QUEANBEYAN-PALERANG REGIONAL COUNCIL GOOGONG, BUNGENDORE, BRAIDWOOD, CAPTAINS FLAT AND QUEANBEYAN (RETICULATION) SEWERAGE SCHEMES

POLLUTION INCIDENT RESPONSE MANAGEMENT PLAN

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Public Works Advisory - A division of the Department of Finance & Services

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Foreword

The Pollution Incident Response Management Plan (PIRMP) has been prepared to assist staff in the management of pollution incidents at Queanbeyan-Palerang Regional Council's sewerage schemes including sewage treatment plants (STPs) and the sewage reticulation systems. Details for each STP and associated reticulation system are documented in the different chapters in the PIRMP.

The plan ensures that, where possible, pollution incidents are avoided but if they do occur they are managed appropriately to minimise the effects on the environment and to human health.

The objectives of this PIRMP are:

- to communicate in a timely manner and with sufficient detail about a pollution incident to relevant authorities and people outside the facilities who may be affected by the impacts of the pollution incident;
- to minimise and control the risk of any pollution incident occurring at the facilities by identification of risks and the development of planned actions to minimise and manage those risks; and
- to ensure that the plan is properly implemented by trained staff, identifying persons responsible for implementing it, and ensuring that the plan is regularly tested for accuracy, currency and suitability.

This PIRMP addresses the requirements under the POELA Act 2011.

This management plan is to be reviewed and tested annually by the Manager Utilities (MU).

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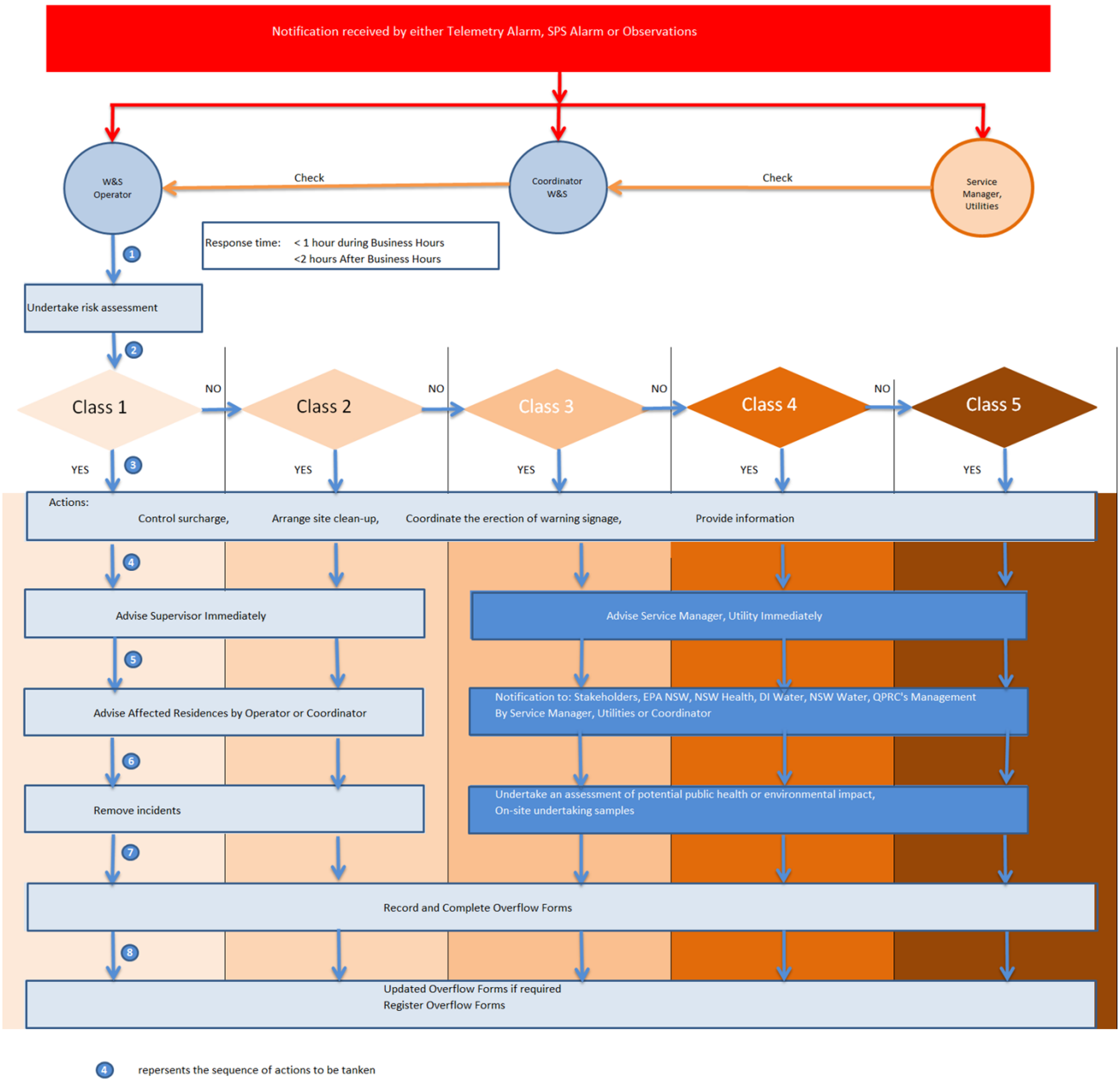
1 Summary

The communication protocols are defined in dealing with pollution incidents of:

- Sewage surcharge from sewerage reticulation systems;
- Process failure and storm bypassing at Sewage Treatment Plants (STPs); and
- Chemicals leaking and spilling at STPs.

Figure S - 1: Incident Notification Process Chart



2 Introduction

Three (3) PIRMPs were developed for each of the former Palerang based sewerage scheme in 2012. Those PIRMPs have been reviewed and updated to capture changes which have occurred since 2012, and integrated into Version 1 of this PIRMP to cover the sewerage schemes. Version 2 (and subsequent versions) have now incorporated the Googong Sewerage Scheme and the greater Queanbeyan reticulation system. The Queanbeyan STP (QSTP) is located in the ACT and as such is not specifically covered by this plan.

2.1 Scope of the PIRMP

The scope of the plan is as follows:

- Description and likelihood of hazards
- List pre-emptive actions to be taken
- Provide inventory of pollutants
- List required safety equipment
- List contact details
- Provide communication strategy communicating with neighbours and the local community
- Minimise harm to persons on the premises
- Maps showing location of scheme components
- Actions to be taken during or immediately after a pollution incident
- Staff training

2.2 Structure of the PIRMP

The PIRMP covers QPRC's NSW based sewerage schemes, comprising the sewage treatment plants (STPs) and their associated sewerage reticulation systems for Googong, Bungendore, Braidwood and Captains Flat. The common elements and principles applicable to all the plants and systems are documented in the front of the PIRMP and elements specific to each scheme are detailed in separate sections of the plan.

The plan also covers the reticulation component of the Queanbeyan City sewerage system. The Queanbeyan Sewage Treatment Plant (QSTP) is located within the ACT and thus is regulated by ACT EPA under that jurisdiction's Environmental Approval 0417.

3 Context of the Assessment

3.1 Background

A new provision under the *Protection of the Environment Legislation Amendment Act* (POELA) 2011 is the requirement to prepare, keep, test and implement a pollution incident response management plan for each environmental protection licence that Council holds.

The objectives of these plans are to:

- communicate in a timely manner and with sufficient detail about a pollution incident to relevant authorities and people outside the facilities who may be affected by the impacts of the pollution incident;
- minimise and control the risk of any pollution incident occurring at the facilities by requiring identification of risks and the development of planned actions to minimise and manage those risks; and
- ensure that the plan is properly implemented by trained staff, identifying persons responsible for implementing it, and ensuring that the plan is regularly tested for accuracy, currency and suitability.

The NSW EPA defines a "pollution incident" as follows;

> " an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur. It includes an incident or set of circumstances in which a substance has been placed or disposed of on premises, but it does not include an incident or set of circumstances involving only the emission of any noise."

A pollution incident is required to be notified if there is a risk of "material harm to the environment", which is defined in section 147 of the POEO Act as:

> "(a) harm to the environment is material if:
>
> (i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or
>
> (ii) it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations), and
>
> (b) loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment."

Industry is required to report pollution incidents *immediately* to the EPA, NSW Health, Fire and Rescue NSW, SafeWork NSW and the local council. "Immediately" has its ordinary dictionary meaning of promptly and without delay. These strengthened provisions will ensure that pollution incidents are reported directly to the relevant response agencies so they will have direct access to the information they need to manage and deal with the incident in as quickly as is practical.

3.2 Council Commitment

Queanbeyan-Palerang Regional Council is committed to protecting the health of the public, the environment and its workers. This commitment has been formalised and is contained in Council's Annual Reports and Council's charter which is shown below.

Local Government Act - Council's Charter

The Local Government Act contains a Charter for Local Government which describes the approach to supplying services and activities. It charges local government with a number of responsibilities:

- to provide directly or on behalf of other levels of government, after due consultation, adequate, equitable and appropriate services and facilities for the community and to ensure that those services and facilities are managed efficiently and effectively;
- to exercise community leadership;
- to exercise its functions in a manner that is consistent with and actively promotes the principles of multiculturalism;
- to promote and to provide and plan for the needs of children;
- to properly manage, develop, protect, restore, enhance and conserve the environment of the area for which it is responsible, in a manner that is consistent with and promotes the principles of ecologically sustainable development;
- to have regard to the long term and cumulative effects of its decisions;
- to bear in mind that it is the custodian and trustee of public assets and to effectively account for and manage the assets for which it is responsible;
- to engage in long-term strategic planning on behalf of the local community;
- to exercise its functions in a manner that is consistent with and promotes social justice principles of equity, participation and rights;
- to facilitate the involvement of councillors, members of the public, users of facilities and services and council staff in the development, improvement and co-ordination of local government;
- to raise funds for local purposes by the fair imposition of rates, charges and fees, by income earned from investments and, when appropriate, by borrowings and grants;
- to keep the local community and the State government (and through it, the wider community) informed about its activities;
- to ensure that, in the exercise of its regulatory functions, it acts consistently and without bias, particularly where an activity of the council is affected; and
- to be a responsible employer.

3.3 Regulatory and Formal Requirements

The regulatory and formal requirements applicable to the Council's sewerage schemes are shown in **Table 3-1**. These legislative and licensing requirements, and guidelines are to be met to ensure the protection of environmental and public health and to satisfy work health and safety (WHS) requirements. This management plan addresses how these requirements are to be met.

Table 3 - 1: Formal and Regulatory Requirements

Parameter	Instrument	Responsible Agency
Overall Scheme Operation	Water Management Act 2000	Department of Industry - Water (DoI Water)
	Local Government Act 1993	Office of Local Government administers, or shares responsibility for administering this Act
	Protection of Water Catchments	Southern Rivers Region Catchment Department of Industry - Water
Public Health	Part 2 General public health; Part 9, Division 1 Public health officers of Public Health Act 2010	NSW Health
Environmental Health	S116 Leaks, spillages and other escapes; S120 Prohibition of pollution of waters 142A Pollution of land; Part 5.7A Duty to prepare and implement PIRMP of Protection of the Environment Operations Act 1997 Protection of the Environment Legislation Amendment Act 2011 Environment Protection Licence *No. 1929 for Captains Flat STP* *No. 1733 for Braidwood STP* *No. 201 for Bungendore STP*	NSW EPA
WHS	*Work Health and Safety Act 2011* (WHS Act) and the WHS Regulations.	SafeWork NSW
Plumbing	All pipe work associated with recycled water schemes is to be installed in accordance with AS/NZS 3500 (Plumbing and Drainage Code: Standards Australia 1996-2003)	Queanbeyan-Palerang Regional Council

The Manager Utilities of Queanbeyan-Palerang Regional Council is responsible for the review and evaluation of this plan and for meeting the regulatory and other requirements.

4 Roles, Responsibilities and Contact Details

4.1 Stakeholder Responsibilities and Engagement

Council has committed to operating its STPs and collection systems in a responsible manner. Effective stakeholder engagement is necessary to fulfil this commitment. ***Table 4-1*** presents the stakeholders involved in the operation of the STPs and collection systems, sets out their roles and the communication expected to occur to achieve safe operation of the plants and collection systems. Further information on the operation of the system and communication protocols is addressed later in this plan.

Table 4 - 1: Stakeholder Responsibilities and Engagement

Stakeholder	Responsibility	Communicates with	Reason
Queanbeyan-Palerang Regional Council Manager Utilities	Overall scheme operation/ responsibility	Co-ordinator Water and Sewerage, East Co-ordinator Sewage Treatment (West QSTP & Googong) Co-ordinator Water and Sewerage, West	Overall Management of Sewer Schemes
	Updates and audits PIRMP	Co-ordinator Water and Sewerage, East	Management of operations staff
	Ensures staff and inducted and trained appropriately	Co-ordinator Water and Sewerage, East	Management of operations staff
	Communication with agency	NSW Health	Health advice, reporting incidents
	Communication with agency	NSW EPA	Reporting on Licence compliance, reporting incidents
	Communication with agency	Local Community	Advice where required during incidents
	Communication with agency	SafeWork NSW	Reporting of injuries and accidents where required.
	Communication with agency	Local Catchment Authority	Reporting of spills
	Environmental compliance. Emergency response.	Co-ordinator Water and Sewerage, East Sewage Treatment Plant Operators/WRP Operators	Monitoring for environmental compliance to Council, collecting samples, testing, assessment and reporting during incidents.
	Emergency response.	Queanbeyan-Palerang Regional Council Manager Environment & Compliance	Third party testing and public health liaison
Queanbeyan-Palerang Regional Council **Co-ordinator Water and Sewerage (East)**	Management of scheme operation and maintenance, emergency response	Sewage Treatment Plant (STP) Operators Team Leader WRP	Management of operations staff, reporting issues regarding operation, maintenance and

Stakeholder	Responsibility	Communicates with	Reason
Co-ordinator Sewage Treatment (West QSTP & Googong)			compliance to Council, resolving site issues,
Queanbeyan-Palerang Regional Council **STP/WRP Operators**	Day to day operation of STPs and collection system, response to emergencies	Co-ordinator Water and Sewerage, East	Communicates issues regarding operation, maintenance and compliance
Police /Fire brigade/HAZMAT/ Ambulance/ SES	Response to emergencies	Queanbeyan-Palerang Regional Council Manager Utilities Co-ordinator Water and Sewerage, East	Response to spills, injuries, accidents

4.2 List of Contact Details

The contact details of the stakeholders are listed below in ***Table 4-2***.

Table 4 - 2: Stakeholder Contact Details

Name	Position and Organisation	Phone
Queanbeyan-Palerang Regional Council	After-hours contact number	1300 735 025
	Council during business hours	1300 735 025
	Manager Utilities	0429 200 294
	Co-ordinator Water & Sewerage East	0427 467 670
	Co-ordinator Sewage Treatment (West QSTP & Googong)	0428 422 162
	Co-ordinator Water & Sewerage West	0439 071 250
	Co-ordinator Utilities Technical	0408 752 802
	Manager Environment & Compliance	0428 623 448
	Team Leader Pump Stations (QBN)	0402 971 120
	Oncall Plumber (Queanbeyan AH)	0428 072 822
	Team Leader Googong WRP Operations	0419 931 120 (BH) 0487 034 419 (AH)
	Bungendore W&S Operator	0429 447 649
	Captains Flat W&S Operator	0428 826 494
	Braidwood W&S Operator	0428 887 992
	Co-ordinator Open Spaces	0448 260 386
	Manager, Transport & Facilities	0409 447 294
	Manager Customer, Communication & Libraries	0478 402 933

Name	Position and Organisation	Phone
	Director Infrastructure Services	0497 027 288
	General Manager	0427 752 690
Local Neighbourhoods	Bungendore Public School	(02) 6238 1317
	Bungendore Pre-School (Turallo Tce)	(02) 6238 1423
	Milestones Early Leaning (Bungendore)	(02) 6238 1315
	Bungendore Swimming Pool	(02) 6238 1775
	Captains Flat Public School	(02) 6236 6253
	Captains Flat Pre-School (Foxlow St.)	(02) 6236 6333
	Captains Flat Swimming Pool	(02) 6236 6264
	Braidwood Public School	(02) 4842 2249
	St Bedes Primary School	(02) 4842 2413
	Braidwood Pre-School (66 Wilson St.)	(02) 4842 2128
	Braidwood Swimming Pool	(02) 4842 2240
	The Anglican School Googong	(02) 6154 9400
	Our Place Early Learning Googong	(02) 6299 2510
	Anglicare Googong Early Learning Centre	(02) 6154 9420
	Aquatots Swim School Googong	(02) 6162 0507
Agencies	NSW EPA	131 500 (02) 6229 7002 (Claudine Jeffery)
	NSW Health	0407 060 237 (Tabitha Holliday)
	NSW Health	0427 004 992 (Peter Harrington)
	Department of Industry - Water	0439 248 718 (Tad Ledwos)
	NSW Police	131 444 1800 725 631 000
	NSW Fire and Rescue	000

4.3 List of Council Contact Details

The contact details of Council are listed in ***Appendix A.***

4.4 Council Procedures for Contacting Staff to Respond to a Possible Incident

For incidents occurring during work hours:

- All critical Shire based SPS telemetry alarms received by Manager Utilities, Co-ordinator Water and Sewerage West and W&S Operators simultaneously.
- All Googong based SPS telemetry alarms are received by the Manager Utilities, Co-ordinator Water & Sewerage West and the Team Leader Pump Stations simultaneously

- All Googong WRP based telemetry alarms are received by both the Manager Utilities and the Team Leader Googong WRP Operations or on-call operator as appropriate.
- Manager Utilities and/ or Co-ordinator will call associated W&S Operator to check whether the alarm is received and what actions to be taken.
- Remedial actions to commence in less than 1 hour.

For incidents occurring outside work hours:

- All critical shire based SPS telemetry alarms received by Manager Utilities, Co-ordinator Water and Sewerage East and W&S Operators simultaneously.
- All critical City (inc Googong) based SPS telemetry alarms received by Manager Utilities, Co-ordinator Water and Sewerage West and Oncall Plumber simultaneously.
- Manager Utilities and/ or Co-ordinator East will call associated W&S Operator to check whether the alarm is received and what actions to be taken.
- Manager Utilities and/ or Co-ordinator West will call Oncall Plumber to check whether the alarm is received and what actions to be taken.
- All critical Googong WRP and Hill 800 reservoir-based telemetry alarms will be received by Manager Utilities, Co-ordinator Sewage Treatment (West QSTP & Googong) and oncall WRP operator simultaneously.
- Remedial actions to be taken less than 2 hours.

All works are undertaken to comply with the relevant Safe Work Method Statement(s) and appropriate action report forms are completed.

5 Communicating with Neighbours and the Community

To determine the appropriate communication strategy for an incident, the incident needs to be categorised. Once categorised, the prescribed communication strategy can be deployed.

5.1 Incident Classification

QPRC developed overflow/ bypass classification, which will be used to assess occurred incidences. The Overflow/ bypass classification is shown in ***Table 5.1***.

Table 5 - 1 Overflow/ Bypass Classification.

Class Level	Type	Definitions
Class 1	Reticulation	Spill is entirely contained within a localised ***non-public area***[1] < 100 m^2 and with insignificant/ minor spill volume.
	Treatment	Failure of treatment system between 6 hours and 8 hours. **OR** Length of storm bypass between 6 hours and 8 hours.
Class 2	Reticulation	Spill is entirely contained within a localised ***public area***[2] < 100 m^2 and with insignificant/ minor spill volume. **OR** Spill is entirely contained within a localised ***non-public area*** > 100 m^2 **OR** with major spill volume.
	Treatment	Failure of treatment system between 8 hours and 10 hours. **OR** Length of storm bypass between 8 hours and 10 hours. **OR** Chemicals spill is entirely contained within the bund area and with significant/ minor spill volume.
Class 3	Reticulation	Spill is entirely contained within a localised ***public area*** > 100 m^2 **OR** significant spilled volume. **OR** Any contained spill that has encroached onto a high-risk public area[3].
	Treatment	Failure of treatment system between 10 hours and 12 hours. **OR** Length of storm bypass between 10 hours and 12 hours. **OR** Chemicals spill is entirely contained within the bund area and with major spill volume.
Class 4	Reticulation	Spill is not contained. **AND** Effluent has entered reticulated stormwater or waterways. **AND** insignificant/ minor volume of effluent enters waterway.
	Treatment	Failure of treatment process > 12 hours. **OR** Length of storm bypass > 12 hours. **OR** Chemicals spill is not contained within the bund area and with insignificant/ minor spill volume.
Class 5	Reticulation	Spill is not contained. **AND** Effluent has entered reticulated stormwater or waterways. **AND** major volume of effluent enters waterway.

Note:

1: non-public area is the area that the public does not have ready access.

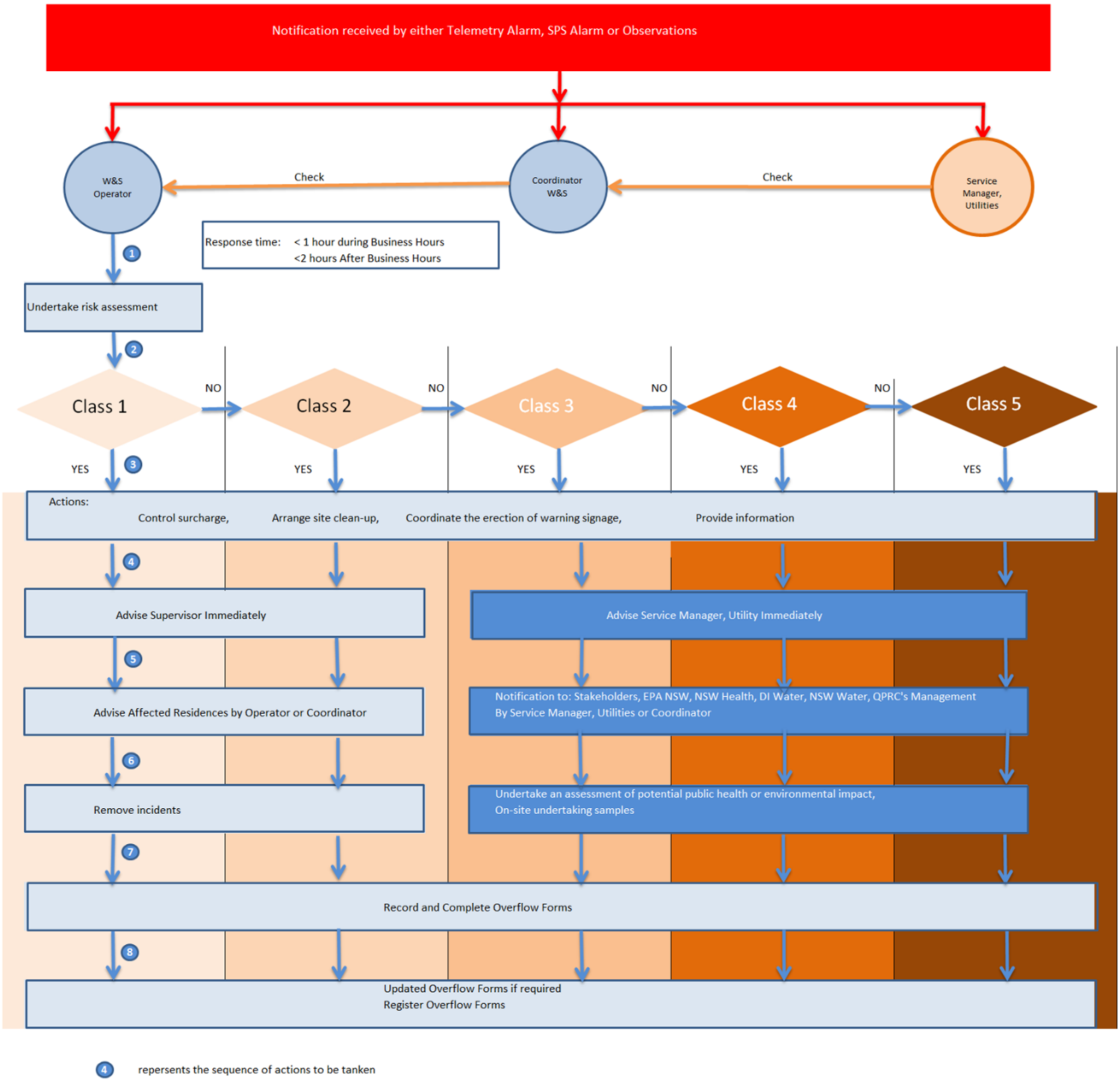
2: public area is the area that members of the public have ready access.

