Annual Compliance Report

EPBC 2016/7776

26 August 2020 to 25 August 2021

Shoreline Urban Village, Redland Bay, Redland City, Queensland

Lendlease Communities (Shoreline) Pty Ltd

24 November 2021

Job No: 10724 E

Document control

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Document Issue

Issue	Date	Prepared By	Checked By
A	24/11/2021	KT	JB

Prepared by

ABN 24 144 972 949
www.saundershavill.com

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1. Introduction

Saunders Havill Group (SHG) have prepared this Annual Compliance Report (ACR) for the Shoreline urban village project at Redland Bay, Queensland on behalf of Lendlease Communities (Shoreline) Pty Ltd (Lendlease).

This report provides an assessment of the project's compliance with the approval granted under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (ref EPBC 2016/7776) and is specifically required by condition 12 of the approval granted on 26 April 2018 (refer **Appendix A**). The approval was granted by the Australian Government Department of the Environment and Energy, and is currently administered by, the Australian Government Department of Agriculture, Water and the Environment (the Department).

On 12 March 2020, initial notification was provided to the Department that the action had commenced on 12 March 2020. However, due to the subsequent impact of the COVID-19 pandemic in March 2020, the works did not eventuate. Following correspondence with the Department, it was agreed that the initial notification of commencement was considered to be withdrawn.

Following the resumption of works in late August 2020, the Department was notified that the development had commenced on the 26 August 2020. Therefore, the current reporting period for this ACR is for the twelve months commencing on 26 August 2020, and ending on the 25 August 2021.

Shoreline is located approximately 34 kilometres (km) southeast of Brisbane in the Redland City local government area (refer **Figure 1**). Within the project area, the development is undertaken in accordance with the approved Eastern Curlew Impact Management Plan (ECIMP) and Water Quality Management Plan (WQMP), and the EPBC Act approval conditions.

1.1. Approval summary

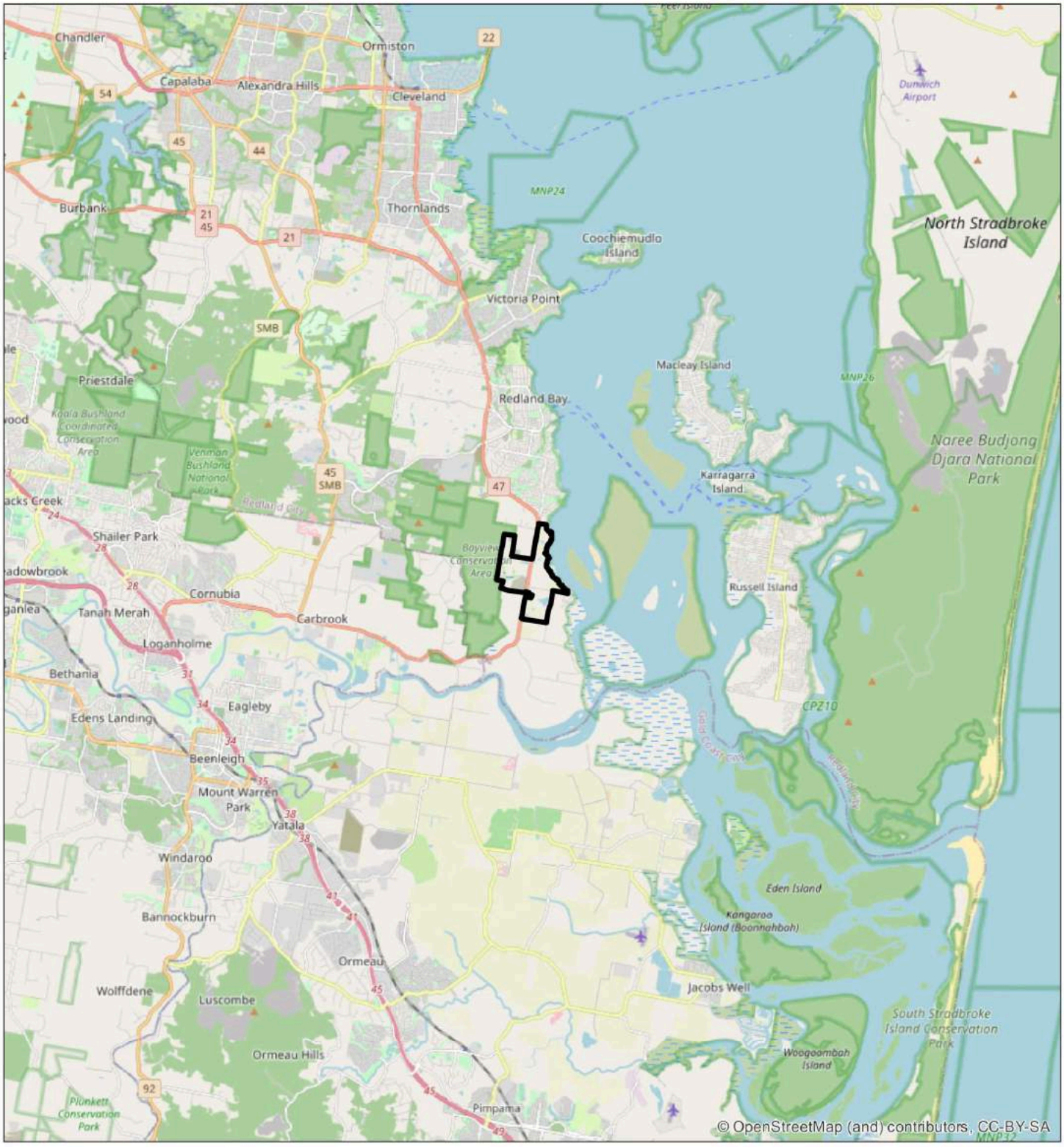
There are three approval documents issued under the EPBC Act relevant to the project:

1. *Approval* dated 26 April, 2018.
2. *Eastern Curlew Impact Management Plan* (Version 5, dated 28 January 2020) – approved by the Department on 3 February 2020, and
3. *Water Quality Management Plan* (Version 5, dated November 2019) – approved by the Department on the 14 November 2019

Table 1 summarises the approval details under the EPBC Act relevant to Shoreline urban village.

Table 1: EPBC Act approval summary

Department reference	EPBC 2016/7776
Approval holder, ACN	Lendlease Communities (Shoreline) Pty Ltd, 623 367 377
Approval date	26 April 2018
Period for which the approval has effect	31 March 2038
Approved action	To develop the Shoreline urban village development in Redland Bay, Queensland (See EPBC Act Referral 2016/7776)
Controlling provision	Approved – Wetlands of international importance (sections 16 & 17B) Approved – Listed threatened species and communities (sections 18 & 18A) Approved – Listed migratory species (sections 20 & 20A)
Address	Serpentine Creek Road, Redland Bay Queensland 4165



Legend

Shoreline Development Site

Figure 1

Site Context

File ref. 10724 E Figure 1 Site Context A
Date 11/10/2021
Project Shoreline, Redland Bay

0 1 2 4 6 km

N

Scale (A4): 1:175,000 [GDA 1994 MGA Z56]

saunders havill group

Layer Source: © State of Queensland 2021

1.2. Declaration of accuracy

In making this declaration, I am aware that sections 490 and 491 of the 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	Murray Saunders
Position	Director
Organisation	Saunders Havill Group (ABN 24 144 972 949)
Date	24 November 2021

2. Description of activities – impact area

The Shoreline urban village action (the Project) is a master planned residential development in Redland Bay, a suburb of Redland City in South East Queensland. The development encompasses the establishment of residential land parcels and open space areas, and construction is ongoing.

Construction commenced on 26 August 2020 in the form of bulk earthworks within Precinct 1 for the first Reconfiguration of a Lot (RAL) approval (council ref. RAL19/061), and an area associated with the upgrade of the intersection of Serpentine Road and Scenic Road. The work areas relevant to the current reporting period are shown in **Figure 2**. These works will facilitate the creation of a total of 130 residential allotments, one large new park (i.e. open space), new road and a balance lot. Clearing commenced with utmost diligence afforded by Lendlease Communities (Shoreline) Pty Ltd to minimise harm to fauna potentially residing amongst the works area. A Fauna Spotter Catcher supervised all vegetation clearing works. Furthermore, minimising disturbances to neighbours was also an ongoing priority.

During the current reporting period, the following activities were underway or established in the project area:

- Earthworks to create residential land parcels (**Photo Set 1**);
- Internal road network and associated infrastructure (**Photo Set 1**);
- Installation of essential services (e.g. water, sewer, electrical);
- Bioretention basin infrastructure (**Photo set 2**); and
- Serpentine Creek Road and Scenic Road intersection upgrade (**Photo set 3**).

The construction works were concentrated amongst sparsely vegetated areas. Consequently, very limited vegetation clearing was required to facilitate earthworks undertaken during the current reporting period. All vegetation clearing was supervised by qualified Fauna Spotter Catchers. A summary of fauna management reports following clearing activities is provided in **Section 2.1**.

Sediment and erosion control measures were installed within and bounding the works extent (refer **Photo Set 4**) at the direction of a Certified Professional in Erosion and Sediment Control (CPESC). These works were largely focused along the interface between the works extent and adjacent undisturbed areas, and in association with utility infrastructure (e.g. drainage culverts, stormwater basins).

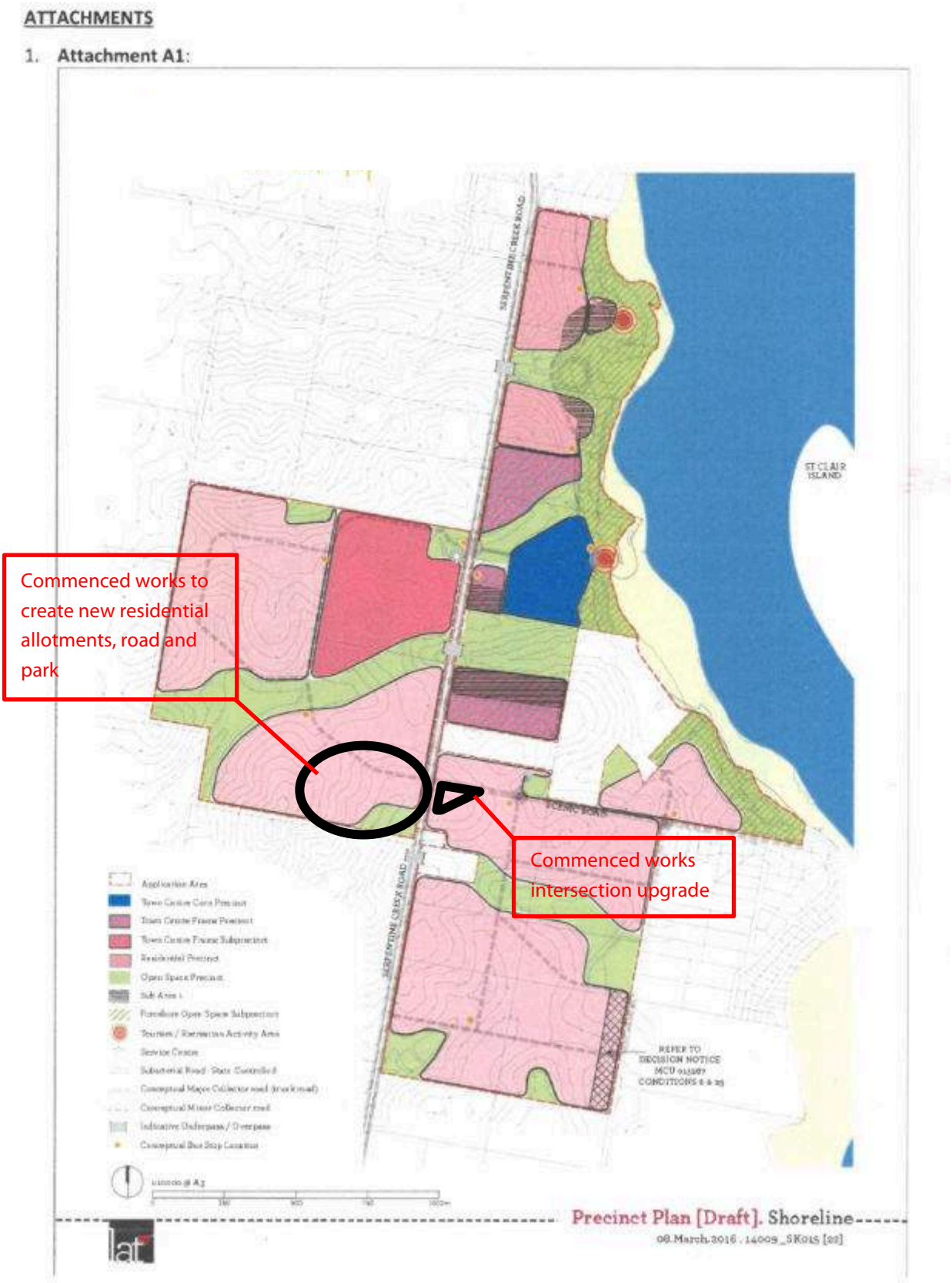
Photo Set 1: New residential allotments and internal roads

Photo Set 2: Bioretention basin construction

Photo Set 3: Serpentine Creek Road and Scenic Road intersection upgrade

Photo Set 4: Erosion and sediment controls

Figure 2: Location of commenced works



2.1. Fauna management summary

Very limited vegetation clearing was undertaken during the current reporting period, as very few native trees were present within the works area. Qualified Fauna Spotter Catchers, Queensland Fauna Consultancy (QFC), supervised all vegetation clearing works that occurred during the current reporting period (refer **Appendix B** *Services Reports*). All Fauna Spotter Catcher activities were conducted under the provisions of Rehabilitation Permit (WA0026789) issued to QFC by the Queensland Government Department of Environment and Science, approving the observation and relocation of protected animals. Microhabitats identified and inspected during clearing activities included:

- Arboreal nests, hollows and termitaria; and
- Terrestrial hollow logs, woody debris, rock piles, burrows, and dense leaf litter.

Over the course of all vegetation clearing activities that were undertaken during the current reporting period, the following fauna species were observed and managed by the supervising Fauna Spotter Catcher:

- Tree Martin chicks (*Petrochelidon nigricans)*;
- Rainbow Lorikeet chicks (*Trichoglossus haematodus*);
- Kingfisher sp. eggs;
- Common Brushtail Possums (*Trichosurus vulpecula*); and
- Yellow-footed Antechinus (*Antechinus flavipes*).

The Tree Martin and Rainbow Lorikeet chicks were recovered from hollows and were taken to a qualified wildlife carer. The Kingfisher sp. eggs were found already damaged and deceased. The Common Brushtail Possums were relocated to suitable adjacent habitat with refugia and feeding resources consistent with species requirements. The Yellow-footed Antechinus was left *in situ* to allow self-relocation overnight. Other fauna mitigation measures were not required.

All supervised clearance activities were conducted with the full co-operation of on-site personnel and machinery operators.

2.2. Eastern Curlew management summary

Condition 4 of the approval required the approval holder to prepare an ECIMP (Eastern Curlew Impact Management Plan) and submit for the Minister's approval before commencement of the action. The ECIMP was submitted to the Minister for assessment, and was subsequently approved on the 3 February 2020. Following this, condition 5 required the approval holder to implement the approved ECIMP.

The approved ECIMP outlines key management measures and monitoring requirements that the approval holder must implement throughout the life of the Shoreline urban village development. The objective of these management measures is to maintain the densities of Eastern Curlews and other migratory shorebird

numbers, foraging habitat quality, or foreshore foraging habitat extent in foreshore habitat adjacent to the Shoreline urban village development.

The ECIMP documents the approval holder's commitment to implement a monitoring program that is designed to:

- Assess pre commencement Eastern Curlew densities, foraging habitat quality and foraging habitat extent;
- Detect impacts on Eastern Curlew densities, foraging habitat quality and foraging habitat extent; and
- Delineate impacts due to the action from impacts due to natural or other anthropogenic causes.

As part of the preparation of the ECIMP, baseline surveys for Eastern Curlew and other target migratory shorebirds (Whimbrel and Bar-tailed Godwit) were undertaken at specific development monitoring sites and two control site monitoring locations. The two control site locations contain a similar total area of foraging habitat to the development site locations. **Figure 3** shows the development site and control site monitoring locations. Control Site 1 consists of the 'Oyster Point North and South' and 'Point O'Halloran' areas, and Control Site 2 consists of the 'Point O'Halloran to Victoria Point' and 'Victoria Point North East', 'Victoria Point South' and 'Redland Bay North' areas shown in **Figure 3**. The development site monitoring locations consist of the areas identified as 'Shorelines – North mainland, 'Shorelines – Island' and 'Shorelines – South Mainland' in **Figure 3**.

The same development site and control site locations will be used for the ongoing monitoring required to implement the ECIMP over the life of the development. The monitoring program focuses on recording data on three key aspects, these being:

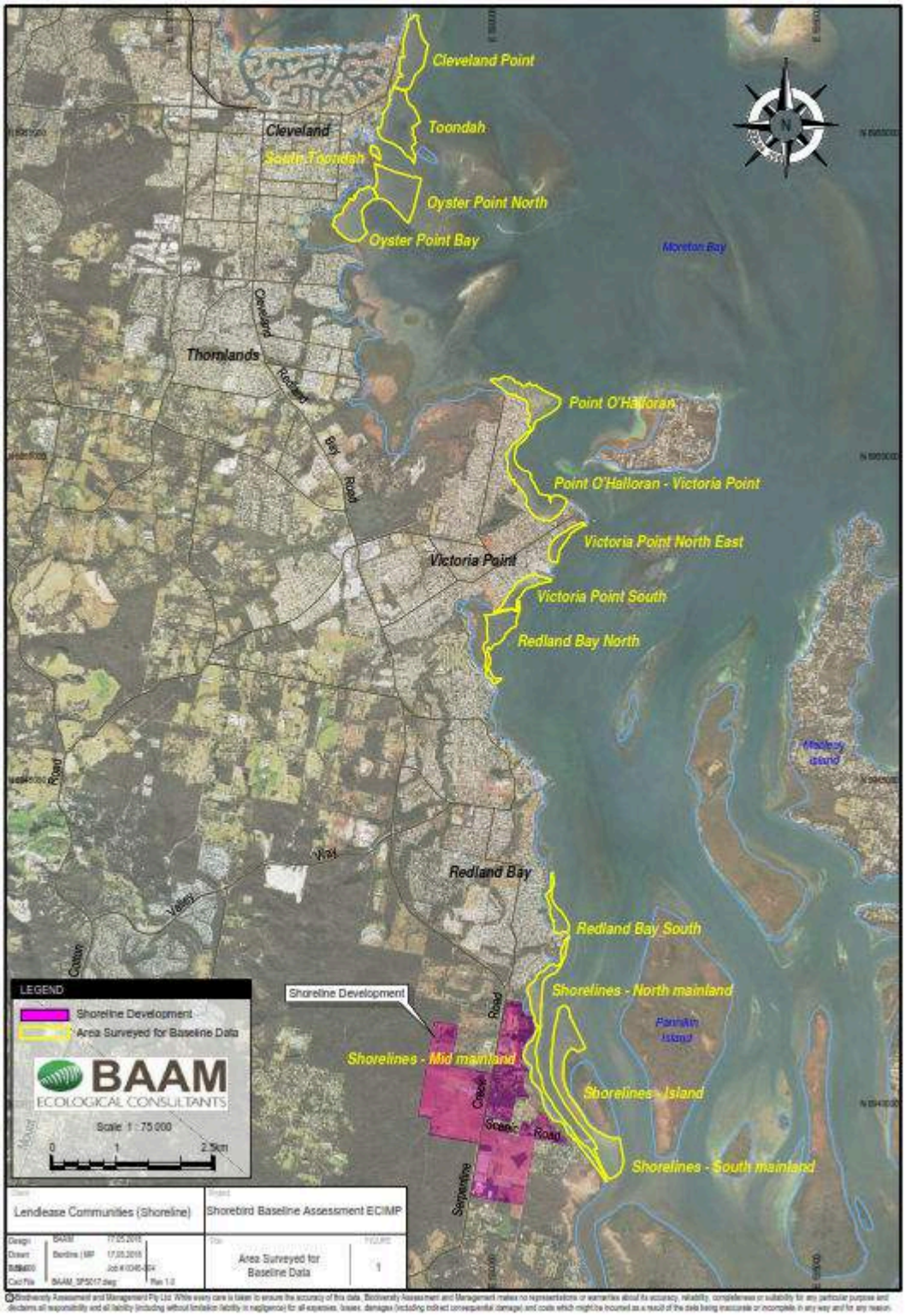
- Eastern Curlew and other target migratory shorebirds (Whimbrel and Bar-tailed Godwit) numbers and average densities;
- Foraging habitat quality; and
- Foraging habitat extent.

