POLLUTION INCIDENT RESPONSE MANAGEMENT PLAN

DENMAN WASTEWATER SCHEME (EPL #5059)

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PIRMP Testing

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Foreword

This Pollution Incident Response Management Plan (PIRMP) for the Denman Sewerage Scheme is a document that has been developed for Muswellbrook Shire Council's (MSC) use in the operation and management of incidents at the Denman Sewage Treatment Plant (STP) and its sewerage collection system. The purpose of this plan is to ensure that, where possible, pollution incidents are avoided but if they do occur, they are managed appropriately to minimise the effects on the environment and to human health.

This PIRMP addresses the requirements under Part 5.7A of the *Protection of the Environment Operations Act (POEO) 1997*.

The objectives of the plan are to:

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

This management plan is to be continually updated and reviewed by the Operations Manager Water and Wastewater, Muswellbrook Shire Council.

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Abbreviations

Abbreviation	Description
%	Percent
ABS	Australian Bureau of Statistics
ADWF	average dry weather flow
Ave.	Average
BOD_5	(5 day) biochemical oxygen demand
D	day
DFS	(NSW) Department of Finance and Services
DSPS	Denman Sewage Pumping Station
EP	equivalent person or equivalent population
EPL	Environment Protection Licence
G	grams
hr	hours
IDEA	Intermittent Decanted Extended Aeration
Kg	kilogram
kg/d	kilogram per day
kg/h	kilogram per hour
kL	Kilolitres
kL/d	kilolitres per day
L	Litre
L/EP/d	litres per EP per day
L/s	litres per second
M	metres
max.	maximum
mg/L	milligrams per litre
min.	minimum
mins	minutes
mL	millilitre
mm	millimetres
MSC	Muswellbrook Shire Council
MSDS	material safety data sheet
N	Nitrogen
NATA	National Association of Testing Authority (Australia)

NFR	non-filterable residue
NH_3	ammonia
NH_3-N	ammonia nitrogen
NO	nitrites and nitrates (oxidised nitrogen)
NSW EPA	New South Wales Environment Protection Authority
O&G	oil and grease
Ortho-P	orthophosphates
P	phosphorus
pH	unit of measure of hydrogen ion activity in solutions
PIRMP	Pollution Incident Response Management Plan
POEO	Protection of the Environment Operations (Act)
PPE	personal protective equipment
SPS	sewage pumping station
SCADA	Supervisory Control and Data Acquisition System
SS	suspended solids
STP	sewage treatment plant
TKN	total kjeldahl nitrogen
TN	total nitrogen
TP	total phosphorus
TSS	total suspended solids
Yr	year

1 Introduction

The township of Denman is located 235 km north of Sydney. Denman Urban Centre Locality currently has a population of approximately 1,400 people.

Denman is in the Muswellbrook Local Government Area (LGA). Muswellbrook Council owns and operates the Denman Wastewater Scheme. The scheme consists of a Wastewater (Sewage) treatment plant (STP) and the collection system servicing the town.

1.1 Sewage Treatment Plant and Collection System

The Denman STP comprises the following treatment /process units:

- Inlet structure and screen
- Intermittently Decanted Extended Aeration (IDEA) biological reactor
- Maturation ponds (2 in series)
- Sludge Lagoons (2, duty/stand-by)
- Drying bed

The Denman sewerage collection system comprises the following:

- Sewage transfer pump stations DSPS1 and DSPS2
- Associated gravity mains and rising mains

Sewage is pumped to the STP via DSPS1. DSPS1 collects flow from its catchment plus pumped flow from DSPS2. DSPS2 collects sewage from the northern half of the town and pumps into DSPS1. Tertiary treated effluent is pumped to a reservoir for subsequent reuse at the local golf course and sporting fields. Denman Creek and the Hunter River run on either side of the STP. Surcharges from DSPS1 and its catchment will flow directly into Denman Creek. Surcharges from DSPS2 and its catchment will flow into Sandy Creek. Sandy Creek and Denman Creek subsequently flow into the Hunter River.

Figures 1.1 and **1.2** indicate the locations of receiving waters relative to the STP and the pumping stations.

The STP and its collection system operates under Environmental Protection Licence (EPL) No. 5059 granted by the NSW Environment Protection Authority (EPA).

Figure 1.1. Denman Sewerage System

Figure 1.2. Denman STP Overview

1.2 Scope of the PIRMP

The scope of the plan is as follows:

- ✓ Description and likelihood of hazards;
- ✓ Pre-emptive actions to be taken;
- ✓ Inventory of pollutants;
- ✓ Safety equipment;
- ✓ Contact details;
- ✓ Communicating with neighbours and the local community;
- ✓ Minimising harm to persons on the premises;
- ✓ Maps showing location of scheme components;
- ✓ Actions to be taken during or immediately after a pollution incident; and
- ✓ Staff training (i.e. annual review of plan and annual test of plan).

2 Context of the Assessment

2.1 Background

A new provision under the *Protection of the Environment Operations Act (POEO) 1997* is the requirement to prepare, keep, test and implement a pollution incident response management plan for each environmental protection licence that Council holds.

The objectives of these plans are to:

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

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

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

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

(a) harm to the environment is material if:

(i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or

(ii) it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations), and

(b) loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.

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

The NSW EPA requires a PIRMP to be implemented for all existing licenses. Council has EPL #5059 for the Denman STP and its collection system.

2.2 Council Commitment

Muswellbrook Shire Council is committed to protecting the health of the public, the environment and its workers. This commitment has been formalised and is contained in Council’s Operational Plan.

The Local Government Act contains a Charter for Local Government which describes the approach to supplying services and activities. It charges local government with a number of responsibilities including but not limited to the following:

- to provide directly or on behalf of other levels of government, after due consultation, adequate, equitable and appropriate services and facilities for the community and to ensure that those services and facilities are managed efficiently and effectively;
- to exercise community leadership;
- to properly manage, develop, protect, restore, enhance and conserve the environment of the area for which it is responsible, in a manner that is consistent with and promotes the principles of ecologically sustainable development;
- to bear in mind that it is the custodian and trustee of public assets and to effectively account for and manage the assets for which it is responsible;
- to engage in long-term strategic planning on behalf of the local community;
- to keep the local community and the State government (and through it, the wider community) informed about its activities;

Relevant Council objectives and strategies with respect to its sewerage and environmentally related operations as stated in its management plan are summarised in **Table 2.1** (refer to management plan for detailed objectives and strategies).

Table 2.1 Council's Sewerage and Environmentally related Objectives and Strategies.