3: high risk public area is a public area that was near a school or pre-school, near a hospital or nursing home or in a very high traffic pedestrian area e.g. main street

5.2 Notification Process

The following chart (***Figure 5-1***) shows incident notification process to be undertaken for the identified incident levels.

Figure 5 - 1 Communication Protocol



When an incident occurs, an alarm may be populated on mobile phones of Manager Utilities, Co-ordinator of Water and Sewerage (East or West) (W&S) and associated W&S Operators, Oncall Plumbers or WRP Operator simultaneously. Alternatively, incidents may be reported directly by other stakeholders.

The W&S Operator, WRP Operator, Oncall Plumber or Team Leader Pump Stations will attend the incident site within one (1) hour of being advised (during business hours) and two (2) hours of being advised (after hours) to undertake the following assessments and actions:

- undertake risk assessment;
- take actions to control the incident;

- advise the Co-ordinator W&S (East or West – as appropriate) immediately where required.
- advise affected neighbourhoods in consultation with the relevant Co-ordinator W&S where required.
- Remove/ rectify the incident;
- Record the incident and complete incidents forms; and
- Upgrade the incident form if required and archive the incidents forms.

If the incident is defined as above class 2 incident after risk assessment, the **Co-ordinator W&S or Team Leader Googong WRP Opertions (as appropriate)** will inform **Manager Utilities** immediately and assist the **Manager Utilities** to advise **Government Agencies** and also assist Council's **Manager Environment & Compliance** to undertake environmental assessment and on-site sampling if required.

This procedure will form part of the Operator training and awareness.

5.3 **Workplace Incidents**

The following incidents and injuries must be reported to SafeWork NSW:

- Notifiable incidents involving a fatality or a serious injury or illness,
- Notifiable incidents involving a fatality or serious injury or illness to other people at your workplace,
- Notifiable incidents that present a serious risk to health and safety at your workplace (dangerous incidents), and
- Other incidents involving an injury or illness where workers compensation is payable.

Details on Workplace Incidents refer to Council's WHS policies and procedures.

5.4 Investigation of Incidents and Emergencies

Following any incident or emergency situation, including any "near misses", an investigation will be undertaken by Council's delegated Officer and all involved staff debriefed to discuss performance and address any issues or concerns.

The investigation will consider factors such as:

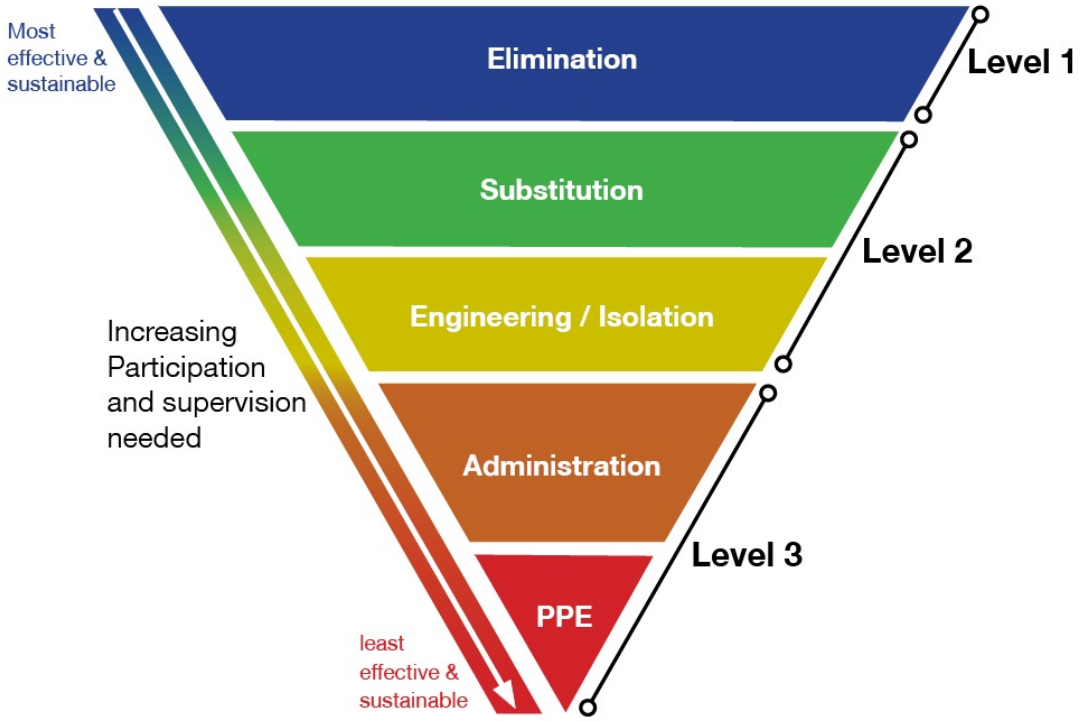
- What was the initiating cause of the problem?
- How was the problem first identified or recognised?
- What were the most critical actions required?
- What communication problems arose and how were they addressed?
- What were the immediate and longer-term consequences?
- How well did the protocol function?

6 Preventative Actions to be Undertaken

The preventative actions or measures to manage and minimise the risk to human health and the environment involve a hierarchy of controls approach. The hierarchy of controls, in order of preference, are as follows ***(Figure 6-1)***:

- Elimination
- Substitution
- Engineering means
- Administrative
- Personal protection equipment (PPE)

Figure 6 - 1: Hierarchy of Control



These are readily broken down to the following classification of management strategies:

- Appropriate design of the facilities;
- Appropriate operation and monitoring; and
- Appropriate education and training.

The identified current preventative actions are shown in this section.

6.1 Reticulation System

Reticulation system overflows can principally occur from four main causes. They are:

- Power/mechanical failure at pumping stations;
- Reticulation system blockage/leakage;
- Rising main breakage (leaks or major failure); and

- Excessive inflows/infiltration

6.1.1 Gravity Sewer System

Overall the Council's reticulation systems are in a good condition and have sufficient capacity for detention of sewage within the reticulation system and sewage pumping stations. The number of overflows or incidents per kilometre of pipeline per year would be considered low by industry standards. Council uses water jetting equipment (eg ***Figure 6-2***) to clear blockages. Blockages in reticulation mains occur infrequently. The main cause is tree root intrusions but can also occur due to foreign objects lodging in the pipelines.

Council records indicate, apart from minor seepages due to blockages in pipelines, few major overflow events have occurred in the reticulation system in the recent past.

Council will respond to overflows within one (1) hour during business hours and two (2) hours after business hours.

Unusual excessive inflows (> design peak wet weather flow (PWWF)) may occur during extreme flood events if reticulation manholes become inundated and the inflow is greater than the pumping station capacity.

Other possibilities for sewer overflows include illegal connection of storm water pipes and low-lying gullies or boundary traps.

Figure 6 - 2: Water Jetter Stored at Sewage Treatment Plant

6.1.2 Rising Mains

Rising main breaks can either cause small or large leaks. Small leaks are difficult to identify but cause little damage. Large breaks may be detected from the sudden change in pump efficiency and drop in operating performance, although they would more likely be discovered and reported by stakeholder advice. Council's operators would stop the pumps, contain any spill and call in a pumper truck to empty out the rising main so the main can be prepared. Rising main breaks are rare.

6.2 Pumping Stations

The likelihood of overflows from SPSs can be minimised by the provision of the following;

- Adequate pumping capacity
- Reliable power supply.
- Emergency power generation (portable diesel generator).
- Ability to store 8 hours ADWF flows before an overflow occurs.
- Ability to detect and respond to abnormal operating conditions via telemetry system and, in some circumstances, visual alarm light (flashing) in the events of power failure, pump failure, etc.
- Availability of standby pumps (duty/ standby operation).
- MultiSmart pump controller (***Figure 6-3***) and telemetry remote terminal unit (RTU) ***(Figure 6–4***) are examples of what are installed at the majority of each SPS to control pump's operation remotely.
- Spare infrastructure available.
- Implementation of effective emergency plan/operational procedures for attending to failure and breakdown within the system.
- Flood protection.

6.2.1 Adequate Pumping Capacity

All of the SPSs within the Council's Sewerage Scheme have sufficient pumping capacity for present and provision of variable speed pumps at the main SPSs and fixed speed pumps for other SPSs.

6.2.2 Reliable Power Supply

Council has a relatively reliable power supply. Generally power outages have been less than 4 hours in duration. While not common, power failures of extended duration are possible, but are usually planned outages.

6.2.3 Emergency Power Generation

In case of power failure each SPS has a generator connection point ***(Figure 6-5***). This allows Council to connect one of its diesel generators ***(Figure 6-6)*** to the SPS SCA to operate the pumps. The relevant operator will look up the SPS details, and the appropriate generator will be dispatched.

Figure 6 - 3: MultiSmart Pump Controller

Figure 6 - 4: Telemetry Remote Terminal Unit (RTU)

Figure 6 - 5: Diesel Generator Connection Point at Each SPS

Figure 6 - 6: Diesel Generators Stored at Sewage Treatment Plant

6.2.4 Provision of Emergency Storage

A sewerage system must have sufficient capacity to store sewage, which continues to flow from the catchment during extended mechanical breakdowns or electrical failures. Each of the SPSs is designed to have 8 hours of ADWF emergency storage from the inflows from its immediate catchment.

6.2.5 Telemetry System

All the SPSs in Council's Sewerage Schemes are controlled via a telemetry system and displayed on the SCADA screen ***(Figure 6-7)***. The operation of each SPS can also be controlled by smart phones. Level sensors ***(Figure 6-8)*** are installed in each of sewage pumping station and connected to Council's telemetry system. Instances of power outages, mechanical failure, and high-level alarms are transmitted to smart phones of Manager Utilities, Co-ordinator W&S and relevant W&S Operator. The W&S Operator will go to sites to undertake an incident assessment and take subsequent immediate actions.

Some SPSs have a visual alarm light ***(Figure 6-9)*** mounted on the top of their SPS's switchboard to show flashing light when SPSs failure.

Figure 6 - 7: SPSs SCADA Screen on Water and Sewerage Arrangement

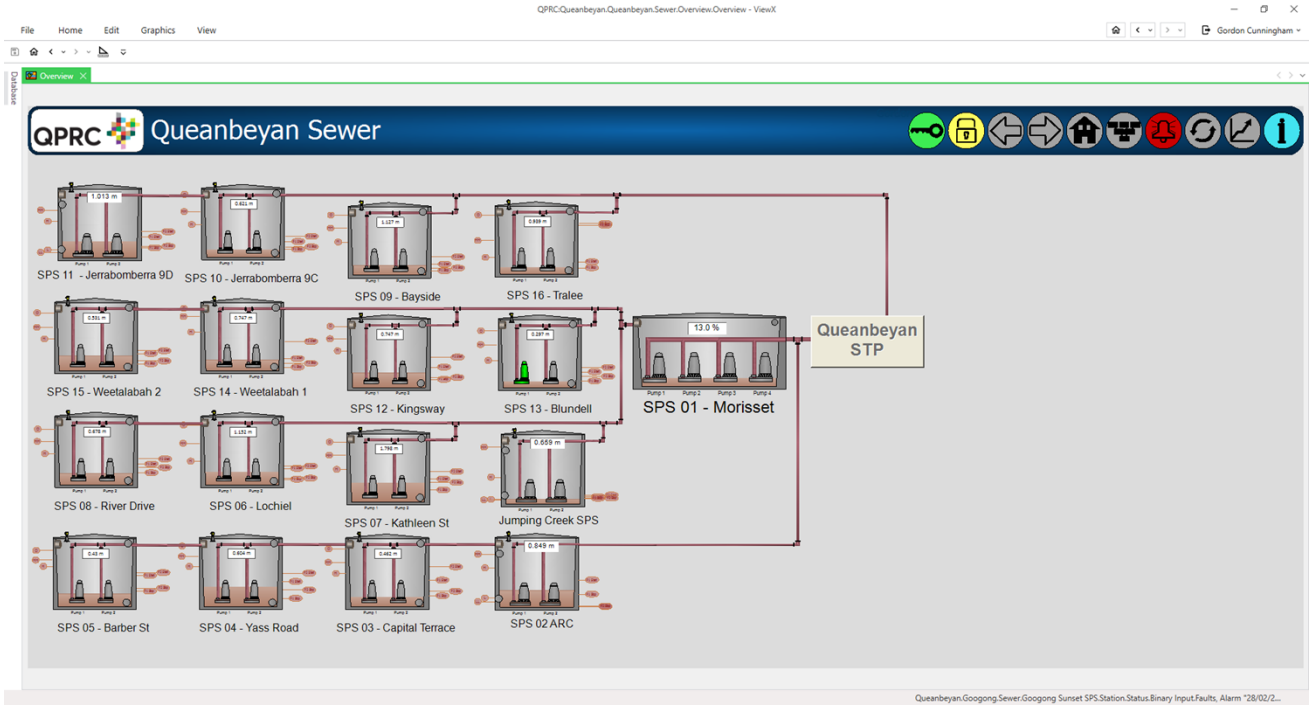


Figure 6 - 8: Typical QPRC SPS Level Sensors Arrangement

Figure 6 - 9: Typical Installation for Visible Alarm Light

6.2.6 Standby Pumps

All SPSs have duty and standby pumps installed (100%). If the duty pump fails, the standby pump will operate automatically. Some stations have duty/assist/standby arrangements.

6.2.7 Control Arrangement

If a SPS is overflowing, the Council's operators will shutdown upstream sewage pumps manually to prevent further overflowing in the SPS. This control arrangement can be done manually and remotely.

6.2.8 Spare Parts

Council has spare MultiSmart pump controllers/RTUs and telemetry units in case of those control unit's failure. Council also has a range of spare submersible sewage pumps which can be used at SPS should a pump failure occur at an SPS. The spare pumps are stored at the different STPs.

6.2.9 Response Times to Abnormal Operating Conditions

Council has advised that the response time for Operator attendance to any abnormal operating condition would generally be less than one (1) hour during business hours and two (2) hours after business hours.

6.2.10 Flood Protection

SPSs in flood prone areas have been protected by lifting the SCA above the 1% AEP flood level and sealing the SPS well covers.

6.3 Sewage Treatment Plant Bypass

The Council has four (4) STPs, all STPs have the capacity to treat design inflows to meet EPA licence requirements. All STPs have a SCADA system and a telemetry system installed. This means that each STP is monitored continuously. Alarms triggered by the SCADA system will alert the Manager Utilities, Co-ordinator W&S (East), W&S Operators and WRP Operators (as the case may be) simultaneously by sending text message on their smart phones.

The respective Operator would then respond to the alarm by attending the STP/WRP. The Operators live relatively locally to the STP which provides ready response to any treatment problem events.

A bypass may occur in wet weather conditions. In wet weather, all storm inflows are directed into the inlet works for primary treatment then are bypassed to the storm pond, effluent pond or emergency detention tank (EDT) for storage if required. If these storm detention ponds or effluent ponds are full then overflows will discharge into an adjacent area or waterway. The overflow will be measured and recorded on the plant SCADA.

The alarms will be populated on the SCADA screen and the message will be sent to the Manager Utilities, Co-ordinator W&S, and W&SWRP Operators simultaneously when overflowing from the storm pond or effluent pond occurs.

6.4 Sewage Treatment Plant Chemical Spills

In general, Council's STPs use chemicals such as aluminium sulphate (Alum/Alphos) and sodium hypochlorite in the treatment process. The Googong WRP uses a wider array of chemicals such as ferric sulphate, sodium hydroxide, acetic acid, citric acid, sodium hypochlorite, aluminium sulphate, polymer and sodium bisulphate. In all cases however, the chemicals are stored in chemical storage tanks which are placed in bunds as a safety measure to contain any leakages. The bunds are designed to hold more than 100 % of the chemicals stored within the storage tank/s. The bund has a sump in the corner with a manual valve (kept in closed position during standard operation) which

allows stormwater to flow to the storm water system as required. A typical arrangement is shown in ***Figure 6-10.***

In the case of a minor spill, the spilled chemical is retained within the sump. From here it can be removed by truck or pumped back into the treatment process.

Major chemical spills will be retained in the bund, as the isolation valve will be in the closed position. The spilled chemicals would be removed from the bund by a vacuum/sucker truck tanker.

There is a sensor installed inside the bund to monitor leakages from a chemical storage tank at Braidwood STP only, therefore any chemicals spill in the bund area are detected by the level sensor and triggered an alarm on the SCADA screen. Googong WRP is similarly supported. For all other sites any chemical leaks will be detected via the Operator's routine check and inspection.

A number of other chemicals, such as gear oils or petrol, etc. are stored on sites with other equipment used in the maintenance of the facility. These is no chemical storage container used for storage of chemicals at each STP.

Safety showers and eyewash facilities are provided in the event of direct human contact with dangerous chemicals, those safety showers and eyewash facilities are required for maintenance on regular basis to achieve their functionality. A safety data sheet (SDS) shall be located at the STP/WRP office and chemical bund area.

Figure 6 - 10: Typical Chemical Storage Arrangement for QPRC STPs

7 Inventory of Pollutants and Treatment Chemicals

7.1 Inventory of Chemicals

A variety of chemicals are used in the treatment process and stored on-site.

The inventory for each STP is shown in ***Sections 12 to 15***.

Their safety data sheets (SDS) are placed in the operation room and chemicals storage area. Details of SDSs are included in **Appendix A**.

It is recommended that a chemical storage container should be provided at each STP to store various gear oils or petrol and chemicals.

7.2 Chemical Usage

The usage of chemicals used in the treatment of the sewage is recorded on the logbook and within the plant SCADA located in the respective plant operation rooms.

7.3 Other Pollutants – Sewage and Effluent

The other potential pollutants are:

- Sewage – within the collection system and at head of the STP,
- Effluent – produced at the STP,
- Sludge (including WAS and stabilised and/or dewatered biosolids) produced at the STP,
- Supernatant – produced at the STP,
- Screenings – produced at the STP inlet works,
- Grit – produced at the STP inlet works, and
- Contaminated stormwater.

8 Safety Equipment

Safety equipment and other devices that are provided on-site will minimise the risks to human health or the environment and contain or control a pollution incident. These will include any PPE, MSDS, monitoring devices, and spill containment facilities/equipment.

8.1 List of PPE Equipment Carried by Operators or Stored Onsite

The following PPE safety equipment (***Table 8-1***) is typically provided for each STP:

Table 8 - 1: List of PPE

Personal Protective Equipment	Location	Location
Hearing protection	STP	Operators Truck/WRP
Protective gloves	STP	Operators Truck/WRP
Dust mask	STP	Operators Truck/WRP
Safety glasses	STP	Operators Truck/WRP
Self-contained breathing apparatus (SCBA)	STP	Store room
Safety apron	STP	Operators Truck/WRP

8.2 List of Monitoring Devices

Council's Sewerage Schemes are fully covered by its LGA wide telemetry system. The following ***Table 8-2*** is a summary of the monitoring that occurs at the STP and SPS:

Table 8 - 2: List of Monitoring Devices

System	Monitoring Devices and Monitored Systems	Devices Alert
STP (Shire)	SCADA and telemetry system monitors: • Inlet works, • EA tanks, • Chemical dosing unit, • Reuse pumps, • UV system, and • Storm bypassing and overflowing	Manager Utilities Co-ordinator Water and Sewer (East) Water & Sewer Operator
SPSs (Shire)	Telemetry system monitors: • High and alarm levels, • Power failure, • Pump failure, • Motor power, and • Electrical failure.	Manager Utilities Co-ordinator Water and Sewer (East) Water & Sewer Operator
SPSs (City & Googong network)	Telemetry system monitors: • High and alarm levels, • Power failure, • Pump failure, • Motor power, and • Electrical failure	Manager Utilities Co-ordinator Water and Sewer (West) TL Pump Stations (BH) Oncall Plumber (AH)
WRP & Hill 800	SCADA and telemetry system monitors: • Inlet works, • EDT • 5 stage Bardenpho tanks • MOS tanks • Tertiary filtration system • Filtrate, Off Spec & RWST • Chemical dosing units, • Reuse pumps, • UV systems • Recycled and potable reservoirs (Hill 800) • Chemical dosing (Hill 800)	Manager Utilities Co-ordinator Sewage Treatment (West QSTP & WRP) TL Googong WRP (BH) Oncall WRP Operator (AH)

9 Minimising Harm to Persons on the Premises

9.1 Attendance Register

An attendance register is in place at each Plant. All visitors must sign in and out of each site.

9.2 Site Induction

Visitors are instructed to report to the site office where they receive plant induction from the STP/WRP Operator prior to access to treatment areas of each site.

9.3 Evacuation Procedure

The evacuation procedure is depicted on a plan as displayed in the amenities building/site office.

9.4 Emergency Assembly Point

The emergency assembly point, as indicated on the Evacuation Plan, is located near the entrance to the all STPs and is clearly sign posted on the wall of office.

10 Evaluation, Audit and Review for Continuous Development

10.1 Evaluation and Review

This PIRMP is required to be reviewed, tested and updated at least once every 12 months. Following the occurrence of a pollution incident, this PIRMP is to be updated within one month.

The evaluation will:

- Assess the relevance of the risk assessment against the current state of the plant,
- Identify any emerging problems and trends,
- Assess the communication between Council, Council's operational staff and regulators,
- Assist in determining priorities for improving procedures,
- Assessment of incidents and responses determined, and
- Determine when and what is to be audited in the next six months.

Evaluation of results described above will be documented and the plan updated.

Evaluation will be reported to Council and stakeholders.

10.2 Auditing

Auditing of the pollutant inventory is to be done annually.

An audit may also be triggered by a significant incident or if the process chemical is changed.

11 Assessment of the Risks

A part of the PIRMP a risk assessment has been undertaken for each scheme. The risk assessment has been based on a site inspection undertaken in October 2018 by PWA with QPRC staff.

The risk assessment has been undertaken on the following basis;

- Identification of the hazards
- Identification of hazardous events
- assessment of the likelihood of the event and other factors that may increase the likelihood
- assess the impacts
- assess the overall risk.