The ECIMP specifies the trigger points, timing and frequency of when monitoring events for these aspects are to be undertaken. All monitoring required by the ECIMP will commence between 1 September and 30 March in the year immediately prior to construction commencing within 250 m of Moreton Bay. No monitoring activities are required to be undertaken until this trigger point is reached.

All works during the current reporting period of 26 August 2020 to 25 August 2021 occurred more than 250 m from Moreton Bay. Therefore, the monitoring requirements specified by the ECIMP are not yet required to be undertaken and are consequently not assessed for compliance in the current reporting period.

Nonetheless, and to align with future ACRs, **Section 4** of this report details the implementation status of the ECIMP.

Figure 3: ECIMP Monitoring locations



2.3. Water quality management summary

Conditions 7-9 require the approval holder to prepare a Water Quality Management Plan (WQMP) and submit this for the Minister's approval before commencement of the action. The WQMP was submitted to the Minister for assessment, and was then subsequently approved on 14 November 2019. Condition 9 requires the approval holder to implement the approved WQMP. The Annual Compliance Report 2020-2021 prepared by DesignFlow, and presented in **Appendix C**, provides a summary of the management and monitoring activities related to the approved WQMP over the current reporting period. **Section 5** of this report summarises the current progress of the development in implementing the WQMP.

3. EPBC Act approval conditions compliance table

The approval conditions for the Shoreline urban village, Redland Bay are replicated in **Table 2** with a designation of compliance or non-compliance if the condition was applicable during the current reporting period, and evidence and comments as necessary. A copy of the approval is provided in **Appendix A**. The designations are made in accordance with the guidance provided in the Departments *Annual Compliance Report Guildelines* (2014), as follows:

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 2: Approval conditions compliance table

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
PROJECT SITE			
1	The approval holder must ensure that development associated with the action occurs within the site identified in Attachment A1 as the Application Area.	Compliant	Construction to facilitate the creation of residential and open space lots commenced within areas shown as Residential Precinct and Open Space Precinct on Attachment 1 of the EPBC Act Approval 2016/7776.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
			Construction to facilitate the upgrade of the Serpentine Road and Scenic Road intersection has also commenced within the Serpentine Creek Road reserve corridor and areas shown as Residential Precinct within Attachment A.
2	The approval holder must ensure that no buildings are constructed within the Foreshore Subprecinct as identified at Attachment A2 except barbeque shelters, picnic shelters, and toilet amenities.	Compliant	No buildings were constructed within the Foreshore Subprecinct as identified in Attachment A2 of the approval during the current reporting period.
SHOREBIRD MANAGEMENT			
3	For the period for which this approval has effect, the approval holder must ensure there is no decline in eastern curlew (*Numenius madagascariensis*) density, foraging habitat quality, or foraging habitat extent in the site identified as 'shorebird foraging habitats' at Attachment A3, compared to pre-commencement, as a result of the approved action.	Compliant	The approval has effect until Wednesday, 31 March 2038. The approved ECIMP identifies that when works are scheduled to occur within 250 m of Moreton Bay, management actions (e.g. surveys, monitoring and reporting) must commence in the preceding summer due to the risk of potential impacts on Eastern Curlew as a result of the approved action. During the current reporting period for this ACR: • works associated with the approved action were located more than 250 m from Moreton Bay; and • no Eastern Curlew foraging habitat was disturbed or impacted by works undertaken as part of the approved action. Consequently, due to the lack of development within 250 m of Moreton Bay, the adjacent shorebird foraging habitat attributes and density of Eastern Curlew is reasonably inferred to be disconnected from any impacts associated with construction work that has occurred during the current reporting period.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
4	The approval holder must prepare and submit an Eastern Curlew Management Plan (ECIMP) to the Minister before commencement. In addition to the detail provided in Eastern Curlew Impact Management Plan - Shoreline Redlands - 20 July 2017, the ECIMP must include: a) a scientifically valid monitoring program, sufficient to:. i. determine pre-commencement eastern curlew density, foraging habitat quality and foraging habitat extent; ii. detect impacts on the matters identified in condition 4(a)(i); and iii. delineate impacts due to the action from impacts due to natural or other anthropogenic causes; b) delineate impacts due to the action from impacts due to natural or other anthropogenic causes; c) a timeframe for when contingency measures will be implemented; d) details of reporting to be provided to the Department in the event that the outcome described in condition 3 is not met; and e) provisions to make monitoring results publicly available on the approval holder's website for the life of the project.	Not applicable (refer comments)	An ECIMP was prepared and submitted to the Minister for assessment prior to the commencement of the action, and was therefore outside of the scope of the current reporting. The ECIMP was approved by the Minister on the 3 February 2020. The ECIMP was developed to comply with condition 4. a) A monitoring program which is both trigger-based and recurring has been outlined in the approved ECIMP. The ECIMP monitoring program has been designed to: i. determine pre commencement eastern curlew density, foraging habitat quality and foraging habitat extent; ii. detect impacts on the matters identified in Condition 4 (a)(i); and iii. delineate impacts due to the action from impacts due to natural or other anthropogenic causes. b) The ECIMP monitoring program has been designed to delineate impacts due to the action from impacts due to natural or other anthropogenic causes. c) The ECIMP specifies contingency measures and specific timeframes for when contingency measures are required to be implemented. d) The ECIMP specifies that the Department must be advised of any observed decline in Eastern Curlew numbers within 14 days of the decline being observed.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
			e) The ECIMP specifies that the results of each monitoring period will be publicly available on the developers' website for the life of the project. Section 4 of this ACR report analyses the implementation of the commitments contained within the approved ECIMP for the current reporting period.
5	The ECIMP, including any revised plans, must be peer reviewed by a suitably qualified person. The peer review must be submitted to the Minister together with the ECIMP and a statement from the suitably qualified person stating that they carried out the peer review and evaluated the adequacy of the monitoring, mitigation and management measures proposed. The approved ECIMP must be implemented by the approval holder.	Compliant	This condition relates to obtaining the ECIMP approval and subsequent implementation of the approved ECIMP, with only the latter being relevant to the current reporting period. The ECIMP was approved by the Department on 3 February 2020. The approval holder implemented the ECIMP during the current reporting period, however this did not involve any management actions due to: 1. the works associated with the approved action were located more than 250 m from Moreton Bay; and 2. no Eastern Curlew foraging habitat disturbed or impacted by works undertaken as part of the approved action. **Section 4** of this ACR analyses the implementation of the commitments contained within the approved ECIMP for the current reporting period.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
6	The approval holder must not: a) undertake construction within 250 m of the Moreton Bay Ramsar wetland between 1 September and 30 March; or b) facilitate public access to the Moreton Bay Ramsar wetland, until the ECIMP has been approved by the Minister in writing and pre-commencement eastern curlew density, foraging habitat quality and foraging habitat extent has been determined.	Compliant	The ECIMP was approved by the Department on 3 February 2020, however the work relating to the pre-commencement eastern curlew density, foraging habitat quality and foraging habitat extent has not yet been required. Nonetheless, during the current reporting period there was no construction within 250 m of Moreton Bay and public access to the Moreton Bay Ramsar wetland was not facilitated by the approval holder.
WATER QUALITY MANAGEMENT			
7	The approval holder must prepare and submit a Water Quality Management Plan (WQMP) to the Minister before commencement. In addition to the detail provided in Shorelines Redland Water Quality Management Plan - June 2017, the WQMP must accord with national water quality guidelines and include: a) a monitoring program sufficient to determine pre-commencement water quality within all catchments within the site and at a reference/control monitoring site; b) a rationale for the sampling effort undertaken to determine pre-commencement water quality and justify the selection of the reference/control monitoring site with respect to the potential impacts of the action and the objectives of the WQMP; c) details of the ongoing monitoring locations and the parameters to be monitored d) proposed early warning indicators, trigger thresholds and limits for detecting impacts on surface water quality;	Not applicable (refer comments)	A WQMP was prepared and submitted to the Minister for assessment prior to the commencement of the action in accordance with conditions 7 and 9, and was therefore outside of the scope of the current reporting period. The WQMP addressed the listed information requirements and was approved by the Minister on 14 November 2019. Appendix C contains an annual report prepared by DesignFlow that details water quality management during the current reporting period. **Section 5** of this ACR analyses the implementation of the approved WQMP for the current reporting period.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	e) contingency measures to be implemented in the event that trigger thresholds are breached; and f) provisions to make monitoring results publicly available on the approval holder's website for the life of the project.		
8	The WQMP, including any revised plans, must be peer reviewed by a suitably qualified person. The peer review must be submitted to the Minister together with the WQMP and a statement from the suitably qualified person stating that they carried out the peer review and evaluated the adequacy of the monitoring, mitigation and management measures proposed.	Not applicable (refer comments)	This condition is a pre-commencement requirement (i.e. falls outside of the scope of the current reporting) or is triggered post-commencement if the WQMP is revised. The WQMP was approved by the Minister on 14 November 2019. The WQMP was not revised during the current reporting period.
9	The approval holder must not commence until the WQMP has been approved by the Minister in writing. The approved WQMP must be implemented by the approval holder.	Compliant	This condition relates to obtaining the WQMP approval and subsequent implementation of the approved WQMP, with only the latter being relevant to the current reporting period. The WQMP was approved by the Minister on 14 November 2019 and the action commenced on 26 August 2020. Appendix C contains an annual report prepared by DesignFlow that details water quality management during the current reporting period. **Section 5** of this ACR analyses the implementation of the approved WQMP for the current reporting period.
GENERAL			

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
10	Within 20 days after the commencement of the action, the approval holder must advise the Department in writing of the actual date of commencement.	Compliant	On 12 March 2020, initial written notification was provided to the Department that the action had commenced on 12 March 2020. However, due to the subsequent impact of the COVID-19 pandemic towards the end of March 2020, the works did not eventuate. Following correspondence with the Department, it was agreed that the initial notification of commencement was considered to be withdrawn. The action commenced on 26 August 2020, and the Department was notified by formal written correspondence on 31 August 2020. Therefore, it is confirmed that the approval holder advised the Department in writing of the commencement of the action within 20 days.
11	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 plans 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	Saunders Havill Group records and holds relevant information for this approval on behalf of the approval holder. Electronic records of all material are held collectively by the Saunders Havill Group and the approval holder, and will be made available upon request in accordance with section 458 of the EPBC Act, or if required to verify compliance with the conditions of approval.
12	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	Not applicable	The anniversary of the commencement of the action is 26 August, however there was no annual compliance report to publish during the current reporting period (because it was the first year of operations). The annual deadline for publishing the report addressing compliance

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	management plans as specified in the conditions. Documentary evidence providing the date of publication and non-compliance with any of the conditions of this approval must be provided to the Department at the same time as the compliance report is published. Reports must remain on the website for the period this approval has effect. The approval holder may cease preparing and publishing compliance reports required by this condition with written agreement of the Minister to do so.		with each of the conditions of the approval (*i.e.*, this Annual Compliance Report) is 26 November. When this deadline is a non-business day in Brisbane, the next business day is taken to be the deadline. Documentary evidence providing proof of the date of publication will be provided to the Department when the report is published. This report details compliance for Year 1 of the project (period from 26 August 2020 to 25 August 2021, inclusive) and will be published on the Lendlease Communities (Shoreline) Pty Ltd development website prior to close of business 26 November 2021. The Department will be notified when this occurs.
13	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 must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.	Not applicable	The Minister has not provided a direction to complete an independent audit of compliance.
14	The approval holder may choose to revise a plan approved by the Minister under Conditions 4 or 7 without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan would not be likely to have a new or increased impact. If the approval holder makes this choice they must:	Not applicable	The approval holder has not revised a plan approved by the Minister under conditions 4 or 7 within the current reporting period. The approved ECIMP and WQMP documents approved by the Minister, on 3 February 2020 and 14 November 2019 respectively, remain the current and relevant versions.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	i. notify the Department in writing that the approved plan has been revised and provide the Department with an electronic copy of the revised plan; ii. implement the revised plan from the date that the plan is submitted to the Department; and iii. for the life of this approval, maintain a record of the reasons the approval holder considers that taking the action in accordance with the revised plan would not be likely to have a new or increased impact.		
14A	The approval holder may revoke its choice under Condition 14 at any time by notice to the Department. If the approval holder revokes the choice to implement a revised plan without approval under section 143A of the EPBC Act, the approval holder must implement the version of the plan most recently approved by the Minister.	Not applicable	The approval holder has not revised a plan approved by the Minister under conditions 4 or 7 within the current reporting period. The approved ECIMP and WQMP documents approved by the Minister, on 3 February 2020 and 14 November 2019 respectively, remain the current and relevant versions.
14B	Condition 14 does not apply if the revisions to the approved plan include changes to environmental offsets provided under the plan 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 would, or would not, be likely to have new or increased impacts.	Not applicable	The approval holder has not revised a plan approved by the Minister under conditions 4 or 7 within the current reporting period. The approved ECIMP and WQMP documents approved by the Minister, on 3 February 2020 and 14 November 2019 respectively, remain the current and relevant versions.
14C	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 would be likely to have a new or increased impact, then:	Not applicable	The approval holder has not revised a plan approved by the Minister under conditions 4 or 7 within the current reporting period.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	i. Condition 14 does not apply, or ceases to apply, in relation to the revised plan; and ii. the approval holder must implement the version of the plan most recently approved by the Minister. iii. to avoid any doubt, this condition does not affect any operation of Conditions 14, 14A and 14B in the period before the day after the notice is given. At the time of giving a notice under condition 14A, the Minister may also notify that for a specified period of time condition 14 does not apply for one or more specified plans required under the approval.		The approved ECIMP and WQMP documents approved by the Minister, on 3 February 2020 and 14 November 2019 respectively, remain the current and relevant versions.
14D	Conditions 14, 14A, 14B and 14C are not intended to limit the operation of section 143A of the EPBC Act which allows the approval holder to submit a revised plan to the Minister for approval.	Not applicable	The approval holder has not revised a plan approved by the Minister under conditions 4 or 7 within the current reporting period. The approved ECIMP and WQMP documents approved by the Minister, on 3 February 2020 and 14 November 2019 respectively, remain the current and relevant versions.
15	If, at any time after five years from the date of this approval, the approval holder has not commenced the action, then the approval holder must not commence the action without written agreement from the Minister.	Not applicable	This approval is dated 26 April 2018. The Department was notified by formal written correspondence on 31 August 2020 that the development had commenced on 26 August 2020. Therefore, the action commenced within five years of the approval date.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
16	Unless otherwise agreed to in writing by the Minister, the approval holder must publish all management plans referred to in these conditions of approval on its website.	Compliant	The ECIMP was approved on 3 February 2020, and the WQMP was approved on 14 November 2019. These management plans are the current versions (approval holder did not revise a plan approved by the Minister within the current reporting period).
	Each management plan must be published on the website within one month of being approved by the Minister or being submitted under conditions 4, 7 or 14.	Non-compliant (minor, administrative)	The ECIMP and WQMP were published on the Lendlease Communities (Shoreline) Pty Ltd webpage on 21 September 2020 (during the current reporting period). The publication date was not within one month of being approved by the Minister or being submitted under conditions 4, 7 or 14. This minor administrative non-compliance became known to the approval holder and Saunders Havill Group on 25 October 2021 as a result of the annual compliance review. It is considered an administrative error and had no bearing on the implementation of either management plan as the commitments made in each did not depend on the website publication. Additionally, the key objectives common to both management plans are the management measures in place for the action when it takes place in close proximity (i.e. 250 m) of the Moreton Bay Ramsar wetland, and this has not occurred to date. This non-compliance will have no lasting effect on the project or environmental outcomes.

4. ECIMP implementation table

The implementation status of the ECIMP is detailed in **Table 3**.

Table 3: ECIMP implementation table

No.	Commitment	Evidence/comments/status
IMPACTS		
ECIMP-1	As there will be no development within foraging or potential roosting habitats for Eastern Curlew and other migratory shorebirds within the adjacent Moreton Bay, there will be no direct impacts on these habitats.	No development within foraging or potential roosting habitats for the Eastern Curlew or other migratory shorebirds is approved to occur, therefore no development or disturbance in these areas has occurred during the current reporting period.
MANAGEMENT MEASURES		
ECIMP-2	As part of the induction process for site construction, it will be the responsibility of the Project Manger to advise all contractors that bringing dogs into the development area is prohibited during construction and that no contractor/employee is to traverse the mangrove lined intertidal area.	Dogs are not permitted on the work site. The construction area is not located at the mangrove lined intertidal area and all works to date are disconnected from mangrove vegetation communities.
ECIMP-3	A community education program will be developed prior to the occupation stage, which includes educational signage erected at strategic locations along the formed walkway running adjacent to the band of mangroves. The community education program will inform residents / visitors of the presence of Eastern Curlew and other migratory shorebirds and the impacts caused by feed the birds. It is proposed the education program will be in leaflet form to be provided to all new and prospective property buyers at the time of purchase / inspection.	This commitment relates to development adjacent to the Foreshore Open Space area which has not yet commenced. Once development occurs adjacent to the Foreshore, landscape works will capture these commitments.

No.	Commitment	Evidence/comments/status
	It will be the Principals responsibility to ensure all local real estate agents and the Shoreline website display this leaflet. Advice from Council and DES will be sought when compiling the community education package to ensure this mitigation strategy achieves the objectives of this plan.	
ECIMP-4	The existing band of mangrove vegetation, which ranges in width from approximately 30 m to 120 m, provides an effective barrier to potential human and/or dog disturbances, and to noise and light disturbances to Eastern Curlew and other migratory shorebirds whilst foraging, due to the dense growth form of mangroves and associated ground cover of pneumatophores growing in soft mud. This band of mangrove vegetation, which will assist in minimising noise and light disturbances for foraging birds, will be retained, protected and managed as part of the proposed development. The retention, protection and ongoing management of the intertidal vegetation will assist in minimising the threat of noise/light pollution disturbing foraging shorebirds.	No development within the band of mangrove vegetation is approved to occur, and no development or disturbance in these areas has occurred during the current reporting period. The approved Shoreline Open Space Landscape Strategy outlines the management strategies to be implemented within Foreshore Open Space area, which will continue to provide a managed buffer to the retained mangrove vegetation.
ECIMP-5	Prior to occupation education signage will be erected at a minimum of three locations (to be determined in consultation with developers and DES/Council on completion of final designs) along the pedestrian walkway that will advise engagement with residents / visitors of the nearby presence of shorebirds and the threat that increased or sudden loud noises can disturb foraging shorebirds.	This commitment relates to development adjacent to the Foreshore Open Space area which has not yet commenced. Once development occurs adjacent to the Foreshore, landscape works will capture these commitments.
ECIMP-6	Any public events within the foreshore open space area will require authorised permits from Redland City Council. Permits will have controls on noise levels for any event.	No public events within the foreshore open space area were proposed or authorised during the current reporting period.

