sunwater

Lower Fitzroy River Infrastructure – EPBC (2009/5173) Annual Compliance Report 2024

17 July 2023 to 16 July 2024

Date: 15 October 2024

Report contents

Declaration of accuracy

In making this declaration, I am aware that sections 490 and 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed:

Full name: Inaki Goni

Position: Rookwood Weir Project Director

Organisation: Sunwater Limited

Date: 15 October 2024

Introduction

This Annual Compliance Report is the fourth annual report for the Lower Fitzroy River Infrastructure Project, Queensland, which commenced in July 2020. This report has been prepared by Sunwater Ltd and only considers the Rookwood Weir component of the Lower Fitzroy River Infrastructure project (LFRIP) under the *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999* approval (2009/5173 – Condition 10). The project was granted approval on 28 February 2017 and the conditions were varied on 27 May 2020 and again on 27 July 2021. The approval conditions outlined in Table 1 reflect the varied approval conditions dated 27 July 2021.

Project background

In May 2011, the Coordinator-General (Queensland) declared the LFRIP a 'Coordinated Project' for which an Environmental Impact Statement (EIS) was required pursuant to section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The Coordinator-General approved the LFRIP, subject to conditions and in accordance with recommendations set out in the Coordinator-General's Evaluation Report on 8 December 2016. In addition, the Commonwealth Minister for the then Department of Environment and Energy granted approval (EPBC Referral 2009/5173) for the project on 28 February 2017, subject to specific approval conditions as outlined in the Commonwealth Decision Notice.

The project is a component of the LFRIP. The LFRIP originally contemplated the construction and operation of a raised Eden Bann Weir plus a new weir at Rookwood on the Fitzroy River in Central Queensland. The Rookwood Weir component of the LFRIP included two stages: Stage 1 (RW1) was a concrete crested weir built to full supply level (FSL) of 45.5m Australian Height Datum (AHD, also referred to as Relevant Level (RL)); and Stage 2 (RW2), which involved the addition of flap gates to raise the weir height to FSL of 49.0m AHD/RL. Under the EIS, impacts of the Rookwood Weir component were assessed and approved for construction for a maximum weir height corresponding to RL 49m for RW2.

In late 2017, Sunwater, in partnership with Building Queensland, completed the detailed business case for construction of RW2 as the reference project and the design was progressed to 85 per cent. Further budget assessments in 2019 identified that RW2 would exceed the budget allocated for the LFRIP and in 2019, the project was directed to proceed with RW1 or a weir height corresponding to RL 45.5m. The RW1 project was also to be delivered under an alliance agreement. In 2020, detailed design of RW1 was progressed by the alliance. In parallel to the detailed design process, Sunwater, together with the alliance, identified an opportunity to raise the crest height of RW1 by 700 mm – optimising the yield the weir will deliver. The Queensland and Commonwealth Governments committed to funding this optimised weir height. As such, the current project involves construction of a new weir at Rookwood to a corresponding weir height of RL 46.2m.

Project components and commencement (construction)

The Rookwood Weir project comprises several components including:

- construction of Rookwood Weir
- construction of a new bridge at Riverslea due to the current crossing being inundated and impassable when the weir fills
- upgrades to the current crossing to the Apis Creek Road crossing at Foleyvale
- upgrades to the low-level crossing at Hanrahan's Road downstream of the weir site.

Supporting works that were not included in the EPBC approval included upgrades to the Capricorn Highway/Second Avenue intersection at Gogango and upgrades to Thirsty Creek Road (required to facilitate construction traffic to the weir site). These works commenced in early 2020 and were completed

in mid-2020. Additionally, the project commenced construction on a new fishway on the Fitzroy Barrage in Rockhampton as part of the project's Fish Passage Offset Delivery Plan approved by the Queensland Department of Agriculture and Fisheries (DAF).

Commencement of the action was deemed to occur following commencement of construction of Riverslea Bridge, which occurred on 17 July 2020. A notice of commencement was provided to the Department of Agriculture, Water and Environment (DAWE, now the Department of Climate Change, Energy Efficiency and Water (DCCEEW)) on 22 July 2020.

Purpose of this document

The purpose of this report is to meet the requirements of Condition 10 of EPBC 2009/5173 which states:

> *Within three months of every 12-month anniversary of the commencement of the action, the approval holder must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication must be provided to the Department at the same time as the compliance report is published.*

This report is the fourth annual compliance report for the project and covers the period from 17 July 2023 to 16 July 2024.

Figure 1 Location of Rookwood Weir

Description of activities

Overview

EPBC number	EPBC 2009/5173
Project name	Lower Fitzroy River Infrastructure Project, Queensland
Approval holder and ACN or ABN	Sunwater Limited ABN: 17 020 276 523
Approved action	The raising of the existing Eden Bann Weir, construction, and operation of a new weir near Rookwood crossing, and construction and operation of associated ancillary infrastructure. Note: as outlined above, only the Rookwood Weir component is being undertaken during this reporting period.
Scope of compliance report	Rookwood Weir component of the LFRIP
Location of the project	Rookwood Weir, approximately 66 km south-west of Rockhampton.
Dates for the reporting period of the report	17 July 2023 to 16 July 2024

Details of activities undertaken during reporting period

Activities carried out for the period of 17 July 2023 to 16 July 2024 in accordance with conditions of the EPBC Act approval included construction and wet commissioning phases of the project.

Construction (17 July 2023 – 21 December 2023)

- Continued construction of the weir structure with construction of remaining monoliths
- Completion of the fish passage structure
- Completion of turtle passage on the right bank
- Mechanical and electrical equipment installation for the fish lock and turtle passage
- Dry commissioning of equipment
- Demobilisation of project camp
- Demobilisation of project offices, sheds, laydown areas, concrete batch plants from left and right banks
- Removal of materials and rehabilitation of stockpile areas
- Removal of temporary instream waterway barriers
- Submission of Water Quality Monitoring and Reporting Program (Condition 1), Land Management Code of Practice (Condition 2), Offset Management Plans (Condition 5) and Fitzroy River Turtle Species Management Plan (Condition 6)
- Approval of the Terrestrial Offset Management Plan in accordance with Condition 5
- Conducting turtle monitoring surveys in the Fitzroy River as per Construction Species Management Plan
- Onboarding of Sunwater Operational Environmental Team based in Rockhampton.

Wet Commissioning (17 December 2023 – 16 July 2024)

- Wet commissioning of the fish lock and turtle passage
- Procurement of consultants to undertake environmental packages of work during operational phase e.g. water quality monitoring, turtle monitoring, feral pest management, fish monitoring
- Commencement of water quality monitoring
- Agreement with Woorabinda Aboriginal Shire Council and Woorabinda Pastoral Company for terrestrial offset sites at Foleyvale and Stoney Creek
- Completion of defects works for construction at the weir
- Approval of the Fitzroy River Turtle Offset Management Plans in accordance with Condition 5
- Approval of the Water Quality (Nitrogen) Offset Management Plan in accordance with Condition 5
- Approval of the Fitzroy River Turtle Species Management Plan in accordance with Condition 6
- Approval of the Water Quality Monitoring and Reporting Program in accordance with Condition 1
- Approval of the Land Management Code of Practice in accordance with Condition 2
- Establishment of monitoring equipment within the turtle passage and Fitzroy River.

The action did not enter the operational phase during the reporting period, as no water from Rookwood Weir was used for the purposes of irrigated agriculture during this time. Due to delays with the approval of plans after construction, the implementation of various items within the plans will not commence until the operational phase of the project.

Weir construction site, July 2023

Weir construction site, October 2023

Completion of construction, December 2023

Start of January 2024 following first overflow of the weir

April 2024 during wet commissioning phase

Rookwood Weir, June 2024

Project compliance

Table 1 provides details of the status of compliance with the conditions of the EPBC Act approval notice (EPBC 2009/5173). The following designations have been used to record findings in this compliance report:

Compliant

'Compliance' is achieved when all the requirements of a condition have been met, including the implementation of management plans or other measures required by those conditions.

Non-compliant

A designation of 'non-compliance' should be given where the requirements of a condition or elements of a condition, including the implementation of management plans and other measures, have not been met.

Not applicable

A designation of 'not applicable' should be given where the requirements of a condition or elements of a condition fall outside of the scope of the current reporting period. For example, a condition which applies to an activity that has not yet commenced.

