Kempsey Shire Council

Pollution Incident Response Management Plan

February 2021

Table of contents

Table index

Figure index

Appendices

1. Introduction

1.1 Background

Kempsey Shire Council (KSC) operates seven sewerage schemes across the local government area (LGA) that each operate under an Environment Protection Licence (EPL) issued under the *Protection of the Environment Operations Act 1997* (POEO Act) by the NSW Environment Protection Authority (EPA). Each licensed sewerage scheme has a sewage treatment plant (STP) and infrastructure associated with their reticulation network. Table 1-1 below lists the sewerage schemes and their licence number. Section 2 provides further details on each sewerage scheme.

Table 1-1 KSC Sewerage Schemes and EPL Number

Sewerage Scheme	EPL Number
West Kempsey Sewerage Scheme	763
South Kempsey Sewerage Scheme	720
Gladstone Sewerage Scheme	1781
South West Rocks Sewerage Scheme	2497
Crescent Head Sewerage Scheme	577
Hat Head Sewerage Scheme	11874
Frederickton Sewerage Scheme	363

1.2 Legislative requirements

As per the POEO Act, the holder of an EPL must prepare, keep, test and implement a pollution incident response management plan (PIRMP) that complies with Part 5.7A of the POEO Act in relation to the activity to which the licence relates.

If a pollution incident occurs in the course of an activity so that material harm to the environment (within the meaning of section 147 of the POEO Act) is caused or threatened, the person carrying out the activity must immediately implement this plan in relation to the activity required by Part 5.7A of the POEO Act.

A copy of this plan must be kept at the licensed premises, or where the activity takes place in the case of mobile plant licences, and be made available on request by an authorised EPA officer and to any person who is responsible for implementing this plan.

Parts of the plan must also be available either on a publicly accessible website, or if there is no such website, by providing a copy of the plan to any person who makes a written request. The sections of the plan that are required to be publicly available are set out in clause 98D of the Protection of the Environment Operations (General) Regulation 2009.

1.3 Objective

To provide an, updated and complying PIRMP that meets the requirements for EPL holders as specified in Part 5.7A of the POEO Act.

2. Sewerage Schemes of KSC

2.1 Management of the sewerage schemes

Figure 2-1 depicts the organisational structure for the management of the sewerage schemes administered by KSC.

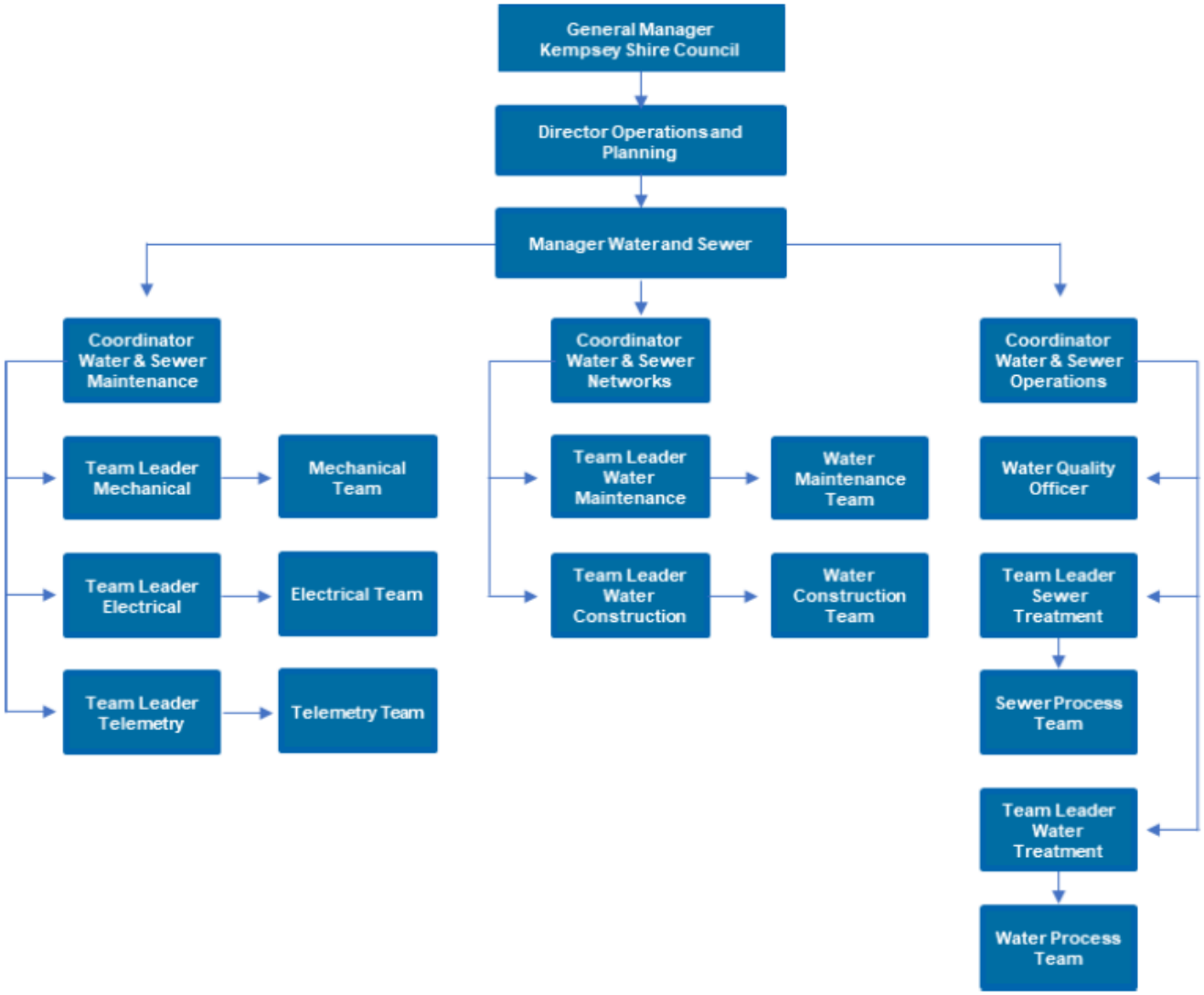


Figure 2-1 Organisational structure

The Director of Operations and Planning administers the seven KSC sewerage schemes. The Coordinator Water and Sewer Operations, Coordinator Water and Sewer Networks and the Coordinator Water and Sewer Maintenance report to the Manager Water and Sewer, who is responsible for managing the sewerage schemes. The Team Leader Sewer Treatment is responsible to the Coordinator Water and Sewer Operations for the day-to-day management of the sewerage schemes, including sewage pump stations (SPS's) and STP's. The Team Leader Water Maintenance and Team Leader Water Construction is responsible to the Coordinator Water and Sewer Networks for the day-to-day management of the scheme's sewage mains including repairs, maintenance and replacements. The Team Leader Mechanical, Team Leader Telemetry and the Team Leader Electrical are responsible to the Coordinator Water and Sewer Maintenance for all electrical, telemetry and mechanical maintenance and repairs at SPS's and STP's.

There are four teams responsible for operating and maintaining the schemes as follows:

- Sewer Process Team – responsible for the day-to-day operation of the STP's and SPS's, and after-hours response to STP failures and SPS failures.
- Water Construction Team – Responsible for mains replacements.
- Water Maintenance Team – Responsible for repairs and maintenance of the mains and after hours response to main failures and blockages.
- Water Trades Team – includes fitters, telemetry/instrumentation technicians and electricians responsible for associated maintenance of the scheme.

A summary of each licensed sewerage scheme is included in this section. Schematics of each scheme are included in Appendix A. All STP's have sludge stored in sludge lagoons on site, dewatered by a portable centrifuge or long arm excavator (West Kempsey STP only) and transported and applied to private land as per EPA Biosolids application protocols and *Review of Environmental Factors for "177 White Rock Road" Volume 1 and 2,* prepared by Arkwood Organic Recycling, 2010 (the REF). It should be noted that when sludge cannot be transported to private land, it is instead transported to the Kempsey Shire Council's landfill site.

2.2 West Kempsey sewerage scheme

2.2.1 Licence details

EPL #: 763

STP site address: North and Belmore Streets, West Kempsey NSW 2440

Contact details: Name: Kempsey Shire Council

Position: Team Leader Sewer Treatment

Business hours contact: 02 6566 3200

After hours contact: On call operator 0478 492 540

Scheduled activity: Sewage treatment

Fee based activity: Sewage treatment processing by small plants, >1000-5000 ML annual maximum volume of discharge.

2.2.2 Summary of operations

The West Kempsey sewerage scheme contains:

- 66 kilometres (km) of gravity sewers
- Current loading of approximately 4,400 equivalent tenements (ET)

- 15 KSC owned pumping stations and a further 11 privately owned pumping stations
- A number of pump stations for the wastewater transportation system which independently discharge to the West Kempsey STP
- A sizeable gravity catchment discharges to the treatment works through two large carrier mains
- One formal overflow structure within the system located at the K6C SPS

The West Kempsey STP has two parallel process trains, consisting initially of primary sedimentation followed by biological trickling filters. The first process train was constructed in 1939 with a duplicate process constructed in 1966. Flow enters the plant through a distribution structure that discharges to the head of the inlet works through a gravity main. The effluent travels through five maturation ponds and then is pumped from the end of the ponds to the Macleay River for discharge.

2.3 South Kempsey sewerage scheme

2.3.1 Licence details

EPL #: 720

STP site address: South Street, South Kempsey NSW 2440

Contact details: Name: Kempsey Shire Council

Position: Team Leader Sewer Treatment

Business hours contact: 02 6566 3200

After hours contact: On call operator 0478 492 540

Scheduled activity: Sewage treatment

Fee based activity: Sewage treatment processing by small plants, >219 - 1000 ML discharged.

2.3.2 Summary of operations

The South Kempsey sewage scheme contains:

- Approximately 45 km of gravity sewers.
- Current loading of approximately 1,897 ET.
- 16 KSC pumping stations and a further four privately owned pumping stations.
- Three separate systems that each independently discharge to the STP.
- One overflow structure in the system discharging to the environment located at K11B SPS. An additional high level overflow is located at K11C SPS which overflows to K11B SPS.

The plant consists of a trickling filter plant built in 1960 with a nominal capacity of 3,400 equivalent population (EP), and a 2,000 EP Intermittent Extended Aeration Tank (Pasveer Channel P2000). There are also three effluent ponds including a catch pond. The effluent ponds have a detention time of 10 days at average dry weather flow (ADWF) for 5,400 EP. The sludge from the digestion tanks and excess sludge from the Pasveer Channel is treated in sludge lagoons and displaced supernatant liquor is returned to the head works. Currently the South Kempsey Golf course can use the effluent for irrigation reuse during period of dry weather.

2.4 Gladstone sewerage scheme

2.4.1 Licence details

EPL #: 1781

STP site address: Darkwater Street, Gladstone NSW 2440

Contact details: Name: Kempsey Shire Council

Position: Team Leader Sewer Treatment

Business hours contact: 02 6566 3200

After hours contact: On call operator 0478 492 540

Scheduled activity: Sewage treatment

Fee based activity: Sewage treatment processing by small plants, >100 – 219 ML discharged.

2.4.2 Summary of operations

The Gladstone sewage scheme, which services Gladstone and Smithtown, contains:

- Approximately 9 km of gravity sewers
- Current loading of approximately 534 ET
- Eight KSC pumping stations and one privately owned pumping station.
- No formal overflow structures within the system.

The Gladstone STP is an intermittent extended aeration plant (Bathurst Box) designed for a population of 2,000 EP. The average flow through the plant is approximately 360 kilolitres per day (kL/day). The tertiary ponds provide 15 days retention at ADWF and the effluent is discharged into the Macleay River. Gladstone is bounded by the Macleay River to the west, and farm land to the north, east and south. Smithtown is bounded on three sides by the Macleay River with open farmland located to the north. All of this land could potentially be impacted upon by overflows from the system.

2.5 South West Rocks sewerage scheme

2.5.1 Licence details

EPL #: 2497

STP site address: Belle O'Connor Street, South West Rocks NSW 2431

Contact details: Name: Kempsey Shire Council

Position: Team Leader Sewer Treatment

Business hours contact: 02 6566 3200

After hours contact: On call operator 0478 492 540

Scheduled activity: Sewage treatment

Fee based activity: Sewage treatment processing by small plants, >219 - 1000 ML annual maximum volume of discharge.

2.5.2 Summary of operations

The South West Rocks (SWR) sewerage scheme contains:

- Approximately 55 km of gravity sewers
- Current loading of approximately 2,950 ET
- 26 KSC pumping stations and a further seven privately owned pumping stations, which service the suburbs of South West Rocks, Arakoon and New Entrance
- Three separate systems that independently discharge to the STP
- One formal overflow structure within the system located at the in ground balance tank EPA No. 8 that discharges into a storm water drain

The SWR STP is a 6,000 EP Sequence Batch Reactor plant with a further 6,000 EP Pasveer treatment capacity. Excess sludge from the plant is stored in two sludge lagoons and displaced supernatant liquor is returned to the head of the plant. The effluent from the plant is treated with Sodium hypochlorite and discharged to a dune disposal site. Additional storm water attenuation is available on site through the use of one, or all, of the three standby Pasveer channels. During peak periods of tourist visitation, the standby Pasveer channels are brought on line to treat the additional load. The SWR Golf course currently uses SWR effluent for irrigation purposes.

A Water Recycling Plant has also been constructed on site to tertiary treat the SWR STP effluent for reticulation for irrigation, household and laundry use. This plant has to undergo validation prior to operation for full reuse.

2.6 Crescent Head sewerage scheme

2.6.1 Licence details

EPL #: 577

STP site address: Belmore Street, Crescent Head NSW 2440

Contact details: Name: Kempsey Shire Council

Position: Team Leader Sewer Treatment

Business hours contact: 02 6566 3200

After hours contact: On call operator 0478 492 540

Scheduled activity: Sewage treatment

Fee based activity: Sewage treatment processing by small plants, >219 - 1000 ML discharged.

2.6.2 Summary of operations

The Crescent Head sewage scheme contains:

- Approximately 14 km of gravity sewers
- Current loading of approximately 988 ET
- Six KSC pumping stations and one privately owned pumping station
- No formal overflow structures within the system

The Crescent Head STP is a 2,000 EP Intermittent Decanted Aerated Lagoon (IDAL) plant that consists of two intermittent aeration tanks. The current average daily flow is approximately 300 kL/day. Excess sludge from the plant is stored in two sludge lagoons and displaced supernatant liquor is returned to the head of the plant. The effluent from the plant is stored throughout the day and pumped out, after UV disinfection, to an ocean outfall. Additionally, storm water flow retention is available on site through the use of two decommissioned Pasveer channels.

2.7 Hat Head sewerage scheme

2.7.1 Licence details

EPL #: 11874

STP site address: Hungry Head Road, Hat Head NSW 2440

Contact details: Name: Kempsey Shire Council

Position: Team Leader Sewer Treatment

Business hours contact: 02 6566 3200

After hours contact: On call operator 0478 492 540

Scheduled activity: Sewage treatment

Fee based activity: Sewage treatment processing by small plants, >100 - 219 ML discharged.

2.7.2 Summary of operations

The Hat Head sewage scheme contains:

- A vacuum sewage system with approximately 11 km of sewers, which consists of one KSC owned pumping station which houses vacuum pumps, a pressure vessel and discharge pumps
- Current loading of approximately 456 ET
- No formal overflow structures within the system

The Hat Head STP is an intermittently decanted extended aeration plant with sand filtration and effluent Sodium hypochlorite disinfection. Sewage from households flows under gravity to collection pits, which are of typical manhole type construction but are fitted with vacuum interface valves and controllers. There is typically one collection pit per four house lots.

The STP treats an average of approximately 65 kL/day with a current capacity of approximately 250 kL/day. The effluent is discharged to a sand dune disposal area north-west of the village. The permanent population of Hat Head is around 350 EP with a peak holiday population of approximately 2,000 EP.

Hat Head sewerage scheme is bounded by coastal sand dunes to the north and National Park to the east, south and west. The system is bisected by Korogoro Creek, which is subject to primary contact recreation and thus classified as sensitive. All of this land could potentially be impacted upon by overflows from the system.

