Mill Stream Environment Management Plan 2024 - 2027











Document Control

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1 Introduction

Emergency relief structures (ERS) are an essential component of all wastewater systems. They are critical control points which are engineered to prevent damage to networks and protect public health by preventing wastewater surcharges and flooding of private property and public spaces during wet weather. The structures and discharges are commonly referred to as overflows and most often occur at times of intense rainfall when the stormwater flows have infiltrated the wastewater system.

The Malabar wastewater system (Figure 1-1) is the largest system that Sydney Water owns and operates. It covers approximately one third of Sydney and services more than 2 million people. The South Western Suburbs Ocean Outfall Sewer (SWSOOS) transports wastewater from the merging chamber at Arncliffe to Malabar Wastewater Resource Recovery Facility (WRRF).



Figure 1-1 Map of the Malabar Wastewater system

Sydney Water owns and operates eight ERS on the SWSOOS that discharge wastewater to the Mill Stream during wet weather (known collectively as the Mill Stream ERS). The Mill Stream ERS is one of the largest in Sydney Water's network and is located on the eastern side of Sydney Airport at Mascot. It is the last major ERS on the SWSOOS before the Malabar WRRF. Figure 1-2 shows the layout of the sewer infrastructure around Mill Stream and near receiving environment.



This Environmental Management Plan (EMP) is for the period 1 April 2024 to 30 March 2027 and supports the application for authorisation to operate the Mill Stream overflows. It represents the next phase of improvement work which builds on the improvement work delivered during the 2021-24 authorisation period.



Figure 1-2 Location of Mill Stream ERS and receiving environment

1.1 Background

The SWSOOS consists of three major interlinked trunk sewers. The original sewer (SWSOOS1) was constructed in 1916 and was later amplified (SWSOOS 2) in 1941. SWSOOS 2 is split into two barrels – SWSOOS2N and SWSOOS2S. With the expansion of Sydney Airport, local waterways have changed, and overflows were diverted to the newly constructed mouth of the Mill Stream when the third runway was built in the early 1990s.

The ERS is located on federally owned land at Sydney Airport and has potential impacts on the local environment. This requires Sydney Water to apply for an Authorisation under the Airports (Environment Protection) Regulation (AEPR) 1997 from the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) to operate the ERS.

Under the Protection of the Environment Operations Act 1997 (POEO Act), wastewater reticulation systems and wastewater overflow structures fall under what is defined as Sewage Treatment which is a Scheduled Activity. The Mill Stream ERS is covered under the Malabar wastewater system's Environment Protection Licence (EPL372) regulated by the NSW Environment Protection



Authority (EPA). The licence requires that 'the reticulation system must be managed, operated and maintained such that the operational and maintenance works and activities result in ongoing improvement in the system environmental performance, when compared with existing system environmental performance' (Condition O4.7). The existing Malabar wastewater system is permitted to overflow 238 events in 10 years, the limit with which all ERS in the system must comply. In addition to condition O4.7, EPL 372 has the following conditions that relate to the monitoring and improvement of wet weather overflows operated within the Malabar Wastewater System

- L7.1 Hydraulic Sewer System Model To comply with condition L7.1(a) to L7.1(d), Sydney Water implements a quality management system (QMS) certified to ISO 9001:2015 for the hydraulic sewer system modelling processes. Quality assurance includes surveillance audits for select procedures and a technical management review of all models. Each year, prior to a hydraulic sewer model being used to predict the overflows for the reticulation system, it must be adjusted to reflect changes in the real world and recalibrated if significant changes have occurred. The new model is checked for accuracy and classified in accordance with the accuracy achieved. The modelled performance of the Mill Stream overflows reported in this document adheres to this process.
- PRP 307: Wet Weather Overflow Pollution Reduction Program The PRP requires Sydney Water to reduce the impact of wet weather overflows across the licensee's four major coastal reticulation systems by undertaking abatement works at prioritised sites. As part of the risk based regulatory approach overflows are assessed for risk (ecological and public health), overflows with the highest risk are then prioritised for works. The Mill Stream overflows have been assessed as high risk (2024-2030 risk profile) and are therefore a priority. The Wet Weather Overflow Abatement program primarily utilises source control work, as detailed in 6.1.2.

In addition to the regulatory responsibilities detailed above, Sydney Water has a key role in the implementation of the Greater Sydney Water Strategy (2022). A commitment Sydney Water has made in support of the strategy is to 'Invest in wastewater and improve waterway health', improving the wet weather performance of our assets is a critical activity to achieve this outcome.

1.2 Purpose of this EMP

This EMP has been prepared to support an application for a new Authorisation to operate the ERS. Clause 5.07 of the AEPR states:

5.07(3) An application must be supported by an environment management plan detailing the actions that the applicant proposes to take, during the period for which the Authorisation has effect:

a) that the applicant expects will ensure that pollution emissions overall are not more environmentally damaging than would be the case if exact compliance with the accepted limits mentioned in the Schedules were achieved; or



b) if the applicant believes the outcome described in paragraph (a) can be achieved only by incremental improvements over a greater period of time—to make satisfactory progress toward achievement of that outcome.

As per Clause 5.07(3)(b), Sydney Water is committed to incremental improvements towards improved compliance with Schedule 2 water quality requirements. This EMP sets out all the actions to be implemented to minimise adverse environmental impacts of the ERS and achieve improved compliance with Schedule 2. The main environmental risks from the operation of the ERS are associated with water quality impacts on the receiving waterway during and following overflow events. Sydney Waters Environmental and Ecological Assessment Report (Sydney Water, 2021) documented a comprehensive assessment of the potential impact of the Mill Stream overflows on the receiving environment and waterway values. The report also assessed the statutory considerations, stakeholder environment and the risk of bird strike, which helped inform the development of the Mill Stream EMP (current and previous).

Whilst not included in the Schedule 2 limits, the Mill Stream overflows can result in the emission of gross pollutants (wet wipes, paper, hygiene products). A reduction in overflow activity and the implementation of wastewater screening will significantly reduce the generation of this pollutant, in line with regulation 4.01 of the Airports (Environment Protection) Regulations 1997. Sydney Water will continue to inspect and clean up any gross pollutants observed post overflow event.

Water quality analysis includes assessment against the Australian and New Zealand guidelines for fresh and marine water quality (ARMCANZ/ANZECC 2000 and ANZG 2018), where possible. The NSW Department of Planning and Environment's (DPE) Beachwatch program routinely monitors water quality at Foreshores Beach, providing a consistent measure that can be referenced when assessing the receiving environment and overflow influence.

This EMP focuses on the near-term actions to be implemented during operation of the ERS over the 2024 – 2027 Authorisation period. Some of the actions take many years to implement and so they have been carried forward from the last EMP and some will extend beyond this EMP. The EMP also covers longer-term strategic work currently being progressed for the Mill Stream ERS and the Malabar wastewater system.

The specific objectives of the EMP are to:

- review and manage identified environmental risks from the operation of the ERS to the receiving environment
- specify requirements on how environmental safeguards will be implemented to
- improve the operation of the Mill Stream ERS and water quality within Mill Stream and Foreshores Beach
- define responsibilities and reporting lines for implementation
- provide clear and appropriate performance indicators for the delivery and completion of EMP actions
- define the reporting and meeting requirements
- meet the requirements of the Authorisation



1.3 Site description

1.3.1 Waterway

The Mill Stream is a lined stormwater channel that contains a mixture of water flowing over the Mill Pond weir and the tidal waters of Botany Bay. The weir separates the tidal Mill Stream from the upstream freshwater Mill Pond and Engine Ponds. Mill Stream is a tidal waterway with a largely urbanised upstream catchment carrying stormwater from residential, commercial, and industrial areas. The Mill Stream is an environmentally significant area, as identified in the Sydney Airport Environmental Strategy 2019-2024 (Sydney Airport, 2019). Sydney Water's activities to reduce the activity and impact of the Mill Stream ERS on the receiving environment supports the objectives of this strategy.

The Mill Stream joins Botany Bay at Foreshore Beach, which is between the third runway at Sydney Airport and the Port Botany Container Terminal. Foreshores Beach is used for public recreation including swimming and fishing. Foreshores Beach swimming suitability grade was 'Very Poor' in the 2023 State of the beaches report (NSW DPE, 2023), as it was the preceding year. Results from the Beachwatch sampling and Sydney Waters monitoring program indicate the Mill Stream overflows influence water quality and the swimability of Foreshores beach during and following wet weather. The Port Botany Container Terminal is a key shipping port with a number of ships regularly entering and leaving the area. The site is on land mapped as acid sulphate soil impacted land.

1.3.2 Heritage

There are currently no identified Aboriginal sites or places of significance within the airport land and the potential for unknown finds is low due to the highly disturbed nature of the site.

Sydney Airport is recognised for its Commonwealth heritage value as one of the oldest, continually operating airports in the world. The Airport's Heritage Management Plan (GML, 2018) lists three items of exceptional heritage significance within the airport site being: Keith Smith Avenue, main north-south and east-west runways and Mill Pond/ Mill Stream.

The Botany Water Reserves are listed in the State Heritage Inventory (SHR 01317) and the listing includes the freshwater sections of the Mill Stream and various ponds that made up Sydney's third drinking water supply system. The tidal saltwater section of the Mill Stream that was heavily modified during the construction of Sydney Airports third runway is not included in the heritage listing (Figure 1-3).

The State Heritage Inventory listing also notes other important surviving elements of nonindigenous heritage that relate to the wastewater system including:

• Sewage Pumping Station no. 38 (1916) near the engine house ruins



- Part of the Southern and Western Suburbs Ocean Outfall Sewer System (SWOOS) No's 1 and 2 mains
- 1915 Sewer Pumphouse
- Twin sewer inverted syphons and easements (this relates to the twin sewer syphons under the Cooks River)
- Syphonic Overflows (relates to the syphonic ERSs that are the subject of this application.



