)
- **Post Mitigation Risk Assessment** – the reassessment of the risk following implementation of appropriate controls to ensure that the risk is sufficiently mitigate (how effective do we anticipate the controls to be?)

Controls

Controls modify the likelihood or the impact of the risk (i.e. both the likelihood and consequence of a risk).

- Preventive controls apply at the beginning of a risk's life, at or near the root causes(s). As a device, they often act as a barrier to "nip it (the risk) in the bud". They primarily reduce the likelihood of the risk occurring. Examples are system passwords, locked doors, machinery maintenance etc.
- Detective controls usually apply somewhere in the middle of the risk's life. Detective controls rely on the analysis of information in order to detect that a risk is "in motion". Detective controls that are "early" in the risk's life usually modify likelihood and those that are "late" in the life, usually modify impact. Examples are online monitoring, inspections, complaints and incident monitoring etc.
- Reactive controls (sometimes also called Responsive or Corrective), apply towards the end of a risk's life when the impact is imminent or being felt. They are focused on modifying impact. Examples are plant shutdown, drinking water top up, incident and emergency response processes.

Risk rating before and after controls

The risk rating after controls is a risk assessment with controls in place. As explained above, controls can modify both the likelihood and consequence of a risk.

The qualitative descriptions for consequence or impact contained in the recommendations of the AGWR and ADWG (refer to Attachments A and B), use a combination of the scale of the impact and the size of population or ecosystem affected. If the controls can reduce the scale of the impact or size of the population or ecosystem affected, then the overall risk rating can be reduced.

Examples include:
Drinking water - The risk of a low disinfection residual will lead to lower disinfection, but there will still be a level of disinfection, thereby reducing the scale of the impact and the size of the population affected.
Sewage – The risk of sewage overflow is mitigated by rapid response and isolation reducing the quantity of sewage released, and/or the flows to sensitive receiving environments being diverted, and therefore the scale and size of the ecosystems affected.
Recycled water - The risk of process failure is mitigated by a multi-barrier treatment approach and plant shutdown if critical control points are exceeded.

Outcomes

Sewage Risk Assessment

In undertaking the preliminary risk assessment, risks were identified across the following areas:

Area	Descriptions
The Catchment	Risks associated with the catchment area including consideration of items such as contamination, volume changes, public health incidents, storage requirements, illegal discharge to sewers etc.
The Sewer Network	Risks associate with the network itself including blockages, pipe or equipment failure, loss of power etc.
Management	General operation management issues risks that may impact operational reliability or supply surety.

Risks have been summarise at Attachment D as the detailed preliminary risk assessment contains information that is commercial in confidence.

Recycled Water Risk Assessment

In undertaking the preliminary risk assessment, risks were identified across the following areas:

Area	Descriptions
Local Water Centre	Consideration of the potential risk associated with the operation of the treatment facility including tank and/or equipment failure, odour, noise, process risks, capacity, power failure, telemetry, vandalism, operator error, flooding etc.
Recycled Water Reticulation and Use	Risks associated with the storage and distribution of recycled water to users and considered areas such as equipment failure, demand, unauthorized usage, water quality, security, power failure etc.
Management	General operation management issues risks that may impact operational reliability or supply surety.

Risks have been summarise at Attachment E as the detailed preliminary risk assessment contains information that is commercial in confidence.

Drinking Water Risk Assessment

In undertaking the preliminary risk assessment, risks were identified across the following areas:

Area	Descriptions

Supply	Consideration of the potential risk associated with the supply of drinking water from a public water authority
Potable Water Reticulation and Use	Risks associated with the storage and distribution of drinking water to users and considered areas such as equipment failure, demand, unauthorized usage, water quality, security, power failure etc.
Management	General operation management issues risks that may impact operational reliability or supply surety.

Risks have been summarise at Attachment F as the detailed preliminary risk assessment contains information that is commercial in confidence.

