



Rookwood Weir Project

Water Quality (Agriculture) Offset Management Plan

EPBC: 2009/5173

Document Number: RWP-SUN-ENV-MP-0007

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Review and Approval

Role	Position	Name	Signature	Date
Reviewer	Environmental Manager	Michael Dixon	 <small>M R Dixon (Jan 25, 2024 13:29 GMT+10)</small>	25/01/2024
Approver	Project Director	Inaki Goni		25/01/2024

List of abbreviations

Abbreviation	Description
AEIS	Additional information to the EIS
AHD	Australian Height Datum
CHRC	Central Highlands Regional Council
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth)
DES	Department of Environment and Science (Qld)
EIS	Environmental impact statement
EOP	Environmental Offsets Policy (October 2012) (EPBC Act)
EPBC Act	<i>Environment Protection & Biodiversity Conservation Act 1999</i> (Cth)
FBA	Fitzroy Basin Association
FSL	Full Supply Level
GAWB	Gladstone Area Water Board
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef Marine Park
GBRWHA	Great Barrier Reef World Heritage Area
ha	Hectares
km	Kilometres
LFRIP	Lower Fitzroy Infrastructure Project
LMCOP	Land Management Code of Practice
m	Metres
MNES	Matters of National Environmental Significance
OMP	Offset Management Plan
Project	Rookwood Weir Project
Reef 2050 Plan	<i>Reef 2050 Long-term Sustainability Plan</i> (July 2018)
RL	Relative Level
RRC	Rockhampton Regional Council
SS	Suspended Solids
WQIP	<i>Reef 2050 Water Quality Improvement Plan 2017-2022</i>
WQMP	Water Quality Monitoring Program

Glossary

Term	Definition
business day	A day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.
compliance report/s	Written reports: <ol style="list-style-type: none"> providing accurate and complete details of compliance, incidents, and non-compliance with the conditions and plans; consistent with the Department's Annual Compliance Report Guidelines (2014) (or subsequent published revision); include a shapefile of any impact of any protected matters, or their habitat, undertaken within the relevant 12 month period; and identifying the version/s of the plans prepared and in existence in relation to the conditions of this approval during the relevant 12 month period.
Department	The Australian Government Department responsible for the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) from time to time.
Minister	The Minister administering the <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
Nutrients	Water quality parameters including nitrogen and phosphorus.
Plan/s	Any of the documents required to be submitted to the Department, implemented by the approval holder and/or published on its website in accordance with the approval conditions.
riparian zone	The area within a minimum of 100 metres of the defining bank of any watercourse (as defined under the Queensland <i>Water Act 2000</i>).
site specific assessment/s	A baseline investigation which explains the scientific basis on which the description and location of impact/s and associated users, performance indicators, trigger values and limits have been derived, or not derived.
suitably qualified person	A person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.
suspended solids	Small solid particles which remain in suspension in water as a colloid or due to motion of the water. Suspended solids can be removed by sedimentation if their size or density is comparatively large, or by filtration.
water quality	Levels of pesticides and farm chemicals, nutrients such as phosphorus and nitrogen, sediments and other suspended solids. A detrimental impact to water quality would be an increase in any of these parameters above established baselines.
website	A set of related web pages located under a single domain name attributed to the approval holder and available to the public.

Declaration

In making this declaration, I am aware that section 491 of the Environmental Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. 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: 
Chris Delamont (Jan 25, 2024 14:30 GMT+10)

Full name: Chris Delamont
Organisation: Sunwater
EPBC Referral Number: EPBC 2009/5173
EPBC Offset Management Plan
Date: 25/01/2024

Executive Summary

The Rookwood Weir Project (the **Project**) involves the construction of the new Rookwood Weir component of the Lower Fitzroy River Infrastructure Project (**LFRIP**). The LFRIP was approved by the Queensland Government's Coordinator General in December 2016 and the Australian Minister for the Environment in February 2017 (EPBC 2009/5173), subject to conditions.

Sunwater Limited (**Sunwater**) (ACN: 131 034 985; ABN: 17 020 276 523) is the sole proponent of the Project. Sunwater is a statutory government-owned corporation under the Queensland *Government Owned Corporations Act 1993*. Sunwater owns and operates the Queensland Government's bulk water supply and distribution infrastructure located throughout regional Queensland.

This Offset Management Plan (**OMP**) that has been prepared to meet the offset obligations and conditions for matters of national environmental significance (**MNES**) related to Water Quality (Agriculture) under the approval given under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. The Project was conditioned to offset water quality impacts as the Fitzroy River, on which the Project is located, flows into the Great Barrier Reef World Heritage Area (**GBRWHA**). This OMP describes how the offsets for the potential increase of pollutants resulting from the use of water for irrigated agriculture in the Lower Fitzroy sub catchment area will be delivered as described by item vi of Condition 4 b) Table 1.

Water quality impacts in the form of Nitrogen from vegetation decay following weir inundation, as described by item vii of Condition 4 b) Table 1, is covered by the Water Quality (Nitrogen) Offset Management Plan. Other MNES impacted by the project include:

- Terrestrial MNES, including.
 - threatened ecological community (TEC), being Brigalow (*Acacia harpophylla* dominant and co-dominant) (brigalow TEC);
 - flora species (black ironbox (*Eucalyptus raveretiana*)), and
 - one terrestrial fauna species (red goshawk (*Erythrorchis radiates*)).
- Aquatic fauna species (Fitzroy River Turtle).

Separate OMPs have been developed for each of these matters, and these additional matters are not dealt with in this document.

The potential impacts to the GBR from agricultural development and planned offsets shall be determined through the DCCEEW approved Water Quality Monitoring and Reporting Program. Following notification to DCCEEW that the need for an offset has been identified through this program due to an increase above baseline levels, Sunwater shall develop specific offset management programs(s) as outlined in Section 11 of this plan. These will address either one or a more of the following:

- Nutrients
- Sediments
- Farm chemicals
- Other water quality parameters.

This OMP demonstrates that the proposed offset projects meet the principles of the EPBC Act Environmental Offsets Policy (**EOP**) and is a suitable offset for water quality impacts resulting from the Rookwood Weir Project.

Sunwater commits to the implementation of this OMP.