Table 1 EPBC Act approval notice (2009/5173) as varied on 27 July 2021 compliance results

#	Approval condition	Is the project compliant?	Comments
1	**Water Quality Monitoring Program** a) The approval holder must develop a separate water quality monitoring and reporting program (Program) for each weir that is to be constructed or raised, in consultation with the Great Barrier Reef Marine Park Authority and the following Queensland Government departments, that meets current recognised standards for water quality monitoring and reporting: i. Department of Environment and Science (DES); ii. REVOKED iii. Department of Agriculture and Fisheries; and iv. Department of Natural Resources, Mines and Energy; b) The Program for each weir must specify the monitoring activities and procedures capable of predicting potential, and detecting actual, impacts from the action in respect of the relevant weir on the Great Barrier Reef World Heritage Area and National Heritage place that may result from: i. changes in nutrient concentrations and oxygen levels due to decaying vegetation; and ii. agricultural development facilitated by the action in respect of the relevant weir. c) In order to predict, detect and manage impacts on the Great Barrier Reef World Heritage Area and National Heritage place, the Program for each weir must: i. specify water quality characteristics for: ii. the lower Fitzroy River; iii. water entering irrigation areas from higher in the sub-catchment; and iv. water flowing from irrigated areas, and comparable unirrigated areas; v. provide details of water sampling and analysis methodologies for detecting and predicting all water impacts on matters of national environmental significance (MNES) from changes in water quality that may be derived from the action in respect of the relevant weir; vi. provide details of reporting requirements, including timeframes, vii. state the reliability of the Program to predict and detect changes to water quality as a result of implementing the action in respect of the	Not applicable	The revised Water Quality Monitoring and Reporting Program (WQMRP) was submitted to DCCEEW and, following a period of review and revision, was approved on 30 May 2024. In accordance with Condition 18 of the EPBC Act approval, the WQMRP was published on the Rookwood Weir Project web page on 3 June 2024 and is available publicly at: Rookwood Weir - Sunwater No water from Rookwood Weir was used for the purposes of irrigated agriculture prior to the approval by the Minister. The first use of irrigated water for agriculture had not occurred by the end of the reporting period. A Suitably Qualified Person (SQP) was engaged in December 2023 to complete monthly and event based water quality monitoring, in line with the WQMRP. As per the approved WQMRP, an Initial Water Quality Review Report has been prepared by Sunwater summarising all data from the commencement of the action in July 2020 to June 2024 during the construction and wet commissioning phases. This report was submitted to DCCEEW on 17 October 2024. No residual impact on the Great Barrier Reef was determined during this reporting period, with the first assessment to be undertaken in July 2025 as per the WQMRP.

#	Approval condition	Is the project compliant?	Comments
	relevant weir, and include adaptive implementation and continuous improvement systems to enhance its capacity to predict and detect changes to water quality and impacts on the Great Barrier Reef World Heritage Area and National Heritage place; viii. outline how monitoring will be conducted during major flood events for the purpose of the Program; ix. provide details of a process for: x. reviewing the effectiveness of the Program; and xi. amending and/or terminating the Program; xii. provide sufficient information, including the establishment of pre-action baselines, to enable the determination of, and the need for, the water quality offset appropriate to fully offset any residual water quality impacts on the Great Barrier Reef World Heritage Area and National Heritage place for each year in which those impacts occur. d) If the monitoring results from the Program for a weir determine that a residual impact to the Great Barrier Reef World Heritage Area and National Heritage place is likely to or has actually occurred, the approval holder must notify the Minister within 20 business days. If and when such notification occurs, a description of actions and timeframes for the provision of water quality offsets in accordance with the Program and the offsets strategy for that weir must be provided to the Minister within 20 business days after notification. e) Prior to inundation of the impoundment from the construction or raising of a weir, the approval holder must submit the Program for that weir for approval by the Minister in writing. No water from the raising of Eden Bann Weir or Rookwood Weir respectively may be used for the purpose of irrigated agriculture until the Program for that weir has been approved by the Minister and the water quality baselines required under condition 1.c) vii. for that weir have been established. f) The Program for each weir must be designed to complement relevant existing or future water quality monitoring programs including, but not limited to, the Reef 2050 Integrated Monitoring and Reporting Program.		

#	Approval condition	Is the project compliant?	Comments
2	**Land Management Code of Practice** a) The approval holder must develop a separate land management code of practice (code) for each weir that is to be constructed or raised, in consultation with the Great Barrier Reef Marine Park Authority and the following Queensland Government departments and stakeholders: i. Department of Agriculture and Fisheries; ii. Department of Environment and Science; iii. Department of Natural Resources Mines and Energy; and iv. community and relevant agricultural industry bodies. b) Prior to inundation of the impoundment from the construction or raising of a weir, the approval holder must submit the code for that weir for approval by the Minister in writing. No water from the raising of Eden Bann Weir or Rookwood Weir respectively may be used for the purpose of irrigated agriculture until the code for that weir has been approved by the Minister. The approved code(s) must be implemented. c) The code for each weir must: i. include water quality objectives for nutrients, sediments, and farm chemicals for the sub-catchment. Those objectives must include sediment, water column concentration and flow weighted total pollutant loading objectives and targets; ii. demonstrate how the water quality objectives will meet the targets of the Reef 2050 Plan and the Reef Water Quality Protection Plan as updated from time to time; iii. include land and water management practices that will be implemented by the purchaser of the water to ensure water quality objectives are achieved, accounting for seasonal variability, and the types of agriculture and water uses undertaken; iv. include a process for: A. reviewing the effectiveness of the code with respect to achieving and maintaining water quality objectives; and B. amending the code if water quality objectives are not met; d) The code for each weir may include an accreditation scheme for individual irrigators that may reduce any monitoring and compliance obligations.	Not applicable	The revised Land Management Code of Practice (LMCOP) was submitted to DCCEEW and, following a period of review and revision, was approved on 2 April 2024. No water from Rookwood Weir was used for the purposes of irrigated agriculture prior to the approval by the Minister. In accordance with Condition 18 of the EPBC Act approval, the WQMRP was published on the Rookwood Weir Project web page and is available publicly at: Rookwood Weir - Sunwater The first review of a purchaser's LMCP farm plan was conducted by Sunwater's SQP on 1 July 2024 prior to the use of water for irrigated agriculture. During the reporting period, there was one purchaser with a compliant LMCOP farm plan, although no water was utilised by this entity for the purposes of irrigated agriculture during the reporting period. A second farm plan was submitted during the reporting period but review by Sunwater's SQP was not complete by the end of the reporting period. No annual notifications from purchasers were required during this compliance period as operation had not commenced.

#	Approval condition	Is the project compliant?	Comments
	e) The approval holder must require each purchaser, proposing to use water in a manner that may impact on the quality of the water entering the Great Barrier Reef World Heritage Area and National Heritage place, to comply with the approved code for the relevant weir; and f) The approval holder must require the purchaser to provide annual notification of compliance with the approved code for the relevant weir, as it applies to land management practices on their property or require the purchaser to participate in the accreditation scheme under condition 2d).		
3	Pre-clearance surveys a) Prior to clearing/inundation of vegetation for each weir that is to be constructed or raised, the approval holder must undertake a pre-clearance survey and prepare a preclearance survey report for the impact area of the relevant weir to identify the extent of EPBC Act listed threatened species and ecological communities. b) The pre-clearance survey for each weir must: i. be undertaken in accordance with the Department's survey guidelines in effect at the time of the survey, or another survey methodology agreed by the Department prior to the survey being undertaken; ii. be undertaken by a suitably qualified person/s. iii. Revoked iv. Revoked v. Revoked c) The pre-clearance survey report for each weir must: i. Include details of survey methods utilised and the timing of the survey ii. identify measures to minimise mortality of EPBC Act listed threatened species and impacts on listed threatened ecological communities; iii. identify measures to protect EPBC Act listed threatened species and ecological community habitat located adjacent to the cleared/inundated areas; iv. for any EPBC Act listed threatened species and ecological communities identified during the survey, provide to the Department precise data on the areas of habitat or ecological community directly and indirectly	Compliant	Pre-clearance surveys were undertaken in May 2019 and January 2020. The formal pre-clearance report was submitted to DAWE (now DCCEEW) on 25 February 2020. Pre-clearance surveys for the inundation area were undertaken in mid-September 2021. The formal clearance report was submitted to DAWE (now DCCEEW) on 22 October 2021.