Attachment A Qualitative Risk Assessment Criteria as per the AGWR

Risk Matrix - Australian Guidelines for Water Recycling

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

Likelihood (qualitative measures)

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

Consequence or impact (qualitative measures)

Level	Descriptor	Example description
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 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 specias. Widespread on-site and off-site impacts.

Note:
1. The levels used for "Likelihood" have been changed to be the same as the ADWG i.e. A = Almost certain. In the AGWR A = Rare

Attachment B Qualitative Risk Assessment Criteria as per the ADWG

Risk Matrix - Australian Drinking Water Guidelines

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

Likelihood (qualitative measures)

Level	Descriptor	Example description
A	**Almost certain**	Is expected to occur in most circumstances.
B	**Likely**	Will probably occu in most circumstances.
C	**Possible**	Might occur or should occur at some time.
D	**Unlikley**	Could occur at some time.
E	**Rare**	May occur only in exceptional circumstances.

Consequence or impact (qualitative measures)

Level	Descriptor	Example description
1	**Insignificant**	Insignificant impact, little disruption to normal operation, low increase in normal operation costs.
2	**Minor**	Minor impact for small population, some maneagable operation design interuption, some increase in operating costs.
3	**Moderate**	Minor impact for large population, signicificant modificaiton to nornal operation but manageable, operation costs increased, increased monitoring.
4	**Major**	Major impact for small population, systems significantly compromised and abnormal operation if at all, high level of monitoring required.
5	**Catastrophic**	Major impact for large population, complete failure of system.

Attachment C Flow's Qualitative Risk Assessment Criteria

Risk Matrix - Flow Systems

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

Attachment C Flow's Qualitative Risk Assessment Criteria *cont.*

Likelihood (qualitative measures)

Level	Descriptor	Example description (Flow)
A	Almost certain	Expected to occur in most circumstances. Greater than 90% chance of occurrence. More than once per year.
B	Likely	Will probably occur in most circumstances. 65%-90% chance of occurrence Once in 1-2 years
C	Possible	Might occur or should occur at some time. 35%-65% chance of occurrence Once in 2-5 years
D	Unlikley	Could occur in unusual circumstances. 10%-35% chance of occurrence. Once in 5- 20 years.
E	Rare	May occur only in exceptional circumstances. Less than 10% chance of occurrence. Once in 20 years

Consequence or impact (qualitative measures)

Level	Descriptor	Example description
1	Insignificant	No material financial consequence to Flow Cost <$10k 1-2 customers impacted. Little disruption to normal operation, low increase in normal operation costs.
2	Minor	Some financial consequences to Flow Cost $10k-100k. 2-10 customers or a whole street impacted. May require notification but no other extraordinary activities. Some manageable operation disruption, some increase in operating costs.
3	Moderate	Considerable financial consequences to Flow. Cost $100k-$250k. Subdivision of community or whole development stage impacted. Significant negative consequences requiring additional actions to rectify. Negative client / customer reaction but temporary. Significant modification to normal operation but manageable, operation costs increased, increased monitoring.
4	Major	Material financial consequences to Flow Cost $250k-$1 million. Whole community impacted. High likelihood of adverse client/ customer reaction (e.g. lawsuits). May lose some clients / customers permanently. Systems significantly compromised and abnormal operation if at all, high level of monitoring required.
5	Catastrophic	Such significant financial consequences to Flow that its ability to operate is threatened. Cost > $1 million. More than one community impacted. Adverse client / customer reaction (e.g. lawsuits). Permanent loss of multiple clients / customers. Flow's key point of contact with IPART in the short term. Complete failure of systems.