No.	Commitment	Evidence/comments/status
ECIMP-7	Foreshore walkways will be lit by bollard style 'smart' lighting (Photo 4 below). Any other lighting required for safety purposes will be directional away from Moreton Bay.  **Photo 4 shows example of bollard lighting (source: ledoutdoor.net.au).**	This commitment is not yet applicable, as construction has not commenced in development stages adjacent to Foreshore Open Space areas.
MONITORING – EASTERN CURLEW		
ECIMP-8	In order to be able to detect changes in the number of Eastern Curlew attributable to the Shorelines development, the shorebird foraging habitats adjacent to the development site will be surveyed prior to construction commencing within 250 m of Moreton Bay to provide baseline data for comparison with future monitoring data.	The construction undertaken within the current reporting period is not within 250 m of Moreton Bay. The development site and control site monitoring survey requirements specified by the approved ECIMP are not yet applicable, as these monitoring requirements are not triggered to begin until the period 1 September to 30 March of the year immediately preceding the commencement of works within 250 m of Moreton Bay.
ECIMP-9	To detect if changes in Eastern Curlew numbers have been influenced by the construction and occupation of the development, control site monitoring will be undertaken in conjunction with the development site monitoring at each of two control sites with similar total areas of foraging habitat to the impact site area.	

No.	Commitment	Evidence/comments/status
ECIMP-10	Monitoring will be undertaken in accordance with DoEE (2017) guidelines. Using a high powered spotting telescope, each monitoring survey will be conducted within the four-hour period either side of low tide and will cover the shorebird foraging habitats shown in Figure 5.1. Data collected during the surveys will include the numbers of targeted shorebirds (i.e. Eastern Curlew, Whimbrel and Bar-tailed Godwit) using the area at low tide and any real or potential sources of disturbance observed and the response of the birds to these disturbance sources. Wherever practical, dependent on tide times, surveys will be conducted at times of peak use of the Foreshore Area.	Baseline monitoring presented in the approved ECIMP was undertaken in accordance with this methodology and specifies that this methodology will be used for future monitoring surveys. No monitoring events occurred during the current reporting period.
ECIMP-11	Pre Commencement surveys for Eastern Curlew will be undertaken between 1 September until 30 March in the year immediately prior to the construction commencing within 250 m of Moreton Bay.	The construction undertaken within the current reporting period is not within 250 m of Moreton Bay. The development site and control site monitoring requirements specified by the approved ECIMP are not yet applicable, as these monitoring requirements are not triggered to begin until the period 1 September to 30 March of the year immediately preceding the commencement of works within 250 m of Moreton Bay.
ECIMP-12	During the construction period, where activities pose a risk of potentially significant impacts to migratory shorebirds, the monitoring program will involve eight low-tide, targeted shorebird surveys, undertaken on an annual basis and in accordance with DoEE (2017) Guidelines. This will include monthly surveys between 1 September and 30 March.	
ECIMP-13	During the operational phase, a single annual low-tide, targeted shorebird survey will be undertaken within the peak Eastern Curlew season (November to January). This monitoring program will continue for the life of the EPBC approval (i.e. until 2038).	
ECIMP-14	To test for an impact of the Project on Eastern Curlew, a generalised linear mixed model (GLMM) approach shall be used to account for repeated measures of Eastern Curlew numbers through each summer season (year). In the analysis, the response variable is the count of Eastern Curlew at each site during the months November to February (when numbers are expected to be most stable in Moreton Bay), explanatory variables are year (to capture temporal change over time), tide height (a continuous variable) and site (impact, control 1, control 2), with year as a random effect within each site to control for repeated measures.	

No.	Commitment	Evidence/comments/status
MONITORING – FORAGING HABITAT QUALITY		
ECIMP-15	Foraging habitat quality will be monitored indirectly through the monitoring of: 1) disturbance; and 2) the densities of Eastern Curlew and two other migratory shorebirds that feed on similar foods, namely Whimbrel and Bar-tailed Godwit. Monitoring will be undertaken at the impact site and the two control sites identified for Eastern Curlew monitoring, in conjunction with the Eastern Curlew monitoring (pre-commencement, construction and operational). Foraging habitat monitoring will include recording any signs of human/dog presence, including signs of bait collection and signs of rubbish within foraging habitats.	The construction undertaken within the current reporting period is not within 250 m of Moreton Bay. The development site and control site monitoring requirements specified by the approved ECIMP are not yet applicable, as these monitoring requirements are not triggered to begin until the period 1 September to 30 March of the year immediately preceding the commencement of works within 250 m of Moreton Bay.
ECIMP-16	In addition, inspections of mangrove habitats, including stormwater outlet sites for signs of weed incursions, plant die-back, erosion and human/dog disturbances (e.g. footprints, refuse) will be undertaken during each monitoring event.	
ECIMP-17	As part of the community education program, community members will also be encouraged to report to the Project Manager any observed disturbances to migratory shorebirds or human/dogs traversing migratory shorebird foraging habitats that adjoin the Shorelines development	

No.	Commitment	Evidence/comments/status
MONITORING-FORAGING HABITAT EXTENT		
ECIMP-18	Foraging habitat extent for Eastern Curlew shall be monitored using two main methods: 1) Mapping the extent of intertidal mudflat foraging habitat exposed at spring low tide level of 0.3 m using aerial imagery and recording the seaward edge of exposed mudflat using a mobile GPS system. This mapping shall be confined to the mainland extent of intertidal mudflat opposite the full length of The Project that interacts with the foreshore; i.e. from east of Scenic Road on the south to east of the northern most extent of The Project. This mapping shall be undertaken once prior to construction commencing within 250 m of Moreton Bay (pre-impact baseline) and once each year thereafter for the duration of monitoring. 2) As a measure of the extent of effective foraging habitat, the approximate locations of all Eastern Curlew observed foraging within the foraging habitat extent (shown in Figure 5.1 of the ECIMP) shall be recorded during the annual Eastern Curlew monitoring surveys.	The construction undertaken within the current reporting period is not within 250 m of Moreton Bay. The development site and control site monitoring requirements specified by the approved ECIMP are not yet applicable, as these monitoring requirements are not triggered to begin until the period 1 September to 30 March of the year immediately preceding the commencement of works within 250 m of Moreton Bay.
ECIMP-19	To test for an impact of the Project on foraging habitat extent, the total area of intertidal foraging habitat shall be compared with the baseline area. Any areas of change in extent investigated to determine if the change in extent is attributable to the Project.	
MANAGEMENT OBJECTIVES		
ECIMP-20	Eastern Curlew are at densities that reflect baseline densities in the adjacent feeding habitats, controlling for natural temporal variation and a background decline in shorebird populations relating to ongoing habitat loss at key stop-over sites in Asia.	During the current reporting period, development activities did not occur in the vicinity (i.e. within 250 m) of Moreton Bay migratory shorebird habitat. Therefore, the monitoring surveys required under the approved ECIMP were not triggered. Consequently, due to nil development within 250 m of the Eastern Curlew habitat, the density of Eastern Curlew in the adjacent feeding habitats within the current reporting period is reasonably

No.	Commitment	Evidence/comments/status
		inferred to be disconnected from any impacts associated with construction work that has occurred in the development site during the current reporting period.
ECIMP-21	There is no reduction in migratory shorebird foraging habitat extent.	During the current reporting period, development activities did not occur in the vicinity (i.e. within 250 m) of Moreton Bay migratory shorebird habitat. Therefore, it is reasonably inferred that there has been no development occur that could be considered to have had an influence on these management objectives during the current reporting period.
ECIMP-22	There is no weed intrusions or mangrove vegetation die-back in areas adjacent to migratory shorebird foraging habitats.	
ECIMP-23	There is no human and/or dog disturbance of foraging Eastern Curlew or other migratory shorebirds.	
ECIMP-24	There are no human/dogs traversing migratory shorebird foraging habitats.	
ECIMP-25	There is no increase in light or noise to foraging migratory shorebirds.	
ECIMP-26	There are no recreational activities causing sudden loud noises within the foreshore open space area	
ECIMP-27	Water quality objectives (DesignFlow 2017) and Acid Sulfate Soil objective (Douglas Partners 2017) have been met during construction and operation.	The achievement of water quality objects in accordance with the approved Water Sensitive Urban Design Preliminary Advice, and approved Stormwater Management Plans will be evaluated in **Section 5 – WQMP implementation table** of this ACR. Within the current reporting period there have been no construction works commence in the areas identified by Douglas Partners (Douglas Partners 2017) as potentially requiring further acid sulfate soil management or investigation.

No.	Commitment	Evidence/comments/status
CORRECTIVE MEASURES		
ECIMP-28	If the Project Manager is alerted to any incidence of shorebird disturbance, or disturbance as a result of light or noise, or if targeted shorebird monitoring surveys detect significant changes in Eastern Curlew numbers and/or human or dog disturbance to foraging shorebirds, these incidences will be investigated within 24 hours of being reported and actions to rectify any breaches of mitigation measures or mangrove vegetation buffer habitats will be commenced within three days of the initial report. DES and Council will be contacted to request guidance on additional measures required to rectify/eliminate disturbances.	The Project Manager has not been alerted to any instances of shorebird disturbance within the current reporting period.
CONTINGENCY MEASURES		
ECIMP-29	Table 7.1 (of the ECIMP) provides contingency measures that will be enforced if results from Eastern Curlew or foraging habitat monitoring events indicate a significant change in Eastern Curlew numbers or foraging habitat quality that could be attributed to the Shoreline Development.	This commitment is not yet applicable, as the monitoring required to evaluate if contingency measures are necessary has not yet occurred, due to construction not yet commencing within 250 m of Moreton Bay.
MANAGEMENT RESPONSIBILITIES		
ECIMP-30	<u>Principal</u> The roles and responsibilities of the Principal are to:	Lendlease Communities (Shoreline) Pty Ltd is the Principal for the Shoreline project. A Project Manager has been appointed. The community education

No.	Commitment	Evidence/comments/status
	• Comply with the Eastern Curlew Impact Management Plan (ECIMP); • Comply with the Nature Conservation Act 1992; • Develop a community education program; • Nominate a Project Manager who will represent the Principal in reviewing the performance of contractors, issue instructions and variations, and be responsible for ECIMP implementation; and • Promptly notify the DoEE of any changes to this ECIMP and its implementation, reporting or monitoring, and any breach of Administrating Authority conditions and proposed corrective action. It will be the responsibility of the Principal to ensure the contents of the ECIMP are adequately communicated to all contractors, residents and visitors and they are advised of the seriousness of potential impacts if the recommended actions are not observed.	program (as per ECIMP-3) is not yet required, as no development has commenced within 250 m of Moreton Bay. No changes to the ECIMP have been proposed since its approval by the Department on the 2 February 2020. The ECIMP forms part of the approval documentation that is available to site personnel and visitors (including residents).
ECIMP-31	<u>Project Manager</u> This Eastern Curlew Impact Management Plan (ECIMP) will be overseen by the Project Manager. The Project Manager is responsible for: • Implementation of the ECIMP to minimise environmental impacts from the project; • Ensuring the mitigation measures detailed in this ECIMP, including the community education program, are implemented; • Ensuring a review of this ECIMP is undertaken in year 3 in the first instance and then at intervals of not less than five years or sooner if required. Any significant or unexpected alteration in the proposed development may require the ECIMP to be revised and amended accordingly. Any changes or amendments to the ECIMP will be confirmed by the Principal; • Keeping up-to-date records of all disturbance incidence reports, monitoring events, results and corrective actions;	Lendlease Communities (Shoreline) Pty Ltd is the Project Manager, with Saunders Havill Group assistance as necessary.

No.	Commitment	Evidence/comments/status
	• Reviewing and advising the DoEE of any proposed changes to the ECIMP; and • Designate suitable experienced persons for the management and auditing of the ECIMP as required.	
ECIMP-32	<u>Designated Person</u> The roles and responsibilities of the Designated Person are to: • Liaise with the Project Manager to facilitate compliance with legislation, Council policy and conditions during the development; • Conduct audit inspections as required /requested during earthworks, and clearing or other inspections as triggered by environmental events or incidents; • Advise the Project Manager on the compliance and effectiveness of the ECIMP/Site Instructions and its implementation; • Immediately contact the Project Manager regarding any environmental incidents that have the potential to cause environmental harm to Moreton Bay and request written details within 24 hours of occurrence; • Issue Site Instructions (for correction of non-compliance) to the Project Manager within three (3) days of inspections and completion of the Inspection Procedures and Checklist(s); • Maintain accurate reports (incidents, near miss, results of monitoring) to be provided to DoEE within ten days of request.	Saunders Havill Group and BAAM are both jointly considered Designated Persons for the purposes of implementing the ECIMP.

No.	Commitment	Evidence/comments/status
REPORTING		
ECIMP-33 **ECIMP-34** **ECIMP-35**	A monitoring report will be prepared at the end of each annual monitoring period, noting any significant changes in measured variables, trends and conditions to ensure alignment with DoEE reporting requirements. The report will include tabulated data (migratory shorebird census and feeding habitat quality, records of disturbances, vegetation health and stormwater outlet site stability) from all monitoring events to allow assessment of trends. A copy of the yearly report will be provided for Annual Compliance Reporting documentation. Should monitoring results indicate a decline in Eastern Curlew densities, foraging habitat quality, or foraging habitat extent; the following information will be reported to DoEE within 14 days of noting the decline/s: • the nature of the decline (Eastern Curlew densities, foraging habitat quality/extent); • where the decline has been detected; • how the decline was evidenced; • suspected cause of decline and whether the decline is attributable to the development; • corrective actions proposed, and why they are likely to be effective. The results of each monitoring period will be publicly available on the developers' website for the life of the project.	These monitoring and reporting commitments are not yet applicable, as the monitoring events (pre commencement, construction and operational) necessary to inform the monitoring report have not yet been triggered, due to construction not yet commencing within 250 m of Moreton Bay.
AUDITING		
ECIMP-36	On completion of each state of development within areas adjacent to the foreshore and prior to occupation, a suitably experienced, independent ecologist (auditor) will be engaged to inspect lighting, signage and retained	This commitment is not yet applicable, as no development stages within areas adjacent to the foreshore have commenced during the current reporting period.

No.	Commitment	Evidence/comments/status
	mangrove vegetation to ensure all mitigation measures provided in the ECIMP have been implemented. On a yearly basis the auditor will review the Project Manager's incidence reports and the yearly targeted shorebird survey reports to ensure the mitigation measures and any necessary corrective actions specified within this ECIMP have been undertaken to ensure the objectives of this ECIMP have been achieved. Any reported breaches of the mitigation measures detailed in this ECIMP will trigger the need for additional auditing to ensure corrective actions have been implemented and the reported breach has been rectified.	

5. WQMP implementation table

The implementation status of the WQMP is detailed in **Table 4**.

Table 4: WQMP implementation table

No.	Commitment	Evidence/comments/status
DESIGN OBJECTIVES – CONSTRUCTION PHASE		
WQMP-1	Design objectives presented below are to be used to demonstrate how the proposed development will comply with the mandatory stormwater management objectives required by the SPP *(SPP DSDIP, 2017 Appendix 2: Stormwater Management Objectives)*. Stormwater management design objectives for the Construction Phase are outlined in Table 4 (WQMP). **Table 4. Minimum stormwater management design objectives for Construction Phase for Shoreline Redlands (Source: SPP Code: Appendix 2 - Table A).** ISSUE / Management Objective Drainage Control: 1. Manage stormwater flows around or through areas of exposed soil to avoid contamination. 2. Manage sheet flows in order to avoid or minimise the generation of rill or gully erosion. 3. Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works. 4. Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives for emergency spillways on temporary sediment basins. Erosion Control: 1. Stage clearing and construction works to minimise the area of exposed soil at any one time. 2. Effectively cover or stabilise exposed soils prior to predicted rainfall. 3. Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised using methods which will achieve effective short-term stabilisation. Sediment Control: 1. Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. 2. All exposed areas greater than 2500 m² must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5). Litter, hydrocarbons and other contaminants: 1. Remove gross pollutants and litter. 2. Avoid the release of oil or visible sheen to released waters. 3. Dispose of waste containing contaminants at authorised facilities. Waterway stability objective and flow management: 1. Where measures are required to meet post-construction waterway stability objectives (refer to Table B, SPP Code: Appendix 2), these are either installed prior to land disturbance and are integrated with erosion and sediment controls, or equivalent alternative measures are implemented during construction. 2. Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1 in 100 year ARI (1% AEP).	The Stormwater Management Plan (SMP) submitted to Redlands City Council and approved as part of application RAL19/0061 specifically references the required design objectives contained within Table 4, and demonstrates via stormwater quality modelling how the proposed stormwater solutions will meet enable the development to meet these objectives.

No.	Commitment	Evidence/comments/status
	The developer must demonstrate via modelling and reporting in SQMPs how these objectives will be met prior to the development being approved and constructed.	
DESIGN OBJECTIVES – OPERATIONAL PHASE		
WQMP-2	The stormwater quality management design objectives that apply to the Operational Phases of Shoreline Redlands are listed in Table 5 (WQMP). **Table 5. Minimum stormwater quality design objectives for Operational Phase stormwater quality (source: SPP code: Water Quality, Appendix 2, Table B).** Pollutant: Total suspended solids (TSS) — Design objectives (% reduction in mean annual load): 80% Pollutant: Total phosphorus (TP) — 60% Pollutant: Total nitrogen (TN) — 45% Pollutant: Gross pollutants (GP) — 90% These load reduction targets are aimed at protecting the environmental values of Moreton Bay from the impacts of urban stormwater runoff. The objectives and load targets will be achieved through a combination of stormwater treatment measures including bioretention and wetland systems, sediment basins and revegetated waterways. These are to be documented in Stormwater Quality Management Plans (SQMPs) which will be submitted to Redland City Council for approval with each development application.	The required design objectives for the operational phase of stormwater management are specifically referenced in: • The Water Sensitive Urban Design documentation that was submitted to Redlands City Council and approved as part of application MCU18/0220. • The Stormwater Management Plan (SMP) submitted to Redlands City Council and approved as part of application RAL19/0061, which specifically references the minimum stormwater quality design objectives for Operational Stormwater Quality shown in Table 5, and demonstrates via stormwater quality modelling how the proposed stormwater solutions will meet enable the development to meet these objectives. • The technical letter provided to Redland City Council as part of the assessment of OPW20/0003 which outlined an updated stormwater quality strategy for Precinct 1, and • The Operational Works plans for the Precinct 1 Bioretention Basin that were submitted to Redlands City Council and approved as part of application OPW20/0003. The approved SMP, the technical letter to Redland City Council, and the operational works plans for the Precinct 1 Bioretention basin design outline how the objectives and load targets in Table 5 will achieve the required design objectives.

No.	Commitment	Evidence/comments/status
CONSTRUCTION SITE DISCHARGES – CONSTRUCTION AND OPERATIONAL PHASE		
WQMP-3	The State Planning Policy (DSDIP, July 2017) requires that runoff from areas greater than 2500m2 must be provided with sediment controls that are designed to demonstrate compliance with the construction site discharge standards provided in Table 6. These standards are to apply at the point of release of flows from the construction site. **Table 6. Construction site water quality discharge standards.** Parameter / Limit / Limit Type pH / 6.5-8.5 / Minimum-maximum TSS / 50 mg/L / 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) < 50mg/L Total Suspended Solids (TSS) In practice this objective requires the developer to implement High Efficiency Sediment basin (HES Basin) systems during construction phases. HES basins include automatic dosing of flocculants to ensure that the majority of construction runoff will be treated to a high standard. The HES basin monitoring and auditing requirements are described In further detail in Appendix A (WQMP).	During the current reporting period, bulk earthworks commenced in stages 1-4 of the Shoreline Development. The operational works plans for the bulk earthworks associated with Stages 1-4 of the development were submitted and approved by RCC (OPW19/0134) on the 20 December 2019. These approved plans contain a detailed Erosion and Sediment Control Plan that specified the sediment and erosion controls to be implemented during bulk earthworks as part of the construction phase. The specific erosion and sediment control mitigation measures to be utilised on-site include the installation of sediment fencing and catch drains, and the installation of turf to swales, footpaths and batters as soon as practicable after exposing bare earth. In addition, the erosion and sediment control plan details that works will be staged to minimise the amount of area exposed at one time, and that once areas reach finished levels they are to treated with surface stabiliser and drill seeded with grass species to assist with preventing sediment leaving finished lots. The approved OPW19/0134 plans also show the location of two HES basins to be constructed as part of Stages 1-4. The design of these HES basins is detailed in the operational works plans that were submitted and approved by RCC (OPW20/0003) on the 4 September 2020, and amended and approved by RCC on the 11 August 2021. The approved plans from OPW20/0003 detail the specific location and construction specifications for the HES that will be implemented during the construction phases for Stage 1-4 of the Shoreline Development.
WATER QUALITY OBJECTIVES – TRIGGER THRESHOLDS		
WQMP-4	The surface water quality trigger thresholds (80th percentile concentrations) for each parameter are shown in Table 7.	DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual

No.	Commitment	Evidence/comments/status

Table 7. Surface water quality trigger thresholds.