<table>
<tr><th>#</th><th>Approval condition</th><th>Is the project compliant?</th><th>Comments</th></tr>
<tr><td></td><td>impacted by the action and a description of proposed management measures to be implemented.
d) The approval holder must provide the pre-clearance survey report for each weir to be constructed or raised to the Department within 25 business days after the completion of the survey for the respective weir.</td><td></td><td></td></tr>
<tr><td>4</td><td>Offset strategy
a) The approval holder must submit for the Minister's written approval, a separate Offset Strategy for each weir to be constructed or raised, which identifies the residual impacts arising from the respective weir on the following MNES:
i. Brigalow (Acacia harpophylla dominant and codominant) ecological community;
ii. Black Ironbox (Eucalyptus raveretiana);
iii. Red Goshawk (Erythrotriorchis radiates);
iv. Fitzroy River Turtle (Rheodytes leukops);
v. Great Barrier Reef World Heritage Area and National Heritage place.
b) The offset strategy for each weir must propose in general terms the offsets that the approval holder will provide for the residual impacts arising from the construction or raising of the relevant weir, as set out in Table 1, and how the approval holder intends to deliver the offset obligations.
Table 1
<table>
<tr><th>Impact</th><th colspan="2">Indicative impact area/quantity</th></tr>
<tr><td></td><td>Rookwood Weir</td><td>Eden Bann Weir</td></tr>
<tr><td colspan="3">Listed threatened species and ecological communities</td></tr>
<tr><td>i. Inundation of Fitzroy River Turtle nest sites within the weir impoundment areas</td><td></td><td></td></tr>
<tr><td>ii. Modifying aquatic habitat for the Fitzroy River Turtle</td><td>660 ha</td><td>282 ha</td></tr>
<tr><td>iii. Loss of Red Goshawk nesting habitat</td><td>588 ha</td><td>384 ha</td></tr>
</table></td><td>Compliant</td><td>The Biodiversity Offsets Strategy (BOS) for the original project design was approved by DAWE (now DCCEEW) on 27 April 2021.
The Offsets Strategy included field verified vegetation and impact areas at the Riverslea Bridge and Rookwood Weir construction areas. The Offsets Strategy was approved with the requirement that following the inundation area pre-clearance surveys, the Strategy be revised to include the verified impacts requiring offsetting and be submitted for approval by the Minister. In addition, since the Strategy was approved, the overall height of the weir was increased from RL 45.5 to RL 46.2. As outlined against Condition 3, pre-clearance surveys of the inundation area were undertaken in September 2021. These surveys included the additional areas required for inundation to RL 46.2.
As such, the Strategy was revised based on the increased weir height to RL 46.2 and pre-clearance surveys. The revised Strategy was submitted to DCCEEW in January 2022 and approved on 17 November 2022. In accordance with Condition 18 of the EPBC Act approval, the Offset Strategy was published on the Rookwood Weir Project web page and is available publicly at:
Rookwood Weir - Sunwater</td></tr>
</table>

#	Approval condition			Is the project compliant?	Comments
	iv. Loss of the area of Black Ironbox habitat	Impact area to be determined by pre-clearance surveys required under condition 3			
	v. Loss of the area of Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community	Impact area to be determined by pre-clearance surveys required under condition 3			
	vi. Any increase in nutrients, sediments, farm chemicals and/or other water quality parameters above baseline levels	As determined by the Program approved in accordance with condition 1			
	vii. Any increase in nitrogen due to decaying vegetation in the inundation area	At least 645 tonnes [1, 2]	At least 458 tonnes[2]		
		Unless the monitoring required at condition 1b) i. conclusively determines that the impact is less than predicted[1]			

Notes: (1) The indicative areas/quantities will need to be determined based on the particular weir to (first) be constructed or raised. (2) Unless a different impact area is determined by the pre-clearance survey required under condition 3.

c) The offset strategy for each weir must include, but is not limited to:
   i. offset outcomes to be achieved, for listed threatened species and ecological communities listed in Table 1;
   ii. details of how offsets will be provided for modifying Fitzroy River Turtle aquatic habitat (Table 1, item ii.);
   iii. the timeline and legal mechanism/s for securing the offset area/s and offset outcomes;
   iv. information about how the offset area/s will provide connectivity with other relevant habitats and biodiversity corridors;

#	Approval condition	Is the project compliant?	Comments
	v. details of how water quality offsets will be provided consistent with Table 1; vi. inputs and justification for inputs demonstrating that the offsets are likely to be in accordance with the EPBC Act Environmental Offsets Policy and relevant Reef 2050 Plan requirements, including the net benefit principle. d) The approval holder must not commence construction or raising of the relevant weir unless the offset strategy for that weir has been approved by the Minister in writing. The approved offset strategy relevant to each weir must be implemented.		
5	**Offset Management Plans** a) The approval holder must submit for the Minister's written approval a separate offset management plan for each weir to be constructed or raised, addressing each offset requirement in condition 4 for any weir for which an offset strategy has been approved by the Minister. b) The offset management plan for each weir must be consistent with the approved offset strategy for the relevant weir. c) The offset management plan for each weir must include, but not be limited to: i. the offset area/s to be secured for the listed threatened species and ecological communities listed in Table 1; ii. a description and map to clearly define the location and boundaries of the offset area/s, accompanied by the offset attributes; iii. information about how the offset area/s provide connectivity with other relevant habitats and biodiversity corridors; iv. a description of the management measures (including timing, frequency, and duration) that will be implemented in each offset area; v. details of how the management measures proposed are consistent with relevant approved conservation advice, recovery plans and threat abatement plans; vi. performance and completion criteria for implementing the offset management plan/s for evaluating its effectiveness, and criteria for triggering corrective action/s;	Not applicable	Offset Management Plans (OMP) have been developed and submitted to DCCEEW in accordance with Condition 5 for the following Matters of National Environmental Significance: • Inundation of Fitzroy River Turtle nest sites • Modification of Fitzroy River Turtle aquatic habitat • Loss of Red Goshawk nesting habitat • Loss of Black Ironbox habitat • Loss of Brigalow habitat • Great Barrier Reef World Heritage Area and National Heritage place. The following OMPs have been approved by DCCEEW. In accordance with Condition 18 of the EPBC Act approval, the OMPs were published on the Rookwood Weir Project web page and are available publicly at: Rookwood Weir - Sunwater ***Terrestrial Offset Management Plan (incorporating Red Goshawk, Black Ironbox and Brigalow)*** OMP was approved on 8 August 2023. Email sent to DCCEEW at the department's request on 27 May 2024 regarding non-conformance with dates stated in the OMP due to delays between when the OMP was

#	Approval condition	Is the project compliant?	Comments
	vii. a program for monitoring and reporting on the effectiveness of the management measures, and progress against the performance and completion criteria; viii. a description of potential risks to the successful implementation of the offset/s, and contingency measures that can be implemented to mitigate against these risks; and ix. evidence that the offsets are in accordance with the EPBC Act Environmental Offsets Policy and relevant Reef 2050 Plan requirements including the net benefit principle. d) In respect of offsets for impacts to the Fitzroy River turtle, the offset management plan for each weir must: i. be in accordance with Appendix G of the additional information to the EIS (AEIS) and the Addendum to the AEIS ii. ensure the effectiveness of the offset in achieving long-term protection and management of Fitzroy River Turtle nesting habitat until the outcomes of the offset management plan are achieved; iii. specify the offset delivery mechanism. If the mechanism is through a financial settlement, then the financial contribution must be calculated using the Financial Settlement Offset Calculator and offset payments in relation to each weir must be made in full within one year of the completion of each stage of construction or raising of that weir. e) The approval holder must not begin inundation of the impoundment of a weir unless the Minister has approved in writing an offset management plan for the relevant weir for all offset requirements in the approved offset strategy for that weir. The approved offset management plan for each weir must be implemented. f) For the offsets for modifying Fitzroy River turtle aquatic habitat (condition 4. b) ii. [within Table 1]), the approval holder may elect to provide a financial offset in a manner approved by the Minister, as calculated using the Financial Settlement Offset Calculator, or as otherwise agreed by the Minister.		approved and the start of operation of the weir. Refer to Appendix A. Black Ironbox survey undertaken 8-10 July 2024 over 50 per cent of the offset area. No Black Iron box detected. Potential planting areas identified. *Aquatic Species Offset Management Plans (incorporating Fitzroy River Turtle nest sites and aquatic habitat)* OMP was approved on 8 January 2024. Actions undertaken during the current compliance period included: • Contract awarded 5 February 2024 for turtle nest protection activities and feral pest management activities • Landholder events 19 and 20 February 2024 detailing Sunwater's nest protection and feral pest management programs. These events were held prior to initiation of the control program to gain landholder permission for land access (ongoing). *Water Quality (Nitrogen) Offset Management Plan (Great Barrier Reef World Heritage Area)* OMP was approved on 30 May 2024 with a revised nitrogen offset quantity of 194 tonnes to be delivered over a period of 10 years, with 80 per cent to be delivered within six years. A number of actions were undertaken during the current compliance period to establish the offset projects. Refer to WQOMP status plan in Appendix B. Water Quality Offset update report is to be submitted after 12 months of operation in the July 2025 reporting period.

