



# Groundwater Management Plan

A sub plan of  
Operational  
Environmental  
Management Plan.

## Information

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## Compliance table

Table 0-1 Compliance Table

Reference number	Requirement	Document Reference
D3 (Operational Environmental Management Plan – OEMP)	Where an OEMP is required, the Proponent must include the following OEMP sub-plans in the OEMP: Groundwater Management	This Plan.
D4	Each of the OEMP sub-plans must include the requirements set out in Condition D2 (a), (b) and (c).	Sections 4 and 0
D2	An OEMP is not required for the [Critical State Significant Infrastructure] CSSI if the Proponent has an Environmental Management System (EMS) or equivalent as agreed with the Secretary, and can demonstrate, to the written satisfaction of the Secretary, that through the EMS: <ul style="list-style-type: none"> <li>(a) The performance outcomes, commitments and mitigation measures, made and identified in the [Environmental Impact Statement] EIS as amended by the documents listed in A1, and requirements specified in the conditions of this approval can be achieved;</li> <li>(b) issues identified through ongoing risk analysis can be managed; and</li> <li>(c) procedures are in place for rectifying any non-compliance auditing, incident management or any other time during operation.</li> </ul>	Sections 4 and 0
D5	The OEMP sub-plans must be developed in consultation with relevant agencies as identified in Condition D3. Where and agency(ies) request(s) is not included in an OEMP sub-plan, the Proponent must provide the Secretary justification as to why. Details of all information requested by an agency to be included in an OEMP sub-plan as a result of consultation, including copies of all correspondence from those agencies, must be provided with the relevant OEMP sub-plan.	Section 2
D6	The OEMP sub-plans must be submitted to the Secretary as part of the OEMP.	Section 1.2
E107	The CSSI must be constructed and operated so as to maintain the [New South Wales] NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an [Environmental Protection Licence] EPL in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with.	Section 4.2.2.1

# 1 Introduction

## 1.1 Overview and context

Metro Trains Sydney Pty Ltd (MTS) has prepared this Operational Groundwater Management Sub Plan (OGMP or Plan) to continue to assess and monitor groundwater during operation of the Sydney Metro Chatswood to Sydenham project (the Project).

This Plan outlines operational environmental management measures that will be applied to activities across the Project alignment to manage groundwater risks, as detailed in Section 4.3.

## 1.2 Plan purpose

This Plan forms part of the Operational Environmental Management Plan (OEMP) and has been developed to address Conditions of Approval (CoAs) of the Project's Development Consent (Critical State Significant Infrastructure, CSSI 7400, as modified by CSSI 7400 MODs 1 to 9), which requires the preparation of an OGMP prior to commencement of operation, to the satisfaction of the Secretary of the Department of Planning, Housing and Infrastructure (DPHI) and Department of Primary Industries – Water (DPI Water).

## 1.3 Background

The Project involves the operation of a metro rail line and associated stations between Chatswood Station and just north of Sydenham Station. The Project passes through the local government areas (LGAs) of Willoughby, North Sydney, Sydney and Marrickville. Key operational components of the Project include:

- About 15.5 kilometres of twin rail tunnels (two tunnels located side-by-side) between Mowbray Road, Chatswood and Bedwin Road, Marrickville. The tunnel corridor extends about 30 metres either side of each tunnel centre line and around all stations.
- About 250 metres of above ground metro tracks between Chatswood Station and the northern dive structure.
- A northern dive structure (about 400 metres in length) and tunnel portal south of Chatswood Station and north of Mowbray Road, Chatswood.
- A southern dive structure (about 400 metres in length) and tunnel portal north of Sydenham Station and south of Bedwin Road, Marrickville.
- Metro stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street (Gadigal) and Waterloo, as well as underground platforms at Central Station and above ground platforms at Sydenham Station.
- Underground pedestrian links and connections to other modes of transport (such as the suburban rail network) and surrounding land uses.
- Services within each of the stations, including mechanical and fresh air ventilation equipment and electrical power substations.
- A permanent power supply from Surry Hills to Gadigal Station.
- A substation (for traction power supply at Artarmon).
- A services facility (for traction power supply and an operational water treatment plant) adjacent to the southern dive structure.

The Project was subject to assessment by the Department of Planning and Environment (DPE) and approval by the Minister of Planning under part 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). An Environmental Impact Statement (EIS) was prepared in May 2016 to describe and assess the Project and recommend management measures to address impacts. The EIS went on public exhibition on 11 May 2016 and submissions closed on 27 June 2016. A Submissions and Preferred Infrastructure Report (SPIR) was prepared to document submissions made during the EIS public display and provide responses to each submission. The impacts from operation of the Project are highlighted in the EIS and SPIR. As part of the EIS, a groundwater assessment was prepared (Technical paper 7 – Groundwater). Collectively, the EIS and SPIR will be herein referred to as the Environmental Assessment Documentation (EAD).

The Project was declared Critical State Significant Infrastructure (CSSI) and approval was granted by the Minister of Planning in 9 January 2017 (CSSI 7400), including the following modifications (Development Consent):

- MOD 1 – Victoria Cross and Artarmon Substation (approved 18 October 2017)
- MOD 2 – Central Walk (approved 21 December 2017)
- MOD 3 – Martin Place Metro Station (approved 22 March 2018)
- MOD 4 – Sydenham Station and Metro Facility South (approved 13 December 2017)
- MOD 5 – Blues Point Acoustic Shed (approved 2 November 2018)
- MOD 6 – Administrative Changes (approved 21 February 2019)
- MOD 7 – Administrative Changes (approved 24 June 2020)
- MOD 8 – Blues Point Access Site (approved 25 November 2020)
- MOD 9 – Extension to standard construction hours (approved 30 June 2022).

The operational phase commenced in August 2024. During construction, a number of individual Construction Groundwater Management Plans, Environmental Monitoring Reports and Water Quality Monitoring Programs were prepared and implemented by individual construction contractors, as well as completion of groundwater modelling. As well as the EAD, a number of other key documents have been used to develop this Plan, as follows:

- Aurecon GHD Joint Venture (AGJV) (2018), Hydrogeological Inflow Assessment, Ref: SMCSFCSM-LOR-SMC-GE-REP-000202, July 2018.
- PSM (2018). Sydney Metro City & Southwest – TSE, Hydrogeological Interpretive Report, Ref: SMCSWTSE-JPS-TPW-GE-RPT-110003-01, October 2018.
- John Holland (2022). Waterloo Integrated Station Development, Groundwater Management Sub Plan, Ref: SMCSWSWL-JHG-SWL-EM-PLN-000006 Rev 3, August 2022.
- Besix Watpac (2022). Barangaroo Station Water Quality Monitoring Program, Ref: SMCSWSBR-BWC-SBR-EM-PLN-000302, October 2022.
- Laing O'Rourke (2023). Sydney Metro City and Southwest – Central Station Main Works Project, Construction Groundwater Management Plan (CGWMP), Rev 12, August 2023.
- Lendlease (2023). Construction Groundwater Management Plan, Sydney Metro Martin Place Station – Integrated Station Development, Rev 11.1, August 2023.
- AW Edwards (2024). Sydney City & Southwest Metro – Crows Nest Station, Construction Groundwater Management Plan, Ref: SMCSWSCN-AWE-SCN-AN-PLN-0000024, January 2024.
- Sydney Metro City & Southwest, Victoria Cross Integrated Station Development, Construction Groundwater Management Plan, Rev J, March 2024.

## 1.4 Plan scope and objectives

This Plan addresses groundwater aspects associated with the Operation and Maintenance phase of the Project (O&M).

The key objective of the OGMP is to ensure all EAD, mitigation measures and licence/permit requirements relevant to groundwater are described, scheduled and assigned responsibly, as outlined in:

- The EAD prepared for the Project
- CSSI 7400 Approval
- NSW EPA (Environmental Protection Authority) Environment Protection Licence (EPL# 21247)
- All relevant legislation and other requirements described in Section 3.1 of this Plan.

## 2 Consultation

In accordance with CoA D3 of the Project's Development Consent, the OGMP must be prepared in consultation with relevant government agencies and stakeholders. The status of consultation with these parties and a summary of key issues raised is presented in Table 2-1. See the full correspondence in Appendix D.