1.0 Project Description

The Rookwood Weir Project (RWP) is a component of the coordinated Lower Fitzroy River Infrastructure Project (LFRIP). The LFRIP originally considered the construction and operation of a raised Eden Bann Weir plus a new weir at Rookwood on the Fitzroy River in Central Queensland. Following approval of the Environmental Impact Statement (EIS) by both State and Commonwealth Governments, the scope and staging of the original project was revised with Stage 2 in the EIS (being the Rookwood Weir component of LFRIP) now becoming the focus. The RWP involves the construction of a new weir on the Fitzroy River at adopted middle thread distance (AMTD) 265.3 km (see Figure 1) to capture and store water resources for the purposes of supplying water to supplemented water allocation holders.

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

Following the approval of the LFRIP project in 2017, Sunwater and the Gladstone Area Water Board (GAWB), in partnership with Building Queensland, completed the detailed business case (DBC) for construction of Rookwood Weir Stage 2 (RW2). Both State and Federal governments agreed in principle to jointly fund RW2 on a 50:50 basis. In mid-2018, the State Government advised that Sunwater would continue as the sole preferred proponent for the Project and to continue with preparatory activities that had previously commenced under the joint venture agreement between Sunwater and GAWB.

The Rookwood Weir component of the LFRIP was originally designed with two (2) stages; Stage 1) concrete weir to a height of 45.5 m Australian Height Datum (AHD); and Stage 2) addition of 3.5 m high flap gates to raise the height to 49 m AHD. The Stage 2 design exceeded the budget approved in the Detailed Business Case (DBC) and this initiated a review of the infrastructure to assess the most economically viable weir height. Sunwater, in consultation with State and Commonwealth Governments, submitted a business case to raise the weir height level by 700 mm to 46.2 m AHD which was approved on 11 March 2021 by State and Commonwealth Governments. This is less than the maximum weir height assessed in the EIS that was approved by the Queensland and Australian Governments.

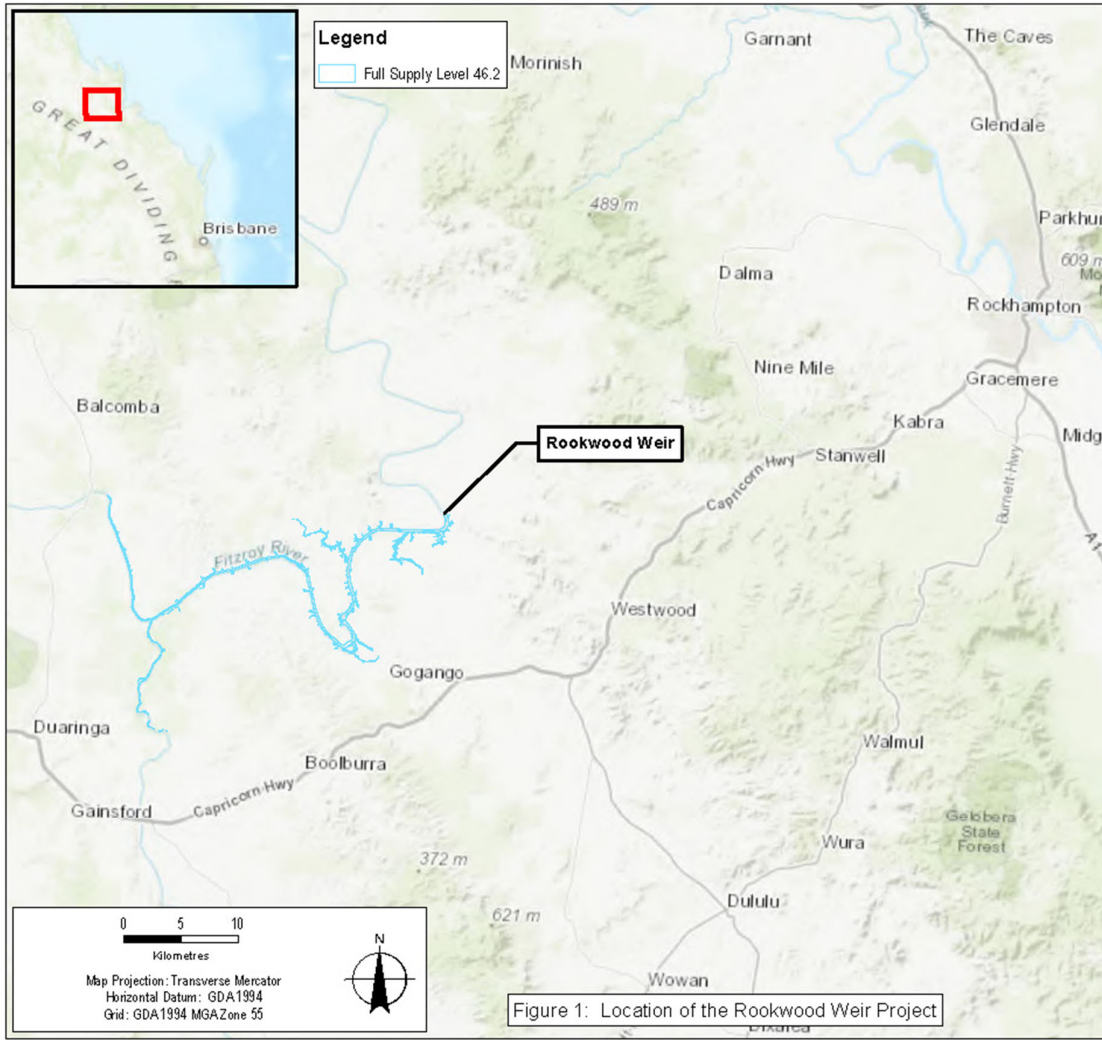
Sunwater have not progressed updating the Eden Bann Raising Business Case and it is not currently on the list of projects to be further developed in the current horizon, and is instead on the list of possible projects to be considered in 2-5 years from now.

1.1 Project Location

The Rookwood Weir is located on the lower Fitzroy River, within the Fitzroy sub-catchment, central Queensland (refer to Figure 1). The Fitzroy River forms at the confluence of the Mackenzie River (flowing from the north) and Dawson River (flowing from the south) and flows out into the Coral Sea. This is where the Great Barrier Reef World Heritage Area (GBRWHA) and the Great Barrier Reef Marine Park (GBRMP) are located.

The Fitzroy River passes through the city of Rockhampton, which lies approximately 59 kilometres (km) from the mouth of the Fitzroy River. The Rookwood Weir Project is located within the Brigalow Belt bioregion, Mount Morgan Ranges subregion.