Shown in **Table 11-1**, **Table 11-2** and **Table 11-3** are the likelihood, impact and risk criteria used in the assessment.

The identified hazard events relating to the STP, SPS and mains are documented in the sections of different STPs in the PIRMP.

Table 11 - 1: Definitions of Likelihood

Level	Likelihood	Description
A	Almost certain	- The event is expected to occur often (several times per year)
B	Likely	- The event will probably occur often (once every 1-3 years)
C	Possible	- The event might occur at some time (once every 3 to 10 years)
D	Unlikely	- The event could occur at some time (once every 10 to 20 years)
E	Rare	- The event may occur only in exceptional circumstances (once every 100 years)

Table 11 - 2: Definitions of Impact

Level	Classification	Description
1	Insignificant	The overflow is extremely unlikely to drain to a local sensitive environment* and: - Where the overflow reaches waters, the volume of sewage likely to enter the waterways is insignificant with regard to the volume and flow of receiving waters, or - Where the overflow reaches land, it is likely to be contained in an area with little chance of public exposure within the maximum response time**.
2	Minor	The overflow is unlikely to drain to a local sensitive environment* and: - Where the overflow reaches waters, the volume of sewage likely to enter the waterways may be significant with regard to the volume and flow of receiving waters, or - Where the overflow reaches land, it is likely to be contained in an area where the public exposure is minimal given the maximum response time**.
3	Moderate	The overflow is likely to drain to a local sensitive environment* and: - Where the overflow reaches waters, the volume of sewage likely to enter the waterways is significant with regard to the volume and flow of receiving waters, or - Where the overflow reaches land, it may travel to an area where public exposure is low within the maximum response time**.
4	Major	The overflow is likely to drain to a local sensitive environment* and: - Where the overflow reaches waters, the volume of sewage likely to enter the waterway is high with regard to the volume and flow of receiving waters, or - Where the overflow reaches land, the public exposure risk is likely given the maximum response time**.
5	Catastrophic	The overflow is likely to drain to a local sensitive environment* and: - Where the overflow reaches waters, the volume of sewage likely to enter the waterways is high with regard to the volume and flow of receiving waters, or - Where the overflow discharges to land, the public exposure risk is high given the maximum response time**.

* A sensitive environment includes: a drinking water catchment or domestic groundwater source, or shellfish growing area, or protected water bodies, marine parks, ecological communities or conservation areas defined by legal an non-legal instruments, such as local environment plans (LEPs), State environmental planning policies (SEPPs), national parks, and class P or class S waters, or waterways used for primary contact recreation, or a recreational area or other area with high public exposure o associated health risk.

** Maximum response time should be based on the length of time taken for the licensee to detect the overflow, or for the overflow to be reported, and the time taken for the licensee to attend the site and secure against public contact

Table 11 - 3: Risk Analysis Criteria

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

12 Captains Flat Sewerage Scheme

The Captains Flat Sewerage Scheme services the township of Captains Flat. The township of Captains Flat is located 322 km south west of Sydney. Captains Flat currently has a population of approximately 500 people.

Captains Flat is in the QPRC Local Government Area (LGA). QPRC owns and operates the Captains Flat Sewerage Scheme that includes a sewage treatment plant (STP) and the collection system servicing the town.

The Captains Flat STP (***Figure 12 - 1***) is in Miners Road of the Captains Flat and has a design capacity of 500 (EP) Equivalent Persons.

12.2.1 **Sewage Treatment Plant and Collection System**

The Captains Flat STP comprises the following treatment /process units and discharges to Molonglo River:

- Inlet works - Inflow reception, screening, grit removal, flow measurement and flow division;
- Pasveer channel;
- Chemical dosing unit;
- UV disinfection unit;
- On-site reuse unit;
- Emergency storage ponds;
- Sludge lagoons; and
- Sludge drying beds.

The Captains Flat sewerage collection system comprises the following:

- Gravity mains
- Sewage pumping station (SPS 1)
- Rising main (from SPS 1)

The STP and the collection system operate under Environmental Protection Licence (EPL) No. 1929 granted by the NSW Environment Protection Authority (EPA) that is renewed annually. The licence may be reviewed after completion of augmentation.

Effluent quality limitations on EPA licence are summarized in ***Table 12-1***.

Table 12 - 1: Pollutant List – Sewage and Effluent for Captains Flat STP

Parameter	Typical Raw Sewage	Effluent (90 percentile) *	Effluent (100 percentile) *
Biochemical oxygen demand (BOD_5)	270 mg/L	<10 mg/L	< 20 mg/L
Suspended solids (SS)	270 mg/L	<10 mg/L	<15 mg/L
Total nitrogen (TN)	53 mg/L	<8 mg/L	<10 mg/L
Ammonia	12 mg/L	<2 mg/L	<5 mg/L
Total phosphorus (TP)	11 mg/L	<0.5 mg/L	<1 mg/L
Oil and grease (O&G)	< 10 mg/L	<2 mg/L	< 10 mg/L

Parameter	Typical Raw Sewage	Effluent (90 percentile) *	Effluent (100 percentile) *
Faecal coliforms (FC)	1,000,000 cfu/100 mL	<100 cfu/100ml	<200 cfu/100ml
pH	6.5 - 8.5		6.5 – 8.5

* Licence Conditions

Figure 12 - 1: Captains Flat STP Location

12.2 Types of Pollution Incidents

12.2.1 STP Overflowing or Bypass

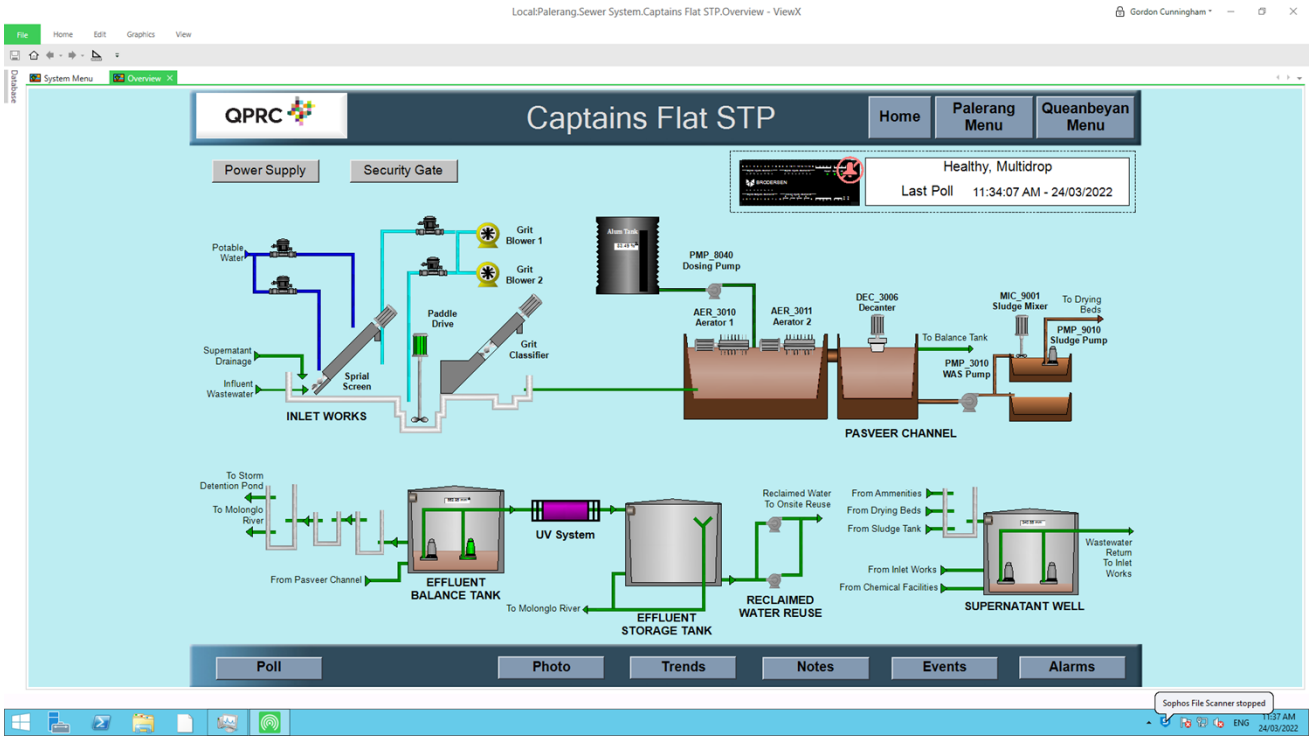
The Captains Flat STP is a small STP, which has a storm pond to store storm water during wet weather conditions, and storm water will be pumped back to the receival chamber of the inlet works during dry weather condition in the future. An overflow or bypass may occur when exceptional prolonged wet weather inflows occur, which fills the storm detention pond, overflows into the existing effluent storage pond and discharges into Molonglo Creek.

Equipment failure may occur at the plant leading to poor quality effluent being discharged, however, sufficient standby equipment is kept and personnel are available to ensure any failures are rectified quickly.

The plant has a SCADA system *(**Figure 12-2**)* and a telemetry system. This means that the STP is monitored continuously. Alarms triggered by the SCADA system will alert the Manager Utilities, Co-ordinator W&S and W&S Operators by sending their text messages simultaneously.

The Operator would then respond to the alarm by attending the STP. The Operators live locally to the STP which provides ready response to any treatment problem events.

Figure 12 - 2 Captains Flat STP SCADA Screen



12.2.1.1 Dry Weather

Generally, unless exceptional circumstances such as malfunction of systems due to mechanical/ electrical failure or blockages occur, overflows or bypasses of poor quality effluent at the STP in dry weather flow conditions are extremely unlikely as they would likely be contained within the Storm Detention Pond.

The following overflow or bypass events that could occur are shown below. Also shown are the appropriate management strategy to minimise the possible effects;

- Inlet works bypass
  - blocked screens – telemetry alarm, flow to the bypass screens and go to the Pasveer.
  - screen failure – telemetry alarm, flow to the bypass screens and then go to the Pasveer.
  - power failure -- telemetry alarm, flow to the bypass screens and then go to the Pasveer.
- Aeration system
  - aerator system bearing failure - telemetry alarm, flow to the storm detention pond then return for treatment.
  - power failure - telemetry alarm, flow to the storm detention pond then return for treatment.
- SCA Failure
  - failure of SCA from fire - segregated boards.

12.2.1.2 Wet Weather

The STP is designed to treat all inflows with wet weather flows in excess of 3xADWF being diverted to the storm detention pond then returned for full treatment after the wet weather event has ended.

If the storm detention pond is full, storm water will overflow to the effluent storage pond and discharge into Molonglo River. There is no overflow measurement device to monitor this overflow.

12.2.2 **Sewage Pumping Station or Manhole Overflowing**

Overall the Captains Flat reticulation system is in a good condition and has sufficient capacity. The number of overflows or incidents per kilometre of pipeline per year would be considered low by industry standards. Council uses water jetting equipment to clear blockages. Blockages in reticulation mains occur infrequently. The main cause is tree root intrusions but can also occur due to foreign objects lodging in the pipelines.

Only one SPS is used in the Captain Flat sewerage, the SPS has been and now includes new pumps, new SCA and new access lids. This SPS has the following capacity and control methods to minimise the risk of overflows from a SPS:

- Adequate pumping capacity,
- Reliable power supply,
- Emergency power generation (portable diesel generator),
- Ability to store 8 hours at ADWF flows before an overflow occurs,
- Ability to detect and respond to abnormal operating conditions via telemetry system and visual alarm light (flashing) in the events of power failure, pump failure, etc.
- Availability of standby pumps (duty/ standby operation),
- Control arrangement,
- Spare infrastructure available,
- Implementation of effective emergency plan/operational procedures for attending to failure and breakdown within the system, and
- Flood protection.

The alarms on high level and high high level will be early warning alarms when sewage in SPSs has the potential of surcharging.

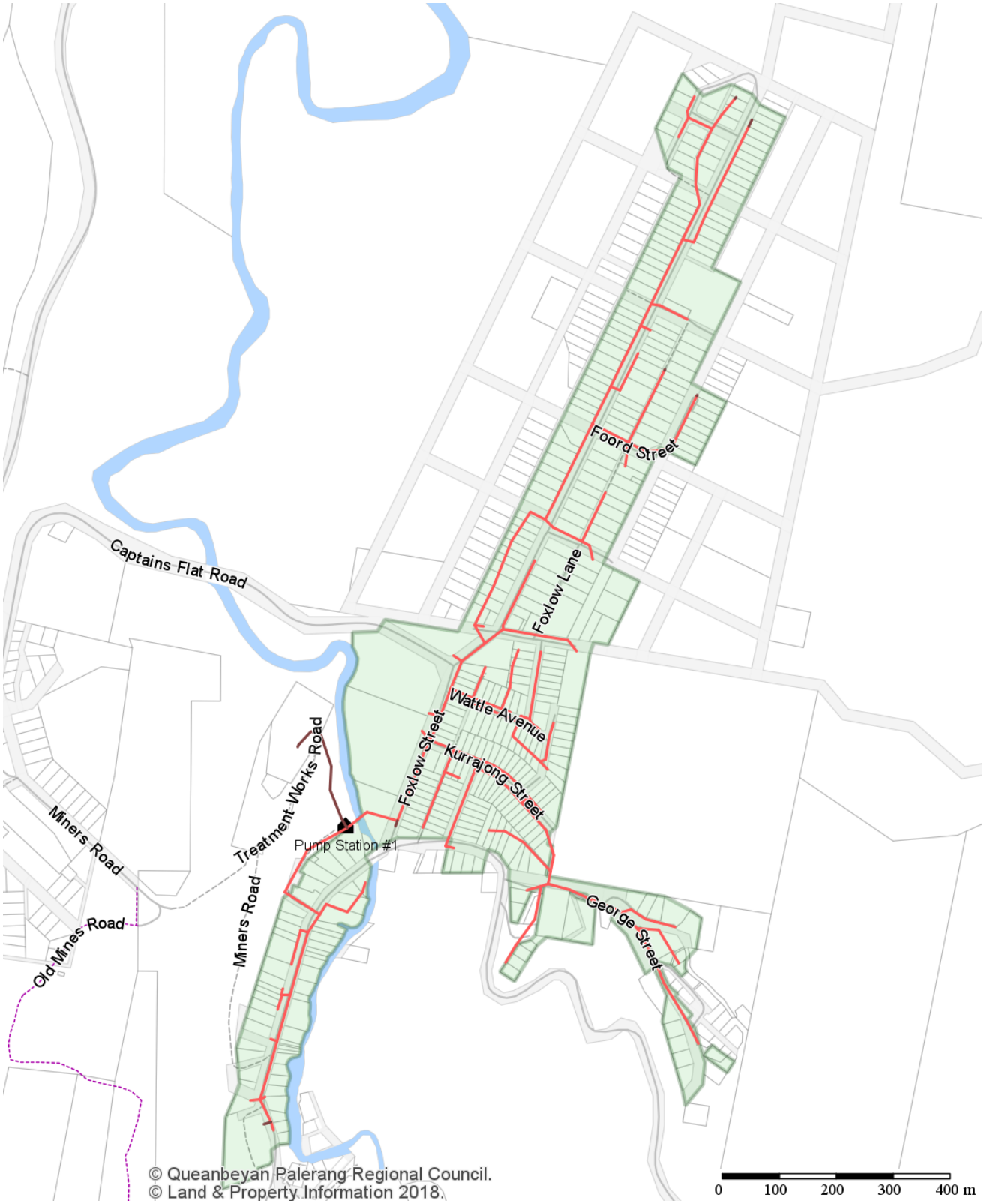
Council will respond to overflows once notified. The Manager Utilities, Co-ordinator W&S, W&S Operator can control and isolate upstream mains and SPS remotely vis a MultiSmart pump controller.

Overflows can also happen during unusual excessive inflows (>PWWF) which may occur during extreme flood events if reticulation manholes are inundated and the inflow is greater than the pumping station capacity.

Other possibilities for sewer overflows include illegal connection of storm water pipes and low-lying gullies or boundary traps.

The schematic of Captains Flat sewerage scheme is demonstrated in ***Figure 12-3.***

Figure 12 - 3: Captains Flat Sewerage Schematic



12.2.3 **Chemical Spill or Leakage**

The Captains Flat STP uses *Alphos* a proprietary aluminium sulphate solution for phosphorus removal. The chemical tank is installed inside a secure bund ***(Figure 12-4)***. Any leakage, breaks or spills from the chemical dosing system will be retained in the bund and flows into the sump. An

isolation valve is installed inside the sump and kept in closed position. A minor chemical spill in the sump would flow into the storm water pit when the isolation valve is opened manually, and then flows into the plant storm water system.

A major chemical spill would be retained in the bund, which is designed for holding whole tank's chemical volume. Any spills would be removed by tanker/vacuum truck.

A safety shower and eyewash facility is provided in the event of direct human contact with chemicals.

A chemical storage container should be provided after the augmentation of the STP is completed.

Figure 12 - 4: Not Used

12.2.4 **Odour Emission**

STP

There is no odour treatment unit used in the STP.

Reticulation System

There is no odour treatment unit used for the SPS.

12.3 Risk Assessment – Captains Flat STP and Collection System

Table 12 - 2: Risk Register for Captains Flat STP and Collection System

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
	STP								
1	**Sewage**	**Excessive inflows – bypass**	✓	✓	Likely	Wet weather	Minor	Moderate	Storm detention pond provided.
2	**Effluent**	**Septage upsets process**	✓	✓	Unlikely	Toxic waste	Insignificant	Low	No septage receival.
3	**Effluent**	**Toxic wastes upsets / kills process**	✓	✓	Unlikely	Trade waste discharges	Moderate	Low ***There is virtually no industry in the Captains Flat***	Trade waste policy. Routine plant monitoring.
4	**Effluent**	**Stormwater inflow to STP causing overflows**	✓	✓	Unlikely		Minor	Low	Plant designed to handle PWWF. All inflows pumped. Telemetry system. Inflow/ infiltration study including house inspections, smoke testing and targeted main relining. Operator attendance within 1 hour.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
5	**Effluent**	**Poor quality - disruption of plant**	✓	✓	Unlikely		Minor	Low	Telemetry system. Storm detention pond provided.
6	**Effluent**	**Poor quality - extended power failure**	✓	✓	Unlikely		Minor	Low	Reliable power system. Long outages would be planned. Units will provide some treatment. Telemetry system. Storm detention pond provided.
7	**Effluent**	**Poor quality - equipment failure**	✓	✓	Unlikely		Minor	Low	Standby capacity. SPS storage if required. Telemetry system. Operator attendance within 1 hour.
8	**Various Chemicals**	**Chemical spill**	✓	✓	Unlikely	Stop valve left open	Minor	Low	All chemicals are stored in secure bunded areas.
9	**Sludge**	**Spill from drying bed due to heavy rain**	✓	✓	Unlikely	Wet weather	Minor	Low	Bund beds
10	**Stored biosolids**	**Washed off site**	✓	✓	Unlikely		Minor	Low	Bund area

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
11	**Effluent**	**Fire - switch room**	✓	✓	Unlikely		Minor	Low	Segregated SCA. Telemetry Fire extinguisher.
12	**Effluent**	**STP flooded**	✓	✓	Rare		Minor	Low	STP is above 1 % AEP.
	SPS Near Waterways								
13	**Sewage**	**Overflow to River - extended power failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Reliable power system. Long outages would be planned. 8 hours at ADWF emergency storage Operator response less than 1 hour. Council has a generator. SCA have connection points.
14	**Sewage**	**Overflow to River - extended power failure unplanned**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Reliable power system. 8 hours ADWF emergency storage. Telemetry system. Operator response less than 1 hour Council has a generator. SCA have connection points.
15	**Sewage**	**Overflow to River - pump failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Duty and standby Pumps - Pumps maintained every 3 years. Spare pumps provided. 8 hours ADWF emergency storage Telemetry system. Operator response less than 1 hour.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
16	**Sewage**	**Overflow to River - electrical failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Telemetry system. Operator response less than 1 hour. Diesel pump and connection point. Spare SCA at depot. 8 hours ADWF emergency storage.
17	**Sewage**	**Overflow to River - flooding of SPS**	✓	✓	Rare	Wet weather event	Moderate	Low	Telemetry system. Operator response less than 1 hour. SCA above 1% AEP. 8 hours ADWF emergency storage
	SPS Not Near Waterways (It is on the banks of the Molonglo River)								
18	**Sewage**	**Overflow to Public area - extended power failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Reliable power system. Long outages would be planned. 8 hours ADWF emergency storage Operator response less than 1 hour. Council has generators. SCA have connection points.
19	**Sewage**	**Overflow to Public area - extended power failure unplanned**	✓	✓	Unlikely	Wet weather event	Minor	Low	Reliable power system. 8 hours ADWF emergency storage. Telemetry system. Operator response less than 1 hour Council has generators. SCA have connection points.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
20	**Sewage**	**Overflow to Public area - pump failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Duty and standby Pumps - Pumps maintained every 3 years Spare pumps provided. 8 hours ADWF emergency storage Telemetry system. Operator response less than 1 hour.
21	**Sewage**	**Overflow to Public area - electrical failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Telemetry system. Operator response less than 1 hour. Diesel pump and connection point. Spare SCA at depot. 8 hours ADWF emergency storage.
22	**Sewage**	**Overflow to Public area - flooding of SPS**	✓	✓	Rare	Wet weather event	Minor	Low	Telemetry system. Operator response less than 1 hour. SCA above 1 in 100 ARI. 8 hours ADWF emergency storage
	Gravity System								
23	**Sewage**	**Overflow due to blockage**	✓	✓	Moderate	Wet weather event	Minor	Low	Operator to call in tanker. Jet flush unit to clear. Operator response within 1 hour. Small volumes.
24	**Sewage**	**Discharge due to pipe break – ground movement/ earthquake**	✓	✓	Rare	Wet weather event	Major	Moderate	Operator to call in tanker. Operator response within 1 hour. Small volumes.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
25	**Sewage**	**Discharge due to pipe break – excavation works**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Dial before dig. Maintain up-to-date plan records.
	Rising Mains								
26	**Sewage**	**Discharge due to pipe break – poor pipe condition or high pressure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Flow/pump monitoring. Telemetry system.
27	**Sewage**	**Discharge due to pipe break – ground movement**	✓	✓	Rare	Wet weather event	Major	Moderate	Flow/pump monitoring. Telemetry system.
28	**Sewage**	**Discharge due to pipe break – excavation works**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Flow/pump monitoring. Telemetry system. Dial before dig. Maintain up-to-date plans.