2.8 Frederickton sewerage scheme

2.8.1 Licence details

EPL #: 363

STP site address: Macleay Valley Way, Frederickton NSW 2440

Contact details: Name: Kempsey Shire Council

Position: Team Leader Sewer Treatment

Business hours contact: 02 6566 3200

After hours contact: On call operator 0478 492 540

Scheduled activity: Sewage treatment

Fee based activity: Sewage treatment processing by small plants, >100 - 219 ML discharged.

2.8.2 Summary of operations

The Frederickton sewerage scheme contains:

- Approximately 15 km of gravity sewers
- Current loading of approximately 481 ET
- Four KSC owned pumping stations and one privately owned pumping station
- No formal overflow structures within the system

The Frederickton STP consists of one 1,000 EP Pasveer channel with excess sludge from the treatment process being stored in two sludge lagoons and displaced supernatant liquor being returned to the Pasveer channel.

The ADWF for this population is approximately 200 kL/day tertiary treatment provided in the form of three effluent ponds allowing for 15 days detention at ADWF. An effluent reuse system has been installed to provide irrigation water for the nearby golf course. Effluent from the plant is also discharged to the Macleay River when not reused by the golf course.

The Frederickton sewage scheme is bounded by Christmas Creek to the south, the Macleay River to the east, and rural lands to the west and north, which could all potentially be impacted upon by overflows from the system.

3. Pollution incident response planning

3.1 Risk assessment

A series of risk assessment workshops were completed by KSC personnel in August 2020. The revised, complete risk assessment document is presented in Appendix E.

Table 3-1 summarises the main hazards identified in the risk assessment and the control measures implemented to minimise the occurrence and consequences (people and environment) of the identified hazards.

Note: the summary in Table 3-1 presents the range of residual risk consequences and likelihoods across the KSC sewerage treatment catchments. The specific, detailed risks are shown for each sewer system in the risk assessment presented in Appendix E.

Table 3-1 Hazards Summary

Location	Hazard	Escalating Factors	Control Measure/s	Mitigated consequence	Mitigated likelihood of material harm	Residual risk range
STPs	Spill of untreated sewage to land/water and/or community contact	– Significant rainfall event – Large volume trade waste discharge – Insufficient treatment capacity – Plant malfunction/failure – Emergency disasters (flood, fire, landslips) – Proximity to sensitive human and ecological receptors	– Certified staff and staff training – Inlet level monitoring and telemetry alarming – Infiltration abatement programs – Physical inlet screen with designed bypass channel – Run STP in Wet Weather/flood mode – Buffering in tertiary ponds – Plant maintenance – Business Continuity Plan (BCP) – Multiple controlled overflow designs – Bypass storage capacities – Back up mobile generators	Moderate to Major	Rare to Possible	Moderate to Very High
	Spill of chemicals / fuels / oils	– Inappropriate storage of chemicals / fuels / oils – Use of chemicals / fuels / oils by untrained staff – Proximity to sensitive human and ecological receptors	– Certified staff and staff training – Bunded area around chemical storage – Chemical spill kits on site – Buffering/dilution in tertiary ponds – Staff on site for chemical deliveries – SDS for chemical handling – SDS information box at front of plant	Insignificant to Catastrophic	Rare	Low to High

Location	Hazard	Escalating Factors	Control Measure/s	Mitigated consequence	Mitigated likelihood of material harm	Residual risk range
Sewer reticulation network	Spill of untreated sewage to land - sewer choke - mains break	– Increase in solids content of sewage – Unauthorised material discharged to sewer network or vandalism – Infiltration of tree roots or misaligned pipe connections due to ground movement – Wet weather events – Proximity of sewer choke to sensitive receptors – Deteriorating infrastructure – Unreported breaks in isolated areas – Ground movement due to changes in weather patterns (flood to droughts for example)	– Certified staff and staff training – Incident response plan and protocols – Preventative maintenance programme – Telemetry that includes monitoring and alarms of pump stations that influence retic flows – Documentation and procedures – Asset renewal / upgrades and auditing – Critical spares – 24hrs on call availability – Access to plant and equipment (loaders, excavators, CCTV) – Access to contractor VAC truck – Vegetation management – Implement containment measures to minimise impact – Remedial actions (lime, disinfection, fencing) – Isolation of main at pump stations and valves throughout the sewer system	Minor to Catastrophic	Rare to Possible	Low to High

Location	Hazard	Escalating Factors	Control Measure/s	Mitigated consequence	Mitigated likelihood of material harm	Residual risk range
	Spill of untreated sewage to land: – pump station failure	– Increase in solids content of sewage – Unauthorised material discharged to sewer network – Proximity to sensitive human and ecological receptors – Deteriorating infrastructure – Extreme wet weather events	– Certified staff and staff training – Incident response plan and protocols – Preventative maintenance programme – Telemetry that includes monitoring and alarms – Documentation and procedures – Asset renewal / upgrades – Critical spares – Mobile backup generators – 24hrs on call availability – Access to contractor VAC truck – Vegetation management – Implement containment measures to minimise impact – Designed overflow structures	Insignificant to Catastrophic	Rare to Possible	Low to Very High

3.2 Potential pollutants and safety equipment

A number of potential pollutants are stored, used and disposed of at each STP for operational activities. These include chemicals, fuels, oils, lubricants, cement, lime, and treated and untreated sewage.

A range of safety equipment and alarms are maintained at the STP's and throughout the sewer network for use during emergencies.

Details of potential pollutants and safety equipment are provided in Table 3-2. The location of the items listed is shown on the maps in Appendix A.

Table 3-2 Inventory of pollutants and safety equipment

Location	Potential Pollutant	Maximum Quantity	Storage	Safety Equipment and Devices	Alarms
West Kempsey STP	Sewage	ADWF 1645 kL/day (approx.)	N/A	– Firefighting equipment – SDS's – First aid kit – Spill kits – Signage – PPE including ear protection, hard hats, appropriate footwear, high visibility vests, rubber gloves, face masks	Nil
	Ferric Chloride	25,000 L	Tank and bund		
	Fuel	20 L	Operations building		
	Roundup	0.5 L	Storage shed		
	Hydrate lime	40 kg	Storage shed		
	Disinfectant	5 L	Operations building		
	Oils	20 L	Storage shed		
South Kempsey STP	Sewage	ADWF 590 kL/day (approx.)	N/A	– Firefighting equipment – SDS's – First aid kit – Spill kits – Signage – PPE including ear protection, hard hats, appropriate footwear, high visibility vests, rubber gloves, face masks	Nil
	Sodium Hypochlorite	2,000 L	Tank and bund		
	Fuel	20 L	Operations building		
	Roundup	0.5 L			
	Hydrate lime	40 kg			
	Disinfectant	5 L			
	Oils	20 L			
Gladstone STP	Sewage	ADWF 340 kL/day (approx.)	N/A	– Firefighting equipment – SDS's – First aid kit – Spill kits – Signage – PPE including ear protection, hard hats, appropriate footwear, high visibility vests, rubber gloves, face masks	Nil
	Fuel	20 L	Operations building		
	Roundup	0.5 L			
	Hydrate lime	40 kg			
	Disinfectant	5 L			
	Oils	20 L			

Location	Potential Pollutant	Maximum Quantity	Storage	Safety Equipment and Devices	Alarms
South West Rocks STP	Sewage	ADWF 1300 kL/day (approx.)	N/A	– Firefighting equipment – SDS's – First aid kit – Spill kits – Signage – PPE including ear protection, hard hats, appropriate footwear, high visibility vests, rubber gloves, face masks	High level alarm for the effluent pond
	Sodium Hypochlorite	7,000 L	Tank and bund		
	Alum	24,000 L	Tank and bund		
	Fuel	20 L	Storage shed		
	Roundup	0.5 L			
	Hydrate lime	40 kg			
	Disinfectant	5 L			
	Oils	20 L			
Storage shed Operations building Storage shed	Sewage	ADWF 300 kL/day (approx.)	N/A	– Firefighting equipment – SDS's – First aid kit – Signage – PPE including ear protection, hard hats, appropriate footwear, high visibility vests, rubber gloves, face masks	Nil
	Alum	16,000 L	Tank and bund		
	Fuel	20 L	Storage shed		
	Roundup	0.5 L			
	Soda Ash	40 kg			
	Disinfectant	5 L			
	Oils	20 L			
Hat Head STP	Sewage	ADWF 104 kL/day (approx.)	N/A	– Firefighting equipment – SDS's – First aid kit – Spill kits – Signage – PPE including ear protection, hard hats, appropriate footwear, high visibility vests, rubber gloves, face masks	Nil
	Sodium Hypochlorite	2,400 L	Tank and bund		
	Alum	10,000 L			
	Caustic	10,000 L			
	Fuel	20 L	Site container		
	Roundup	0.5 L			
	Hydrate lime	40 kg			
	Disinfectant	5 L			
	Oils	20 L			

Location	Potential Pollutant	Maximum Quantity	Storage	Safety Equipment and Devices	Alarms
Frederickton STP	Sewage	ADWF 224 kL/day (approx.)	N/A	– Firefighting equipment – SDS's – First aid kit – Spill kits – Signage – PPE including ear protection, hard hats, appropriate footwear, high visibility vests, rubber gloves, face masks	Nil
	Fuel	20 L	Site container		
	Roundup	0.5 L			
	Hydrate lime	40 kg			
	Disinfectant	5 L			
	Oils	20 L			
Pump stations	Sewage	Site specific – refer to documentation held at pump station	N/A	– Standby pumps – Bunds	High level alarms connected to telemetry
Sewer reticulation network	Sewage	Site specific	N/A	N/A	Nil

3.3 Maps

Pollution incident response maps have been prepared to facilitate planning for incident response and provide readily accessible and accurate information to support the assessment of an incident and assist in the implementation of incident response procedures and clean-up.

The following maps are provided in Appendix A:

- Locality maps of each STP and associated sewerage network.
- Site features map of each STP showing a radius of potential influence in the event of an incident, and the location of potential pollutants.
- Stormwater and potential pollutants flow direction.

3.4 Pre-emptive management strategies

KSC uses a combination of monitoring, physical controls and preventative maintenance to reduce the potential for pollution incidents to occur within the sewerage schemes. The following sections provide a summary of the pre-emptive management strategies employed by KSC.

3.4.1 Remote Monitoring

A telemetric monitoring system is in place that enables remote monitoring of the sewerage schemes. Radio telemetry units (RTUs) are located at all sewage pump stations in each of the sewerage schemes. In addition, there are RTUs at each of the sewage treatment plants. Each RTU has a battery-sourced power back up in order that it can continue to operate in the event of failure of a power phase or the mains supply.

Radio signals from the RTUs are directed to Yarrahapinni (Mountain) where there is a radio repeater station, which relays the signals to a number of base stations. There are duty and stand by radios at Yarrahapinni. There is no power back up at this location, however power supply here is generally reliable given that there are a number of other radio communication systems that rely on Yarrahapinni.

Data is processed by dedicated software and can be monitored on screens at various locations such as a number of STPs, the Managers offices and the Works Depot. The system can also be monitored remotely on laptops and mobile devices. This system has alarm monitoring and generates alarms to the designated responsible officers through an SMS alarm system. Hat Head STP and South West Rocks STP are operated through Citect which is also monitored remotely by the above outlined systems.

During working hours, the monitor screens are generally under surveillance by those staff stationed at the relevant locations. After hours general surveillance is conducted by the staff members that are on-call. Alarms are also generated and are sent out through a SMS alarm system to designated staff throughout the day and to the appropriate after hours on-call staff.

Maintenance of the telemetry system is undertaken by Telemetry Team and some maintenance is outsourced to contractors.

3.4.2 Physical Controls

All chemical storages are bunded to ensure that if the storage fails the pollutant is contained. Some of the older bunded storage areas have discharge pipework to drain the spilled chemical from the bund pits. The pipework has isolation valves, which are kept in the closed position. Additional labelling at each of the valves is provided to ensure that the valve is maintained in the closed position and only operated to allow removal of rain in the bund.

- At the South West Rocks STP and Crescent Head STP, offline Pasveer channels have been set up to store excessive flow from infiltration during a storm event to prevent offsite discharges of partially treated sewage. If capacity is reached at South West Rocks STP, discharge occurs at licensed controlled bypass EPA No. 8 into a storm water drain. At all other STPs, there is sufficient capacity to treat additional inflows due to storm events, however this normally results in reduced treatment performance at the plant. The West Kempsey STP has a licensed controlled bypass to the Macleay River through the K6C SPS. Significant controls are in place to minimise the use of this bypass.

The SPSs also have multiple alarm systems to alert operators of conditions that may result in incidents, which include:

- High level alarms
- Communication failure
- Pump failure alarms
- Power failure alarms

Only South West Rocks STP has a high level alarm on the effluent pond.

3.4.3 Preventative Maintenance

Sewer Process Team

The Sewer Process team are responsible for the operation of all the STPs and the SPSs. Each member of the team is designated a STP or a number of STPs that they are responsible for. They are also designated a number of SPSs that they are responsible for within their STPs catchment area. They are required to attend the plants daily, during the working week, to monitor the performance of the plant. They are also required to attend each pump station on a weekly basis to monitor its performance. A single operator is designated as on-call for one week periods. This operator is required to check the STPs on a weekend roster and monitor all alarms for the whole KSC Sewage Scheme. They are also required to attend to any alarms for the STPs after hours.

General tasks include the following:

- Checking plant performance including water quality testing
- Housekeeping, including cleaning
- Visual checks of all equipment
- Minor maintenance tasks
- Chemical system checks
- Site security checks
- SCADA monitoring and alarm performance
- Alarm testing – operating floats
- Vermin proofing
- Biosolids management and off-site disposal
- Organising grit and screenings removal to landfill
- Contractor site management
- Overflow structure inspections
- EPA licence sampling

Water Maintenance Team

The Water Operations and Maintenance teams are responsible for the planned repairs and replacement of all sewer mains. The Maintenance team is also responsible for providing after hours responses to mains breaks and SPS alarms.

General tasks include:

- All valve operations - exercising, maintenance
- Inlet Valves - exercising, maintenance
- Isolation Valves - exercising, maintenance
- Reduced Pressure Zone (RPZ) Device testing
- CCTV and jetting for repeat chokes
- Tree removal where there are repeat chokes
- Inspection and mowing of pipeline easements
- Condition assessment of above ground rising mains
- Manhole inspections

Water Trades Team

The Water Trades Team are responsible for all electrical, telemetry and mechanical maintenance of STPs and SPSs. The team are responsible for managing the preventative maintenance of these systems as well as rectifying equipment defects. KSC are currently in the process of developing a preventative maintenance system to improve the monitoring and control of its equipment. This team is also responsible for the maintenance of the telemetry system.

General tasks for this team include:

- Alarm monitoring and testing
- Telemetry system performance monitoring and maintenance
- Pump maintenance and performance testing
- Organising contractors for scheduled maintenance of blowers, air compressors and gas chlorine dosing systems
- UPS and back up battery checks and maintenance

4. Incident response

4.1 Notifiable Incidents

4.1.1 POEO Act Definitions

A pollution incident is defined by the POEO Act as:

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.

Material harm is defined by the POEO Act as:

(1) For the purposes of this Part:

(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.

(2) For the purposes of this Part, it does not matter that harm to the environment is caused only in the premises where the pollution incident occurs.

Licensed facilities are 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.

4.2 Immediate notification incident

4.2.1 Incident response and notification

As per the definition of an immediate notification incident in section 4.1.1, KSC has identified several hazards in their risk assessment which have the potential to require immediate notification. These hazards have a consequence of Major or Catastrophic with a residual risk rating of High or Very High.

KSC's procedures for responding to a potential immediate notification incident are outlined in Figure 4-1. Contact details for notifying KSC personnel and the required external agencies are provided in and Table 4-2. The applicable Work Method Statement to assist in incident response actions is provided in Appendix F.