Figure 1: Project Location



The 46.2 m AHD full supply level (FSL) impoundment area associated with Rookwood Weir extends up the Fitzroy River to the confluence of the Mackenzie River and the Dawson River, to an upstream limit on the Mackenzie River at 322.4 km AMTD and 11.5 km AMTD on the Dawson River. Figure 2 shows the extent of the storage impoundment at FSL. The Rookwood Weir infrastructure footprint lies within the Rockhampton Regional Council (RRC) Local Government Area (LGA). The Rookwood Weir impoundment extends into areas of the Woorabinda Aboriginal Shire Council LGA and the Central Highlands Regional Council LGA.

1.2 Rookwood Weir

The primary purpose of the Rookwood Weir is to address the demands from urban populations, industry and agriculture within the Gladstone and Rockhampton regions and along the Capricorn coast to secure future water supply and improve water security in the short to medium term.

The key components of the RWP include:

- Constructing a new weir at Rookwood to capture and store water resources to an approximate height of 46.2 m (AHD);
- Constructing turtle and fish passage infrastructure to facilitate movement of turtles and fish around Rookwood Weir;
- Replacing the low-level crossing at Riverslea with a new bridge and associated road approaches upstream of the weir;
- Upgrading the low level and existing culvert crossing at Hanrahan's downstream of the weir; and
- Upgrading public roads (State and local) to facilitate construction traffic along Thirsty Creek Road (a local road) from the Capricorn Highway (including the intersection with the State controlled road) at Gogango.

The RWP does not include water delivery infrastructure (e.g. pipelines) to supply water directly to users, with water released through the weir as per the Resource Operation Licence (ROL), with customers extracting water from various points along the river downstream.

2.0 Purpose and objectives of this management plan

The purpose of this OMP is to address Condition 5 of EPBC 2009/5173 dated 27 July 2021. Specially, this OMP will address the impacts caused by any increase in nutrients, sediments, farm chemicals and/or other water quality parameters, as outlined in Table 1 of Condition 4.

The objectives of this OMP are to offset any increases in nutrients, sediments, farm chemicals and/or other water quality parameters that will have an impact on the GBRMP. Increases in nutrients, sediments, farm chemicals and/or other water quality parameters will be determined by the Water Quality Monitoring and Reporting Program approved under Condition 1 of EPBC 2009/5173.

Table 1: EPBC 2009/5173 Approval Condition addressed in this OMP

Condition	Section of this OMP
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.	This document
b) The offset management plan for each weir must be consistent with the approved offset strategy for the relevant weir.	This document
c) The offset management plan for each weir must include, but not be limited to:	
ii. a description and map to clearly define the location and boundaries of the offset area/s, accompanied by the offset attributes;	Section 10
iv. a description of the management measures (including timing, frequency and duration) that will be implemented in each offset area;	Section 10
vi. performance and completion criteria for implementing the offset management plan/s for evaluating its effectiveness, and criteria for triggering corrective action/s;	Section 11
vii. a program for monitoring and reporting on the effectiveness of the management measures, and progress against the performance and completion criteria;	Section 14 and 15
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	Section 13
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.	Section 4 & 5
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.	This document

3.0 Commitments made in the OMP

This section summarises the commitments made by this OMP to offset any increase in nutrients, sediments, farm chemicals and/or other water quality parameters which will impact the GBRMP. It is noted that this is only a requirement if the Water Quality Monitoring and Reporting Program approved under Condition 1 of EPBC 2009/5173 verifies that there has been an increase in water quality parameters as a result of the Project, as stated in Condition 4. b) vii, and addressed in the Offset Strategy.

Additional commitments are also made in alignment with the standard and administrative conditions of the approval. Table 2 below lists each of these commitments and provides references to the sections in this OMP where these commitments are detailed.

Table 2: EPBC 2009/5173 Approval Condition addressed in this OMP

Condition	Section of this OMP
<p>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.</p>	Section 14
<p>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.</p>	Section 14
<p>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 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).</p>	Section 14
<p>19. 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:</p> <ul style="list-style-type: none"> 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. 	Section 15
<p>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:</p> <ul style="list-style-type: none"> 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. 	Section 15

4.0 EPBC Act Environmental Offsets Policy

The EPBC Act Environmental Offset Policy (EOP) provides upfront guidance on the role of offsets in environmental impact assessments, and how the department considers the suitability of a proposed offset. It aims to improve environmental outcomes through the consistent application of best practice offset principles, provide more certainty and transparency, and encourage advanced planning of offsets.

This section of the OMP describes how the proposed offsets meet the relevant requirements of the EOP.

4.1 Policy Principles

The EPBC Act EOP sets out eight key overarching principles to determine the suitability of offsets. Table 3 outlines each of the policy principles and how it has been considered in the OMP, with a reference to the relevant OMP section.

Table 3: EPBC Act Environmental Offset Policy principles

Policy principle	Project offsets
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matters.	Each offset program will developed to provide a conservation outcome for the Great Barrier Reef that is reflective of the water quality parameter of concern.
Suitable offsets must be built around direct offsets but may include other compensatory measures.	100% of the Project’s water quality (Agriculture) offset obligations will be acquitted by the proposed direct offsets.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.	Each offset program will developed to a scale that is proportionate to the impact on the protected matter.
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	The extent of the offset has been calculated based on a preliminary model that identified land use changes. This will deliver a reduction in pollutants.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding.	The risks associated with the offset have been assessed (Table 13) and mitigation and appropriate management actions proposed in the offset area management measures shown in Table 14.
Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs.	The offset program shall be over and above the current commitment by Sunwater for the delivery of the project.
Suitable offsets must be efficient, timely, transparent, scientifically robust and reasonable	The proposed offsets will be efficient and timely with offset will be established as agreed following the statutory timeframes of the approvals. Delivery of the offset will be determined to be reasonable in timing depending on the type and scale at the time. Depending on the pollutant required to be offset, a methodology shall be chosen that is transparent and scientifically robust.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	Monitoring and reporting are detailed in the Offset Area Management Measures outlined below in this document

4.2 Addressing relevant EPBC plans and advice

The EOP states that an offset should address key priority actions for the impacted MNES in any approved recovery plans, threat abatement plans, conservation advice, or approved Australian Government management plans. The Reef 2050 Long-term Sustainability Plan 2021-2025 (2021) (Reef 2050 Plan) addresses many of the threats to the GBR including water quality. The Reef 2050 Water Quality Improvement Plan 2017-2022 (WQIP) is a joint commitment of the Australian and Queensland governments that seeks to improve the quality of water flowing from the catchments adjacent to the Great Barrier Reef. The WQIP is a nested plan under the Reef 2050 Plan and contains actions that relate to land-based sources of water quality pollution (diffuse source pollutants).