Table 2-1: Consultation details

Agency	Key issues raised	MTS update	Status
DPI Water (Department of Climate Change, Energy, the Environment and Water; DCCEEW)	The proponent should include groundwater monitoring at deep designed drained structures listed in the operational groundwater management plan (OGMP) for a minimum of three (3) years after operations commence.	Drained structures are outlined in Section 4.2. A Groundwater Monitoring Program will be developed for groundwater monitoring during the operational phase (in preparation as at September 2024). The monitoring program is planned to be undertaken for 3 years, with subsequent review to identify the need, if any, for further groundwater monitoring after three years (as outlined in Section 5).	Closed – 11 September 2024.  See Appendix D for consultation communication
DPI Water (DCCEEW)	The proponent should update the hydrogeology conceptualisation for the Ashfield shale in the background section of the OGMP to: <ul style="list-style-type: none"> <li>Align the statement regarding the quality of groundwater from Ashfield shale with accepted parameters.</li> <li>Detail the potential evidential causes for any variation observed in the parameter values for the Ashfield shale groundwater quality</li> </ul>	This comment is considered closed based on updates to Section 4.1.3 of this Plan, based on information available at this time.	Closed – 11 September 2024.  See Appendix D for consultation communication
DPI Water (DCCEEW)	The proponent should update the OGMP to clarify: <ul style="list-style-type: none"> <li>Why the construction groundwater inflow rates are being used as the target for the operational phase, whilst it is described “tunnels, station boxes, shaft and dive structures have been designed to minimise groundwater inflow” and hence lower inflow rates would be expected.</li> <li>The predicted groundwater inflow at the tanked Waterloo station.</li> </ul>	Table 4.7 has been updated with the model-predicted groundwater inflow (seepage) rates during the operational phase for the station sites, including Waterloo (currently drained but to be tanked). These inflow (seepage) rates are generally lower than predicted under construction and drained conditions (as per the EIS) and which were referenced in a previous version of this Plan.	Closed – 11 September 2024.  See Appendix D for consultation communication
DPI Water (DCCEEW)	The proponent should re-evaluate the groundwater modelling impacts against actual monitored drawdown data once three years of post-construction groundwater monitoring is obtained.	The Groundwater Monitoring Program (being developed in Q3 2024) will include re-evaluation of groundwater modelling impacts against actual monitored drawdown data once three years of post-construction monitoring is obtained, after which this	Closed – 11 September 2024.  See Appendix D for consultation communication

Agency	Key issues raised	MTS update	Status
		comment will be considered closed. Section 5.4 makes reference to the review of the groundwater monitoring program after 3 years, and with reference to the groundwater model predicted groundwater levels / drawdown.	
DPI Water (DCCEEW)	Letter on 6 August 2024 – The proponent must ensure that they hold sufficient water entitlement on a Water Access Licence (WAL) to account for the maximum predicted water take prior to take occurring, unless an exemption can apply.	Section 3.1 updated to include reference to a WAL being required. The model-predicted groundwater inflow rates have been revised in Table 4.7 and provide an estimate of the predicted water take during operations.  MTS will continue to engage with DCCEEW to seek a resolution to the challenges currently faced by the water regulations, and this item will be closed once a resolution has been met.	Closed – 11 September 2024.  See Appendix D for consultation communication
DPHI	Comment 3.1 – Table 2: Consultation Details does not adequately respond to or close out the issues raised by DCCEEW, particularly with respect to groundwater monitoring at deep designed structures during operation. These monitoring programs, must be referenced and discussed in the Groundwater Management Plan and must be implemented in time for first passenger services.	This will be considered closed once the Groundwater Monitoring Program has been developed and approved through external stakeholder consultation with DCCEEW and DPHI. Refer to specific responses provided above.	Open – in progress  DCCEEW Water have stated on September 11 they have no additional comments on V4 of the GMP.  This version is still to be submitted to DPHI for close out of this comment.
DPHI	Comment 3.3 – A consideration of approval requirements under the Water Management Act 2000 & Regulation 2018 is required in relation to groundwater collection, treatment and disposal at Barangaroo Station and the Marrickville Dive site.	See Section 3.1 for more information regarding approval requirements under the Water Management Act 2000 and Regulation 2018.  Refer to the approved EPL (21247) for treatment and disposal requirements from Marrickville Dive site / structure. MTS will develop a new Operational WDIA and WQMP for the Barangaroo WTP in Q3 2024, after conclusion of the Tunnel and Station Excavation Contractor (TSE) works.	Open – in progress  DCCEEW Water have stated on September 11 they have no additional comments on V4 of the GMP.  This version is still to be submitted to DPHI for close out of this comment.

## 3 Statutory requirements

### 3.1 Legal and other obligations

The legislation and planning instruments considered during development of this Plan are listed below:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation)
- *Water Management Act 2000*
- *Water Management (General) Regulation (2018)*
- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Protection of the Environment Operations (General) Regulation 2009*
- *Environmental Protection and Biodiversity Conservation Act 1999* (Cth)
- *Contaminated Land Management Act 1997*.

The main guidelines, specifications and policy documents relevant to this Plan include:

- *NSW Aquifer Interference Policy* (NSW Office of Water, 2012)
- *NSW Groundwater Quality Protection Policy* (Department of Land and Water Conservation, DLWC, 1998)
- *NSW Groundwater Dependent Ecosystems Policy* (DLWC, 2002)
- *Water Sharing Plan for the Greater Sydney Region Groundwater Sources 2011*
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC/ARMCANZ, 2000), and associated update prepared by the Australian and New Zealand Governments (ANZG, 2018).

In relation to approval requirements under the *Water Management Act 2000* and *Regulation 2018* for groundwater collection, treatment and disposal at Barangaroo Station and Marrickville Dive site's water treatment plants, MTS ensures all groundwater management activities abide by these legislations and all required approvals are obtained. When operational, groundwater captured from any drained station excavations and caverns would be transferred to the Water Treatment Plant (WTP) at Marrickville, prior to discharge to stormwater. The discharge water quality level has been determined in consultation with the NSW EPA during detailed design, taking into consideration the current water quality of the receiving watercourse, and is outlined in the EPL# 21247. Barangaroo's water treatment plant, although separate to the main groundwater management system, will also operate according to the above once MTS creates and implements the new Water Discharge Impact Assessment (WDIA) for the station (see Section 4.2.2.1 for more information).

Entitlement to take water from the aquifer, including via groundwater inflow / seepage from drained structures, is detailed in the *Water Management (General) Regulation 2018*, which includes exemptions for transport authorities for construction and maintenance of rail infrastructure. However, MTS understands that an exemption is not applicable to CSSI projects, including the current Chatswood to Sydenham project (which forms part of the Sydney Metro City and Southwest). Therefore, a Water Access Licence (WAL) is likely to be required, and discussions are ongoing with DCCEEW to seek a resolution to the challenges presented by the current water regulations to this Project. The *NSW Aquifer Interference Policy* (NSW Office of Water, 2012) documents the NSW Government's intention to implement the requirement for approval of 'aquifer interference activities' under the *Water Management Act 2000*.

The *Water Management Act 2000* includes the concept of ensuring 'no more than minimal harm' for both the granting of WALs and the granting of approvals. The *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011* also provides rules for granting access licences, managing access licences, water supply works approvals and access licence dealings. Both the minimal harm criteria and the rules outlined in these documents were considered in the Sydney Metro Chatswood to Sydenham EIS.

### 3.2 Development consent conditions

The Project was declared Critical State Significant Infrastructure (CSSI), and approval was granted by the Minister of Planning on 9 January 2017 (CCSI 7400). The conditions of approval (CoAs) include groundwater management requirements to be addressed in the operation phase of the Project under D3 CCSI7400. These requirements, and how they are addressed are provided within Table 0-1.

### 3.3 Revised environmental performance outcomes

Operational desired performance outcomes associated with groundwater management are listed in the SPIR and detailed in Table 3-1.

Table 3-1: Operational desired performance outcomes associated with groundwater

Desired performance outcome	Environmental performance outcome	Document reference
<b>Water – hydrology</b> Long term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised. The environmental values of nearby, connected and affected water sources, groundwater and dependent ecological systems, including estuarine and marine water (if applicable) are maintained (where values are achieved) or improved and maintained (where values are not achieved). Sustainable use of water resources.	The Project would make good any impacts on groundwater users.	Section 4.3

### 3.4 Roles and responsibilities

Key roles and responsibilities applicable to this Plan are presented in Table 3-2. Further details regarding roles and responsibilities are outlined in Section 5.1 of the OEMP.

Table 3-2: Roles and Responsibilities

Roles	Responsibilities
<b>Learning &amp; Development Manager</b>	Work with Environment & Sustainability Advisor to develop training packages addressing environmental risk.
	Develop and implement the training delivery schedule for the O&M Phase, including environmental and sustainability aspects
	Operate reasonably independently, in accordance with MTS's policies; quality, safety and environmental management systems; processes and relevant legislation.
<b>Head of Safety, Quality, Risk &amp; Environment</b>	Be an emergency contact and available to be contacted by EPA, Department of Planning, Industry and Environment (DPIE) and The Sydney Metro Authority Representatives on a 24-hour basis.
	Provide environmental oversight, direction and leadership regarding the environmental and sustainability management of the Project.
	Support the CEO-MTS on MTS operations and the management of stakeholders including, The Sydney Metro Authority, EPA and other State and Federal government bodies and other government agencies.
	Review the Project's management systems and key management plans to ensure and maintain compliance with the requirements of the MTS IMS, CoA and EPL.
	Ensure environmental incidents are managed and reported (to DPIE, EPA and Parent Companies) in accordance with the planning approval and EPL requirements.
<b>Environment &amp; Sustainability Advisor</b>	Obtain all required approvals to facilitate O&M of the Project, including but not limited to the EPL.
	Undertake environmental risk assessment, and revisit this through the life of the project through continual review and improvement processes within the MTS Integrated Management System (IMS).