Objective	Strategies
Operate water supply and sewerage systems to provide levels of service (LOS) stated in the Strategic Business Plan (SBP)	• Operate to Water and Sewerage Strategic Business Plans. • Monitor and review, as necessary, the effectiveness of Water and Sewerage section structure to ensure the most beneficial arrangement for both staff and customers on an on-going basis. • Review, update and implement training program for water
Effectively Manage Council's Water and sewer assets.	• Develop a comprehensive asset management plan for Council's water and sewer assets. • Continue with pipe replacement program.
Provide water and sewer service to the service areas of the Muswellbrook LGA that are sustainable, affordable, best value and represent industry best practice.	• Assess LOS consistent with best practice. • Assess short-, medium- and long-term strategies for servicing growth in urban areas in the LGA. • Reduce water demand by encouraging wise use of water. • Reduce infiltration to and from the sewerage system.
Reuse* 100% of effluent in Muswellbrook and Denman excluding peak and wet weather conditions.	• Operate system to achieve effluent quality as determined. • Regular sampling and testing of decanted effluent from the IDEA reactor and from the maturation pond, prior to pumping to reuse system. Do not pump to reuse system when effluent quality exceeds limits. • Prevent access to irrigation areas when irrigating. (i.e. allow for a withholding period)
Effectively manage contaminated sites to protect the environment, public health and safety.	• Review legislative changes to determine impact on Council's roles and responsibilities. • Prepare plan information system mapping of land suspected to be subject to contamination practices.
Monitor water quality and identify trends.	• Monitor water quality in Hunter River and tributaries on a monthly basis. • Maintain records of monitoring results to enable water quality trends identification.

2.3 Regulatory and Formal Requirements

The regulatory and formal requirements applicable to the Denman Sewerage Scheme are shown in Table 2.2. These legislative and licensing requirements and guidelines are to be met to ensure the protection of environmental and public health and to satisfy work health and safety (WHS) requirements. This management plan addresses how these requirements are to be met.

Table 2.2. Formal and Regulatory Requirements

Parameter	Instrument		Administered
Overall Scheme Operation	*Water Management Act, 2000*	• Granting of water licenses • Integrated management of water resources	NSW EPA
	Local Government Act 1993 – Section	• Approval to construct extend water supply/treatment works	NSW DCCEEW
	Catchment Management Authorities Act 2003	• Management of natural resources at a catchment level	Water NSW
	Protection of the Environment Operations Act (POEO) 1997 –	• Granting/refusal of Environment Protection Licence (EPL)	NSW EPA
Public Health	*Public Health Act 2010*	• Promotion, protection and improvement of public health • Control risks to public health • Promoting control and preventing spread of infectious diseases	NSW Health
Environmental Health	*Protection of the Environment Operations Act (POEO) 1997*	• Protection, Restoration and Enhancement of the quality of the environment	NSW EPA
	Part 5.7A of POEO Act 1997	• Pollution Incident Response Management Plan (PIRMP) compliance	
WHS	*Work Health and Safety Act 2011*	• Promote and ensure health and safety of workers	SafeWork NSW

Plumbing	*AS/NZS 3500 - Plumbing and Drainage Code 1996-2003*	• Ensures all pipework associated with recycled water schemes is installed in accordance with standard	Network Utility Operator (Muswellbrook Shire Council)

Operations Manager Water & Wastewater Muswellbrook Shire Council is responsible for the review and evaluation of this plan.

2.4 NSW EPA Licence.

Denman STP is covered by Environment Protection Licence (EPL) No. 5059. The licence restricts the effluent quality discharge by the plan to the following 100 percentile limits:

- Biological Oxygen Demand (BOD) – 20mg/L
- Total Suspended Solids (TSS) – 30mg/L
- Oil and Grease (O&G) – 10mg/L
- pH – 6.5 – 8.5
- Volume – 2100kL/day

The STP has not discharged into receiving waters since 2009. All effluent is transferred to, chlorinated and utilised for irrigating the golf course and sporting fields. Effluent reuse is not a licensed activity and therefore not covered by this PIRMP.

3 Assessment of the Risks

A risk assessment was undertaken with Council's water and sewerage staff at Denman. The objective of the assessment was to:

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

Shown in Table 3.1, Table 3.2 and Table 3.3 are the likelihood, impact and risk criteria used in the assessment.

As can be seen in Table 3.4, the residual STP and SPS risks are rated as low to moderate. Inundation of DPS1 produces the greatest risk because the pump well is currently located below 1 in100yr flood levels. The STP is licensed to discharge into the effluent pond designated as "EPA Identification Point 1" on the plan.

Table 3.1. Definitions of Likelihood

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

Table 3.2 Definitions of Impact

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

5	Catastrophic	The overflow is likely to drain to a local sensitive environment* and: - Where the overflow reaches waters, the volume of sewage likely to enter the waterways is high with regard to the volume and flow of receiving waters, or - Where the overflow discharges to land, the public exposure risk is high given the maximum response time**

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

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

Table 3.3. Risk Analysis Criteria

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

Table 3.4. STP Risk Register

	Contaminant	Description of the Hazardous Event	Public Health	Environmental Risks	Likelihood	Events or Circumstances that would acerbate or increase likelihood	Impact	Assessed Risk	Existing Controls In addition to operator training, SWMS
1	Raw sewage	Untreated sewage flows into maturation ponds.	X	X	Unlikely	• Faulty IDEA aerator • Power failure • Decanting system faulty	Moderate	Moderate	• Ponds have designed storage of approximately 21 days • Reactor has two aerators. One aerator can provide partial treatment. • Alarms to operator via telemetry and SMS • Reliable power supply.
2	Waste activated sludge	Sludge carryover due to poor settlement in the IDEA reactor	X	X	Likely	• Faulty aeration system, • Trade waste discharged into plant.	Insignificant	Low	• Maturation ponds can capture sludge carried over. • Regular process monitoring by operator.
3	Effluent	Effluent overflows to Hunter River.	X	X	Possible	• Low demand for reuse water, • Faulty reuse water transfer pump.	Moderate	Moderate	• Ponds have 21 days storage capacity. • Secondary treated effluent. • Alarms to operator via telemetry and SMS • 2nd pump as a critical spare

4	Effluent	Poor quality - equipment failure	X	X	Likely	• Faulty IDEA aerator • Power failure • Decanting system faulty	Minor	Moderate	• Ponds have designed storage of approximately 21 days • Reactor has two aerators. One aerator can provide partial treatment. • Alarms to operator via telemetry and SMS • Reliable power supply.
5	Effluent	Toxic wastes upsets / kills process	X	X	Rare	• Trade waste discharges	Moderate	Low	• No trade waste sources
6	Effluent	High strength (poor quality) effluent transferred to reuse reservoir.	X	X	Possible	• Faulty aeration system, • Trade waste discharged into plant.	Moderate	Moderate	• Ponds at STP have designed storage of approximately 21 days • Reactor has two aerators. One aerator can provide partial treatment. • Alarms to operator via telemetry and SMS. • Controllable application and public exclusion times prior to application.

7	Sludge lagoon supernatant	Supernatant from lagoons overflow into	X	X	Rare	• Blocked supernatant return pipe.	Minor	Low	• Two sludge lagoons available. Blocked lagoon can surcharge to standby lagoon which will
8	Sodium Hypochlorite dosing	Leakage in dosing system	X	X	Possible	• Leaking/ corroded pipework • Pump leak	Moderate	Moderate	• Controllable application and public exclusion times prior to application. • Doubled – walled dosing pipes
9	Sodium Hypochlorite dosing	Leakage in dosing tank	X	X	Possible	• Cracks in tank • Overfilling of tank • Leaking dosing pipe connection to tank	Moderate	Moderate	• Tank bund part as the package supplied with installation

Table 3.4. Risk Register – Sewer Pump Stations (DSPS#1 and DSPS#2) and network (continued).