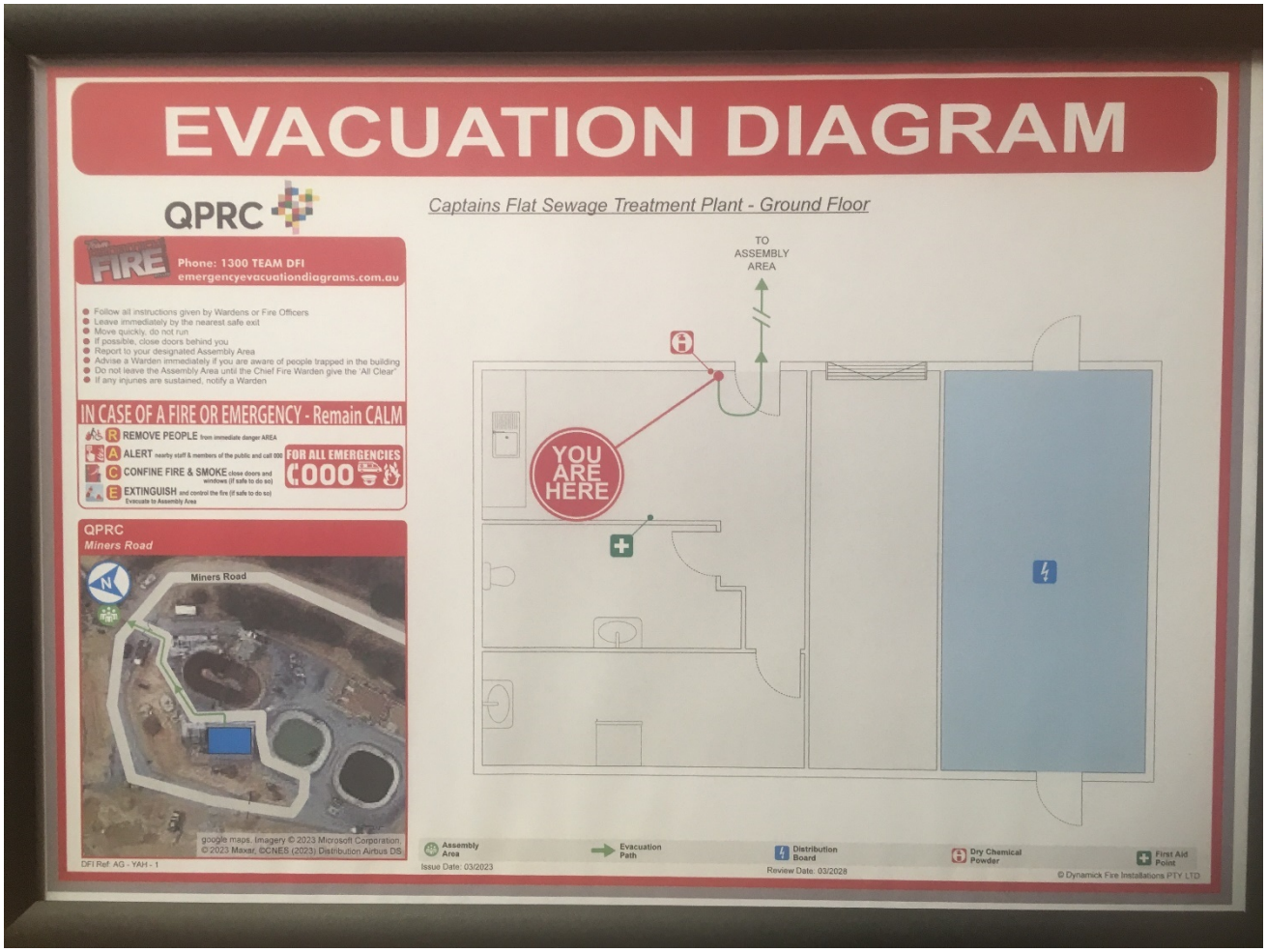
12.4 Evacuation Procedure

The evacuation procedure should be depicted on a plan as displayed in the amenities building/site office and reviewed periodically by the Manager Utilities.

12.5 Emergency Assembly Point

The emergency assembly point, as indicated on the Evacuation Plan, is located near the entrance to the STP and is clearly sign posted as shown in ***Figure 12-5***.

Figure 12 - 5: Captains Flat STP Emergency Evacuation Point



13 Bungendore Sewerage Scheme

The township of Bungendore is located 278 km southwest of Sydney. Bungendore is in the Queanbeyan-Palerang Local Government Area (LGA).

The Bungendore Sewerage Scheme currently services a total of around permanent population of 3,800 Equivalent Persons (EP). The Bungendore Sewerage Scheme that includes a sewage treatment plant (STP) (***Figure 13-1***) and the collection system servicing Bungendore.

13.1 Sewage Treatment Plant and Collection System

The Bungendore STP comprises the following treatment /process units:

- Inlet works Inflow reception, screening, grit removal, flow measurement, and flow division;
- 2 x IDEA reactors (a 3,000 EP (new), a 2,000 EP (old))
- Catch/balance pond;
- Effluent ponds;
- Alum dosing facilities;
- Sludge Lagoons;
- Sludge drying beds;
- UV disinfection system and
- Chlorination system.

The Bungendore sewage collection system comprises the following:

- Gravity mains;
- Eleven sewage pumping stations
- Rising mains (from each SPS).

The arrangement of all SPSs is shown in ***Figure 13-2*** below.

The STP and the collection system operate under Environmental Protection Licence (EPL) No. 201 granted by the NSW Environment Protection Authority (EPA) that is renewed annually.

Effluent quality limitations on EPA licence is summarized in ***Table 13-1***.

Table 13 - 1: Pollutant List – Sewage and Effluent for Bungendore STP

Parameter	Typical Raw Sewage	Effluent (90 percentile) *	Effluent (100 percentile) *
Biochemical oxygen demand (BOD_5)	270 mg/L	<5 mg/L	< 10 mg/L
Suspended solids (SS)	270 mg/L	<10 mg/L	< 15 mg/L
Total nitrogen (TN)	53 mg/L	<8 mg/L	<10 mg/L
Ammonia	12 mg/L	<2 mg/L	<5 mg/L
Total phosphorus (TP)	11 mg/L	<0.5 mg/L	<1 mg/L
Oil and grease (O&G)	< 10 mg/L	<2 mg/L	<10 mg/L
Faecal coliforms (FC)	1,000,000 cfu/100 mL	<100 cfu/100mL	<200 cfu/100 mL
pH	6.5 - 8.5		6.5 – 8.5

*Note: * Licence Conditions*

The Bungendore STP also now includes a recycled water component that treats a stream of treated effluent from the plant's catch pond to a standard suitable for uncontrolled use (namely open space irrigation and trucked dust suppression). A schematic of the plant is shown below.

Figure 13 - 1a: Bungendore STP Reuse flow diagram

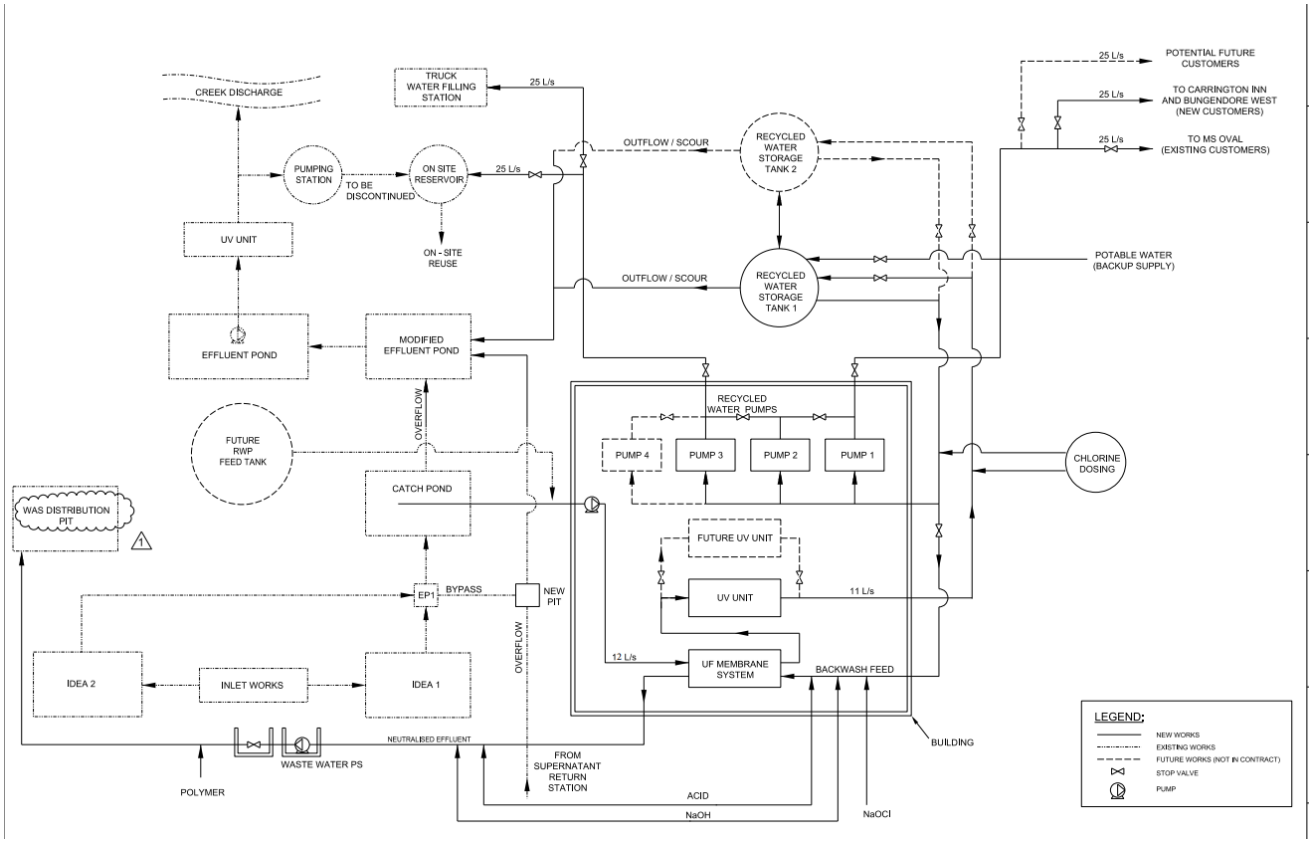


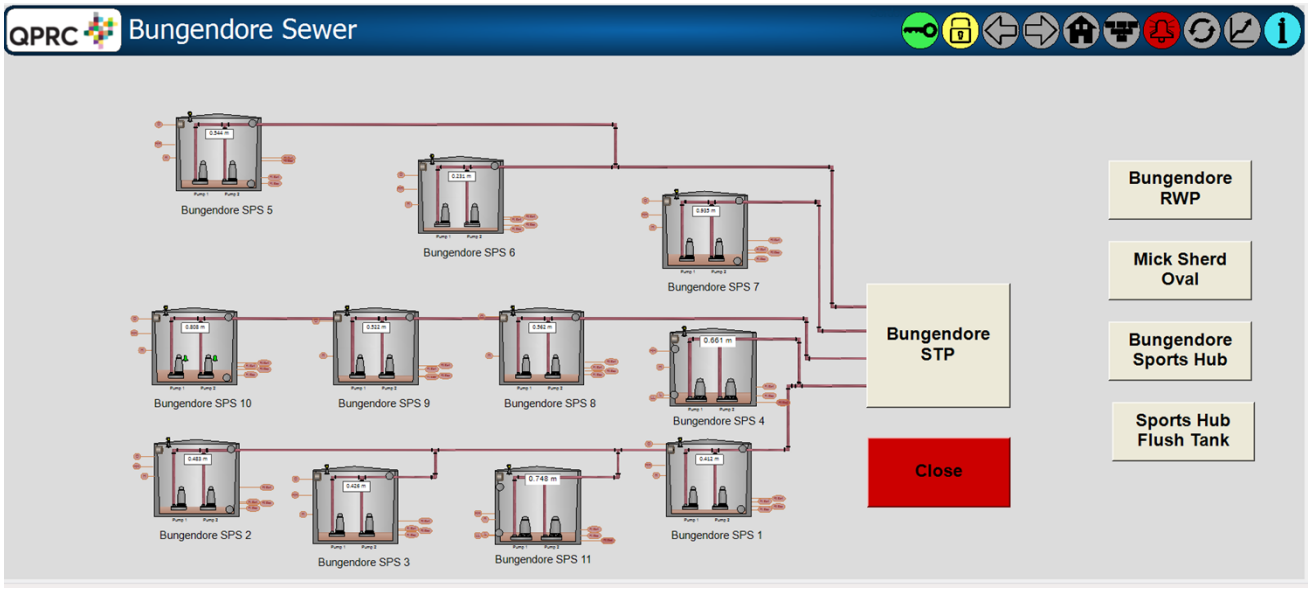
Figure 13 - 2b: Bungendore STP Reuse plant

This portion of the system now comprises of the following additional components:

- Catchpond pump
- Prescreening
- UF membrane
- UV system
- Recycled water storage tank
- Sodium hypochlorite dosing
- Citric acid (membrane cleaning)
- Sodium Hydroxide (membrane cleaning)
- Sodium metabisulphite

Figure 13 - 3: Bungendore STP Location

Figure 13 - 4: Bungendore SPSs Arrangement



13.2 Types of Pollution Incidents

13.2.1 STP Overflowing or Bypass

The Bungendore STP is a modern STP, all inflows can be fully treated as the design capacity of the STP. The Bungendore STP has effluent ponds that can store storm water during wet weather conditions.

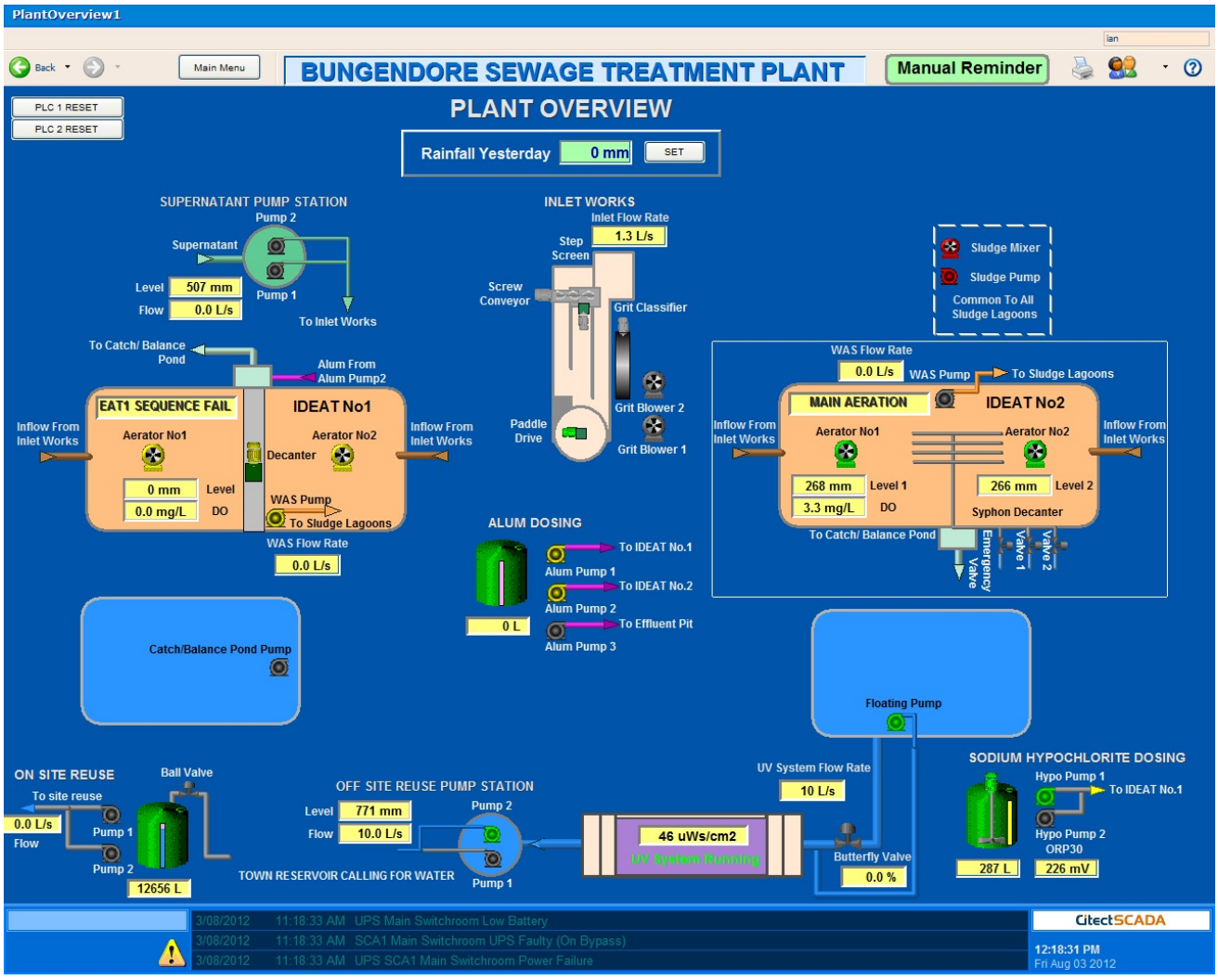
At present all flows are pumped to the inlet works. A storm bypass chamber is located upstream of the flow measuring flume. Inflows in excess of 7 x ADWF spill over the overflow weir and are collected in a storm bypass chamber and are subsequently directed to an effluent pond via a storm bypass gravity pipeline. The overflow or bypass may occur when under exceptional circumstances such as wet weather events or malfunction of systems due to mechanical/ electrical failure or blockages occur.

The plant has a SCADA system and a telemetry system. This means that the STP is monitored continuously. Alarms triggered by the SCADA system will alert the Manager Utilities, Co-ordinator W&S and W&S Operators by sending their text messages simultaneously.

The Operator would then respond to the alarm by attending the STP. The Operators live locally to the STP which provides ready response to any treatment problem events.

The general flow schematic of the treatment process in the Bungendore STP is demonstrated on the plant SCADA screen ***(Figure 13-3)***.

Figure 13 - 5: Bungendore STP Flow Schematic SCADA Screen



13.2.1.1 Dry Weather

Generally, unless exceptional circumstances occur, such as malfunction of systems due to mechanical/ electrical failure or blockages occur, overflows or bypasses of poor quality effluent at the STP in dry weather flow conditions are extremely unlikely.

The following overflow or bypass events that could occur are shown below. Also shown, is the appropriate management strategy to minimise the possible effects;

- Inlet works bypass
    - blocked screens – telemetry alarm, flow to both IDEA reactors via the manual bar screen.
    - screen failure – telemetry alarm, flow to both IDEA reactors via the manual bar screen.
    - power failure – telemetry alarm, flow to both IDEA reactors, the wastewater will overflow to the catch pond from the trough that parked at the TWL, then flows into Mill Post Creek from the effluent ponds.
- Aeration system
    - aerator system bearing failure - telemetry alarm. The treated or partially treated effluent will flow into the catch pond, then flows into the effluent ponds. The overflowing from the effluent ponds will flow into Mill Post Creek.
    - power failure - telemetry alarm, gravity flow to the catch pond from the trough parked at TWL, then flows into the effluent ponds without treatment.
- SCA Failure
    - failure of SCA from fire - isolated boards, flow to the effluent ponds without treatment.

13.2.1.2 Wet Weather

The STP is designed to receive inflow up to 7 x ADWF, the inflow will be diverted into the catch pond from the overflow chamber of the inlet works when inflow greater than 7 x ADWF. The bypassed flow will flow into the effluent ponds and be discharged into Mill Post Creek without treatment.

The SCADA and telemetry alarms will be populated when overflows are discharged into Mill Post Creek. The amount of discharging into Mill Post Creek is not monitored on the STP's SCADA screen.

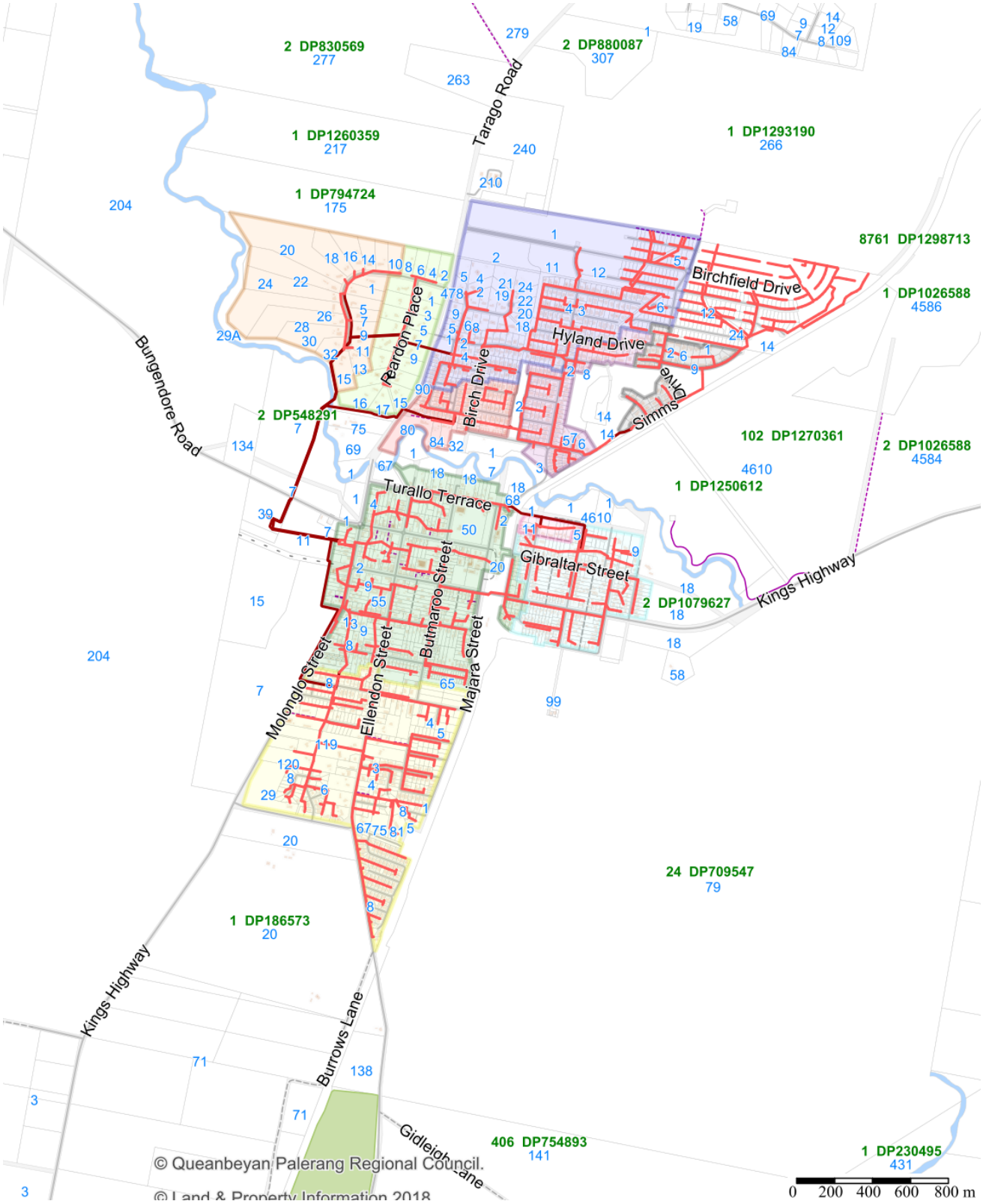
13.2.2 Sewage Pumping Station or Manhole Overflowing

As per the past records kept by Council, apart from minor seepages due to blockages in pipelines, no major overflow events have occurred in the reticulation system in the recent past.

Overall, the Bungendore reticulation system is in a good condition and has sufficient capacity. The number of overflows or incidents per kilometre of pipeline per year would be considered low by industry standards. Council uses water jetting equipment to clear blockages. Blockages in reticulation mains occur infrequently. The main cause is tree root intrusions, but it can also occur due to foreign objects lodging in the pipelines.