Roles	Responsibilities
	<p>Key point of contact for environmental and planning approvals and sustainability stakeholders, including but not limited to DPIE, EPA, Infrastructure Sustainability Council of Australia (ISCA).</p> <p>Be an emergency contact and available to be contacted by EPA, DPIE and The Sydney Metro Authority Representatives on a 24-hour basis.</p> <p>Notify MTS, OpCo2 and agencies as required in response to environmental incidents and potential incidents.</p> <p>Identify and maintain a register of relevant legal, MTS IMS requirements, contractual and other requirements.</p> <p>Obtain all necessary approvals prior to commencing relevant works.</p> <p>Ensure the project induction includes appropriate training regarding the requirements of this OEMP, the EPL and any other key obligations.</p> <p>Ensure identified risks are analysed and evaluated according to agreed criteria. Regularly review identified risks and controls and maintain a risk register.</p> <p>Ensure regular inspections, observations, monitoring and audits are conducted to check the effectiveness of controls and that compliance is maintained.</p> <p>Review subcontractors' performance and compliance with MTS environmental and sustainability requirements.</p> <p>Enter and close out all environmental incidents in the O&amp;M Phase Reporting System.</p> <p>Identify and implement corrective and preventative actions after incidents and share lessons learned within the MTS team or other projects, as applicable.</p>
<b>General Manager (GM) Safety, Quality, Risk &amp; Environment</b>	<p>O&amp;M related investigations, compliance inspections, and data and trend analysis to mitigate safety and environmental risks.</p> <p>Maintain MTS compliance with relevant environmental standards, and legal and regulatory requirements.</p> <p>Support the Head of Safety, Quality, Risk &amp; Environment with the delivery of key O&amp;M milestones in alignment with MTS legal and regulatory requirements, business objectives and key performance indicators.</p> <p>Ensure preventative and corrective actions requested are completed within appropriate timeframes through efficient monitoring.</p> <p>Expected to operate reasonably independently, in accordance with MTS's policies; quality, safety and environmental management systems; processes and relevant legislation.</p>
<b>GM Engineering &amp; Maintenance Delivery</b>	<p>Responsible for establishing and executing O&amp;M asset management strategy and asset management plan in adherence to the OEMP.</p>
<b>Head of Asset Management</b>	<p>Expected to operate reasonably independently in accordance with MTS's policies, IMS, processes, Safety Management System and relevant legislation.</p>
<b>Infrastructure Engineering Manager</b>	<p>Expected to operate reasonably independently in accordance with MTS's policies. Safety, Quality, Risk and Environment (SQRE) management system, processes, and relevant legislations.</p>
<b>Infrastructure Delivery Manager</b>	<p>Expected to operate reasonably independently in accordance with MTS's policies. SQRE management system, processes, and relevant legislations.</p>
<b>Head of Strategy, Corporate Relations &amp; Communications</b>	<p>Providing the delivery of internal and external communication (media, government and stakeholder relations).</p>

## 3.5 Training

All employees, contractors and utility staff working on the Project will undergo site induction training, in accordance with the Training Management Plan and Section 5.2 of the OEMP. The site induction training will provide initial training on various environmental aspects, including groundwater management issues/measures.

Records will be kept of all personnel undertaking the site induction training, including the contents the training, date and name of trainer/s.

Targeted training or specific training will also be provided to personnel with a key role in groundwater management, if required.

## 4 Implementation

### 4.1 Existing environment

#### 4.1.1 Geological context

The Project area transverses seven regional geological units identified by the *Sydney 1:100,000 Geological Sheet 9130* (Herbert, 1983), as detailed in Table 4-1. The tunnels primarily transition through Hawkesbury Sandstone with some sections of Ashfield Shale and Mittagong Formation. For a small part of the Sydney Harbour crossing, the tunnels pass through fluvial / marine clayey-silty and clayey-sandy sediments.

Table 4-1: Regional geology along the Project alignment

Geological unit	Description
<b>Fill</b>	Reclaimed areas generally adjacent to Sydney Harbour and some parklands
<b>Holocene alluvium</b>	Normally consolidated sediments
<b>Pleistocene alluvium</b>	Over-consolidated sediments (often sandy clays)
<b>Residual soil</b>	Derived from completely weathered siltstone and sandstone
<b>Ashfield Shale</b>	Black to dark-grey shale and laminite
<b>Mittagong Formation</b>	Interbedded shale, laminate and medium-grained quartz sandstone
<b>Hawkesbury Sandstone</b>	Medium to coarse-grained quartz sandstone

The geological context for each Project element is described in Table 4-2. In contrast to alluvium, the permeability of shale, siltstone and sandstone is generally low to very low, with the majority of groundwater flow transmitted through joints and fractures, rather than via the porous nature of the material.

Table 4-2: Geological context for each Project element

Project element	Geological context
<b>Chatswood dive structure</b>	Residual soils and fill with underlying Ashfield Shale. Hawkesbury Sandstone is below the level of the dive structure.
<b>Marrickville dive structure</b>	Variable depths of fill, alluvium, residual soils and then Ashfield Shale.
<b>Crows Nest Station</b>	Fill, residual soils, Ashfield Shale, Mittagong Formation and then Hawkesbury Sandstone.
<b>Victoria Cross Station</b>	Hawkesbury Sandstone.
<b>Barangaroo Station</b>	Extensive near surface fill and Hawkesbury Sandstone.
<b>Martin Place Station</b>	Fill, residual soil and Hawkesbury Sandstone.
<b>Gadigal Station</b>	Fill, residual soil, Mittagong Formation and Hawkesbury Sandstone.
<b>Central Station</b>	Fill, residual soil, Ashfield Shale, Mittagong Formation and Hawkesbury Sandstone.
<b>Waterloo Station</b>	Fill, alluvium, residual soils, Ashfield Shale and Hawkesbury Sandstone.
<b>Artarmon substation</b>	Ashfield Shale, Mittagong Formation and Hawkesbury Sandstone.

#### 4.1.2 Groundwater levels

The groundwater level along most of the Project alignment is between 10 metres to 30 metres below ground level. Local shallow groundwater within residual soils is anticipated at two to five metres below ground level.

#### 4.1.3 Groundwater quality

As per the Sydney Metro Chatswood to Sydenham EIS, salinity of groundwater in the Ashfield Shale was identified to be fresh (in the range 269 to 493 milligrams per litre (mg/L) as total dissolved solids (TDS)), and pH was slightly acidic (between 4.9 and 5.1). This is discussed further below.

As outlined in the EIS, the salinity of groundwater from the Mittagong Formation was identified to be fresh (range between 265 to 350 mg/L as TDS), with slightly acidic pH (between 4.7 and 5.6). Salinity in the Hawkesbury Sandstone groundwater was identified as being fresh (range between 147 to 574 mg/L as TDS), with near-neutral pH (range between 5.2 and 6.8).

The concentration of dissolved metals and nutrients in the Ashfield Shale, Mittagong Formation and Hawkesbury Sandstone, including residual soils, was expected to be naturally very low. Organic compounds are not naturally associated with Ashfield Shale, Mittagong Formation or Hawkesbury Sandstone.

Ashfield and Bringelly shales (Late Triassic Wianamatta Group), though primarily aquitards, do include scattered zones of fracture porosity within the weathered bedrock and groundwater is generally saline, typically in the range of 5,000 to 50,000 mg/L (McNally, 2009). The low salinity groundwater in the Ashfield Shale, compared to the expected brackish to saline quality, is considered to indicate an influx of fresh water such as rainfall or leakage from water supply pipes, adjacent irrigation, or possible leakage from the underlying formations (containing fresher groundwater). The Ashfield Shale comprises black to dark grey shale and laminate of four variably thick sub-units. The thickness of the unit ranges between less than one metre and 50 metres. At some locations, the shale may become carbonaceous, with variable silt and clay particles present. The unit is laminated, although it retains bedding planes at some locations. Based on these observations, there is the potential the fresher groundwater in the Ashfield Shale may be associated with areas of more open fracture permeability or higher delamination, resulting in higher through flow of fresh water and variation in the salinity of groundwater from the Ashfield Shale. Further reasons for the variation in Ashfield Shale groundwater could be the depth of extraction, fracture density, proximity to recharge zones and anthropogenic influences such as urban runoff.

With respect to pH, the groundwater within the Ashfield Shale was identified to be more acidic than the expected range, with monitoring during construction confirming the generally acidic nature of groundwater in the area, with the exception of Gadigal / Pitt Street Station where pH was measured between 7.2 and 8.5 (noting this was associated with Mittagong Formation and Hawkesbury Sandstone). The accepted pH range for discharge in accordance with the EPL#21247 is 7.0 to 8.5, therefore treatment prior to discharge is expected to be required to neutralise the water, and align other parameters with the discharge criteria, if exceeded (i.e. metals).

There are areas of groundwater contamination identified in the EIS, refer to Section 4.2.2 for discussion.

#### 4.1.4 Groundwater users and extraction

There is limited groundwater use near the Project alignment due to the presence of low permeability shale, siltstone and sandstone (Ashfield Shale, Mittagong Formation and/or Hawkesbury Sandstone). Identified groundwater users (as per the EIS) are off sufficient distance from drained Project elements (refer Table 4-5) and there are no anticipated changes in groundwater level at these water supply works due to the operational phase of the Project. Table 4-3 provides an overview of groundwater users near the Project alignment, from the EIS.