#	Approval condition	Is the project compliant?	Comments
			Fitzroy River Turtle Nest Protection Management Plan and Expanded Feral Pest Animal Management Plan Actions undertaken during the current compliance period included: • Contract awarded 5 February 2024 for turtle nest protection activities and feral pest management activities • Landholder events 19 and 20 February 2024 detailing Sunwater's nest protection and feral pest management programs. These events were held prior to initiation of the control program to gain landholder permission for land access (ongoing).
6	**Fitzroy River Turtle** a) The approval holder must submit for the Minister's written approval, a separate species management plan to minimise impacts on the Fitzroy River turtle (*Rheodytes leukops*) for each weir to be constructed or raised b) The species management plan for each weir must: i. be developed in consultation with DES and be in accordance with Appendix E of the AEIS; ii. detail how the population and habitat for the Fitzroy River turtle will be protected during construction and operation of the action; iii. detail how, subject to compliance with the Queensland Fitzroy Basin Water Plan and the weir operating plan, the approval holder will manage weir storage levels within the impoundment of the relevant weir to minimise the inundation of Fitzroy River turtle nests; and iv. detail how the approval holder will manage the impoundment water levels of the relevant weir during the period from May to January to encourage high nesting positions and reduce the risk of nest inundation. c) The species management plan may include subplans relative to each development stage (if relevant). d) The approval holder must not commence construction or raising of a weir unless the species management plan for the relevant weir has been approved	Compliant	The construction Species Management Plan (SMP) for the Fitzroy River Turtle was approved by DAWE (now DEECCW) on 02 November 2020. Due to the time differences between construction and operational impacts, DAWE agreed that the species management plan could be split with the first plan covering the construction areas and a second plan covering the operational requirements. The Operational SMP was developed in consultation with and approved by the Queensland Department of Environment and Sciences (DES) under Condition 1 of Appendix 2 of the Coordinator-General Imposed Condition for Rookwood Weir. This SMP was submitted to DCCEEW and was approved on 8 January 2024. In accordance with Condition 18 of the EPBC Act approval, the Offset Strategy was published on the Rookwood Weir Project web page and is available publicly at: Rookwood Weir - Sunwater Monitoring of turtle populations by Sunwater's SQP commenced in April 2024 with the servicing of acoustic

#	Approval condition	Is the project compliant?	Comments
	by the Minister in writing. The approved species management plan for each weir must be implemented.		hydrophones installed during the construction period up and downstream of the weir. Reporting for this aspect is included in Appendix C.
7	**Turtle passage infrastructure** a) At each weir to be constructed or raised, the approval holder must: i. construct turtle passage infrastructure (suitable for the Fitzroy River turtle) before the commencement of operation of the relevant weir; ii. construct turtle passage infrastructure at the relevant weir site in accordance with a design informed by the turtle movement study (at conditions 7b) and 7c)); iii. ensure turtle passage infrastructure and weir design and operation minimise the incidence of turtle injury; iv. monitor the effectiveness of the turtle passage infrastructure against the success criteria approved by the Minister (at conditions 7c) iii. and 7d)) twelve months after the construction of the relevant weir; and v. report to DES on the effectiveness of the turtle passage infrastructure in relation to the turtle movement success criteria, (taking account of wet and dry seasons and a full year of turtle movement, breeding and nesting distribution) twelve months after the construction of the relevant weir and thereafter annually and include a copy as part of the annual environmental report required under condition 10. b) Before finalising the design of turtle passage infrastructure for each weir (condition 7), the approval holder must undertake a turtle movement study for the relevant weir (Study), in accordance with the AEIS and Addendum to the AEIS, to collect baseline data for relevant sections of the Fitzroy River. c) The Study for each weir must: i. be prepared and undertaken by a suitably qualified person in accordance with a methodology determined in consultation with DES; ii. collect data on seasonal movement patterns and home ranges of the Fitzroy River turtle. The study must include wet and dry season movements, breeding periods and nesting distribution; and	Compliant	On 15 August 2022, the 'success criteria' was approved by the Minister in writing and construction of the turtle passage continued. The turtle movement study, in accordance with the AEIS and Addendum to the AEIS, commenced in 2017 and was carried through to 2023 in line with the completion of construction. Future turtle movement studies are to be undertaken in the operational phase as per the approved aquatic species management plans. As per Condition a) part iv and the approved Aquatic Species Conservation Summary Report, monitoring of the turtle passage infrastructure commenced on 14 April 2024 with the installation of acoustic hydrophones within the turtle passage infrastructure. Reporting for this aspect is included in Appendix C. Reporting (Condition a) part v) for these aspects will be included in the next annual report. As per part f) Sunwater has engaged a SQP – refer to details in SMP. Acoustic hydrophone monitoring equipment was installed in the turtle ladder by Sunwater's SQP in April 2024 for monitoring the movement of tagged turtles through the turtle passage. Reporting for this aspect is included in Appendix C.

#	Approval condition	Is the project compliant?	Comments
	iii. inform the development of criteria for demonstrating successful movement of Fitzroy River turtles around the relevant weir (success criteria). d) The approval holder must not commence the construction of turtle passage infrastructure at the Eden Bann or Rookwood Weir sites unless the success criteria for the relevant weir have been approved by the Minister. The approval holder must provide written advice to the Minister on how DES's advice has been addressed for each weir prior to submitting the success criteria for approval. e) The turtle passage infrastructure design and success criteria approved under condition 7d) must be applied to the Eden Bann Weir or Rookwood Weir, as relevant. f) The monitoring and reporting of the effectiveness of the turtle passage infrastructure (condition 7a) iv.) must be undertaken by a suitably qualified person and externally peer reviewed. g) If the monitoring specified by conditions 7a) iv. and 7a) v. fails to demonstrate that the success criteria are being met, the turtle passage infrastructure must be modified in accordance with advice provided by DES with the aim of achieving the success criteria. h) The approval holder must maintain the operation of the turtle passage infrastructure while the relevant weir remains in operation and provide for the safe access by officers of DES and the Department to the weir infrastructure (including the turtle passage) for monitoring and compliance purposes. i) If the monitoring specified by condition 7a) iv. Demonstrates that the success criteria are not being met, the approval holder must implement an ongoing catch and release program for the Fitzroy River Turtle until the criteria are met. j) The catch and release program must ensure complete, safe turtle passage upstream and downstream of the relevant weir site. k) The catch and release program must be prepared and implemented by a suitably qualified person in accordance with a methodology determined in consultation with DES.		

#	Approval condition	Is the project compliant?	Comments
	l) In relation to the raising of Eden Bann Weir, the approval holder must undertake construction works at Glenroy Crossing outside of the nesting (September to November) and hatching (December to February) seasons for the Fitzroy River Turtle, unless surveys required by condition 7m) fail to identify the presence of turtle nests. m) Prior to undertaking construction works at Glenroy Crossing (condition 7 (l)), a suitably qualified person must undertake surveys for Fitzroy River Turtle nests, gravid females, and hatchlings within 100 meters of Glenroy Crossing. n) If any Fitzroy River Turtle nests, gravid female turtles and/or hatchlings are identified during surveys referred to in condition 7m), the approval holder must undertake management protocols to avoid and/or minimise disturbance to turtles.		
8	Standard conditions Within 5 business days after the commencement of the action, the approval holder must advise the Department in writing of the actual date of commencement of the action.	Compliant	Notice of commencement was provided to DAWE (now DCCEEW) on 22 July 2020. Action commenced 17 July 2020.
9	The approval holder must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plan, program, strategy, or code of practice required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media	Compliant	Sunwater has maintained records substantiating all activities associated with or relevant to the conditions of approval.
10	Within three months of every 12-month anniversary of the commencement of the action, the approval holder must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication must be provided to the Department at the same time as the compliance report is published.	Compliant	The 2023 Compliance Report was uploaded to the Rookwood Weir Project webpage in October 2023. This compliance report will be published on the Rookwood Weir Scheme's web page (Rookwood Weir - Sunwater) within the relevant timeframe.

#	Approval condition	Is the project compliant?	Comments
11	Upon the direction of the Minister, the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor and audit criteria must be approved by the Minister prior to the commencement of the audit. The audit report must address the criteria to the satisfaction of the Minister.	Not applicable	This did not occur during the reporting period.
12	The approval holder may choose to revise a management plan, program or code of practice approved by the Minister under conditions 1, 2, 5 and 6 without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan, program or code of practice would not be likely to have a new or increased impact. If the approval holder makes this choice they must: a) notify the Department in writing that the approved action management plan has been revised and provide the Department with: i. an electronic copy of the revised plan, program, or code of practice; ii. an electronic copy of the revised plan, program or code of practice marked up with track changes to show the differences between the approved revised plan, program or code of practice and the revised plan, program, or code of practice; iii. an explanation of the differences between the approved revised plan, program or code of practice and the revised plan, program, or code of practice; iv. the reasons the approval holder considers that taking the action in accordance with the revised plan, program, or code of practice; would not be likely to have a new or increased impact; and v. written notice of the date on which the approval holder will implement the revised plan, program, or code of practice; (RAMP implementation date), being at least 20 business days after the date of providing notice of the revision of the revised plan, program or code of practice, or a date agreed to in writing with the Department. b) subject to condition 15, implement the revised plan, program, or code of practice from the RAMP implementation date.	Compliant	No other revisions of management plans or reports have occurred within the scope of this compliance report.