	Contaminant	Description of the Hazardous Event	Public Health	Environ-mental Risks	Likelihood	Events or Circumstances that would acerbate or increase likelihood	Impact	Assessed Risk	Existing Controls In addition to operator training, SWMS
	DSPS#1								
1	Sewage	Overflow to Denman Creek	X	X	Unlikely	• Extended power failure. • Pump failure (pump well and bund wall located below 1: 100yr flood levels) • Rising main blockage.	Major	High	• Reliable power system. Long outages would be planned. • Automatic stand-by pump • Alarms to operator via telemetry and SMS • Operator response less than 1 hour • Concrete bund around pump well.
2	Sewage	Inundation by Denman Creek	X	X	Possible	• Flooding	Minor	Moderate	• Concrete bund around pump well. (Council is planning to eventually relocate DSPS1 above 1 in 100yr flood levels) • Dilution by flood waters
3	Sewage	Rising main blockage	X	X	Possible	• Blockage by gross solids.	Moderate	Moderate	• Jetting of mains.

	DPS#2								
1	Sewage	Overflow from pump well onto roadway	X	X	Unlikely	• Extended power failure. • Pump failure	Minor	Low	• Reliable power system. Long outages would be planned. • Automatic stand-by pump • Alarms to operator via telemetry and SMS • Operator response less than 1 hour • Pump well overflows directly into DSPS#1 providing overflow doesn't occur in wet weather.

2	Sewage	Overflow Sandy Creek	X	X	Unlikely	• Extended power failure. • Pump failure	Moderate	Low	• Reliable power system. Long outages would be planned. • Automatic stand-by pump • Alarms to operator via telemetry and SMS • Operator response less than 1
3	Sewage	Inundation by Denman Creek	X	X	Unlikely	• Flooding	Moderate	Moderate	• Existing flood levee. • Dilution by flood waters

Gravity System									
1	Sewage	Upstream discharge	X	X	Unlikely	• Pipe blockage • Excavation works	Moderate	Moderate	• Utilise Before You Dig Australia • Leakage can easily be detected. • Pumping station standby pump can be used.
2	Sewage	Leakage	X	X	Rare	• Earthquake/ground movement	Moderate	Low	
Rising Mains									
1	Sewage	Pipe break	X	X	Rare	• Earthquake/ground movement • Excavation works	Moderate	Low	• Pumps can be turned off whilst repairs are undertaken. • Storage in upstream pump station(s).

4 Preventative Actions to be Undertaken

4.1 General

The preventative actions or measures to manage and minimise the risk to human health and the environment involve a multiple barrier approach. The multiple barriers, in order of preference, are as follows.

- Elimination
- Substitution
- Isolation
- Engineering means
- Administrative
- Personal Protection Equipment (PPE)

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

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

The identified current preventative actions are shown in this section. Photos of the existing measures are shown in Figures 4.1 – 4.6.

4.2 Collection System

Collection system overflows can principally occur from five main causes. These are:

- Power/mechanical failure at pumping stations
- Reticulation system blockage/leakage
- Rising main breakage (leaks or major failure),
- Breakdown of pump units, and
- Excessive inflows.

4.2.1 Pipelines

Overall, Denman reticulation system is in good condition, has sufficient capacity and the number of overflows or incidents per kilometer of pipeline per year is considered low by industry standards. Council uses water jetting equipment to clear blockages. Blockages in reticulation mains occur infrequently. The main cause is tree root intrusions but can also occur due to foreign objects lodging in the pipelines. Other possibilities for sewer overflows include illegal connection of storm water pipes and low-lying gullies or boundary traps.

4.2.2 Pumping Stations

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

- Adequate pumping capacity;
- Reliable power supply;
- Standby pumps installed in the pumping station (no portable generator);
- Service response time to address abnormal operating conditions such as power failure, pump failure is less than the detention time for the pumping station before overflow occurs;
- Implementation of effective emergency plan/operational procedures for attending to failure and breakdown within the system effectively. There is a telemetry system in place;
- Location above 1-in-100-year flood level. There is currently no record of DSPS#2 being inundated and is protected by a flood levee bank. The switchboard for both of the pump stations is located above 1-in-100-year flood level, as illustrated by Figures 4.1 and 4.2.

Figure 4.1 Pump Station DSPS#1.

Figure 4.2 Pump station DSPS#2.

4.2.3 Pumping and storage capacity

DSPS#1 has 2 x 37kW pumps, each with a capacity of 110L/s, equivalent 6.4 times the average flow to the 2000EP capacity STP. The SPS has a dry well and emergency storage tank capacity of 220kL and the upstream mains and manholes have a storage capacity of 44.1kL. These equate to a total storage time of 4.4hrs at ADWF. The ADWF is currently 4.7L/s.

DSPS2 has 2 x 6kW pumps, each with a capacity of 35L/s, equivalent 6.4 times the average flow to the 2000EP capacity STP. The SPS has a dry well capacity of 30.31kL and the upstream mains and manholes have a storage capacity of 44.1kL. These equate to a total storage time of 11.6hrs at ADWF. The ADWF is currently 2.1L/s.

4.2.4 Reliable Power Supply

Council has reported that Denman has a reliable power supply. Generally power outages in the Denman area are not common. Power failures of extended duration are possible but are usually planned outages.

4.2.5 Provision of Emergency Storage

A sewerage system must have sufficient capacity to store sewage, which continues to flow from the catchment during extended mechanical breakdowns or electrical failures. DSPS#1 and DSPS#2 have emergency storage capacities of 4 and 11.4 hrs, respectively.

4.2.6 Telemetry System

The pumping station is connected via a telemetry system. The telemetry sends an SMS to the operator on call when high water alarm and electrical and mechanical faults occur. Alarms escalate through the telemetry, from the Operators to the Water & Wastewater Supervisor and then to the Council's Operations Manager if they are not acknowledged.

4.2.7 Response Times to Abnormal Operating Conditions

Response times are expected to be short. It is however recommended to store essential spare parts on site including spares for decanting system. Failure of the decanting system can result in significant plant down-time.

4.2.8 Stand-by Pumps

DSPS#1 and DSPS#2 are both equipped with automatic duty and standby pumps (100% standby).

4.3 Sewage Treatment Plant (STP)

Denman STP is a 2000EP capacity treatment plant. The plant is an activated sludge type plant producing secondary treated effluent consisting of the following process units:

- Inlet works with mechanical screening;
- 2000EP capacity intermittently decanted extended aeration (IDEA) biological reactor;
- Maturation/polishing ponds; and
- Chlorine dosing on the re-use main to the golf course.

The Denman STP is a simple plant, which is likely to be upgraded in the near future. It is underloaded based on the current connected population.

At present all flows are pumped via SPS#1 to the inlet works. All flows to the plant are treated by the IDEA reactor. IDEA reactors generally allow for at least partial treatment for flows between DDWF and PWWF.