Table 4-3: Groundwater users and extraction (from EIS)

Location	Bore ID	Approval type	Work type	Status	Estimated extraction*
<b>Chatswood Oval</b>	GW107757	Water Supply	Bore (intended purpose – recreation)	Unknown	N/A
	GW029731	Water Supply	Bore (intended purpose – recreation)	Unknown	N/A
<b>St Leonards TAFE</b>	GW072478	Basic Rights	Bore (intended purpose – domestic)	Functioning	N/A
<b>Private Well near St Leonards Station</b>	GW108224	Water Supply Basic Rights	Bore (intended purpose – domestic)	Functioning	<1 ML/y
<b>Shore School</b>	GW107764	Unknown	Bore	Unknown	<1 ML/y
<b>Redfern Park</b>	GW071907	Water Supply Works	Bore (intended purpose – recreation)	Functioning	12 ML/y

Location	Bore ID	Approval type	Work type	Status	Estimated extraction*
Private Spear near Waterloo Station	GW106192	Water Supply	Spearpoint (intended purpose – domestic)	Functioning	<1 ML/y
Industrial Water Supply, Bourke Road	GW017342 GW017684	Commercial	Bore (intended purpose – industrial)	Unknown	N/A
Erskineville Oval	GW110351	Water Supply Works	Bore (intended purpose – recreation)	Unknown	10 ML/y
Private Spear in Alexandria	GW111164	Water Supply	Spearpoint (intended purpose – domestic)	Functioning	<1 ML/y

\*Note: These values are based on 2016 data. N/A = not available

### 4.1.5 Groundwater inflows

Groundwater inflow in existing drained tunnels in Sydney (as outlined in the Sydney Metro Chatswood to Sydenham EIS) are outlined in Table 4-4. This indicates that long term inflow into 'drained' tunnels is in the order of one litre per second per kilometre (L/sec/km) and provides a reference for likely long term groundwater inflows to drained elements of the Project. Further discussion on the modelled groundwater inflows (seepage) for the Project elements is provided in Section 4.2.1.

Table 4-4: Measured inflows to existing Sydney tunnels

Project tunnel	Length (km)	Diameter (m)	Maximum rock cover (m)	Dominant rock type	Measured inflow (L/s/km)
Northside storage	20	6	90	Hawkesbury Sandstone	0.9
Epping to Chatswood Rail Line	13	7.2 (twin)	60	Hawkesbury Sandstone	0.9
M5 East	3.9	8 (twin)	4 to 60	Hawkesbury Sandstone	0.8
Eastern Distributor	1.7	12 (double deck)	40	Hawkesbury Sandstone	1.0
MetroGrid	3.5	2	10 to 40	Narrabeen Group	0.8
Cross City Tunnel	2.1	8 (twin)	53	Hawkesbury Sandstone	<3
Lane Cove Tunnel	3.6	9 (twin)	60	Hawkesbury Sandstone	<3

## 4.2 Impacts and risks

### 4.2.1 Identified impacts

The Project is not anticipated to trigger significant impacts to groundwater due to the majority of the project elements being tanked, as detailed in Table 4-5. Tanked structures entail waterproofing membrane combined with permanent/concrete lining while drained structures do not include waterproofing and would be perpetually dewatered where sited below the water table.

As outlined in Section 3.1, the Project does not exceed the Groundwater Related Minimum Harm Criteria Assessment (NSW Office of Water, 2012).

Table 4-5: Project elements and groundwater management approach

Project element	Groundwater management approach
Rail tunnels	Tanked
Cross-passages	Tanked
Chatswood dive structure	Drained
Marrickville dive structure	Drained
Crows Nest Station	Drained
Victoria Cross Station	Tanked
Barangaroo Station	Designed to be tanked, currently drained (see Section 4.2.1.2)
Martin Place Station	Tanked
Gadigal Station	Tanked
Central Station	Drained
Waterloo Station	Tanked
Crows Nest Station Shaft	Drained
Victoria Cross Station Shaft	Drained
Barangaroo Station Shaft	Tanked
Martin Place Station Shaft	Drained
Gadigal Station Shaft	Drained
Central Station Shaft	Drained
Waterloo Station Shaft	Tanked
Artarmon Substation	Tanked
Artarmon Substation Shaft	Tanked

In summary, the drained structures (Project elements) in the long term include:

- Chatswood dive structure
- Marrickville dive structure
- Crows Nest Station, and associated Crows Nest Station shaft
- Central Station and associated Central Station shaft
- Victoria Cross Station shaft (but not the Victoria Cross Station)
- Martin Place Station shaft (but not Martin Place Station)
- Gadigal Station shaft (but not Gadigal Station)
- Artarmon Substation shaft.

#### 4.2.1.1 Groundwater levels

Changes to groundwater levels at surrounding land uses was identified during the EIS as being “limited to negligible”, as the majority of Project elements are tanked (designed to inhibit the inflow of groundwater). There is no change expected to groundwater levels associated with tanked elements.

Groundwater users in the vicinity of the Project are of sufficient distance from drained elements and therefore there are no anticipated changes in groundwater level at the water supply works (as outlined in Section 4.1.4) due to the Project. Target changes to groundwater level at surrounding land uses (as per the EIS) are shown in

Table 4-6.

Note that the Target change for Barangaroo Station is not currently accurate, due to the Southern Wall at the station not being waterproofed at the time of the start of operation (see Section 4.2.1.2 for more information).

Table 4-6: Target change to groundwater level at surrounding land uses (as per EIS)

Location	Design	Target change (metres)
<b>Chatswood dive site (northern)</b>	Piled retained wall, drained	<0.5 (residual soil), <2.0 (Ashfield Shale)
	Tunnels with segmental lining	<4.0 (assuming deep foundations), otherwise <2.0
<b>Artarmon substation</b>	Tanked Shaft	<0.5 (residential in the vicinity)
<b>Crows Nest Station</b>	Drained station shaft	<1.0 (residual soil), <2.0 (Ashfield Shale and Mittagong Formation)
	Drained station	<2.0 (Mittagong Formation)
	Tunnels with segmental lining	<2.0 (Hawkesbury Sandstone)
<b>Victoria Cross Station</b>	Drained station shaft	<1.0 (residual soil), <4.0 (assuming deep foundations), otherwise <2.0
	Tanked station cavern	<1.0 (residual soil), <4.0 (assuming deep foundations), otherwise <2.0
	Tunnels with segmental lining	<1.0 (residual soil), <4.0 (assuming deep foundations), otherwise <2.0
<b>Harbour crossing</b>	Tunnels with segmental lining	N/A (no change presented since, by design, groundwater inflow must be negligible)
<b>Barangaroo Station</b>	Tanked station shaft	<1.0 (residual soil), <2.0 (Hawkesbury Sandstone)
	Tanked station cavern (not currently achieved)	<2.0 (residential in the vicinity)
	Tunnels with segmental lining	<2.0 (residential in the vicinity)
<b>Martin Place Station</b>	Drained station shaft	<1.0 (residual soil), <4.0 (assuming deep foundations), otherwise <2.0
	Tanked station cavern	<4.0 (assuming deep foundations), otherwise <2.0
	Tunnels with segmental lining	<4.0 (assuming deep foundations), otherwise <2.0
<b>Gadigal Station</b>	Drained station shaft	<1.0 (residual soil), <2.0 (Mittagong Formation), <40.0 (assuming deep foundations), otherwise <2.0 (Hawkesbury Sandstone)
	Tanked station cavern	<4.0 (assuming deep foundations), otherwise <2.0
	Tunnels with segmental lining	<4.0 (assuming deep foundations), otherwise <2.0
<b>Central Station</b>	Drained station shaft	<1.0 (residual soil), <2.0 (residential in the vicinity) (Mittagong Formation, Hawkesbury Sandstone)
	Drained station cavern	<2.0 (residential in the vicinity)
	Tunnels with segmental lining	<2.0 (residential in the vicinity)
<b>Waterloo Station</b>	Tanked station cavern*	<0.5 (fill / aeolian sand), <2.0 (Ashfield Shale), <2.0 (residential in the vicinity) (Hawkesbury Sandstone)
<b>Marrickville dive site (southern)</b>	Piled retained wall, drained	<0.5 (residual soil), <2.0 (due to stormwater channel)

\* Waterloo station shaft is also tanked

## 4.2.1.2 Groundwater inflows

The Project's tunnels, station boxes, shaft and dive structures have been designed to minimise groundwater inflow.

Table 4-7 provides a breakdown of the groundwater inflow (seepage) rates for each Project element, based on the predicted operational seepage rates from the groundwater model (Pells Sullivan Meynink; PSM, 2018). The model predicted groundwater inflow rates in Table 4-7 are for a) 12 months post construction and b) once steady state groundwater conditions are achieved. Steady state time frames vary based on the water table setting and distance to recharge sources for the specific station sites.

Table 4-7: Predicted seepage rates along the Project alignment (from PSM, 2018)

Project Element)	Seepage Rate (kL/day)	
	12 months after construction	Steady-State
Marrickville dive structure	29	17
Chatswood dive structure	29	25
<b>Waterloo<sup>~</sup></b>	161	147
<b>Barangaroo</b>		
- Station <sup>^</sup>	57	NA
- Cavern <sup>^</sup>	242	NA
<b>Crows Nest</b>	104	74
<b>Pitt Street / Gadigal</b>		
- Station Cavern <sup>*</sup>	0	0
- South Shaft	6	6
- North Shaft	7	7
<b>Martin Place</b>		
- Station Cavern <sup>*</sup>	0	0
- South Shaft	9	9
- North Shaft	14	13
<b>Victoria Cross</b>		
- Station Cavern <sup>*</sup>	0	0
- South Shaft	14	11
- North Shaft	19	18

<sup>\*</sup>Inflows are understood to refer to drained conditions, with the permanent condition being tanked and therefore assumption is no seepage during operation

<sup>\*</sup>Tanked Project element

<sup>^</sup>Designed to be tanked, currently drained

Central Station was not included in the groundwater modelling and inflow seepage assessment (PSM, 2019). The inflow modelling for Central Station was detailed in the Hydrogeological Inflow Assessment report (Aurecon GHD Joint Venture; AGJV, 2018), with 0.1 L/s (equating to 8.64 kL/day) modelled as the lower predicted inflow rate for this station.