Figure 1-3 Area covered by the Botany Water Reserves listing in the State Heritage Inventory

1.3.3 Ecology

The vegetation on airport land between Foreshore Drive and Mill Stream is mapped as Coast Banksia-Coast Wattle Dune Scrub, Sydney (Sydney Airport, 2019). However, the Airport site in general provides refuge for birds and several fish species which have been recorded in Mill Stream. Botany Bay is listed as key fish habitat under the Fisheries Management Act 1994. There are several protected/vulnerable/endangered and migratory species that have been recorded in the area or on land adjacent to the works, with majority of these species being highly mobile (e.g., the Pied Oystercatcher and the Little Tern) and unlikely to be impacted by the clean-up activities detailed in this EMP.



The potential environmental impacts from operation of the ERS mainly relate to water quality and have been assessed in separate reports (Sydney Water, 2020 & 2024).



2 Legal requirements

2.1 Development and approval process

The SWSOOS and associated ERS is an existing wastewater system and has been in operation for over 90 years. No further planning approvals are required for the operation of the ERS under the NSW Environmental Planning and Assessment Act 1979 (EP&A Act).

2.2 Statutory obligations and requirements

The key statutory obligations and approvals required for operation of the existing ERS are listed in the following table.

| Activity requiring approval | Legislation, licences | Licence/ Approval | Authority | Date required | Date obtained | Reporting requirements |
|---|---|---|-----------|------------------|----------------------|------------------------------------|
| Operation of ERS exceeding Schedule 2 | Airport (Environment Protection) Regulation 1997 | Authorisation 2024-2027 | DITRDCA | 31/03/2024 | TBC | EMP annual compliance report |
| Operation of wastewater system (Malabar) | Protection of the Environment Operations Act 1997 | Environment Protection Licence (372) | NSW EPA | - | Issued 25/05/2000 | Annual returns |

Table 1 Statutory obligations and approvals



3 Mill Stream ERS operations

3.1 Mill Stream ERS

The Mill Stream ERS should only be operational following rainfall. Normally, this would result from rainfall occurring across the Malabar wastewater catchment. The dilution of the wastewater discharged during overflow events increases from about 1 part wastewater to 0.5 parts stormwater (i.e. 1 in 1.5 diluted or two thirds wastewater) for small discharges to 1 part wastewater to 1 part stormwater (i.e. 1 in 2 diluted or half wastewater) for large storm events. These dilutions are variable and recent improvements to the wastewater network may result in larger dilutions, greater than 1 in 2. The SWSOOS contains both domestic wastewater and licensed trade waste inputs from industrial and commercial premises (including Sydney Airport and Airservices facilities).

The Mill Stream ERS are continuously monitored by Sydney Water. Sydney Water's Systems Operations Control (SOC) operates 24 hours a day 7 days a week and will initiate a response to overflow events.

3.2 ERS operational performance

The Mill Stream ERS discharges at an average modelled frequency of 13 events per year and overflow volume of 1,238ML/yr. This has been improved from the 2020 performance of 19 events per year and an overflow volume of 3,094 ML/yr. The target performance of the Mill Stream overflows on 31 March 2027 is expected to be 12 events per year and an overflow volume of 1,115 ML/yr. The Mill Stream plan on a page (Figure 3-1) summarises the improvement in overflow performance since 2020 and the future targeted performance dependant on the completion of key actions documented in this EMP. The expected improvement during the 2024-2027 period will be limited, however there is investment in actions that will achieve greater improvement from 2029 onwards. Significant step wise improvements in overflow performance can only be fully realised and measured when major asset works are completed. The SWSOOS2 desilting, source control packages and the preferred long-term augmentation option for the Malabar system will provide these improvements. While these projects will see significant investment and effort during the 2024-2027 authorisation period, they will not be completed. The Mill Stream overflows are large and are located at a crucial juncture point of the Malabar system. As the improvement level is incrementally reduced, the time, resources and complexity required to achieve continued improvement increases.

The overflow activity at the Mill Stream ERS is weather dependent. Rainwater entering the wastewater network is highly variable and depends on multiple factors, including the location, amount and timing of rainfall, rate of inflow and infiltration into the sewer network and domestic water usage. For these reasons, Sydney Water cannot accurately predict when or how much rainfall will trigger the ERS and cause overflows. To track the progress of EMP actions and to work towards incremental environmental improvement, Sydney Water has wastewater models that replicate the system performance.



The wastewater models need to allow for the performance of a system to be tracked through time independently of changes in performance from year to year due to climate. Each year the model is updated with growth or changes in the geometry or operation of the system. The model is then recalibrated using rainfall and sewer flow and level data and validated with collected overflow data, this is conducted annually. The model is then used to simulate the performance using a designated 10 year weather period 1985 to 1994, that is a fair representation of long-term climatic variation to predict 'long term average performance'. To track performance the singular average is used, however the model reflects the natural variation that would occur with dry and wet years, included in Figure 3-2. This is the modelling approach used to assess compliance with Sydney Water's EPLs (as detailed in section 1.1).



Figure 3-1 Mill Stream plan on a page (page 1)

U









KEY Modelled data range: S 2020 actual (a wet year) Wet Year Average Year Dry Year Dry Year

| Scenarios modelled: | | | | | | |
|--|--|--|--|--|--|--|
| A – Baseline (2020) | | | | | | |
| D – Flow balancing (2023) | | | | | | |
| F – After SWSOOS 2 desilting (2029) | | | | | | |

I.1 – Release to Georges River (preferred)

I.2 – SWSOOS rising main (alternative)

G+H+I – I.1 or I.2 + improved source control and silt management, beyond Business As Usual

Notes on Long-Term options:

In 2032, Mill Stream improves largely <u>as a result of</u> on-going source control and silt management. Results from I.1 and I.2 are similar. Following 2032, improvements at Mill Stream could be achieved by silt management that is better than business as usual, which could be facilitated by improved cleaning regime at the Grit Pits, currently located in airport land.

Figure 3-2 Mill Stream plan on a page (page 2)

4 Roles and Responsibilities

The accountability for the Mill Stream Authorisation sits with the Head of Business, Wastewater and Environment. A Mill Stream Project Team provides the governance, assurance of compliance and collation of content for reporting against the actions within the EMP. The key responsibilities are assigned to multiple business units to deliver projects and maintain compliance with the Authorisation and EMP, these are summarised in Table 2 and are also detailed against each respective action Table 4.

| Sydney Water Businesses supporting delivery of the EMP | | | | | |
|--|---|--|--|--|--|
| Head of Wastewater & Environment | Ensures that Sydney Water fulfils its regulatory obligations and meets customer expectations, including accountability for Sydney Water compliance with the Mill Stream Authorisation Oversee the application process and monitors the delivery of actions under the EMP | | | | |
| | Manages overflow reporting and stakeholder forums and meetings | | | | |
| Head of System & Asset Planning | Ensures planning studies are conducted for solutions for Mill Stream ERS and Malabar system, including source control works | | | | |
| Head of Program Delivery | Ensures capital work projects are designed and constructed to meet their required objectives (e.g. desilting and source control works) | | | | |
| Head of Major Projects | Development of the Malabar System Investment Program Strategic Business Case | | | | |
| Head of Customer Hub | The Systems Operations Centre (SOC) monitors and controls the Mill Stream ERS on a 24/7 basis using IICATS (telemetry system) | | | | |
| | Coordinate notification and response teams, sends work instructions for overflow events and odour complaints | | | | |
| | Environmental Liaisons respond and coordinate feedback and complaints relating to the ERS (including material harm incidents) | | | | |
| Head of Operational Technology | Conducts wastewater system monitoring and performance reporting | | | | |

Table 2 Sydney Water business units supporting delivery of the EMP

| Sydney Water Businesses supporting delivery of the EMP | | | | | | |
|--|--|--|--|--|--|--|
| Head of Specialised Services | Manages grit pit hardstand and maintenance activities | | | | | |
| Head of Work Programming & Optimisation | Ensures correct measures and resources are available for environmental incidents and alignment to EMP objectives | | | | | |
| Head of Network Operations | Implements and ensures correct measures and resources for environmental incidents and EMP activities | | | | | |
| Head of Network Maintenance | Implements correct measures and resources for environmental incidents and EMP activities | | | | | |
| Head of Laboratory Services | Conduct water and air quality monitoring and reporting | | | | | |
| Head of Government, Stakeholder and Community | Maintain relationships with regulators, government, Sydney Water's customers and the public Ensures platforms for stakeholders to interact with Sydney Water on Mill Stream are available (e.g. Sydney Water Talk Mill Stream page) | | | | | |

4.1.1 Complaints management

Complaints will be handled in accordance with Sydney Water processes and recorded in the Sydney Water Customer Relations Management (CRM) system. Complaints related to the operation of the Mill Stream ERS will be recorded and reported in the Annual Compliance reports and during quarterly Stakeholder Reference Group (SRG) meetings.

4.1.2 Overflow management

Sydney Water has developed a specific work instruction (Sydney Water document ID: D0001845.01) for the inspection and clean up tasks following all overflow events at Mill Stream. The work instruction compliments the existing Sydney Water processes for reporting, responding and remediating incidents. The area that is to be inspected and cleaned up is shown in Figure 4-1. The inspection and cleanup process is summarised below in Table 3.