Attachment D – Preliminary Risk Assessment Summary - Sewage

Risk ID	Component	Potential Risk	Pre-mitigation Risk	Controls	Post-mitigation Risk (or residual risk)
SW 1.1	Whole of system	Failure of overarching sewer management plan	**Very High**	• Additional controls as listed for each individual risk below. • **Preventive:** • Business Management System (BMS) independently verified to the International Standards ISO 9001 for quality management, ISO 14001 for environmental management and ISO 45001 for safety management • Regular audits by auditors from the regulator's (IPART) independent panel of auditors. • Regular internal process and compliance audits are a component of the Flow BMS. • Review of resource requirements as part of Flow's business planning and budgeting process. • Annual review of BMS and water quality management plans. • Regulator oversight and enforcement action. • Skilled and trained operators. • Competency based training system. • **Detective:** • Consumer complaints • Operator inspections • **Reactive:** • Incident & Emergency Management Plan and associated processes to ensure a rapid and effective incident response and to prevent incident escalation. • Incident Notification Protocol with NSW Health to ensure risks to public health are controlled quickly • Qualified contractors engaged to provide rapid response to faults and emergencies including sewage overflows. • Pollution incident notification as per POEO Act requirements	**Low**
SDW 1.1	Delivery of developer works	Delays in construction and delivery of infrastructure by developer	**High**	• Compliance Certificate only issued when developer completes works • If works delayed, developer pays bond to Flow and Flow will deliver infrastructure • Early identification of contingency measures through modelling. • Project management processes. • Generators if delay related to connection to power. • Other reactive contingency measures dependent on service i.e. : sewage tankering, drinking water tankering, deployment of extra pumps	**Minimal**
SDW 1.2	Delivery of Local Water Centre	Delays in construction and delivery of Local Water Centre by Flow	**Very High**	• ISO 9001 certified project management processes to ensure timely delivery of infrastructure • Early identification of contingency measures through modelling. • Sewage tankering • Provision of drinking water through recycled water network.	**Minimal**
SC 1.3 SC 1.4	Collection system (Sewer main)	Sewage escape from sewer main due to third party damage	**High**	• Dial Before You Dig (DBYD) • Survey prior to invasive site work • Physical and mechanical protection on mains • Customer and community complaints and response process • Customer communications	**Low**

SL 1.6 SL 1.10	Local Water Centre (Flow Balance Tank)	Overflow from tank	**Very High**	• Design, production, installation and testing by qualified contractors and quality assurance to AS3735 Water Retaining Structures. • Standby pumps and emergency alarms • Incident and Emergency Management Plan and associated processes to ensure rapid response and mitigation.	**Low**
SL 1.8 SL 1.9 SL 1.10	Local Water Centre (Flow Balance Tank)	Operational failure	**Very High**	• Duty / standby of equipment • Monitoring and controls • Proactive maintenance regime • Experienced operators • Trade waste agreement • Tankering company on emergency callout contract. • Customer Complaints Program • Continuous monitoring and alarms • Diversion to Public Water Utility	**Low**
SL 1.11	Local Water Centre	Inability to service customers	**Very High**	• Duty / standby of equipment • Storage within the Flow Balance Tank • Skilled operators • Monitoring and controls • Overflow relief • Tankering company on emergency callout contract • Drinking water top up to recycled water tanks.	**Minimal**