Any offset programs developed due to an increase in water quality pollutants from agricultural operations will be done in accordance with both the EOP and the Reef 2050 Plan including the net benefit principle.

5.0 Reef 2050 Plan

In 2015, the Australian and Queensland governments released the Reef 2050 Plan. The Reef 2050 Plan identifies seven themes (ecosystem health, biodiversity, heritage, water quality, community benefits, economic benefits and governance) for managing the Great Barrier Reef World Heritage Area. The five-year Reef WQIP is included as an action within the water quality theme of the Reef 2050 Plan. Its specific purpose is to identify management and monitoring requirements for all land-based pollution to improve the quality of water flowing from catchments adjacent to the Reef.

Water quality targets define the required reductions in sediment and nutrient loads by 2025 for the catchments discharging to the Reef. Progress towards these targets will be delivered by:

- applying minimum practice standards across all industries and land uses,
- supporting industries and communities to build a culture of innovation and stewardship that takes them beyond minimum standards,
- restoring catchments through works to improve or repair streambanks, gullies, riparian vegetation and wetlands.

A 2025 Catchment and Land Management Target within the *Reef WQIP* relating to applying minimum practice standards is “90% of land in priority areas under grazing, horticulture, bananas, sugarcane and other broad-acre cropping are managed using best management practice systems for water quality outcomes (soil, nutrient and pesticides)”. Implementation will assist in meeting the targeted reduction in end-of-catchment loads.

The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef program) provides the framework for evaluating and reporting progress towards *Reef WQIP* targets through the Reef Water Quality Report Card. Monitoring and modelling occur across a range of attributes, from paddock scale through to sub-catchment, catchment, regional and Great Barrier Reef-wide. In line with the Reef 2050 WQIP framework, the Paddock to Reef program evaluates management practice adoption and effectiveness, catchment condition, pollutant runoff and marine condition.

The management practice adoption component of the Paddock to Reef program develops rigorous estimates of management practice benchmarks and change for the major agricultural industries of the Reef catchments—sugarcane, grazing, horticulture, grains and bananas.

The adoption of improved management practices is reported using industry and regional specific management practice frameworks (water quality risk frameworks).

The water quality offsets proposed assist in meeting:

- the Catchment and Land Management Target of the Reef WQIP,
- the reef wide (Reef 2050) water quality targets for pollution loads.

Success can be measured using the Paddock to Reef program and as reported in the *Great Barrier Reef Water Quality Report Card* as required by the WQIP.

6.0 Impact Site Description

Rookwood Weir is located on the Fitzroy River at AMTD 265.3km. This is the approximate distance to GBRMP at the mouth of the Fitzroy River. The tailwater of Rookwood Weir at Full Supply Level (RL46.2m) goes beyond the confluence of the Dawson and Mackenzie Rivers upstream of the weir. Downstream from Rookwood the flow passes through an additional two structures, Eden Bann Weir at approximately AMTD140km and the Fitzroy River Barrage at approximately AMTD 60km. The Fitzroy River Barrage acts as the delineation between freshwater and saltwater in the river.

6.1 Water Allocation

Approximately 43GL (50%) from Rookwood Weir is allocated for domestic/industrial use to Gladstone Area Water Board (GAWB) Pipeline and to Livingstone Shire Council. The remaining 43GL (50%) is allocated to agriculture operations in the Lower Fitzroy subcatchment. This consists of high priority and medium priority water. Water is unavailable from Rookwood Weir when the flow gets below the nominated operating level as per the conditions of the Resource Operations Licence (ROL) approved by the QLD Department of Regional Development, Manufacturing and Water (DRDMW) in October 2023. Water shall be released from the weir and accessed via offtakes from the Fitzroy River at locations along the waterway near each customer.

Table 4: Indicative Water Allocations from Rookwood Weir

Category	Indicative Allocation (ML)
Gladstone Area Water Board (GAWB) Pipeline & Livingstone Shire Council	43
Agricultural (Allocated)	30
Agriculture (Unallocated)	13
Total	86

6.2 Agricultural Development

The agricultural development in Lower Fitzroy sub catchment extends from the Rookwood Weir down to the Fitzroy Barrage near Rockhampton. In this area it is expected there will be 20-30 Sunwater customers utilising water from the Rookwood Weir project. However this is not an homogenous group of users with large sections of non-Rookwood operations interspersed amongst Rookwood water customers.

Hence the lower Fitzroy River has been split into zones to monitor for temporal and spatial changes over time of agricultural operations associated with the water for the Rookwood scheme. These have been correlated to accessible water quality monitoring locations along the river. Refer to Figure 2 below