Pollutant	Trigger threshold[1]	WQO[2]
Turbidity (NTU)	36.2	<50
Total suspended solids (mg/L)	32	<6
Total nitrogen (mg/L)	4.4	<0.5
Total phosphorus	2.6	<0.05

[1] 80th percentile concentrations from baseline water quality monitoring.
[2] Subset of representative parameters derived from Table 1.

Monitoring of water quality against trigger thresholds during construction and operational phases of the development will be used to initiate investigation and implementation of corrective actions. Where a trigger threshold is exceeded corrective measures will be undertaken to investigate the causes and identify actions to resolve or mitigate the non-compliance.

Compliance Report, the WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase for the current reporting period, because construction phases have not commenced in the catchments draining directly to Moreton Bay.

The aim of the Pre Construction Monitoring phase is to characterise the site's water quality discharges and define site-based trigger thresholds for construction and establishment phases. During the current reporting period, a total of 8 baseline water quality monitoring rounds were undertaken. Overall, 23 baseline monitoring rounds have been completed since sampling commenced in 2017. Based on the new data collected from these monitoring rounds, the DesignFlow Annual Compliance Report 2021-2021 provides updated surface water quality trigger thresholds for each of the parameters from table 4 of the approved WQMP. These updated trigger thresholds are presented in Table 5 below taken from the DesignFlow Annual Compliance Report 2021-2021:

Table 5. Surface water quality trigger thresholds.

Pollutant	WQMP threshold[1]	Updated Trigger threshold[2]
Turbidity (NTU)	36.2	53.2
Total suspended solids (mg/L)	32	29.2
Total nitrogen (mg/L)	4.4	3.82
Total phosphorus (mg/L)	2.6	1.11

[1] 80th percentile concentrations from baseline water quality at time of preparation of WQMP (2017-2019).
[2] 80th percentile concentrations from all baseline water quality monitoring (2017-2021).

WATER QUALITY MONITORING PROGRAM

WQMP-5	Six water quality monitoring locations are proposed (Table 8, Figure 3). Sites 1 to 5 were used to collect baseline water quality data (discussed in Section 3) and are located within the proposed development areas. Site 6 has been selected as the	DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual Compliance Report, the WQMP is currently in the 'Pre-construction (baseline)

No.	Commitment	Evidence/comments/status
	reference (control) site for comparison with Sites 1-5 as each sub-catchment is developed. **Table 8. Water quality monitoring site location details.** Site ID / Access / Comments: 1 – 194-214 Serpentine Creek Rd – Shoreline Development catchments used for baseline impact monitoring. 2* – 260-280 Serpentine Creek Rd – Shoreline Development catchments used for baseline impact monitoring. 3* – 304-324 Serpentine Creek Road – Shoreline Development catchments used for baseline impact monitoring. 4 – 74A Scenic Road – Shoreline Development catchments used for baseline impact monitoring. 5 – 50-56 Orchard Road – Shoreline Development catchments used for baseline impact monitoring. 6 – 15-23 Kidd Street – Reference site within Catchment 6, external to the development and has no urban development proposed. * Sites 2 and 3 may be moved further downstream closer to the discharge point of the catchment to Moreton Bay once access is available	Monitoring' phase for the current reporting period, because construction phases did not commence in the catchments draining directly to Moreton Bay. The baseline monitoring undertaken during the current reporting period as summarised in the DesignFlow Annual Compliance Report 2020-2021 was completed at the six water quality monitoring locations as outlined by Table 8 of the approved WQMP.
WQMP-6	The frequency and duration of the proposed water quality monitoring is summarised in Table 9 below. Due to the ephemeral hydrology of the waterways, post-event based sampling is proposed rather than ambient water quality monitoring. The triggers for all sampling will be following runoff producing rainfall and sampling will be completed following the rainfall event (prior to the cessation of flow flow). **Table 9. Water quality monitoring frequency and duration** Development Phase / Frequency / Commencement / Cessation: **Pre-construction / Control sites (baseline)** – Event based (up to 12 times per year) – Minimum of 24 months prior to construction phase – Commencement of development works **Construction Phase** – Event based Construction site discharge monitoring – During construction phase activities – Completion of construction activities **Operational Phase** – Event based (up to 12 times per year) – Completion of construction activities – 12 months after development works have been completed	DesignFlow has prepared the 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual Compliance Report, the WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase for the current reporting period, because construction phases did not commence in the catchments draining directly to Moreton Bay.

No.	Commitment	Evidence/comments/status
WQMP-7	A range of physico-chemical parameters has been selected for water quality monitoring that reflect the potential water quality impacts discussed in Section 6.2, Physico-chemical parameters to be monitored at Sites 1-6 are summarised in Table 10 below: **Table 10. Post-event based sampling water quality parameters** | Parameter	Reporting Units	Method | |---|---|---| | **LABORATORY MEASUREMENTS1** | | | | Total Dissolved Solids | mg/L | EA01H | | Suspended Solids (SS) | mg/L | EA025H | | Total Nitrogen | mg/L | EK062G | | Ammonia | mg/L | EK055G | | Nitrite | mg/L | EK057G | | Nitrite + Nitrate | mg/L | EK059G | | Total Kjeldahl Nitrogen (TKN) | mg/L | EK061G | | Organic N | mg/L | TKN minus ammonia | | Total Phosphorus | mg/L | EK067G | | Reactive Phosphorus | mg/L | EK071G | | **FIELD MEASUREMENTS** | | | | pH | pH Unit | Field measurement | | Electrical Conductivity | µS/cm | Field measurement | | Dissolved Oxygen | % saturation | Field measurement | | Temperature | °C | Field measurement | | Turbidity | NTU | Field measurement | | Redox Potential (ORP) | mV | Field measurement | 1 Chlorophyll-a was omitted from the sampling parameters as it was deemed to be an inapplicable parameter given the ephemeral natural of the waterways and the presence of large dams within each of the development sub-catchments. All samples are to be collected, stored and transported via clear chain of custody and analysed by a NATA approved laboratory.	DesignFlow has prepared the 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual Compliance Report, the WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase for the current reporting period, and construction phases did not commence in the catchments draining directly to Moreton Bay. Table 2 of the DesignFlow Annual Compliance Report 2020-2021 notes the same post event based sampling water quality parameters to be monitored as required by Table 10 of the approved WQMP.
WQMP-8	Concurrent with and in addition to the event based sampling, Construction Phase activities are required to undertake site discharge monitoring in accordance with the Best Practice Erosion and Sediment Control Guidelines (IECA, 2008). Discharge monitoring is to occur at the discharge location from each construction site and be sufficient to demonstrate compliance with the design objectives listed in Table 6.	DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual Compliance Report, the WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase for the current reporting period, and construction phases did not commence in the catchments draining directly to Moreton Bay.

No.	Commitment	Evidence/comments/status
	Table 6. Construction site water quality discharge standards. Parameter: pH — Limit: 6.5-8.5 — Limit Type: Minimum-maximum Parameter: TSS — Limit: 50 mg/L — Limit Type: 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) < 50mg/L Total Suspended Solids (TSS)	WQMP-8 was not applicable to the current reporting period, as construction phases did not commence in the catchments draining directly to Moreton Bay.
WQMP-9	All monitoring data is to be logged and stored and made available for the reporting requirements listed in Section 7.4 (WQMP).	DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. This contains all monitoring data collected during the current reporting period.
WQMP-10	Surface water quality trigger thresholds are provided in Table 7 (Refer Section 6.2). The water quality trigger thresholds apply to construction and operational phases of the development. **Table 7. Surface water quality trigger thresholds.** Pollutant: Turbidity (NTU) — Trigger threshold[1]: 36.2 — WQO[2]: <50 Pollutant: Total suspended solids (mg/L) — Trigger threshold[1]: 32 — WQO[2]: <6 Pollutant: Total nitrogen (mg/L) — Trigger threshold[1]: 4.4 — WQO[2]: <0.5 Pollutant: Total phosphorus — Trigger threshold[1]: 2.6 — WQO[2]: <0.05 [1] 80th percentile concentrations from baseline water quality monitoring. [2] Subset of representative parameters derived from Table 1. Where a non-compliance is detected (i.e. exceedance of a trigger threshold), corrective measures will be undertaken to investigate the causes of the non-conformance, and identify actions to resolve or mitigate the non-compliance (Refer Section 8).	DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual Compliance Report, the WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase for the current reporting period, and construction phases did not commence in the catchments draining directly to Moreton Bay. WQMP-10 was not applicable to the current reporting period, as construction and operational phases did not commence in the catchments draining directly to Moreton Bay.

No.	Commitment	Evidence/comments/status
WQMP REPORTING		
WQMP-11	An Annual Environmental Report is to be prepared and published on the development website upon commencement of the Construction Phase and for the life of the project. The report will document: • Demonstrated compliance with project development conditions • Actions and activities undertaken during the 12 month period • Summarise results of event and construction site water quality monitoring activities	Saunders Havill group has prepared this overarching Annual Compliance Report for publishing on the development website to demonstrate: • how the project is complying with project development conditions, and • actions and activities undertaken during the 12 month period. DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period.
WQMP-12	The monitoring of triggers for further investigation, implementation of corrective actions and reporting will be overseen by the superintendent for the site.	DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual Compliance Report, the WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase for the current reporting period, and construction phases did not commence in the catchments draining directly to Moreton Bay. WQMP-12 was not applicable to the current reporting period, as construction and operational phases did not commence in the catchments draining directly to Moreton Bay.
WQMP-13	Any non-compliance events that occur must be reported within two business days (or as specified) to the relevant government authority in accordance with development conditions.	DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual Compliance Report, the WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase for the current reporting period, and construction phases did not commence in the catchments draining directly to Moreton Bay.

No.	Commitment	Evidence/comments/status
		WQMP-13 was not applicable to the current reporting period, as construction and operational phases did not commence in the catchments draining directly to Moreton Bay.
INDEPENDENT AUDIT		
WQMP-14	An independent audit of the monitoring program will occur every three (3) years after commencement of the project to evaluate the performance of the monitoring program in relation to the conditions of approval.	DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual Compliance Report, the WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase for the current reporting period, and construction phases did not commence in the catchments draining directly to Moreton Bay. WQMP-14 was not applicable to the current reporting period, as construction and operational phases did not commence in the catchments draining directly to Moreton Bay.
CORRECTIVE MEASURES		
WQMP-15	Where monitoring indicates the construction phase standards identified in Table 6 are not being achieved, corrective actions will be undertaken to ensure that standards are achieved in future. Where the construction phase objectives described in Section 6.3.1 are not being met, the following corrective actions are to be implemented: • Undertake third party investigation by a Certified Professional in Erosion and Sediment Control (CPESC) to identify inadequacies in the erosion and sediment control strategy and prepare a Rectification Plan in consultation with Redland City Council. This assessment will be completed in accordance with the Department of Environment and Resource Management Procedural	DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual Compliance Report, the WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase for the current reporting period, and construction phases did not commence in the catchments draining directly to Moreton Bay. WQMP-15 was not applicable to the current reporting period, as construction and operational phases did not commence in the catchments draining directly to Moreton Bay.

No.	Commitment	Evidence/comments/status
	Guideline: Standard Work Method for the Assessment of the Lawfulness of Releases to Waters from Construction Sites – South-East Queensland. • Clean, reset, repair and amend erosion and sediment control measures as necessary to address any identified inadequacies and ensure the water quality objectives are not exceeded. • Construction works in the relevant catchment will cease if corrective measures proposed for that catchment are not implemented in accordance with the Rectification Plan.	
WQMP-16	Corrective measures associated with the operational phase of the development will be related to the function and operation of the stormwater treatment devices (such as bioretention systems, sediment ponds and constructed wetlands) that will be located within each development area. Where performance criteria outlined in Section 6.3.2 (Table 7) are not being met, the following corrective actions are to be implemented: • Review water quality data to identify trends in water quality parameters and inspect constructed stormwater treatment systems to identify the source of non-compliance issues. • Where sources are identified, investigate and identify rectification measures to improve water quality discharges. Rectification measures are to be documented in a Rectification Plan and be based on the approaches and methods outlined in the Rectifying Vegetated Stormwater Assets (Water by Design, 2012).	DesignFlow has provided the document entitled 'Annual Compliance Report 2020-2021' (refer to **Appendix C**) to report on compliance with the requirements of the approved WQMP for the current reporting period. As stated in the WQMP Annual Compliance Report, the WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase for the current reporting period, and construction phases did not commence in the catchments draining directly to Moreton Bay. WQMP-16 was not applicable to the current reporting period, as construction and operational phases did not commence in the catchments draining directly to Moreton Bay.
ADAPTIVE MANAGEMENT		
WQMP-17	Required maintenance will be completed within 24 hours, subject to site accessibility and health and safety requirements.	WQMP-17 was not applicable to the current reporting period, as construction and operational phases did not commence in the catchments draining directly to Moreton Bay.

No.	Commitment	Evidence/comments/status
WQMP-18	Additional temporary controls, for example temporary works until permanent measures can be installed will be implemented until maintenance can be completed.	WQMP-18 was not applicable to the current reporting period, as construction and operational phases did not commence in the catchments draining directly to Moreton Bay.
WQMP-19	Potential contamination, such as loss of sediment from construction areas, shall be contained and investigated. Water is not to be released until investigation has shown that water is of a suitable quality to comply with the discharge standards listed in Table 6	WQMP-19 was not applicable to the current reporting period, as construction and operational phases did not commence in the catchments draining directly to Moreton Bay.
WQMP-20	Incidents shall be documented, investigations conducted and action plans established so as to minimise the likelihood of the event recurring.	WQMP-20 was not applicable to the current reporting period, as construction and operational phases did not commence in the catchments draining directly to Moreton Bay.
RESPONSIBLE PERSONNEL		
WQMP-21	<u>Shoreline Principle</u> The roles and general responsibilities of the Principal are to: • Comply with this Water Quality Management Plan (WQMP); • Comply with legislation and Council policy; • Nominate a Project Manager who will represent the Principal in reviewing the • performance of contractors and assess implementation of the construction and operation phase measures; • Provide appropriate and adequate resources to allow effective implementation and review of the WQMP; • Conduct periodic reviews of environmental performance;	Lendlease Communities (Shoreline) Pty Ltd is the appointed Shoreline Principal for the purposes of the roles and general responsibilities outlined in WQMP-21.

No.	Commitment	Evidence/comments/status
	• Promptly notify regulatory authorities of any changes to this WQMP and its implementation, reporting or monitoring, and any breaches and proposed corrective actions[1]; • Report any environmental incidents that may have a significant impact on the surrounding environment to the relevant authorities (Redland City Council); and • Provide employees and contractors with relevant environmental instruction in relation to the WQMP and awareness and understanding of their obligations and duties. It will be the responsibility of the Principal to ensure that the contents of the WQMP are adequately communicated to all contractors, and that they are advised of the seriousness of potential impacts if the recommended actions are not taken.	
WQMP-22	<u>Project Manager</u> This Water Quality Management Plan (WQMP) will be overseen by the Project Manager. • The Project Manager is responsible for implementation of the WQMP, including; ensuring mitigation measures detailed in this plan are implemented; • ensuring a review of this WQMP is undertaken in year 3 in the first instance and then at intervals of not less than five years or that align with commencement/conclusion of construction or operational phases. Any significant or unexpected alteration in the proposed development may require the WQMP to be revised and amended accordingly. Any changes or amendments proposed to the WQMP will be forwarded to DES for comment/approval prior to their adoption; • keeping up-to-date records of all disturbance incidence reports, monitoring events, results and corrective actions; • reviewing and advising DES of any proposed changes to the WQMP; and	Lendlease Communities (Shoreline) Pty Ltd is the appointed Shoreline Principal for the purposes of the roles and general responsibilities outlined in WQMP-22.

No.	Commitment	Evidence/comments/status
	• designating suitably experienced persons for the management and auditing of the WQMP as required.	
WQMP-23	Designated person The roles and responsibilities of the Designated Person are to: • Liaise with the Project Manager to facilitate compliance with legislation, Council policy and conditions during the development; • Conduct audit inspections as required /requested during earthworks, and clearing or other inspections as triggered by environmental events or incidents; • Advise the Project Manager on the compliance and effectiveness of the WQMP /Site Instructions and its implementation; • Immediately contact the Project Manager regarding any environmental incidents that have the potential to cause environmental harm to Moreton Bay, request written details within 24 hours of occurrence, and issue Site Instructions for rectification/remediation to the Project Manager as soon as possible; • Issue Site Instructions (for correction of non-compliance) to the Project Manager within seven (7) days of inspections and completion of the Inspection Procedures and Checklist(s); and • Maintain accurate reports (incidents, near miss, results of monitoring) to be provided to DES within ten days of request.	DesignFlow and Shadforth are considered joint Designated Persons for the purposes of the roles and responsibilities outlined in WQMP-23.
APPENDIX A – SPECIFIC CONSTRUCTION PHASE MONITORING AND AUDITING		
WQMP-24	All exposed areas greater than 2500 m2 must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).	During the current reporting period, bulk earthworks commenced in stages 1-4 of the Shoreline Development. The operational works plans for the Bulk earthworks associated with Stages 1-4 of the development were submitted and approved by RCC (OPW19/0134) on the 20 December 2019. These approved plans contain a detailed Erosion and Sediment control Plan that specifies the sediment and erosion controls that to be implemented during bulk earthworks as part of the construction

No.	Commitment	Evidence/comments/status
	This will require an appropriately designed Type A or B High Efficiency Sediment (HES) basin in line with the latest design guidance.	phase. The specific erosion and sediment control mitigation measures to be utilised on-site include the installation of sediment fencing and catch drains, and the installation of turf to swales, footpaths and batters as soon as practical after areas have been exposed. In addition, the erosion and sediment control plan details that works are to be staged to minimise the amount of area exposed at one time, and that once areas reach finished levels they are to treated with surface stabiliser and drill seeded with grass species to assist with preventing sediment leaving finished lots. The approved OPW19/0134 plans also show the location of a two HES basins to be constructed as part of Stages 1-4 of the Shoreline Development. The design of these HES basins is detailed in the operational works plans that were submitted and approved by RCC (OPW20/0003) on the 4 September 2020, and amended and approved by RCC on the 11 August 2021. The approved plans from OPW20/0003 detail the specific location and construction specifications for the HES that will be implemented during the construction of Stages 1-4 of the Shoreline Development. Construction and operational phases have not yet commenced in the catchments draining directly to Moreton Bay. As detailed earthworks and engineering design is undertaken for stages within these catchments, operational works plans and applications similar to OPW19/0134 and OPW20/0003 will be required to detail erosion control measures, and the location and design of the required HES basins for that respective construction stage. These respective operational works plans will be submitted to RCC for approval as required for each stage of new operational works.
WQMP-25	HES Basins will be designed and operated in accordance Type A or B sediment basins as per the current versions of Appendix B Sediment basin design and operation (June Revision) of IECA (2008).	During the current reporting period, bulk earthworks has only commenced in stages 1-4 of the Shoreline Development. The approved plans from OPW20/0003 detail the specific location and construction specifications for the HES that will be implemented during the construction of Stages 1-4 of the Shoreline development.