Attachment E – Preliminary Risk Assessment Summary – Recycled Water

Risk ID	Component	Potential Risk	Pre-mitigation Risk (or	Controls	Post-mitigation Risk (or residual risk)
RW 1.1	Whole of system	Failure of overarching recycled water quality plan	**Very High**	• See SW1.1	**Low**
RDW 1.1	Delivery of developer works	Delays in construction and delivery of infrastructure by developer	**Very High**	• Compliance Certificate only issued when developer completes works • If works delayed, developer pays bond to Flow and Flow will deliver infrastructure • ISO 9001 certified project management processes including project meetings, program updates, and reporting. • Generators if delay related to connection to power. • Other reactive contingency measures dependent on service i.e. : sewage tankering, drinking water tankering, deployment of extra pumps	**Minimal**
RDW 1.2	Delivery of Local Water Centre	Delays in construction and delivery of Local Water Centre by Flow	**Very High**	• ISO 9001 certified project management processes to ensure timely delivery of infrastructure • Early identification of contingency measures through modelling. • Sewage tankering • Provision of drinking water through recycled water network.	**Minimal**
RC 1.2 RC 1.3	Collection System	Raw sewage characteristics are outside of design influent parameters	**Very High**	• Design influent parameters based on industry guidelines for water efficient homes. • Treatment process log reduction is greater than the minimum for required uses. • Community education i.e. new owner information packs, newsletters, school experience programmes etc. used to inform the public on what can be disposed of down the sewer. • Trade Waste Agreements with retail and commercial users • Multiple treatment barrier approach • Automatic plant shutdown when critical control points are breached. • Key process parameters are monitored and alarms generated should these indicate a toxic event • Ability to tanker from LWC balance tank or divert to public water utility sewer (if applicable) • Incident and Emergency Management Plan and Processes • Incident notification protocol with NSW Health	**Low**
RL 1.1 RL 1.6 RL 1.8 RL 1.13	Local Water Centre	Process equipment damage / failure	**Very High**	• Duty / standby of equipment • Spares of critical equipment on site • Monitoring and controls • Proactive maintenance regime • Experienced operators • Incident and Emergency Management Plan and associated processes to ensure rapid response and mitigation. • Tankering company on emergency callout contract • Drinking water top up.	**Low**
RL 1.2 RL 1. 4	Local Water Centre	Process performance outside operational parameters	**Very High**	• Duty / standby of equipment • Inlet and product water buffer storage • Spares of critical equipment on site • Monitoring and controls • Proactive maintenance regime	**Low**

RL 1. 7 RL 1. 9 RL 1.12				• Experienced operators • Incident and Emergency Management Plan and associated processes to ensure rapid response and mitigation • Drinking water top up • Tankering company on emergency callout contract.	
RL 1.3 RL 1.5	Local Water Centre	Tank failure	**High**	• Design, production, installation and testing by qualified contractors and quality assurance to AS3735 Water Retaining Structures • Level monitoring • Incident and Emergency Management Plan and associated processes to ensure rapid response and mitigation • Tankering company on emergency call out contract.	**Low**
RL 1.11	Local Water Centre	Supply of chemicals is exhausted or degraded/poor quality	**Very High**	• Tanks sized appropriately and procedure in place for when to reorder chemicals. • Chemical supply from a reputable supplier. • Skilled operators with documented operational procedure • Chemical storage tanks are fitted with level devices to ensure levels are continuously monitored.	**Low**
RL 1.15	Local Water Centre	Chemical spill	**Very High**	• Chemicals stored within weatherproof, bunded area as per Australian standards • Chemical loading area within bunded area • Chemical delivery procedures • Trained and inducted delivery drivers • Operator inspections • Spill response procedure • Tankering company on emergency callout contract • Incident and Emergency Management Plan and processes	**Low**
RL 1.16	Local Water Centre	Incorrect chemical delivery	**Very High**	• Operators on site and supervise chemical deliveries • Chemical supply agreements and operational procedures • Chemical delivery procedures including signage and labelling • Trained and inducted delivery drivers • Tankering company on emergency callout contract • Incident and Emergency Management Plan and processes • Spill response procedure.	**Low**
RL 1.17 RL 1.18 RL 1.19 RL 1.20	Local Water Centre	Disaster Emergency such as fire, lightning, vandalism, theft, power failure	**Very High**	• In the event of power failure onsite back-up generator used to maintain key process units. • Regular maintenance of back up generator • Ability to source an offsite generator as a backup • UPS system installed to ensure control and access to the plant is still maintained. • Top-up with drinking water • Firefighting system for the LWC • Incident and Emergency Management Plan and processes	**Low**
RL 1.23 RL 1.24	Local Water Centre	Poor aesthetics / Noise	**Very High**	• Local Water Centre has been designed to blend in with the local environment whilst not hiding its core activity. • Building layout has been designed to facilitate scheduled visits from interested stakeholders. • All odour generating equipment has been fitted with covers and odour treatment as required.	**Minimal**