Due to the proximity of Barangaroo Station to Sydney Harbour and the presence of remediated land (as outlined in Section 4.1.3), Barangaroo Station has been designed to be a tanked structure to prevent groundwater inflows. However, due to construction difficulties and delays, the southern wall of the station will remain un-waterproofed until the southern entrance is complete, as part of the future adjacent Aqualand development. At the time of submission of this Plan, a timeframe for the completion of this development has not been established. The operational use of the Water Treatment Plant at Barangaroo Station is also subject to a consistency assessment by Sydney Metro transferring responsibility to MTS.

The Project was designed to prevent groundwater seepage into the tunnels (tanked). The greatest amount of groundwater inflow is anticipated to occur at drained station boxes (including Crows Nest, Waterloo and Central Stations) and lesser from the shafts and dive structures.

### 4.2.1.3 Ground movement or settlement.

As the tunnels and the majority of other Project elements are tanked, long-term settlement effects associated with groundwater drawdown has not been anticipated at most locations.

Most of the Project alignment falls within the three-millimetre ground movement contour and has been considered to have a negligible ground movement risk, with superficial damage to buildings unlikely. Small areas at station sites and dive sites are within the ten-millimetre contour and may require future building strain and structural assessment to address settlement related risks.

Ground movement associated with groundwater drawdown is considered to be minimal during operation, as most of the predicted ground movement has already occurred during construction.

### 4.2.1.4 Groundwater quality

For operation, the Project has been designed to achieve a maximum water discharge quality equivalent to the 90 percent protection level specified for freshwater ecosystems in accordance with ANZECC guidelines (ANZECC / ARMCANZ, 2000, now ANZG, 2018).

There is a current Environment Protection Licence (EPL #21247) that manages water treated and discharged through the Marrickville WTP. Water is sourced from sumps and drained structures along the project alignment, which is pumped to the Marrickville plant through permanent stormwater infrastructure. The EPL covers frequency of monitoring, monitoring points and interim water quality levels that cannot be exceeded prior to discharge into existing stormwater infrastructure (Alexandra Canal at Tempe).

The interim discharge water quality levels have been determined in consultation with the NSE EPA taking in consideration of the current water quality of the receiving watercourse. These interim water quality levels are part of a Water Treatment Plant Proof of Performance Program. The Program will be reviewed by the NSW EPA, and they will determine final discharge criteria and Monitoring / Limit Conditions for the Marrickville WTP's long term operation.

### 4.2.1.5 Interaction between surface water and groundwater

From the Chatswood dive site to Sydney Harbour, the Project alignment generally coincides with the topographic ridgeline. Aside from local shallow water tables within residual soils, the groundwater level with the Mittagong Formation and Hawkesbury Sandstone is expected to be encountered at depth. Therefore, other than very localised perched water interactions, no interaction between surface water and groundwater have been anticipated, as outlined in the EIS.

For the Sydney Harbour crossing, segmental lining of the metro tunnels have been designed to prevent interaction between surface water and groundwater.

Between the Sydney Harbour crossing and Central Station, the alignment is essentially north-south and parallel to the topographic ridgeline after slewing eastward from Barangaroo Station to Martin Place. Interaction between surface water and groundwater has not been anticipated at Martin Place, Gadigal and Central Stations. Barangaroo Station is anticipated to have an operational Water Treatment Plant pumping groundwater into surface water bodies after the Sydney Metro consistency assessment has been completed after the beginning of first passenger services on CSW.

The Marrickville dive site is located adjacent to an existing lined stormwater channel, which is a proposed discharge location for the Marrickville Water Treatment Plant i.e. this represents an operational "interaction" between groundwater and surface water at this location.

### 4.2.1.6 Groundwater dependent ecosystems

No high priority groundwater dependent ecosystems have been identified in the vicinity of the Project, as per the EIS.

### 4.2.1.7 Cumulative groundwater impacts

As the majority of tunnels and structures will be tanked during operation to prevent groundwater ingress, limited additional effect will arise from future construction projects that may arise in the local area, except for Barangaroo Station and the current temporary Aqualand development and construction (see Section 4.2.1.2)

## 4.2.2 Potential operational risks

Potential operational risks associated with groundwater include:

- Minimal groundwater inflow, as the tunnels, station boxes, shafts and dive structures are either tanked or have been designed to minimise groundwater inflow. Actual ongoing inflows are anticipated to be lower than the estimated maximum presented in the EAD and are outlined in Table 4-7.
- Ingress of contaminated water from tunnels and cross passages and un-tanked station boxes, in places due to both point and diffuse sources of contamination exterior to the alignment.
- Changes to groundwater levels and influences on surrounding groundwater users, noting further changes in groundwater levels are likely to be minor during operational phase compared to during construction.
- Settlement or damage to the tunnel, resulting in additional groundwater inflow and drawdown.
- Potential affect to nearby buildings or other structures as a result of ground movement or settlement (ground consolidations following the drawdown of groundwater). Groundwater drawdown is expected to be minimal during operations, as most drawdown has already occurred during construction.
- Potential aquifer damming could occur where the underground infrastructure restricts groundwater flow through an aquifer, resulting in changes to groundwater levels upstream (mounding) and downstream (lowering). However, the extensive nature of the aquifer units along the Project alignment would likely only lead to very minor change over short distances (metres). Given the absence of groundwater users and interests in close proximity to the Project, it is anticipated that any associated risk is negligible.
- Spills or leaks of petroleum hydrocarbon as a result of the operation of the rolling stock.
- Impacts to surface water quality as a result of the discharge of untreated groundwater, WTP failure or unauthorised discharge.
- Risk of higher-than-expected levels of cyanide being discharged off the Barangaroo site.

#### 4.2.2.1 Operational water treatment plants

With the exception of Barangaroo Station, until it is tanked, groundwater inflow during operation will be captured along the Project alignment and pumped to the operational WTP located adjacent the Marrickville dive structure for treatment, before discharge into the stormwater network. Treated water will then flow approximately 1.2 kilometres through the existing stormwater networks before out-falling into the degraded estuarine aquatic environment of Alexandra Canal at Tempe.

Discharges of treated water from the Marrickville WTP will be monitored to ensure compliance with the Project discharge criteria, in accordance with the EPL# 21247. Treated water quality will be sampled prior to controlled discharges to confirm that the EPL's discharge criteria for water quality are met.

A Water Discharge Impact Assessment (WDIA) has been prepared for the operational Water Treatment Plant for the Marrickville Water Treatment Plant, dated September 2023. The WDIA anticipates the quality of groundwater entering the tunnels and being pumped to the WTP will be altered due to dilution, attenuation and microbial activity, such that no single groundwater investigation location or series of groundwater monitoring bores is likely to give a complete picture of specific water quality likely to be received at the WTP (Environmental Earth Sciences; EES, 2023).

The Barangaroo station site was historically used for commercial purposes, with a gas plant existing where the station now sits. Previous groundwater assessments to the south of the site before construction (METRON, 2021) identified primary contaminants including volatile hydrocarbons, ammonia and phenol which may volatilise into air resulting in a vapour intrusion inhalation risk that may potentially impact station users and workers. After an audit of the site, the auditor deemed that the vapour intrusion modelling scenarios, contaminants of potential concern, adopted toxicity reference values for inhalation pathway and acceptable levels of risk as defined in the *Vapour Intrusion Assessment report* (METRON, 2021) and *Douglas Partners Validation Report* (Ramboll Australia, 2021) are reasonable and acceptable. Further details are outlined in the Besix Watpac Pty Ltd *Barangaroo Groundwater and Vapour Intrusion Assessment*.

The Barangaroo Water Treatment Plant has been designed and constructed to be operated separately to the main Marrickville WTP. For Barangaroo WTP, water discharge is into Sydney Harbour. Due to the higher-than-expected levels of cyanide indicated in the construction groundwater monitoring, MTS cannot use the existing Construction WDIA and WQMP for the Barangaroo WTP as they do not account for the increase in cyanide. Therefore, MTS will develop a new Operational WDIA and WQMP for the Barangaroo WTP in the Q3 2024, and after the consistency assessment has been completed with Sydney Metro. The low risk of volatile hydrocarbons, ammonia and phenol will also be addressed in the WQMP and WDIA to ensure MTS monitor the risk annually to ensure levels are not increasing.

The plan for the Barangaroo WTP at the time of submission is for Besix Watpac to continue water monitoring using their WDIA and WQMP in the interim, until MTS can create and implement the Operational WQMP and WDIA to take into consideration the increase of cyanide in the water test results. MTS anticipates to implement the WQMP and WDIA and obtain an EPL for, or revise the existing EPL to include, the Barangaroo WTP by Q3 2024. Once these items have been achieved, MTS will take over the operation of WTP and implement their own operators to manage the plant moving forward.

Potential sources of groundwater contamination along the Project alignment which would contribute to the water quality sent to the operational WTP, as identified in the OEMP, are described in Table 4-8.