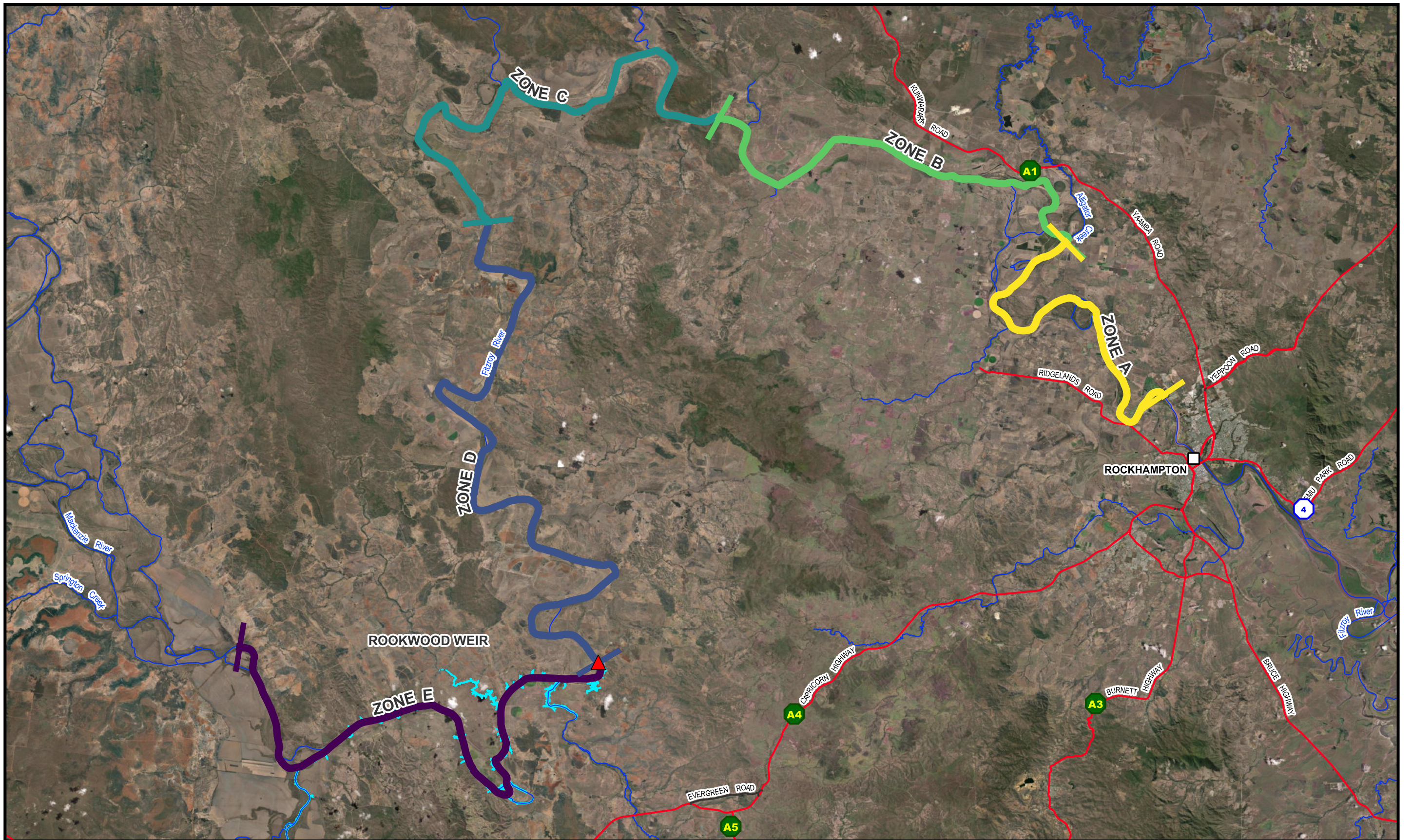


Figure 2: Agricultural Zones

0 2.5 5 7.5 10 km

Scale @ A3: 1 : 250000
 Date: 17/10/2023
 Job: J0234
 Drawn: Corey Taylor
 CRS: EPSG:7844_GDA2020



DATA SOURCE:
 QSPATIAL 2023: The State of Queensland (Department of Resources) 2023; Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

- | | |
|---------------------------------|---------------------------|
| Rookwood Weir Project | Agricultural Zones |
| State Controlled Roads | Zone A |
| Roads | Zone B |
| Rail | Zone C |
| Inundation Area (46.2 m) | Zone D |
| Watercourse / Drainage Features | Zone E |



Table 5: Lower Fitzroy Subcatchment Agricultural Zones

Zone	AMTD	Description	US WQ Location	DS WQ Location
A	59.6 - 115.0	Fitzroy Barrage to Upstream Limit of Fitzroy Barrage water storage	Etna Ck	RRC Water
B	115.0 – 141.2	Upstream Limit of Fitzroy Barrage water storage to Eden Bann Weir	Eden Bann	Etna Ck
C	141.2 – 183.4	Eden Bann Weir to upstream limit of Eden Bann Weir pool	Glenroy Crossing	Eden Bann
D	183.4 – 265.3	Upstream limit of Eden Bann Weir pool to Rookwood Weir	Rookwood Weir	Glenroy Crossing
E	265.3 – 310.3 (Fitzroy), 310.3 – 322.4 (Mackenzie), 0.0 – 11.5 (Dawson)	Rookwood Weir to upstream limits of Rookwood Weir pool in Mackenzie and Dawson Rivers	Apis Ck Rd (Mackenzie) & Boolburra (Dawson)	Rookwood Weir

Type of agriculture likely to be developed:

- Intensive cropping / horticulture eg macadamia, lychees
- Cattle grazing (where water is supplied for irrigated agriculture eg growing feed for hay)

Refer to the Land Management Code of Practice (LMCOP) for further information regarding the applicable land use practices for the scheme and management practices. Additionally refer to the Water Quality Monitoring and Reporting Program for further information regarding monitoring locations.

7.0 Potential Water Quality Impacts

Currently the predominant land uses within the Fitzroy Basin include grazing (80%), forestry (6%) and conservation (6%). The Basin is a major contributor to fine sediment loads (Douglas et al. 2006) and dissolved inorganic nitrogen (Wolff et al. 2018) to the Great Barrier Reef, primarily sourced from agricultural land uses including grazing, stream bank erosion and dry land cropping. Currently, the dominant land use in the vicinity of Rookwood Weir is grazing and native vegetation.

Upstream of the proposed weir, along the Fitzroy River adjacent to the inundation zone, there are pastures, dryland cropping and some small areas of irrigated crops and/or intensive horticulture. Cropping is a significant land use directly upstream of the confluence of the Fitzroy River with the Mackenzie and Dawson Rivers. Up to 6,300 ha of grazing on native vegetation land could become a mix of cattle feedlots (4,000 ha), irrigated cropping (1,600 ha) and irrigated horticulture (700 ha). The following issues may be associated with more intensive or new agricultural developments:

- The use of impounded water to establish and maintain irrigated agriculture can involve increased application of pesticides and fertilisers. Overland flow can then lead to diffuse pollution and increased pesticide and nutrient concentrations in receiving waters.
- Diffuse-source pollution from agricultural land in Great Barrier Reef catchments is the main source of the Reef 2050 priority pollutants: nutrients (dissolved inorganic nitrogen, particulate phosphorus, particulate nitrogen), sediment (fine sediment) and pesticides. In order to determine loads of pollutants, it is necessary to monitor both concentrations and flow.
- Irrigated cropping is also associated with changes in ground cover, with periods of reduced erosion when crops are well established, and periods of increased availability of particulates (and particulate bound contaminants) after harvest. Total suspended solids (TSS) and particle size analysis (PSA; for determination of fine and very fine particle fractions) should be monitored as land use changes. High rainfall events can enhance erosion and sediment runoff from cropping land, leading to periods of increased turbidity, so event monitoring and continuous flow logging are required.
- Cattle feedlots are nutrient sources due to the possibility of waste material (manure) running off in overland flows, and potentially leaching into groundwater. Areas of cleared and regularly disturbed ground with little groundcover (such as feedlots) can be a source of sediments entering river systems. Monitoring needs include nutrient concentrations, total suspended solids, particle size analysis and continuous water flow gauging.