Sydney Water periodically audits and reviews the work instruction to ensure alignment with commitments, regulatory responsibilities and to look for opportunities to improve processes.



| Wet weather overflow clean-up Work Instruction | | | | | | | |
|---|---|--|--|--|--|--|--|
| Notification | • An alarm in IICATS (telemetry monitoring system) will cease and trigger a manual job to be created within Sydney Water's Systems Operating Centre (SOC). | | | | | | |
| | Alerts are sent via SMS to relevant Sydney Water personnel and external stakeholders. | | | | | | |
| | The job must be inspected within two days after the overflow ceases near low tide (rainfall, tide and daylight permitting). | | | | | | |
| A Network Technician (NT) will attend and assess Mill Stream a Foreshores Beach (Figure 1-2) to determine if a clean-up is required including an assessment of Material Harm (duty under the POE 1997). | | | | | | | |
| Remediation | If a clean-up (material harm) is required, maintenance personnel and subcontractors will remove gross pollutants such as wipes, syringes, rags, sanitary products and rubbish from identified areas at low tide. Where syringes are found, this is documented for reporting purposes. | | | | | | |
| | Gross pollutants will be stored in sealed bags atop a waterproof membrane (e.g. tarpaulin) and the volume of debris is recorded, photos of the site and clean up are to be taken as supporting material. | | | | | | |
| | Network Operators (NO) ensure that the clean-up is conducted according to the work instruction and that all requirements of the EMP are followed at site | | | | | | |
| Validation | When a clean-up is complete, a NO will attend and validate the site, bacteriological results from Laboratory Services are then used to evidence if the incident can be closed (when results are not representative of wastewater contamination) | | | | | | |
| | If there is no further evidence of material harm, the NO will close the incident in Maximo (Sydney Water's work order management system). | | | | | | |
| Reporting | • The Wastewater and Environment team review and report to the Airport Environment Officer (AEO) the volume of gross pollutants removed from Foreshore Beach (m ³) and keep records of each incident's duration and number of syringes observed and removed. | | | | | | |

Table 3 Mill Stream overflow inspection and clean-up process



In the event of material harm and/or dry weather overflow, Sydney Water's Pollution Reduction Incident Management Plan (PIRMP) will be enacted, and the following authorities immediately notified (in this order):

- 1. the EPA on Environment Line ph: 13 15 55
- 2. Ministry of Health ph: 9391 9939 (office hours); 0491 227 423 (after hours)
- 3. SafeWork NSW ph: 13 10 50
- 4. Bayside Council ph: 9562 1666
- 5. Fire and Rescue NSW ph: 1300 729 579 (emergency only 000).

The Sydney Water's Environmental Liaison Officers are responsible for notifying the above authorities regarding notifiable pollution incidents and the ongoing management of information. Sydney Water will notify the AEO and SYD of a material harm incident being declared within one business day, where possible this will be completed on the day that the incident response starts.



Figure 4-1 Location map indicating area of concern for Mill Stream overflow inspection and cleanups



5 Communication and engagement

5.1 Stakeholder engagement

5.1.1 Stakeholder Reference Group

Since January 2020 when the Mill Stream SRG was established, the group has been meeting quarterly to ensure key stakeholders contributed to the EMP. The SRG members include representatives from Sydney Water, DITRDCA, Bayside Council, Sydney Airport, Port Authority and the NSW EPA.

At the SRG meeting in October 2023, Sydney Water discussed the plans for the next Authorisation for members to provide their inputs and views.

Sydney Water will continue quarterly meetings with the SRG in the next Authorisation period, from April 2024 to March 2027. For more information on the SRG, refer to section 6.7.2.

5.1.2 Engagement with other stakeholders

Sydney Water developed a Stakeholder Engagement Plan for supporting extensive engagements with key stakeholders throughout the Authorisation period. Sydney Water provided updates on EMP actions, and near and long-term plans for Mill Stream in the next Authorisation period through the following engagements:

- Site tour with Bayside Council Mayor, General Manager and Councillors of the Mill Stream overflow location and the Malabar WRRF (January 2023).
- Meetings with Bayside Council Mayors Christina Curry (2021/22/23) and Bill Saravinovski (October 2023) and General Manager Meredith Wallace (2021/22/23).
- Correspondences and meetings with Members of Parliament (local and federal) including Federal Member for Kingsford Smith, the Hon. Matt Thistlethwaite, Member for Heffron, the Hon. Ron Hoenig MP and Member for Maroubra, the Hon. Michael Daley MP (2021/22/23)
- Quarterly meetings between Sydney Water's Managing Director and Chair and Sydney Airport's CEO and Board Director.
- Establish a Hydraulic Improvement working group with Sydney Airport, Port Authority and Bayside Council to explore options for improving tidal flushing in Mill Stream.
- 2024-27 Authorisation meetings with the DITRDCA which commenced in May 2023.

In July 2023, Sydney Water met with Sydney Airport to discuss the potential for overflows from Mill Stream to increase bird strike risk. Sydney Water also met with the Minister for Water, Rose Jackson and Sydney Airport CEO in September 2023 to discuss the Airport's concerns and the work we're doing to improve outcomes at Mill Stream for both the near- and long-term.



In November 2023, Sydney Airport set up a Project Control Group (PCG) with Sydney Water to facilitate ongoing and upcoming Sydney Water projects needing Sydney Airport's involvement or support. The PCG held its first meeting in November 2023 and will meet each month.

Sydney Water will continue working with key stakeholders through proactive, timely and meaningful engagements in the next Authorisation period.

5.1.3 Community engagement

Sydney Water's Community Engagement team has engaged with several community groups that have an interest in Mill Stream, ahead of submitting our next Authorisation including:

- Correspondence with Botany Public School
- Meeting with Cooks River Alliance Executive Committee
- Facebook updates to over 20,000 residents in Mill Stream surrounding areas including La Perouse, Little Bay, Chifley, Malabar, Matraville, Botany, Banksmeadow, Mascot and Pagewood. The advert provided a link to the dedicated Mill Stream page on the Sydney Water Talk website: www.sydneywatertalk.com/millstream.
- <u>Sydney Water Talk web page</u> providing progress on works and plans and the contact details of our Community Engagement team for any questions and feedback.

During 2020-21, Sydney Water surveyed 6,800 local community members to assess nuisance odour in the area around Mill Stream, within the directly neighboring suburbs of Botany and Banksmeadow. Findings showed that odour was mainly from fugitive emissions from the SWSOOS trunk sewers and not related to overflow events into Mill Stream. Sydney Water completed works to rectify the odour issues arising from the SWSOOS trunk sewers in March 2023.

Sydney Water will keep the community informed on updates and plans for improving the Mill Stream overflow performance during this Authorisation period.



6 Environmental management plan

The objectives of the Environmental Management Plan (this document) and Sydney Water's proposed actions to fulfil them are detailed in the following section. Many of the actions in this EMP are continued from the last Authorisation period. Due to the complexity and resources required to complete them, timeframes extend beyond the scope of an individual Authorisation period.

The actions detailed in this EMP seek to reduce risk of adverse impacts from the operation of the Mill Stream overflows on the environment and public health. The EMP doesn't include an action specific to bird strike, however, there are a series of actions that seek to reduce the potential risk and was a key objective in the development an inclusion of those actions. This includes the actions to provide a stepwise improvement in overflow performance, wastewater screening, hydraulic improvement plan and the continued inspections and clean ups after every overflow event.

The following short-term actions were completed during the 2021-2024 Authorisation period, and are no longer required in the current EMP.

- SWSOOS1 desilting
- Flow balancing trials
- Preparation of Work Instruction for clean-up activities
- Option investigation for screening at the Airport site
- Planning and trial for aeration technology within Mill Stream waterway
- Odour surveying and proactive community engagement (engagement detailed in Section 5)

Table 4 provides a summary of the objectives, actions and performance indicators which will either begin or continue during the 2024-2027 Authorisation period. The following sections provide more information about each action, including where actions will continue beyond the current authorisation period.

| Objective | Action | Timeframe | Business Unit responsible | Performance indicator/s |
|--|--|---|--|---|
| Objective 1 Increase capacity of the wastewater system to reduce frequency and | Action 1.1 Desilt SWSOOS 2 - SP0038 to Malabar WRRF See section 6.1.1 | Planning started - March 2027 | Program Delivery | Procurement and contract award to be completed by December 2024 15% (1.35km) desilted December 2025 35% (3.15km) desilted December 2026 40% (3.6km) desilted by March 2027, achieve overflow performance of 12 events/year and 1115 ML/year |
| volume of overflow | Action 1.2 Implement source control for the Malabar system to reduce wet weather inflows into the SWSOOS See section 6.1.2 Action 1.3 | Started – March 2027 April 2024 – March 2027 | System and Asset Planning Program Delivery Specialised Services | Prospect, GPOP, Lower NGRS/Cooks and Lower Georges River catchment completed by June 2025 Completion of further WWOA stages as indicated in Appendix A and to be reported in Annual Compliance reports Grit Pit Hardstand constructed November 2024 |
| | Conduct Grit Pit Maintenance See section 6.1.3 Action 1.4 Implement Malabar Strategic Business Case (SBC) – network augmentation preferred option See section 6.1.4 | 2026 | Major Projects System and Asset Planning | Achieve 8 maintenance cycles each 12 month period Increase tonnage removed per quarter Confirmation of decision point on preferred network augmentation 2026 Confirmation that Sydney Waters IPART pricing submission includes network augmentation funding allocation |