Table 4-8: Potential groundwater contamination sources (adapted from EIS)

Location	Description	Management
<b>Barangaroo</b>	<p>Groundwater contamination was identified in the vicinity of Barangaroo Station as a result of the operation of a historical gasworks facility.</p> <p>Higher than anticipated cyanide levels have been identified in during construction, as outlined in the groundwater monitoring reports.</p> <p>Risk of volatile hydrocarbons, ammonia and phenol to volatilise into air resulting in a vapour intrusion inhalation risk that may potentially impact station users and workers (noting this has not been closed out by site audit).</p>	<p>The Barangaroo Station site will be fully tanked to reduce groundwater ingress when the Aqualand development has been completed and the risk of ongoing contaminated groundwater inflow is considered to be low.</p> <p>MTS' operational WDIA and WQMP (completed by Q3 2024) will allocate new testing levels and processes for the higher-than-expected cyanide concentrations in the groundwater. These plans will also outline groundwater monitoring (as it relates to vapour intrusion) for volatile hydrocarbons, ammonia and phenol, with cessation of monitoring if physical works occur that reduce or eliminate groundwater ingress to the station box (i.e. fully tanking the station box) to align with the expectations in the Vapour Intrusion Assessment Report (METRON, 2021), thereby removing the risk of vapour intrusion.</p>
<b>Central Station</b>	Groundwater contamination was identified in the vicinity of Central Station in association with the historical operation of three gasworks facilities and general railway operation.	Contamination to groundwater has been delineated and managed to support construction and therefore ongoing operation of the Project.
<b>Waterloo Station</b>	Groundwater contamination was identified at Waterloo Station, potentially due to historic industrial use of the site but also likely due to off-site sources and potential migration due to the elevated porosity and permeability of the nearby Botany Sands stratigraphy.	The Waterloo Station site design is fully tanked to mitigate significant groundwater ingress, and as such the risk posed by contamination is considered to be low during operation.
<b>Marrickville Dive Site</b>	Low-level concentrations of organic analytes in groundwater were reported in Site Audit Report (SAR), including volatile organic compounds (VOCs) of cis-1,2-dichloroethene, tetrachloroethylene (PCE) and trichloroethene (TCE), ammonia, dissolved methane and Total Recoverable Hydrocarbons TRH (C6 - C10) (F1). VOC impact was likely associated with diffuse long-term industrial contamination in the surrounding area, including a former dry cleaner that was formally regulated by NSW EPA. Several potential sources of ammonia and methane were identified including former brick pits within the immediate and surrounding areas, and more distal sources at former landfills at Sydney Park and Tempe, as well as potentially associated with swampy soils (rich in organic matter) and possible leaks in aged sewerage infrastructure nearby to this site.	Significant groundwater contamination was not present at this site, therefore further investigation or remediation of groundwater was not required for the purposes of construction or operation.

## 4.3 Management measures

This section describes the overall approach to managing and mitigating risks or potential impacts associated with groundwater during operation of the Project. Management measures are outlined in

Table 4-9.

Table 4-9: Management Measures

ID	Management Measure	Timing	Responsibility	Reference or Source
<b>GW01</b>	Impacts on groundwater users within the draw-down radius of influence from operational activities associated with the Project will be made good.	During operation	Head of Safety, Quality, Risk and Environment	Environmental Performance Outcome (SPIR)  OEMP
<b>GW02</b>	Inflowing groundwater from the tunnel and stations will be monitored, captured and treated at the operational WTP prior to discharge.	During operation	Site Supervisor Environment and Sustainability Advisor	EPL
<b>GW03</b>	Discharges from operational WTP will be monitored to assess compliance with the EPL discharge criteria.	During operation	Environment & Sustainability Advisor	EPL and Water Discharge Permit. WDIA and WQMP for Barangaroo (yet to be developed)
<b>GW04</b>	The set of pumps and pipes to capture groundwater inflow into tunnels and stations for further treatment at the operational Water Treatment Plant will be monitored and maintained.	During operation	Site Supervisor Head of Asset Management	Periodic inspection
<b>GW05</b>	Hazardous substances that may be required for operation will be stored and managed in accordance with the <i>Storage and Handling of Dangerous Goods Code of Practice</i> (WorkCover NSW, 2005).	During operation	Environment & Sustainability Advisor	Environmental Aspects Maps Site Environmental Plan Rail Operating Manual (Hazardous Goods)
<b>GW06</b>	Spill kits will be available and accessible in storage areas for use in works locations if required.	During operation	Environment & Sustainability Advisor	Spill Management Procedure
<b>SCW7</b>	Discharges from the tunnel water treatment plant would be monitored to ensure compliance with the discharge criteria determined in consultation with the NSW Environment Protection Authority.	During operation	Environment & Sustainability Advisor	Groundwater Management Plan  EPL  WDIA and WQMP for Barangaroo (yet to be developed)

## 5 Monitoring and review

### 5.1 Monitoring requirements

Table 5-1 details monitoring actions that will be undertaken during operation associated with groundwater management.

Table 5-1: Summary of monitoring requirements associated with groundwater management

Monitoring details	Frequency	Procedure	Responsibility
<b>Water Quality</b> Water quality monitoring of groundwater flowing to the WTPs, and prior to WTP discharge to confirm if the EPL discharge criteria has been met. If water discharge criteria have not been met, additional sampling will be undertaken, and water will be recirculated to the WTP for further treatment.	Monthly, or as otherwise outlined in the EPL	Water Quality Monitoring Program	Environment & Sustainability Advisor
<b>Contingency</b> Contingency groundwater monitoring will be undertaken if triggered by a significant groundwater discharge increase or seepage is identified that is significantly different to anticipated.	If triggered	Contingency Groundwater Monitoring and Management Procedure (to be prepared on a case-by-case basis)	Environment & Sustainability Advisor
<b>Deep Designed Drained Structures</b> Groundwater level monitoring near deep designed drained structures, as outlined in this Operational Groundwater Management Plan.	Minimum of three years after operations commence	Groundwater Monitoring Program	Environment & Sustainability Advisor

This section will be updated when the WDIA and WQMP has been created and implemented for Barangaroo WTP within the first year of operation.

A Groundwater Monitoring Program will be developed in Q3 2024 to outline the groundwater monitoring MTS are required to undertake and manage as per its operational requirements (as outlined in Table 5-1 above). At the time of submission of this Groundwater Management Plan, MTS are already in the process of developing these plans. MTS commits to working with the DCCEW to create and implement this Groundwater Monitoring Program, where required.

### 5.2 Environmental auditing

Environmental audits will be undertaken in accordance with the indicative audit schedule provided in Table 15 of the OEMP, which includes an environmental audit, a sustainability audit and an operation performance audit. All environmental audits will be carried out in accordance with Section 8.2 of the OEMP.

### 5.3 Review and improvement

Review and improvement of this Plan will be undertaken in accordance with the conditions of approval, the Quality Management Plan and Section 9 of the OEMP. Continuous improvement will be achieved by the ongoing evaluation of environmental management performance and effectiveness of this Plan against environmental policies, objectives and targets.

At a minimum, the groundwater monitoring at the drained structures will be conducted for a period of 3 years, at which time review of the need for further groundwater monitoring will be conducted. The review will include

An MTR, John Holland and UGL Rail Company



comparison of the groundwater monitoring (levels / drawdown) with the model-predicted groundwater levels / drawdown to assess if users have been affected, and to validate and verify the predicted operational outcomes. The groundwater model to be used for comparison is documented in PSM (2019) and AGJV (2018) for Central Station. The review will also provide an opportunity for review of this Plan and reassessment of the Groundwater Monitoring Program.

## 5.4 Incidents

In the event of an environmental incident or unpredicted impacts relating to groundwater during operation of the Project, it is the responsibility of all personnel to report the incident or the event immediately to the Environment & Sustainability Advisor and the Head of Safety, Quality, Risk & Environment.

All environmental incidents are to be reported and managed in accordance with the Pollution Incident Response Management Plan (PIRMP) and the Incident Management Framework (IMF). Incidents are classified based on the incidents severity as shown in the IMF.

All incidents will be managed and reported according to Section 7 of the OEMP.

## 5.5 Complaints

All groundwater related complaints will be handled in accordance with Section 4.4 of the OEMP and the Stakeholder Community Involvement Plan (SCIP).

## 5.6 Non-compliance, non-conformances and corrective actions

All non-compliances, non-conformances and resulting corrective actions associated with groundwater management will be managed in accordance with Section 8.4 of the OEMP.

## 6 Relevant documentation

### 6.1 References

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000a)*
- Aurecon GHD Joint Venture (2018). Central Station Main Works, Hydrogeological Inflow Assessment, Ref: SMCSFCSM-LOR-SMC-GE-REP-000202, July 2018.*
- AW Edwards (2024). Sydney City & Southwest Metro – Crows Nest Station, Construction Groundwater Management Plan, Ref: SMCSWSCN-AWE-SCN-AN-PLN-0000024, January 2024.*
- Besix Watpac (2022). Barangaroo Station Water Quality Monitoring Program, Ref: SMCSWSBR-BWC-SBR-EM-PLN-000302, October 2022.*
- EES (2023). Water Discharge Impact Assessment for Operational Water Treatment Plan, Sydney Metro City and Southwest Linewide Works, Ref: 122075 Version 4, September 2023.*
- Herbert, C (1983). Sydney 1:100 000 Geological Sheet 9130, 1st edition. Geological Survey of New South Wales, Sydney.*
- John Holland (2022). Waterloo Integrated Station Development, Groundwater Management Sub Plan, Ref: SMCSWSWL-JHG-SWL-EM-PLN-000006 Rev 3, August 2022.*
- Laing O'Rourke (2023). Sydney Metro City and Southwest – Central Station Main Works Project, Construction Groundwater Management Plan (CGWMP), Rev 12, August 2023.*
- Lendlease (2023). Construction Groundwater Management Plan, Sydney Metro Martin Place Station – Integrated Station Development, Rev 11.1, August 2023.*
- McNally, G (2009). Shale, salinity and groundwater in Western Sydney. Australian Geomechanics.*
- MTS (2024). Operational Environmental Management Plan, Sydney Metro City & Southwest, Ref: SMCSWTS2-MTS-CSW-EM-PLN-002697, August 2024.*
- NSW Aquifer Interference Policy (NSW Office of Water, 2012)*
- PSM (2018). Sydney Metro City & Southwest – TSE, Hydrogeological Interpretive Report, Ref: SMCSWTSE-JPS-TPW-GE-RPT-110003-01, October 2018.*
- Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005)*
- Sydney 1:100,000 Geological Sheet 9130 (Herbert, 1983)*
- Sydney Metro City & Southwest, Victoria Cross Integrated Station Development, Construction Groundwater Management Plan, Rev J, March 2024.*
- Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011*