8.0 Land Management Code of Practice

The Land Management Code of Practice (LMCOP) has been prepared by Sunwater as per Condition 2 of the approval and acts as an avoidance strategy for the project to prevent pollutants from agricultural operations from impacting the GBR. As per the EPBC approval conditions, each Rookwood Weir customer proposing to use water for irrigated agriculture in a manner that may impact on the quality of the water entering the Great Barrier Reef World Heritage Area and National Heritage place is required to comply with the code.

The aim of the code is to provide irrigated agricultural operations with guidance to achieve best practice. Failure to meet the requirements of the LMCOP may be a factor in an increase in water pollutants impacting the GBR and consequently result in the need for offsets to be implemented under this plan. Refer to LMCOP document RWW-SUN-LAN-RP-0019.0.IFA for detail.

9.0 Water Quality Monitoring and Reporting Program

A Water Quality Monitoring and Reporting Program has been developed by the project in conjunction with Central Queensland University to address the EPBC approval conditions. The program includes:

- Water quality monitoring undertaken pre and during construction for the establishment of a baseline;
- Determination of baseline loads and correlation of pollutants with stream flow events;
- Water quality monitoring to be conducted from commissioning for the duration of the action including standard frequency and additional event monitoring triggers (eg flood, incident);
- Water quality monitoring locations in the catchment upstream, within the impoundment and downstream of Rookwood Weir; and
- Parameters to be monitored on a regular basis.

Once agricultural land use developments begin, this schedule will commence at the identified monitoring sites as per the WQIP. While monthly monitoring for the effects of inundation is underway that schedule will also cover the seven sites that are common to agricultural land use monitoring (Dawson River at Boolburra, Fitzroy River at Riverslea, Weir-Upstream, Weir-Downstream, Fitzroy River at Hanrahan, Fitzroy River at Glenroy Rd, Fitzroy River at FRW). For the remaining three river sites (Mackenzie at Apis Ck Rd, Fitzroy River at Etna Creek and Fitzroy River at the Gap) and the four creek sites, additional monitoring will be undertaken as described in the WQIP. Also as described for inundation monitoring, pesticide monitoring will include the 22 reference pesticides that are used to calculate the Reef catchment loads monitoring Pesticide Risk Metric (Table 15; Australian and Queensland governments 2020), and PSA will be monitored to calculate the fine sediment fraction.

9.1 Determination of Offset Trigger

The determination of whether there has been an increase in water quality pollutants that is likely or has actually resulted in a residual impact on the Great Barrier Reef will be undertaken on an annual basis. This shall involve analysis of 12 months of data by a suitably qualified person with experience in water quality field. Where increased levels have been observed these will then be assessed as to whether they are attributed to agricultural practices associated with the operation of Rookwood Weir.

This will be conducted to address whether an offset is required for one or more of the parameters:

- nutrients;
- sediment;
- farm chemicals; or
- other.

This process is outlined in the Water Quality Monitoring and Reporting Program.

Decision Procedure

Water quality guidelines for the Fitzroy Basin are available for most monitored parameters in the Fitzroy Basin Water Quality Objectives (State of Queensland 2013) and the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018). A pesticide metric assessing the total toxicity (multi-substance potentially affected fraction; msPAF) for 22 pesticides has also recently been developed

(Australian and Queensland Governments 2020). These guidelines and the project pre-action baseline numbers that were developed in the Water Quality Monitoring and Reporting Program shall be utilised to determine if further investigation is required into the source of the increased pollutant levels.

It is important to note that as the development is occurring within an already modified and moderately impacted catchment, frequent exceedances of available guideline values are already recorded, as evidenced in the baseline monitoring data. To determine whether a future water quality impact occurs as a result of the development, or was pre-existing, measured results must also be compared to baseline water quality monitoring data in addition to the water quality guidelines.

The first step in the assessment process to be conducted monthly by Sunwater, is comparison of a 12-month rolling median to the relevant guideline values for each parameter. A 12-month rolling median must be used for this assessment, as individual measurements can't be compared to guideline values. If an exceedance is identified, the monitoring results will be compared to the baseline results using the 25th, median and 75th percentiles as comparison points. If the monitoring results exceed baseline values, it will be necessary to investigate results from upstream sites, to determine whether the exceedance was caused by an activity upstream of the inundation/agricultural change area.

If the exceedance does not appear to be derived from upstream, additional checks will be undertaken to determine the source of the exceedance.

As part of the Water Quality Monitoring and Reporting Program a decision procedure has been developed to inform the project if offsets are to be triggered. This includes a number of aspects such as:

- Was an increase in pollutant observed above baseline;
- Was this due to an upstream flood event - ie elevated upstream WQ;
- What zone of river did the WQ increase occur;
- Did a rain event greater than 75mm (1yr ARI/ 0.63 AEP) occur in the Lower Fitzroy catchment during the time period;
- Does this correlate with the rain event in a gauge;
- Are there any Rookwood associated agricultural operations in this zone of the river;
- Do these operations have compliant Land Management Code of Practice Farm Plans;
- Does the type of farming relate to the pollutant of concern (eg farm chemicals used); and
- Are there any noticeable changes in practices on non-Rookwood agricultural operations that may be the source of the issue.

If it is determined that there is an increase in pollutant loads to the Great Barrier Reef due to an increase in irrigated agricultural operations utilising Rookwood Weir water, this Offset Management Plan will be utilised to manage the delivery of the offsets for the project.

10.0 Offset Management Plans

10.1 Procedure for Residual Impact Offset

If the above decision procedure determines that a residual impact to the GBRWHA is likely or has actually occurred as a result of increased agricultural operations utilising Rookwood Weir water, Sunwater shall determine the offset required for the particular parameter.