No.	Commitment	Evidence/comments/status
		Operation of the HES basins in Stages 1-4 has not yet commenced, as construction of these basins was not yet completed during the current reporting period.
WQMP-26	Automated flocculant dosing will be undertaken in response to inflow and outflow turbidity monitoring.	During the current reporting period, bulk earthworks has only commenced in stages 1-4 of the Shoreline Development. The approved plans from OPW20/0003 detail the specific location and construction specifications for the HES that will be implemented during the construction of Stages 1-4 of the Shoreline development. Operation of the HES basins in Stages 1-4 has not yet commenced, as construction of these basins was not yet completed during the current reporting period. The operation of the HES basins in Stages 1-4 has not yet commenced, construction of these basins was not yet completed during the current reporting period. WQMP-26 was not applicable to the current reporting period.
WQMP-27	The design flowrate has been selected as the flowrate which will ensure >80% of the annual average runoff volume is treated by the system (i.e. 80% hydrologic effectiveness or HE).	The operation of the HES basins in Stages 1-4 has not yet commenced, construction of these basins was not yet completed during the current reporting period. WQMP-27 was not applicable to the current reporting period.
WQMP-28	Flow monitoring is typically achieved using a depth sensor, with depth readings converted to flow via a rating curve. The depth sensor therefore needs to be positioned in a location where accurate depth readings can be established and where a reliable rating curve (depth-flow relationship) is known. In order to deliver all flows from the disturbed catchment to a single point for flow gauging and dosing, a bund and culvert system will be required.	The operation of the HES basins in Stages 1-4 has not yet commenced, construction of these basins was not yet completed during the current reporting period. WQMP-28 was not applicable to the current reporting period.
WQMP-29	pH and turbidity monitoring is to occur at the inlet and the outlet of HES Basins to verify the performance of the systems.	The operation of the HES basins in Stages 1-4 has not yet commenced, construction of these basins was not yet completed during the current reporting period. WQMP-29 was not applicable to the current reporting period.
WQMP-30	The developer is required to supply, install and operate the automated monitoring and flocculant dosing system for the duration of the period of the works. The system is required to meet the following requirements:	The operation of the HES basins in Stages 1-4 has not yet commenced, construction of these basins was not yet completed during the current reporting period. WQMP-30 was not applicable to the current reporting period.

No.	Commitment	Evidence/comments/status
	• The system must be able to treat at the required Design Maximum Flow rate • Continuous inflow depth/flow, pH and turbidity monitoring is required • Automated flocculant dosing of the inflow is required and must be proportional to the flowrate and level of contamination (turbidity) of the incoming flow • A chemical flocculant is to be provided which is fast-acting and which can achieve a concentration of 50mg/L of TSS within a 250 mL jar within a maximum of 3 hours. The flocculant must have low ecotoxicity and the MSDS and any environmental toxicity reports must be provided to the Principal prior to use • An adequate supply of the chemical flocculant is to be maintained on site at all times • Continuous turbidity and pH monitoring must be undertaken of the outflow from the basin • All monitoring sensors and anchoring points must be suitable for the expected • flowrates, debris loadings and water quality for the duration of the period of the works • All monitoring data is to be logged and stored and made available for reporting • Turbidity and pH data to be recorded and sent real time to cloud based system via telemetry. Where data indicates non-compliance with discharge standards (Section 6.3.1) the Principal Contractor and developer are to be notified via text message (SMS). • The system is to be provided with a roofed shelter, mains power plus a back-up power supply. Bunding of all areas where chemicals are stored is to be provided based on 110% of the maximum chemical volume.	

No.	Commitment	Evidence/comments/status
	• The system is to be sited and provided with an adequate access track such that it remains accessible to service vehicles such as flocculant delivery during all weather.	
WQMP-31	The developer will nominate a Principal Contractor to undertake the works and to act as the clients representative. Site inspections and monitoring are to be undertaken by the principal contractor in accordance with Sections 6.17 and 7.4 of the Best Practice Erosion and Sediment Control Document (IECA, 2008) as detailed below. Best practice site management requires all ESC measures to be inspected at the following frequencies and include the following checks as a minimum: Daily site inspections (during rainfall): • All drainage, erosion and sediment control measures • Occurrences of excessive sediment deposition (whether on-site or off-site) • All site discharge points (including dewatering activities as appropriate) • Weekly site inspections (even if work is not occurring on-site) • All drainage, erosion and sediment control measures • Occurrences of excessive sediment deposition (whether on-site or off-site) • Occurrences of construction materials, litter or sediment placed, deposited, washed or • blown from the site, including deposition by vehicular movements • Litter and waste receptors • Oil, fuel and chemical storage facilities • Prior to anticipated runoff producing rainfall (within 24 hours of expected rainfall) • All drainage, erosion and sediment control measures • All temporary flow diversion and drainage works Following runoff producing rainfall (within 18 hours of rainfall event) • All drainage, erosion and sediment control measures	Shadforth is the appointed Principal Contractor for the purposes of the roles and general responsibilities outlined in WQMP-31.

No.	Commitment	Evidence/comments/status
	• Occurrences of excessive sediment deposition (whether on-site or off-site) • Occurrences of construction materials, litter or sediment placed, deposited, washed or • blown from the site, including deposition by vehicular movements	

WQMP-32	The ESC measures implemented at the site are to be inspected on a monthly basis by a Certified Professional in Erosion and Sediment Control (CPESC) who is independent of the principal contractor and an audit report kept on file. The purpose of the audits to is to ensure the developed and the contractors are meeting their obligations for ESC under the Environmental Protection Act (EP Act). The site will be assessed against these requirements in accordance with Procedural Guideline: Standard work method for the assessment of the lawfulness of releases to waters from construction sites in South East Queensland EM1135 (DEHP, 2011).
	The compliance audits will involve:
	• Site inspection with the contractors to assess ESC actions on the site against the ESC plans and the requirements of EP Act and Procedural Guideline: Standard work method for the assessment of the lawfulness of releases to waters from construction sites in South East Queensland EM1135 (DEHP, 2011).
	• Identifying non-compliances on the site, photographing and recording these for reporting.
	• Where the rectification action is simple, these will be recorded and verbally communicated to the contractor for action.
	• Review of any water quality and rainfall information for the site.
	• Compilation of a ESC Audit report which:
	  ○ Identifies the ESC obligations;
	  ○ ESC issue and non-compliances;
	  ○ Actions (simple) to be taken to rectify the issues and non-compliances.
		In the role of Principal Contractor, Shadforth were responsible for coordinating CPESC inspections and implementing the CPESC recommendations. These occurred at the intervals listed in WQMP-32.

No.	Commitment	Evidence/comments/status
	The triggers for inspections and reporting by the CPESC are as follows: • Prior to the commencement of clearing works in each catchment; • Prior to the commencement of bulk earthworks; • Prior to the commencement of civil works; and • At regular monthly intervals during works.	

6. Appendices

Appendix A

EPBC Act approval granted 26 April 2018

Appendix B

Fauna Spotter Catcher Reports

Appendix C

DesignFlow Annual Compliance Report 2020-2021

Appendix A

EPBC Act approval granted 26 April 2018

APPROVAL

Shoreline urban village development, Redlands Bay, Qld (EPBC 2016/7776)

This decision is made under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999 (Cth).*

Details

Person to whom the approval is granted (approval holder)	Shoreline Redlands Pty Ltd
ACN or ABN of approval holder	ACN 163 078 715
Action	To develop an urban village within a footprint of 279.5 hectares in Redland Bay, Queensland [See EPBC Act referral 2016/7776]

Approval decision

My decision on whether or not to approve the taking of the action for the purposes of each controlling provision for the action are as follows:

Controlling Provisions

Wetlands of international importance	
Section 16	Approve
Section 17B	Approve
Listed Threatened Species and Communities	
Section 18	Approve
Section 18A	Approve
Listed migratory species	
Section 20	Approve
Section 20A	Approve

Period for which the approval has effect

This approval has effect until Wednesday, 31 March 2038

Decision-maker

Name and position	Nathan Hanna Acting Assistant Secretary Assessments and Governance Branch
Signature	N Hanna
Date of decision	26 April 2018

Conditions of approval

This approval is subject to the conditions under the EPBC Act as set out in ANNEXURE A.

ANNEXURE A – CONDITIONS OF APPROVAL

Project site

1. The **approval holder** must ensure that development associated with the action occurs within the **site** identified in **Attachment A1** as the Application Area.

2. The **approval holder** must ensure that no buildings are constructed within the Foreshore Subprecinct as identified at **Attachment A2** except barbeque shelters, picnic shelters, and toilet amenities.

Shorebird management

3. For the period for which this approval has effect, the **approval holder** must ensure there is no decline in eastern curlew (*Numenius madagascariensis*) density, foraging habitat quality, or foraging habitat extent in the site identified as 'shorebird foraging habitats' at **Attachment A3**, compared to pre-**commencement**, as a result of the approved action.

4. The **approval holder** must prepare and submit an Eastern Curlew Management Plan (ECIMP) to the **Minister** before **commencement**. In addition to the detail provided in *Eastern Curlew Impact Management Plan –Shoreline Redlands – 20 July 2017,* the ECIMP must include:

    a. a scientifically valid monitoring program, sufficient to:

        i. determine pre-**commencement** eastern curlew density, foraging habitat quality and foraging habitat extent;

        ii. detect **impacts** on the matters identified in condition 4(a)(i); and

        iii. delineate **impacts** due to the action from **impacts** due to natural or other anthropogenic causes;

    b. contingency measures to be implemented (such as fencing) in the event that monitoring identifies that the outcome described in condition 3 is not met;

    c. a timeframe for when contingency measures will be implemented;

    d. details of reporting to be provided to the **Department** in the event that the outcome described in condition 3 is not met; and

    e. provisions to make monitoring results publicly available on the **approval holder**'s website for the life of the project.

5. The ECIMP, including any revised plans, must be peer reviewed by a **suitably qualified person**. The peer review must be submitted to the **Minister** together with the ECIMP and a statement from the **suitably qualified person** stating that they carried out the peer review and evaluated the adequacy of the monitoring, mitigation and management measures proposed. The approved ECIMP must be implemented by the **approval holder**.

6. The **approval holder** must not:

    a. undertake construction within 250m of the Moreton Bay Ramsar wetland between 1 September and 30 March; or

    b. facilitate public access to the Moreton Bay Ramsar wetland,

    until the ECIMP has been approved by the **Minister** in writing and pre-**commencement** eastern curlew density, foraging habitat quality and foraging habitat extent has been determined.

Water quality management

7. The **approval holder** must prepare and submit a Water Quality Management Plan (WQMP) to the **Minister** before **commencement**. In addition to the detail provided in *Shorelines Redland Water Quality Management Plan – June 2017*, the WQMP must accord with **national water quality guidelines** and include:

    a. a monitoring program sufficient to determine pre-**commencement** water quality within all catchments within the **site** and at a reference/control monitoring site;

    b. a rationale for the sampling effort undertaken to determine pre-**commencement** water quality and justify the selection of the reference/control monitoring site with respect to the potential **impacts** of the action and the objectives of the WQMP;

    c. details of ongoing monitoring locations and the parameters to be monitored;

    d. proposed early warning indicators, trigger thresholds and limits for detecting **impacts** on surface water quality;

    e. contingency measures to be implemented in the event that trigger thresholds are breached; and

    f. provisions to make monitoring results publicly available on the **approval holder**'s website for the life of the project.

8. The WQMP, including any revised plans, must be peer reviewed by a **suitably qualified person**. The peer review must be submitted to the **Minister** together with the WQMP and a statement from the **suitably qualified person** stating that they carried out the peer review and evaluated the adequacy of the monitoring, mitigation and management measures proposed.

9. The **approval holder** must not **commence** until the WQMP has been approved by the **Minister** in writing. The approved WQMP must be implemented by the **approval holder**.

General

10. Within 20 days after the **commencement** of the **action**, the **approval holder** must advise the **Department** in writing of the actual date of **commencement**.

11. 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 plans 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.

12. 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 the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the compliance report is published. Reports must remain on the website for the period this approval has effect. The **approval holder** may cease preparing and publishing compliance reports required by this condition with written agreement of the **Minister** to do so.

13. 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 must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.

14. The **approval holder** may choose to revise a plan approved by the **Minister** under Conditions 4 or 7 without submitting it for approval under section 143A of the **EPBC Act**, if the taking of the action in accordance with the revised plan would not be likely to have a new or increased **impact**. If the **approval holder** makes this choice they must:

    i. notify the **Department** in writing that the approved plan has been revised and provide the **Department** with an electronic copy of the revised plan;

    ii. implement the revised plan from the date that the plan is submitted to the **Department**; and

    iii. for the life of this approval, maintain a record of the reasons the **approval holder** considers that taking the action in accordance with the revised plan would not be likely to have a new or increased **impact**.

14A. The **approval holder** may revoke its choice under Condition 14 at any time by notice to the **Department.** If the **approval holder** revokes the choice to implement a revised plan without approval under section 143A of the **EPBC Act**, the **approval holder** must implement the version of the plan most recently approved by the **Minister**.

14B. Condition 14 does not apply if the revisions to the approved plan include changes to environmental offsets provided under the plan 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 would, or would not, be likely to have new or increased **impacts**.

14C. 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 would be likely to have a new or increased **impact**, then:

i. Condition 14 does not apply, or ceases to apply, in relation to the revised plan; and

ii. the **approval holder** must implement the version of the plan most recently approved by the **Minister**.

iii. to avoid any doubt, this condition does not affect any operation of Conditions 14, 14A and 14B in the period before the day after the notice is given.

At the time of giving a notice under condition 14A, the **Minister** may also notify that for a specified period of time condition 14 does not apply for one or more specified plans required under the approval.

14D. Conditions 14, 14A, 14B and 14C are not intended to limit the operation of section 143A of the **EPBC Act** which allows the **approval holder** to submit a revised plan to the **Minister** for approval.

15. If, at any time after five years from the date of this approval, the **approval holder** has not **commenced** the **action**, then the **approval holder** must not **commence** the action without written agreement from the **Minister.**

16. Unless otherwise agreed to in writing by the **Minister**, the **approval holder** must publish all management plans referred to in these conditions of approval on its website. Each management plan must be published on the website within one month of being approved by the **Minister** or being submitted under conditions 4, 7 or 14.

Definitions

Approval holder: means the person to whom the approval is granted or any person acting on their behalf, or to whom the approval is transferred under section 145B of the **EPBC Act**.

Commence/commencement means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; preliminary site preparation work which involves breaking of the ground (including pile driving); the laying of pipes and other prefabricated materials in the ground, and any associated excavation work; excluding the installation of fences and signage.

Department means the Australian Government Department administering the *Environment Protection and Biodiversity Conservation Act 1999.*

EPBC/ EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Impact/s: as defined in section 527E of the EPBC Act.

Minister means the Minister administering the Environment Protection and Biodiversity Conservation Act 1999 and includes a delegate of the Minister.

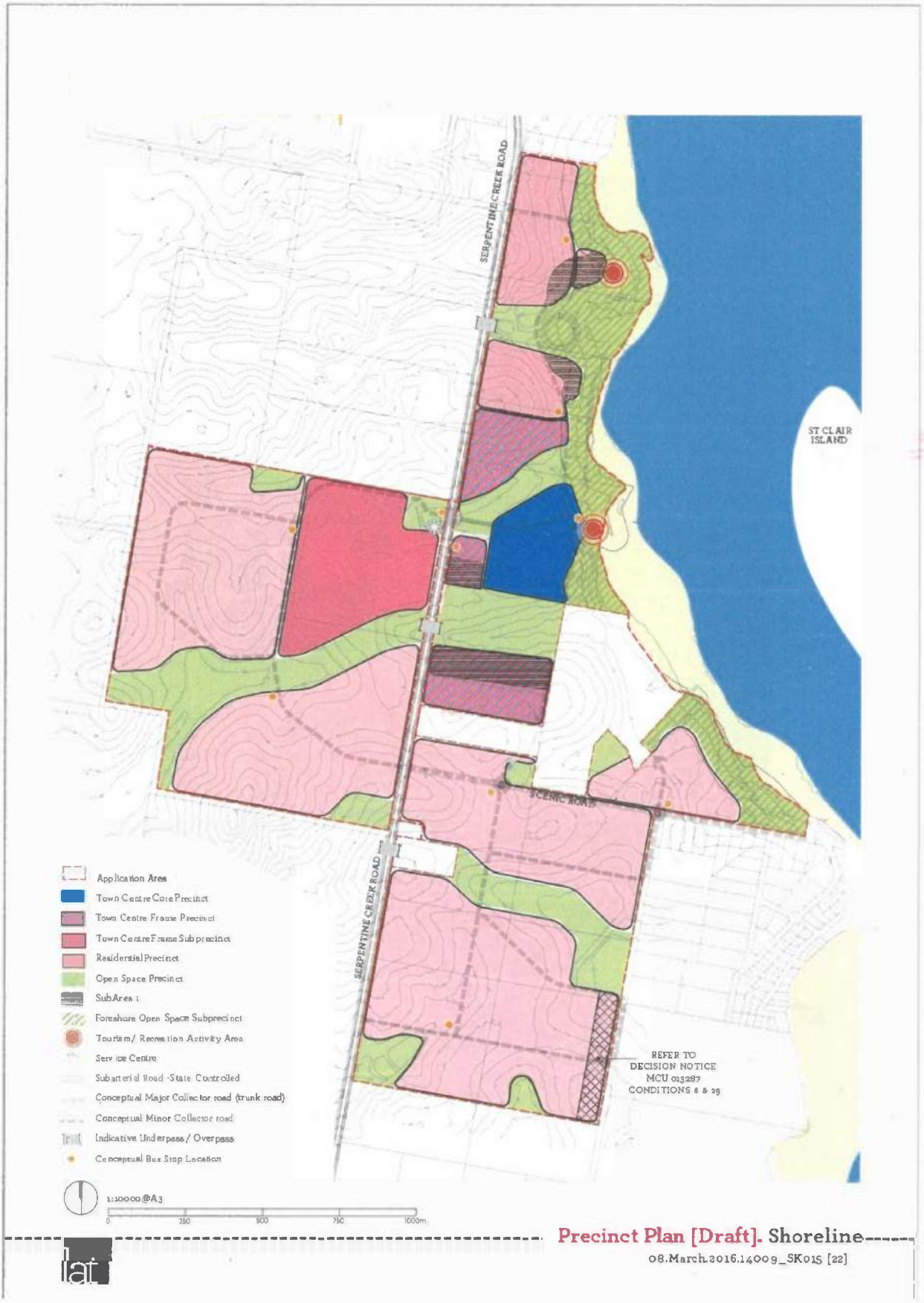
National water quality guidelines means guidelines under the *National Water Quality Management Strategy* including the *Australian and New Zealand guidelines for fresh and marine water quality – 2000* or future revisions of these guidelines.

Site means the area shown as the Application Area shown at Attachment A.