Table 4 Mill Stream environmental management plan summary

| Objective | Action | Timeframe | Business Unit responsible | Performance indicator/s |
|---|---|-------------------------------|------------------------------|---|
| | Action 1.5 Botany Low Level Carrier Rehabilitation | April 2024 – December 2024 | Program Delivery | Completion of all operational works by December 2024 Provide increased storage when wastewater screens are operational |
| | See section 6.1.5 | | | |
| Objective 2 Feasibility of Grit Pit relocation | Action 2.1 Conduct a feasibility assessment for the relocation of the SWSOOS Grit Pits See section 6.2.1 | Started – June 2024 | System and Asset Planning | Report submitted to AEO by 30 June 2024 and present findings at the following SRG |
| Objective 3 Hydraulic Improvement Plan (HIP) | Action 3.1 Chair Hydraulic Improvement Leadership Group (HILG) See section 6.3.1 | Ongoing | System and Asset Planning | Quarterly meetings conducted to support implementation and completion of Phase 2B and 3 |
| | Action 3.2 Conduct HIP Phase 2B See section 6.3.2 | June 2024 – February 2026 | System and Asset Planning | Cost sharing agreement in place June 2024 Studies conducted and report submitted to AEO by February 2026 Progress of activities will be provided in Annual Compliance reports |

| Objective | Action | Timeframe | Business Unit responsible | Performance indicator/s | | | | |
|---|---|----------------------------------|--|---|--|--|--|--|
| | Action 3.3 Conduct HIP Phase 3 See section 6.3.3 | February 2026 – December 2026 | System and Asset Planning | Cost sharing agreement in place February 2026 Works completed and detailed in a final report delivered to AEO by December 2026 | | | | |
| Objective 4 Protect the environment and public health | Objective 4 Action 4.1 Ongoing Protect the environment and public health Inspect Mill Stream and Foreshores Beach after all overflow events and remove gross pollutants See section 6.4.1 | Ongoing | Network Maintenance Customer Hub Work Programming and Optimisation | All inspections initiated correctly and adhere to Work Instruction – Mill Stream/Foreshore Beach wet weather clean-up Inspections within 2 days of a discharge event ceasing and next daylight low tide Volume of gross pollutants collected in m ³ /event AEO and SYD notified of all material harm incidents within one business day | | | | |
| | Action 4.2 Implement wastewater screening at Airport site See section 6.4.2 | Started – December 2026 | Program Delivery | All works completed and screening implemented by December 2026 Completion of project stages as indicated in Appendix A and to be reported in Annual Compliance reports | | | | |
| | Action 4.3 Maintain permanent signage at Foreshore Beach See section 6.4.3 | Ongoing | Network Maintenance Work Programming and Optimisation | Permanent signage maintained at Foreshore Beach, all overflow inspections to include signage checks External review of public health content and language to be completed and implemented if required by October 2024 | | | | |
| | Action 4.4 Ensure all maintenance personnel and contractors are aware of threatened species fact sheets See section 6.4.4 | Ongoing | Network Maintenance Customer Hub Work Programming and Optimisation | No impact to threatened bird species, fact sheet included in Work Instruction – Mill Stream/Foreshore Beach wet weather clean-up | | | | |

| Objective | Action | Timeframe | Business Unit responsible | Performance indicator/s |
|--|--|-----------|--|---|
| | Action 4.5 Store gross pollutants appropriately during clean-ups See section 6.4.5 | Ongoing | Network Maintenance Work Programming and Optimisation | All waste correctly stored prior to disposal, evidenced by clean up photos and reports |
| | Dispose of gross pollutants appropriately See section 6.4.6 | Cirgoing | Maintenance Work Programming and Optimisation | |
| Objective 5 Monitor wastewater system performance, odour and receiving | Action 5.1 Conduct continuous overflow monitoring and routine monthly reporting See section 6.5.1 | Ongoing | Wastewater and Environment Operational Technology | All monthly reports provided to AEO and SYD |
| waterway health | Action 5.2 Provide overflow alerts to AEO and Sydney Airport representatives See section 6.5.2 | Ongoing | Operational Technology | SMS overflow alerts are received for all overflows |
| | Action 5.3 Monitor the dry weather sewage capacity in the SWSOOS See section 6.5.3 | Ongoing | Operational Technology Wastewater and Environment | Minimum wastewater level for a rolling 6-month period is maintained at 0.45m |

| Objective | Action | Timeframe | Business Unit responsible | Performance indicator/s |
|--|---|----------------------------------|-----------------------------|---|
| | Action 5.4 Monitor water quality at Mill Stream See section 6.5.4 | April 2024 – July 2025 | Laboratory Services | Monitoring is completed and final report delivered July 2025, including recommendations for future monitoring options |
| | Action 5.5 Air quality monitoring (H ₂ S) near discharge location See section 6.5.5 | October 2024 – September 2025 | Laboratory Services | Monitoring completed and results reported by September 2025 |
| Objective 6 Conduct effective complaint management | Action 6.1 Respond to and investigate all complaints regarding the Mill Stream ERS See section 6.6.1 | Ongoing | Customer Hub | Response provided to complainant within 2-5 working days Complaints recorded and included in annual report |
| Objective 7 Progress Reporting | 7.1 Provide Quarterly Update Report See section 6.7.1 | Ongoing | Wastewater & Environment | Reports submitted to the AEO within 21 days of each quarter ending |
| | 7.2 Chair Quarterly Stakeholder Reference Group (SRG) meeting See section 6.7.2 | Ongoing | Wastewater & Environment | SRG conducted within 4 weeks of the quarter ending |

| Objective | Action | Timeframe | Business Unit responsible | Performance indicator/s |
|-----------|---|-----------|-----------------------------|--|
| | 7.3 Provide Annual EMP Compliance Report See section 6.7.3 | Ongoing | Wastewater & Environment | Annual Compliance Report submitted by 31 December for each year of the Authorisation |

6.1 Objective 1 – Increase capacity of the wastewater system to reduce frequency and volume of overflow

The most effective way for Sydney Water to improve the Mill Stream ERS performance over time and comply with the requirements of Airports (Environment Protection) Regulation 1997 is to increase the capacity of the wastewater system through desilting, grit removal and reducing the ingress of stormwater into the wastewater system. The actions below outline how and when Sydney Water will achieve periodic reductions in the frequency and volume of overflow discharges.

The actions that are detailed under Objective 1 will deliver the targeted 2032 average frequency of between 4-8 events per year and a reduced overflow volume of between 155 and 774ML/yr. The volume reduction from source control works, increased grit removal and combined benefit with the Malabar SBC preferred network augmentation is difficult to predict and model for the benefits assumptions. However, Sydney Water is confident that these works will result in significant benefit to the performance of the Mill Stream ERS.

6.1.1 Action 1.1 - Desilt SWSOOS 2 – SP0038 to Malabar WRRF

The SWSOOS desilting is one of the key activities Sydney Water is undertaking to improve the performance of the Mill Stream overflows, the extent of the desilting works is shown in Figure 6-1, and detailed delivery timeframes are presented in Appendix A – Detailed delivery timeframes. The SWSOOS barrels are some of the largest and most significant wastewater assets in Sydney Water's operational area, approximately one third of Sydney's population's wastewater travels through them each day. To carry out the desilting, the barrel needs to be isolated from all flow, with wastewater flow redirected to the other barrels so that staff and equipment can enter. The desilting of SWSOOS1 was completed in May 2023.

Detailed planning for SWSOOS2 could only begin once the SWSOOS1 desilting and flow balancing trials were completed and implemented. Planning involves flow isolation trials in varying conditions to enable the development of flow isolation management plans, which are crucial to the delivery process as well as personnel safety and environmental protection. Site mobilisation and flow isolation and flow management (FIFM) is to occur in the second half of 2024 and early 2025. Silt removal and essential rehabilitation works will commence after these planning stages are completed in early 2025, approximately 9km of SWSOOS2 will be desilted (4.5km in each barrel).

The expected completion date for the project is June 2029, with site decommissioning activities to be finalised in September 2029. This timeframe was revised from the previous EMP, due to the SWSOOS1 delay and an increase in project scope. At the end of this authorisation period (March 2027), it is expected that 40% (3.6km) of the desilting work will be completed, and achieve average overflow performance of 12 events per year and an overflow volume of 1115 ML/yr. The progress will be measured against the distance of SWSOOS2 that is desilted. At the completion of all works it is estimated that approximately 7,300 tonnes of silt will be removed from the two SWSOOS2 barrels. At the completion of the desilting, in 2029, the improved average performance of the Mill Stream overflows will be 10 events per year and an overflow volume of 928ML/yr.



Desilting cannot occur in the SWSOOS following rainfall, increased flow doesn't allow for safe and efficient isolation of the work area. The SWSOOS1 desilting works experienced significant delays, with approximately 170 stand down days from wet weather alone. Wet weather remains a significant risk to the delivery of the SWSOOS2 project.





6.1.2 Action 1.2 - Implement source control for the Malabar system to reduce wet weather inflows into the SWSOOS

Source control works reduce the amount of stormwater entering the wastewater system and reduce the frequency and volume of overflows from ERSs. These works will be conducted in sewer catchments across the Malabar system and will be crucial to the medium to long term improvement of the Mill Stream ERS. The source control works are conducted in three stages, described in Table 5. The stages will progress concurrently and not all stages are implemented in every sewer catchment area.

There are works currently underway or planned for completion through to 2030. The Malabar system is large and necessitates extensive works across multiple sub-catchments, upstream of the Mill Stream overflows, to enable observable benefits at Mill Stream. The planned works will also see localised benefits, with reduced overflow frequency and volumes at ERS that discharge to the Georges and Cooks River catchments.

| Source Control Stage | Definition |
|--------------------------------|--|
| Stage 1 – Inflow management | Prevention of stormwater inflow at ERS principally by installing inflow (backflow) prevention valves on the overflow pipeline. These valves prevent stormwater that is backing up in the stormwater system from flowing into the wastewater system via overflow discharge pipelines. |

Table 5 Source control stages



| Stage 2 – Infiltration management | Prevention of stormwater infiltration through faulty and damaged pipes and maintenance holes. This stage targets assets that are in high infiltration areas. The works include inflow prevention at maintenance chamber lids. |
|---|--|
| | The works include pipe lining, maintenance hole repairs and installation of anti- inflow devices (rain stoppers) under the lids of maintenance holes. The maintenance holes targeted for inflow prevention are those that become flooded during rainfall because they are low or located in stormwater flow paths. |
| Stage 3 – Private properties | Prevention of inflow and infiltration to private sewer pipes. The work uses smoke testing and property inspections to identify issues and correct faulty and defective private property connections. The works include repairing and raising overflow relief gullies, redirecting roof drainage connections from the sewer to stormwater, and repairs to damaged private sewer pipelines. |

There are multiple source control projects currently underway that will benefit Mill Stream (Figure 6-2), these include:

- Prospect Catchment (Wet Weather Overflow Abatement (WWOA) 2020-2024) Stage 1 and 2 works have been completed and Stage 3 works are underway and will be completed in September 2024
- Greater Parramatta to Olympic Peninsula (GPOP Growth) planning is underway with works to begin early 2024 and will be completed in March 2025
- Lower Northern Georges River Submain (NGRS) and Cooks River Stage 1 works (WWOA 2020-2024) Project specifically initiated to address Mill Stream overflows. The project began in October 2023 and will be completed in June 2024
- Panania, Revesby, Padstow, Lugarno and Peakhurst work program (WWOA 2024/2025)
 planning is underway, and works will start in July 2024 and completion is expected in June 2025.