#	Approval condition	Is the project compliant?	Comments
13	The approval holder may revoke their choice under condition 12 at any time by notice to the Department. If the approval holder revokes the choice to implement a plan, program, or code of practice, without approval under section 143A of the EPBC Act, the plan, program, or code of practice previously in force must be implemented.	Not applicable	This did not occur during the reporting period.
14	Condition 12 does not apply if the revisions to the approved plan, program or code of practice include changes to environmental offsets provided under the plan, program, or code of practice in relation to a matter protected by a controlling provision for the action, unless otherwise agreed in writing by the Minister. This does not otherwise limit the circumstances in which the taking of the action in accordance with a revised plan, program or code of practice would, or would not, be likely to have new or increased impacts.	Compliant	No other revisions of management plans, reports or strategies has occurred within the scope of this compliance report.
15	If the Minister gives a notice to the approval holder that the Minister is satisfied that the taking of the action in accordance with the revised plan, program or code of practice would be likely to have a new or increased impact, then: a) Condition 12 does not apply, or ceases to apply, in relation to the plan, program or code of practice; and b) The approval holder must implement the plan, program or code of practice specified by the Minister. To avoid any doubt, condition 15 does not affect any operation of conditions 12, 13 and 14 in the period before the day the notice is given. At the time of giving the notice the Minister may also notify that for a specified period of time that condition 12 does not apply for one or more specified plan, program or code of practice required under the approval.	Not applicable	The Minister did not give a notice to Sunwater.
16	Conditions 12, 13, 14 and 15 are not intended to limit the operation of section 143A of the EPBC Act which allows the approval holder to submit a revised plan, program, or code of practice to the Minister for approval.	Not applicable	Note only.
17	If, at any time after 5 years from the date of this approval, the approval holder has not substantially commenced the action, then the approval holder must not commence the action without the written agreement of the Minister.	Compliant	Notice of commencement was provided to DAWE (now DCCEEW) on 22 July 2020. Action commenced 17 July 2020.
18	Unless otherwise agreed to in writing by the Minister, the approval holder must publish all management plans, reports, strategies, or codes of practice referred	Compliant	Approved management plans are available on the Sunwater website: Rookwood Weir - Sunwater

#	Approval condition	Is the project compliant?	Comments
	to in these conditions of approval on their website. Each management plan, report, strategy, or code of practice must be published on the website within 15 business days of being approved by the Minister or being submitted under condition 12a).		
19	Reporting Compliance The approval holder must notify the Department in writing of any: incident; non-compliance with the conditions; or non-compliance with the commitments made in approved plans. The notification must be given as soon as practicable, and no later than two business days after becoming aware of the incident or non-compliance. The notification must specify: a) any condition which is or may be in breach; b) a short description of the incident and/or non-compliance; and c) the location (including co-ordinates), date, and time of the incident and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.	Compliant	No non-compliance reporting occurred during the reporting period.
20	The approval holder must provide to the Department the details of any incident or non-compliance with the conditions or commitments made in an approved plan as soon as practicable and no later than 10 business days after becoming aware of the incident or non-compliance, specifying: a) any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future; b) the potential impacts of the incident or non-compliance; and c) the method and timing of any remedial action that will be undertaken by the approval holder.	Compliant	No non-compliance reporting occurred during the reporting period.
21	Interpretation The action may be constructed and operated in two stages. Each stage comprises the construction or raising of one weir, the consequent inundation of the impoundment created by that weir and any ancillary works required in order to raise or construct the particular weir and the operation of that weir and ancillary infrastructure. To allow the proposed action to be so staged, and notwithstanding any condition in this Approval to the contrary, each condition in this Approval is to be read, interpreted, and implemented so as to apply only to the relevant weir that is to be constructed or raised.	Not applicable	Note only.

Appendix A – Terrestrial Offset Management Plan

Black Ironbox survey Lot 1LR146

As required under the Offset Area Management Plan, the offset area for *Eucalyptus raveretiana* (Black Ironbox) was surveyed from 8-10 July 2024 by four Sunwater environmental staff by foot. The survey was led by Geoff Sharp who is a Suitably Qualified Person (SQP) for undertaking threatened plant surveys in Queensland. Approximately 50 per cent of the offset area was traversed (Figure 1). Access was difficult due to areas of grass more than two metres tall, steep banks, crocodiles and frequent side gullies.

The offset area was confirmed to be suitable habitat for Black Ironbox and consisted of *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines with areas of *Eucalyptus coolabah* fringing the active and relict channels of the Mackenzie River.

No Black Ironbox were detected during the survey. Relatively open areas with safe access were identified for possible future planting of Black Ironbox if required. Seed can be opportunistically collected from Black Ironbox trees on the Mackenzie River in 2024-25 for cultivation to provide 245 trees at year 10 post operation of the weir.

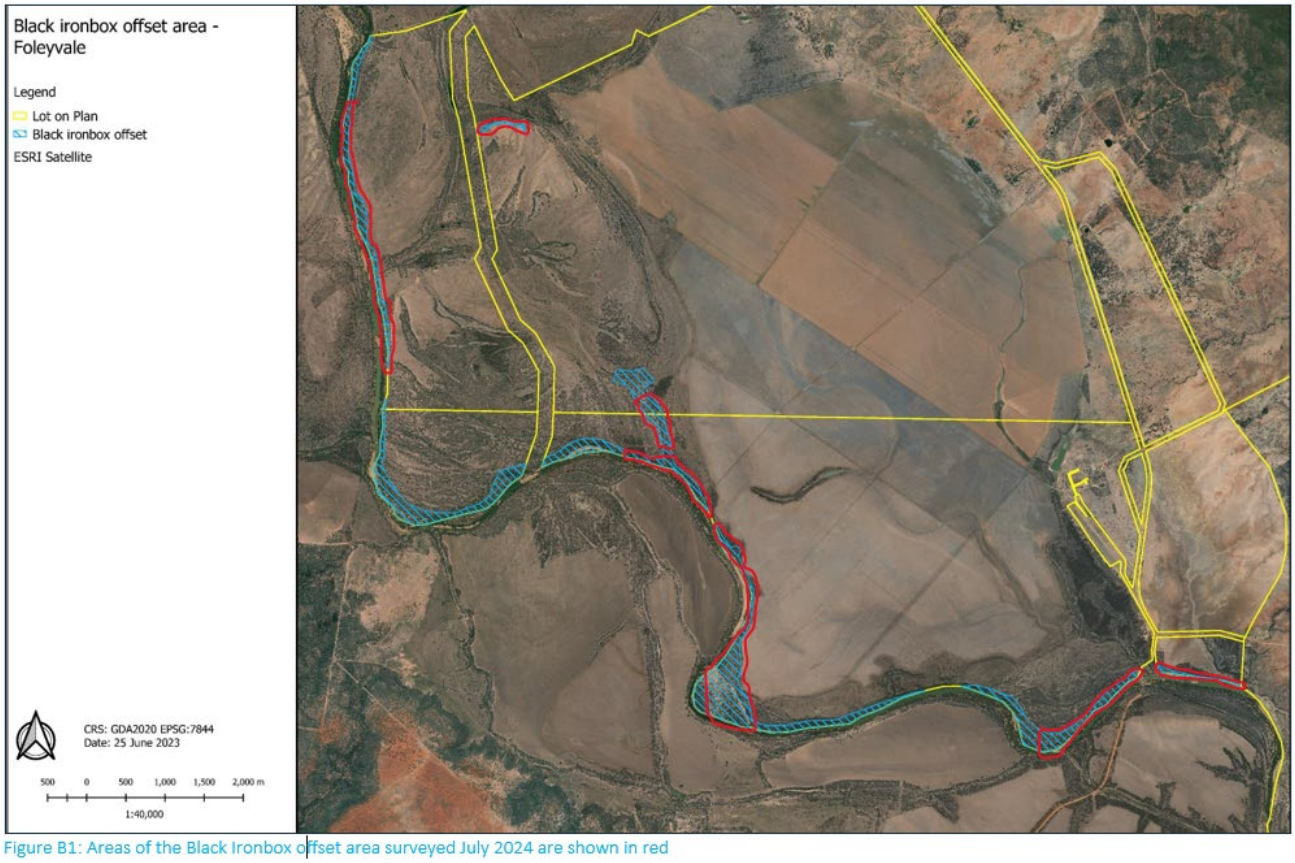

Figure B1: Areas of the Black Ironbox offset area surveyed July 2024 are shown in red

Appendix B – Water Quality Offset Management Plan

The following is a list of actions commenced during the reporting period in preparation for the project entering the operational phase and delivery of the water quality offset:

Offset project	WQOMP reference	Description of actions
Foleyvale / Stoney Creek streambank rehabilitation	5.1	**1. Review of overall strategy (Foleyvale and Stony Creek Offset)** Review the offset strategy and previously completed work (Soil Horizon report) to ensure that that site investigations capture the information to confirm the assumptions. **2. Review of the proposed offset works and supplementary activities** Identification of additional slope stability/rehabilitation works required to achieve the offset. **3. Field investigations and LIDAR capture** Planning for completing field investigations to confirm the parameters within the offset calculation. Completed a LIDAR flight of the site to allow erosion calculations to be completed.
Water quality research projects	5.2	Established arrangements for the funding of two water quality research projects with Central Queensland University (CQU). This involves PhD and Masters students undertaking research work over the next three years to contribute towards the offset, specifically: • PhD: Pertaining to efficient nutrient monitoring frameworks for tropical impoundments • Masters: Taxonomic composition of microalgae following freshwater impoundment and identification of cost-effective monitoring options.
Streambank rehabilitation	5.3	Communications and meetings held with Natural Resource Management Groups regarding project planning and delivery arrangements for the four prospective sites. • Fitzroy Basin Association • Burnett Mary River Group.
Weed harvesting	5.4	Communications and meetings held with parties involved in the pilot program.