Suitably qualified person means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

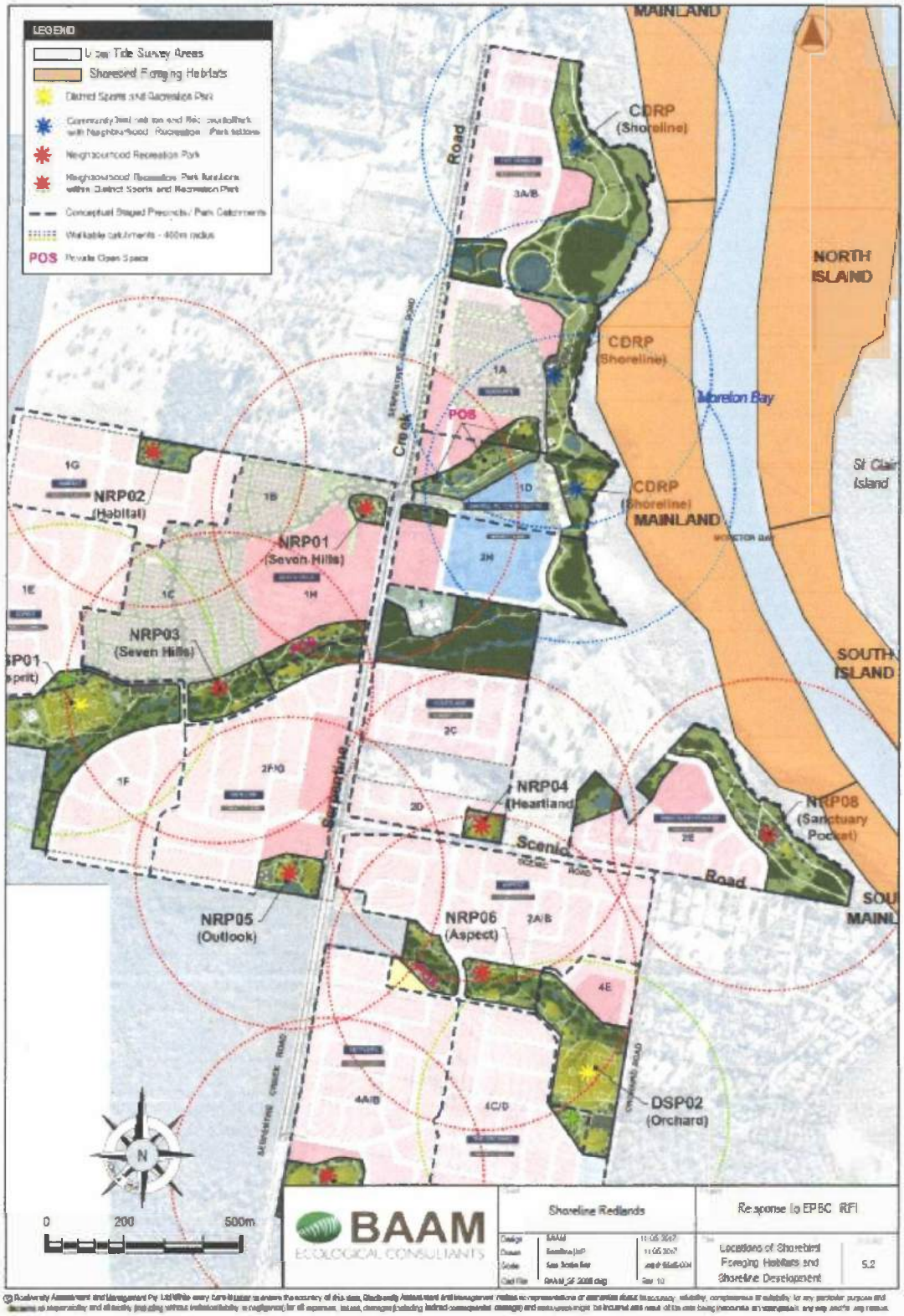
ATTACHMENTS

1. **Attachment A1:**



2. Attachment A2:

3. Attachment A3:



Appendix B

Fauna Spotter Catcher Reports

QFC
QUEENSLAND FAUNA CONSULTANCY
Pty Ltd

September 2020

Fauna Management and Spotter/Catcher Services Report

Shoreline, 325 Serpentine Creek Road, Redland Bay

Report prepared for Shadforth Civil Contractors

Report prepared by

QLD Fauna Consultancy Pty Ltd

Phone: (07) 3376 9780

Fax: (07) 3376 9740

Email: fauna@qfc.com.au

Date:	01/10/2020
Title:	Fauna Management and Spotter/Catcher Services Report Shoreline, 325 Serpentine Creek Road, Redland Bay
Author/s:	Bryan Robinson, Jasmine Zeleny
Reviewed by:	Ramona Rohwedder
Field personnel:	Jason Raguse
Status:	Final Report
Filed as:	QFC FMR Shadforth Redland Bay Sept 2020.doc

Contents

1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Contractors to conduct Fauna Spotter/Catcher and Fauna Management activities for works at 325 Serpentine Creek Road, Redland Bay, involving the removal of a singular Fig tree.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken on 22nd September 2020.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed on the day of clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

If applicable, trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required.

Tuesday 22nd September 2020

- Pre-clearance activities carried out (refer to Methodology) at 325 Serpentine Creek Road, Redland Bay
- Vegetation clearance carried out at 325 Serpentine Creek Road, Redland Bay
- 0 trees flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 0 Nest (N) ☐Y ☒N Hollows (H) ☐Y ☒N Arboreal termitaria (ATM) ☐Y ☒N No. & size of hollow/s (mm): 0
Terrestrial Microhabitats: Hollow logs ☐Y ☒N Woody debris ☐Y ☒N Rock piles ☐Y ☒N Burrows ☐Y ☒N
Aquatic habitat/s: Dam ☐Y ☒N Creek ☐Y ☒N Wetland ☐Y ☒N
No Fauna Found

4 Conclusion

All vegetation clearance was supervised as requested by Shadforth Civil Contractors and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017.*

No fauna required mitigation during clearance works.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

5 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*. Queensland Government.

References for nomenclature

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Strahan, R. And Van Dyck, S. (2008) *The Mammals of Australia*, 3rd edn Sydney: New Holland Publishers.

QUEENSLAND FAUNA CONSULTANCY Pty Ltd

October 2020

Fauna Management and Spotter/Catcher Services Report

Shoreline, 325 Serpentine Creek Road, Redland Bay

Report prepared for Shadforth Civil Contractors

Report prepared by

QLD Fauna Consultancy Pty Ltd

Phone: (07) 3376 9780

Fax: (07) 3376 9740

Email: fauna@qfc.com.au

Date:	27/10/2020
Title:	Fauna Management and Spotter/Catcher Services Report Shoreline, 325 Serpentine Creek Road, Redland Bay
Author/s:	Bryan Robinson, Jasmine Zeleny
Reviewed by:	Ramona Rohwedder
Field personnel:	Rebecca Ferris
Status:	Final Report
Filed as:	QFC FMR Shadforth Redland Bay Oct 2020.docx

Contents

1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Pty Ltd to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Shoreline, 325 Serpentine Creek Road, Redland Bay.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken on 14th October 2020.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed on the day of clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required. Refer to **Appendix A** for fauna photos.

Wednesday 14th October 2020

- Pre-clearance activities carried out (refer to Methodology) at 325 Serpentine Creek Road, Redland Bay
- Vegetation clearance carried out at 325 Serpentine Creek Road, Redland Bay
- Refer to **Fauna Register** for fauna found
- 1 tree flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 1 Nest (N) ☒Y ☐N Hollows (H) ☒Y ☐N Arboreal termitaria (ATM) ☒Y ☐N Other: Fissure No. & size of hollow/s (mm): 0-49:11, 50-99:9, 100-149:5, 150-199:4, 200-249:3, 250-199:1
Terrestrial Microhabitats: Hollow logs ☒Y ☐N Woody debris ☒Y ☐N Rock piles ☐Y ☒N Burrows ☒Y ☐N
Aquatic habitat/s: Dam ☐Y ☒N Creek ☐Y ☒N Wetland ☐Y ☒N

4 Fauna Register

			Capture Location							Release Details			Actions					
Collectors Name	**Date**	**Time**	**Capture Location**	**Latitude**	**Longitude**	**Count Type**	**Status**	***Common Name - Scientific Name***	**Count**	**Date**	**Latitude**	**Longitude**	**R1**	**R2**	**D**	**I**	**Release Location Description**	**Comments**
Rebecca Ferris	14/10/2020	09:41	325 Serpentine Creek Road, Redland Bay	-27.6672	153.2974	Alive	Least Concern	Tree Martin *Petrochelidon nigricans*	14	NA	NA	NA	X					14x eggs from 2x 50-99mm hollows in adjacent branches. Taken to carer.
Rebecca Ferris	14/10/2020	12:11	325 Serpentine Creek Road, Redland Bay	-27.6672	153.2970	Alive	Least Concern	Tree Martin *Petrochelidon nigricans*	4	NA	NA	NA	X					4x advanced chicks found in 100-149mm hollow. Taken to carer.
Rebecca Ferris	14/10/2020	13:49	325 Serpentine Creek Road, Redland Bay	-27.6673	153.2972	Alive	Least Concern	Rainbow Lorikeet *Trichoglossus haematodus*	2	NA	NA	NA	X					2x chicks found in 100-149mm hollow. Taken to carer.

Rebecca Ferris	14/10/2020	13:50	325 Serpentine Creek Road, Redland Bay	-27.6673	153.2972	Alive	Least Concern	Tree Martin *Petrochelidon nigricans*	4	NA	NA	NA	X				4x chicks found in 50-99mm hollow. Taken to carer.
Rebecca Ferris	14/10/2020	14:02	325 Serpentine Creek Road, Redland Bay	-27.6673	153.2973	Alive	Least Concern	Tree Martin *Petrochelidon nigricans*	4	NA	NA	NA	X				4x newly hatched chicks found in 0-49mm hollow. Taken to carer.

5 Conclusion

All vegetation clearance was supervised as requested by Shadforth Civil Pty Ltd and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017.*

No Koalas were observed during clearance. Tree Martin chicks and eggs, and Rainbow Lorikeet chicks found during clearance works were taken to a certified wildlife carer.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

6 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*. Queensland Government.

References for nomenclature

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Simpson, K. & Day, N. (2004) *Field Guide to the Birds of Australia*. Penguin Group, Australia

Strahan, R. And Van Dyck, S. (2008) *The Mammals of Australia*, 3rd edn Sydney: New Holland Publishers.

7 Appendix A: Fauna Photos

Rainbow Lorikeet chicks
Trichoglossus haematodus

Tree Martin chicks
Petrochelidon nigricans

Tree Martin chicks
Petrochelidon nigricans

November 2020

Fauna Management and Spotter/Catcher Services Report

Shoreline – Stage 3, 325 Serpentine Creek Road, Redland Bay

Report prepared for Shadforth Civil Contractors

Report prepared by

QLD Fauna Consultancy Pty Ltd

Phone: (07) 3376 9780

Fax: (07) 3376 9740

Email: fauna@qfc.com.au

Date:	03/12/2020
Title:	Fauna Management and Spotter/Catcher Services Report Shoreline – Stage 3, 325 Serpentine Creek Road, Redland Bay
Author/s:	Bryan Robinson, Jasmine Zeleny, Ramona Rohwedder
Reviewed by:	Stephanie Robinson
Field personnel:	Rebecca Ferris
Status:	Final Report
Filed as:	QFC FMR Shadforth Redland Bay Nov 2020.docx

Contents

1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Pty Ltd to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Shoreline – Stage 3, 325 Serpentine Creek Road, Redland Bay.

All activities were conducted under the provisions of Rehabilitation Permit (WA0026789) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken in November 2020.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed each day during clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures, and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required.

Wednesday 18th November 2020

- Pre-clearance activities carried out (refer to Methodology) at Serpentine Creek Road, Redland Bay (Service Corridor)
- Vegetation clearance carried out at Serpentine Creek Road, Redland Bay (Service Corridor)
- 1 tree flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 1 Nest (N) ☒Y ☐N Hollows (H) ☐Y ☒N Arboreal termitaria (ATM) ☐Y ☒N No. & size of hollow/s (mm): 0
Terrestrial Microhabitats: Hollow logs ☐Y ☒N Woody debris ☐Y ☒N Rock piles ☐Y ☒N Burrows ☐Y ☒N Other: Dense leaf litter
Aquatic habitat/s: Dam ☐Y ☒N Creek ☐Y ☒N Wetland ☐Y ☒N
No Fauna Found

Thursday 19th November 2020

- Pre-clearance activities carried out (refer to Methodology) at Serpentine Creek Road, Redland Bay (Service Corridor)
- Vegetation clearance carried out at Serpentine Creek Road, Redland Bay (Service Corridor)
- Refer to **Fauna Register** for fauna found
- 1 tree flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 4
Nest (N) ☒Y ☐N Hollows (H) ☒Y ☐N Arboreal termitaria (ATM) ☒Y ☐N
No. & size of hollow/s (mm): 0-49:2, 100-149:2, 200-249:3, 250-299:1, 300+:1
Terrestrial Microhabitats:
Hollow logs ☒Y ☐N Woody debris ☒Y ☐N Rock piles ☐Y ☒N Burrows ☐Y ☒N
Other: Dense leaf litter
Aquatic habitat/s: Dam ☐Y ☒N Creek ☐Y ☒N Wetland ☐Y ☒N

Monday 30th November 2020

- Pre-clearance activities carried out (refer to Methodology) at Serpentine Creek Road, Redland Bay (Road 12/15)
- Vegetation clearance carried out at Serpentine Creek Road, Redland Bay (Road 12/15)
- Refer to **Fauna Register** for fauna found
- 0 trees flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 11
Nest (N) ☐Y ☒N Hollows (H) ☒Y ☐N Arboreal termitaria (ATM) ☒Y ☐N
Other: Exfoliating bark, fissure, Possum drey
No. & size of hollow/s (mm): 0-49:5, 100-149:3, 150-199: 1, 200-249:2
Terrestrial Microhabitats:
Hollow logs ☒Y ☐N Woody debris ☒Y ☐N Rock piles ☐Y ☒N Burrows ☐Y ☒N
Other: Dense leaf litter, timber stockpiles
Aquatic habitat/s: Dam ☐Y ☒N Creek ☐Y ☒N Wetland ☐Y ☒N

4 Fauna Register

			Capture Location							Release Details			Actions					
Collectors Name	**Date**	**Time**	**Capture Location**	**Latitude**	**Longitude**	**Count Type**	**Status**	***Common Name - Scientific Name***	**Count**	**Date**	**Latitude**	**Longitude**	**R1**	**R2**	**D**	**I**	**Release Location Description**	**Comments**
Rebecca Ferris	19/11/2020	09:05	325 Serpentine Creek Road, Redland Bay	-27.6660	153.3019	Deceased	Least Concern	Kingfisher sp. eggs	2	NA	NA	NA			X			2x Kingfisher eggs found in arboreal termite mound were damaged during tree clearing.
Rebecca Ferris	19/11/2020	09:35	325 Serpentine Creek Road, Redland Bay	-27.6659	153.3018	Alive	Least Concern	Common Brushtail Possum *Trichosurus vulpecula*	2	19/11/20	-27.6660	153.3042	X				Released into tree with dense canopy outside clearance zone.	Found in 200-249mm hollow.
Rebecca Ferris	30/11/20	13:21	325 Serpentine Creek Road, Redland Bay	-27.6681	153.2981	Alive	Least Concern	Yellow-footed Antechinus *Antechinus flavipes*	5	NA	NA	NA	X				Left in tree hollow for self-relocation.	Mother antechinus with 4 young (min.) attached; Left in situ for self-relocation overnight. (Found in 50-99mm hollow)

5 Conclusion

All vegetation clearance was supervised as requested by Shadforth Civil Pty Ltd and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017.*

No Koalas were observed during clearance. Two Common Brushtail Possums found during clearance works were relocated to an adjacent locality comprising suitable refugia and feeding resources consistent with species requirements. Two Kingfisher eggs found during works were damaged during tree felling leaving them not viable. Yellow-footed Antechinus were left in-situ within an arboreal hollow to allow for self-relocation overnight. No other fauna required mitigation.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

6 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*. Queensland Government.

References for nomenclature

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Simpson, K. & Day, N. (2004) *Field Guide to the Birds of Australia*. Penguin Group, Australia

Strahan, R. And Van Dyck, S. (2008) *The Mammals of Australia*, 3rd edn Sydney: New Holland Publishers.

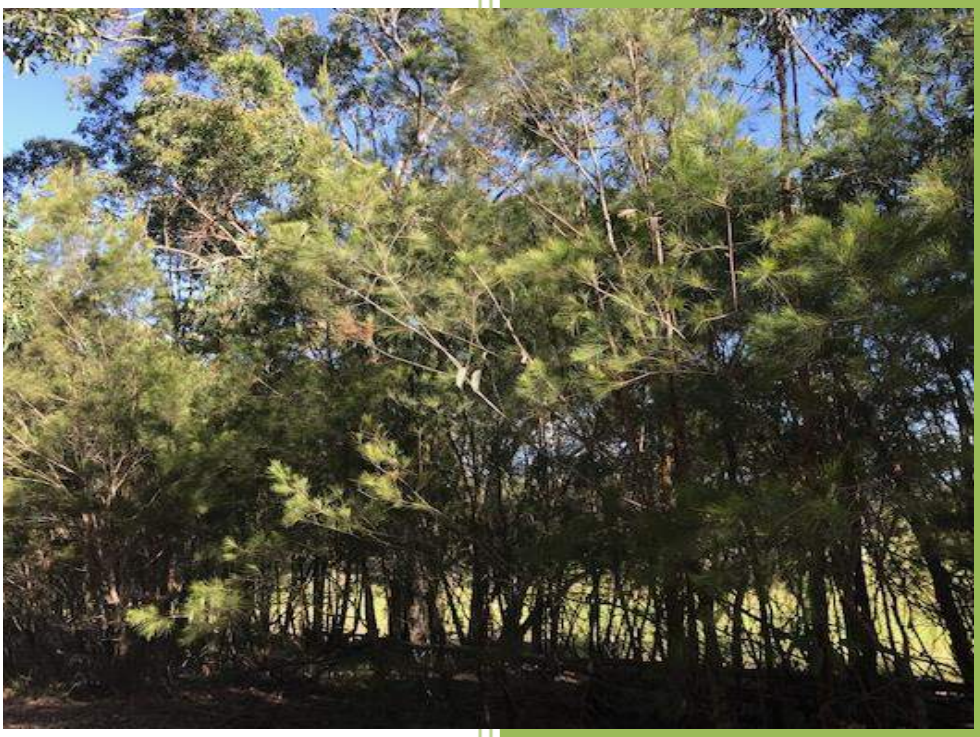
QUEENSLAND FAUNA CONSULTANCY Pty Ltd

February 2021

Fauna Management and Spotter/Catcher Services Report

Shoreline – Stage 3, 325 Serpentine Creek Road, Redland Bay

Report prepared for Shadforth Civil Contractors



Report prepared by

QLD Fauna Consultancy Pty Ltd

Phone: (07) 3376 9780

Fax: (07) 3376 9740

Email: fauna@qfc.com.au

Date:	01/03/2021
Title:	Fauna Management and Spotter/Catcher Services Report Shoreline – Stage 3, 325 Serpentine Creek Road, Redland Bay
Author/s:	Bryan Robinson, Jasmine Zeleny
Reviewed by:	Ramona Rohwedder
Field personnel:	Rebecca Ferris
Status:	Final Report
Filed as:	QFC FMR Shadforth Redland Bay Feb 2021.docx

Contents

1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Pty Ltd to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Shoreline – Stage 3, 325 Serpentine Creek Road, Redland Bay.

All activities were conducted under the provisions of Rehabilitation Permit (WA0026789) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken on 5th February 2021.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed on the day of clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures, and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a handheld radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required.

Friday 5th February 2021

- Pre-clearance activities carried out (refer to Methodology) at Stage 3 - Internal, Redland Bay
- Vegetation clearance carried out at Stage 3 - Internal, Redland Bay
- 0 trees flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 0 Nest (N) ☐Y ☒N Hollows (H) ☐Y ☒N Arboreal termitaria (ATM) ☐Y ☒N No. & size of hollow/s (mm): 0
Terrestrial Microhabitats: Hollow logs ☐Y ☒N Woody debris ☐Y ☒N Rock piles ☐Y ☒N Burrows ☐Y ☒N Other: Dense leaf litter, bark exfoliations, timber stockpiles
Aquatic habitat/s: Dam ☐Y ☒N Creek ☐Y ☒N Wetland ☐Y ☒N
No Fauna Found

4 Conclusion

All vegetation clearance was supervised as requested by Shadforth Civil Pty Ltd and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017.*

No Koalas were observed during clearance; and no fauna required mitigation.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

5 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*. Queensland Government.