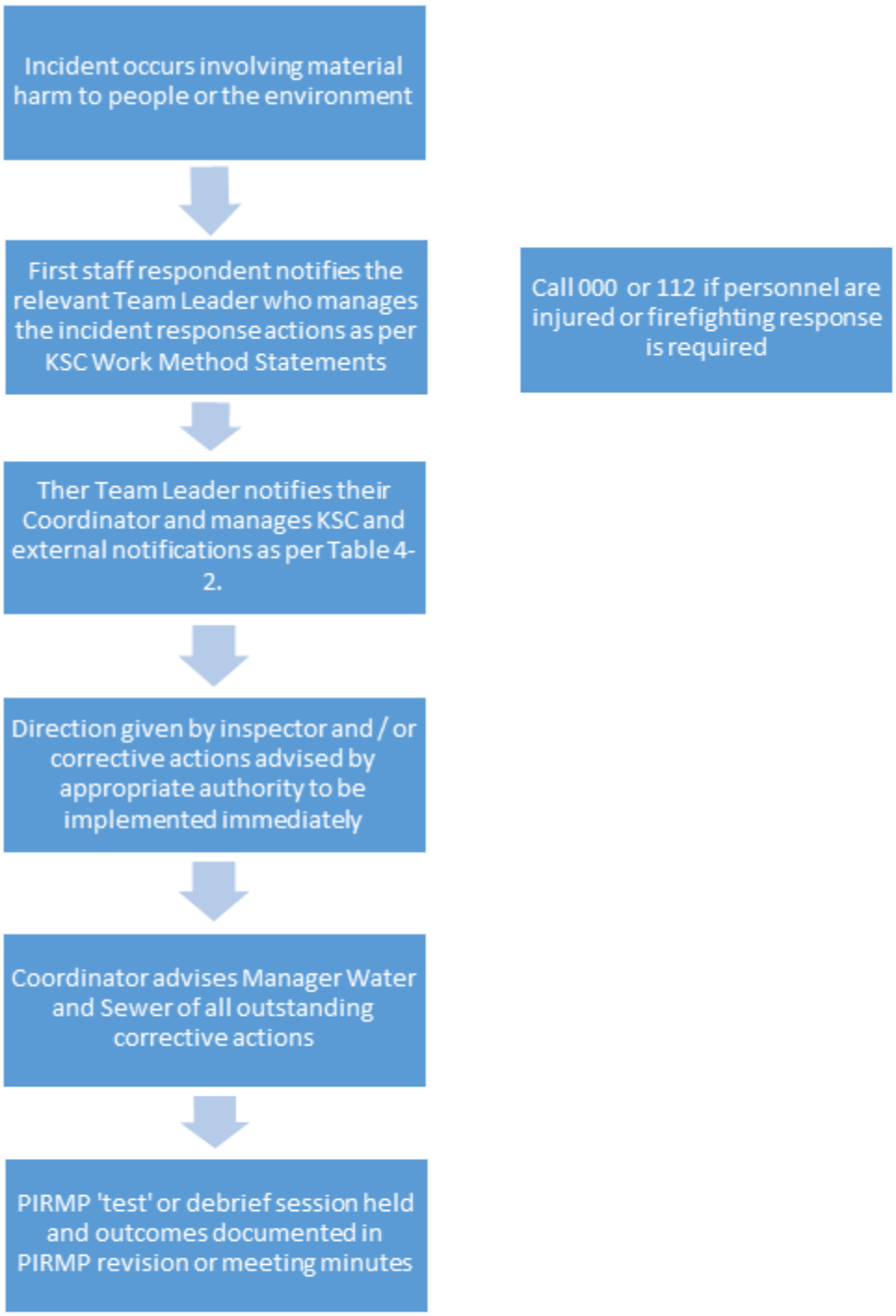


Figure 4-1 Incident Notification Response Flowchart

Table 4-1 Incident contact details – Council

Location	Name	Role Title	24 hrs contact number
ALL STPs Pump stations	Barry Young	Team Leader Sewer Treatment	0427 475 253
Network Assets (pipes, manholes, etc)	Douglas Tovey	Team Leader Water Maintenance	0427 302 256
Network Assets (pipes, manholes, etc)	Peter Ingold	Team Leader Water Construction	0429 827 377

Table 4-2 Incident contact details – External

Organisation	Contact Number	Local office if applicable
Emergency Services	000 or 112	
NSW EPA	131 555	
SafeWork NSW	131 050	
Essential Energy	132 080	
NSW Health/Service NSW	137 788	
National Parks and Wildlife Service	1300 361 967	(02) 6561 6700
NSW Fisheries	(02) 6391 3100	0407 957 631
Roads and Maritime Service	132 213	

In the event of an immediate notification incident, responsibilities for incident management are as follows:

- Team Leader Sewer Treatment, Team Leader Water Maintenance, or Team Leader Water Construction is responsible for actioning response to the incident.
- Manager Water and Sewer or their delegate is responsible for notifying internal parties such as the Principal Work Health and Safety if Fire and Rescue attended the incident, external authorities, potentially affected community, and ensuring adequate resources are available for incident response.

Information that will need to be provided to the EPA may include:

- Time, date, nature, duration, and location of the incident
- Estimated quantity and pollutants involved
- Cause and circumstances of the incident
- Action taken or proposed to be taken

The Manager Water and Sewer shall determine the most appropriate means of contacting potentially affected community including:

- Door knocking
- Letterbox drops
- Phone
- Local media
- Social media
- Signage

Information provided to the community would depend on the incident but could include:

- Description of the incident

- Status of incident
- Response actions
- Actions to minimise harm
- Likely duration

As per all KSC EPL conditions, the licensee must provide written details of the notification to the NSW EPA within seven days of the date on which the incident occurred. The appropriate notification and reporting forms are presented in Appendix B through to Appendix D.

4.3 General incident

KSC maintain incident response procedures for all potential incidents.

General incidents addressed in the risk assessment may also include fuel, oil and chemical spills.

General incidents (i.e. those not requiring notification to the NSW EPA) are to be reported to the appropriate KSC management staff and details recorded for annual reporting purposes.

Figure 4-2 below depicts the procedures to follow in the event of a general incident.

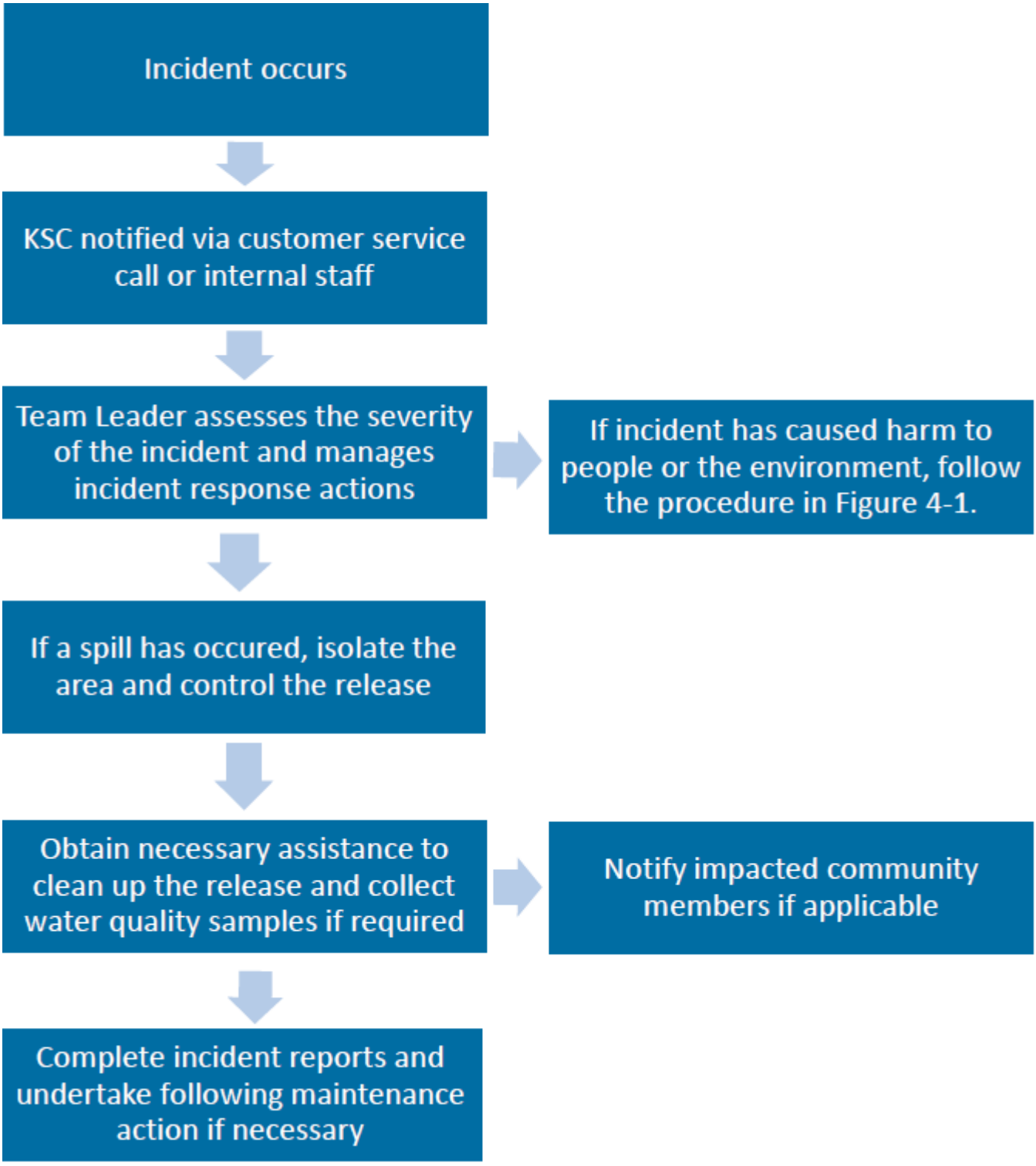


Figure 4-2 General Incident Response

5. Training

5.1 Training

Personnel involved in sewage operations undertake a range of training to assist in the response to potential incidents and to test the adequacy of incident response procedures and plans. Details of the training and testing of the PIRMP is provided in Table 5-1.

Table 5-1 Incident Response Training

Type of Training	Personnel Involved	Frequency	Records
Pollutant containment and clean up	New water and sewer staff	On-the-job for first six months prior to going on the On Call roster	Nil
NSW DPIE Part 1 – Basic Wastewater Treatment Operations	Sewer Operators	Once	Human Resources
NSW DPIE Part 2 – Advanced Wastewater Treatment Operations	Sewer Operators	Once	Human Resources
Water Operations Cert 3	Water and sewer Operators	Once	Human Resources
Confined space	Sewer staff	As required by training provider	Human Resources
Toolbox meetings	Sewer staff	Monthly	Minutes
PIRMP VOC/test	Sewer staff Water Quality Officer	Annually	Minutes Section 6 of PIRMP
Incident debrief/PIRMP test	Personnel involved in incident Independent chair Water Quality Officer	Within one month of a notifiable incident	Minutes Section 6 of PIRMP

6. PIRMP Review

6.1 PIRMP Review

The guidelines require the PIRMP to be reviewed annually. The PIRMP will be updated when there is a material change to operations including but not limited to:

- Modification of any EPL conditions
- Changes in standard operating procedures referred to in this PIRMP
- Review or changes to the risk assessment for licensed sites
- Change in legislative requirements
- Recommendations arising from an incident debrief emergency drill or emergency simulation exercise

The responsibility for reviewing the PIRMP is the Coordinator Water and Sewer Operations with assistance from relevant operations staff.

Records of PIRMP review and testing is provided in Table 6-1. An update of the PIRMP would trigger all staff to undergo refresher training as part of toolbox meetings as per Table 5-1.

Table 6-1 PIRMP Review and Test

Issue	Date	Reviewed by	Description
PIRMP Review			
1	September 2012	KSC Sewer personnel	Initial document prepared to meet the PIRMP guidelines
2	February 2021	KSC Sewer personnel GHD	PIRMP review in response to updated PIRMP guidelines. Full revision and update of Risk Assessment for KSC sewer operations network. PIRMP update including additional maps, response flowcharts and contact details for incident response.
PIRMP Testing			
1	16 June 2020	KSC Sewer personnel GHD	PIRMP desktop scenario test with KSC sewer personnel in response to updated PIRMP guidelines and PIRMP review process.

7. Disclaimer

This report has been prepared by GHD for Kempsey Shire Council and may only be used and relied on by Kempsey Shire Council for the purpose agreed between GHD and Kempsey Shire Council as set out in section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than Kempsey Shire Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

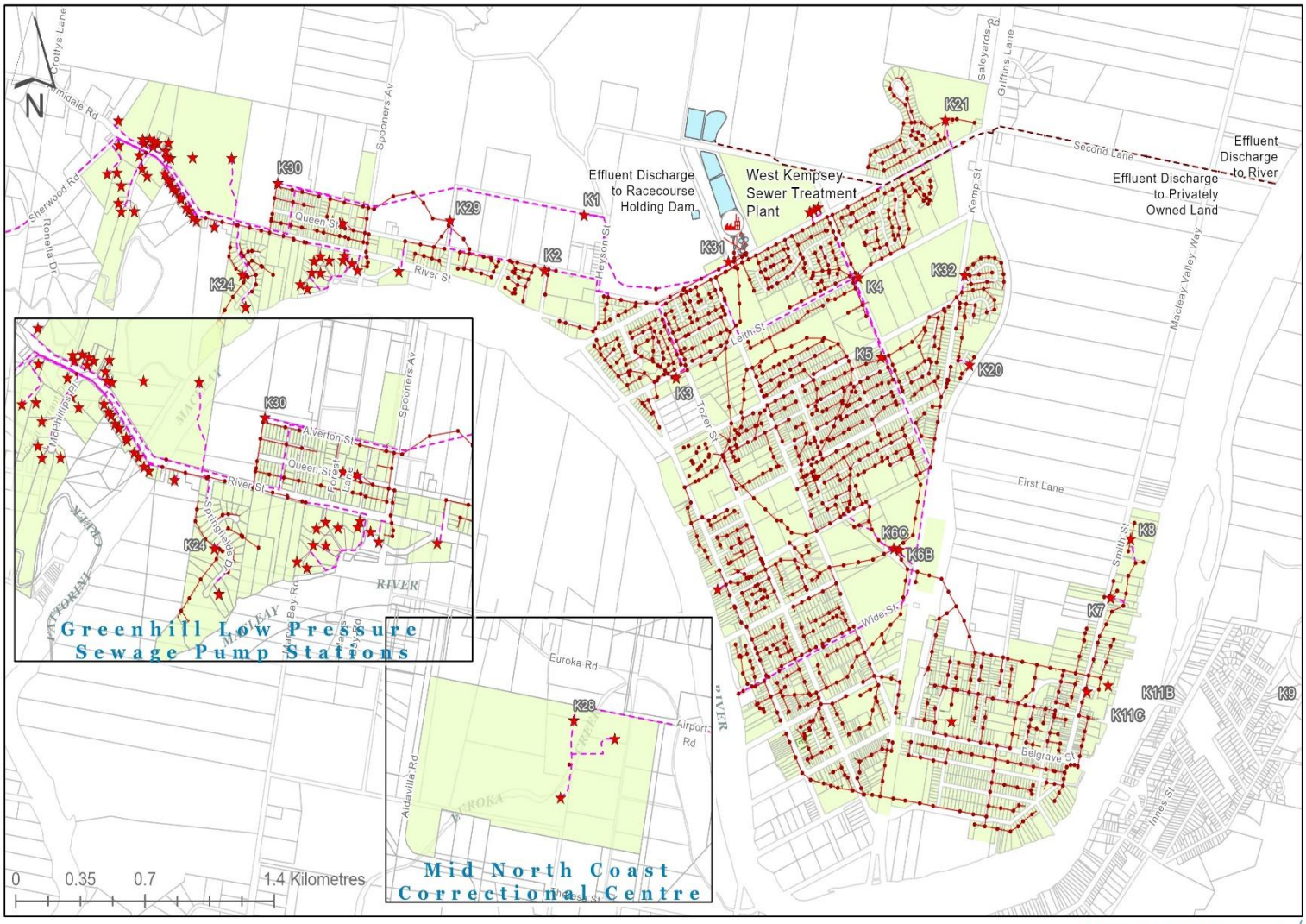
The opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the date of preparation of the Report. GHD has no responsibility or obligation to update this Report to account for events or changes occurring subsequent to the date that the Report was prepared. Specifically, this Report does not take into account the effects, implications and consequences of or responses to COVID-19, which is a highly dynamic situation and rapidly changing. These effects, implications, consequences of and responses to COVID-19 may have a material effect on the opinions, conclusions, recommendations, assumptions, qualifications and limitations in this Report, and the entire Report must be re-examined and revisited in light of COVID-19.