Equipment failure that may occur at the STP includes:

- Mechanical aerator – reduced aeration capacity will result in reduced treatment capability. The IDEA reactor has two (2) surface aerators. Failure of one aerator will reduce the biological treatment capacity of the IDEA reactors.
- Failure of the decanting weir's rubber membrane ("sock"). Failure of the membrane will result in significant reactor down-time. This may be mitigated by storing spare membranes on site.
- Reuse transfer pump failure. Failure of the reuse pump will result in the possibility of overflow from the maturation pond into Hunter River, instead of being reused. The maturation ponds have a designed 30-day storage capacity.

The Denman STP has a SCADA system and a telemetry system that provides a monitoring options during out of business hours. On-call operators monitor the plant during this time. Telemetry system provides Alarms triggered by the SCADA system and the alert in the form of an automatic phone message is sent to on-call operator. Operator responds to the alarm by attending the STP.

The process units of the STP are illustrated by Figures 4.3 – 4.6.

Figure 4.3. Raw Sewage Inlet Channel.

Figure 4.4. IDEA Biological Reactor.

Figure 4.5 Maturation Ponds *(reuse transfer pump in foreground)*

Figure 4.6. Sludge Lagoons

4.3.1 Dry Weather

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

4.3.2 Wet Weather

The STP is designed to treat all inflows. Generally, unless exceptional circumstances such as malfunction of system due to mechanical/electrical failure or blockages occur, overflows at STP are unlikely.

4.4 Sewage Treatment Plant Chemical Spills

Liquid Chlorine (Sodium Hypochlorite) is dosed at Denman STP into re-use main to the golf course for disinfection. A maximum of 2000 liters is stored in 5000 liters capacity tank that is located in bunded area inside the chemical dosing room.

5 Inventory of Pollutants

5.1 Inventory of Stored Chemicals

Chemical	Amount onsite, L	Maximum tank capacity, L
Sodium Hypochlorite	2000 max	5000

5.2 Chemical Usage

Sodium Hypochlorite dosed at an average of 24L/day and 720L/month.

5.3 Other Pollutants – Sewage and Effluent

The other potential pollutants are:

- Sewage (within the collection system and at head of the STP). All raw sewage is processed by the IDEA biological reactor.
- Effluent – produced at the STP. 100% of the treated effluent is reused by the golf course.
- Sludge produced at the STP. Waste activated sludge is initially transferred to the sludge lagoon for stabilisation. It is then removed to the drying bed. Once it is dry, it is disposed of by contractor.
- Sludge lagoon supernatant – returned to the inlet works for treatment by the IDEA reactor.
- Grit and screenings (inlet works) – Collected and disposed of at Council's landfill site.

Table 5.2. Pollutant List – Sewage and Effluent

Parameter	Typical Raw Sewage	Effluent
Biochemical oxygen demand (BOD_5), mg/l	270	<20
Suspended solids (SS), mg/l	270	<30
Total nitrogen (TN), mg/l	53	<20
Ammonia, mg/l	53	<10
Total phosphorus (TP), mg/l	11	<11
Oil and grease (O&G), mg/l	<10	<2
Fecal coliforms, CFU/100ml	1,000,000	<1000
pH	6.5 - 8.5	6.5 - 8.5

Table 5.3 Maximum amount of pollutants in respective parts of the plant.

Pollutant	Storage
IDEA Reactor, kL	563
Maturation Pond Effluent, kL	4000
Sludge Lagoon, t in dry weight	147
Golf Course Reservoir, kL	900
Effluent Dam, kL	30000

Figure 5.1 Denman re-use system.

6 Safety Equipment

Safety equipment or other devices that are onsite will minimise the risks to human health or the environment and contain or control a pollution incident. These will include any personal protective equipment (PPE), material safety data sheets (MSDS), monitoring devices and spill containment equipment.

6.1 List of PPE Equipment Onsite

The following PPE safety equipment is provided onsite:

Table 6.1. List of PPE

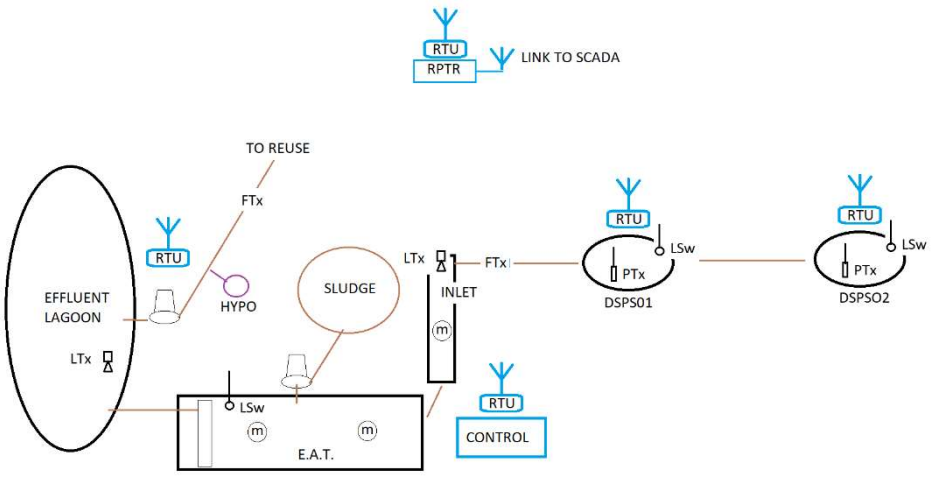
Personal Protective Equipment	Location
Hearing protection	STP and Operator's Truck
Protective gloves	STP and Operator's Truck
Dust mask	STP and Operator's Truck
Safety glasses	STP and Operator's Truck
Self – contained breathing apparatus (SCBA)	Denman WTP
Safety apron	STP and Operator's Truck

6.2 List of Monitoring Devices

The sewerage system is monitored via a SCADA and telemetry systems. Alarms are automatically sent to operators via SMS.

Figure 6.1 Overview of Denman Sewer Treatment

OVERVIEW DENMAN SEWER TREATMENT



The list of monitoring devices onsite is shown in Table 6.2.

Table 6.2. List of monitoring alarms

System	Monitoring Devices	Devices Alert
STP	SCADA and telemetry system monitors: Power, Intrusion, Aerators & Sludge pump	Escalates from “On-call Operator” to “Supervisor - Treatment Plants” and finally to “Operations Manager”, if not acknowledged.
SPS	High Level alarm	As above
	Power failure	As above
	Pump Mechanical Failure	As above
	Intrusion Alarm	As above, only after hours.