				• Odour modelling has been undertaken to confirm that expected impact on surrounding stakeholders is negligible. • All noise generating equipment has been fitted with acoustic covers. Further acoustic treatment has been provided on the Local Water Centre building. • Noise modelling has been used to confirm that expected impact on surrounding stakeholders is negligible. • Incident and Emergency Management Plan and processes	
RL 1.25	Local Water Centre	PLC / SCADA failure	**Very High**	• Local Water Centre can continue operation in the event telemetry is lost. • Automatic LWC shutdown on PLC failure • Operating procedure to respond to PLC failure • Data capture will continue on the local SCADA and PLC. • Plant would shut down if parameters were out of specification. • Top up with drinking water • Software and hardware back up • Supply agreement with telemetry with emergency response provision	**Minimal**
RD 1.1 RD 1.2	Recycled Water Distribution	Tank overflow / failure	**Low**	• Design, production, installation and testing by qualified contractors and quality assurance • Incident and Emergency Management Plan and associated processes to ensure rapid response and mitigation • Tankering company on emergency callout contract	**Low**
RD 1.3 RD 1.4	Recycled Water Distribution	Cross connection	**Very High**	• Recycled water kept at lower pressure than drinking water thereby mitigating recycled water entering the system • Colour coded, different materials, labelled pipes and marker tape • QA inspections of house plumbing by NSW Office of Trading prior to handover / operation • Plumbing inspections triggered by DA process • OFT inspection and Flow's cross-connection plumbing check pre-conditions to Flow's connection of sewerage • QA checks on reticulation installation prior to handover to Flow (and Flow's issue of Certificate of Compliance) • Home builder education (website, Builders Guide) • Customer education (website, home owners guide, including translated services) • Backflow prevention at each house connection • Telemetry monitoring of drinking and recycled water usage to identify anomalous use	**Low**
RD 1.5	Recycled Water Distribution	Recycled water is used for unauthorized purposes	**Very High**	• Colour coded, different materials, labelled pipes and marker tape • Information packs will be supplied to householders on initial connection or with change of ownership. These information packs will clearly define the authorised uses for the recycled water. • Community education on recycled water / website • Signage on recycled water taps • Monitoring of drinking and recycled water usage to identify anomalous use	**Low**

RD 1.6	Recycled Water Distribution	Process equipment damage / failure	**Moderate**	• Pumps are installed duty / standby with automatic changeover. • Maintenance contractor to be engaged under standard protocols to investigate cause of pump failure. • Maintenance contractor to be engaged under emergency protocols to repair pump(s) or install temporary pump or repair leak. • Preventive maintenance on pumps • Reticulation pipe work will be provided with a number of valves enabling isolation of parts of the network • Incident and Emergency Management Plan and processes.	**Minimal**
RD 1.7	Recycled Water Distribution	Main break leading to discharge of recycled water	**Moderate**	• Reticulation pipe work will be provided with a number of valves enabling isolation of parts of the network. • Maintenance contractor to be engaged under emergency protocols to repair leak. • High quality recycled water • Dial Before You Dig (DBYD) • Automatic shut down on high flow • Looped reticulation design and construction • Highlighting of single supply mains as high priority on DBYD where looping not possible • Pressure monitoring of the network for early alert of leaks • Mechanical vehicle protection on storage tanks (height restrictions, bollards) • Detectable marker tape over all mains	**Low**
RD 1.9	Recycled Water Distribution	Demand exceeds supply	**Moderate**	• Recycled water storage sized at >5 days of average production. • Drinking water used to maintain supply if the recycled water storage tank drops below a minimum level. • Membrane tank over-sized to allow for the option of stormwater harvesting to supplement the source water supply.	**Minimal**
RD 1.10	Recycled Water Distribution	Health impact from exposure to water features	**Very High**	• Signage indicating use of recycled water in water features and proper use • High quality recycled water has low risk of health impact • Information packs and community education • Incident and Emergency Management Plan and processes	**Low**
RD 1.11	Recycled Water Distribution	Supply exceeds demand	**Very High**	• Implement Integrated Water Cycle Management (IWCM) Policy and regularly review scheme specific IWCM Plan. • Seek additional recycled water customers • Monitor volumes, demands and trends and adjust operations to suit.	**Low**
EU 1.1 EU 1.2 EU 1.3 EU 1.5 EU 1.6 EU 1.7 EU 1.8 EU 1.9 EU 1.10	End Uses	Health impact from exposure to recycled water through customer end uses	**High**	• Multiple barrier treatment process • Regular audits by auditors from the regulator's (IPART) independent panel of auditors. • Regular internal process and compliance audits are a component of the Flow BMS. • Information packs will be supplied to householders on initial connection or with change of ownership. These information packs will clearly define the authorised uses for the recycled water. • Community education on recycled water / website	**Low**