Appendix C – Rookwood Weir Turtle Movement Study – Establishment Phase

Technical Memorandum

10 May 2024

To	Alison Bird	**Contact No.**	0429 895 670
Copy to		**Email**	alison.bird@tunuba.com.au
From	Lauren Pratt and Dr Natalie Clark	**Project No.**	12627098
Project Name	Rookwood Weir Turtle Movement Study - Establishment Phase		
Subject	Rookwood Weir Establishment Phase Field Summary Memorandum		

1. Introduction

The field team, involving Natalie Clark (GHD), Lauren Pratt (GHD), Craig Chargulaf (GHD), Sheldon Edmund (Tunuba) and Chris Pietsch (Blue Earth Environmental), undertook the Rookwood Weir Establishment Phase April 2024 field survey between 14th to 18th April 2024. Included below is a summary of the works completed and recommendations.

1.1 Scope of work

The scope of works for the Establishment Phase Turtle Movement Study included:

– Deployment of the acoustic hydrophone array and initial download/maintenance following the first wet season inflows/weir spilling
– Identification of remote camera installation requirements and data storage and analysis procedures
– Development of a procedure for turtle capture
– Training of Rookwood Weir Operators in completion of Turtle Passage Inspection Form and Turtle Observation Form
– Preparation of an Establishment Summary Technical Memorandum to document the methodology and results of the Establishment Phase and identify next steps.

1.2 Purpose of this Memorandum

The purpose of this memorandum is to detail the outcomes of the Rookwood Weir Establishment Phase April 2024 field survey. This memorandum also provides high-level information on remote camera requirements, suggested hydrophone anchor options and next steps.

1.3 Scope and limitations

This technical memorandum has been prepared by GHD for Tunuba Pty Ltd. It is not prepared as, and is not represented to be, a deliverable suitable for reliance by any person for any purpose. It is not intended for circulation or incorporation into other documents. The matters discussed in this memorandum are limited to those specifically detailed in the memorandum and are subject to any limitations or assumptions specially set out.

The opinions, conclusions and any recommendations in this memorandum are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this memorandum are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this memorandum.

Accessibility of documents

If this Technical Memorandum is required to be accessible in any other format this can be provided by GHD upon request and at an additional cost if necessary.

2. Remote telemetry

2.1 Acoustic hydrophones

One objective of the field survey was to deploy additional acoustic hydrophones for the turtle ramp monitoring and download/maintain the existing hydrophones following the first wet season inflows/weir spilling. Details are provided in Sections 2.1.1, 2.1.2 and 2.3.

2.1.1 Turtle ramp monitoring

Hydrophones were installed at the entrance and within the resting pools of the turtle passage. These hydrophones will allow the assessment of turtle behaviour on the turtle ramp and whether they are able to successfully navigate between upstream and downstream sides of the weir. Specifically:

– Seven (7) hydrophones (five new and two existing hydrophones) were installed to monitor the Rookwood Weir turtle ramp and immediate area (Table 1; Figure 1). As agreed on site with Sunwater,

hydrophones were attached directly to the anchor points adjacent to the turtle ramp resting pools with concrete anchors and floats used to maintain the position of the hydrophone within each pool.

– An additional two hydrophones still need to be deployed, one in the approach channel downstream of the turtle ramp and one on the left bank downstream of the weir. These hydrophones were unable to be installed during the April 2023 fieldtrip due to downstream access constraints (Rookwood Weir was spilling so there was no access within 200 m of the weir wall as per Sunwater Health and Safety (HSE) requirements). These hydrophones will be deployed on the next hydrophone download and maintenance survey during the Operational Phase works. The Approach channel downstream and Downstream left bank hydrophones are expected to monitor broad scale turtle movement immediately downstream of the weir and within the vicinity of the turtle ramp and fishway entrances. There may be some areas, particularly along the left bank behind the mid-stream rock bar that are outside the hydrophone detection range.
– At the time of the survey Approach channel upstream (36) was deployed in what was currently the approach channel when the weir was above FSL. However, the position of this hydrophone may need to be relocated when the storage level within the impoundment decreases.

Table 1 Acoustic hydrophone locations installed during April 2024

No.	Site Name	Latitude (anchor point) #	Longitude (anchor point) #
30	Ramp entrance downstream	23.54005	150.01624
31	Lower resting pool downstream	23.54005	150.01624
32	Mid resting pool downstream	23.53992	150.01642
33	Upper resting pool downstream	23.540066	150.01676
34	Upper resting pool upstream	23.540299	150.01696
35	Lower resting pool upstream	23.54039	150.01680
36	Approach channel upstream	23.54039	150.01680

Datum: GDA2020

Figure 1 Hydrophone installation locations for the turtle ramp monitoring

2.1.2 Broad-scale turtle monitoring

Four hydrophones were proposed to be re-located within the existing array to the stilling basin and approach channel immediately downstream of the weir and immediately upstream of the weir within the impoundment. The intention was to increase coverage in these areas to support assessment of whether turtles are aggregating upstream or downstream, as required by the success criteria within the Operations SMP. The four hydrophones that were earmarked for re-location were Hanrahan's far downstream, Hanrahan's downstream, Hanrahan Creek and Rookwood riffle.

The outcome of the relocations was:

– Hanrahan's far downstream, Hanrahan's downstream and Hanrahan's Creek hydrophones were not re-located during April 2024. There was no access to sites downstream of Rookwood Weir due to access constraints (Hanrahan's crossing was flooding so conditions were not safe to access). These three hydrophones will be retrieved on the next survey.
– Rookwood riffle complex hydrophone was unable to be retrieved due to debris over the anchor line. It is expected that this hydrophone can be retrieved with a smaller vessel on the next survey. The Rookwood riffle complex hydrophones were surrounded by submerged trees which prevented the larger vessel from getting close enough to retrieve the hydrophone. A smaller vessel would allow closer access as it can manoeuvre more easily around the submerged trees.
– Spare hydrophones were deployed as alternatives to the existing hydrophones that were unable to be retrieved. The four hydrophones to be retrieved during subsequent surveys will become the new spare hydrophones (Table 2).
– It was determined that it is not feasible to place a hydrophone within the stilling basin due to high turbulence when Rookwood Weir is overtopping and the absence of suitable attachment points. Instead, a hydrophone will be deployed on the next survey further downstream but as close as safely possible to the stilling basin, on the left bank, where conditions are safer.

The existing hydrophone array has an anchor design which uses steel cable attached to mature trees on the bank. During the November 2023 survey, the tree anchor points were relocated above the full supply level (FSL) on the upper bank by extending the length of the steel cable. However, this arrangement will be unsuitable long-term. With the extended steel cable length (up to 100 m) there is a greater risk that hydrophones are lost post-inundation due to riparian die back, fallen trees, high debris loads, land slumps and sediment deposition. The long steel cables could also pose a HSE and operational risk. Risk management options were discussed with Sunwater during the field survey and an interim design implemented during the April 2024 survey event. The interim design involved the anchor points within the weir pool being relocated to mature trees protruding from the water's surface post-inundation and the hydrophones hanging directly down and adjacent to the tree trunk.

During April 2024, attempts were made to retrieve the 15 installed hydrophones within the weir pool (extending from Rookwood Weir upstream to The Pocket):

– Ten (10) hydrophones were retrieved without issue, nine (9) of these hydrophones were redeployed at new anchor points on a submerged tree within proximity to the initial anchor point.
– One (1) hydrophone was lost in retrieval – Gogango Creek Upstream – the 5mm steel cable snapped on retrieval. The Gogango Creek Upstream hydrophone was replaced with the hydrophone that was retrieved from Riverslea Riffle Upstream as there was as there was a larger gap within the array at this point.
– Four (4) hydrophones were unable to be retrieved. Of these, two (2) temporary hydrophones were deployed on submerged trees adjacent the initial anchor point to provide some data continuation. The hydrophones unable to be retrieved were:
    - Rookwood Mid – Wire stuck under large debris. May be able to retrieve with a reef anchor and smaller vessel during subsequent field surveys – Temporary hydrophone deployed due to proximity to weir.