Table 6.3. List of monitoring devices

Site	Device	Manufacturer/Model	Function
DSPS#2	Pressure Transmitter	Aquamonix / PS7000	Level Indication and Pump Control
	Float Switch	Flyght/ ENM10	Well level critical alarm & emergency pump start
	Remote Telemetry Unit	Serch Controls/ PDS500	Communicate status to SCADA and control pumps
DSPS#1	Pressure Transmitter	Vega/Well52	Level indication (including alarm) and pump control
	Float Switch	Flyght/ ENM10	Well level critical alarm & emergency pump start
	Remote Telemetry Unit	Serch Controls/ PDS500	Communicate status to SCADA and control pumps
	Inflow Flowmeter (FTx)	Endress and Hauser/Promag400 5w4c2h-20W6/0	Record & display influent to plant (Kl total indicated on SCADA)
	Let Screen Level (FTx)	Miltronics/The Probe 8616030	Monitor level to control Inlet Screen

	High Level Float Switch	Flyght/ENM10	Change E.A.T. cycle to Storm Duty and give Alarm to SCADA
	Remote Telemetry Unit	Serck Controls/PDS550	Communicate plant status and alarms to SCADA
	Effluent Lagoon Level (LTx)	Endress and Hauser/ Prosonic M FMU40	Indication of level to SCADA and control reuse pump
	SCADA	Ci Technologies / Citect Version 7.2	Communicate status to SCADA and control pump
	Alarm Dialler	Schneider / ScadaPhone	Advise relevant contact in event of alarm as per alarm list – if call not acknowledge by On-Call Operator ScadaPhone will call Senior Operator, then Supervisor and then Operations Manager

Table 6.4. SCADA alarms list

Site	Alarm	Cause
Denman Effluent Reuse Pumping Station	Mains Fail Alarm	Loss of 3 phase power supply
Denman Effluent Reuse Pumping Station	Battery Volts Low	RTU12V backup battery below 11 volts
Denman Effluent Reuse Pumping Station	Intrusion Alarm	Site Accessed
Denman Effluent Reuse Pumping Station Level	Sensor Fault	Level Transmitter not working
Denman Effluent Reuse Pumping Station Pump	Maximum Starts Alarm	Pump cycle un-naturally short
Denman Effluent Reuse Pumping Station Pump	Fault	Motor protection or Hypo dosing pump trip

Denman Effluent Reuse Pumping Station	Telemetry Mains Fail	RTU running on battery
Denman Effluent Reuse Pumping Station RTU	Isagraf Program Halted	RTU program not running
Denman Effluent Reuse Pumping Station RTU	Backup Battery Fault	RTU CPU battery failed
Denman Effluent Reuse Pumping Station RTU	Hardware Fault	RTU internal error
Denman Sewerage Pumping Station 1	Mains Fail Alarm	Loss of 3 phase power supply
Denman Sewerage Pumping Station 1	Battery Volts Low	RTU12V backup battery below 11 volts
Denman Sewerage Pumping Station 1	Intrusion Alarm	Site Accessed
Denman Sewerage Pumping Station 1	Maximum Starts Alarm	Pump cycle un-naturally short
Denman Sewerage Pumping Station 1	Fault	Motor Protection Trip
Denman Sewerage Pumping Station 1	Maximum Starts Alarm	Pump cycle un-naturally short
Denman Sewerage Pumping Station 1	Fault	Motor Protection Trip
Denman Sewerage Pumping Station 1	Telemetry Mains Fail	RTU running on battery
Denman Sewerage Pumping Station 1 Wet Well	Level High	Wet Well at Critical Level
Denman Sewerage Pumping Station 1 RTU	Isagraf Program Halted	RTU program not running
Denman Sewerage Pumping Station 1 RTU	Backup Battery Fault	RTU CPU battery failed
Denman Sewerage Pumping Station 1 RTU	Hardware Fault	RTU internal error

Denman Sewerage Pumping Station 2	Mains Fail Alarm	Loss of 3 phase power supply
Denman Sewerage Pumping Station 2	Battery Volts Low	RTU12V backup battery below 11 volts
Denman Sewerage Pumping Station 2	Intrusion Alarm	Site Accessed
Denman Sewerage Pumping Station 2 Pump 1	Maximum Starts Alarm	Pump cycle un-naturally short
Denman Sewerage Pumping Station 2 Pump 1	Fault	Motor Protection Trip
Denman Sewerage Pumping Station 2 Pump 2	Maximum Starts Alarm	Pump cycle un-naturally short
Denman Sewerage Pumping Station 2 Pump 2	Fault	Motor Protection Trip
Denman Sewerage Pumping Station 2	Telemetry Mains Fail	RTU running on battery
Denman Sewerage Pumping Station 2 Wet Well	Level High	Wet Well at Critical Level
Denman Sewerage Pumping Station 2 RTU	Isagraf Program Halted	RTU program not running
Denman Sewerage Pumping Station 2 RTU	Backup Battery Fault	RTU CPU battery failed
Denman Sewerage Pumping Station 2 RTU	Hardware Fault	RTU internal error
Denman Sewerage Treatment Plant	Mains Fail Alarm	Loss of 3 phase power supply
Denman Sewerage Treatment Plant Aerator 1	Fault	Motor Protection Trip
Denman Sewerage Treatment Plant Aerator 2	Fault	Motor Protection Trip
Denman Sewerage Treatment Plant Basin	Flood	E.A.T. Storm Cycle Level Active

Denman Sewerage Treatment Plant	Battery Volts Low	RTU12V backup battery below 11 volts
Denman Sewerage Treatment Plant Decanter	Fault	Motor Protection Trip
Denman Sewerage Treatment Plant	Intrusion Alarm	RTU Panel Accessed
Denman Sewerage Treatment Plant	Telemetry Mains Fail	RTU running on battery
Denman Sewerage Treatment Plant Inlet Screen	Fault	Motor Protection Trip
Denman Sewerage Treatment Plant Sludge Pump	Maximum Starts Alarm	Pump cycle un-naturally short
Denman Sewerage Treatment Plant Sludge Pump	Fault	Motor Protection Trip
Denman Sewerage Treatment Plant RTU	Isagraf Program Halted	RTU program not running
Denman Sewerage Treatment Plant RTU	Backup Battery Fault	RTU CPU battery failed
Denman Sewerage Treatment Plant RTU	Hardware Fault	RTU internal error

Method for volume estimation to be used if monitoring equipment fails

1. Use historical data on average daily dry weather wastewater inflow and effluent outflow.
2. In addition, with regard to pumping of wastewater and effluent the following details for all pumps are known (from SCADA trends):
    - Instantaneous flow (L/S) for both wastewater and effluent pumps
    - Sewage (Wastewater) Inflow from pump station per pump run
    - Pumps run time data from pumps
    - Number of starts of pumps per day or per hour.

Both inflow and outflow can be estimated using above information.

7 Roles, Responsibilities and Contact Details

7.1 Stakeholder Responsibilities and Engagement

Council has committed to operating its Wastewater Treatment Plants and collection system in a responsible manner. Effective stakeholder engagement is necessary to fulfil this commitment. Table 7.1 presents the list of stakeholders involved in the operation of the Denman STP and collection system, outlines their roles and communication expected to occur to achieve safe operation of the plant and collection system. Further information on the operation of the system and communication protocols is addressed later in this plan.