References for nomenclature

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Strahan, R. And Van Dyck, S. (2008) *The Mammals of Australia*, 3rd edn Sydney: New Holland Publishers.

Appendix C

DesignFlow Annual Compliance Report 2020-2021

ANNUAL COMPLIANCE REPORT 2020-2021
SHORELINE REDLANDS WQMP (EPBC 2016/7776)

DesignFlow
Prepared for Lendlease Communities (Shoreline) Pty Ltd
November 2021

Document Control Sheet

Report Title:	Annual Compliance Report 2020-2021 - Shoreline Redlands WQMP (LPBC 2016/7776)
Version:	01
Author(s):	Andrew Cook
Reviewed By:	Shaun Leinster
Approved By:	Shaun Leinster
Client:	Lendlease Communities (Shoreline) Pty Ltd
Date:	08/11/2021

DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this Management Plan *Shoreline Redlands - Water Quality Management Plan V05* is complete, current and correct.

2. I am duly authorised to sign this declaration on behalf of the approval holder.

3. I am aware that:

a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.

b. Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) where the person knows the information or document is false or misleading.

c. The above offences are punishable on conviction by imprisonment, a fine or both.

Signed

_____

Full name (please print)

_____

Organisation (please print)

_____

Date __/__/__

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Figures

Tables

1 INTRODUCTION

The Shoreline Redlands development was determined a controlled action under the Environmental Protection and Biodiversity Conservation (EBPC) Act 1999 under Approval 2016/7776, April 2018. This is because part of the Shoreline Redlands development site drains directly to the Moreton Bay Ramsar wetland and potential impacts to listed threatened and migratory species, and communities.

The EPBC Act Approval (2016/7776, April 2018) required the development and implementation of the following approved Water Quality Monitoring Program (WQMP) being:

- *Shoreline Redlands - Water Quality Management Plan V05* (DesignFlow, 2019) as approved by the Minister under EPBC Act Approval (2016/7776, April 2018).

This report has been prepared to support Annual Compliance Reporting for the 2020 –2021 period in accordance Shoreline Redlands WQMP and the EPBC 2016/7776 approval conditions.

This report presents the baseline monitoring completed to date. No development has commenced in the catchments draining directly to Moreton Bay.

2 BASELINE MONITORING REQUIREMENTS

Details of the sampling and monitoring requirements for each phase of the development are summarised in Table 1. The Shoreline Redlands WQMP is currently in the 'Pre-construction (baseline) Monitoring' phase because construction phases have not yet commenced in the catchments draining directly to Moreton Bay.

The aim of the Pre-Construction Monitoring phase is to characterise the sites water quality discharges and define site-based trigger thresholds for construction and establishment phases.

Table 1. Water quality monitoring frequency for each phase of development.

Development Phase	Frequency	Commencement	Cessation
Pre-construction / Control sites (baseline)	Event based (up to 12 times per year)	Minimum of 24 months prior to construction phase	Commencement of development works
Construction Phase	Event based Construction site discharge monitoring	During construction phase activities	Completion of construction activities
Operational Phase	Event based (up to 12 times per year)	Completion of construction activities	12 months after development works have been completed

2.1 ANALYITES

Physico-chemical parameters to be monitored are summarised in Table 2.

Table 2. Post-event based sampling water quality parameters

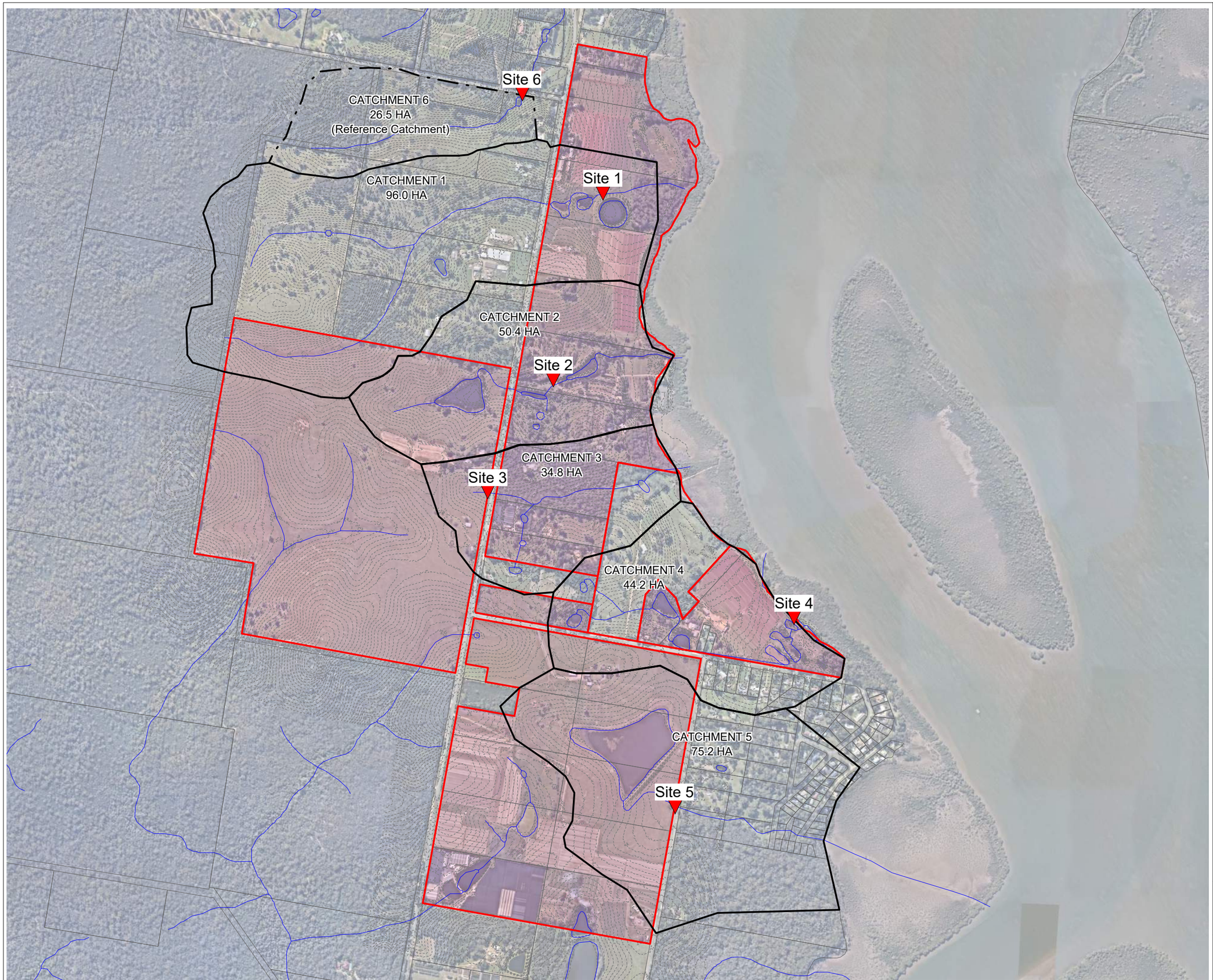
Parameter	Reporting Units	Method
LABORATORY MEASUREMENTS1		
Total Dissolved Solids	mg/L	EA01H
Suspended Solids (SS)	mg/L	EA025H
Total Nitrogen	mg/L	EK062G
Ammonia	mg/L	EK055G
Nitrite	mg/L	EK057G
Nitrite + Nitrate	mg/L	EK059G
Total Kjeldahl Nitrogen (TKN)	mg/L	EK061G
Organic N	mg/L	TKN minus ammonia
Total Phosphorus	mg/L	EK067G
Reactive Phosphorus	mg/L	EK071G
FIELD MEASUREMENTS		
pH	pH Unit	Field measurement
Electrical Conductivity	µS/cm	Field measurement
Dissolved Oxygen	% saturation	Field measurement
Temperature	°C	Field measurement
Turbidity	NTU	Field measurement
Redox Potential (ORP)	mV	Field measurement

2.2 SAMPLING LOCATIONS

Six water quality monitoring locations are being used to collect baseline water quality data (Table 3 and Figure 1). Sites 1-5 are located within the proposed development area and Site 6 has been selected as the reference (control) site for comparison with Sites 1-5 as each sub-catchment is developed.

Table 3. Water quality monitoring site location details.

Site ID	Access	Comments
1	194-214 Serpentine Creek Rd	Shoreline Development catchments used for baseline impact monitoring.
2	260-280 Serpentine Creek Rd	
3	304-324 Serpentine Creek Road	
4	74A Scenic Road	
5	50-56 Orchard Road	
6	15-23 Kidd Street	Reference site within Catchment 6, external to the development and has no urban development proposed.



DesignFlow

LEGEND

- Shoreline Application Boundary
- RP Boundary
- 1m contours
- Drainage
- Moreton Bay draining catchment
- Water quality sample site

N W E S

Scale:

1 : 12,500 (A3)

FIGURE 1

Shoreline Redlands WQMP
Water Quality Sampling Locations

Project: 4388

Annual Compliance Report 2020-21
for Shoreline Redlands WQMP
EOBC 2016/7776

Date:
5 November 2021

Client:
Lendlease Communities
(Shoreline) Pty Ltd

3 SAMPLE EVENTS FOR REPORTING PERIOD

Figure 2 shows sampling events and daily rainfall totals for the August 2020 to August 2021 reporting period. A total of eight baseline water quality monitoring rounds were undertaken in this period. No samples were collected in August, September, November or June due to insufficient rainfall to generate flows within the waterways at these times. Including the current reporting period, 23 sampling rounds have been completed since sampling commenced in 2017.

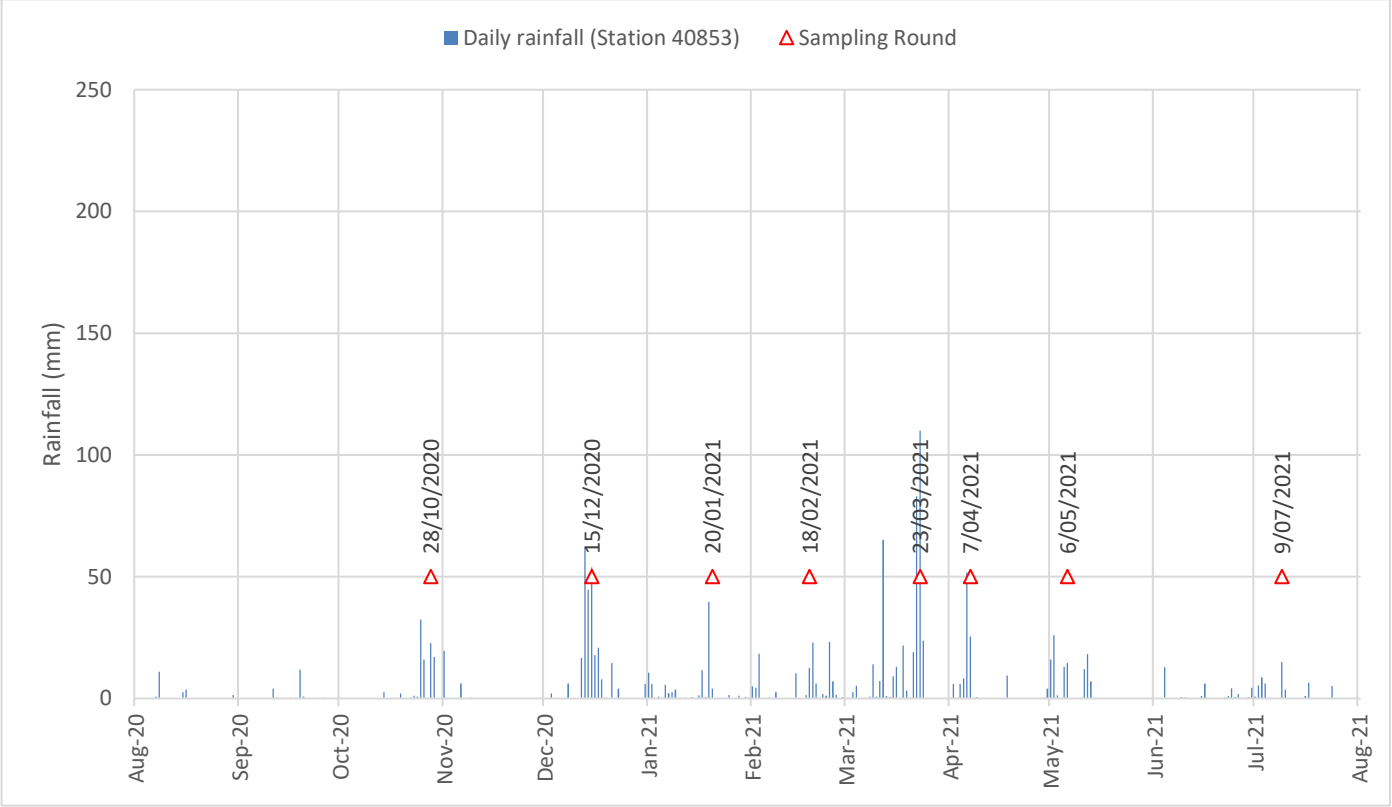


Figure 2. Sampling events and daily rainfall totals for the 2020-21 reporting period.

4 BASELINE WATER QUALITY MONITORING SUMMARY DATA

Details of individual sampled parameters for all sites and sampling rounds are provided in Appendix A.

Table 4 presents the mean water quality values and standard deviation of the sample mean values for each site and across all sampling rounds since commencement.

As per the approved WQMP (DesignFlow, 2018), sampling can be stopped once 24 sampling rounds are completed at Sites 1-5 (i.e., the base line monitoring sites). Sampling will recommence once construction commences within catchments draining directly to Moreton Bay.

Details of individual sampled parameters for all sites and sampling rounds are provided in Appendix A.

Table 4. Mean values (± standard deviation of the sample mean) of baseline water quality parameters for waterways within the Shoreline.

Water Quality Parameter	Site 1 (± SD)	Site 2 (± SD)	Site 3 (± SD)	Site 4 (± SD)	Site 5 (± SD)	Site 6 (± SD)	All Sites (± SD)
Number of samples	23	22	22	22	21	15	125
Total Dissolved Solids @180°C (mg/L)	273 (± 113)	215 (± 68)	187 (± 72)	386 (± 126)	276 (± 157)	177 (± 67)	257 (± 127)
Suspended Solids (SS) (mg/L)	17 (± 13)	11 (± 10)	59 (± 125)	39 (± 49)	54 (± 102)	11 (± 13)	32.7 (± 71.8)
Ammonia (mg/L)	0.03 (± 0.03)	0.02 (± 0.01)	0.02 (± 0.01)	0.3 (± 0.34)	0.09 (± 0.16)	0.02 (± 0.03)	0.08 (± 0.19)
Nitrite as N (mg/L)	0.01 (± 0)	0.01 (± 0)	0.01 (± 0.01)	0.08 (± 0.1)	0.02 (± 0.02)	0.01 (± 0)	0.02 (± 0.05)
Nitrate as N (mg/L)	1 (± 2.38)	0.01 (± 0)	0.07 (± 0.29)	2.43 (± 3.49)	0.59 (± 1.52)	0.04 (± 0.04)	0.73 (± 2.05)
Oxidised N (Nitrite + Nitrate) (mg/L)	1 (± 2.39)	0.01 (± 0)	0.07 (± 0.3)	2.5 (± 3.55)	0.6 (± 1.54)	0.04 (± 0.04)	0.75 (± 2.08)
Total Kjeldahl Nitrogen as N (mg/L)	1.4 (± 0.6)	1.4 (± 0.7)	2.3 (± 4.3)	2.4 (± 0.8)	3.1 (± 1.3)	1 (± 0.6)	2 (± 2.1)
Total Nitrogen as N (mg/L)	2.4 (± 2.5)	1.4 (± 0.7)	2.3 (± 4.3)	4.9 (± 3.9)	3.7 (± 2.2)	1.1 (± 0.6)	2.72 (± 3.07)
Organic N (mg/L)	1.4 (± 0.6)	1.4 (± 0.7)	2.3 (± 4.3)	2.1 (± 0.8)	3 (± 1.3)	1 (± 0.6)	1.9 (± 2)
Total Phosphorus (mg/L)	0.24 (± 0.17)	0.32 (± 0.36)	0.74 (± 1.93)	0.86 (± 0.66)	3.53 (± 2.06)	0.12 (± 0.07)	0.99 (± 1.67)
Filterable Reactive Phosphorus (mg/L)	0.1 (± 0.07)	0.17 (± 0.31)	0.16 (± 0.2)	0.42 (± 0.46)	3 (± 1.78)	0.04 (± 0.03)	0.66 (± 1.3)
pH	6.4 (± 0.61)	5.97 (± 0.5)	5.85 (± 0.59)	6.96 (± 0.44)	6.65 (± 0.32)	5.43 (± 0.37)	6.25 (± 0.69)
Electrical Conductivity (µS/cm)	382 (± 197)	291 (± 158)	239 (± 125)	610 (± 252)	338 (± 241)	205 (± 110)	352 (± 230)
Dissolved Oxygen (% saturation)	65 (± 35.2)	43.1 (± 27.5)	41.8 (± 24.5)	65.6 (± 34.8)	53.9 (± 21.1)	73.4 (± 13.4)	56.3 (± 29.7)
Temperature (°C)	24.3 (± 3.5)	23 (± 4.5)	23.1 (± 4.2)	24.5 (± 4)	25.1 (± 4.4)	24.1 (± 4.3)	24 (± 4)
Turbidity (NTU)	28 (± 55.4)	21.3 (± 26)	107.7 (± 295.4)	98.9 (± 178.1)	67.3 (± 136.5)	13.7 (± 10.6)	58.2 (± 158.8)
Redox Potential (mV)	157 (± 74)	153 (± 64)	166 (± 85)	116 (± 55)	144 (± 64)	205 (± 58)	154.4 (± 71)

4.1 UPDATED TO TRIGGER VALUES

The WQMP (Designflow, 2019), identified four surface water quality parameters as threshold parameters: turbidity, total suspended solids, total nitrogen, and total phosphorus. Base line monitoring has been used to define the 80th percentile concentrations of each to be used as trigger thresholds during construction and operational phases of the development.

The original trigger values developed in the WQMP have been refined based on new data. Table 5 provides details of the original WQMP and updated trigger thresholds (80th percentile concentrations) for each parameter. The updated thresholds values are derived from all baseline monitoring to date.

Figure 3 (turbidity), Figure 4 (total suspended solids), Figure 5 (total nitrogen) and Figure 6 (total phosphorus) present time series sampling results for each of these trigger pollutants. The data confirms the highly variable nature of the sites water quality, which is not unexpected given the nature of land use within these catchments (agriculture and grazing). The results also re-confirm the WQMP findings that the sites existing water quality discharge is poor (which is expected).

Table 5. Surface water quality trigger thresholds.

Pollutant	WQMP threshold[1]	Updated Trigger threshold[2]
Turbidity (NTU)	36.2	53.2
Total suspended solids (mg/L)	32	29.2
Total nitrogen (mg/L)	4.4	3.82
Total phosphorus (mg/L)	2.6	1.11

[1] 80th percentile concentrations from baseline water quality at time of preparation of WQMP (2017-2019).
[2] 80th percentile concentrations from all baseline water quality monitoring (2017-2021).