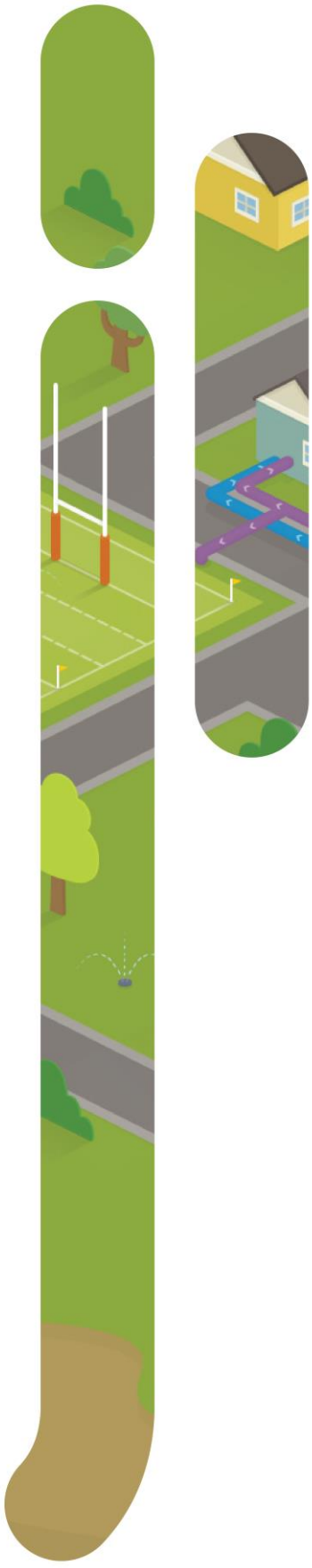
EU 1.3 EU 1.8 EU 1.9	End Uses	Environmental impact from recycled water runoff	**High**	• Multiple barrier treatment process • Regular audits by auditors from the regulator's (IPART) independent panel of auditors. • Regular internal process and compliance audits are a component of the Flow BMS. • Flow/customer agreements which allow Flow to communicate authorised purposes, associated health and environmental risks and required risk controls. • Customer education for appropriate end uses (website, home owners guide, including translated services)	**Low**