The arrangement of all sewage pumping stations (SPSs) in the Bungendore sewerage scheme is demonstrated in ***Figure 13-4.***

Figure 13 - 6: Bungendore STP Reticulation Schematic



All SPSs are in good condition and have the following capabilities:

- Adequate pumping capacity;
- Reliable power supply,
- Emergency power generation (portable diesel generator);
- Ability to store 8 hours ADWF flows before an overflow occurs;
- Ability to detect and respond to abnormal operating conditions via telemetry system and visual alarm light (flashing) in the events of power failure, pump failure, etc.;
- Availability of standby pumps (duty/ standby operation);
- Control arrangement;
- Spare infrastructure available;
- Implementation of effective emergency plan/operational procedures for attending to failure and breakdown within the system; and
- Flood protection.

The alarms on high level and high high level will be early warning alarms when sewage in SPSs has the potential of surcharging.

Council will respond to overflows once notified. The Manager Utilities, Co-ordinator W&S, W&S Operator can control and isolate upstream mains and SPS remotely via a MultiSmart pump controller.

Overflows can also happen during unusual excessive inflows (>PWWF) which may occur during extreme flood events if reticulation manholes are inundated and the inflow is greater than the pumping station capacity.

Other possibilities for sewer overflows include illegal connection of storm water pipes and low-lying gullies or boundary traps.

13.2.3 **Chemical Spill or Leakage**

The Bungendore STP uses the following chemicals either for sewage treatment or as part of the recycled water system:

- Aluminium Sulphate
- Sodium hypochlorite
- Citric acid
- Sodium Hydroxide
- Sodium metabisulphite

All chemicals are installed inside a secure bund area or in double skinned storage tanks (***Figure 13-6***). The leakage from the chemical dosing system will be retained in the bund and flows into the sump. An isolation valve is installed inside the sump and kept in closed position. A minor chemical spill in the sump is flowed into the storm water pit when the isolation valve is opened manually, and then flows into the plant storm water system.

A major chemical spill would be retained in the bund, which is designed for holding whole tank's chemical volume. Any spills would be removed by tanker/vacuum truck.

There is no monitoring of chemical spills on the plant SCADA and telemetry. Detection is dependent on the Operator's routine inspections and checks.

A number of other chemicals are stored with other equipment used in the maintenance of the facility ***(Figure 13-7)*** on site. These is no a chemical storage container used for storage of chemicals.

A safety shower and eyewash facility is provided in the event of direct human contact with alum/chlorine chemicals. However, the maintenance for the safety shower and eyewash facility is required on regularly basis. Safety data sheets (SDS) ***(Figure 13-8)*** are located at the STP office and chemical bund area.

Figure 13 - 7: Bungendore STP – Effluent reuse plant general

Bungendore Recyled water system – safety shower

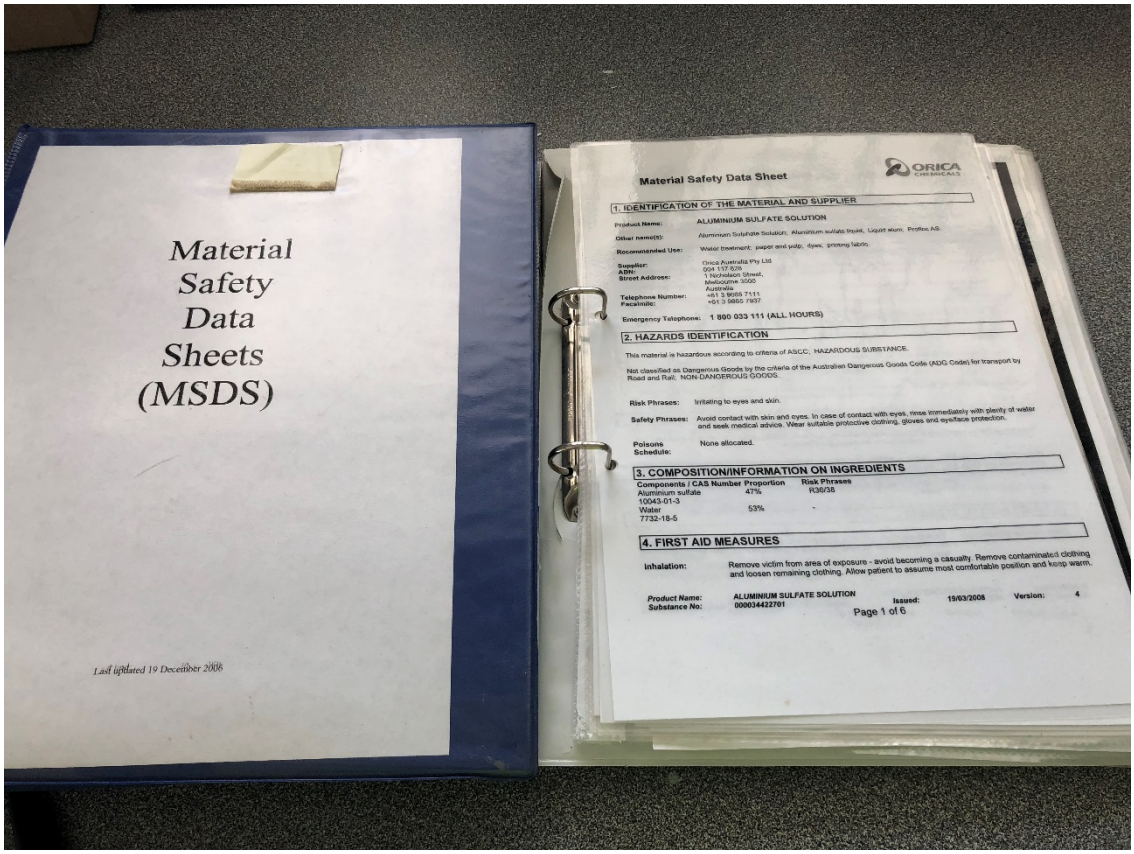
Bungendore recycled water system sodium hypochlorite storage tank

Bungendore recycled water system Citric Acid, NaOH and SMS storage tanks

Figure 13 - 8: Bungendore STP – Chemical Storage Aluminium Sulphate

Figure 13 - 9: Bungendore STP – General Storage Room

Figure 13 - 10: Bungendore STP – SDS



13.2.4 **Odour Emission**

STP

There are no odour treatment units used in the Bungendore STP.

Reticulation System

Odours are generated in the sewerage system and treated by an activate carbon unit installed on each SPSs (**Figure 13-9**).

Figure 13 - 11: Activate Carbon Unit Located at SPSs

13.3 Risk Assessment – Bungendore STP and Collection System

Table 13 - 2: Risk Register for Bungendore STP and Collection System

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Moderate - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
	STP								
1	**Effluent**	**Toxic wastes upsets / kills process**	✓	✓	Rare	Trade waste discharges	Moderate	Low	Trade waste policy. Routine plant monitoring.
2	**Effluent**	**Wet weather inflows to the STP causing bypasses and overflows**	✓	✓	Likely	Prolonged wet weather	Minor	Low	Plant designed to handle PWWF. Bypassed flows to the effluent pond. Telemetry system. Operator attendance within 1 hour.
3	**Effluent**	**Poor quality – disruption of plant**	✓	✓	unlikely		Minor	Low	Effluent ponds provided. Telemetry system.
4	**Effluent**	**Poor quality - extended power failure**	✓	✓	Unlikely		Minor	Low	Reliable power system. Long outages would be planned. Units will provide some treatment. Telemetry system. Inlet works bypass to ponds. Effluent ponds provided.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Moderate - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
5	**Effluent**	**Poor quality - equipment failure**	✓	✓	Unlikely		Minor	Low	Standby capacity. SPS storage if required. Telemetry system. Operator attendance in less than 1 hour. Effluent ponds provided.
6	**Various chemicals**	**Chemical spill**	✓	✓	Unlikely	Stop valve left open	Minor	Low	All chemicals are stored in secure bunded area
7	**Stored biosolids**	**Washed off site**	✓	✓	Unlikely		Minor	Low	Bund area.
8	**Effluent**	**Fire - switchroom**	✓	✓	Unlikely		Minor	Low	Segregated SCA. Telemetry Fire extinguisher.
9	**Effluent**	**STP flooded**	✓	✓	Rare		Minor	Low	STP is above 1% AEP
	SPS Near Waterways								
10	**Sewage**	**Overflow to estuary/creek - extended power failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Reliable power system. Long outages would be planned. 8 hours ADWF emergency storage Operator response within 1 hour.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Moderate - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
									Council has generators SCA have connection points.
11	**Sewage**	**Overflow to creek - extended power failure unplanned**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Reliable power system. 8 hours ADWF emergency storage. Telemetry system. Operator response within 1 hour. Council has generators. SCA have connection points.
12	**Sewage**	**Overflow to creek - pump failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Duty and standby Pumps - Pumps maintained every 3 years 8 hours ADWF emergency storage. Spare pumps provided. Telemetry system. Operator response within 1 hour.
13	**Sewage**	**Overflow to creek - electrical failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Telemetry system. Operator response within 1 hour. Diesel pump and connection point. Spare SCA at depot. 8 hours ADWF emergency storage
14	**Sewage**	**Overflow to creek - flooding of SPS**	✓	✓	Rare	Wet weather event	Moderate	Low	Telemetry system. Operator response within 1 hour. SCA above 1 in 100 level. 8 hours ADWF emergency storage.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Moderate - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
	SPS Not Near Waterways								
15	**Sewage**	**Overflow to creek - extended power failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Reliable power system. Long outages would be planned. 8 hours ADWF emergency storage Operator response within 1 hour. Council has generators. SCA have connection points.
16	**Sewage**	**Overflow to creek - extended power failure unplanned**	✓	✓	Unlikely	Wet weather event	Minor	Low	Reliable power system. 8 hours ADWF emergency storage. Telemetry system. Operator response within 1 hour Council has generators. SCA have connection points.
17	**Sewage**	**Overflow to creek - pump failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Duty and standby Pumps - Pumps maintained every 3 years. Spare pumps provided. 8 hours ADWF emergency storage. Telemetry system. Operator response within 1 hour.
18	**Sewage**	**Overflow to creek - electrical failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Telemetry system. Operator response within 1 hour. Diesel pumps and connection point. Spare SCA at depot. 8 hours ADWF emergency storage.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Moderate - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
19	**Sewage**	**Overflow to creek - flooding of SPS**	✓	✓	Rare	Wet weather event	Minor	Low	Telemetry system. Operator response within 1 hour. SCA above 1 in 100 level. 8 hours ADWF emergency storage
	Gravity System								
20	**Sewage**	**Overflow due to blockage**	✓	✓	Moderate	Wet weather event	Minor	Low	Operator to call in tanker and use Jet Flush Units to clear. Operator response less than 1 hour. Small volumes
21	**Sewage**	**Discharge due to pipe break – ground movement/ earthquake**	✓	✓	Rare	Wet weather event	Major	Moderate	Operator to call in tanker. Operator response within 1 hour. Small volumes
22	**Sewage**	**Discharge due to pipe break – excavation works**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Dial before dig. Maintain up-to-date plan records.
	Rising Mains								
23	**Sewage**	**Discharge due to pipe break – poor pipe condition or high pressure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Flow/pump monitoring. Telemetry system.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Moderate - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
24	**Sewage**	**Discharge due to pipe break – ground movement**	✓	✓	Rare	Wet weather event	Major	Moderate	Flow/pump monitoring. Telemetry system.
25	**Sewage**	**Discharge due to pipe break – excavation works**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Flow/pump monitoring. Telemetry system. Dial before dig. Maintain up-to-date plans.

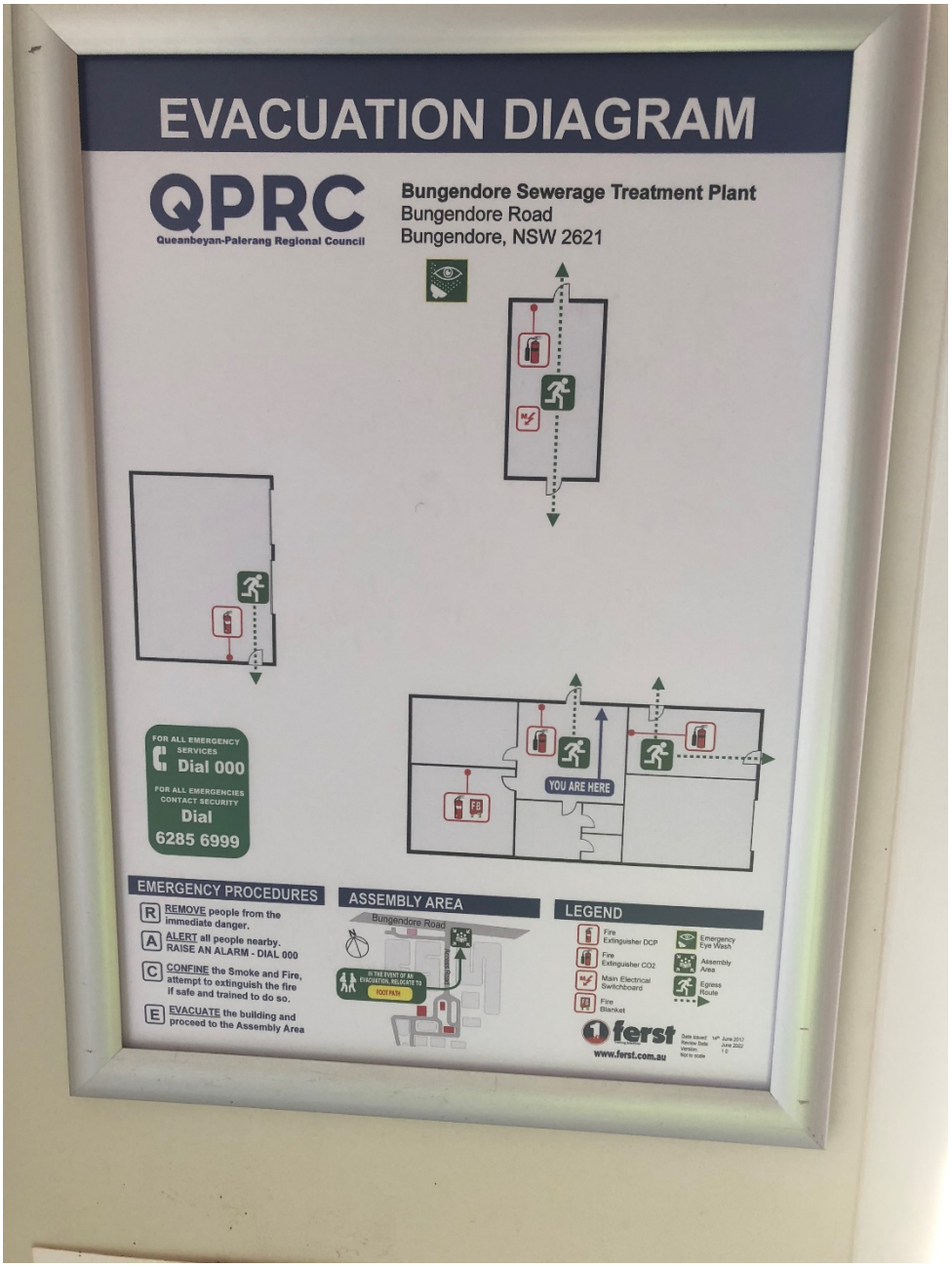
13.4 Evacuation Procedure

The evacuation procedure should be depicted on a plan as displayed in the amenities building/site office and reviewed annually by the Manager Utilities.

13.5 Emergency Assembly Point

The emergency assembly point, as indicated on the Evacuation Plan, is located near the entrance to the STP and is clearly sign posted as shown in ***Figure 13-10***.

Figure 13 - 12: Bungendore STP Emergency Evacuation Point



14 Braidwood Sewerage Scheme

The town of Braidwood is located 280 km south of Sydney and 109 km east of Canberra within the upper catchment of the Shoalhaven River in the Queanbeyan-Palerang LGA. Braidwood is serviced by a conventional gravity sewerage reticulation system. Sewage from Braidwood is collected in sewage pump station No. 1 then pumped into the inlet chamber of at Braidwood STP *(**Figure 14-1**)*.

14.1 Sewage Treatment Plant and Collection System

The Braidwood STP with design capacity of 2,000 EP comprises the following treatment /process units:

- A septage receival with screenings receiving septage wastes delivered to the plant via tanker trucks;
- A packaged waste pump station receiving sewage from the plant amenities building;
- Inlet works including a mechanical fine screen with bypass channel fitted with manually raked bar screen, grit removal, storm bypass, flow measurement unit and flow divider;
- An emergency overflow/ storage pond receiving inflow in excess of 64 L/s from the overflow chamber of the inlet works and draining to the plant supernatant pump station;
- An intermittently decanted extended aeration (IDEA) reactor with surface aeration systems to accommodate a peak load of 2,000 EP;
- Alum dosing system for two-stage chemical phosphorus removal (proprietary *Alphos*);
- A catch/balance pond, located downstream of the IDEA reactor to attenuate IDEA effluent flows and capture second stage chemical (alum) sludge;
- An effluent UV disinfection system;
- A reclaimed water storage tank and two on-site reuse pressure pumps;
- Biosolids treatment and handling facilities, including sludge lagoons, sludge drying beds and sludge storage area;
- A supernatant and storm return pumping station; and
- Site works including amenities building, site drainage and lighting, etc.

The Braidwood sewage collection system comprises of the following:

- Gravity mains including septage receival gravity pipeline;
- Main SPS 1;
- 6 other sewage pumping stations, the arrangement of all SPSs is shown in ***Figure 14-2***;
- Rising mains (from each SPS); and
- Saleyard tank;

The STP and the collection system operate under Environmental Protection Licence (EPL) No. 1733 granted by the NSW Environment Protection Authority (EPA) that is renewed annually.

Effluent quality on EPA licence is summarized in ***Table 14-1***.

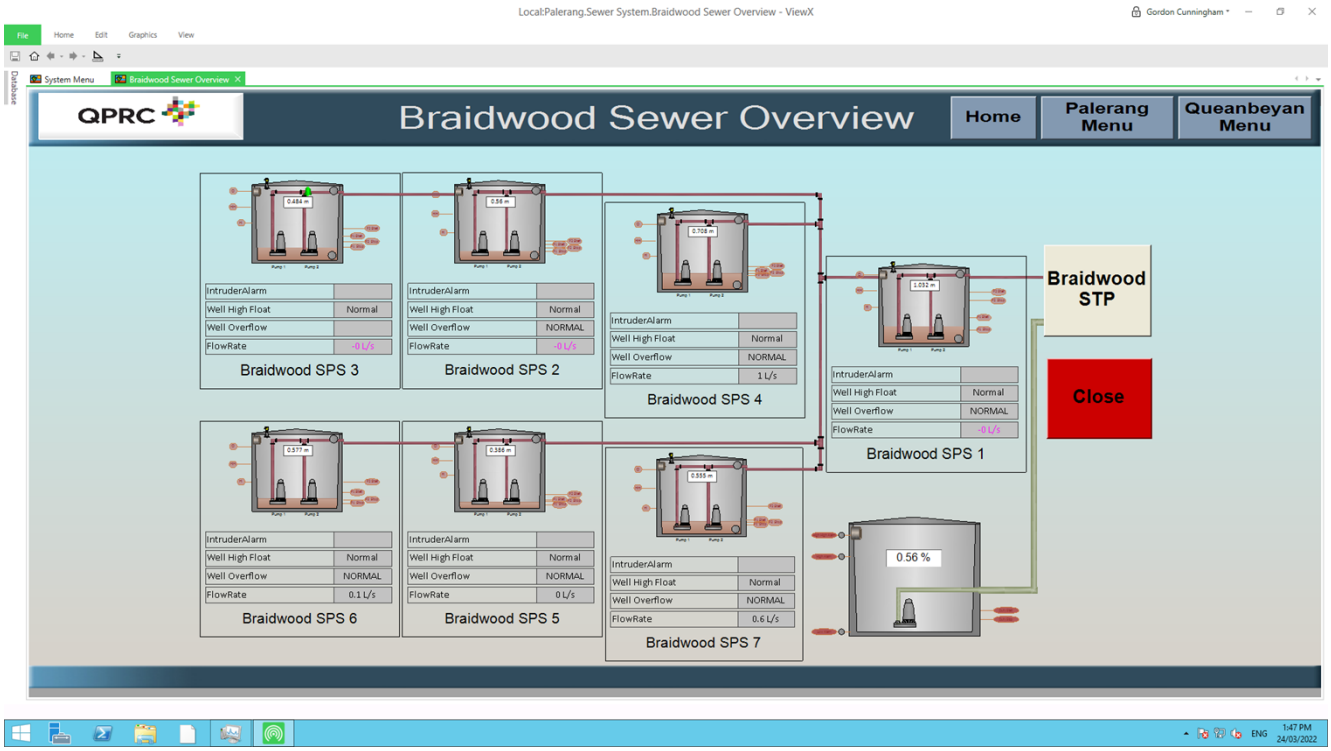
Table 14 - 1: Pollutant List – Sewage and Effluent for Braidwood STP

Parameter	Typical Raw Sewage	Effluent (90 percentile) *	Effluent (100 percentile) *
Biochemical oxygen demand (BOD_5)	270 mg/L	<5 mg/L	<10 mg/L
Suspended solids (SS)	270 mg/L	<10 mg/L	<15 mg/L
Total nitrogen (TN)	53 mg/L	<8 mg/L	<10 mg/L
Ammonia	12 mg/L	<2 mg/L	<5 mg/L
Total phosphorus (TP)	11 mg/L	<0.5 mg/L	<1 mg/L
Oil and grease (O&G)	<10 mg/L	<2 mg/L	< 10 mg/L
Faecal coliforms (FC)	1,000,000 cfu/100 mL	<100 cfu/100 mL	<200 cfu/100 mL
pH	6.5 - 8.5		6.5 – 8.5

** Licence Conditions*

Figure 14 - 1: Braidwood STP Aerial View

Figure 14 - 2: Braidwood SPSs Arrangement



14.2 Types of Pollution Incidents

14.2.1 STP Overflowing or Bypass

The Braidwood STP is a modern STP, all inflows can be fully treated as the design capacity of the STP. The Braidwood STP has an emergency storm pond that can store storm water during wet weather conditions and effluent used for on-site reuse and surplus is discharged to Flood Creek for final disposal.

At present all flows are pumped via SPS1 to the inlet works. The inflow flows through the inlet works, IDEA reactor, catch/balance pond, UV unit and on-site reuse storage tank in sequences for normal operations conditions. In the wet weather condition, the storm overflows from the overflow chamber of the inlet works to the storm pond for temporal storage, then storm water will be pumped into the receival chamber of the inlet works via the supernatant pumping station during dry weather conditions.