GHD has prepared this report on the basis of information provided by Kempsey Shire Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Appendices

Appendix A – Maps

A-1a West Kempsey Sewage Treatment Plant – Sewerage Network Locality

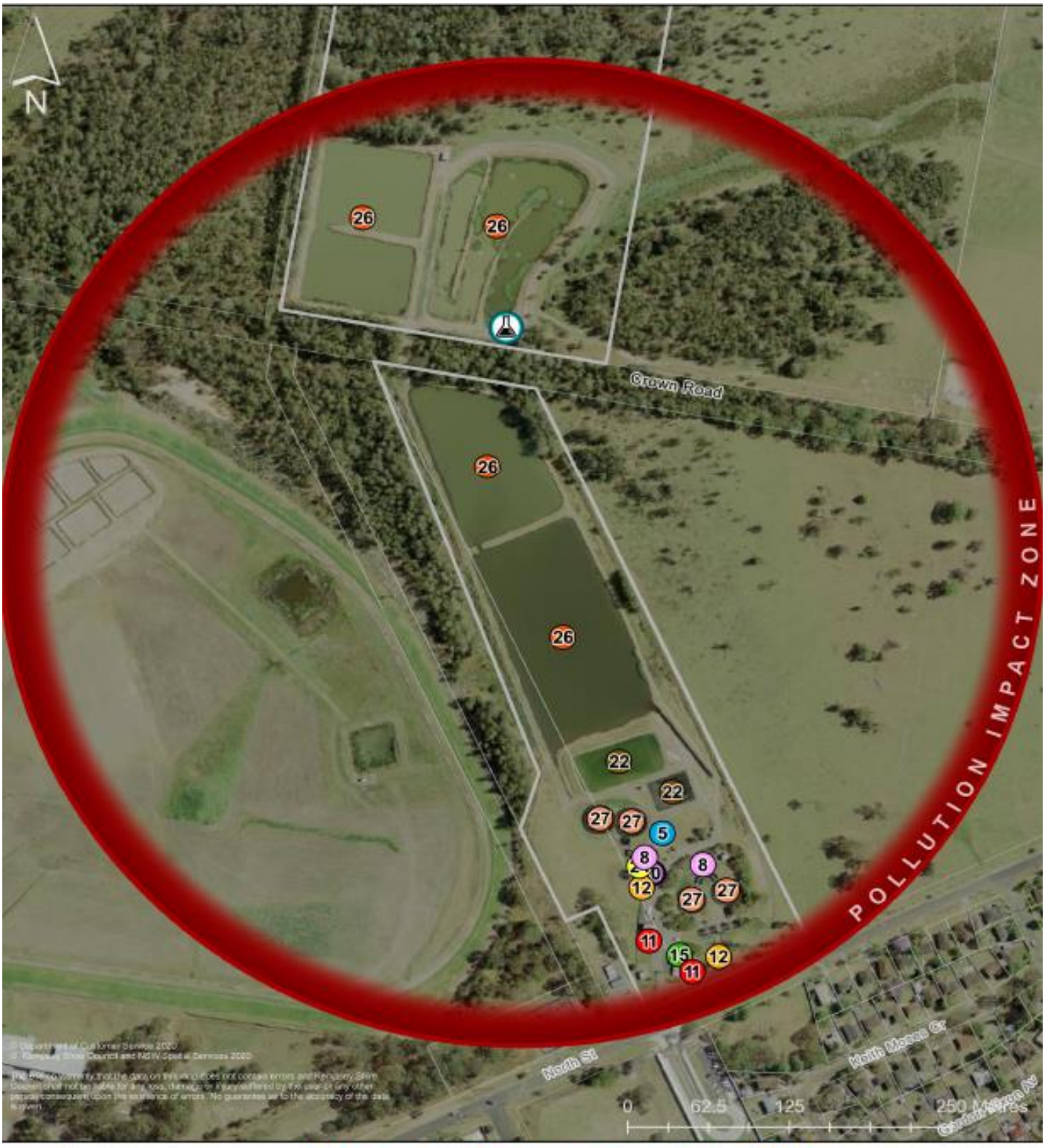


West Kempsey Sewerage Scheme

Sewer Treatment Plant
Sewer Pump
Manhole
Sewer Effluent Main
Sewer Rising Main
Pressure Sewer Service
Sewer Main
Sewer Junction
Sewer Catchment Area

KEMPSEY Shire Council

A-1b West Kempsey Sewage Treatment Plant – Potential Pollution Zone

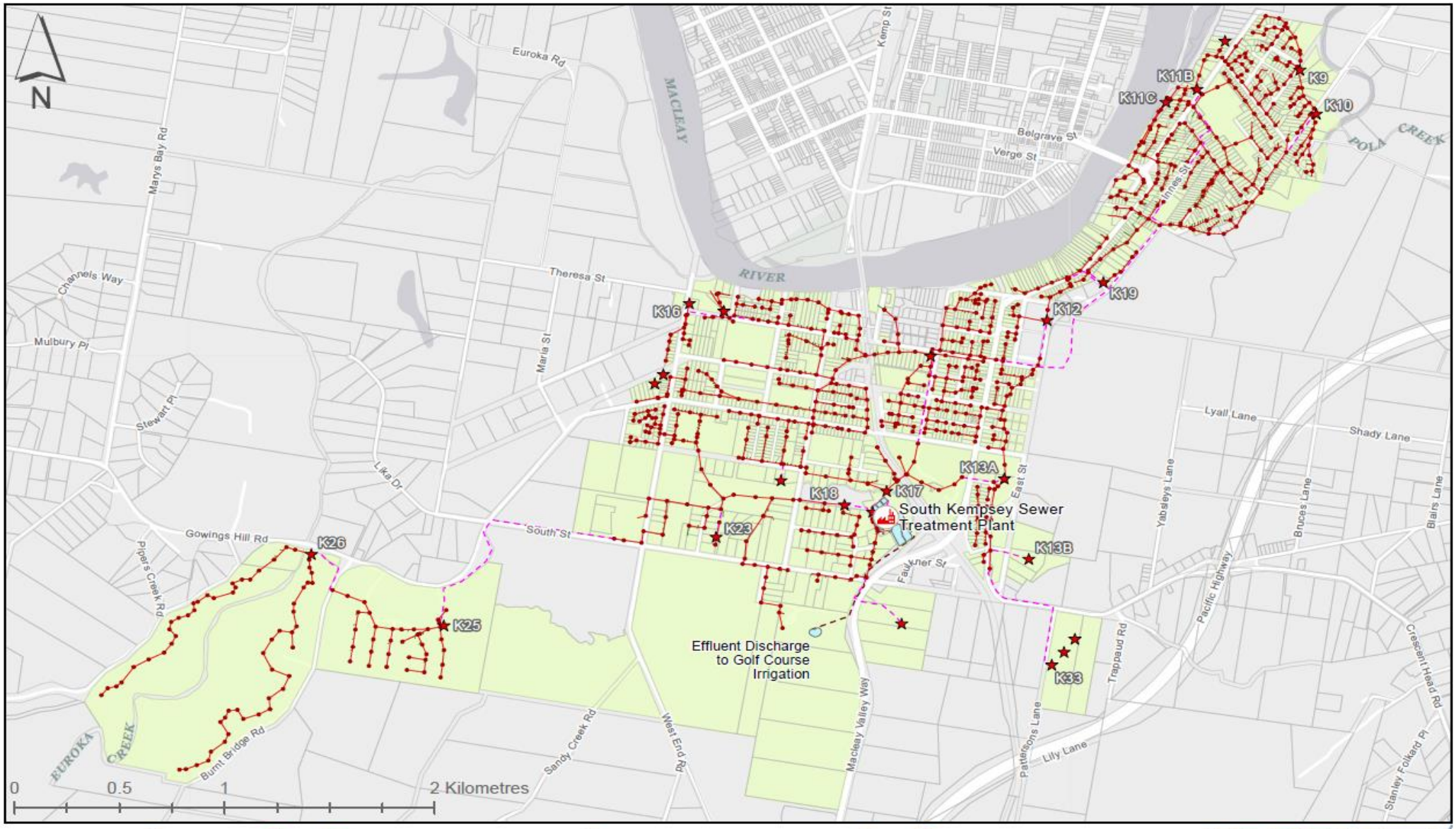


West Kempsey STP
Pollution Impact Zone

- EPA Licenced Sample Point
- 5 Clarifier
- 8 Digestors
- 10 Ferric Chloride
- 11 Fuel
- 12 Head of Works
- 15 Office
- 22 Sludge Lagoon
- 24 Spill Kit
- 26 Tertiary Pond
- 27 Trickling Filter
- Pollution Impact Zone
- STP Site Boundary

A-1c West Kempsey Sewage Treatment Plant – Direction of Flow

A-2a South Kempsey Sewage Treatment Plant - Sewerage Network Locality



South Kempsey Sewerage Scheme

Sewer Treatment Plant
Sewer Pump
Manhole
Sewer Effluent Main
Sewer Rising Main
Pressure Sewer Service
Sewer Main
Sewer Junction
Sewer Catchment Area

KEMPSEY Shire Council

A-2b South Kempsey Sewage Treatment Plant – Potential Pollution Zone

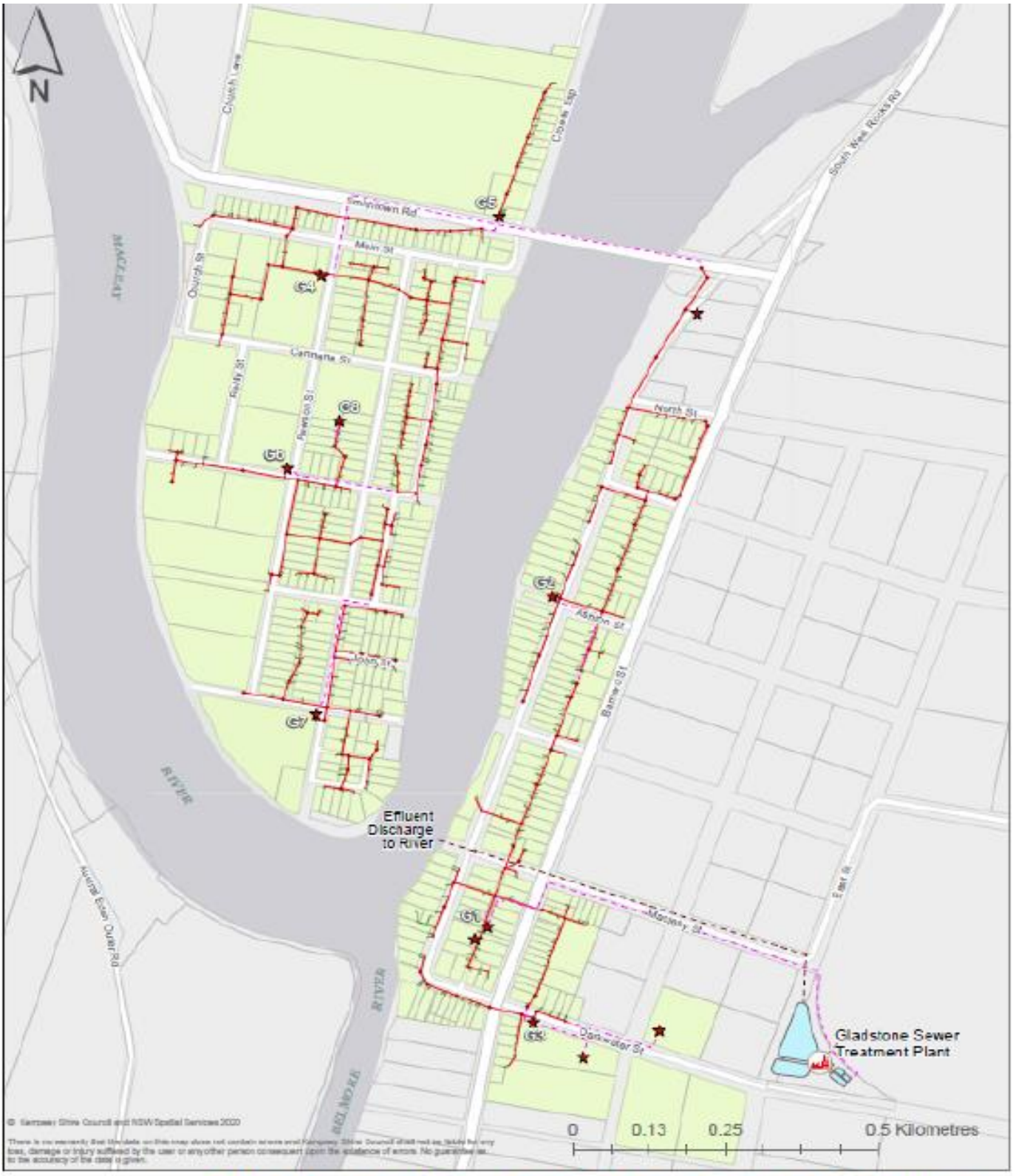
KEMPSEY Shire Council

South Kempsey STP Pollution Impact Zone

- EPA Licenced Sample Point
- 4 Chlorine Tank and Bund
- 11 Fuel
- 16 Old Inlet Works
- 17 Pasveer Channel
- 21 Septic Recieval Station
- 22 Sludge Lagoon
- 24 Spill Kit
- 26 Tertiary Pond
- 27 Trickling Filter
- Pollution Impact Zone
- STP Site Boundary

A-2c South Kempsey Sewage Treatment Plant – Direction of flow

A-3a Gladstone Sewage Treatment Plant - Sewerage Network Locality



A-3b Gladstone Sewage Treatment Plant – Potential Pollution Zone

KEMPSEY Shire Council

Gladstone STP Pollution Impact Zone

EPA Licenced Sample Point

Fuel

Office

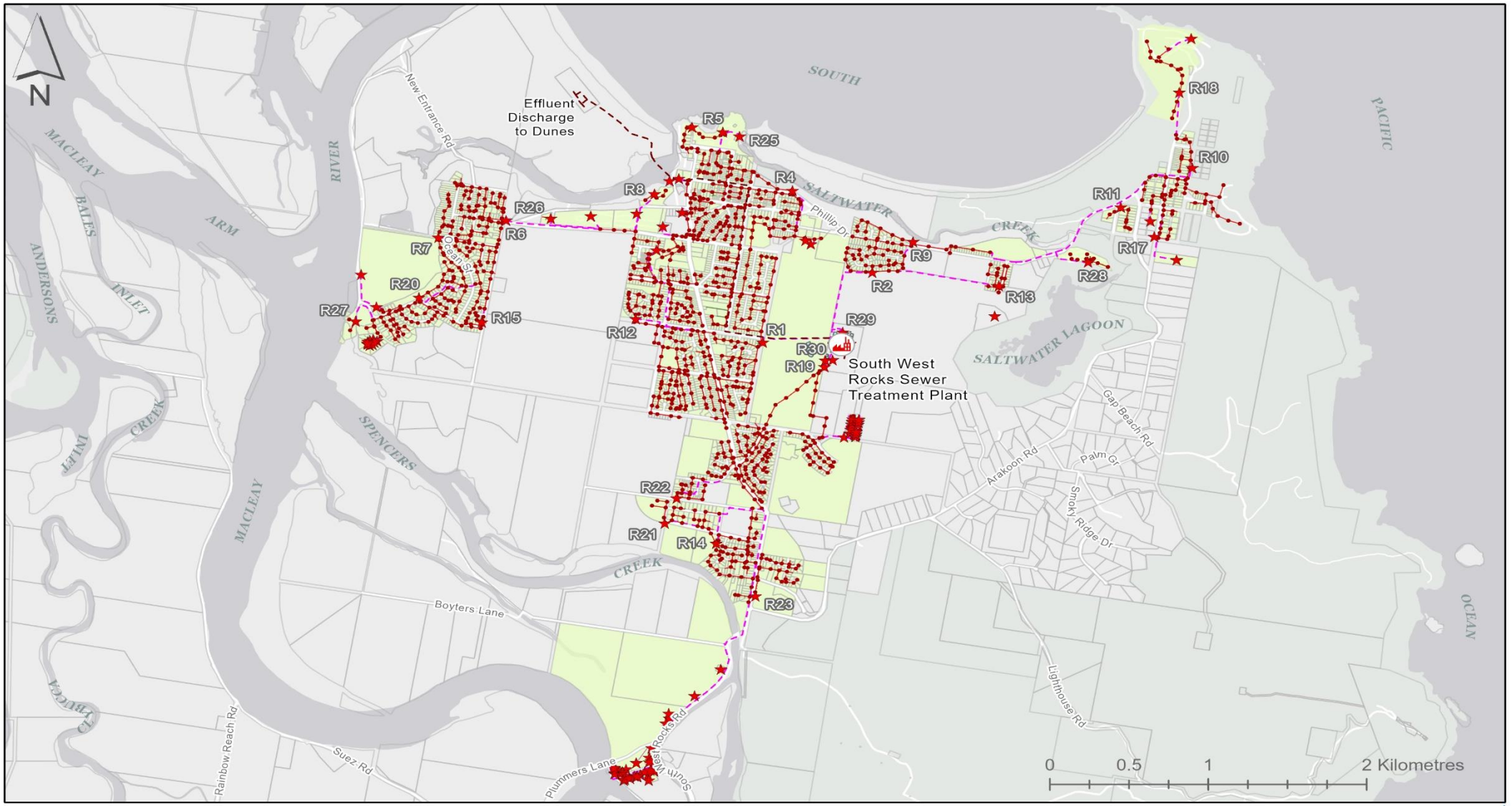
Tertiary Pond

Pollution Impact Zone

STP Site Boundary

A-3c Gladstone Sewage Treatment Plant – Direction of Flow

A-4a South West Rocks Sewage Treatment Plant – Potential Pollution Zone



South West Rocks Sewerage Scheme

Sewer Treatment Plant
Sewer Pump
Manhole
Sewer Effluent Main
Sewer Rising Main
Pressure Sewer Service
Sewer Main
Sewer Junction
Sewer Catchment Area