Table 7.1. Stakeholder Responsibilities and Engagement

Stakeholder	Responsibility
Muswellbrook Shire Council (MSC)	Provision of safe and reliable water and sewerage services for Muswellbrook Local Government area
Director Property and Place	Reports to MSC General Manager on: • Water & Sewerage Works & Facilities • Roads & Stormwater Drainage Facilities • Sporting & Recreation Services & Facilities • Waste Removal • Treatment & Disposal Services • Technical Services • In conjunction with Manager Water and Wastewater assesses risk to public safety should an incident posing health risk occur.
Manager Water and Wastewater	Reports to Director Property and Place Provides leadership and overall management of water and wastewater services for Muswellbrook Shire, with strategic and asset management focus to ensure water and wastewater services are planned and managed to a best practice standard to achieve the strategic objectives of Council and the community.

Asset Manager Water and Wastewater	Reports to Manager Water and Wastewater Responsible for: • asset renewal projects; • capital projects; • Water and Sewer assessments; • Asset Management
Operations Manager Water and Wastewater	Reports to Manager Water and Wastewater Responsible for: • management and supervision of Operations area • maintenance of water and wastewater services
Supervisor – Treatment Plant	Reports to Operations Manager Water and Wastewater Responsible for: • daily operation of STP • routine maintenance of STP • data collection and reporting • supervision of operators and trainees on daily basis
Operators Water and Wastewater	Reports to Water & Wastewater Supervisor Responsible for: • routine tasks at STP • Collection of relevant data • Daily control of the plant • On-call duties according to the roster
NSW Health	Promote, protect and maintain the health of residents of Muswellbrook LGA.
NSW EPA	The NSW Environment Protection Authority (EPA) is the primary environmental regulator for New South Wales. EPA roles include protecting, restoring and enhancing the quality of the environment in NSW and reducing risk to human health.

NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW)	• Provide advice and assistance to Council with process treatment issues • Monitor compliance with legislation and regulation • Conduct plant inspections • Provide assistance and technical support for the Water and Sewer Projects
SafeWork NSW	• Provide advice, information and education on WHS • Provide licensing and registration for potentially dangerous work and plant items • Provide testing services for chemicals used in workplaces, and electrical and mechanical equipment used in hazardous areas.
Community of Muswellbrook	• Advice where required during incidents such as odorous releases, pipeline and SPS overflows
NSW Police / Fire & Rescue NSW (inc HAZMAT) /	• Provide response to incidents and emergencies (i.e. spills, injuries and accidents).

7.2 List of Contact Details

The contact details of the stakeholders are listed below in Table 7.2.

Table 7.2. Stakeholder Contact Details

Organisation	Position / Key Personnel	Contact Details
Muswellbrook Shire Council	24 Hour emergency number	02 6549 3700
	Council during business hours	02 6549 3700
	Derek Finnigan General Manager	02 6549 3700 Derek.Finnigan@muswellbrook.nsw.gov.au
	Matthew Lysaught Director Property and Place	02 6549 3730 matthew.lysaught@muswellbrook.nsw.gov.au
	Sergei Iagunkov Manager Water and Wastewater	02 6549 3774 sergei.iagunkov@muswellbrook.nsw.gov.au
	Operations Manager	Vacant

	Mark Donnelly Supervisor – Treatment	0490 859 584 mark.donnelly@muswellbrook.nsw.gov.au
Relevant Authority Contacts		
NSW EPA	EPA Environment Line	131 555 info@environment.nsw.gov.au
NSW Health	Hunter New England District – Public Health Unit	1300 066 055 (02) 4924 5704 (After Hours)
NSW DCCEEW	Graham Campbell	0419 620 990 graham.campbell@dpie.nsw.gov.au
Safework NSW		13 10 50 contact@safework.nsw.gov.au
Emergency Services	Police, Fire Brigade, Ambulance, Hazmat	000

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

All SPS and STP telemetry alarms are transmitted by SMS phone message to the On-Call Operator to respond. If alarm is not acknowledged it escalated to the Supervisor – Treatment Plant and then, if required, escalated to the Operations Manager.

The Operator will attend to an alarm/possible incident and report to the Supervisor - Treatment Plants. If required, Supervisor to notify Operations Manager.

Any blockages reported within the sewage system are attended to by the Operators Networks and cleared with Jet Cleaner. All works are undertaken to comply with the relevant Safe Work Method Statements (SWMS) and appropriate service requests are to be completed.

8 Communicating with Neighbours and the Community

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

8.1 Pollution Incident Management.

8.1.1 Sewerage Incident Notification Protocol

Pollution incidents are currently managed via Council's "Sewer Incident Notification Protocol" and a "Sewer Spills or Overflows" checklist which are in place for its sewage transport and treatment systems at Muswellbrook and Denman townships. The protocol and checklist are attached as Appendix A.

The object of the protocol is to ensure that all relevant organisations and members of any affected communities are notified of overflows and sewage treatment bypasses. It is important to note that the notification protocol does not allow for members of the community to be notified of every bypass and/or overflow event. Community members will only be notified if the incident is considered to be "significant risk to public health". The risk to public health will be determined following consultation with NSW Health representative by Council's Water and Wastewater Manager.

The triggers for notification are:

- Discharge from the STP of raw sewage or partially treated effluent from the STP which may pose as a public health risk; or
- An observed or reported overflow from the reticulation system, SPS or STP which may pose as a public health risk.

8.1.2 Significant Public Health Risk Events

Examples of events that are considered to be of "significant risk to public health" when an overflow or bypass has occurred:

- in a public park or sporting field where significant usage for recreational activities is being undertaken;
- inside the grounds of or in close proximity to a school or a child care centre; and/or
- at the treatment plant where disinfection has been compromised or bypass of the secondary treatment process has occurred with subsequent discharge of untreated/partially treated wastewater to receiving waters.

If a public health risk is assessed, Council will:

- initiate a water quality sampling and testing program to be undertaken by qualified and independent personnel to monitor and manage any public health threat related to the event; and
- erect signs and barricades as required.

8.1.3 Information to be collected

Information to be collected in the event of an overflow or bypass from the reticulation system, at a sewage pumping station or a sewage treatment plant will include but not be limited to:

- The location of the overflow/bypass and a description of the receiving environment;
- Date, estimated start time and duration of event;
- Volume of overflow/bypass;
- Classification of overflow/bypass due to dry (eg. power and mechanical equipment failure) and/or wet (ie. due to heavy rainfall) weather ;
- Probable cause of the overflow/bypass;
- Actions taken to stop overflow/bypass from occurring;
- Clean up activities undertaken; and
- Mitigating actions to prevent overflow/bypass from recurring.

8.1.4 Event Notification

Information provided to the Community will generally be sufficient to reduce public health risks to an acceptable level.

The need and extent of notification of overflows/bypasses will be assessed on a case by case basis as follows:

- Council's Director Property and Place and Manager Water and Wastewater will liaise with NSW Health's representative to determine which sections of the Community have the potential to be affected and how they will be notified.

Event notification will consist of:

- Ringing NSW EPA's Pollution Line of 131555.
- Immediate notification of Council being aware of the overflow/bypass incident and provision (by fax or email) of completed "Record of Sewer Overflow" report within a week after the incident to the following bodies:

- NSW Health;
- NSW EPA;
- DCCEEW;
- Council's Corporate and Community Services Section and
- Council's Environmental Services Section.

Contact details are provided in the "Sewer Incident Notification Protocol" document in Appendix A.