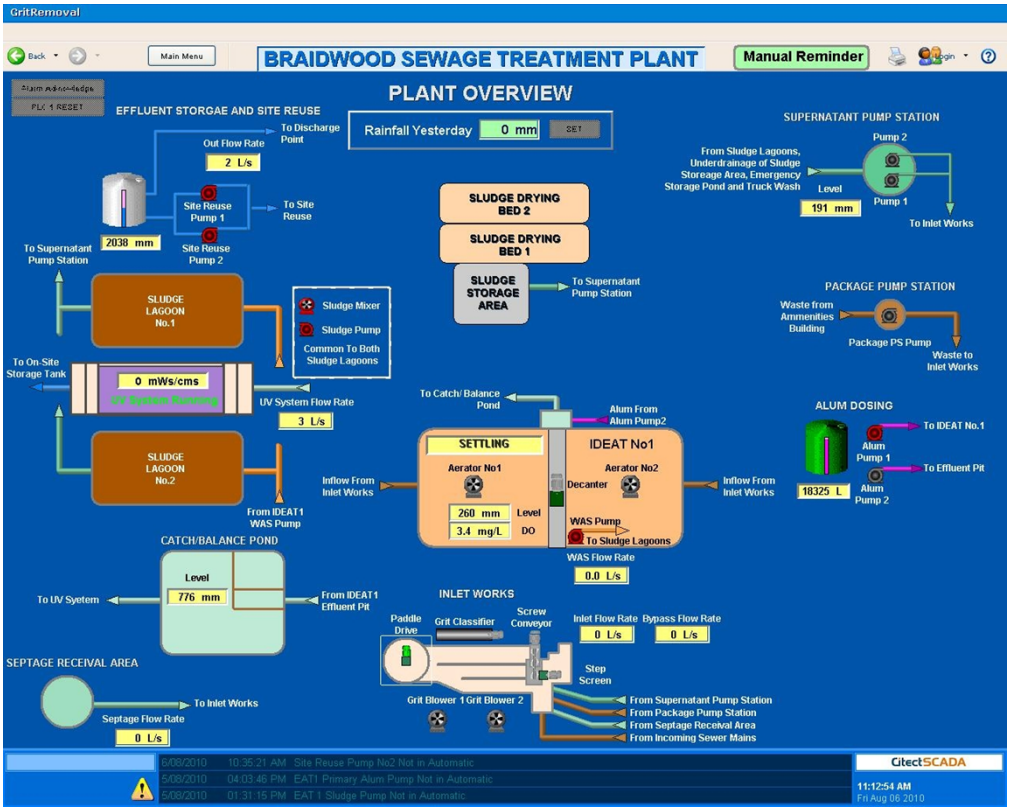
The overflow or bypass may occur when under exceptional circumstances such as wet weather events or malfunction of systems due to mechanical/ electrical failure or blockages occur.

The plant has a SCADA system and a telemetry system. This means that the STP is monitored continuously. Alarms triggered by the SCADA system will alert the Manager Utilities, Co-ordinator W&S and W&S Operators by sending their text messages simultaneously.

The Operator would then respond to the alarm by attending the STP. The Operators live locally to the STP which provides ready response to any treatment problem events.

The general flow schematic of the treatment process in the Braidwood STP is demonstrated on the plant SCADA screen (***Figure 14-3***).

Figure 14 - 3: Braidwood STP Flow Schematic SCADA Screen



14.2.1.1 Dry Weather

Generally, unless exceptional circumstances such as malfunction of systems due to mechanical/ electrical failure or blockages occur, overflows or bypasses of poor quality effluent at the STP in dry weather flow conditions are extremely unlikely.

The following overflow or bypass events that could occur are shown below. Also shown in the appropriate management strategy to minimise the possible effects;

- Inlet works bypass
  - blocked screens – telemetry alarm, flow to the IDEA reactor via the manual bar screen installed inside bypass channel.
  - screen failure – telemetry alarm, flow to the IDEA reactor via the manual bar screen installed inside bypass channel.
  - power failure -- telemetry alarm, flow to the IDEA reactor via the manual bar screen installed inside bypass channel.
- Aeration system
  - aerator system bearing failure - telemetry alarm, the inflow will overflow into the catch/balance pond via the trough parked at the TWL inside the IDEA tank, then overflow into the emergency storm pond by gravity. If the emergency storm pond is full, untreated or partially treated effluent will be discharged into Flood Creek.
  - power failure - telemetry alarm, the inflow will overflow into the catch/balance pond via the trough parked at the TWL inside the IDEA tank, then overflow into the emergency storm pond by gravity. If the emergency storm pond is full, untreated or partially treated effluent will be discharged into Flood Creek.

- UV unit
  - failure of UV unit - telemetry alarm, the effluent will be discharged into the emergency storm pond without sterilisation, then flow into Flood Creek.
  - power failure of UV unit - telemetry alarm, the effluent will be discharged into the emergency storm pond without sterilisation, then flow into Flood Creek.
- SCA Failure
  - failure of SCA from fire - segregated boards, flow to the emergency storm pond for partial treatment.

14.2.1.2 **Wet Weather**

The STP is designed to treat all dry weather inflows and small wet weather events to 3 x ADWF. Wet weather inflows in excess of 7 x ADWF will bypass to the emergency storm pond via the overflow chamber of the inlet works, then overflow into the Flood Creek without treatment.

The SCADA and telemetry alarms will be generated when overflow occurs from the emergency storm pond. the amount of overflow is not recorded on the STP's SCADA screen.

14.2.2 **Sewage Pumping Station or Manhole Overflowing**

Overall, the reticulation system is in a good condition and has sufficient capacity. The number of overflows or incidents per kilometre of pipeline per year would be considered low by industry standards. Council uses water jetting equipment to clear blockages. Blockages in reticulation mains occur infrequently. The main cause is tree root intrusions but can also occur due to foreign objects lodging in the pipelines.

All SPSs are in a good condition, each pumping station has following capacity and control methods to minimise the overflowing from a SPS:

- Adequate pumping capacity;
- Reliable power supply;
- Emergency power generation (portable diesel generator);
- Ability to store 8 hours ADWF flows before an overflow occurs;
- Ability to detect and respond to abnormal operating conditions via telemetry system and visual alarm light (flashing) in the events of power failure, pump failure, etc.;
- Availability of standby pumps (duty/ standby operation);
- Control arrangement;
- Spare infrastructure available;
- Implementation of effective emergency plan/operational procedures for attending to failure and breakdown within the system; and
- Flood protection.

The alarms on high level and high high level will be early warning alarms when sewage in SPSs has the potential of surcharging.

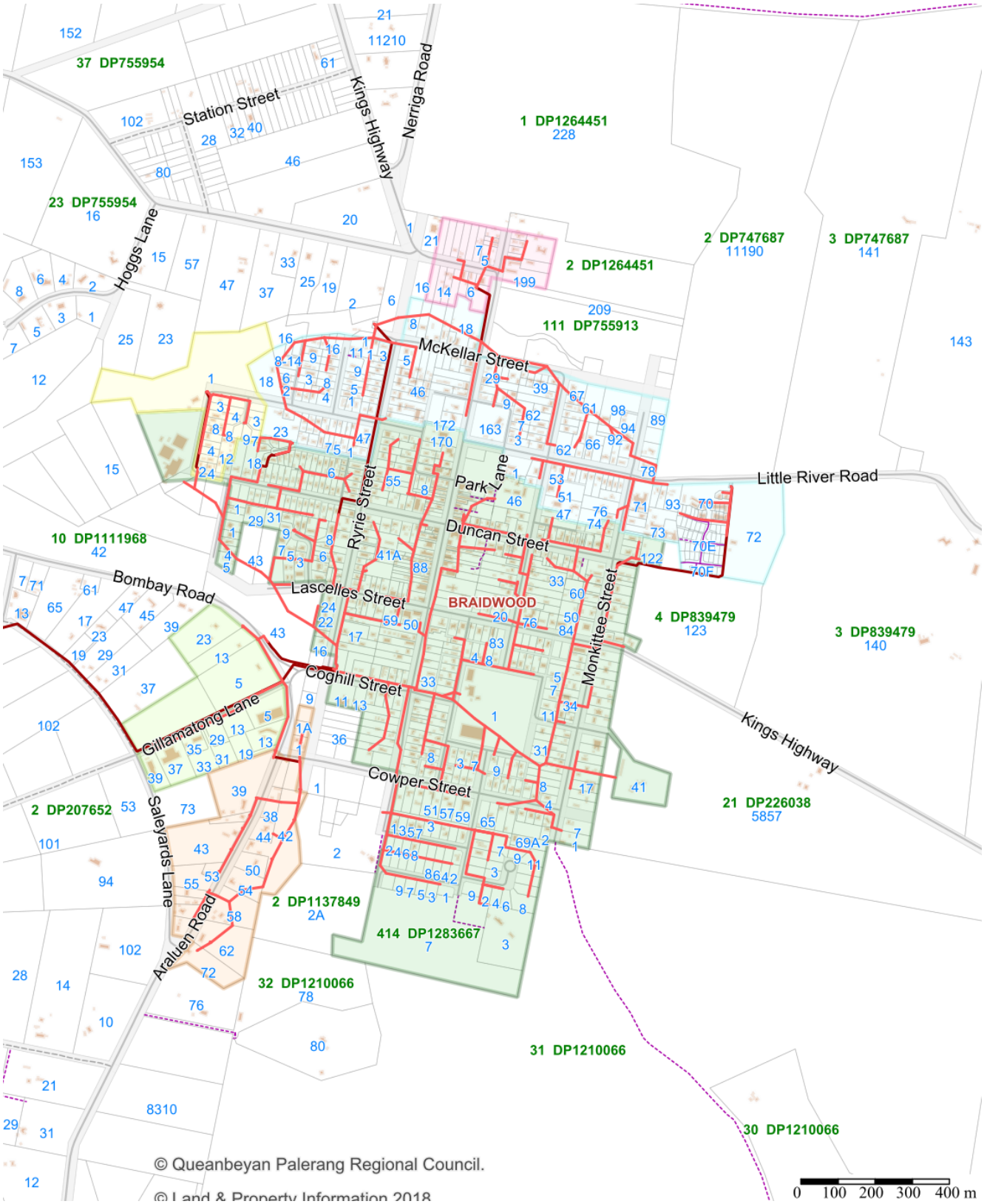
Council will respond to overflows once notified. The Manager Utilities, Co-ordinator W&S, W&S Operator can control and isolate upstream mains and SPS remotely vis a MultiSmart pump controller.

Overflows can also happen during unusual excessive inflows (>PWWF) which may occur during extreme flood events if reticulation manholes are inundated, and the inflow is greater than the pumping station capacity.

Other possibilities for sewer overflows include illegal connection of storm water pipes and low-lying gullies or boundary traps.

The Braidwood reticulation schematic is shown on ***Figure 14-4***.

Figure 14 - 4: Braidwood Reticulation Schematic



14.2.3 **Chemical Spill or Leakage**

The Braidwood STP uses a proprietary *Alphos* product in the treatment process to remove phosphorous and final effluent sent to the on-site reuse tank for reuse. All chemicals are installed inside a secure bund area (***Figure 14-5***). The leakage from the chemical dosing system will be retained in the bund and flows into the sump. An isolation valve is installed inside the sump and kept in closed position. A minor chemical spill in the sump is flowed into the storm water pit when the isolation valve is opened manually, and then flows into the plant storm water system.

A major chemical spill would be retained in the bund, which is designed for holding whole tank's chemical volume. Any spills would be removed by tanker/vacuum truck.

A level sensor is installed inside bund to monitoring of chemical spills, the information is displayed on the plant SCADA and an alarm will be sent by the telemetry. However, Operators are also required for routine inspections and checks to detect any leakages and spills.

A number of other chemicals are stored with other equipment used in the maintenance of the facility on site ***(Figure 14-6)***. These is no a chemical storage container used for storage of chemicals.

A safety shower and eyewash facility is provided in the event of direct human contact with alum chemicals. However, the maintenance for the safety shower and eyewash facility is required on regularly basis. Safety data sheet (SDS) shall be located at the STP office and chemical bund area.

Figure 14 - 5: Braidwood STP – Chemical Storage *Alphos* for Phosphorus Removal

Figure 14 - 6: Braidwood STP – General Storage Room

14.2.4 **Odour Emission**

STP

Odour is not an issue at the Braidwood STP.

Reticulation System

Odours are generated in the sewerage system and treated by an activated carbon unit installed on each SPSs *(**Figure 14-7**).*

Figure 14 - 7: Activated Carbon Unit Located at SPSs

14.3 Risk Assessment – Braidwood STP and Collection System

Table 14 - 2: Risk Register for Braidwood STP and Collection System

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
	STP								
1	**Sewage**	**Excessive inflows – bypass**	✓	✓	Likely	Wet weather	Minor	Low	Storm detention ponds provided
2	**Effluent**	**Toxic wastes upsets / kills process**	✓	✓	Unlikely	Trade waste discharges	Moderate	Low	Trade waste policy. Routine plant monitoring.
3	**Effluent**	**Stormwater inflow to STP causing overflows**	✓	✓	Unlikely		Minor	Low	Plant designed to handle PWWF. All inflows pumped. Telemetry system. Operator attendance within 1 hour.
4	**Effluent**	**Poor quality - disruption of plant**	✓	✓	Unlikely		Minor	Low	Telemetry system. Storm detention pond provided.
5	**Effluent**	**Poor quality - extended power failure**	✓	✓	Unlikely		Minor	Low	Reliable power system. Long outages would be planned. Units will provide some treatment. Telemetry system.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
									Inlet works bypass to ponds. Storm detention pond provided.
6	**Effluent**	**Poor quality - equipment failure**	✓	✓	Unlikely		Minor	Low	Standby capacity. SPS storage if required. Telemetry system. Operator attendance in within 1 hour.
7	**Various Chemicals**	**Chemical spill**	✓	✓	Unlikely	Stop valve left open	Minor	Low	All chemicals are stored in secure bund areas.
8	**Stored biosolids**	**Washed off site**	✓	✓	Unlikely		Minor	Low	Bund area.
9	**Effluent**	**Fire - switchroom**	✓	✓	Rare		Minor	Low	Segregated SCA. Telemetry Fire extinguisher.
10	**Effluent/ Sludge**	**STP flooded**	✓	✓	Rare		Minor	Low	STP is above flood level
	SPS Near Waterways								

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
11	**Sewage**	**Overflow to creek - extended power failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Reliable power system. Long outages would be planned. 8 hours ADWF emergency storage Operator response within 1 hour. Council has generators. SCA's have connection points.
12	**Sewage**	**Overflow to creek - extended power failure unplanned**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Reliable power system. 8 hours ADWF emergency storage. Telemetry system. Operator response within 1 hour Council has generators. SCA's have connection points.
13	**Sewage**	**Overflow to creek - pump failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Duty and standby Pumps - Pumps maintained every 3 years. Spare pumps provided. 8 hours ADWF emergency storage Telemetry system. Operator response within 1 hour.
14	**Sewage**	**Overflow to creek - electrical failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Telemetry system. Operator response within 1 hour. Diesel pumps and connection point. Spare SCA at depot. 8 hours ADWF emergency storage.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
15	**Sewage**	**Overflow to creek - flooding of SPS**	✓	✓	Rare	Wet weather event	Moderate	Low	Telemetry system. Operator response less than 1 hour. SCA above 1 in 100 level. 8 hours ADWF emergency storage
	SPS Not Near Waterways								
16	**Sewage**	**Overflow to creek - extended power failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Reliable power system. Long outages would be planned. 8 hours ADWF emergency storage Operator response within 1 hour. Council has generators. SCA's have connection points.
17	**Sewage**	**Overflow to creek - extended power failure unplanned**	✓	✓	Unlikely	Wet weather event	Minor	Low	Reliable power system. 8 hours ADWF emergency storage. Telemetry system. Operator response less than 1 hour Council has generators. SCA's have connection points.
18	**Sewage**	**Overflow to creek - pump failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Duty and standby Pumps - Pumps maintained every 3 years. Spare pumps provided. 8 hours ADWF emergency storage Telemetry system. Operator response within 1 hour.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
19	**Sewage**	**Overflow to creek - electrical failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Telemetry system. Operator response within 1 hour. Diesel pumps and connection point. Spare SCA at depot. 8 hours ADWF emergency storage.
20	**Sewage**	**Overflow to creek - flooding of SPS**	✓	✓	Rare	Wet weather event	Minor	Low	Telemetry system. Operator response less than 1 hour. SCA above 1 in 100 level. 8 hours ADWF emergency storage
	Gravity System								
21	**Sewage**	**Overflow due to blockage**	✓	✓	Moderate	Wet weather event	Minor	Low	Operator to call in tanker and use Jet Flush Units to clear. Operator response within 1 hour. Small volumes.
22	**Sewage**	**Discharge due to pipe break – ground movement/ earthquake**	✓	✓	Rare	Wet weather event	Major	Moderate	Operator to call in tanker. Operator response within 1 hour. Small volumes.
23	**Sewage**	**Discharge due to pipe break – excavation works**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Dial before dig. Maintain up-to-date plan records.
	Rising Mains								

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
24	**Sewage**	**Discharge due to pipe break – poor pipe condition or high pressure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Flow/pump monitoring. Telemetry system.
25	**Sewage**	**Discharge due to pipe break – ground movement**	✓	✓	Rare	Wet weather event	Major	Moderate	Flow/pump monitoring. Telemetry system.
26	**Sewage**	**Discharge due to pipe break – excavation works**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Flow/pump monitoring. Telemetry system. Dial before dig. Maintain up-to-date plans.

14.4 Evacuation Procedure

The evacuation procedure should be depicted on a plan as displayed in the amenities building/site office and reviewed annually by Manager Utilities.

14.5 Emergency Assembly Point

The emergency assembly point, as indicated on the Evacuation Plan, is located near the entrance to the STP and is clearly sign posted as shown in ***Figure 14-7.***

Figure 14 - 2: Braidwood STP Emergency Evacuation Point

15 Googong Sewerage Scheme

The township of Googong is a new greenfield town located approximately 300 km south of Sydney and 28 km from Canberra. It is located within the catchment of the Queanbeyan River. Googong is a rapidly developing town with a current population of around 5,000 people and an expectation to grow to nearly 18,500 people within the next 20 to 30 years. The township is serviced by a gravity sewerage network and two independent and one satellite sewage pumping stations. These stations pump to a central sewage treatment plant that also operates as a Water Recycling Plant (WRP) that reticulates the treated effluent to the township's residents through a 3rd purple pipe system.

The WRP is a 5 stage Bardenpho MBR system.

15.1 Water Recycling Plant (WRP) and Collection System

The Googong WRP has a current capacity of 18,500 EP known as stages AB, C & D Stage D has been the subject of construction over the past 12 months and was recently commissioned (December 2023) and incorporated into the plant. The plant consists of the following treatment/process units:

- Raw sewage receiving chamber
- 6mm coarse screens
- Vortex grit trap and classifier
- 1.5mm fine screens
- Screenings handling equipment
- Emergency detention tank for flows >3ADWF and other emergency bypass
- 3 x independent 5 stage Bardenpho treatment trains
- 3 x MBR cells per treatment train (total of 7 MOS tanks)
- Filtrate storage tanks
- Tertiary filtration system
- UV system
- Chlorine dosing tank
- Off spec tanks
- Recycled Water Tanks
- Pumping equipment
- Chemical dosing systems
- Aerated sludge processing systems
- Sludge centrifuge
- Sludge receiving bins
- General Purpose pump station

The Googong sewage collection system comprises of the following:

- Gravity mains
- Two independent and one dependent sewage pump stations
- Rising mains for each SPS

The WRP and Collection system operate under Environmental Protection Licence (EPL) 20188 granted by the NSW Environmental Protection Authority (EPA) that is reviewed annually. The EPL quality limits are summarized in table 15-1 following.

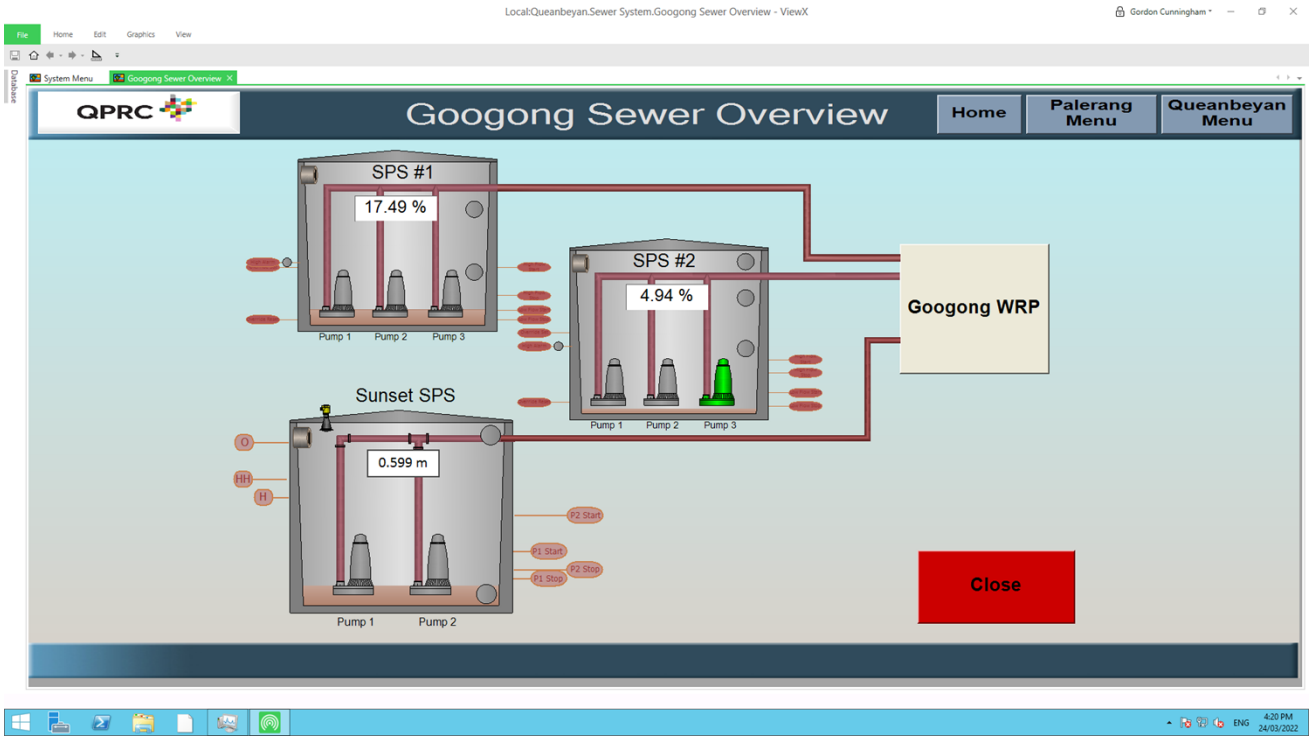
Table 15-1: Pollutant List – Sewage & Effluent for Googong WRP

Parameter	Typical Raw Sewage	Effluent (90 percentile) *	Effluent (100 percentile) *
Biochemical oxygen demand (BOD_5)	270 mg/L	<5 mg/L	<10 mg/L
Suspended solids (SS)	270 mg/L	<10 mg/L	<15 mg/L
Total nitrogen (TN)	53 mg/L	<8 mg/L	<10 mg/L
Ammonia	12 mg/L	<2 mg/L	<5 mg/L
Total phosphorus (TP)	11 mg/L	<0.3 mg/L	<0.5 mg/L
Oil and grease (O&G)	<10 mg/L	<2 mg/L	< 10 mg/L
Faecal coliforms (FC)	1,000,000 cfu/100 mL	<100 cfu/100 mL	<200 cfu/100 mL
pH	6.5 - 8.5		6.5 – 8.5
Chlorine (free residual)			<0.1 mg/L

** Licence Conditions*

Figure 15-1: Googong WRP Location

Figure 15-2: Googong SPSs Arrangement



15.2 Types of Pollution Incidents

15.2.1 WRP Overflowing or Bypass

The WRP receives the pumped flows intermittently and is sized to treat the instantaneous flows described in Table 15-2. Flow attenuation of these intermittent pumped flows is provided in the Bioreactor during dry weather periods. In a wet weather event flows greater than 3 ADWF are be stored in the Emergency Detention Tank (EDT) and returned to the plant for processing when the incoming flow subsides.