KEMPSEY Shire Council

A-4b South West Rocks Sewage Treatment Plant – Potential Pollution Zone

KEMPSEY Shire Council

South West Rocks STP Pollution Impact Zone

- EPA Licenced Sample Point
- 1 Alum
- 3 Centrifuge Hard Stand
- 4 Chlorine
- 6 Day Pond
- 7 Dewatering Plant
- 11 Fuel
- 12 Head of Works
- 15 Office
- 17 Pasveer Channel
- 18 Pump House
- 19 Recycled Water Tank
- 20 SBR
- 22 Sludge Lagoon
- 24 Spill Kit
- 29 Old Office and Electrical Room
- Pollution Impact Zone
- STP Site Boundary

A-4c South West Rocks Sewage Treatment Plant – Direction of Flow

KEMPSEY Shire Council

South West Rocks STP
Stormwater Runoff

- EPA Licenced Sample Point
- 1 Alum
- 3 Centrifuge Hard Stand
- 4 Chlorine
- 6 Day Pond
- 7 Dewatering Plant
- 11 Fuel
- 12 Head of Works
- 15 Office
- 17 Pasveer Channel
- 18 Pump House
- 19 Recycled Water Tank
- 20 SBR
- 22 Sludge Lagoon
- 24 Spill Kit
- 29 Old Office and Electrical Room
- Stormwater Flow Direction
- STP Site Boundary

A-5a Crescent Head Sewage Treatment Plant – Sewerage Network locality

KEMPSEY Shire Council

Crescent Head Sewerage Scheme

- Sewer Treatment Plant
- Sewer Pump
- Manhole
- Sewer Effluent Main
- Sewer Rising Main
- Pressure Sewer Service
- Sewer Main
- Sewer Junction
- Sewer Catchment Area

A-5b Crescent Head Sewage Treatment Plant – Potential Pollution Zone

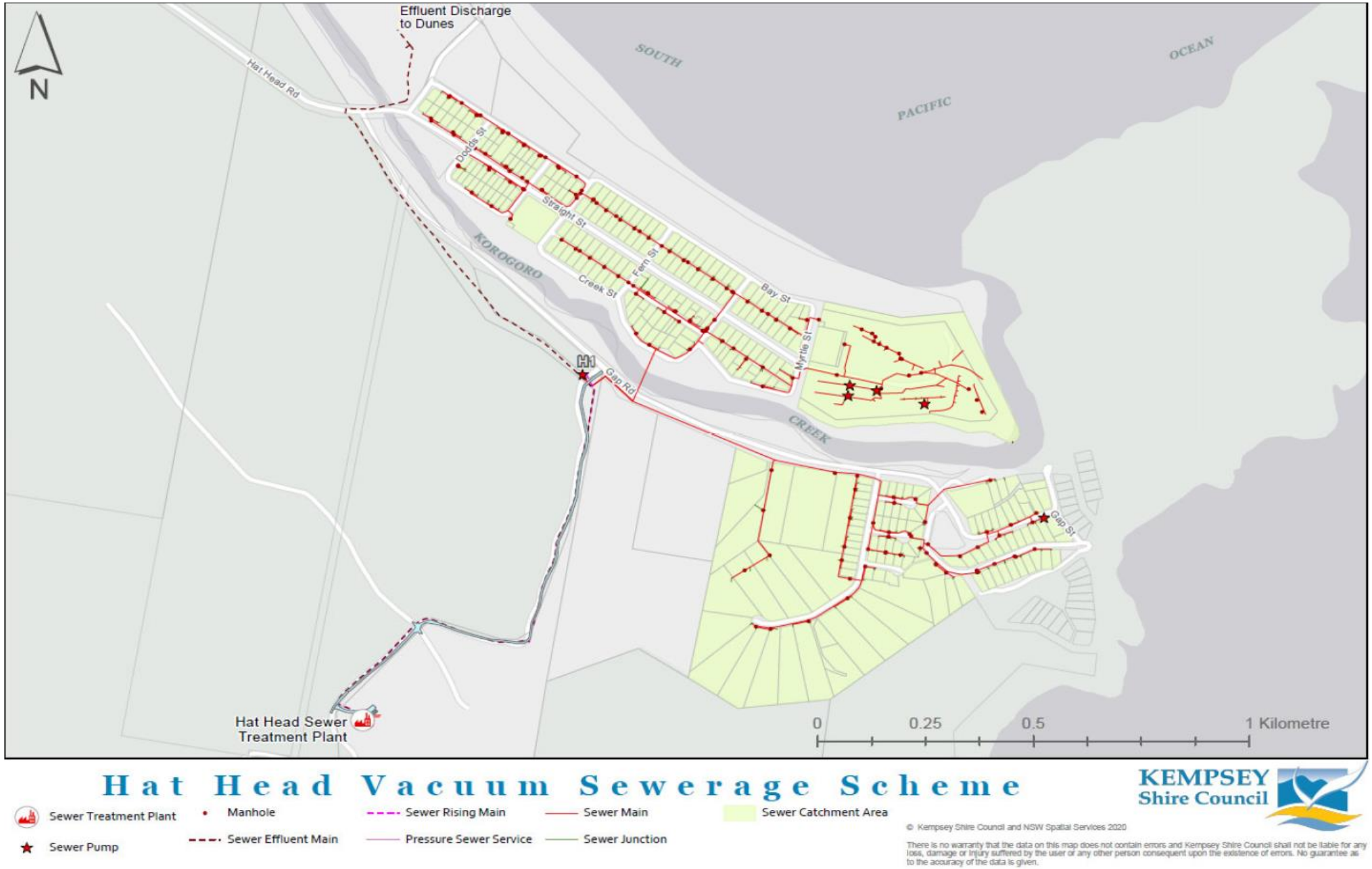
A-5c Crescent Head Sewage Treatment Plant – Direction of Flow

Crescent Head STP Stormwater Runoff

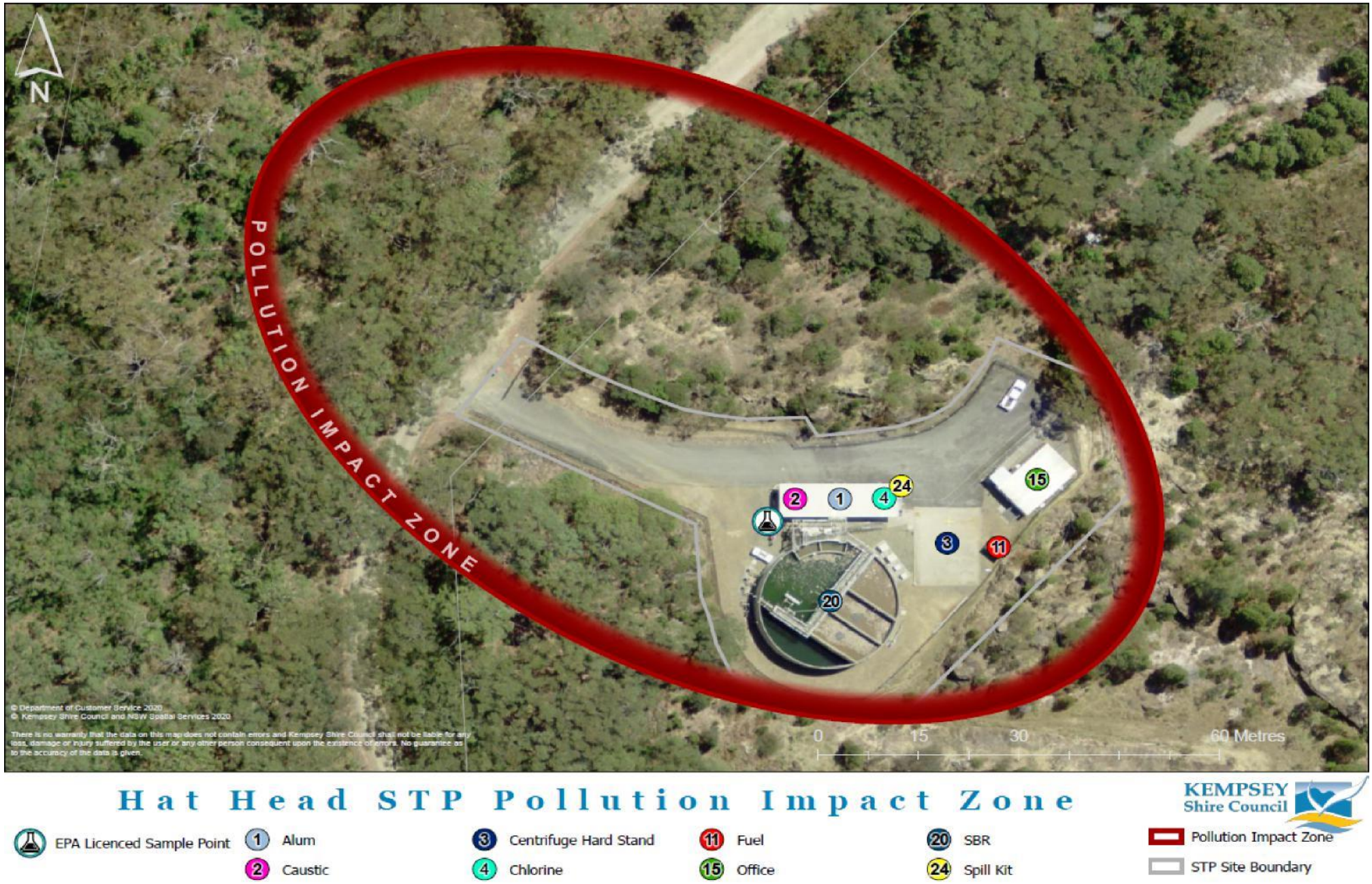
KEMPSEY Shire Council

- EPA Licenced Sample Point
- 1 Alum Tank and Bund
- 3 Centrifuge Hard Stand
- 6 Day Pond
- 11 Fuel
- 13 IAT/DAT Tank
- 12 Inlet Works
- 15 Office
- 22 Sludge Lagoon
- 23 Soda Ash - 25kg Bags
- 25 Stormwater Bypass - Disused Pasveer Channel
- 28 UV Shed
- Stormwater Flow Direction
- STP Site Boundary

A-6a Hat Head Sewage Treatment Plant - Sewerage Network Locality



A-6b Hat Head Sewage Treatment Plant – Potential Pollution Zone



A-6c Hat Head Sewage Treatment Plant – Direction of Flow

Hat Head STP Stormwater Runoff

KEMPSEY Shire Council

EPA Licenced Sample Point

1 Alum
2 Caustic
3 Centrifuge Hard Stand
4 Chlorine
11 Fuel
15 Office
20 SBR
24 Spill Kit

Stormwater Flow Direction

STP Site Boundary

A-7a Frederickton Sewage Treatment Plant - Sewerage Network Locality

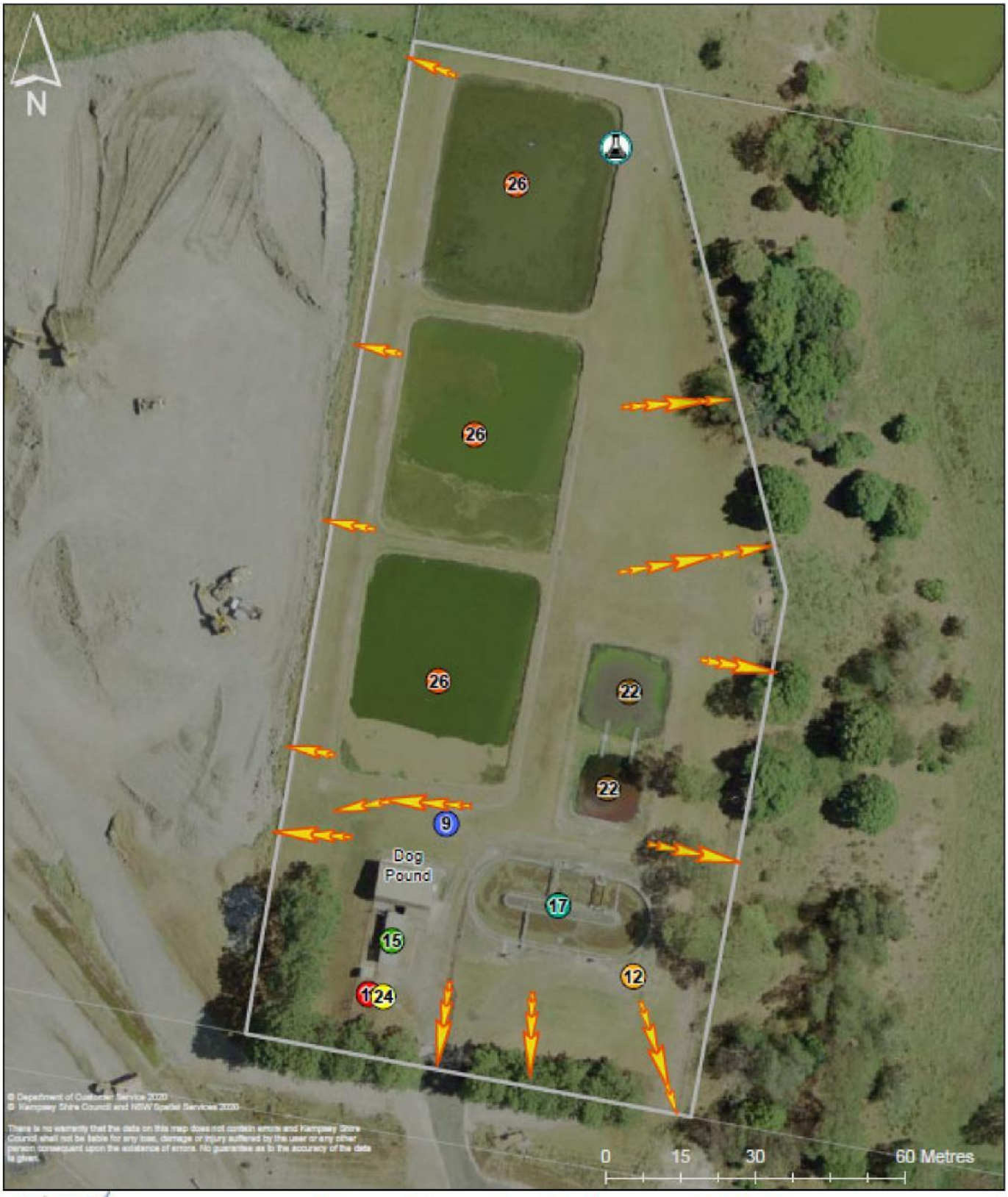
A-7b Frederickton Sewage Treatment Plant – Potential Pollution Zone

KEMPSEY Shire Council

Frederickton STP
Pollution Impact Zone

- EPA Licenced Sample Point
- 9 Dog Pound Pump Station
- 11 Fuel
- 12 Inlet Works
- 15 Office
- 17 Pasveer Channel
- 22 Sludge Lagoon
- 24 Spill Kit
- 26 Tertiary Pond
- Pollution Impact Zone
- STP Site Boundary

A-7c Frederickton Sewage Treatment Plant – Direction of Flow



KEMPSEY Shire Council

Frederickton STP Stormwater Runoff

- EPA Licenced Sample Point
- 9 Dog Pound Pump Station
- 11 Fuel
- 12 Inlet Works
- 15 Office
- 17 Pasveer Channel
- 22 Sludge Lagoon
- 24 Spill Kit
- 26 Tertiary Pond
- Stormwater Flow Direction
- STP Site Boundary

Appendix B – Initial Incident Response Check Sheet

APPENDIX B – INITIAL INCIDENT RESPONSE CHECK SHEET

The Operator in attendance at the incident is responsible for completion of this form.