# A

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## APPENDIX

## Appendix A Document control

### Appendix A1. Document information

Document Number:	SMCSWTS2-MTS-1NL-EM-PLN-002712
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### Appendix A2. Approval Record

Function	Position	Name	Signature	Date
Prepared by:	Environment & Sustainability Advisor	Peter Scioscia		
Reviewed by:	Head of Safety, Quality, Risk & Environment	Melissa Northey		
Approved by:	General Manager Safety, Quality, Risk & Environment	Amanda Calvez		
Approved by:	A/General Manager Engineering & Maintenance Delivery	Michael Leah		
Approved by:	MTS Chief Executive Officer	Daniel Williams		
Endorsed by:	MTR Representative	Ronnie Tong		
Authorised by:	OpCo2 Delivery Director	Phil Dark		
Approved by:	NRT Chief Executive Officer	Steve Herman		

### Appendix A3. Amendment Record

Date	Rev	Amendment description	By
14/05/2024	01	Initial release.	Peter Scioscia
28/06/2024	02	Updated plan as per external consultation comments for final submission to DPHI.	Peter Scioscia
28/07/2024	03	Updated plan as per DPHI's comments	Peter Scioscia
10/09/2024	04	Updated plan to address DPI Water and DPHI comments	Peter Scioscia

# B

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## APPENDIX

## Appendix B List of acronyms

Acronym	Definition
<b>BS</b>	Barangaroo Station
<b>C&amp;SW</b>	City & Southwest
<b>Development Consent</b>	<ul style="list-style-type: none"> <li>CSSI 7400 – NSW Minister of Planning, January 2017</li> <li>MOD 1 – Victoria Cross and Artarmon Substation (determined 18 October 2017)</li> <li>MOD 2 – Central Walk (determined 21 December 2017)</li> <li>MOD 3 – Martin Place Metro Station (determined 22 March 2018)</li> <li>MOD 4 – Sydenham Station and Metro Facility South (determined 13 December 2017)</li> <li>MOD 5 – Blues Point Acoustic Shed (determined 2 November 2018)</li> <li>MOD 6 – Administrative Changes (determined 21 February 2019)</li> <li>MOD 7 – Administrative Changes (determined 24 June 2020)</li> <li>MOD 8 – Blues Point Access Site (determined 25 November 2020)</li> <li>MOD 9 – Extension to standard construction hours (determined 30 June 2022).</li> </ul>
<b>CoA(s)</b>	Condition(s) of Approval
<b>CSSI</b>	Critical State Significant Infrastructure
<b>DIA</b>	Discharge Impact Assessment
<b>DPE</b>	NSW Department of Planning and Environmental (formerly DPIE)
<b>DPIE</b>	Department of Planning, Industry and Environment (new DPE)
<b>DPI Water</b>	NSW Department
<b>EIS</b>	Environmental Impact Statement
<b>EMS</b>	Environmental Management System
<b>EP&amp;A Act</b>	<i>Environmental Planning and Assessment Act 1979</i>
<b>EP&amp;A Regulation</b>	<i>Environmental Planning and Assessment Regulation</i>
<b>EPA</b>	NSW Environment Protection Authority
<b>EPL</b>	Environmental Protection Licence
<b>EAD</b>	Environmental Assessment Documentation
<b>OGMP</b>	Operational Groundwater Management Sub Plan
<b>IMF</b>	Incident Management Framework
<b>IMS</b>	Integrated Management System
<b>ISCA</b>	Infrastructure Sustainability Council of Australia
<b>LGA</b>	Local Government Area
<b>MTS</b>	Metro Trains Sydney Pty Ltd
<b>OEMP</b>	Operational Environmental Management Plan
<b>OpCo / OpCo2</b>	NRT Group
<b>O&amp;M</b>	Operation and Maintenance
<b>PIRMP</b>	Pollution Incident Response Management Plan

Acronym	Definition
<b>POEO Act</b>	<i>Protection of the Environment Operations Act 1997</i>
<b>REMMs</b>	Revised Environmental Mitigation Measures
<b>SAR</b>	Site Audit Report
<b>SCIP</b>	Stakeholder Community Involvement Plan
<b>SPIR</b>	Submissions and Preferred Infrastructure Report
<b>SQRE</b>	Safety, Quality, Risk and Environment
<b>SMCSW</b>	Sydney Metro City & Southwest
<b>WTP</b>	Water Treatment Plant

# C

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## APPENDIX

## Appendix C Related documents

*Note: some documents will be closely interconnected and will need to be reviewed when this one is changed. Others are simply related content that supplement the material in this document.*

Document Number	Document Title	Review
SMCSWTS2-MTS-CSW-EM-PLN-002107	Carbon and Energy Management Plan	Yes
NWRLOTS-NRT-ADM-EM-PRO-720473-01	Fauna Handling Procedure	Yes
SMCSWTS2-MTS-1NL-EM-PLN-002711	Flooding and Hydrology Plan	Yes
NWRLOTS-NRT-PRD-PM-PLN-000874	Flora & Fauna Management Plan	Yes
SMCSWTS2-MTS-CSW-HE-PLN-002100	Heritage Management Plan	No
SMCSWTS2-MTS-CSW-PM-PLN-002143	Human Resource Plan	No
SMCSWTS2-MTS-eCSW-PM-PLN-002145	Incident Management Plan	No
NWRLOTS-NRT-SWD-FA-POL-723353	MTS Procurement Policy	No
SMCSWTS2-MTS-CSW-EM-PLN-002106	Noise and Vibration Management Plan	Yes
NWRLOTS-NRT-ADM-EM-PRO-720474-01	Noise & Vibration Monitoring Procedure	No
SMCSWTS2-MTS-CSW-EM-PLN-002105	Operations Phase Environment and Sustainability Plan	Yes
NWRLOTS-NRT-ADM-EN-PLN-720416	Pollution Incident Response Management Plan	Yes
SMCSWTS2-MTS-CSW-PM-PLN-002156	Quality Management Plan	No
SMCSWTS2-MTS-CSW-PM-PLN-002158	Risk Management Plan	No
NWRLOTS-NRT-SWD-AM-PLN-723029	Severe Weather Conditions Response Plan	No
NWRLOTS-NRT-SWD-RS-FRW-720717	SMS Element 17: Procurement and Contract Management	No
NWRLOTS-NRT-ADM-EM-PRO-720472-01	Spill Management Procedure	Yes
SMCSWTS2-MTS-CSW-PM-PLN-002162	Stakeholder and Community Involvement Plan	No
NWRLOTS-NRT-ADM-PM-PLN-721415	Training Management Plan	No
SMCSWTS2-MTS-CSW-TF-PLN-002803	Traffic and Transport Management Plan	No
NWRLOTS-NRT-ADM-EM-PRO-720475-01	Unexpected Heritage Finds Procedure	No
NWRLOTS-NRT-ADM-EM-PRO-720476-01	Unexpected Contaminated Finds Procedure	Yes
NWRLOTS-NRT-ADM-EM-PRO-720471-01	Waste Resource Management Procedure	Yes
NWRLOTS-NRT-ADM-EM-PRO-720478-01	Water Quality Monitoring Program	Yes
NWRLOTS-NRT-ADM-EM-PRO-720479-01	Weed Management Procedure	Yes
SMCSWTS2-MTS-CSW-EM-PLN-002697	Operational Environmental Management Plan	Yes

# D

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## APPENDIX

## Appendix D External Consultation Comments

**Department of Climate Change, Energy, the Environment and Water**



Our ref: OUT24/7684

Peter Scioscia  
Metro Trains Sydney  
Email: [Peter.Scioscia@metrotrains-sydney.com.au](mailto:Peter.Scioscia@metrotrains-sydney.com.au)

6 June 2024

**Subject: Sydney Metro Chatswood to Sydenham Project (SSI 7400-PA-528) – Flooding and Hydrology Sub-Plan and Groundwater Management Sub-Plan**

Dear Peter Scioscia

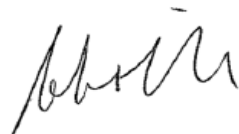
I refer to your request for advice dated 27 May 2024 to the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) Water Group about the above matter.

The NSW DCCEEW Water Group has reviewed the two sub-plans and considers the groundwater management plan requires additional information and clarification to address issues regarding monitoring and impact verification, hydrogeology conceptualisation and inflow rates. No comments are provided for the flooding and hydrology sub-plan.

Please see Attachment A for detailed comments.

Should you have any further queries in relation to this submission please do not hesitate to contact DCCEEW Water Assessments [water.assessments@dpie.nsw.gov.au](mailto:water.assessments@dpie.nsw.gov.au).