- Rookwood Crossing – Anchor point submerged above FSL, and unable to be retrieved through submerged riparian vegetation with large vessel. Likely to be able to retrieve with smaller vessel during subsequent field surveys. Temporary hydrophone deployed due to proximity to weir.
- Rookwood Riffle – Unable to access anchor point through submerged riparian zone with large vessel. Likely to be able to retrieve with smaller vessel during subsequent field surveys.
- Rookwood Upstream – Steel cable stuck under large debris. May be able to retrieve with a reef anchor and smaller vessel during subsequent field survey.

The new anchor points located on large trees within the impoundment are between 3 - 12m in depth. Some of these anchor points will need to be moved slightly in the future to accommodate for reduction in water depth as the impoundment storage volume decreases. At least two of these anchors will likely need to be attached to a weight and float system or the auto release system to allow for large fluctuations of water level from full supply to dead storage (Section 2.2).

Due to access constraints (Rookwood Weir was spilling, flooding downstream and Sunwater HSE Vessel requirements), the hydrophones downstream of Rookwood Weir were not downloaded or maintained. These hydrophones will be accessed on the next field survey (first survey of the Operations Phase monitoring). Hydrophones were last downloaded/maintained in November 2023. Since then, initial weir spilling has occurred. It is recommended that the hydrophones are downloaded/maintained as soon as possible as some of the downstream hydrophones may not be recording data due to damage or expired batteries.

2.2 Hydrophone anchor recommendations

The pervious attachment method of anchoring the hydrophones to tress above FSL is not considered feasible long-term now that weir is operational. This was evident by the challenges experienced during the retrieval of hydrophones during the April field survey event (three unable to be retrieved due to entanglement with debris - including one lost, and two with anchor attachments below water level).

Based on our knowledge and experience in hydrophone attachment, three feasible options for long-term anchor points have been identified:

– Attachment to inundated trees (current option)
– Buoy
– Anchor release.

The objective of the alternative options is to relocate the anchor points to within the middle of the impoundment to allow the hydrophones to remain within the water channel across the full range of impoundment storage levels, whilst reducing the length of steel cable required.

The alterative options discussed below are not extensive or complete and may not cover every aspect that Sunwater need to consider.

2.2.1 Attachment to inundated trees

The attachment to inundated trees was an interim design implemented in the weir pool during the April 2024 survey. This method involved anchoring the hydrophones within the weir to mature trees protruding from the water's surface using stainless steel cable. Considerations for this method long-term include the potential need to relocate anchor points to accommodate for fluctuations in water depth. There may also be a risk of hydrophones being lost if they become entangled with debris or if attachment trees fall.

2.2.2 Buoy

The buoy option would use a UV stabilised yellow marker buoy (concreted and foam filled) attached to marine grade stainless steel chain and anchored on the river bed (such as 2-3 train wheels). The hydrophone would be attached to the buoy by rope with another smaller weight to keep the hydrophone in an upright position. There would also be an option to have a solar light mounted on the top of the buoy for better visibility in low light conditions.

For identification, it is recommended that the buoy has 'keep clear' written on the buoy with a plaque also detailing client details, asset number and contact number if lost.

Deployment would require a vessel with a davit arm for the mooring, so a work punt or similar would be needed. Divers are likely needed to inspect mooring and attachments. Secondary attachment points on the buoy and anchors is also recommend to add redundancy in the case of flood events and wearing through of connections due to the long-term deployment.

Overall, this option has a simple design and is highly visible to weir pool users making it a low-risk to public safety.

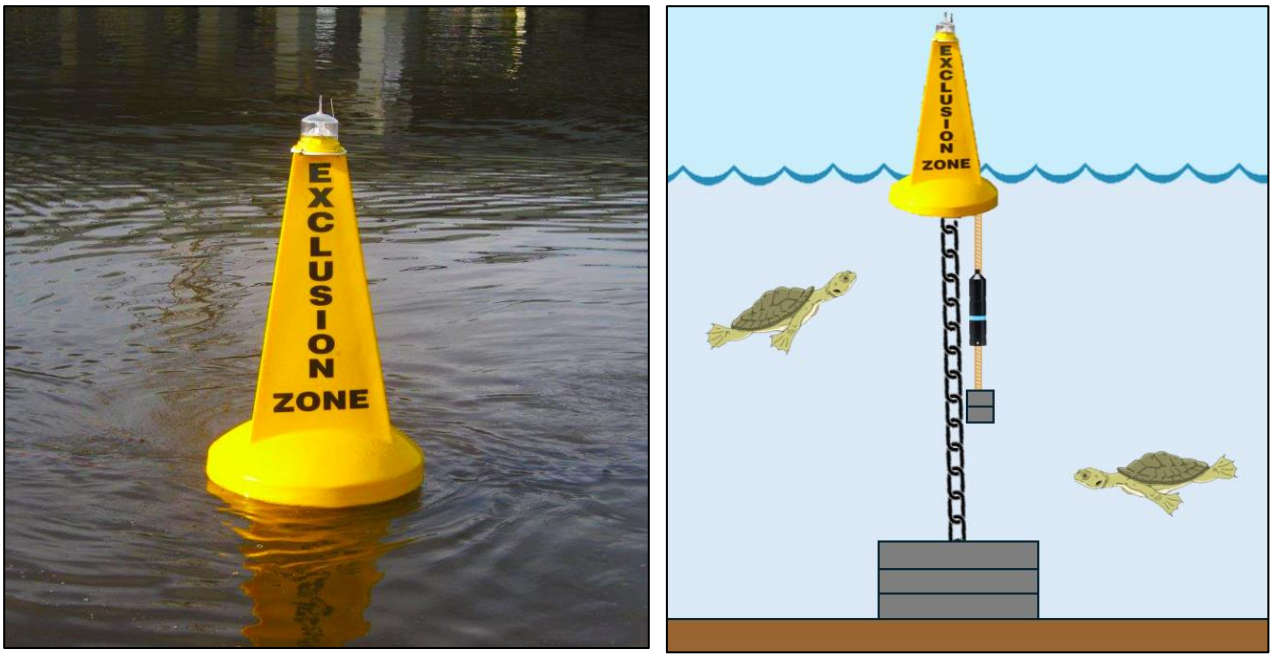

Figure 2 Hydrophone buoy option

2.2.3 Anchor release

The anchor release option would involve a receiver mooring for the VR-2ARs (Automated Release) with a sacrificial anchor. The schematic below shows the recovery mechanism to retrieve the VR2-AR unit with sacrificial anchor. The release mechanism on VR2-AR from vessel is activated from the surface using a portable receiver (VR100-200) and transponding hydrophone. Within 10 seconds, the VR2-AR receiver detaches from the lug and floats to the surface where the data is downloaded.

A new anchor is required for each re-deployment with the sacrificial anchor unable to be salvaged. A length of railway line or a train wheel could be used as the 40kg steel anchor for cost efficiency. Alternatively, 2 x 20 kg dumbbell plates may be suitable.

The purchase of new transponding hydrophones would also be required with this set-up as well as the portable receiver. Within the current array, this would require replacement of up to 15 of the existing hydrophones with the transponding model.

Overall, this option is more expensive, but has a simple release mechanism. There is a risk that the release mechanism could fail to release the hydrophone therefore making data retrieval unachievable. This set-up is completely submerged so there is no risk to the public safety for those using the weir and no risk of public interference with the equipment.