10.1.1 DCCEEW Notification

Following the determination by Sunwater the notification to the DCCEEW (Minister) shall be taken within 20 business days as per EPBC Condition 1d.

10.1.3 Action and Timeframes

Following notification to DCCEEW, Sunwater shall provide an offset program to the DCCEEW (Minister) within 20 business days outlining the description of actions and timeframes as per Condition 1d. The start of the delivery of the offset in the program will be as soon as practicable in the year following the impact is identified.

This offset program shall include, but not limited to:

- Details of the particular parameter that is requiring offsetting due to impact on the GBR
- The impact amount ie tonnes and corresponding offset quantum
- Methodology of delivery of the offset program – ie location, timeframe, project management and responsibility
- Method of calculation of offset delivery and completion criteria
- Monitoring and reporting regime for the offset program
- Potential risks to successful implementation and contingency measures

The offset program including the method to determine the quantum of impact shall be agreed with DCCEEW on a case by case basis and be based on the latest available methodology depending on the current regulatory tools and industry accepted determinations.

10.2 Nutrients

10.2.1 General Description of Nutrients

Nutrients for the purpose of this plan include the water quality parameters nitrogen and phosphorus. These are measured as Total Nitrogen and Total Phosphorus. The primary source of nutrients in agricultural operations is largely through the application of fertilizer to crops in the form of dissolved inorganic nitrogen. Additionally some nutrient load can be attributed to particulate nitrogen associated with soil erosion and sediment transport.

10.2.2 Offset Options

Where possible Sunwater plan to utilise that existing programs that have been developed for the Water Quality (Nitrogen) Offset Management Plan to address any increases in nutrients. Where this occurs during Years 1 to 6 following the commencement of weir operation, there will be the opportunity for Sunwater to deliver the required amount utilising the programs being delivered at the time. For periods where an increase is observed following these initial years, either similar programs will be utilised as previously developed or programs reinstated to achieve the nutrient offset. These may consist of any of the suite of offset programs including:

- Streambank rehabilitation;
- Further water quality research;
- Weed harvesting;
- Landcare programs; or
- Financial contributions such as Reef Credits.

10.3 Sediment

10.3.1 General Description of Sediment

Particulate sediment is one of the key pollutants in the Fitzroy catchment with respect to potential impacts on the Great Barrier Reef. These are measured as Total Suspended Solids and can be also correlated with turbidity levels in the waterway.

10.3.2 Offset Options

Where possible Sunwater plan to utilise that existing programs related to erosion and sediment control developed for the Water Quality (Nitrogen) Offset Management Plan to address any increases in sediment. Where this occurs during Years 1 to 10 following the commencement of weir operation, there will be the opportunity for Sunwater to deliver the required amount utilising the programs being delivered at the time. For periods where an increase is observed following these initial years, either similar programs will be utilised as previously developed or programs reinstated to achieve the nutrient offset. Appropriate offset programs for sediment reduction would involve stream bank rehabilitation and/or landcare programs in the Fitzroy basin or other Great Barrier Reef catchments.

10.4 Farm Chemicals

10.4.1 General Description of Farm Chemicals

A range of different farm chemicals attributed to specific types of agriculture are currently utilised in the Fitzroy River catchment. Chemicals are additionally utilised by government agencies for weed control eg Rockhampton Regional Council on water hyacinth in the Fitzroy River.

A pesticides metric assessing the total toxicity in the form of the Multi Substance Potentially Affected Fraction (msPAF) shall be utilised. This represents the 22 pesticides currently included in the catchment loads monitoring method for the Reef Water Quality Report card. These pesticides are described in the Water Quality Monitoring and Reporting Program.

The types chemicals being utilised by agricultural operations associated with Rookwood Weir will be known through the requirements of the Land Management Code of Practice and associated auditing regime.

Chemicals may not be included in baseline because these types of agriculture are not currently present in the Lower Fitzroy Subcatchment but may be detected during the operation of the weir. Chemicals not included in baseline because they did not exist or available for use in the market at the time of the baseline monitoring program in the Lower Fitzroy Subcatchment but may be detected during the operation of the weir.

10.4.2 Offset Options

To reduce pesticide impacts on the Great Barrier Reef Sunwater shall develop an Agricultural Improvement Program to assist farmers in pesticide use. This may include:

- improving chemical application techniques;
- changing the type of chemicals used to a less harmful option; or
- undertake new equipment trials.

The program would be developed in line with Reef 20250 Water Quality Improvement Plan - Management Practices component of the Paddock to Reef program which includes a number of water quality risk frameworks for the sugarcane, grazing, horticulture, grains and banana industries.

10.5 Other Pollutants

10.5.1 General Description of Other Pollutants

Water quality monitoring has been conducted for a number of other parameters (eg metals, pH) as defined in the Water Quality Monitoring and Reporting Program. These may be shown through the monitoring program to increase above baseline levels. Where this is determined to be associated with irrigated agriculture with a potential impact the Great Barrier Reef, the need for offsets shall be investigated.

10.5.2 Offset Options

Offsets for other pollutants are to be determined on a case by case basis depending on the pollutant required to be offset. The program would be developed in line with Reef 20250 Water Quality Improvement Plan - Management Practices component of the Paddock to Reef program which includes a number of water quality risk frameworks for the sugarcane, grazing, horticulture, grains and banana industries.

11.0 Offset Completion Criteria

A monitoring program appropriate to the nature and type of the offset program required will be developed and will include criteria for triggering corrective action/s. Annual reporting of the monitoring outcomes shall be undertaken to evaluate the program effectiveness against targets and completion criteria. This will involve Sunwater conducting an assessment of each individual program and how it is tracking to meet the required offset amount. Within each offset program that is developed a set of completion criteria shall be established. Once these have been met DCCEEW shall be notified accordingly.

Should the amount of the offset delivered be in arrears of the agreed offset amount in a particular offset program, a review shall be undertaken and additional measures put in place to ensure completion of the full offset. This shall be discussed with DCCEEW with updated agreed timeframes.