Attachment F – Preliminary Risk Assessment Summary – Drinking Water

Risk ID	Component	Potential Risk	Pre-mitigation Risk (or	Controls	Post-mitigation Risk (or residual risk)
DW 1.1	Whole of system	Failure of overarching drinking water quality plan	**Very High**	• Additional controls as listed for each individual risk below. • **Preventive:** • Business Management System (BMS) independently verified to the International Standards ISO 9001 for quality management, ISO 14001 for environmental management and ISO 45001 for safety management • Regular audits by auditors from the regulator's (IPART) independent panel of auditors. • Regular internal process and compliance audits are a component of the Flow BMS. • Review of resource requirements as part of Flow's business planning and budgeting process. • Annual review of BMS and water quality management plans. • Regulator oversight and enforcement action. • Skilled and trained operators. • Competency based training system. • **Detective**: • Consumer complaints • Operator inspections • **Reactive:** • Incident & Emergency Management Plan and associated processes to ensure a rapid and effective incident response and to prevent incident escalation. • Incident Notification Protocol with NSW Health to ensure risks to public health are controlled quickly • Qualified contractors engaged to provide rapid response to faults and emergencies including sewage overflows. • Pollution incident notification as per POEO Act requirements.	**Low**
DDW 1.1	Delivery of developer works	Delays in construction and delivery of infrastructure by developer	**High**	• Compliance Certificate only issued when developer completes works • If works delayed, developer pays bond to Flow and Flow will deliver infrastructure • ISO 9001 certified project management processes including project meetings, program updates, and reporting. • Generators if delay related to connection to power. • Other reactive contingency measures dependent on service i.e. : sewage tankering, drinking water tankering, deployment of extra pumps	**Minimal**
DC 1.1 DC 1.2	Catchment (Connection to Public Water Utility)	Out of specification drinking water quality supplied by Public Water Utility	**Very High**	• Utility Services Agreement with supplying water authority obliging the need to meet ADWG in supply water • Agreed communications protocols between local water utility and supplying water authority forming part of the USA • Accredited laboratory water quality testing by Flow Systems (quarterly grab samples and upon incident notification) • Customer complaints and response procedure • Incident notification protocols with Public Health Unit and determine appropriate public health response	**Moderate**

DC 1.3	Catchment (Connection to Public Water Utility)	Interruption to supply	**Moderate**	• Utility Services Agreement between local water utility and supplying water authority • Agreed communications protocols between local water utility supplying water authority forming part of the USA • Pressure monitoring at or near the bulk supply points • Provide tankered / bottled water • Incident and Emergency Management Plan and processes	**Low**
DD 1.1 DD 1.2	Drinking Water Distribution	Main break	**Very High**	• Dial Before You Dig (DBYD) • Mechanical vehicle protection on storage tanks (height restrictions, bollards) • Detectable marker tape over all mains • Spare repair fittings kept on site • As recycled water is supplied for up to 60% of home water demand, the consequence is already mitigated • Isolation valves on reticulation to allow isolation of sections	**Low**
DD 1.3 DD 1.4	Drinking Water Distribution	Recycled water cross connection	**Very High**	• Recycled water kept at lower pressure than drinking water thereby mitigating recycled water entering the system • Colour coded, different materials, labelled pipes and marker tape • QA inspections of house plumbing by NSW Office of Trading prior to handover / operation • Plumbing inspections triggered by DA process • OFT inspection and Flow's cross-connection plumbing check pre-conditions to Flow's connection of sewerage • QA checks on reticulation installation prior to handover to Flow (and Flow's issue of Certificate of Compliance) • Home builder education (website, Builders Guide) • Customer education (website, home owners guide, including translated services) • Backflow prevention at each apartment and building connection • Cross connection testing	**Moderate**
DD 1.5	Drinking Water Distribution	Loss of supply / pressure	**High**	• Pump provide in duty / standby • Supply recycled water to non-potable use (reduced impact on potable use) • Tankered / bottled water • Continuous pressure monitoring	**Low**
DD 1.6 DD 1.7	Drinking Water Distribution	Chemical leaching into supply	**Very High**	• New system, new materials • Pipework designed to Australian Standards AS4020:2005 • Commissioning testing • Asset management and maintenance inspections • Accredited laboratory water quality testing (grab samples and upon incident notification)	**Low**

Drinking Water Quality Plan (DWQP)



Contents

Recycled Water Quality Plan (RWQP)

Contents

flow

Infrastructure Operating Plan (IOP)

Contents

Sewage Management Plan

Contents