The 2025-2030 WWOA work program has conducted initial planning, that will support the Independent Pricing and Regulatory Tribunal (IPART) pricing submission. The resulting price determination will provide a final funding allocation, and this will be required before detailed planning can be completed. Sydney Water will submit its price proposal by 30 September 2024, evidence of the submission and allocation of WWOA funding will be provided to the AEO. Sydney Water will include specific completed works, benefits (where evidenced) and future detailed planning as part of the annual compliance reporting. More detailed delivery timeframes have been included in Appendix B for the proposed work program, due to the complex delivery across multiple regions only delivery up to June 2027 has been included.





Figure 6-2 Proposed WWOA source control works for the period 2024-2030 (pending IPART review)

6.1.3 Action 1.3 - Conduct Grit Pit Maintenance

Sydney Water's airport grit pits are located airside within Sydney Airport. The multi-compartment grit pits extend across all three barrels (SWSOOS1, SWSOOS2 North and SWSOOS2 South). Regular cleaning of these grit pits is essential to prevent grit accumulating further downstream, where it is difficult and costly to remove. Sydney Water can remove approximately 150 to 200 tonnes of grit from these pits each cycle. Effective and regular grit pit maintenance is crucial to the targeted medium to long term improvement of the Mill Stream ERS.

Sydney Water is committed to doing what it can to increase the grit pit maintenance cycles and significantly increase the tonnage of silt removed from the pits, targeting eight cleaning cycles every 12 months. However, access to the grit pits for maintenance and the cleaning process is complicated:

- requiring permits and safety escorts from Sydney Airport, availability of escorts has been challenging and has resulted in many shifts being missed or not completed
- can only be undertaken when the east west runway is not operating, resulting in mainly night work
- shifts generally include 5-6 working hours, and this includes equipment set up and removal from site which results in limited time for removing silt



- current work area is unsuitable for heavy vehicle access (required) and unsafe in wet weather
- takes one to two weeks to complete each cycle, dependant on weather and above limitations.
- during periods of high rainfall and increased flows within the SWSOOS grit pit cleaning isn't possible

Each cleaning cycle can take one to two weeks to complete, dependent on the factors detailed above. The planning and prioritisation of resources before starting the first cleaning shift can take a similar amount of time, currently resulting in at best one month for each cleaning cycle. To address these issues Sydney Water will be working with Sydney Airport to effectively work within the necessary but limiting conditions of work and entry and to construct a concrete hardstand to enable a safe and efficient work site (Figure 6-3). This will be pivotal to how successful Sydney Water will be in achieving its targeted improvement for grit pit maintenance.

Sydney Water received development approval to construct the hardstand in July 2023 and a request for works permit has been submitted and is awaiting approval. Sydney Airport has advised limitations on availability of their Work Safety Officers and Security escorts which will delay the start of this project, however Sydney Water will target a construction date completion in November 2024.



Figure 6-3 Grit Pits and hardstand locations

6.1.4 Action 1.4 - Implement Malabar Strategic Business Case – network augmentation preferred option

The short to long term strategy for the Malabar Wastewater System is documented in the Malabar System Investment Program Strategic Business Case (SBC). Sydney Water submitted the Malabar SBC to Infrastructure NSW (iNSW) on 31 December 2021. iNSW recommended Sydney Water to progress with near-term works, while the medium- and long-term planning be better aligned to Sydney Water's broader strategy, including the Greater Sydney Water Strategy and the Resilient and Reliable Water Supply planning.



The servicing direction outlined in Sydney Water's Long-Term Capital and Operational Plan (LTCOP) (published in 2023) is to disrupt west to east wastewater flow through decentralisation of our largest wastewater systems. We will build new rainfall independent water sources to use our resources more than once, particularly through purified recycled water (PRW). This will improve resilience, our ability to adapt to change, improve waterway health and reduce the cost of aging assets.

Since the iNSW Gate 1 Assurance Review, Sydney Water has progressed with projects to upgrade the western portion of the Malabar System while further refining planning for the medium- and long-term options around the system's eastern portion (SWSOOS, Malabar WRRF and the Deep Ocean Outfall). Sydney Water has reviewed population growth, completed hydraulic modelling in both dry and wet weather scenarios, and engaged with stakeholders to better understand challenges and opportunities, particularly around Sydney Airport and in Bayside and Randwick Local Council areas.

While progressing the options, Sydney Water's investigations showed that releasing highly treated water to the Georges River (system disconnection) or building a new SWSOOS pipeline from Arncliffe to Malabar (system augmentation) would cater for demand through to 2046. The modelling also showed additional benefits would be achieved with planned operational measures of in-catchment source control and SWSOOS desilting. These provide better value for money than the highly expensive deep tunnel from Arncliffe to Malabar or a new wet weather treatment plant at Mill Stream, both considered in the earlier SBC.

To align with Sydney Water's ambitions in the LTCOP and Greater Sydney Water Strategy, Sydney Water would ideally focus on system disconnection (release of highly treated water to Georges River). Sydney Water expects a determination on river release by 2026, at which point a decision would be made to pursue disconnection of the Georges River catchments or amplify the SWSOOS. The further work undertaken has demonstrated that a SWSOOS rising main is a constructable and feasible option and can be delivered in line with this timeframe.

Sydney Water will be submitting its price proposal to IPART by 30 September 2024, that will include funding allocation to support the planning and commencement of works to deliver which ever option is taken forward by 2026. Evidence of the submission and funding allocations will be provided to the AEO within 21 days. The preferred option is set to be delivered and operational by early 2032 and will contribute to overflow reduction for frequency of 4 to 8 events/year and volume 155-774ML/year. There are more detailed delivery timeframes presented in Appendix A – Detailed delivery timeframes.

This approach will ensure Sydney Water invests at the right time to manage risk and build greater resilience while maintaining the ability to adapt to change and support our ambition to maintain affordability for customers and intergenerational equity – social, economic and environmental.

The focus during this Authorisation period will be to undertake studies and planning related to release of highly treated water to the Georges River while refining options for augmenting the SWSOOS, allowing Sydney Water to make informed investment decisions that give regard to cost, risk, levels of service and future uncertainty.



6.1.5 Action 1.5 - Botany Low Level Carrier Rehabilitation

The Botany Low Level Carrier (Figure 6-4) is a disused gravity main that requires extensive rehabilitation work to avoid asset failure. However, once rehabilitated this asset can be used to increase wet weather storage at Sewer Pumping Station No 0038 (SP0038) at Mascot. Sewage will be accumulated in the sewer during times of high flow and when pumping flows to SP0038 for wastewater screening. The accumulated wastewater will then be allowed to discharge into the SWSOOS2 via the pumping station when the sewer flows have abated. The works will require full relining of the pipe sections and structural rehabilitation of the access chamber internal surfaces, manhole covers and raising of some buried access points to the surface. The increased storage during wet weather will provide improved performance of the Mill Stream ERS and the wastewater screens.

The initial site inspections and condition assessments are largely complete, however Sydney Water needs to complete the remaining on Sydney Airport land, this is pending approval. Once these are completed Sydney Water can commence operational delivery, with final asset commissioning and completion of works in December 2024, see Appendix A for more planning detail



Figure 6-4 Location of Botany LL Carrier



6.2 Objective 2 – Feasibility of Grit Pit relocation

6.2.1 Action 2.1 – Conduct a feasibility assessment for the relocation of the SWSOOS Grit Pits

Sydney Water's grit pits are located airside at Sydney Airport. Regular access is required to appropriately maintain the pits. As described above (Section 6.1.3), regular access is complicated and as a result, the previous EMP identified an action to assess the feasibility of relocating the pits off airport land. The findings of the assessment will be presented at the SRG and a report will be issued to the AEO by 30 June 2024.

This feasibility assessment is currently being undertaken. The initial investigation will assess the long list options, and with input from key stakeholders (Sydney Airport). The long list options include varied system and asset reconfigurations and locations (including airside and off airport land). Sydney Water must thoroughly assess all possibilities to ensure that the preferred option is an appropriate asset option and prudent investment. A preferred option/s and indicative cost is required before Sydney Water can commit to a further funding and planning pathway.

6.3 Objective 3 – Hydraulic Improvement Plan (HIP)

Opportunities to improve the hydraulic performance of the Mill Stream has been investigated and a delivery plan developed. By 30 June 2021, Sydney Water formed the Hydraulic Improvement Leadership Group (HILG) with representatives from Bayside Council, Sydney Airport, DITRDCA and the NSW EPA. In November 2021, the team expanded to include a representative from the Port Authority of NSW.