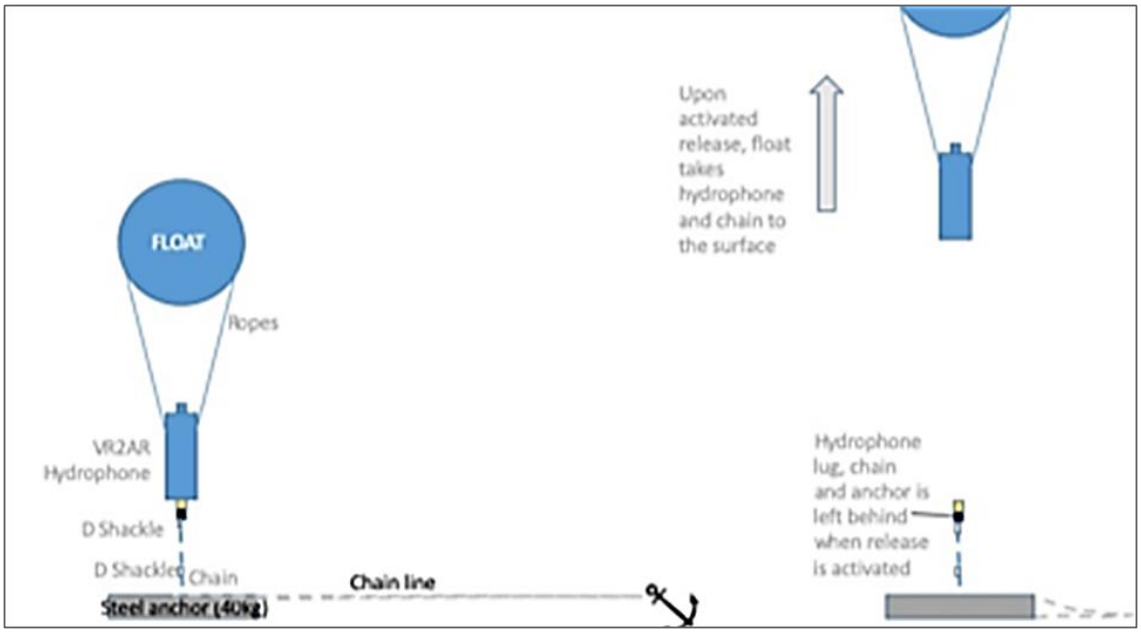

Figure 3 Hydrophone anchor release option

2.3 Hydrophone download and maintenance

The 28 hydrophones currently within the TMS survey area were intended to be downloaded and maintained (i.e. battery change, changing out faulty hydrophones etc.) during the April field survey. However, at Sunwater's direction and due to an internal change in vessel and personnel standards only the 15 hydrophones within the upstream impoundment were downloaded and maintained. Hydrophones downstream of Rookwood Weir (13 hydrophones) were not accessed.

The key results from the hydrophone download were:

– As discussed above, 15 of the 28 hydrophones were accessed with five hydrophones (out of 15) unable to be retrieved for download as detailed in Table 2.
– Almost 1.4 million additional detections have been added to the database from the period November 2023 to April 2024.

Table 2 Summary of acoustic detections on each hydrophone

Hydrophone number	Hydrophone ID number	Location	Number of acoustic detections
Turtle ramp monitoring			
30	139606	Ramp entrance downstream	New deployment
31	139608	Lower resting pool downstream	New deployment

Hydrophone number	Hydrophone ID number	Location	Number of acoustic detections
32	139607	Mid resting pool downstream	New deployment
33	135473	Upper resting pool downstream	New deployment
34	131270	Upper resting pool upstream	New deployment
35	137823	Lower resting pool upstream	New deployment
36	135475	Approach channel upstream	New deployment
Broad-scale monitoring			
26	136829	Hanrahan far downstream	Did not access
1	131256	Hanrahan downstream	Did not access
2	131257	Hanrahan creek	Did not access
3	131260	Hanrahan pool	Did not access
4	134045	Hanrahan upstream	Did not access
5	134044	Hanrahan far upstream	Did not access
6	137825	Lawries bend far downstream	Did not access
7	131263	Lawries bend downstream	Did not access
22	131265	Lawries bend mid	Did not access
8	136830	Lawries bend upstream	Did not access
9	131258	Rookwood far downstream	Did not access
10	131264	Rookwood downstream	Did not access
23	131261	Rookwood weir site	Did not access
11	131259 139604	Rookwood mid	Unable to retrieve Temporary hydrophone deployed
21	131255	Rookwood riffle	Unable to retrieve
24	131266 139605	Rookwood crossing	Unable to retrieve Temporary hydrophone deployed
25	135474	Rookwood upstream riffle	87,238
12	131274	Rookwood upstream	Unable to retrieve
13	131477	Rookwood far upstream	23,085
14	131268	Gogango creek mouth	18,138
15	131269	Gogango creek	6,271
16	131267 136831	Gogango creek upstream	Hydrophone lost Temporary hydrophone deployed
17	131262	Riverslea downstream	29,396
18	137824	Riverslea upstream	227,769
27	136828	Riverslea riffle downstream	950,570
28	136831	Riverslea riffle upstream	61,700
19	131272	The Pocket downstream	126
20	131273	The Pocket upstream	567

2.4 Remote cameras

As required by the Operations SMP, the entrance, middle and exit of turtle ramp is required to be monitored by cameras in order to visually monitor turtle movement and interaction with the turtle passage, monitor for signs of predation and/or turtle aggression. Data captured by the cameras is required to be transferred via live feed if possible or downloaded at least monthly for the first three years.

Installation requirements of the remote cameras were discussed with Sunwater on-site in April 2024. Recommendations are listed below:

– Permanent fixed cameras are expected to be more efficient than remote cameras due to the large amount of data that will be collected through continuous monitoring
– Monitor triggers features would reduce data volume however trigger distance and water flow movement are expected to limit feasibility
– Use of remote cameras will require frequent battery changes and a process for data management including regular (at least monthly for the first three years but likely much more frequently if continuous monitoring) manual download of SD cards and transfer to Sharepoint or similar
– Permanent fixed cameras will require continuous storage of data
– Cameras need to have high quality imagery to support identification of turtle species, assess turtle behaviour, and monitor for signs of predation etc. Cameras need to have night vision to record at night
– Cameras need to be positioned to view the entrance, middle and exit of the turtle passage
– Sunwater confirmed they would provide the recommendations to their internal team to identify the most suitable options and arrange for installation as soon as possible.
– Data processing will be required to screen continuous data for footage containing turtles.

The list of recommendations is not extensive or complete and may not cover every aspect that Sunwater need to consider.

3. Turtle capture planning

The Operational Phase turtle monitoring program requires turtle capture within, upstream and downstream of the turtle passage infrastructure and as a result, new methods and/or procedures are required to be devised for these unique conditions.

A turtle capture method was investigated during the April 2024 field survey. It was determined that a large fyke net erected within a resting pool would be suitable to capture turtles utilising the ramp (Figure 4). However, the fyke net will require support from timber stakes and weights along the front of the cod end to ensure it remains upright, keeps the entrance open and prevents turtles from swimming under the base.

Only one fyke can be set on the turtle ramp per 24-hour period for logistical reasons, with the net moved to a different resting pool every 24 hours.

Health, safety and environment requirements for turtle capture surveys are discussed in Section 4.

Figure 4 Fyke net within turtle ramp pool

4. Health, safety and environment

There are a number of HSE requirements for turtle capture on the turtle ramp and upstream/downstream of the weir. The proposed trapping locations should avoid and/or limit working at height where possible. As discussed within Sunwater during the April 2024 field survey, areas considered to not be working at heights included the top flat sections of the turtle ramp and the turtle ramp sections that can be accessed via the abutment cut downstream of the turtle ramp. If access to the resting pools is required outside of the established walkways, a working at heights certification will be required. Only the anchor points situated at each resting pool will be used for personnel attachment points (i.e. personnel will not anchor to the stairway railings). Sunwater will provide the working at heights equipment.

Discussions with the Rookwood Weir operators prior to accessing site and on a daily basis during the survey are required to discuss planned releases, particularly when working immediately downstream of the weir. At least two forms of communication e.g. mobile, satellite phone, garmin in-reach etc. are required so operators can inform the team of any unplanned releases or changing conditions.

Additional HSE measures were developed/changed and discussed with Sunwater on-site due to their HSE requirements. These were implemented during the survey, including updating the JSEA and Journey Management Plan were possible and were incorporated into the Operations Phase scope. These included:

– Having two coxswains' grade 3 on the vessel during works
– Having a vessel management plan
– Limiting field surveys to 10-hour days for fatigue management
– Using a larger vessel where possible

– Having a lunch-time check in with a Sunwater representative
– Personnel will not access within 200 m of the weir on the upstream and downstream sides whilst it is overtopping. This means using an alternative access on the upstream side (e.g. via the recreation reserve track) as the upstream boat ramp is within 200m of the weir wall.

5. Operating conditions monitoring

GHD provided training during the April 2024 survey to the Rookwood Weir Operators on how to complete the inspection forms (management action 1A5 of the Operations SMP). These forms included the Turtle Passage Inspection Form, Turtle Observation Form and Turtle Injury and Mortality Form.

6. Next steps

The following next steps are required to complete the establishment phase:

– GHD to complete hydrophone deployment, maintenance and battery change of five hydrophones within the weir pool and 13 hydrophones downstream of the weir wall
– Sunwater to confirm long-term anchor options and install anchors for 15 hydrophone locations within the weir pool (Section 2.2)
– Sunwater to purchase and install the remote cameras on the turtle passage and confirm data processing option (Section 2.4)
– Sunwater to confirm HSE procedures for vessel/turtle capture etc. (Section 4).

Regards

Lauren Pratt
Senior Aquatic Ecologist

Dr Natalie Clark
Technical Director – Aquatic Sciences