Yours sincerely



Rob Brownbill  
Manager, Water Assessments, Knowledge Division  
Department of Climate Change, Energy, the Environment and Water

**Department of Climate Change, Energy, the Environment and Water**



**Attachment A**

**Detailed advice to Metro Trains Sydney regarding the Sydney Metro Chatswood to Sydenham (SSI-7400) – Groundwater Management Sub-Plan**

**1.0 Groundwater monitoring, hydrogeology and impacts**

**1.1 Recommendation – Prior to approval**

The proponent should include groundwater monitoring at deep designed drained structures listed in the operational groundwater management plan (OGMP) for a minimum of three (3) years after operations commence.

**Explanation**

This recommendation was included in former Departmental responses (OUT16/25030 and OUT16/45163) submitted on review of the EIS and RTS for this project. This is still a valid recommendation and is considered a minimum requirement for ongoing validation of the impacts predicted by the initial project modelling, especially at locations where there are designed drained components to the whole project.

Ongoing and cumulative drawdown and groundwater inflow will persist indefinitely at designed drained stations and station shafts (Chatswood dive structure, Artarmon substation Shaft, Crows Nest Station, Crows Nest Station Shaft, Victoria Cross Station Shaft, Martin Place Station Shaft, Gadigal Station Shaft (formerly Pitt St Station), Central Station Shaft, Central Station cavern, Marrickville dive structure.) In addition, where there are deep adjoining basements the drawdown is predicted to be higher than the minimum impact criteria of the NSW Aquifer Interference Policy (2012).

Hence groundwater monitoring at drained structures listed in the operational groundwater management plan is recommended to be continued post construction to verify the continued modelled drawdown depths and extents are not exceeded and users not effected.

**1.2 Recommendation – Prior to approval**

The proponent should update the hydrogeology conceptualisation for the Ashfield shale in the background section of the OGMP to:

- align the statement regarding the quality of groundwater from Ashfield shale with accepted parameters.
- detail the potential evidential causes for any variation observed in the parameter values for the Ashfield shale groundwater quality.

**Explanation**

The OGMP includes the statement "Groundwater is expected to be fresh within Ashfield Shale" This is in error as it is reliably and widely recognised that "Ashfield and Bringelly shales (Late Triassic Wianamatta Group), though primarily aquitards, do include scattered zones of fracture porosity within the weathered bedrock and groundwater is generally saline,

## Department of Climate Change, Energy, the Environment and Water



typically in the range of 5,000 to 50,000 mg/L" (McNally, 2009). Low salinity groundwater in the Ashfield shale would indicate an influx of fresh water – rainfall or leakage from water supply pipes, adjacent irrigation, or possible mounding from the underlying formations. Further, the Ashfield shale at those monitoring locations where there is fresher groundwater may have a more open fracture permeability or higher delamination resulting in higher through flow of fresher water.

### 1.3 Recommendation – Prior to approval

The proponent should update the OGMP to clarify:

- why the construction groundwater inflow rates are being used as the target for the operational phase, whilst it is described that “tunnels, station boxes, shaft and dive structures have been designed to minimise groundwater inflow” and hence lower inflow rates would be expected.
- the predicted groundwater inflow at the tanked Waterloo station.

#### Explanation

The inflow rates provided in the OGMP for the drained structures are the same as that presented for the construction phase of the project. However, a decrease in the operational phase inflows to the drained structures would be expected as “tunnels, station boxes, shaft and dive structures have been designed to minimise groundwater inflow” and are believed to have been presented as lower inflow rates in the technical groundwater modelling for the detailed design phase of the project. It is not clear why the construction inflow rates were included as the targeted inflow in this OGMP other than to be overly conservative. It is also noted that with the higher inflow rates presented, the predicted drawdown extent from the drained structures may extend beyond what is anticipated from the original modelling. Hence an ongoing groundwater monitoring program is recommended for a minimum of three years post construction.

The proponent states in section 4.2.1.2 of the OGMP that “Not all station boxes will contribute to the total groundwater inflow, with the Barangaroo and Waterloo station boxes being designed as tanked structures to mitigate groundwater ingress.” However, Waterloo station is included in Table 4-7 detailing the predicted groundwater inflow rates.

### 1.4 Recommendation – Post approval

The proponent should re-evaluate the groundwater modelling impacts against actual monitored drawdown data once three years of post-construction groundwater monitoring is obtained.

#### Explanation

Re-evaluation of modelled impacts against actual monitored drawdown once 3 years of post-construction groundwater monitoring is obtained will assist to verify and validate the continued drawdown depths and extents have not exceeded those modelled for the operational phase of the SydMetroC2S project. This is specifically for the designed drained structures to ensure that users have not been affected. This will also validate and verify

**Department of Climate Change, Energy, the Environment and Water**



predicted operational outcomes and enable a reassessment of the groundwater monitoring program.

End Attachment A

**Additional comment sent to MTS by DCCEEW after initial consultation period.**

## Detailed advice regarding the Metro Trains Sydney - Sydney Metro City Southwest - CSSI 7400 - Groundwater Management Plan

### 1.0 Water supply, take and licensing

#### 1.1 Recommendation – post approval

The proponent must ensure that they hold sufficient entitlement on a Water Access Licence (WAL) to account for the maximum predicted water take prior to take occurring, unless an exemption can apply.

#### Explanation

Section 4.2.1.2 of the Groundwater Management Plan indicates groundwater take is to occur for the project, however there is no detail on how water entitlement is to be obtained or the applicability of an exemption. Clause 3 of Schedule 4, Part 1 of the *Water Management (General) Regulation 2018* provides for water access license exemptions for transport authorities for construction and maintenance of rail infrastructure where they have been assessed under section 5.5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). However, this exemption does not apply to SSI projects (such as in this instance) as they are not assessed under section 5.5 of the EP&A Act 1979 (noted under Division 5.1). As such, sufficient entitlement must be obtained unless another exemption can be identified.

The NSW DCCEEW Water Group acknowledges the difficulties the water regulations present to this project, and the on-going discussions being held with Sydney Metro to seek a resolution to these challenges. This is an issue NSW DCCEEW Water is actively considering and Sydney Metro is encouraged to continue ongoing communications with NSW DCCEEW Water on the matter.

Evidence of Consultation and Status

Evidence of Consultation

Actions 



Attach Evidence

Below is a list of any consultation you have initiated through the portal. Once the public authority responds it will be automatically attached as evidence. Once each of the public authorities has responded, click "Continue". Please attach any other evidence of consultation not captured by the portal by attaching it below.

Public Authority Response Summary

DPE Water [\(PAE-71324499\)](#)

Status  
Closed

Due Date  
Wednesday, 26 June 2024

Department of Climate Change, Energy, the Environment and Water  
[\(PAE-71324502\)](#)

Status  
Pending Withdrawal

Due Date  
Wednesday, 26 June 2024

No response received






## MTS email to stakeholders to confirm closure of comments

RE: Metro Trains Sydney - Sydney Metro City Southwest Groundwater Management Plan Consultation




Peter Scioscia

To: [water.assessments@dpie.nsw.gov.au](mailto:water.assessments@dpie.nsw.gov.au); Patricia Borges


 Reply
  Reply All
  Forward
 


Mon 24/06/2024 4:24 PM


 SMCSWTS2-MTS-1NL-EM-PLN-002712 - Groundwater Management Plan.pdf 1 MB

Hi,

Please see attached for our updated Groundwater Management Plan with your comments considered (See section 2).

If we could ask that you review the plan and get back to us by COB Wednesday the 26<sup>th</sup> of June with any further comments you may have, or your written approval that we have addressed your concerns.

Thanks very much for taking the time to review the plan.

Regards,

**Peter Scioscia**  
 Environment and Sustainability Advisor  
 Metro Trains Sydney  
 47 Tallawong Road  
 Tallawong NSW 2762  
 PO Box 3839  
 Rouse Hill Village 2155  
 M: 0492 233 352  
 E: [Peter.Scioscia@metrotrains-sydney.com.au](mailto:Peter.Scioscia@metrotrains-sydney.com.au)




**DCCEEW's email confirming their acknowledgement of MTS' commitment to closing out their comments in Q3 2024**

RE: Metro Trains Sydney - Sydney Metro City Southwest Groundwa...




DPIE Water Assessments Ma

To  Peter Scioscia

Cc  DPIE Water Assessments Mailbox



Mon 10:00 AM

 You forwarded this message on 12/08/2024 10:20 AM.

Hi Peter,

Thankyou for your email and final version of the Groundwater Management Plan. DCCEEW Water is supportive of the commitment to create and implement the Groundwater Monitoring Program in Q3 2024. Regarding the commencement of first passenger services, DCCEEW Water has no comment and suggests DPHI Planning be consulted.

Regards

Tim

Tim Baker

Senior Project Officer

Water Assessments

**Department of Climate Change, Energy, the Environment and Water**

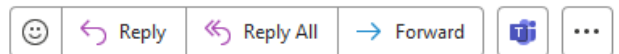
**DCCEEW's email confirming MTS have satisfied their comments after submission of Version 4 to DCCEEW Water**

RE: Metro Trains Sydney - Sydney Metro City Southwest Groundwater Management Plan Comme...



Tim Baker <tim.baker@dpie.nsw.gov.au>

To  Peter Scioscia



Wed 11/09/2024 1:58 PM

 You replied to this message on 11/09/2024 1:59 PM.

Hi Peter,

Yes, DCCEEW Water is satisfied with the updates. The updates are consistent with previous updates that DCCEEW Water were satisfied with and the specific responses are satisfactory.

Regards

Tim