Table 15-2: WRP Capacity

WRP Treatment Area	Stage C WRP Design Capacity		Stage D WRP Design Capacity		Comments
	(Ratio to ADWF at 9,400 EP)	(L/s)	(Ratio to ADWF at 18,850 EP)	(L/s)	
Inlet Structure and Overflow[4]	1 ADWF	22.8	1 ADWF	45.8	
	≈9 ADWF	200[5]	≈4.4 ADWF	200[5]	Approximately equivalent to the maximum pumped flow from SPS1 and SPS2
Coarse Screens & Grit[4]	≈9 ADWF	200[5]	≈4.4 ADWF	200[5]	Approximately equivalent to the maximum pumped flow from SPS1 and SPS2
Fine Screens[4]	3 ADWF + return flows	68.4 + return flows	3 ADWF + return flows	137.4 + return flows	Flows > 3 ADWF to EDT[2] upstream of fine screens. Note the installed fine screen capacity is 140 L/s plus returns but the flow will be restricted by the wet weather bypass. During Stage D, this flow restriction will be lifted.
Secondary Treatment and Disinfection	3 ADWF + return flows	68.4 + return flows	3 ADWF + return flows	137.4 + return flows	
Tertiary Treatment Including Disinfection	3 ADWF + return flows	68.4 + return flows	3 ADWF + return flows	137.4 + return flows	

Notes:

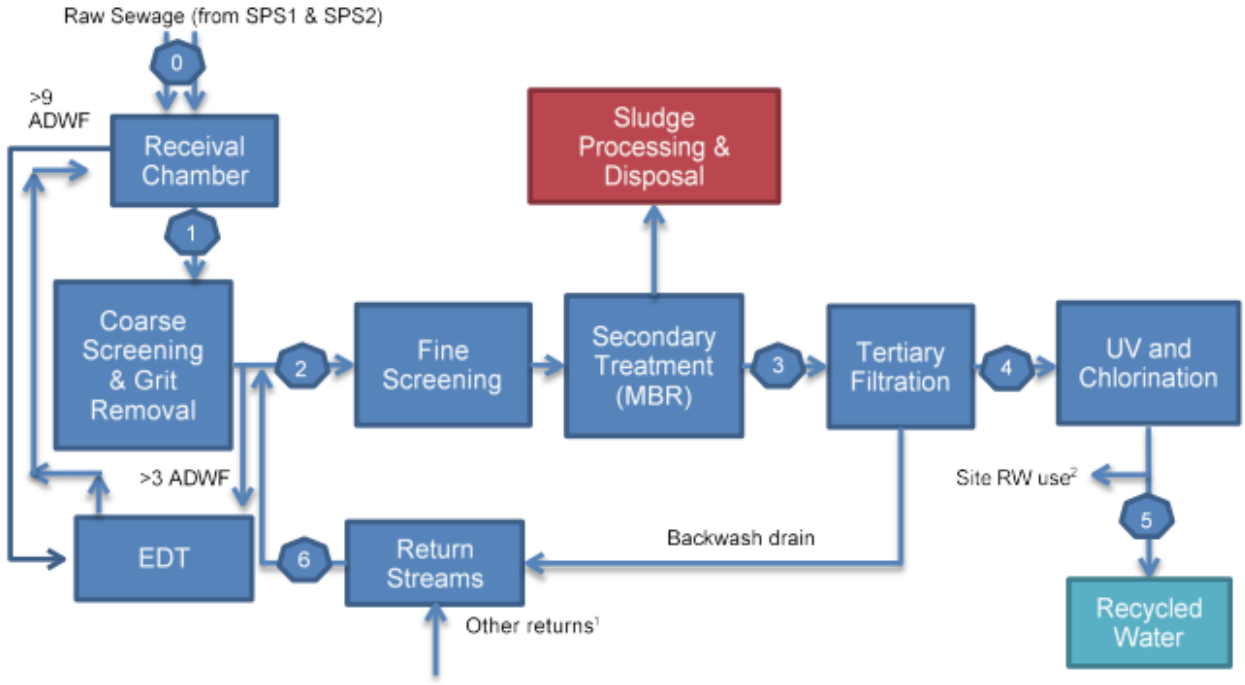
1. ADWF is the average inflow to the WRP, i.e. 22.8 L/s at 9,400 EP (Stage C) and 45.8 at 18,850 EP (Stage D)
2. If high flow persists when the EDT is full, flow will overflow to environmental discharge at Montgomery Creek via the erosion control structure
3. Return flows are determined to be 15 L/s based on current GPPS capacity
4. The inlet works infrastructure installed under the Stage C expansion have sufficient capacity for the Stage D (ultimate) plant flows, however the flow through the fine screens is currently restricted to 3ADWF for Stage C which is the capacity of the downstream process units.
5. This is based on the peak wet weather flow at Stage D (196 L/s), Technical Memo – Sizing of Stage C Emergency Discharge Tank, 13th December 2013

15.2.2 **Overall Flow Balance & Return Streams**

Figures 15-2 presents a basic summary flow diagram for the WRP. These return flows have been used to determine the total design capacity required for each process area. The PDWF to the plant is anticipated to be 2.2 ADWF and PWWF to the plant is anticipated to be limited to 9 ADWF once SPS 1 and SPS 2 are installed with their ultimate pump units. The WRP is nominally sized to provide coarse screening for 6 ADWF; fine screening to 3 ADWF and secondary and tertiary treatment for up to 3 ADWF, plus any return streams. The nature of the process and relatively low inlet flows to the plant means that the return streams are relatively significant and form an important parameter in the sizing of the process units. The return streams are generally returned to the head

of the works via the GPPS which provides buffering capacity and level out return flows, although there are some exceptions to this, where 'return' streams are added directly to the process.

Figure 15-2 WRP Simplified Flow Diagram



15.2.3 **Sewage Pumping Station or Manhole Overflowing**

The reticulation system is in excellent condition and has sufficient capacity. The number of overflows or incidents per kilometre of pipeline per year would be considered very low by industry standards. Council uses water jetting equipment to clear blockages. Blockages in reticulation mains occur infrequently. Given the low age of the pipelines the main cause of any blockages occur due to foreign objects lodging in the pipelines.

All SPSs are in a excellent condition, each pumping station has the following capacity and control methods to minimise the overflowing from a SPS:

- Adequate pumping capacity;
- Reliable power supply;
- Emergency power generation (portable diesel generator);
- Ability to store 8 hours ADWF flows before an overflow occurs;
- Ability to detect and respond to abnormal operating conditions via telemetry system and visual alarm light (flashing) in the events of power failure, pump failure, etc.;
- Availability of standby pumps (duty/ standby operation);
- Control arrangement;
- Spare infrastructure available;
- Implementation of effective emergency plan/operational procedures for attending to failure and breakdown within the system; and
- Flood protection.

The alarms on high level and high high level will be early warning alarms when sewage in SPSs has the potential of surcharging.

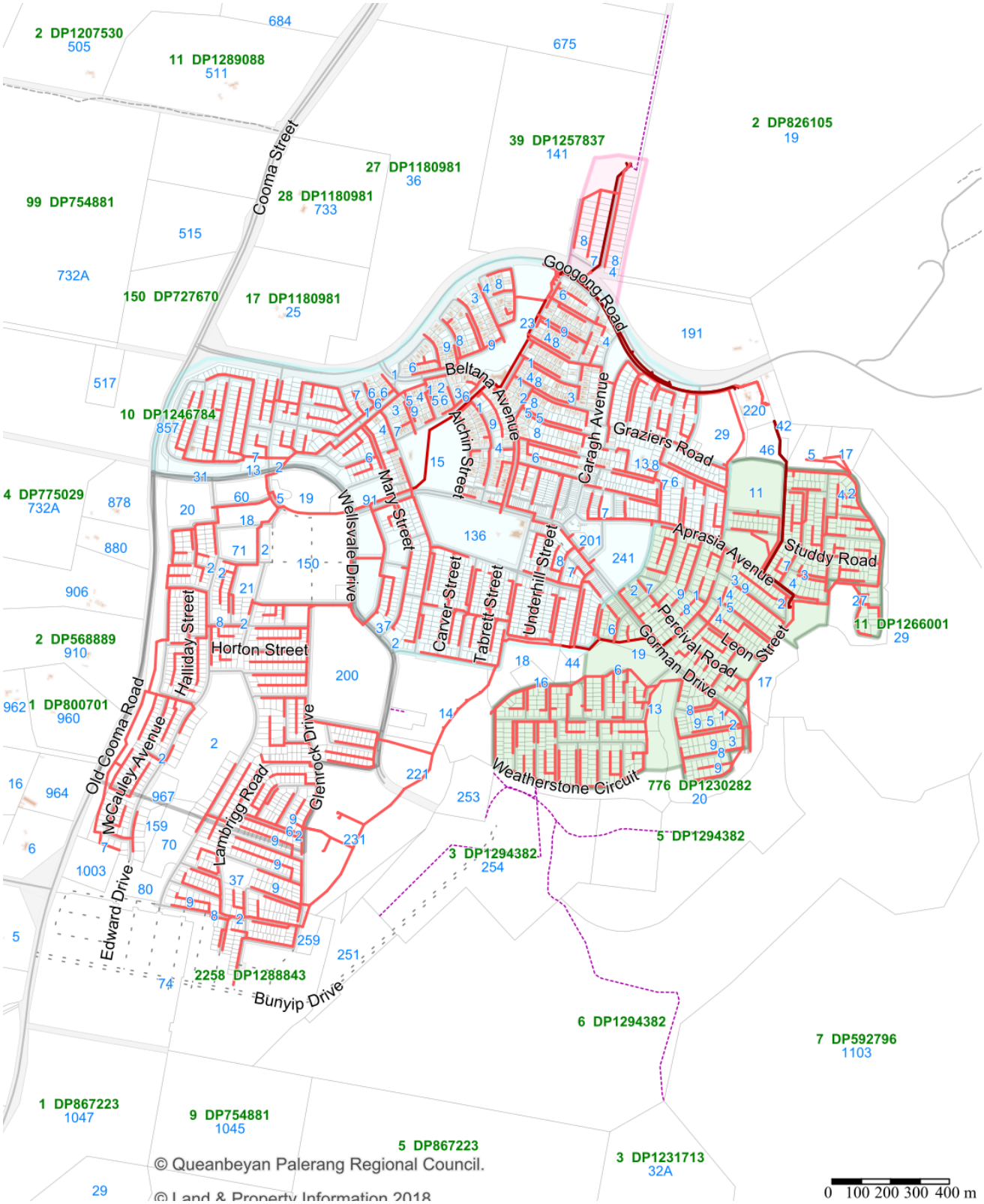
Council will respond to overflows once notified. The Manager Utilities, Co-ordinator W&S, W&S Operator can control and isolate upstream mains and SPS remotely vis site based PLC and HMI pump controllers.

Overflows can also happen during unusual excessive inflows (>PWWF) which may occur during extreme flood events if reticulation manholes are inundated and the inflow is greater than the pumping station capacity.

Other possibilities for sewer overflows include illegal connection of storm water pipes and low-lying gullies or boundary traps.

The Googong reticulation schematic is shown on ***Figure 15-3***.

Figure 15-3 Googong Reticulation Scheme



15.2.4 **Chemical Spill or Leakage**

The Googong WRP uses a variety of chemicals, some for the treatment process and others for plant maintenance. A list of the chemicals and their purpose is provided below:

- Ferric Sulphate (H_2S control)
- Acetic Acid (Supplementary Carbon source)
- Sodium Hypochlorite (Disinfection and Membrane Cleaning)
- Sodium Hydroxide (Additional alkalinity source for that consumed as part of nitrification process)
- Citric Acid (Membrane Cleaning aid)
- Sulphuric Acid ((Membrane Cleaning aid)
- Aluminium Sulphate (Phosphorus removal)
- Sodium Metabisulphite (De-chlorination)
- Sludge thickening polymer
- Sludge dewatering polymer

All chemicals are installed inside a secure bunded area (***Figure 14-5***). Any leakage from the chemical dosing systems would be retained in the bund and flow into a sump. An isolation valve is installed inside the sump and kept in closed position. A minor chemical spill in the sump is flowed into the storm water pit when the isolation valve is opened manually, and then flows into the plant storm water system.

A major chemical spill would be retained in the bund, which is designed for holding whole tank's chemical volume. Any spills would be removed by tanker/vacuum truck.

A level sensor is installed inside each bund to monitor any chemical spill, the information is displayed on the plant SCADA and an alarm will be sent by the telemetry. However, Operators are also required for routine inspections and checks to detect any leakages and spills.

A number of other chemicals/fuels are stored with other equipment used in the maintenance of the facility on site ***(Figure 14-6)***. These is no a chemical storage container used for storage of chemicals.

Safety shower and eyewash facilities are provided in the event of direct human contact with chemicals. However, the maintenance for the safety shower and eyewash facility is required on regularly basis. Safety data sheets (SDSs) are be located at the WRP office and chemical bund area.

Figure 15-4 Googong WRP – Chemical Storage Facilities

Figure 15-5 Googong WRP - General Machinery Room and Storage Area

15.2.5 **Odour Emission**

WRP

The WRP is supported by a plant wide odour control facility that trunks foul air to a central Activated Carbon Stack. As such, odour is not a problem at the WRP. Figure 15-6 below shows the detail of the odour control facility.

Figure 15-6 Googong WRP – Odour Control Facility

Reticulation System

Odours are generated in the sewerage system and are managed at the sewage pump stations through elevated vent stacks (Figure 15-7).

Figure 15-7 Googong SPS#1 elevated vent stack

15.3 Risk Assessment – Googong WRP and Collection System

Table 15-2 Risk Register for Googong WRP and Collection System

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
	STP								
1	**Sewage**	**Excessive inflows – bypass**	✓	✓	Likely	Wet weather	Minor	Low	EDT available at WRP
2	**Effluent**	**Toxic wastes upsets / kills process**	✓	✓	Unlikely	Trade waste discharges	Moderate	Low	Trade waste policy. Routine plant monitoring.
3	**Effluent**	**Stormwater inflow to STP causing overflows**	✓	✓	Unlikely		Minor	Low	Plant designed to handle PWWF. All inflows pumped. Telemetry system. Operator attendance within 1 hour.
4	**Effluent**	**Poor quality - disruption of plant**	✓	✓	Unlikely		Minor	Low	Telemetry system. Storm detention pond provided EDT
5	**Effluent**	**Poor quality - extended power failure**	✓	✓	Unlikely		Minor	Low	Reliable power system. Long outages would be planned. Key systems backed by site generator Telemetry system.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
									Inlet works bypass to EDT
6	**Effluent**	**Poor quality - equipment failure**	✓	✓	Unlikely		Minor	Low	Standby capacity. SPS storage if required. Telemetry system. Operator attendance in within 1 hour.
7	**Various Chemicals**	**Chemical spill**	✓	✓	Unlikely	Stop valve left open	Minor	Low	All chemicals are stored in secure bund areas.
8	**Stored biosolids**	**Washed off site**	✓	✓	Unlikely		Minor	Low	Biosolids centrifuged direct to self levelling enclosed storage bin
9	**Effluent**	**Fire - switchroom**	✓	✓	Rare		Minor	Low	Segregated SCA. Telemetry Fire extinguisher and fire alarm
10	**Effluent/ Sludge**	**STP flooded**	✓	✓	Rare		Minor	Low	STP is above flood level
	SPS Near Waterways								

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
11	**Sewage**	**Overflow to creek - extended power failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Reliable power system. Long outages would be planned. 8 hours ADWF emergency storage Operator response within 1 hour. Council has generators. SCA's have connection points.
12	**Sewage**	**Overflow to creek - extended power failure unplanned**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Reliable power system. 8 hours ADWF emergency storage. Telemetry system. Operator response within 1 hour Council has generators. SCA's have connection points.
13	**Sewage**	**Overflow to creek - pump failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Duty and standby Pumps - Pumps maintained every 3 years. Spare pumps provided. 8 hours ADWF emergency storage Telemetry system. Operator response within 1 hour.
14	**Sewage**	**Overflow to creek - electrical failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Telemetry system. Operator response within 1 hour. Diesel pumps and connection point. Spare SCA at depot. 8 hours ADWF emergency storage.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
15	**Sewage**	**Overflow to creek - flooding of SPS**	✓	✓	Rare	Wet weather event	Moderate	Low	Telemetry system. Operator response less than 1 hour. SCA above 1 in 100 level. 8 hours ADWF emergency storage
	SPS Not Near Waterways								
16	**Sewage**	**Overflow to creek - extended power failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Reliable power system. Long outages would be planned. 8 hours ADWF emergency storage Operator response within 1 hour. Council has generators. SCA's have connection points.
17	**Sewage**	**Overflow to creek - extended power failure unplanned**	✓	✓	Unlikely	Wet weather event	Minor	Low	Reliable power system. 8 hours ADWF emergency storage. Telemetry system. Operator response less than 1 hour Council has generators. SCA's have connection points.
18	**Sewage**	**Overflow to creek - pump failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Duty and standby Pumps - Pumps maintained every 3 years. Spare pumps provided. 8 hours ADWF emergency storage Telemetry system. Operator response within 1 hour.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
19	**Sewage**	**Overflow to creek - electrical failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Telemetry system. Operator response within 1 hour. Diesel pumps and connection point. Spare SCA at depot. 8 hours ADWF emergency storage.
20	**Sewage**	**Overflow to creek - flooding of SPS**	✓	✓	Rare	Wet weather event	Minor	Low	Telemetry system. Operator response less than 1 hour. SCA above 1 in 100 level. 8 hours ADWF emergency storage
	Gravity System								
21	**Sewage**	**Overflow due to blockage**	✓	✓	Possible	Wet weather event	Minor	Low	Operator to call in tanker and use Jet Flush Units to clear. Operator response within 1 hour. Small volumes.
22	**Sewage**	**Discharge due to pipe break – ground movement/ earthquake**	✓	✓	Rare	Wet weather event	Major	Moderate	Operator to call in tanker. Operator response within 1 hour. Small volumes.
23	**Sewage**	**Discharge due to pipe break – excavation works**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Dial before dig. Maintain up-to-date plan records.
	Rising Mains								

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
24	**Sewage**	**Discharge due to pipe break – poor pipe condition or high pressure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Flow/pump monitoring. Telemetry system.
25	**Sewage**	**Discharge due to pipe break – ground movement**	✓	✓	Rare	Wet weather event	Major	Moderate	Flow/pump monitoring. Telemetry system.
26	**Sewage**	**Discharge due to pipe break – excavation works**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Flow/pump monitoring. Telemetry system. Dial before dig. Maintain up-to-date plans.

15.4 Evacuation Procedure

The evacuation procedure for Googong WRP is displayed in the amenities building and is reproduced below in Figure 15-6.