A Charter (Terms of Reference) for the team was established and meetings convened. Sydney Water completed a comprehensive review of management controls, data and assessment tools (models), and approval requirements. The review identified that detailed assessment will be required and that significant gaps in data and assessment tools exists. A detailed project plan was developed and endorsed by the Leadership Team. The work was split into three phases:

- Phase 1 Gap Analysis Desktop review and gap analysis for existing environmental information (data) to identify potential Hydraulic Improvement Plan (HIP) options and recommend specialist studies to close gaps, delivered December 2021 (Sydney Water 2021).
- Phase 2 Options Development Undertake studies and modelling to create a data baseline, refine HIP options (Sydney Water 2022).
- Phase 3 Implementation Commission and implementation of preferred HIP option(s), using baselines to measure success, conduct environmental impact assessment, prepare the plan and obtain regulatory approval for preferred option(s).

In 2022-2023, the Phase 1 and 2A studies were completed and reports were shared with the HILG.



6.3.1 Action 3.1 - Chair Hydraulic Improvement Leadership Group (HILG)

Sydney Water will chair, plan and minute the HILG meetings at a quarterly cadence to support the completion of Phase 2B and 3 works. The meetings will be reliant on the attendance of all parties involved in the required cost sharing proposal (and identified key stakeholders), to endorse ongoing actions.

6.3.2 Action 3.2 - Conduct HIP Phase 2B

The timing and potentially the scope of Phase 2B is dependent on the achievement of a costsharing agreement between the HILG member organisations.

The work included in Phase 2B will include:

- detailed sediment contamination characterisation
- development and refinement of the water quality and hydrodynamic model
- identification of the preferred option and production of technical scope of work, drawings and technical specifications for procurement
- characterisation of existing environment to inform environmental impact assessment, monitoring and mitigation measures e.g. seagrass and protected fish species.

The model modifications are expected to yield a more accurate prediction of the benefits of full and partial dredging, allow the inclusion of the effects of coastal processes occurring in Botany Bay off the mouth of Mill Stream, and thereby allow the impact of coastal engineering solutions to be assessed. The model improvements are expected to yield good estimates for the re-accumulation rate for sediments with each improvement option.

Sydney Water is seeking a cost contribution for Phase 2B from the members of the HILG. Sydney Water can only progress this phase with agreement and endorsement of all members of the HILG. A HILG meeting was held in May 2023 to discuss feedback from stakeholders on the report and to start a discussion of co-funding. Sydney Water will be working with cost sharing partners and the broader HILG to ensure that Phase 2B has momentum to commence in mid-2024, once legal agreements are in place. The studies will be completed, and a final report presented to the AEO February 2026.

6.3.3 Action 3.3 - Conduct HIP Phase 3 Implementation

The timing and scope for Phase 3 is dependent on the preferred option identified in Phase 2B, the achievement of a cost sharing agreement between the HILG member organisations and environmental and planning approvals. Sydney Water can only progress this phase with agreement and endorsement of all members of the HILG. Target dates for Phase 3 are commencement in February 2026 and completion with a final report submitted by December 2026. Given the dependence on the outcomes of Phase 2B no further details are available for the scope of works and activities to be implemented, an indication of the range of options is included in the report for Phase 1.



6.4 Objective 4 – Protect the environment and public health

As Sydney Water works to improve the performance of the Mill Stream ERS and reduce the frequency and volume of overflows, we will also look at all options possible to reduce the potential harm that could occur when the ERS are operational.

6.4.1 Action 4.1 – Inspect Mill Stream and Foreshores Beach after all overflow events and remove gross pollutants

After an overflow occurs Sydney Water will respond as previously detailed in Section 4.1.2, and as per Sydney Water's work instruction which was developed specifically for Mill Stream. Sydney Water crews will attend the site after every notified overflow event and assess whether gross pollutants are present, and a clean-up is required. Clean-up information and photographs are recorded in Sydney Water's incident and resource management systems. This information is regularly reviewed and provide essential data and information to support reporting and communications detailed in Section 6.5.1 and 6.7.

Sydney Water will attend the site until all gross pollutants are collected and safely removed from the Mill Stream and Foreshores Beach. A final inspection will be conducted by a suitably trained staff member before any incident is closed.

6.4.2 Action 4.2 - Implement wastewater screening at Airport site

The objective of wastewater screening is to reduce gross pollutants being transported via Mill Stream to Foreshore Beach in the event of a wet weather overflow and reduce the potential harm to public health and environment.

A feasibility and options study were completed in March 2023 to determine a suitable site and design for the screens. The study identified wastewater screening at Pump Station SP0038 was the preferred option. The proposed infrastructure aims to provide preliminary treatment of overflows by redirecting discharges through a screening system, to remove debris/rags prior to reaching Mill Stream. Importantly, Sydney Water had to ensure that the preferred option would not negatively impact overflow hydraulic performance.

The preferred option was assessed for effectiveness against the existing baseline (2020) modelled performance of the Mill Stream ERS, to identify the amount of overflow volume which would be screened. This is presented in Table 6. It is estimated that all overflow volume in smaller rain events will be screened, while in medium events (70%) and large events (40%) the volume that is screened reduces.

| | Screening Effectiveness (Flow Balance and Desilting completed) | | | | | | | | | | |
|----------------------------|---|-----------------------------------|------------------------------|--|--|--|--|--|--|--|--|
| Rainfall Scenarios | Smaller rain events (<30mm) | Medium rain events (30 – 50mm) | Large rain events (>50mm) | | | | | | | | |
| Screening effectiveness | 100% | 70% | 40% | | | | | | | | |

Table 6 Modelled screening efficacy during different rainfall events



The arrangement consists of an offtake structure from an existing ERS, with flows piped (under gravity) to SP0038. Within the dosing hall building (Building 571) a multi-rake screening system will be retrofitted within the existing inflow channels, with screened material being macerated and pumped back into existing wastewater trunk mains, downstream from the Mill Stream ERS The screened overflows will then gravitate (via designated overflow points) to existing stormwater assets, discharging into the Mill Stream (Figure 6-5).

Sydney Water has prepared the scope for site investigations and are now liaising with Sydney Airport to gain all the necessary access/permits to begin work. We expect to commence our site investigation works in early 2024 and on ground construction will begin in November 2025 and be completed in December 2026. Detailed delivery timeframes are provided in Appendix A.



Figure 6-5 Locations and design of wastewater screening configuration

6.4.3 Action 4.3 - Maintain permanent signage at Foreshore Beach

Sydney Water will continue to maintain and upgrade the permanent signage. The current sign content was upgraded during the previous Authorisation period to provide controls for public health risk while allowing beneficial uses to continue (Figure 6-6). Signage is installed at multiple locations where the community can access Mill Stream Lookout and Foreshores Beach. Locations need to be periodically moved due to changes to the physical environment. When Sydney Water attends clean-ups, staff will confirm that permanent signage is present and if damaged or removed will replace. During clean ups additional temporary signage is also included to ensure the community is aware of the potential risk. The public health advice provided on the signs has been developed in consultation with relevant public health experts from Beachwatch (Department of Climate Change, Energy, the Environment and Water, DCCEEW). Sydney Water will request



DCCEEW subject matter experts provide another review and will look at options to improve the content, such as reference for non-English speakers, links to public health advice and the inclusion of a QR code linking to the Mill Stream talk page. Once this review is completed and if content is to be amended new signs will be produced and implemented at Foreshores Beach by October 2024.



Figure 6-6 Permanent signage installed at Foreshore Beach main access points

6.4.4 Action 4.4 - Ensure all maintenance personnel and contractors are aware of threatened species fact sheets

Sydney Water will ensure all maintenance personnel and contractors accessing Mill Stream and Foreshore Beach are aware of the potential presence of threatened bird species (Pied Oystercatcher – *H. longirostris* and Little Tern – *S. albifrons*) to ensure no impacts occur to birds or nesting areas during clean-up activities. Sydney Water staff will consider risk to all flora and fauna during the completion of site clean ups, and implement controls as required.

All work orders for Mill Stream have threatened animal fact sheets for these two species which will continue to be viewed at the beginning of each clean up activity. They are also included in all training awareness sessions. See Appendix A to view the fact sheets.



6.4.5 Action 4.5 - Store gross pollutants appropriately during clean ups

During clean-up activities, waste bags will be secured shut and stored on waterproof membranes as soon as reasonable, to prevent pollution to land on Foreshore Beach (Figure 6-7). Sydney Water will collect and remove the bags from the site as soon as practicable after each clean-up.



Figure 6-7 Gross pollutants stored in secured area prior to disposal

6.4.6 Action 4.6 - Dispose of gross pollutants appropriately

Sydney Water will collect and maintain records of waste disposal receipts from our contractors to satisfy that gross pollutants removed from Foreshore Beach following overflow events are correctly disposed of at an appropriately licensed putrescible waste facility. They are removed from site immediately and stored in bins at Sydney Water depot sites.

6.5 Objective 5 – Monitor wastewater system performance, odour and receiving waterway health

6.5.1 Action 5.1 - Conduct continuous overflow monitoring and routine monthly reports

The Mill Stream ERS has two level sensors and two pressure change detection sensors that operate and are monitored continuously (Figure 6-8). With a combination of these devices Sydney



Water can determine when an overflow event has commenced and ended, provide alarms, as well as quantify the overflow volume entering the Mill Stream. Sensor performance is reviewed on a weekly schedule and reactive maintenance performed when required. Routine maintenance is conducted on a quarterly basis with an annual verification check. Overflow volumes are calculated using a rating which was developed through analysis of the real time behavior of the overflow and considers the overflow chamber outlet pipe's hydraulic and physical characteristics.

Sydney Water will report both monthly and quarterly to the AEO on the volume, frequency and duration of overflow events from the Mill Stream ERS. Each month, Sydney Water will review the overflow readings and incidents raised during that month to provide transparent information on:

- Overflow volume and frequency
- Overflow duration
- Overflow behaviour vs rainfall
- Volume of gross pollutants removed from Foreshore Beach.