Location of Incident

.....

Description of Incident

.....

Will the Incident

1. Require assistance from Emergency Services to contain, isolate or clean up? **If YES call 000 immediately (**"**112**" if using a mobile and cannot connect using 000)	YES	NO	NOT SURE
2. Pose any actual or potential harm to human health? • Is isolated within 100 m of a school, childcare centre, aged care home? • Could it impact on users of public areas? such as ovals, reserves, waterways? • Could the impact spread and potentially? harm occupants of nearby properties?	YES	NO	NOT SURE
3. Pose any actual or potential harm to ecosystems? • Could the incident flow / impact on a water body or drainage system? • Could the incident flow / impact on environmentally sensitive land?	YES	NO	NOT SURE
4. Result in actual or potential loss or property damage of an amount over $10,000	YES	NO	NOT SURE

*If you answered "YES" OR "NOT SURE" to any of the above then **immediately** contact your team leader.*

Date and Time Spill discovered Date .....Time .....

Team Leader Contacted Name.....

Team Leader was contacted at Date .....Time .....

What occurred?

.....

.....

.....

.....

.....

Why did the incident occur?

.....

.....

.....

.....

What initial actions were

.....

.....

.....

.....

.....

.....

.....

.....

.....

....

Name of Person filling in this form Signature.

Date Time

PLEASE RETURN TO TEAM LEADER WITHIN 48 HOURS OF INCIDENT

Appendix C – Initial Incident Report

Appendix C – INITIAL INCIDENT REPORT

1. LOCATION & DURATION OF INCIDENT (Part 1) **Reference:**

Plant Number & Name			
Exact location of incident			
Description of incident			
Duration of incident	From	Date:	Time:
	To	Date:	Time:
Duration of any contingent discharge	From	Date:	Time:
	To	Date:	Time:

2. INITIAL RESPONSE

Staff member who responded	Name:		
	Position:		
Response time	Notified	Date:	Time:
	On Site	Date:	Time:
Who notified staff member?	Name:		Phone:
	Address:		
Source of notification	Other council staff: yes / no		Telemetry alarm: yes / no
	Property owner affected: yes / no		Routine check of plant yes / no
	Member of the public yes / no		Government officer yes / no
What was carried out during the initial response?	Duty / standby pump started yes / no		Pump blockage cleared yes / no
	Inlet closed yes / no		Upstream pump stations shut down yes / no
	What else was carried out?		
Were these matters attended to during initial response?	Erected any barriers needed for any reason of safety: yes / no		Isolated /contained discharge: yes / no
	TEAM LEADER MUST BE ADVISED Time:		*Told any immediately affected persons: yes / no*
	Who was told?		

3. INCIDENT REPORT (Part 1) AUTHOR

Name:		Date & Time:	
Position:		Signature:	

INCIDENT REPORT (Part 2)

4. DETAILS OF INCIDENT **Reference:**

<table>
<tr><td>Reason(s) for the occurrence taking place:</td><td colspan="3"></td></tr>
<tr><td>What has been done to rectify this?</td><td colspan="3">.....</td></tr>
<tr><td>What else is being done to rectify this?</td><td colspan="3">.....</td></tr>
<tr><td>Overflow confined to STP or Pump Station</td><td colspan="3">yes / no
(If answer is yes, terminate report here, and sign off at end of Page 4.)</td></tr>
<tr><td>Was there a discharge from a sewer asset e.g., MH?</td><td colspan="3">yes / no
If yes, what was done to contain it?
(If answer is no, terminate report here, and sign off at end of Page 4.)</td></tr>
<tr><td rowspan="8">Effects from discharge of overland flow.</td><td colspan="2">Hazard to pedestrians:
yes / no</td><td>Hazard to traffic:
yes / no</td></tr>
<tr><td colspan="2">If yes, what was done to rectify?</td><td>If yes, what was done to rectify?</td></tr>
<tr><td colspan="2" rowspan="3">Contamination of adjoining property:
yes / no</td><td>Backyards: yes / no</td></tr>
<tr><td>Residences: yes / no</td></tr>
<tr><td>Other property?</td></tr>
<tr><td colspan="3">If yes, what was done to rectify?</td></tr>
<tr><td rowspan="5">Widespread contamination of property:
yes / no</td><td colspan="2">Backyards: yes / no</td></tr>
<tr><td colspan="2">Residences: yes / no</td></tr>
<tr><td colspan="2">Reserves / Playing fields / Sensitive Natural Habitat / other Public land:
yes / no</td></tr>
<tr><td colspan="2">Crops / pastures: yes / no</td></tr>
<tr><td colspan="2">Other property?</td></tr>
<tr><td>Estimate of volume of overland flow discharge:</td><td colspan="3">If yes, what was done to rectify?</td></tr>
</table>

(If no discharge to drains, watercourses, wetlands or streams terminate report here, and sign off at end of Page 4.)

<table>
<tr><td rowspan="11">Effects from discharge of flow entering drains, watercourses, or streams.</td><td colspan="6">Was anything else done to confine the discharge to reduce the impact on drains, watercourses or streams? yes / no. If yes, what was done?</td></tr>
<tr><td colspan="6">Did discharge enter any of the following?</td></tr>
<tr><td colspan="3">Pipe drainage system:
yes / no</td><td colspan="3">Natural watercourse:
yes / no</td></tr>
<tr><td colspan="3">Formed drain or channel:
yes / no</td><td colspan="3">Dry creek:
yes / no</td></tr>
<tr><td colspan="3">Wetland:
yes / no</td><td colspan="3">Coastal lagoon:
yes / no</td></tr>
<tr><td colspan="3">Flowing creek:
yes / no</td><td colspan="3">Major stream or river:
yes / no</td></tr>
<tr><td colspan="3">Name(s) of receiving water</td><td colspan="3"></td></tr>
<tr><td colspan="6">Observations of effect on water body:</td></tr>
<tr><td>Odour (circle)</td><td>None</td><td>Slight</td><td>Moderate</td><td colspan="2">Strong</td></tr>
<tr><td rowspan="3">Appearance</td><td colspan="5">Solids present: yes / no
If yes, how extensive were they?</td></tr>
<tr><td colspan="5">Colour present: yes / no
If yes, how extensive was any change?</td></tr>
<tr><td colspan="5">Turbidity present: yes / no
If yes, how extensive was any change?</td></tr>
<tr><td>Estimate of volume of overland flow discharge (page 2):</td><td colspan="5"></td></tr>
<tr><td>Estimate of volume of discharge to watercourses etc:</td><td colspan="5"></td></tr>
<tr><td>Estimate of total volume contingent discharge:</td><td>Flora & Fauna</td><td colspan="5">Fish kill / dead plants: yes / no
If yes to either, describe number & extent.</td></tr>
</table>

(Continue to page 4, sketch of incident and report sign off)

5. Sketch of INCIDENT LOCATION and AFFECTED AREA (include location names, receiving water course, direction of flow)

6. INCIDENT REPORT (Part 2) AUTHOR

Name:		Date & Time	
Position:		Signature	

7 ADVICE and NOTIFICATION of INCIDENT

Have you arranged for action necessary to notify statutory & other agencies? yes / no	**If yes, who has this responsibility?**	
	Name:	
	Position:	

Appendix D – Incident Severity – Effects of Water Body

APPENDIX D – INCIDENT SEVERITY – EFFECTS ON WATER BODY

Reference .....

1. Location of Incident

Plant Number & Name	
Name(s) of Water Body*	
Location & general description	

***** Note. If more than one water body is affected separate scoring **must** be carried out and scores added to determine a single classification for the incident

2. Incident Classification

Classification determined by methodology set out below	**MINOR**	**MODERATE**	**MAJOR**

Note: Strike out two (2) of the above

3. DETERMINE IMPACT ON WATER BODY

Score "Probable Impact" components from the following tables 3A, 3B, and 3C.

Table 3A. Attribute Score from Dilution Rate and/or Faecal Coliform Levels

	Dilution Rate*	**Score**	**FC Count****
Select score from table. If both dilution rate and FC count are known average the scores.	>200	1	<10,000
	100-200	5	10,000 to 20,000
	50-100	10	20,000 to 40,000
	20-50	20	40,000 to 100,000
	1-20	40	>100,000
Score 3A	..... .		

*Dilution rate is Volume of water body (receiving waters) / Volume of discharge. **FC count is organisms per 100 ml.

Table 3B. Attribute Score from Observed Impacts

	Observed Impact	**Score**
Select score from table for each of the observed impacts. **Sum** all scores selected to determine score 3B	plant life dead	80
	fish kill	60
	turbidity	30
	colour	20
	solids	5
	strong odour	20
	slight odour	1
Score 3B		

Note. Observations should be obtained from the Incident Report (Part 2). **Table 3C. Attribute Factor for Mixing and Aeration**

	Flow in Water Body	**Factor**
Select factor from table based on observation or knowledge of the water body.	fast flow	1
	slow flow	1.5
	enclosed lagoon	1.8
	stationary	2
Factor 3C		

Table 3D. Calculate Probable Impact Score

Sum of Scores 3A and 3B		Multiply by Factor 3C	**Probable Impact Score**
.....+.....	**= .....**	**x .....**	**= ..... Score 3D**

4. DETERMINE SEVERITY OF INCIDENT.

Score and classify incident from "Probable Impact Score" (Score 3D), and utilising the following tables 4A, 4B, and 4C.

Table 4A. Attribute Initial Severity Score

Probable Impact Score	Creek	River	Wetland	Recreational	Significant habitat	Drinking water
0-50	1	1	1	2	4	12
50-100	1	4	2	4	8	16
100-150	4	8	6	8	15	20
>150	8	16	12	16	20	25

Select score from matrix	Score 3D	Water body type	Initial Severity Score
			..... Score 4A

Table 4B. Attribute Factor for Recovery Time

Estimate recovery time and attribute factor. Subsequent reviews may be required to reassess incident severity	**Recovery Time**	**Factor**
	> 1 month	3
	1 week to 1 month	1.5
	3 days to 1 week	1.2
	< 3 days	1
Factor 4B		

Table 4C. Calculate Severity Score & Determine Incident Classification

Calculate severity score as indicated then classify incident based on ranges of scores shown	Initial Severity Score 4A	Multiply by Factor 4B	**Severity Score**
		x	**= .....Score 4C**
	Score 4C = 0 to 5	Score 4C = 5 to 20	Score 4C > 20
	MINOR	**MODERATE**	**MAJOR**

Table 5. Incident Severity & Classification determined by

Name		Date	
Position		Signature	

Appendix E – Risk Assessment

					Maximum Risk (MR) Evaluation				Residual Risk (RR) Evaluation				
Event	**Activity ! Process Step**	**Location**	**Hazardous Event ! Consequence**	**Escalating Factors**	**Conseq. (MR)**	**Likeli. (MR)**	**RISK (MR)**	**Existing Control Measures**	**Conseq. (RR)**	**Likeli. (RR)**	**RISK (RR)**	**Additional notes or actions**	**Uncertainty**
1.00	**West Kempsey**	**West Kemspey**											
1.01	West Kempsey sewer system	Sewer Retic	**Main Break** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Deteriorating of infrastructure - Construction repairs/maintenance - Weather conditions (dry and wet) - Damage by third parties - Accessibly to pipes - Size of pipe - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing) - Isolation of main at pump stations and valves throughout the sewer system	Moderate	Rare	Moderate (E3)		Confident
1.02	West Kempsey sewer system	Sewer Retic	**Sewer Choke** leading to the pollution of untreated sewage to sensitive land or water and/or community contact with untreated sewage	- Increase in solids content of sewage - Unauthorised material / foreign objects discharge to sewer network - Infiltration of tree roots - Misalignment of pipes & connections - Ground movement causing misalignment of pipes & connections - Wet Weather events - Accessibly to pipes - Vandalism - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing)	Moderate	Rare	Moderate (E3)	- Intensive catchment survey being conducted	Confident
1.03	West Kempsey sewer system	Sewer Retic	**Emergency Disaster event** resulting in untreated sewage pollution to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Chemical spills - inability to access asset/infrastructure	Moderate	Rare	Moderate (E3)	- Implementation of Councils BCP - Controls as above (Main Break & Sewer Choke) - Chemical spill call 000 (HAZMAT)	Moderate	Rare	Moderate (E3)		Confident
1.04	West Kempsey sewer system	Pump Stations (K2, K3, K20, K21, K29, & K30)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Open paddock Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Insignificant	Possible	Low (C1)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Insignificant	Possible	Low (C1)	- Possibility of pump upgrades at K30 - Pump 2 upgrade in progress at K21	Confident

	EventLocation Activity / Process Step		Hazardous Event / Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
1.05	West Kempsey sewer system	Pump Stations (K4, K5, K24, K28, & K32)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: drains and waterways - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Minor	Unlikely	Low (D2)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - K28 has a designed overflow structure - Implement containment measures to minimise impact	Minor	Unlikely	Low (D2)	- Possibility of upgrading telemetry to allow more control over pump station synchronisation	Confident
1.06	West Kempsey sewer system	Pump Stations (K6a, K6b & K6c)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment Sports fields & parks - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - K6b has a designed overflow structure into K6a & K6b	Moderate	Rare	Moderate (E3)	- K6c is to be de-commissioned	Confident
1.07	West Kempsey Sewer system	Pump Stations (K7 & K8)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Roads, Residential and Commercial areas - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Insignificant	Rare	Low (E1)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Insignificant	Rare	Low (E1)		Confident
1.08	West Kempsey sewer system	All pump stations	**Emergency Disaster event** causing Pump Station Failure - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - inability to access asset/infrastructure - loss of assets	Major	Rare	High (E4)	- Implementation of Councils BCP - Controls as above (Pump Station Failure including pump choke and wet weather events)	Major	Rare	High (E4)		Confident
1.09	West Kempsey Sewer system		**Wet Weather Event causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Significant rainfall event - Large volume trade waste discharge - Plant malfunction - insufficient plant capacity to contain storm waters (PWWF) - insufficient treatment capacity - sewer retic infiltration	Moderate	Possible	High (C3)	- Certified staff & Staff training - Inlet level monitoring and telemetry alarming - Operation of old side inlet to STP - Infiltration abatement program for WK catchment - Physical inlet screen with designed bypass channel - run STP in Wet Weather/flood mode	Moderate	Rare	Moderate (E3)	- New Central Kempsey STP to replace West Kempsey STP	Confident
1.10	West Kempsey sewer system	STP	**Electrical or mechanical Failure at STP causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Aging infrastructure - Power outage - Availability of spares - lack of process procedures - no alarms to on call operators when plant unmanned	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Buffering in tertiary ponds - Plant maintenance - Multiple Controlled overflow designs	Moderate	Rare	Moderate (E3)	- New Central Kempsey STP to replace West Kempsey STP	Confident