8.2 Investigation of Incidents and Emergencies

Following any incident or emergency situation, including any "near misses", an investigation will be undertaken, and all involved staff should be debriefed, to discuss performance and address any issues or concerns. Investigation will consider factors such as:

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

An incident reporting form for Denman is attached as Appendix C.

9 Minimising Harm to Persons on the Premises

9.1 Attendance Register

An attendance register is in place at the STP. All visitors are signed in and out of the site.

9.2 Site Induction

Visitors are instructed to report to the site office where they are inducted to the site by the Operator Water and Wastewater prior to access to treatment areas of the site.

9.3 Evacuation Procedure

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

9.4 Emergency Assembly Point

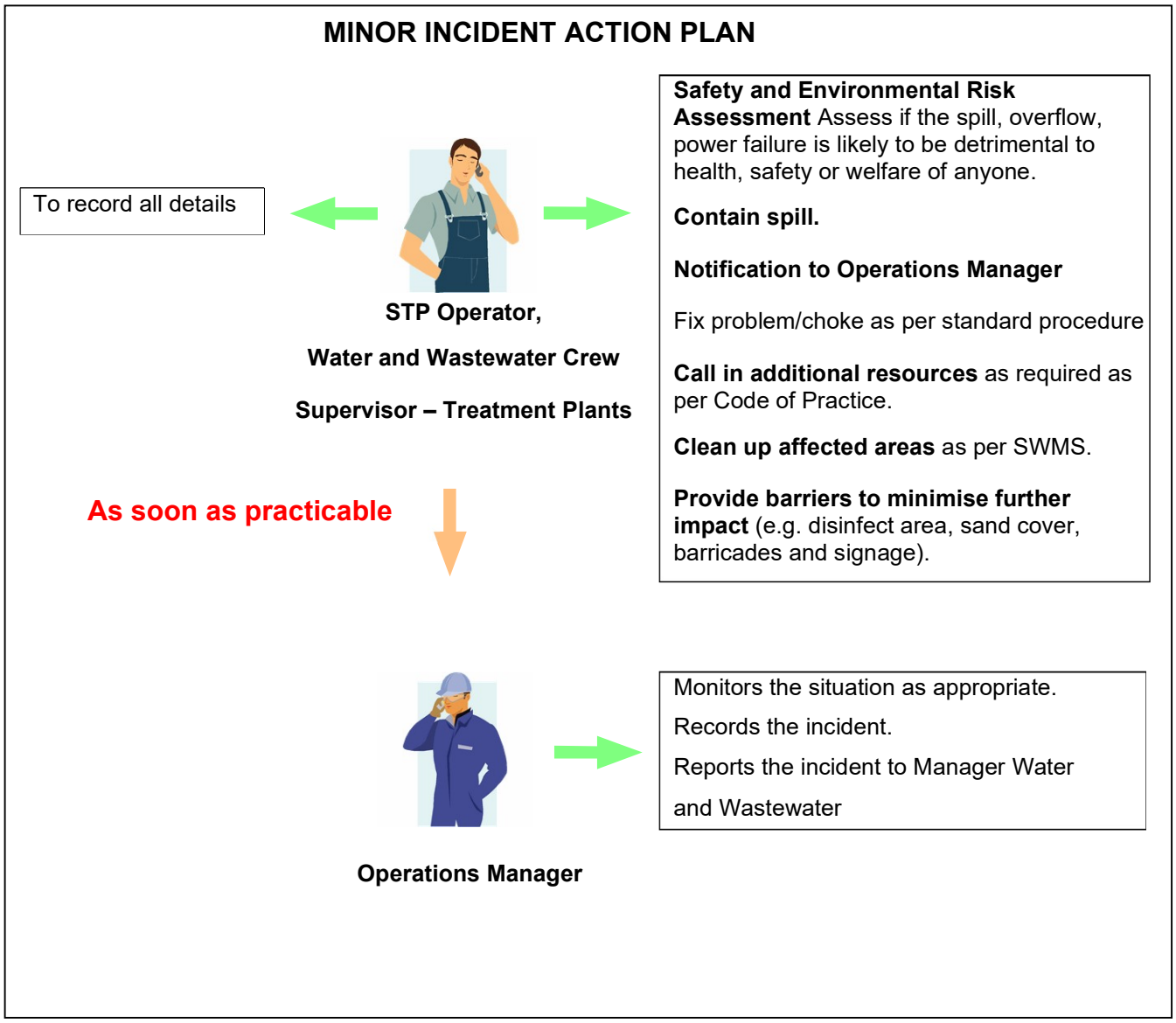
The emergency assembly point is at the front gate near the entrance to the STP.

10 Actions to be undertaken during or immediately after a pollution incident

10.1 Minor Incident Action Plan

The action plan for the following minor incidents is shown in Figure 10.1.