Figure 6-8 Overflow chamber of the emergency relief structure (ERS) from interior showing sensor (left) and exterior (right)

6.5.2 Action 5.2 - Provide overflow alerts to AEO and Sydney Airport representatives

Sydney Water will ensure overflow notifications are sent to AEO and Sydney Airport representatives after each overflow. The contact list will be maintained by Sydney Water and updates will be made to support any staff changes. The sensors that are used to monitor overflow activity will trigger SMS alerts as soon as the Mill Stream ERS becomes operational.

Sydney Water conducts monthly audits and reporting for all overflow activity and response. Included in this process is a check of the triggered SMS alerts and the confirmed overflow activity by our Hydrometric team specialists. Any discrepancy with the alerts is investigated, however this process cannot confirm if alerts are received by individual phones numbers.



6.5.3 Action 5.3 - Monitor the dry weather sewage capacity in the SWSOOS

Sydney Water is monitoring the wastewater level in the SWSOOS in the vicinity of the overflows as a check for deterioration (and improvement) in capacity over time. The measure being used is the minimum wastewater level for a rolling 6-month period being below 0.45m. The gauge measuring the sewer level (SG0035) is in the SWSOOS. The gauge is connected by telemetry to the Sydney Water Integrated Instrumentation Control Automation and Telemetry System (IICATS). Flow depths are captured and recorded every 15 minutes.

Desilting and grit removal increases the capacity and reduces the wastewater level. The minimum wastewater level is used as this level is not affected by fluctuations in wastewater depths due to wet weather, and a rolling 6-month period is used to ensure that a measured period isn't fully influenced by wet weather.

6.5.4 Action 5.4 - Monitor water quality at Mill Stream

Sydney Water will undertake water quality monitoring to provide an assessment of potential impacts and identify pollutants of potential concern. The water quality monitoring during and proceeding overflow events will allow characterisation of conditions against:

- Schedule 2 criteria of Airports (Environment Protection) Regulations 1997,
- Australian and New Zealand guidelines for fresh and marine water quality (ANZECC/ARMCANZ 2000 & ANZG 2018)
- PFAS National Environmental Management Plan Version 2.0.

The monitoring locations are detailed in Table 7 and a map of the locations are presented in Figure 6-9. The testing analytes are presented in Appendix B.

The monitoring will be conducted quarterly for a 12-month period, and each quarter will include:

- One overflow event sampling will be conducted as soon after the ERS becomes operational as possible and will occur for five consecutive days
- One dry weather event conducted when no rainfall has occurred for the previous 72 hours and will be conducted for a single day
- Raw data and a summary of observations will be provided for the quarterly SRG and report.

Following the completion of the monitoring program a water quality report will be produced. Analysis will include data from the previous monitoring periods, assessment against the guidelines and quality assurance/control data. The report will include recommendations for future monitoring programs based on the outcomes of the study. There will also be an opportunity to inform and include outcomes from any relevant studies undertaken as part of the HIP phase 2B project. The final report will be completed by July 2025, and summary results presented to the relevant SRG. There are more detailed delivery timeframes presented in Appendix A – Detailed delivery timeframes.



| Site | Site code | Site Description | GPS |
|--|-----------|---|-------------------------|
| Mill Stream Upstream | MS1 | Upstream of the Mill Stream ERS and weir in the Mill Stream Pond | -33.94472, 151.18995 |
| Mill Stream ERS | MSERS | Sample of wastewater discharge | -33.94457, 151.18943 |
| Mill Stream Receiving water ¹ | MSFSR | Mill Stream from Foreshore Road | -33.94588, 151.18850 |
| Mill Stream Mid-Steam | MSNFB | Mill Stream – Northern most extent of Foreshores Beach | -33.95265, 151.19190 |
| Mill Stream Lookout | MS4 | Mill Stream/ Botany Bay – near Mill Stream look out | -33.95508, 151.19362 |
| Botany Bay Runway | MSRW | Between the end of the runway and the New Botany Wharf | -33.97213, 151.19894 |

Table 7 Mill Stream water quality monitoring location details

¹Boat sampling only possible during mid-high tides. Where we have an overflow event and cannot align sampling with tides, shoreline sampling points will be used as a contingency



Figure 6-9 Mill Stream monitoring locations map



6.5.5 Action 5.5 - Air quality monitoring (H₂S) near discharge location

Sydney Water will undertake continuous air quality monitoring at two locations for Hydrogen Sulfide (H_2S) levels, nearby Botany Public School and on the western bank of Mill Stream near the airport perimeter fence. Monitoring will target the summer period of 2024/25 and will remain in place for an appropriate period to ensure monitoring captures periods of overflow discharge. The findings will complement the monitoring that was conducted in 2020/21. The findings from that period didn't indicate nuisance or dangerous level of H_2S . Sydney Water will monitor and report any complaints with regard to odour that could be attributed to the Mill Stream overflows.

6.6 Objective 6 – Conduct effective complaint management

6.6.1 Action 6.1 - Respond to and investigate all complaints regarding the Mill Stream ERS

The permanent signage located at Mill Stream and Foreshores Beach, and the Sydney Water Talk page references the Sydney Water 24/7 (13 20 90) incident phone line as the appropriate means for raising any issues or concerns with regards to the operation of the ERS at Mill Stream. It is also possible to log a complaint or issue through a portal accessed from Sydney Water's website.

Sydney Water will monitor for any complaints or issues raised by the community through these channels. Complaints will be investigated and will be followed up as required within 2-5 business days. Complaints will also be reported through the annual EMP compliance reports.

6.7 Objective 7 – Progress Reporting

6.7.1 Action 7.1 - Provide Quarterly Update Report

Each quarter Sydney Water will submit a report to the AEO which will provide an update on the progress of all actions and undertakings referred to in this EMP. The report will be provided within 21 days of the quarter ceasing.

6.7.2 Action 7.2 - Chair Quarterly Stakeholder Reference Group (SRG) meeting

Sydney Water will chair the SRG meeting, and provide updates on all actions of the EMP. The SRG membership includes representatives from the DITRDCA, Sydney Airport, Bayside Council, Port Authority NSW and the NSW EPA.

The SRG forum will provide the opportunity for:

- progress updates for all EMP actions
- stakeholder engagement updates
- summary of overflow volume, frequency and duration for that quarter and incident information
- stakeholder feedback and discussion

For more information on the SRG, refer to section 5.1.1.



6.7.3 Action 7.3 - Provide Annual EMP Compliance Report

Sydney Water will provide the AEO an annual compliance report, which will provide an update on:

- the progress of all EMP actions
- community and stakeholder engagement
- the summary of overflow volume, frequency and duration for that year
- any failure to comply with or delays in EMP actions along with details of the cause and what Sydney Water is doing to rectify the matter

In addition to the updates detailed above, the annual compliance report will also consider:

- Rationale and assessment criteria were considered to demonstrate that the overflows were unavoidable
- Information on best practice environmental management and due diligence
- Sewerage system operations and maintenance best practice considerations
- Reference to field data, asset condition and performance reports
- Reference to any external audit of the operational procedures, monitoring programs and records of the system
- Reference to model calibration procedures.

The third and final compliance report will provide a summary of progress for the full Authorisation period and include a final assessment of the modelled Mill Stream average performance. This will provide the measure for assessing what improvement has been observed from works conducted during the period and provide the level that will be used for assessment in the following Authorisation period.



7 References

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Sydney Water, 2024. Mill Stream Water Quality Report



8 Appendices

8.1 Appendix A – Detailed delivery timeframes

Please note: Delivery timeframes that are to be completed during the current authorisation period are presented in darker blue, those that will continue beyond this period are shaded light blue

Action 1.1 - Desilt SWSOOS 2 - SP0038 to Malabar WRRF

| Action 1.1 SWSOOS2 Desilting & Rehabilitation | 2024 H1 | 2024 H2 | 2025 H1 | 2025 H2 | 2026 H1 | 2026 H2 | 2027 H1 | 2027 H2 | 2028 H1 | 2028 H2 | 2029 H1 | 2029 H2 | |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--|
| Planning | | | | | | | | | | | | | |
| SWSOOS2 Flow Trials (complete May 2024) | | | | | | | | | | | | | |
| Procurement Strategy & Cost Finalisation (complete August 2024) | | | | | | | | | | | | | |
| Delivery Business Case and Cost Approvals (complete October 2024) | | | | | | | | | | | | | |
| Award Contract (Complete December 2024) | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | |
| Site mobilisation & FIFM established (Complete February 2025) | | | | | | | | | | | | | |
| SWSOOS2 desilting & rehabilitation (complete June 2029) | | | | | | | | | | | | | |
| Site Decommissioning (complete August 2029) | | | | | | | | | | | | | |