Event	Activity ! Process Step	Location	Hazardous Event ! Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
1.11	West Kempsey sewer system	STP	**Emergency Disaster event** causing Operational Failure/Insufficient Treatment leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Flood - Bushfire - Drought - Chemical Spills - Inability to access asset/infrastructure	Moderate	Rare	Moderate (E3)	- BCP plan - Controls as above (STP Wet Weather Event &/or Electrical or mechanical Failure at causing Operational Failure/Insufficient Treatment	Moderate	Rare	Moderate (E3)		Confident
1.12	West Kempsey sewer system	STP	**Chemical Spill** to land or water and/or community contact with chemicals	- Inappropriate storage of chemicals / fuels / oils - Use of chemicals / fuels / oils by untrained staff	Insignificant	Rare	Low (E1)	- Certified staff & Staff training - Bunded area around chemical storage - Chemical spill kits on site - Buffering/dilution in tertiary ponds - Staff on site for chemical deliveries - SDS for chemical handling - SDS information box at front of plant	Insignificant	Rare	Low (E1)		Confident
1.13	West Kempsey sewer system	Sherwood Environmental Plant	**Wet Weather Event causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Increase flows and infiltration - Insufficient capacity during wet weather	Major	Likely	Very High (B4)	- Certified staff & Staff training - High level alarm set at 80% - Contractor VAC trucks - Initiated incident response protocols	Major	Possible	Very High (C4)	- Decommission enviro plant and converting to a pump station for transfer to West Kempsey STP	Confident
2.00	**South Kempsey**	**South Kempsey**											
2.01	South Kempsey sewer system	Sewer Retic	**Main Break** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Deteriorating of infrastructure - Construction repairs/maintenance - Weather conditions (dry and wet) - Damage by third parties - Accessibly to pipes - Size of pipe - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Major	Rare	High (E4)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing) - Isolation of main at pump stations and valves throughout the sewer system	Major	Rare	High (E4)		Confident
2.02	South Kempsey sewer system	Sewer Retic	**Sewer Choke** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Increase in solids content of sewage - Unauthorised material / foreign objects discharge to sewer network - Infiltration of tree roots - Misalignment of pipes & connections - Ground movement causing misalignment of pipes & connections - Wet Weather events - Accessibly to pipes - Vandalism - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's, wetlands	Major	Rare	High (E4)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing)	Major	Rare	High (E4)		Confident

Event	Activity ! Process Step	Location	Hazardous Event ! Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
2.03	South Kempsey sewer system	Sewer Retic	**Emergency Disaster event** resulting in untreated sewage pollution to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Chemical Spills - Inability to access asset/infrastructure	Major	Rare	High (E4)	- Implementation of Councils BCP - Controls as above (Main Break/ Sewer Choke) - Chemical spill call 000 (HAZMAT)	Major	Rare	High (E4)		Confident
2.04	South Kempsey sewer system	Pump Stations (K9, K10,K11B, K12, K13A, K13B, K14, K15, K16, & K25)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Open paddock & Drains - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Insignificant	Unlikely	Low (D1)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - K14 change pump configurations for flood mode	Insignificant	Unlikely	Low (D1)	- Potential to upgrade pump size at K14 (remove small pump to large) - Upgrade SCADA for remote control	Confident
2.05	South Kempsey sewer system	Pump Stations (K11C, K17, K18, & K26)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Waterways - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Moderate	Possible	High (C3)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - K17 change pump configurations for flood mode	Moderate	Possible	High (C3)		Confident
2.06	South Kempsey sewer system	Pump Stations (K19 & K23)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Roads, Residential and Commercial areas - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Insignificant	Rare	Low (E1)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Insignificant	Rare	Low (E1)		Confident
2.07	South Kempsey sewer system	All pump stations	**Emergency Disaster event causing Pump Station Failure** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure - Loss of assets	Major	Rare	High (E4)	- Implementation of Councils BCP - Controls as above (Pump Station Failure including pump choke and wet weather events)	Major	Rare	High (E4)		Confident
2.08	South Kempsey sewer system	STP	**Wet Weather Event causing Operational Failure!Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Significant rainfall event - Large volume trade waste discharge - Plant malfunction - Insufficient plant capacity to contain storm waters (PWWF) - Insufficient treatment capacity - Sewer retic infiltration	Moderate	Possible	High (C3)	- Certified staff & Staff training - Pasveer level monitoring and telemetry alarming - Flow diversion to pasveer channel - Infiltration abatement program for SK catchment - Physical inlet screen with designed bypass channel - Run STP in Wet Weather/flood mode	Moderate	Unlikely	Moderate (D3)	- New Central Kempsey STP to replace South Kempsey STP	Confident

Event	Activity ! Process Step	Location	Hazardous Event ! Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
2.09	South Kempsey sewer system	STP	**Electrical or mechanical Failure at STP causing Operational Failure!Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Aging infrastructure - Power outage - Availability of spares - Lack of process procedures - No alarms to on call operators when plant unmanned	Moderate	Possible	High (C3)	- Certified staff & Staff training - Buffering in tertiary ponds - Certified staff & Staff training - Plant maintenance - Multiple Controlled overflow designs - Back up mobile generators	Moderate	Unlikely	Moderate (D3)	- New Central Kempsey STP to replace West Kempsey STP - Future permanent generators	Confident
2.10	South Kempsey sewer system	STP	**Emergency Disaster event** causing Operational Failure/Insufficient Treatment leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure - Industrial contamination	Moderate	Unlikely	Moderate (D3)	- BCP plan - Controls as above (STP Wet Weather Event &/or Electrical or mechanical Failure at causing Operational Failure/Insufficient Treatment	Moderate	Unlikely	Moderate (D3)		Confident
2.11	South Kempsey sewer system	STP	**Chemical Spill** to land or water and/or community contact with chemicals	- Inappropriate storage of chemicals / fuels / oils - Use of chemicals / fuels / oils by untrained staff - Lack of procedures Rare	Insignificant		Low (E1)	- Certified staff & Staff training - Bunded area around chemical storage - Chemical spill kits on site - Buffering/dilution in tertiary ponds - Staff on site for chemical deliveries - SDS for chemical handling - SDS information box at front of plant	Insignificant	Rare	Low (E1)		Confident
3.00	**Crescent Head**	**Crescent Head**											
3.01	Crescent Head sewer system	Sewer Retic	**Main Break** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Deteriorating of infrastructure - Construction repairs/maintenance - Weather conditions (dry and wet) - Damage by third parties - Accessibly to pipes - Size of pipe - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Catastrophic	Rare	High (E5)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing) - Isolation of main at pump stations and valves throughout the sewer system	Catastrophic	Rare	High (E5)		Confident
3.02	Crescent Head sewer system	Sewer Retic	**Sewer Choke** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Increase in solids content of sewage - Unauthorised material / foreign objects discharge to sewer network - Infiltration of tree roots - Misalignment of pipes & connections - Ground movement causing misalignment of pipes & connections - Wet Weather events - Accessibly to pipes - Vandalism - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Catastrophic	Rare	High (E5)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing)	Catastrophic	Rare	High (E5)		Confident

Event	Activity / Process Step	Location	Hazardous Event / Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
3.03	Crescent Head sewer system	Sewer Retic	**Emergency Disaster event** resulting in untreated sewage pollution to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Chemical Spills - Inability to access asset/infrastructure	Catastrophic	Rare	High (E5)	- Implementation of Councils BCP - Controls as above (Main Break & Sewer Choke) - Chemical spill call 000 (HAZMAT)	Catastrophic	Rare	High (E5)		Confident
3.04	Crescent Head sewer system	Pump Stations (C4 & C5)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Open paddock Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Minor	Rare	Low (E2)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Minor	Rare	Low (E2)		Confident
3.05	Crescent Head sewer system	Pump Stations (C1, C2, & C3)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: drains and waterways - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Catastrophic	Unlikely	Very High (D5)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Catastrophic	Unlikely	Very High (D5)	- Risk rating is based on C1	Confident
3.06	Crescent Head sewer system	All pump stations	**Emergency Disaster event** causing Pump Station Failure - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure - Loss of assets	Catastrophic	Rare	High (E5)	- Implementation of Councils BCP - Controls as above (Pump Station Failure including pump choke and wet weather events)	Catastrophic	Rare	High (E5)		Confident
3.07	Crescent Head sewer system	STP	**Wet Weather Event causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Significant rainfall event - Large volume trade waste discharge - Plant malfunction - Insufficient plant capacity to contain storm waters (PWWF) - Insufficient treatment capacity - Sewer retic infiltration	Moderate	Possible	High (C3)	- Certified staff & Staff training - Inlet level monitoring and telemetry alarming - Infiltration abatement program for CH catchment - Physical inlet screen with designed bypass channel - Run STP in Wet Weather/flood mode	Moderate	Possible	High (C3)	- Potential future works in a secondary bypass valve - Potential for bypass pump from day pond to pasveers	Confident
3.08	Crescent Head sewer system	STP	**Electrical or mechanical Failure at STP causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Aging infrastructure - Power outage - Availability of spares - Lack of process procedures	Moderate	Unlikely	Moderate (D3)	- Certified staff & Staff training - Buffering in tertiary ponds - Plant maintenance - Multiple Controlled overflow designs - large bypass storage capacity - Back up mobile generators	Moderate	Rare	Moderate (E3)	- Future permanent generators	Confident
3.09	Crescent Head sewer system	STP	**Emergency Disaster event** causing Operational Failure/Insufficient Treatment leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure	Moderate	Rare	Moderate (E3)	- BCP plan - Controls as above (STP Wet Weather Event &/or Electrical or mechanical Failure at causing Operational Failure/Insufficient Treatment	Moderate	Rare	Moderate (E3)		Confident
3.10	Crescent Head sewer system	STP	**Chemical Spill** to land or water and/or community contact with chemicals	- Inappropriate storage of chemicals / fuels / oils - Use of chemicals / fuels / oils by untrained staff	Minor	Rare	Low (E2)	- Certified staff & Staff training - Bunded area around chemical storage - Chemical spill kits on site - Buffering/dilution in tertiary ponds - Staff on site for chemical deliveries - SDS for chemical handling - SDS information box at front of plant	Minor	Rare	Low (E2)		Confident

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4.00	**Hat Head**	**Hat Head**											
4.01	Hat Head sewer system	Sewer Retic	**Main Break** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Deteriorating of infrastructure - Construction repairs/maintenance - Weather conditions (dry and wet) - Damage by third parties - Accessibly to pipes - Size of pipe - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Major	Rare	High (E4)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing) - Isolation of main at pump stations and valves throughout the sewer system	Major	Rare	High (E4)		Confident
4.02	Hat Head sewer system	Sewer Retic	**Sewer Choke** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Increase in solids content of sewage - Unauthorised material / foreign objects discharge to sewer network - Infiltration of tree roots - Misalignment of pipes & connections - Ground movement causing misalignment of pipes & connections - Wet Weather events - Accessibly to pipes - Vandalism - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Moderate	Possible	High (C3)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing)	Moderate	Possible	High (C3)	Specialist training from manufacturer	Confident
4.03	Hat Head sewer system	Sewer Retic	**Emergency Disaster event** resulting in untreated sewage pollution to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure	Major	Rare	High (E4)	- Implementation of Councils BCP - Controls as above (Main Break & Sewer Choke) - Chemical spill call 000 (HAZMAT)	Major	Rare	High (E4)		
4.04	Hat Head sewer system	Pump Stations (H1)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: wetland/ waterways/National Park - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Catastrophic	Rare	High (E5)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Implement containment measures to minimise impact - Large bunded area - Long detention time	Catastrophic	Rare	High (E5)		Confident

Event	Activity / Process Step	Location	Hazardous Event / Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
4.05	Hat Head sewer system	All pump stations	**Emergency Disaster event** causing Pump Station Failure - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Chemical Spills - Inability to access asset/infrastructure - Loss of assets	Catastrophic	Rare	High (E5)	- Implementation of Councils BCP - Controls as above (Pump Station Failure including pump choke and wet weather events)	Catastrophic	Rare	High (E5)		Confident
4.06	Hat Head sewer system	STP	**Wet Weather Event causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Significant rainfall event - Large volume trade waste discharge - Plant malfunction - Insufficient plant capacity to contain storm waters (PWWF) - Sewer retic infiltration - Insufficient treatment capacity - General purpose pump station overflow	Major	Unlikely	High (D4)	- Certified staff & Staff training Inlet level monitoring and telemetry alarming - Infiltration abatement program for HH catchment - Physical inlet screen with designed bypass channel - Run STP in Wet Weather/flood mode	Major	Unlikely	High (D4)		Confident
4.07	Hat Head sewer system	STP	**Electrical or mechanical Failure at STP causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Aging infrastructure - Power outage - Availability of spares - lack of process procedures - no alarms to on call operators when plant unmanned - general purpose pump station overflow	Major	Unlikely	High (D4)	- Certified staff & Staff training - Plant maintenance - Multiple Controlled overflow designs - Back up mobile generators	Major	Unlikely	High (D4)	- Future permanent generators	Confident
4.08	Hat Head sewer system	STP	**Emergency Disaster event** causing Operational Failure/Insufficient Treatment leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Flood - Bushfire - Drought - inability to access asset/infrastructure	Major	Unlikely	High (D4)	- BCP plan - Controls as above (STP Wet Weather Event &/or Electrical or mechanical Failure at causing Operational Failure/Insufficient Treatment	Major	Unlikely	High (D4)		Confident
4.09	Hat Head sewer system	STP	**Chemical Spill** to land or water and/or community contact with chemicals	- Inappropriate storage of chemicals / fuels / oils - Use of chemicals / fuels / oils by untrained staff	Catastrophic	Rare	High (E5)	- Certified staff & Staff training - Bunded area around chemical storage - Chemical spill kits on site - Buffering/dilution in tertiary ponds - Staff on site for chemical deliveries - SDS for chemical handling - SDS information box at front of plant	Catastrophic	Rare	High (E5)		Confident
5.00	**South West Rocks**	**South West Rocks**											
5.01	South West Rocks sewer system	Sewer Retic	**Main Break** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Deteriorating of infrastructure - Construction repairs/maintenance - Weather conditions (dry and wet) - Damage by third parties - Accessibly to pipes - Size of pipe - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Major	Rare	High (E4)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing) - Isolation of main at pump stations and valves throughout the sewer system	Major	Rare	High (E4)		Confident

Event	Activity ! Process Step	Location	Hazardous Event ! Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
5.02	South West Rocks sewer system	Sewer Retic	**Sewer Choke** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Increase in solids content of sewage - Unauthorised material / foreign objects discharge to sewer network - Infiltration of tree roots - Misalignment of pipes & connections - Ground movement causing misalignment of pipes & connections - Wet Weather events - Accessibly to pipes - Vandalism - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Major	Unlikely	High (D4)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing)	Major	Unlikely	High (D4)		
5.03	South West Rocks sewer system	Sewer Retic	**Emergency Disaster event** resulting in untreated sewage pollution to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Chemical Spills - Inability to access asset/infrastructure	Major	Rare	High (E4)	- Implementation of Councils BCP - Controls as above (Main Break & Sewer Choke) - Chemical spill call 000 (HAZMAT)	Major	Rare	High (E4)		
5.04	South West Rocks sewer system	Pump Stations (R23)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Open paddock Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Insignificant	Rare	Low (E1)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Insignificant	Rare	Low (E1)	-	Confident
5.05	South West Rocks sewer system	Pump Stations (R1, R3, R4, R6, R8, R9, R10, R11, R12, R14, R19, R20, R21 & R27)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: drains, wetlands and waterways - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Major	Possible	Very High (C4)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Major	Possible	Very High (C4)	- Future upgrades for R4 - Private pump station R29 to be handed over to Council in near future	Confident
5.06	South West Rocks sewer system	Pump Stations R7, R13, R15, R17, R22, R26 & R28)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Roads, Residential and Commercial areas - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Moderate	Rare	Moderate (E3)		Confident

	EventLocation Activity / Process Step		Hazardous Event / Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
5.07	South West Rocks sewer system	Pump Stations (R5 & R25)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Beach & Ocean - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Major	Unlikely	High (D4)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Major	Unlikely	High (D4)		Confident
5.08	South West Rocks sewer system	Pump Stations (R18)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: National Parks & Waterways - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Major	Rare	High (E4)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Major	Rare	High (E4)		Confident
5.09	South West Rocks sewer system	All pump stations	**Emergency Disaster event** causing Pump Station Failure - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure - Loss of assets	Major	Rare	High (E4)	- Implementation of Councils BCP - Controls as above (Pump Station Failure including pump choke and wet weather events)	Major	Rare	High (E4)		Confident
5.10	South West Rocks sewer system	STP	**Wet Weather Event causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Significant rainfall event - Large volume trade waste discharge - Plant malfunction - Insufficient plant capacity to contain storm waters (PWWF) - Insufficient treatment capacity - Sewer retic infiltration	Major	Possible	Very High (C4)	- Certified staff & Staff training - Inlet level monitoring and telemetry alarming - Infiltration abatement program for SWR catchment - Physical inlet screen with designed bypass channel - Run STP in Wet Weather/flood mode - Controlled overflow into Pasveer - Multiple Pasveer and above ground storage tank	Major	Possible	Very High (C4)	- Potential control through SCADA of pump stations to mitigate wet weather flows	Confident
5.11	South West Rocks sewer system		**Electrical or mechanical Failure at STP causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	5.11STPMajor - Aging infrastructure - Power outage - Availability of spares - Lack of process procedures - No alarms to on call operators when plant unmanned	Major	Rare	High (E4)	- Certified staff & Staff training - Plant maintenance - Multiple Controlled overflow designs - Controlled overflow into Pasveer - Multiple Pasveer, above ground storage tank & day pond		Rare	High (E4)	- Planned PLC upgrade for the SWR plant. Completion in the 2020-2021 - Future permanent generators	Confident
5.12	South West Rocks sewer system	STP	**Emergency Disaster event** causing Operational Failure/Insufficient Treatment leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure	Major	Possible	Very High (C4)	- BCP plan - Controls as above (STP Wet Weather Event &/or Electrical or mechanical Failure at causing Operational Failure/Insufficient Treatment	Major	Possible	Very High (C4)		Confident
5.13	South West Rocks sewer system	STP	**Chemical Spill** to land or water and/or community contact with chemicals	- Inappropriate storage of chemicals / fuels / oils - Use of chemicals / fuels / oils by untrained staff	Moderate	Possible	High (C3)	- Certified staff & Staff training - Bunded area around chemical storage - Chemical spill kits on site - Buffering/dilution in tertiary ponds - Staff on site for chemical deliveries - SDS for chemical handling - SDS information box at front of plant	Major	Rare	High (E4)		Confident