Figure 15-6: Googong WRP Emergency Evacuation Plan

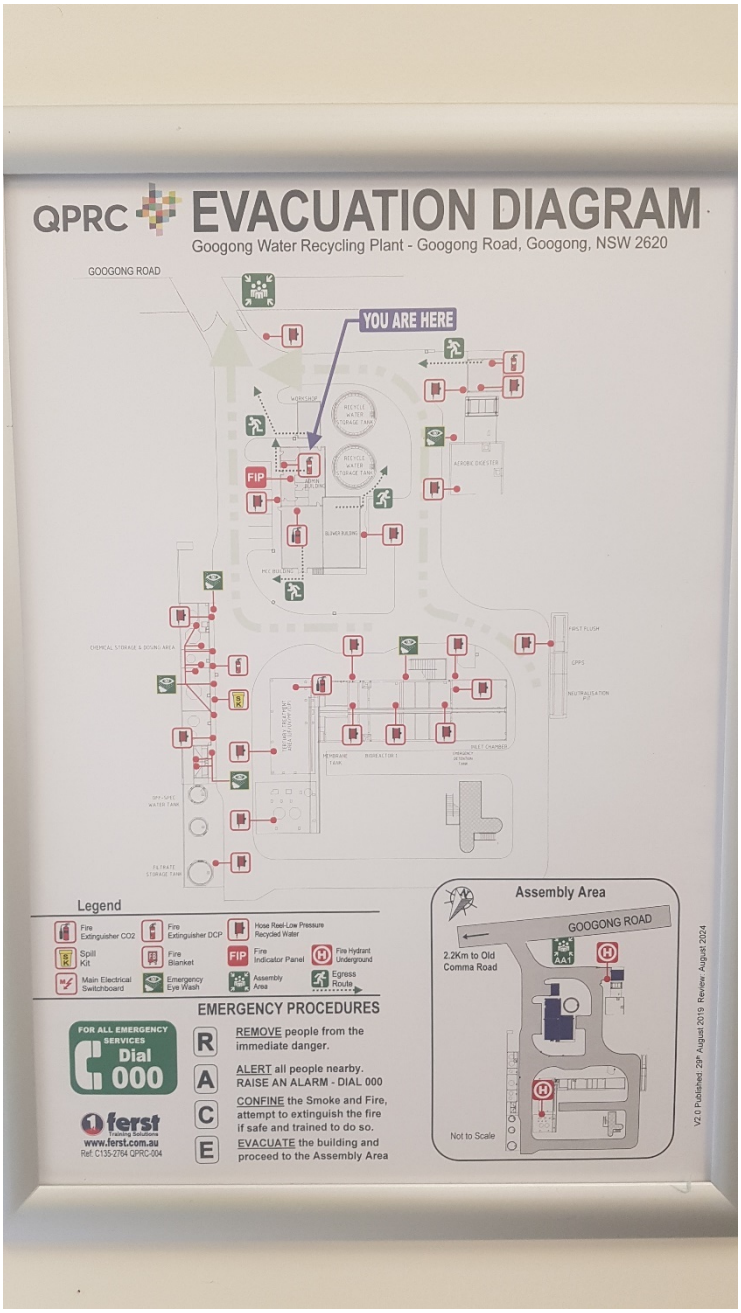


Figure 15-7: Googong WRP Fire Detection Block Plan

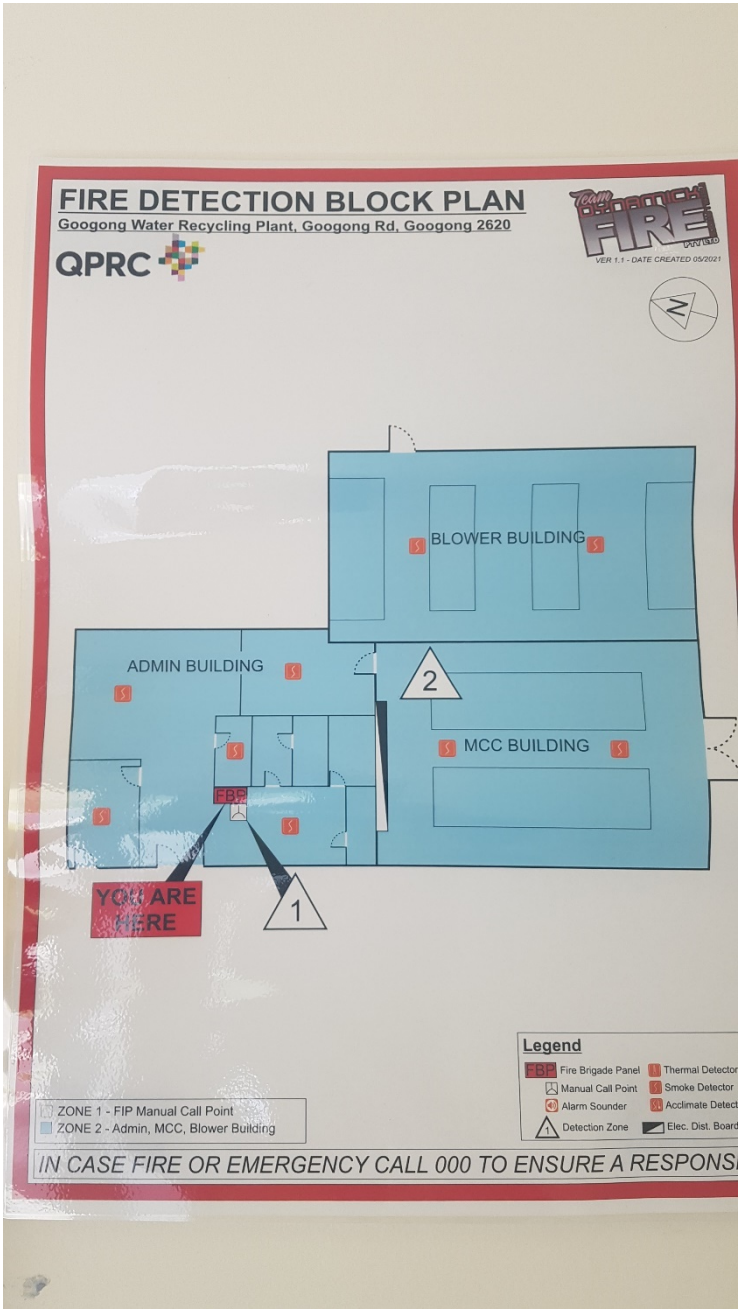
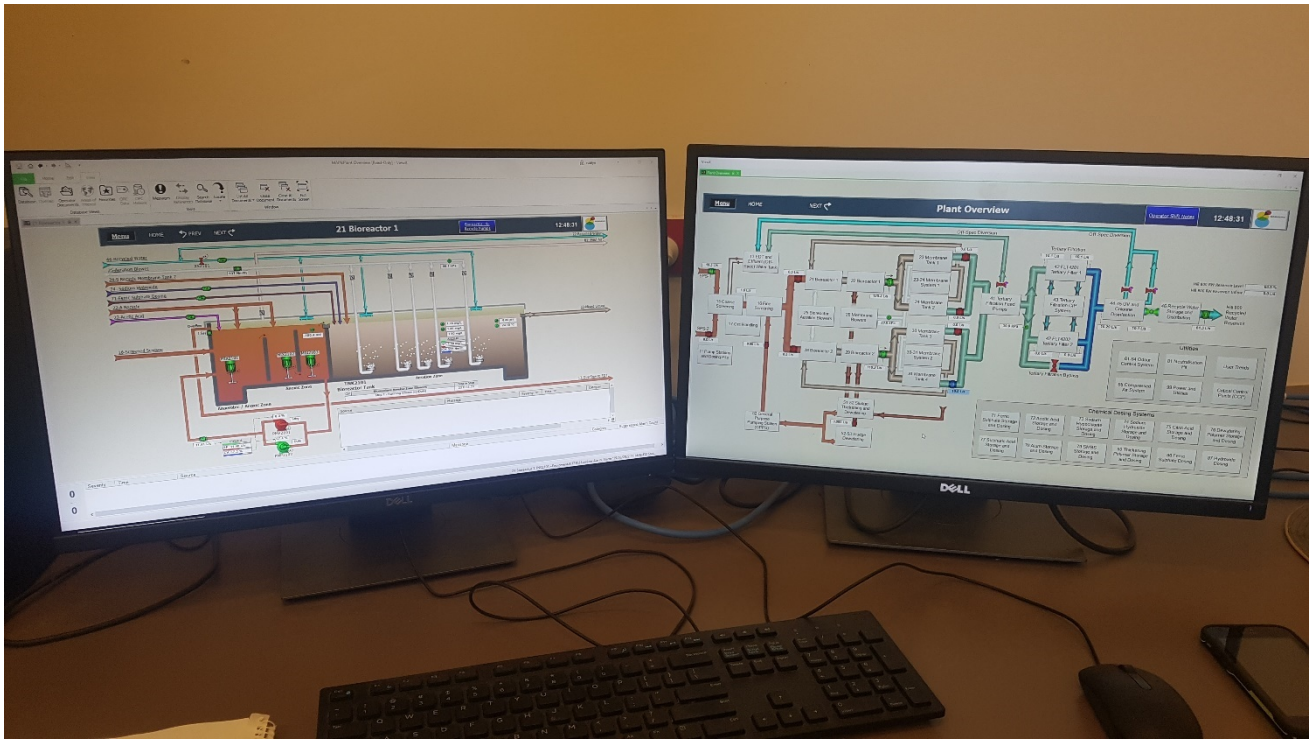


Figure 15-8: Googong WRP Site SCADA Control Console



15.5 Emergency Assembly Point

The emergency assembly point is shown on the Evacuation Diagram – see Figure 15-6

16 QUEANBEYAN SEWERAGE SCHEME (RETIC)

The City of Queanbeyan is located approximately 290 km south of Sydney and 17 km from Canberra. It is located on the Queanbeyan River. The City has population of around 55,000 people and is located immediately on the eastern border of the Australian Capital Territory (ACT). While the entirety of Quenabeyan and its sewerage collection network is located within NSW its Sewage Treatment Plant (STP) is located within the ACT at nearby Oaks Estate. Accordingly, the plant (and network) is not licenced with NSW EPA, rather with ACT EPA under Environmental Authorisation No. 0417. Whilst this PIRMP has been developed according to the requirements of NSW EPA the intention is to extend its use for the reticulation component of Queanbeyan City as if the scheme was fully licenced according to these requirements.

16.1 The Queanbeyan City Sewerage Collection System

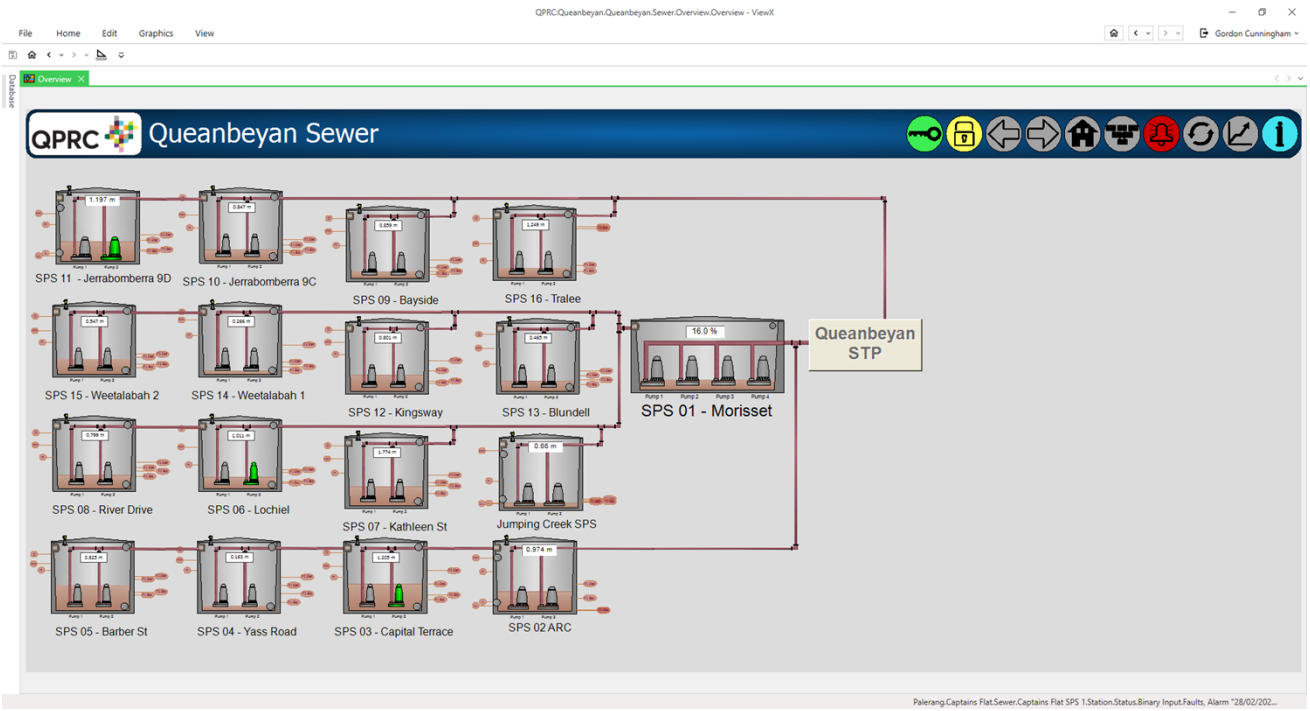
The Queanbeyan sewerage collection system comprises of the following:

- Gravity mains;
- Sixteen (16) sewage pumping stations;
- Rising mains
- Two trunk mains

The STP is licenced with ACT EPA under Environmental Authorisation No. 0417. The reticulation system is not licenced with NSW EPA.

Figure 16-1: Queanbeyan STP (QSTP) Location

Figure 16-2: Queanbeyan SPSs Arrangement



16.2 Types of Pollution Incidents

16.2.1 Sewage Pumping Station or Manhole Overflowing

Overall, the reticulation system is in a good condition and has sufficient capacity. Understandably with a network as large as the City's there are components with a wide range of age. The number of overflows or incidents per kilometre of pipeline per year would be considered normal by industry standards. Council uses water jetting equipment to clear blockages. Blockages in reticulation mains occur frequently. The principal causes are tree root intrusions, foreign objects lodging in the pipelines (eg wipes) and fat.

All SPSs are in a good condition, each pumping station has following capacity and control methods to minimise the overflowing from a SPS:

- Adequate pumping capacity;
- Reliable power supply;
- Emergency power generation (portable diesel generator);
- Ability to store 8 hours ADWF flows before an overflow occurs;
- Ability to detect and respond to abnormal operating conditions via telemetry system and visual alarm light (flashing) in the events of power failure, pump failure, etc.;
- Availability of standby pumps (duty/ standby operation);
- Control arrangement;
- Spare infrastructure available;
- Implementation of effective emergency plan/operational procedures for attending to failure and breakdown within the system; and

- Flood protection.

The alarms on high level and high high level will be early warning alarms when sewage in SPSs has the potential of surcharging.

Council will respond to overflows once notified. The Manager Utilities, Co-ordinator W&S, W&S Operator can control and isolate upstream mains and SPS remotely vis a site controllers.

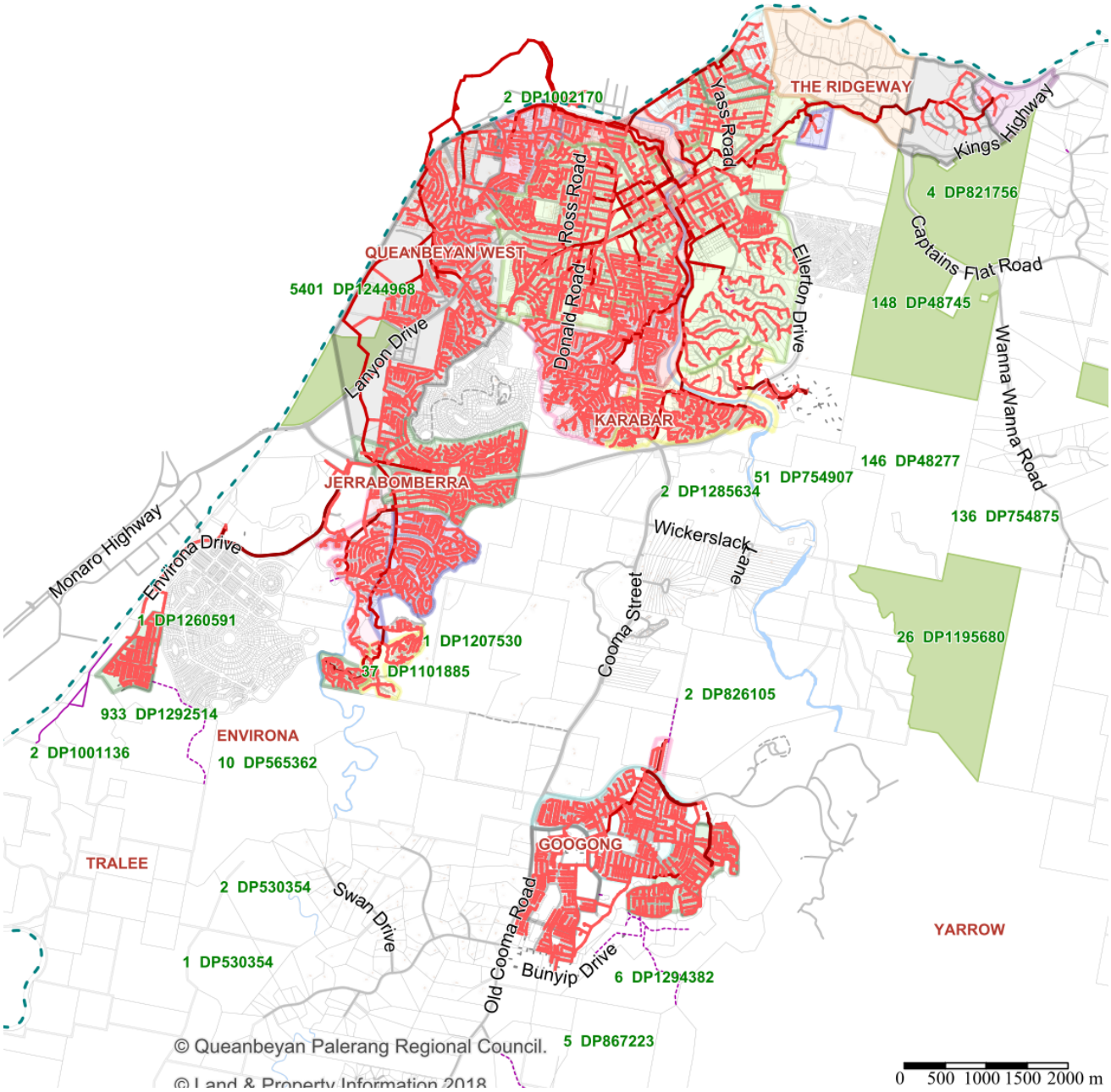
Overflows can also happen during unusual excessive inflows (>PWWF) which may occur during extreme flood events if reticulation manholes are inundated and the inflow is greater than the pumping station capacity.

Other possibilities for sewer overflows include illegal connection of storm water pipes and low-lying gullies or boundary traps.

Figure 16-3 shows the current jetter truck arrangements used for the Queanbeyan City and Googong reticulation networks. The Queanbeyan reticulation schematic is shown on ***Figure 16-4***.

Figure 16-3: Truck mounted Jetter (new 2023)

Figure 16-4: Queanbeyan Reticulation Schematic



16.2.2 **Odour Emission**

Reticulation System

Odours are generated in the sewerage system. Occasional issues are experienced at Morisset Street SPS and may need a bespoke solution in the future. Most other facilities either have elevated vent stacks or low-level carbon filters.

16.3 Risk Assessment – Queanbeyan Collection System

Table 16-1: Risk Register for Queanbeyan Collection System

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
	SPS Near Waterways								
1	**Sewage**	**Overflow to creek - extended power failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Reliable power system. Long outages would be planned. 8 hours ADWF emergency storage Operator response within 1 hour. Council has generators. SCA's have connection points.
2	**Sewage**	**Overflow to creek - extended power failure unplanned**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Reliable power system. 8 hours ADWF emergency storage. Telemetry system. Operator response within 1 hour Council has generators. SCA's have connection points.
3	**Sewage**	**Overflow to creek - pump failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Duty and standby Pumps - Pumps maintained every 3 years. Spare pumps provided. 8 hours ADWF emergency storage Telemetry system. Operator response within 1 hour.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
4	**Sewage**	**Overflow to creek - electrical failure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Telemetry system. Operator response within 1 hour. Diesel pumps and connection point. Spare SCA at depot. 8 hours ADWF emergency storage.
5	**Sewage**	**Overflow to creek - flooding of SPS**	✓	✓	Rare	Wet weather event	Moderate	Low	Telemetry system. Operator response less than 1 hour. SCA above 1 in 100 level. 8 hours ADWF emergency storage
	SPS Not Near Waterways								
6	**Sewage**	**Overflow to creek - extended power failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Reliable power system. Long outages would be planned. 8 hours ADWF emergency storage Operator response within 1 hour. Council has generators. SCA's have connection points.
7	**Sewage**	**Overflow to creek - extended power failure unplanned**	✓	✓	Unlikely	Wet weather event	Minor	Low	Reliable power system. 8 hours ADWF emergency storage. Telemetry system. Operator response less than 1 hour Council has generators. SCA's have connection points.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
8	**Sewage**	**Overflow to creek - pump failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Duty and standby Pumps - Pumps maintained every 3 years. Spare pumps provided. 8 hours ADWF emergency storage Telemetry system. Operator response within 1 hour.
9	**Sewage**	**Overflow to creek - electrical failure**	✓	✓	Unlikely	Wet weather event	Minor	Low	Telemetry system. Operator response within 1 hour. Diesel pumps and connection point. Spare SCA at depot. 8 hours ADWF emergency storage.
10	**Sewage**	**Overflow to creek - flooding of SPS**	✓	✓	Rare	Wet weather event	Minor	Low	Telemetry system. Operator response less than 1 hour. SCA above 1 in 100 level. 8 hours ADWF emergency storage
	Gravity System								
11	**Sewage**	**Overflow due to blockage**	✓	✓	Possible	Wet weather event	Minor	Low	Operator to call in tanker and use Jet Flush Units to clear. Operator response within 1 hour. Small volumes.
12	**Sewage**	**Discharge due to pipe break – ground movement/ earthquake**	✓	✓	Rare	Wet weather event	Major	Moderate	Operator to call in tanker. Operator response within 1 hour. Small volumes.

	Contaminant	Description of the Hazardous Event	Human Health (Public Health)	Environmental Risks	Likelihood Almost certain - several times per year Likely - once every 1 - 3 years Possible - once every 3 - 10 years Unlikely - once every 20 years Rare - once every 100 years	Events or Circumstances that would increase likelihood	Impact Insignificant Minor Moderate Major Catastrophic	Assessed Risk Low Moderate High Very High	Pre-emptive Actions (Existing Controls) In addition to Operator training, SWMS
13	**Sewage**	**Discharge due to pipe break – excavation works**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Dial before dig. Maintain up-to-date plan records.
	Rising Mains								
14	**Sewage**	**Discharge due to pipe break – poor pipe condition or high pressure**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Flow/pump monitoring. Telemetry system.
15	**Sewage**	**Discharge due to pipe break – ground movement**	✓	✓	Rare	Wet weather event	Major	Moderate	Flow/pump monitoring. Telemetry system.
16	**Sewage**	**Discharge due to pipe break – excavation works**	✓	✓	Unlikely	Wet weather event	Moderate	Moderate	Flow/pump monitoring. Telemetry system. Dial before dig. Maintain up-to-date plans.

17 References

1. POELA Act 2011
2. POEO Act 1997
3. O&M Manual – Bungendore STP Operation and Maintenance Manual 2010
4. O&M Manual – Braidwood STP Operation and Maintenance Manual 2012
5. O&M Manual – Captains Flat STP Operation and Maintenance Manual 2020 (ECM 715297)
6. O&M Manual – Googong WRP Operation and Maintenance Manual Stages AB/C (ECM1587144)

18 Appendices

Appendix A – Council's Contact List

Organisation and Role	Name and Title	Contact No. & Communication Links
Internal Contacts		
Queanbeyan-Palerang Regional Council (QPRC) *Manager Utilities*	Gordon Cunningham *Manager Utilities*	(02) 6238 8140 0429 200 294 gordon.cunningham@qprc.nsw.gov.au
Queanbeyan-Palerang Regional Council (QPRC) *Local Emergency Management Officer (LEMO)*	Lorrae Stokes	(02) 4842 9252 0428 243 630 lorrae.stokes@qprc.nsw.gov.au
Queanbeyan-Palerang Regional Council (QPRC) *Captains Flat Operations*	Owen Krauth	0428 826 494 owen.krauth@qprc.nsw.gov.au
Queanbeyan-Palerang Regional Council (QPRC) *Bungendore Flat Operations*	Trent Morgan Chris Crawford Sean Mayberry	0429 447 649
Queanbeyan-Palerang Regional Council (QPRC) *Braidwood Operations*	Greg Ison Dan Ison	0428 887 992
Queanbeyan-Palerang Regional Council (QPRC) *Business Hours TL Pumps*	Brett Anderson	0402 971 120
Queanbeyan-Palerang Regional Council (QPRC) *After Hours Oncall Plumber*		0428 072 822
Queanbeyan-Palerang Regional Council (QPRC) *Googong WRP*	Darren Warner (BH) Oncall Operator	0419 931 120 0487 034 419
Queanbeyan-Palerang Regional Council (QPRC) *Water and Sewerage Coordinator - East (WSC)*	Ken Pearce	0427 467 670 ken.pearce@qprc.nsw.gov.au
Queanbeyan-Palerang Regional Council (QPRC)	Brett Meddemmen	0439 071 250 brett.meddemmen@qprc.nsw.gov.au

Organisation and Role	Name and Title	Contact No. & Communication Links
Water and Sewerage Coordinator - West (WSC)		
Co-ordinator Sewage Treatment (West QSTP & WRP)	Shane O'Shea	0428 422 162 Shane.oshea@qprc.nsw.gov.au
Queanbeyan-Palerang Regional Council (QPRC) *Emergency Civil Works Engineer*	Barry Osmond	0428 610 381 barry.osmond@qprc.nsw.gov.au
Queanbeyan-Palerang Regional Council (QPRC) *Manager Environment & Compliance*	Mel Corey	0428 623 448 Melinda.corey@qprc.nsw.gov.au
Queanbeyan-Palerang Regional Council (QPRC) Director Infrastructure Services	Mike Duff	0497 027 288 Mike.duff@qprc.nsw.gov.au
Queanbeyan-Palerang Regional Council (QPRC) *General Manager*	Rebecca Ryan	0427 752 690 rebecca.ryan@qprc.nsw.gov.au

Appendix B – Councils Call Out Code

Appendix C - SDS

Appendix D - SWMS

Appendix E – Training/ Education Register

Appendix F – Incident Reporting Form

Appendix G – Audit Log Form

Auditor/ reviewer comment (System deficiency and non-compliances)	Scheme response	Corrective actions to prevent reoccurrence	Timetable for corrective/ preventive action	Person(s) responsible	Completion Date

The report must be signed by the Water and Sewer Operations Engineer, Queanbeyan-Palerang Regional Council.

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