Action 1.2 Implement source control for the Malabar system to reduce wet weather inflows into the SWSOOS

| Action 1.2 Implement source control for the Malabar system to reduce wet weather inflows into the SWSOOS | 2024 Q1 | 2024 Q2 | 2024 Q3 | 2024 Q4 | 2025 Q1 | 2025 Q2 | 2025 Q3 | 2025 Q4 | 2026 Q1 | 2026 Q2 | 2026 Q3 | 2026 Q4 | 2027 Q1 | 2027 Q2 |
|---|------------|------------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Prospect Source control work | | | | | | | | | | | | | | |
| GPOP Source control work | | | | | | | | | | | | | | |
| Lower NGRS & Cooks River catchments (Stage 1) | | | | | | | | | | | | | | |
| NWOA 2024-25 (Lugarno, Peakhurst, Panania, Revesby & Padstow) – Stages 1. 2 & 3 | | | | | | | | | | | | | | |
| Inspection and design of 2024-25 work (SC stages 1, 2& 3) | | | | | | | | | | | | | | |
| Preparation of TOC for 2024-25 repair work | | | | | | | | | | | | | | |
| Preparation and approval of DABC | | | | | | | | | | | | | | |
| Delivery of 2024-25 work (SC Stages 1, 2 & 3) | | | | | | | | | | | | | | |
| Flow gauging & data collection for 2024-25 work | | | | | | | | | | | | | | |
| Modelling & benefit assessment of 2024-25 work | | | | | | | | | | | | | | |
| Millstream Long term strategy- Source control work & WWOA So | ource cont | trol works | 2025-2030 |) | | | | | | 1 | 1 | | | |
| Preparation and approval of NABC | | | | | | | | | | | | | | |
| Period 2025-26 | | | | | • | | | | | | | | | |
| Scope of work (SC Stages 1, 2 & 3) for period 2025-26 and RFQ | | | | | | | | | | | | | | |
| RDC proposal and approval | | | | | | | | | | | | | | |
| Inspection and design of 2025-26 work (SC stages 1, 2& 3) | | | | | | | | | | | | | | |
| Preparation of TOC for 2025-26 repair work | | | | | | | | | | | | | | |
| Preparation and approval of DABC | | | | | | | | | | | | | | |
| Period 2026-27 | | • | • | | • | | - | | | | • | | • | |
| Delivery of 2025-26 work (SC stages 1, 2 & 3) | | | | | | | | | | | | | | |
| Flow gauging & data collection for 2025-26 work | | | | | | | | | | | | | | |
| Modelling & benefit assessment of 2025-26 work | | | | | | | | | | | | | | |
| Scope of work (SC Stages 1, 2 & 3) for period 2026-27 and RFQ | | | | | | | | | | | | | | |
| RDC proposal and approval | | | | | | | | | | | | | | |
| Inspection and design of 2026-27 work (SC stages 1, 2& 3) | | | | | | | | | | | | | | |
| Preparation of TOC for 2026-27 repair work | | | | | | | | | | | | | | |
| Preparation and approval of DABC | | | | | | | | | | | | | | |
| Period 2027-28 | 1 | | | | | | | | | | | | | |
| Delivery of 2026-27 work (SC stages 1, 2 & 3) | | | | | | | | | | | | | | |
| Flow gauging & data collection for 2026-27 work | | | | | | | | | | | | | | |
| Modelling & benefit assessment of 2026-27 work | | | | | | | | | | | | | | |
| Scope of work (SC Stages 1, 2 & 3) for period 2027-28 and RFQ | | | | | | | | | | | | | | |
| RDC proposal and approval | | | | | | | | | | | | | | |
| Inspection and design of 2027-28 work (SC stages 1, 2& 3) | | | | | | | | | | | | | | |

Mill Stream Environment Management Plan 2024 - 2027



| Action 1.3 Grit Pit Maintenance (continued each year at same cadence*) | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Hardstand approvals and construction (November 2024) | | | | | | | | | | | | |
| Cleaning resourcing and approvals (1-2 weeks)* | | | | | | | | | | | | |
| Cleaning cycle (1-2 weeks)* | | | | | | | | | | | | |

Action 1.4 Implement Malabar Strategic Business Case (SBC) – network augmentation preferred option

| Action 1.4 Implement Malabar Strategic Business Case (SBC) – network augmentation preferred option | 2024 H1 | 2024 H2 | 2025 H1 | 2025 H2 | 2026 H1 | 2026 H2 | 2027 H1 | 2027 H2 | 2028 H1 | 2028 H2 | 2029 H1 | 2029 H2 | 2030 H1 | 2030H2 |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| Network disconnection - River release feasibility study | | | | | | | | | | | | | | |
| SWSOOS augmentation - Option planning | | | | | | | | | | | | | | |
| Concept design and investment approval | | | | | | | | | | | | | | |
| Environmental assessments and approvals | | | | | | | | | | | | | | |
| Procurement | | | | | | | | | | | | | | |
| Delivery of preferred option | | | | | | | | | | | | | | |



| Action 1.5 Botany Low Level Carrier Rehabilitation | Jan-24 | Feb-24 | Mar-24 | Apr-24 | May-24 | Jun-24 | Jul-24 | Aug-24 | Sep-24 | Oct-24 | Nov-24 | Dec-24 |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Finalise site inspections | | | | | | | | | | | | |
| Award contracts | | | | | | | | | | | | |
| Site commissioning | | | | | | | | | | | | |
| Pipe re-lining and structural rehab | | | | | | | | | | | | |
| Operational completion and asset commissioning | | | | | | | | | | | | |

Action 4.2 Implement wastewater screening at Airport site

| Action 4.2 Implement wastewater screening at Airport site | 2024 Q1 | 2024 Q2 | 2024 Q3 | 2024 Q4 | 2025 Q1 | 2025 Q2 | 2025 Q3 | 2025 Q4 | 2026 Q1 | 2026 Q2 | 2026 Q3 | 2026 Q4 |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Finalise site inspections | | | | | | | | | | | | |
| Concept design | | | | | | | | | | | | |
| Delivery business case and contracts | | | | | | | | | | | | |
| Detailed design and site commissioning | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | |
| Operational completion and asset commissioning | | | | | | | | | | | | |



| Action 5.4 Monitor water quality at Mill Stream | 2024 Q1 | 2024 Q2 | 2024 Q3 | 2024 Q4 | 2025 Q1 | 2025 Q2 | 2025 Q3 |
|---|---------|---------|---------|---------|---------|---------|---------|
| Monitoring | | | | | | | |
| Dry weather sampling - one event each quarter | | | | | | | |
| Wet weather sampling - one event each quarter | | | | | | | |
| Analysis and reporting | | - | | | | | |
| Quarterly update - SRG | | | | | | | |
| Quarterly raw data and summary reported | | | | | | | |
| Data analysis - incl all monitoring periods | | | | | | | |
| Final Report - July 2025 | | | | | | | |

8.2 Appendix B – Threatened bird species fact sheets

Pied Oystercatcher

Conservation status in NSW: Endangered

- 1. Favours intertidal flats of inlets and bays, open beaches and sandbanks.
- 2. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish.
- 3. Two to three eggs are laid between August and January.
- 4. Breeding behaviours
 - a. The Pied Oystercatcher breeds in pairs. A breeding territory of some 200 m is formed and is defended by both birds. Nesting takes place on sand, shell grit or shingle just above highwater mark on beaches, sandbars, margins of estuaries and lagoons. The eggs are wellcamouflaged, being pale brown with darker brown and black blotches and streaks. Both sexes share parenting duties.
 - b. Breeding Season: October to January (earlier in the north) Clutch size: 2 to 3
- The vegetation type located near the work sites is Coastal Foredune Wattle Scrub which is known to be associated with the Pied Oystercatcher



(Photos sourced from <u>https://www.ala.org.au</u>, information sourced from <u>https://www.ala.org.au</u> and <u>https://www.environment.nsw.gov.au</u>)



Little Tern

Conservation status in NSW: Endangered

- 1. In NSW, it arrives from September to November, occurring mainly north of Sydney
- Almost exclusively coastal, preferring sheltered environments; however, may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records).
- 3. Breeding behaviours
 - a. Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands.
 - b. The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles
 - c. Both parents incubate up to three well-camouflaged eggs for up to 22 days, aggressively defending the nest against intruders until the young fledge at 17 - 19 days
 - d. It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months
- 4. The vegetation type located near the work sites is Coastal Foredune Wattle Scrub which is not



(Photos sourced from https://www.ala.org.au, information sourced from https://www.ala.org.au, and https://www.ala.org.au, information sourced from https://www.ala.org.au, information sourced from https://www.ala.org.au, and https://www.ala.org.au, and https://www.ala.org, and htt



8.3 Appendix C – Water quality monitoring analytes

| Analytes | |
|---------------------------|---|
| di(2-ethylhexy) phthalate | Total phosphorous |
| PFAS suite* | Total nitrogen |
| Enterococci | Phosphates, expressed as P |
| Faecal coliforms | Total suspended solids |
| Ethoxylates | BOD |
| Copper | COD |
| Lead | Oil & Grease |
| Nickel | Chlorophyll-a |
| Silver | рН |
| Mercury | Dissolved oxygen |
| Zinc | Conductivity |
| Digestion (prep) | Temperature |
| Sulphide | Turbidity |
| NOx expressed as N | Tidal condition |
| Ammonium, expressed as N | General comments including tidal stage / time |

| Analyte | Schedule 2 guideline value (uq/L) | edule 2 guideline value Sydney Water method code (ug/L) | |
|-----------------------------------|--------------------------------------|--|--------------|
| Metals | | | |
| Copper | 5.0 | TM66TSAL | 0.2 |
| Lead | 5.0 | TM66TSAL | 0.05 |
| Mercury | 0.1 | TM01TU | 0.01 |
| Nickel | 15.0 | TM66TSAL | 0.3 |
| Silver | 2.0 | TM66TSAL | 0.2 |
| Zinc | 50.0 | TM66TSAL | 1.0 |
| Organic toxicants: | | | |
| Ethoxylates | - | TC0068SEW | 5 |
| Inorganic toxicants: | | | |
| Sulphide | 2.0 | WC40NS | |
| Phthalate esters: | | | |
| di(2-ethylhexy) phthalate | 0.6 | XAL_DEHP | 10 |
| Per- and poly-fluoroalkyl substan | ces** | | |
| PFOS | 2* | XNMI_PFASW | 0.2 |
| PFHxS | 2* | XNMI_PFASW | 0.1 |
| PFOA | 10* | XNMI_PFASW | 0.1 |
| Microbiological | | · | |
| Enterococci | - | MI03AS | <1 CFU/100ml |







For more info: <u>https://www.sydneywatertalk.com.au/millstream</u>

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