Event	Activity ! Process Step	Location	Hazardous Event ! Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
6.00	**Gladstone**	**Gladstone**											
6.01	Gladstone sewer system	Sewer Retic	**Main Break** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Deteriorating of infrastructure - Construction repairs/maintenance - Weather conditions (dry and wet) - Damage by third parties - Accessibly to pipes - Size of pipe - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing) - Isolation of main at pump stations and valves throughout the sewer system	Moderate	Rare	Moderate (E3)		
6.02	Gladstone sewer system	Sewer Retic	**Sewer Choke** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Increase in solids content of sewage - Unauthorised material / foreign objects discharge to sewer network - Infiltration of tree roots - Misalignment of pipes & connections - Ground movement causing misalignment of pipes & connections - Wet Weather events - accessibly to pipes - Vandalism - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares -24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing)	Moderate	Rare	Moderate (E3)		
6.03	Gladstone sewer system	Sewer Retic	**Emergency Disaster event** resulting in untreated sewage pollution to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure	Moderate	Rare	Moderate (E3)	- Implementation of Councils BCP - Controls as above (Main Break & Sewer Choke) - Chemical spill call 000 (HAZMAT)	Moderate	Rare	Moderate (E3)		
6.04	Gladstone sewer system	Pump Stations (G1)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: School - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Moderate	Rare	Moderate (E3)		Confident

Event	Activity / Process Step	Location	Hazardous Event / Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
6.05	Gladstone sewer system	Pump Stations (G4 & G7)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment Sports fields & parks - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Major	Rare	High (E4)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Major	Rare	High (E4)		Confident
6.06	Gladstone sewer system	Pump Stations (G2, G3, G5, G6 & G8)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Roads, Residential and Commercial areas - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Moderate	Rare	Moderate (E3)		Confident
6.07	Gladstone sewer system	All pump stations	**Emergency Disaster event** causing Pump Station Failure - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure - Loss of assets	Major	Rare	High (E4)	- Implementation of Councils BCP - Controls as above (Pump Station Failure including pump choke and wet weather events)	Major	Rare	High (E4)		Confident
6.08	Gladstone sewer system	STP	**Wet Weather Event causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Significant rainfall event - Large volume trade waste discharge - Plant malfunction - Insufficient plant capacity to contain storm waters (PWWF) - Sewer retic infiltration - Insufficient treatment capacity	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Inlet level monitoring and telemetry alarming - Infiltration abatement program for Gladstone catchment - Physical inlet screen with designed bypass channel - Run STP in Wet Weather/flood mode	Moderate	Rare	Moderate (E3)		Confident
6.09	Gladstone sewer system	STP	**Electrical or mechanical Failure at STP causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Aging infrastructure - Power outage - Availability of spares - Lack of process procedures - No alarms to on call operators when plant unmanned	Moderate	Rare	Moderate (E3)	- Certified staff & Staff training - Buffering in tertiary ponds - Certified staff & Staff training - Plant maintenance - Multiple Controlled overflow designs - Back up mobile generators	Moderate	Rare	Moderate (E3)	- Future permanent generators	Confident
6.10	Gladstone sewer system	STP	**Emergency Disaster event** causing Operational Failure/Insufficient Treatment leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure	Moderate	Rare	Moderate (E3)	- BCP plan - Controls as above (STP Wet Weather Event &/or Electrical or mechanical Failure at causing Operational Failure/Insufficient Treatment	Moderate	Rare	Moderate (E3)	- Future possible actions to be discussed with EPA is to isolate pumps at each pumping station in Smithtown	Confident
6.11	Gladstone sewer system	STP	**Chemical Spill** to land or water and/or community contact with chemicals	- Inappropriate storage of chemicals / fuels / oils - Use of chemicals / fuels / oils by untrained staff	Insignificant	Rare	Low (E1)	- Certified staff & Staff training - Bunded area around chemical storage - Chemical spill kits on site - Buffering/dilution in tertiary ponds - Staff on site for chemical deliveries - SDS for chemical handling - SDS information box at front of plant	Insignificant	Rare	Low (E1)		Confident

Event	Activity ! Process Step	Location	Hazardous Event ! Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
7.00	**Frederickton sewer**	**Frederickton**											
7.01	Frederickton sewer system	Sewer Retic	**Main Break** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Deteriorating of infrastructure - Construction repairs/maintenance - Weather conditions (dry and wet) - Damage by third parties - Accessibly to pipes - Size of pipe - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Minor	Rare	Low (E2)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing) - Isolation of main at pump stations and valves throughout the sewer system	Minor	Rare	Low (E2)		Confident
7.02	Frederickton sewer system	Sewer Retic	**Sewer Choke** leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Increase in solids content of sewage - Unauthorised material / foreign objects discharge to sewer network - Infiltration of tree roots - Misalignment of pipes & connections - Ground movement causing misalignment of pipes & connections - Wet Weather events - Accessibly to pipes - Vandalism - Unreported breaks in isolated areas - Surcharging environment include paddocks, residential, commercial, sports fields, drains and gully's	Minor	Rare	Low (E2)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms of pump stations that influence retic flows - Documentation and procedures - Asset renewal / upgrades and auditing - Critical spares - 24hrs on call availability - Access to plant equipment (jetters, excavators, CCTV - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact - Remedial actions (lime, disinfection, fencing)	Minor	Rare	Low (E2)		Confident
7.03	Frederickton sewer system	Sewer Retic	**Emergency Disaster event** resulting in untreated sewage pollution to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Chemical Spills - Inability to access asset/infrastructure	Moderate	Rare	Moderate (E3)	- Implementation of Councils BCP - Controls as above (Main Break & Sewer Choke) - Chemical spill call 000 (HAZMAT)	Moderate	Rare	Moderate (E3)		
7.04	Frederickton sewer system	Pump Stations (F1, F2 & F3)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Open paddock Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Insignificant	Unlikely	Low (D1)	- Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact	Insignificant	Unlikely	Low (D1)	- F1 does not have remote access	Confident

	EventLocation Activity / Process Step		Hazardous Event / Consequence	Escalating Factors	Conseq. (MR)	Likeli. (MR)	RISK (MR)	Existing Control Measures	Conseq. (RR)	Likeli. (RR)	RISK (RR)	Additional notes or actions	Uncertainty
7.05	Frederickton sewer system	Pump Stations (F4)	**Pump Station Failure including pump choke and wet weather events** - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Surcharge environment: Roads, Residential and Commercial areas - Increase in solids content of sewage - Unauthorised material / foreign objects - Mechanical fault - Electrical fault - Instrumental faults - Telemetry faults - Significant rainfall - Human error - Not following SOP - Future development pressures	Minor		Low (E2)	RareMinor - Certified staff & Staff training - Incident response plan and protocols - Preventative maintenance programme - Telemetry that includes monitoring and alarms - Documentation and procedures - Asset renewal / upgrades - Critical spares - Mobile backup generators - 24hrs on call availability - Access to contractor VAC truck - Vegetation management - Implement containment measures to minimise impact		Rare	Low (E2)		Confident
7.06	Frederickton sewer system	All pump stations	**Emergency Disaster event** causing Pump Station Failure - Leading to the pollution of untreated sewage to land or water and/or community contact with untreated sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure - Loss of assets	Major	Rare	High (E4)	- Implementation of Councils BCP - Controls as above (Pump Station Failure including pump choke and wet weather events)	Major	Rare	High (E4)		Confident
7.07	Frederickton sewer system	STP	**Wet Weather Event causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Significant rainfall event - Large volume trade waste discharge - Plant malfunction - Insufficient plant capacity to contain storm waters (PWWF) - Sewer retic infiltration - Insufficient treatment capacity	Moderate	Possible	High (C3)	- Certified staff & Staff training - Pasveer level monitoring and telemetry alarming - Infiltration abatement program for FEDK catchment - Physical inlet screen - Run STP in Wet Weather/flood mode - Buffering in tertiary ponds	Moderate	Unlikely	Moderate (D3)	- New Central Kempsey STP to replace West Kempsey STP	Confident
7.08	Frederickton sewer system	STP	**Electrical or mechanical Failure at STP causing Operational Failure/Insufficient Treatment** Leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Aging infrastructure - Power outage - Availability of spares - Lack of process procedures - No alarms to on call operators when plant unmanned	Moderate	Possible	High (C3)	- Certified staff & Staff training - Buffering in tertiary ponds - Certified staff & Staff training - Plant maintenance - Back up mobile generators	Moderate	Unlikely	Moderate (D3)	- New Central Kempsey STP to replace West Kempsey STP - Future permanent generators	Confident
7.09	Frederickton sewer system	STP	**Emergency Disaster event** causing Operational Failure/Insufficient Treatment leading to the pollution of untreated or partially treated sewage to land or water and/or community contact with sewage	- Flood - Bushfire - Drought - Inability to access asset/infrastructure	Moderate	Rare	Moderate (E3)	- BCP plan - Controls as above (STP Wet Weather Event &/or Electrical or mechanical Failure at causing Operational Failure/Insufficient Treatment	Moderate	Rare	Moderate (E3)		Confident
7.10	Frederickton sewer system	STP	**Chemical Spill** to land or water and/or community contact with chemicals	- Inappropriate storage of chemicals / fuels / oils - Use of chemicals / fuels / oils by untrained staff	Insignificant		Low (E1)	RareInsignificant - Certified staff & Staff training - Bunded area around chemical storage - Chemical spill kits on site - Buffering/dilution in tertiary ponds - Staff on site for chemical deliveries - SDS for chemical handling - SDS information box at front of plant		Rare	Low (E1)		Confident

Appendix E – Risk Scoring

Consequence

Level	Descriptor	Definition
1	Insignificant	The overflow is extremely unlikely to drain to a local sensitive environment where an insignificant volume of sewage reaches a waterway or little chance of public exposure.
2	Minor	The overflow is extremely unlikely to drain to a local sensitive environment where a significant volume of sewage may enter a waterway or minimal public exposure.
3	Moderate	The overflow is unlikely to drain to a local sensitive environment where a significant volume of sewage is likely to enter the waterway or public exposure i low
4	Major	The overflow is likely to drain to a local sensitive environment where there is a high likelihood of sewage entering the waterway and public exposure risk is likely.
5	Catastrophic	The overflow is likely to drain to a local sensitive environment where the volume of sewage likely to enter the waterway is high and the public exposure risk is high.

Likelihood

Level	Descriptor	Definition
1	Rare	Occurs less than or equal to once every 5 years
2	Unlikely	Occurs more often than once every 5 years and up to once per year
3	Possible	Occurs more often than once per year and up to once per month (up to 12 times per year)
4	Likely	Occurs more often than once per month (or more often than 12 times per year) and up to once per week (up to 52 times per year)
5	Almost Certain	Occurs more often than once per week (or more often than 52 times per year)

Uncertainty Evaluation

Level	Descriptor	Definition
1	Certain	There is five years of continuous monitoring data, which has been trended and assessed, with at least daily monitoring. The processes involved are thoroughly understood.
2	Confident	There is five years of continuous monitoring data, which has been collated and assessed, with at least weekly monitoring or for the duration of seasonal events. There is a good understanding of the processes involved.
3	Reliable	There is at least one year of continuous monitoring data available, which has been assessed and there is a good understanding of the processes involved.
4	Estimate	There is limited monitoring data available, but there is a reasonable understanding of the processes involved.
5	Uncertain	There is limited or no monitoring data available and the processes are not well understood.

Risk Scoring Matrix			Consequence					
			Insignificant	Minor	Moderate	Major	Catastrophic	
Likelihood	A	Almost certain	Moderate (A1)	High (A2)	Very High (A3)	Very High (A4)	Very High (A5)	5
	B	Likely	Moderate (B1)	High (B2)	High (B3)	Very High (B4)	Very High (B5)	4
	C	Possible	Low (C1)	Moderate (C2)	High (C3)	Very High (C4)	Very High (C5)	3
	D	Unlikely	Low (D1)	Low (D2)	Moderate (D3)	High (D4)	Very High (D5)	2
	E	Rare	Low (E1)	Low (E2)	Moderate (E3)	High (E4)	High (E5)	1

Definitions:

Hazard: a biological, chemical, physical or radiological agent that has the potential to cause harm

Hazardous event: an incident or situation that can lead to the presence of a hazard (what can happen and how)

Risk is the likelihood the identified hazard causing harm in a specified timeframe, including the severity of the consequence.

Preventative measures are actions, activities and processes used to prevent hazards from occurring or to reduce them.

Application of the methodology - agreed as consensus within the risk team:

The likelihood is changed based on the control measures. In most cases, only the likelihood would change, and consequence may remain the same.

Appendix F – Work Method Statement – Sewerage Discharge Clean Up

APPENDIX F – WORK METHOD STATEMENT – SEWAGE DISCHARGE CLEAN UP

Description:

Clean up sewage discharge to prevent or minimise the risk of material harm to the environment or public health.

Hazard Identification:

- Vehicles skidding and colliding.
- Vehicles splashing pedestrians and buildings**.**
- Persons slipping causing injury.
- Persons suffering spoiled shoes and clothing.
- Persons coming into contact with sewage.
- Needle stick injury.
- Sewage overland flow contaminating environs.
- Sewage entering stormwater drain or waterway, or water body.

Quality Standard:

- The sewage discharge is stopped and cleaned up in such a manner as to eliminate or minimise environmental impacts and public health.
- All Work, Health and Safety, and regulatory requirements are met.

Safety Controls:

- Traffic control plan.
- Limit speed of vehicles.
- Barricade affected area.
- Designated walkway for pedestrians.
- Workmen wear appropriate footwear, clothing, and personal protective equipment.
- Contain spill in temporary bunded area.
- Clean up spill and disinfect area as appropriate.

Procedure:

1. Conduct Risk Assessment.
2. Advise Team Leader so that any necessary notifications may be carried out.
3. Put in place Traffic Control Plan and limit speed of vehicles using traffic cones and traffic controllers as necessary.
4. Barricade area, if practicable.
5. Provide designated walkways for pedestrians, if possible segregate from vehicles, and clear the area affected by the discharge.
6. Inform general public affected by the discharge of the nature of the problem.
7. Isolate source of overflow. For example, turn off upstream pump station(s), block up upstream manhole, (providing no other discharge is created). If necessary, engage a vacuum tanker to empty pump wells, manholes, or to pump between manholes.
8. Contain spill in temporary earth or sandbag bunds.
9. Collect and transfer spillage to nearest appropriate manhole or sewage treatment plant.
10. Clean land and waterways impacted by the discharge. Do not hose down surfaces so that runoff enters any drain or waterway unless it is done to facilitate collection within a controlled, bunded area.
11. Determine and record the volume of discharge for reporting purposes.
12. Determine and record the amount and type of disinfectant applied to any impacted land.
13. Do not add a substance to a waterway, unless directed by your team leader or.
14. Once discharge has stopped and the spill cleaned up, proceed to repairing the broken sewer main, clear choked sewer, or unblock choked pump, or as otherwise necessary, according to the relevant Work Method Statements.
15. Collect samples from identified upstream and downstream locations and send to lab for analysis.

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