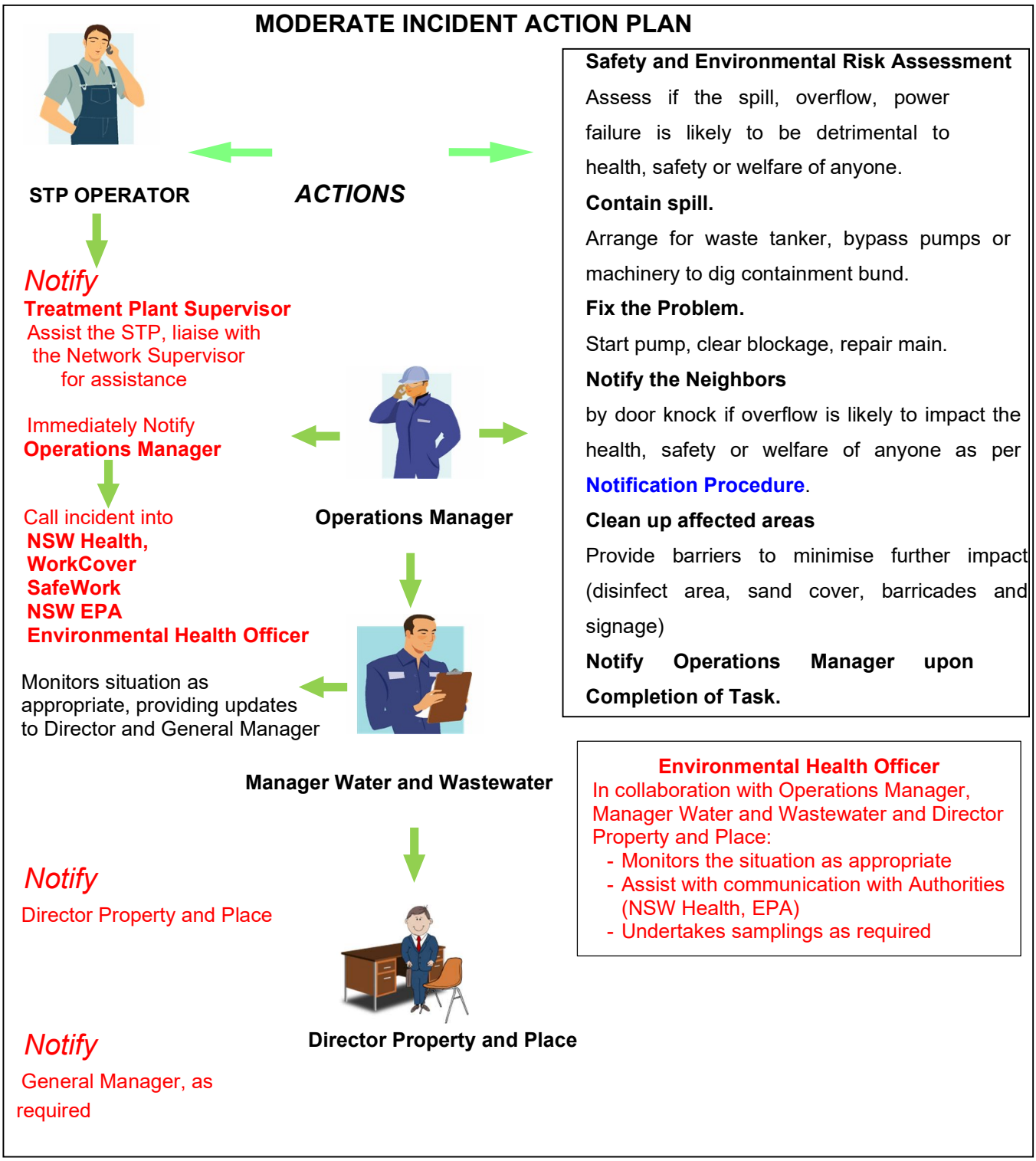
Figure 10.1. Minor Incident Action Plan



10.2 Moderate Incident Action Plan

The action plan for the following moderate incidents is shown in Figure 10.2.

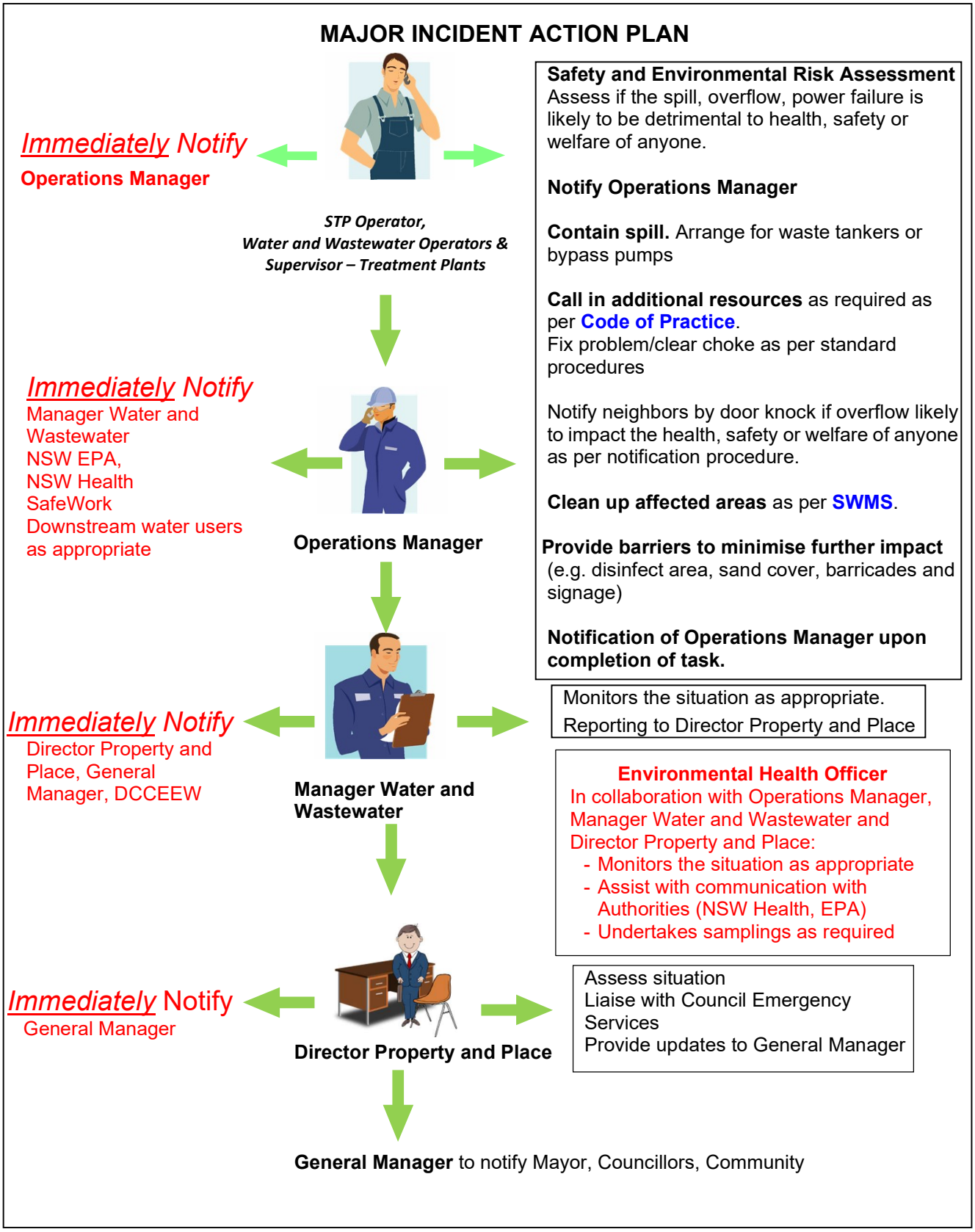
Figure 10.2. Moderate Incident Action Plan



10.3 Major Incident Action Plan

The action plan for the following significant incidents is shown in Figure 10.3.

Figure 10.3. Major Incident Action Plan



11 Evaluation, Audit and Review for Continuous Development

11.1 Evaluation and Review

A systematic review of the plan will be undertaken by the Operations Manager annually or within one month of an incident occurring at the plant. The evaluation will:

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

Evaluation of results described above will be documented and the plan updated. Evaluation will be reported to the Council stakeholders.

11.2 Auditing

Auditing of the pollutant inventory is to be done annually. An audit may also be triggered by a significant incident or if the process chemical is changed.

12 References

1. Protection of the Environment Operations Act (POEO Act), 1997
2. Protection of the Environment Operations (General) Regulation, 2022
3. Water Management Act, 2000
4. Local Government Act, 1993
5. Work Health and Safety Act 2011
6. The Guideline: Pollution Incident Response Management Plans (PIRMP Guidelines)
7. NSW EPA, Environment Protection Licence (EPL) No. 5059.

13 Appendix – Denman Staff Record/Register of Training

Staff training includes:

- Annual review and test of PIRMP
- Original Records/register of training is available from Water & Waste Administrator
- Documentation and review of PIRMP is recorded and saved in Council document register system.

Table 13.1 Staff register – Annual PIRMP Drill test.

Date	Name	Position
26/02/2025	Mark Donnelly	Supervisor – Treatment Plants
26/02/2025	Karlee Boyle	WHS Advisor
26/02/2025	Mark Winning	Water and Wastewater Administration Officer
26/02/2025	William Randall	Works Operator – Networks