12.0 Risk Management

The following table outlines the management of general risks associated with the delivery of the offset programs:

Table 6: Risk Management

Risk Item	Description	Management Actions
Offset Methodology	Currently no accepted offset calculation methodology for a particular pollutant.	Offset delivery plan for a particular pollutant to include development of methodology with DES and industry experts that can be incorporated into the OMP.
Delivery Timeframe	Agreed delivery timeframe for a program cannot be met. This may be as a result of procurement, materials, severe weather events etc.	Monitor delivery of program regularly to determine timeframe for final completion. Report to DCCEEW where extensions are required and adjust OMP accordingly.
Offset Opportunities Availability	Project may not be able to meet 20 day timeframe to develop actions and timeframes for a particular pollutant at the time of notification. May be due to lack of locally available options.	Maintain database of prospective offset program options for particular pollutants and update on an annual basis.
Offset Market Challenges	Multiple offset programs already existing within the Fitzroy catchment funded by external parties such as government or private companies not associated with Rookwood. Potential for remaining opportunities to be limited at any one time or not cost beneficial.	Develop relationships with offset program delivery organisations to understand current offset market shortfalls or oversupply. Investigate options not located within the Fitzroy catchment but still within the Great Barrier Reef catchments.

For each specific offset program that is required to be developed it will include potential risks to its successful implementation. This will also include contingency measures to be implemented to mitigate these particular potential risks to the successful implementation of the program.

13.0 Offset Program Monitoring

Monitoring of all offset programs will be undertaken on a regular basis by Sunwater to ensure compliance and delivery of pollutant load reduction to the Great Barrier Reef. Sunwater shall employ a dedicated team of environmental professionals to oversee the delivery of each of the offset programs. As part of their role they shall undertake a monitoring regime tailored to the timeframes and requirements of each of the programs to offset water quality parameters by Sunwater.

The monitoring requirements for each offset program shall be detailed at the time of the offset being triggered as per Section 10.1.3 above. The overall monitoring of offsets as a result of an increase in pollutant load impacting the Great Barrier Reef attributed to Rookwood Weir agricultural activities, shall be included in the annual Water Quality (Agriculture) Offset Report as per Section 14 below.

14.0 Reporting

Sunwater, its successors or assigns, will, as per Condition 10 of the approval, provide an Annual Compliance Report each year following the date of the commencement of the action for the period of the approval. This is provided to DCCEE as well as being published on Sunwater’s Rookwood Weir Project website. Offset reports describing the progress of the water quality (Agriculture) offset over the relevant 12-month period will be part of those reports until the end of the EPBC Approval (i.e. until 2046).

The annual Water Quality (Agriculture) Offset Report will contain records substantiating all activities relevant to the implementation and management of the offsets, in keeping with the requirements of Condition 10 of the Approval.

Sunwater, its successors or assigns, will publish the annual compliance reports, of which the Water Quality (Agriculture) Offset Reports form a part, on the website within three months of the relevant 12-month period. Sunwater, its successors or assigns, will supply documentary evidence showing proof of the date of publication of the compliance report will be supplied to the Department at the same time that the compliance report is published. These commitments ensure that Condition 10 of the approval is being met.

Table 7: Reporting

Report Details to DCCEE	Reporting period	Submission due date
Annual Water Quality (Agriculture) Offset Report, which contributes to the Annual Compliance Report as per Approval Condition 10.	Annual Offset Area Report – Every 12 months following commencement of the action, as per approval Condition 10.	3 months following 17 July every year for the duration of the approval
Compliance Report detailing compliance with approval conditions under the EPBC Act, including compliance with the offset conditions, as detailed in this OMP. This will be provided at https://www.sunwater.com.au/projects/rookwood-weir-project/environment/	Every 12 months following commencement of the action, as per approval Condition 10.	3 months following 17 July every year for the duration of the approval

15.0 Non-conformance and Incident Reporting

As per approval Condition 19, Sunwater will notify the Department within 2 business days of becoming aware of any incident, non-compliance with conditions, or non-compliance with any of the commitments made in this OMP. Similarly with Condition 20, Sunwater will also provide the details of any incident or non-compliance to the Department as soon as practicable and no later than 10 business days of becoming aware of the incident or non-compliance. (See also *Section 16* - Adaptive management and plan review).

This report shall specify:

- any corrective action or investigation, which the approval holder has already taken or intends to take in the immediate future;
- the potential impacts of the incident or non-compliance; and
- the method and timing of any remedial action that will be undertaken by the approval holder.

Incidents regarding impacts to MNES identified at any of the offset sites will be reported by the landowner or site occupants to Sunwater. The level of severity will dictate the necessary actions through the company's formal incident management system. Responses to incidents related to any offset project will be coordinated by Sunwater, to ensure any necessary notifications and corrective actions are undertaken as soon as reasonably possible.

16.0 Adaptive Management and Plan Review

This plan has been prepared to be implemented until the offset completion criteria have been achieved or when the approval for the action ceases. Management measures will be reported in the annual offset reports, and adapted, where required, should triggers be reached and corrective actions are implemented. If management measures need substantial adjustment, Sunwater will review this plan in consultation with the landholder and/or other stakeholders. The Annual Review of Offset Management Plan shall be conducted in conjunction with Water Quality Monitoring and Reporting Program review. Alterations may be required due to changes in:

- location of agriculture operations;
- crop types of agricultural operations;
- consistent issues observed with particular pollutants;
- pollutants deemed to be less risk over time;
- availability of new technology for water quality monitoring and modelling;
- new agricultural techniques;
- changes to climatic conditions;
- changes to Commonwealth or State legislative requirements; or
- force majeure events (eg cyclone, extreme flood or drought, pandemic, political unrest) impacting agricultural operations or offset delivery locations.

17.0 Responsibility

The following is an outline of the responsibilities for the parties involved in delivering the offset management plan:

Sunwater

- Overall implementation of the offset management plan;
- Completion of annual reporting requirements to DCCEEW;
- Inspection, auditing and review of the offset management plan programs as they are being implemented;
- Consultation with stakeholders for the implementation of offset programs;
- Monitoring, review and assessment of water quality as per the Water Quality Monitoring Program and assessment of pollutant loads to determine offsets; and
- Engagement of suitably qualified persons to undertake appropriate studies and surveys, prepare reports and deliver programs as required.

Agricultural Operations

- Undertake operations and reporting as per the Land Management Code of Practice;
- Report any water quality related incidents; and
- Participate in offset programs to improve agricultural practices.

Offset Delivery Partners

- Engage with stakeholders and communities on Sunwater's behalf to deliver the required offset programs;
- Progressively report to Sunwater on the implementation of the offset program; and
- Review programs to ensure the necessary water quality outcomes are met.