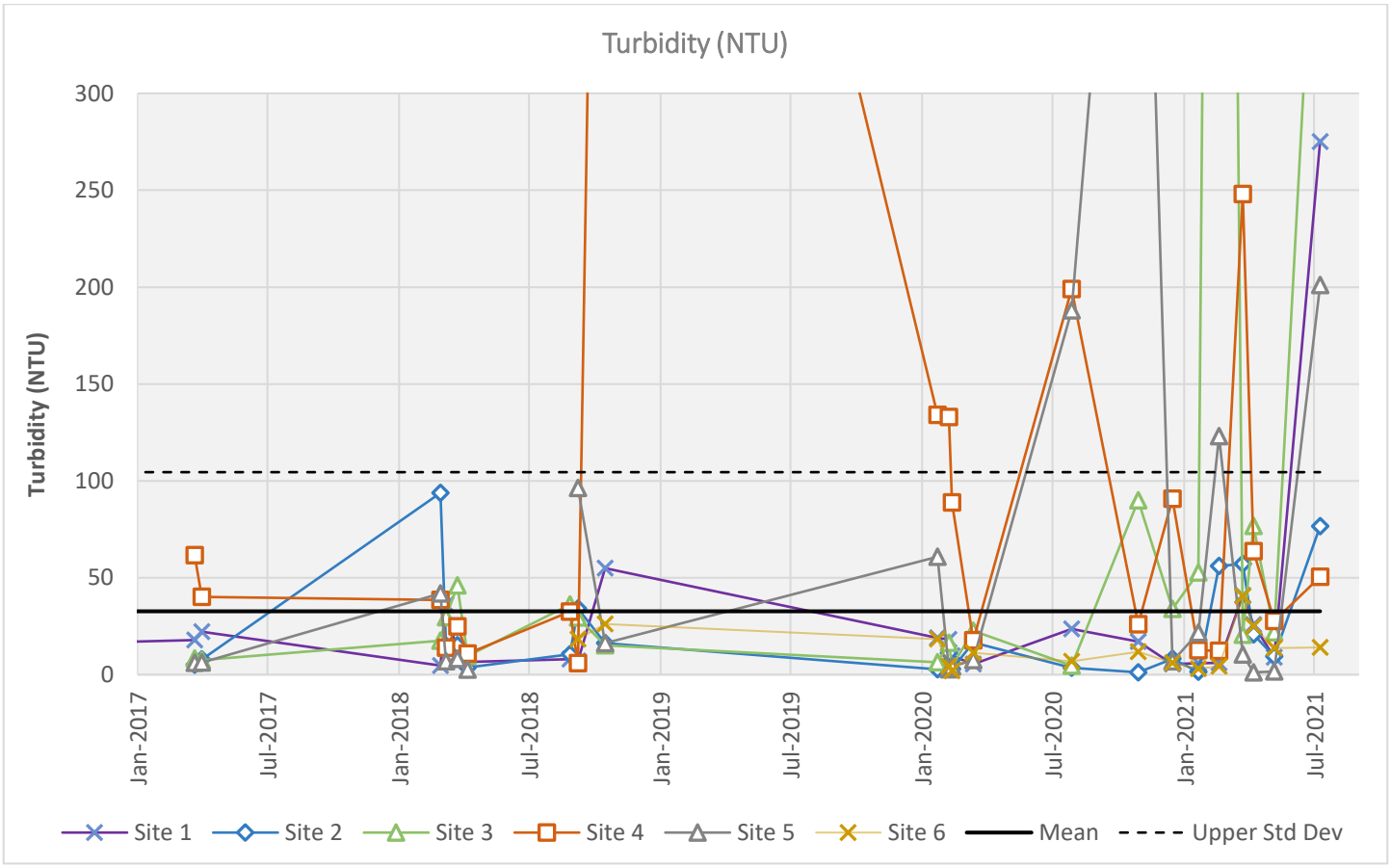


Figure 3. Turbidity (NTU) sampling time series.

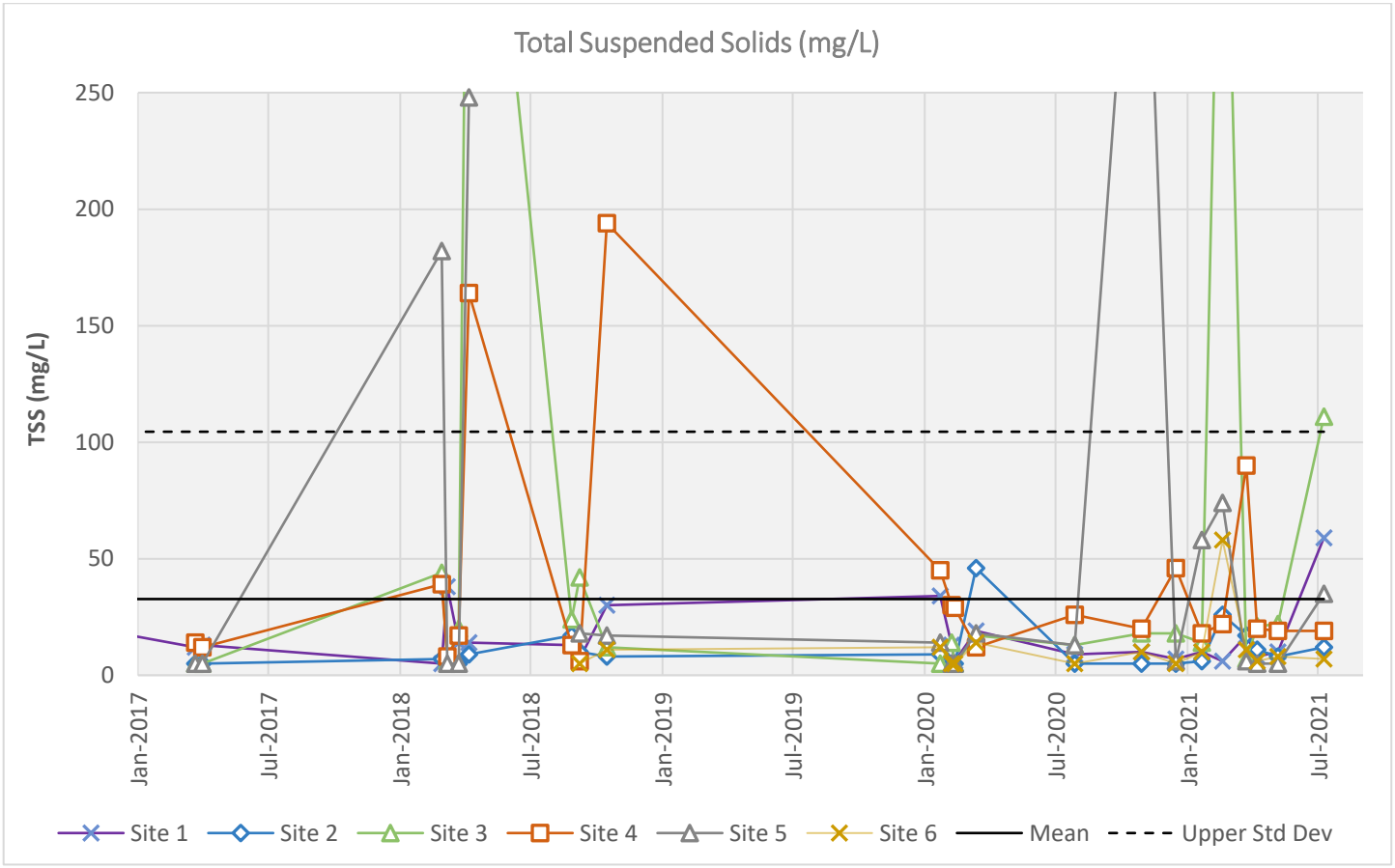


Figure 4. Total suspended solids (TSS) sampling time series.

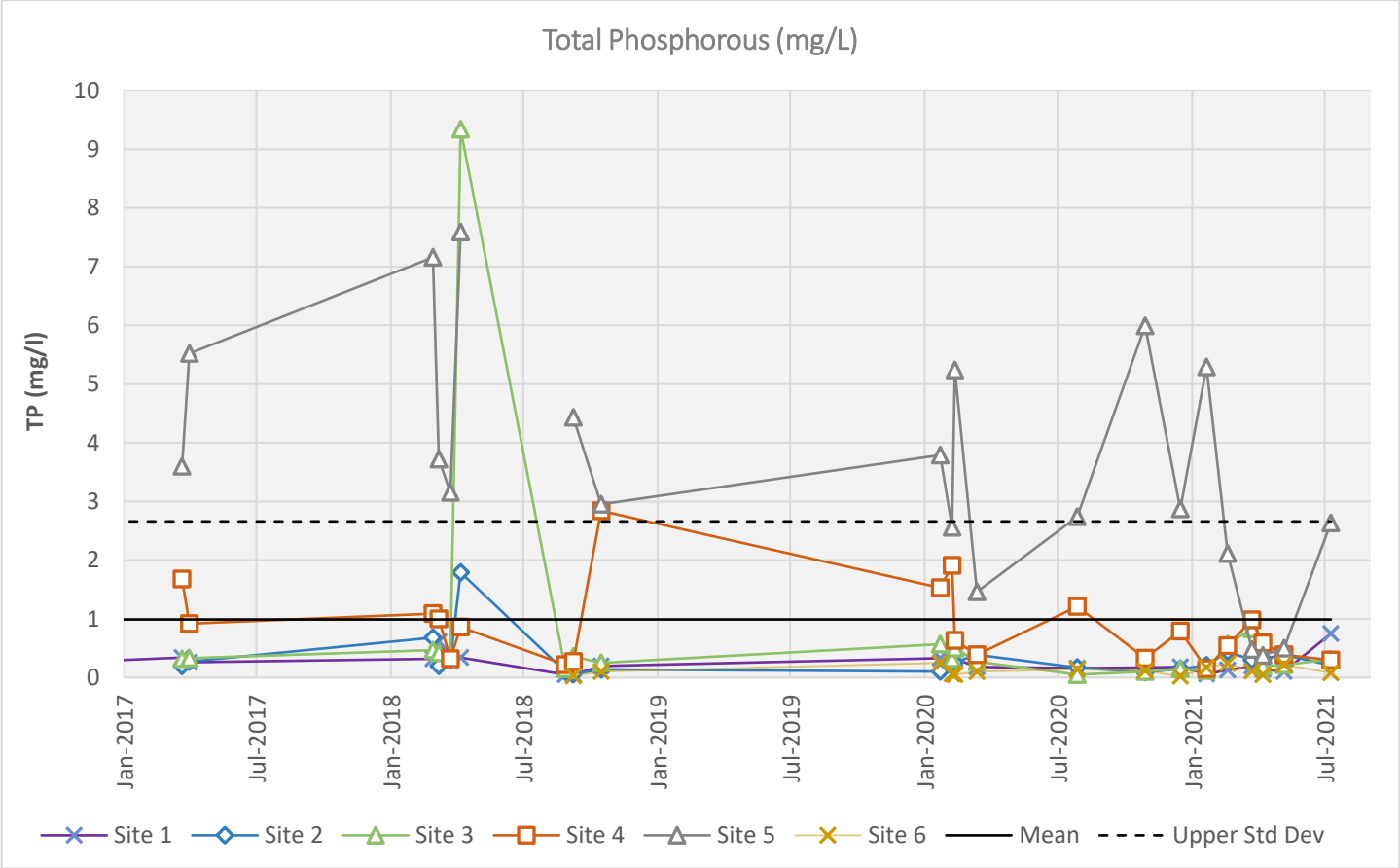


Figure 5. Total phosphorous (TP) sampling time series.

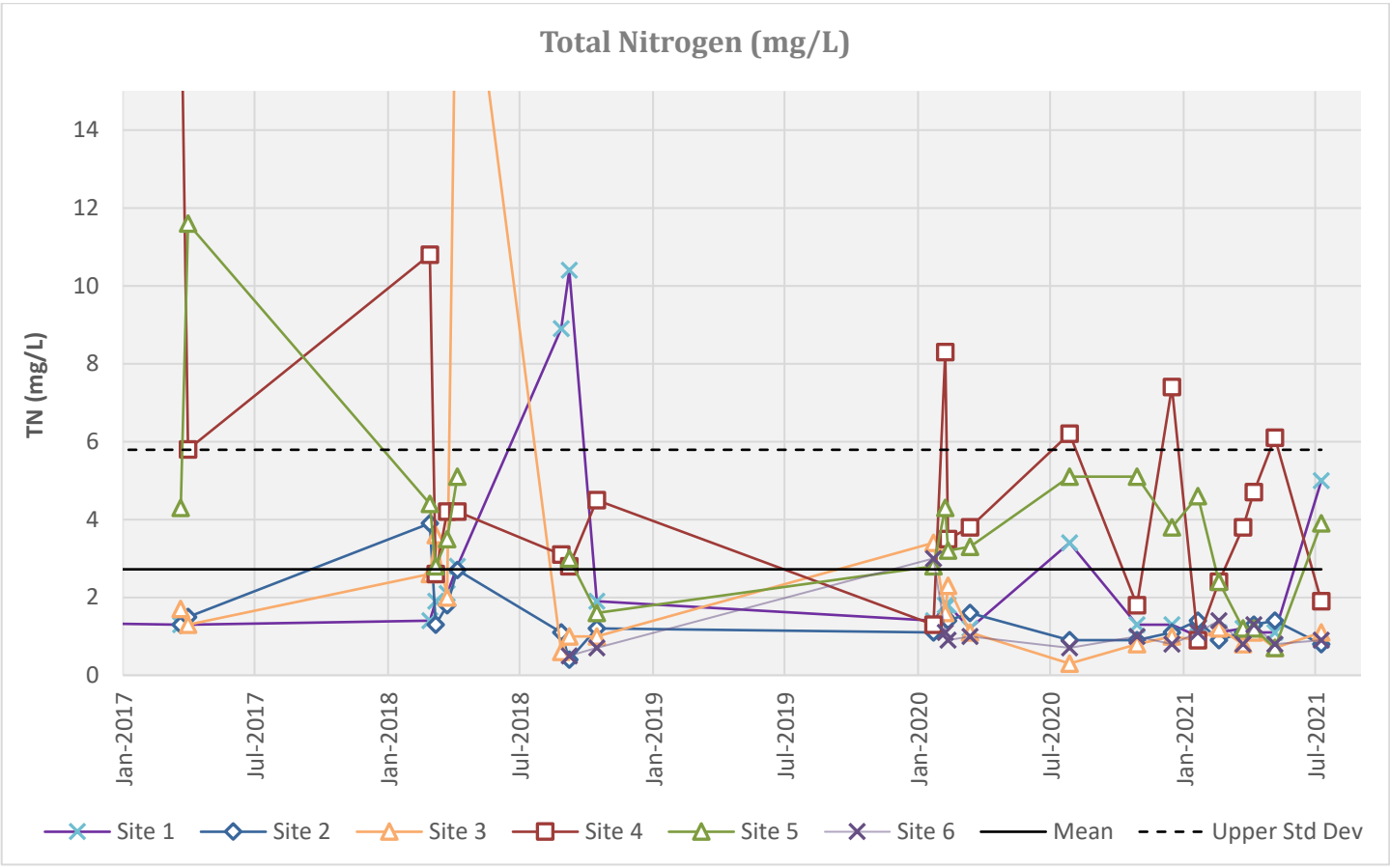


Figure 6. Total nitrogen (TN) sampling time series.

5 CONCLUSION

This report provides details of water quality monitoring undertaken for the Annual Compliance Reporting requirements for the period 2020- 2021, in accordance with the EPBC Act Approval (2016/7776, April 2018). The water quality monitoring has been completed as per the requirements of the *Shoreline Redlands - Water Quality Management Plan V05* (DesignFlow, 2019). This report presents the baseline monitoring completed to date. No development has commenced in the catchments draining directly to Moreton Bay. Sampling rounds for the baseline monitoring sites are close to a total of 24 sampling rounds so baseline monitoring can soon stop.

The monitoring data confirms that the sites water quality is poor, which is not unexpected due to the agricultural land uses within the upstream catchments. These report presents updated trigger thresholds for surface water quality monitoring pollutants based on new data. Once 24 sampling rounds of base line monitoring is completed for Sites 1-5 it is recommended that the WQMP be updated with new trigger thresholds based on all data.

APPENDIX A: BASELINE WATER QUALIYT MONITORING DATA

Site #	Sample date	Total Dissolved Solids @180°C	Suspended Solids (SS)	Ammonia as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Total Kjeldahl Nitrogen as N	Total Nitrogen as N	Organic N	Total Phosphorus as P	Reactive Phosphorus as P	pH	Electrical Conductivity	Dissolved Oxygen	Temperature	Turbidity	Redox Potential
1	16/03/2016	545	33	0.01	0.01	0.01	0.01	1.4	1.4	1.39	0.15	0.01	7.43	936	56.9	26.2	14.4	119
1	21/03/2017	194	12	0.17	0.01	0.13	0.13	1.2	1.3	1.03	0.34	0.22	7.16	279	23.5	25.4	17.8	135
1	31/03/2017	123	13	0.03	0.01	0.14	0.14	1.2	1.3	1.17	0.26	0.21	6.49	192	53.3	26.3	22.1	137
1	27/02/2018	180	5	0.03	0.01	0.01	0.01	1.4	1.4	1.37	0.32	0.14	6.84	462	43.6	28.3	4.7	125
1	7/03/2018	233	38	0.02	0.01	0.01	0.01	1.9	1.9	1.88	0.61	0.05	7.84	291	15.5	24.3	36.1	3.4
1	23/03/2018	453	14	0.04	0.01	0.01	0.01	2.1	2.1	2.06	0.28	0.14	6.28	604	38.2	26.1	10.5	134
1	6/04/2018	456	14	0.02	0.01	0.01	0.01	2.8	2.8	2.78	0.34	0.13	6.89	546	24.5	25.2	6.6	0.1
1	27/08/2018	394	13	0.06	0.01	6.49	6.5	2.4	8.9	2.34	0.05	0.01	6.67	628	157	20.8	8	311
1	07/09/2018	355	7	0.02	0.01	9.7	9.7	0.7	10.4	0.68	0.05	0.01	6.82	559	148	21.6	7.1	263
1	15/10/2018	360	30	0.02	0.01	0.88	0.88	1	1.9	0.98	0.2	0.08	6.54	572	81.4	20	55	234
1	22/01/2020	292	34	0.01	0.01	0.01	0.01	1.4	1.4	1.39	0.33	0.09	6.52	447	77	29.9	18.9	110
1	07/02/2020	222	13	0.04	0.01	0.12	0.12	1.7	1.8	1.66	0.28	0.1	6.17	272	63	26.7	18.1	194
1	11/02/2020	201	6	0.05	0.01	0.01	0.01	1.8	1.8	1.75	0.32	0.2	5.6	209	29.4	26.2	9.8	176
1	12/03/2020	232	19	0.01	0.01	0.01	0.01	1.2	1.2	1.19	0.18	0.06	6.04	284	71.3	22.5	5.4	167
1	27/07/2020	235	9	0.03	0.01	2.43	2.43	1	3.4	0.97	0.16	0.08	6.02	325	67.8	18.2	23.6	88.4
1	28/10/2020	324	10	0.06	0.02	0.35	0.37	0.9	1.3	0.84	0.17	0.06	6.36	491	55.8	24.8	17	90.2
1	15/12/2020	245	7	0.03	0.01	0.12	0.12	1.2	1.3	1.17	0.18	0.08	6.05	294	76.5	26.9	5.4	183
1	20/01/2021	230	10	0.01	0.01	0.01	0.01	1	1	0.99	0.06	0.01	5.93	228	36.2	26.3	5.9	168
1	18/02/2021	225	6	0.01	0.01	0.01	0.01	1.1	1.1	1.09	0.13	0.03	6.44	294	90.1	30.1	6.1	233
1	23/03/2021	93	17	0.01	0.01	0.05	0.05	1.2	1.2	1.19	0.19	0.18	5.41	70.7	79.4	23.2	40.9	192
1	07/04/2021	126.00	8.00	0.01	0.01	0.03	0.03	1.10	1.10	1.09	0.14	0.09	5.68	129.00	57.80	23.00	25.80	206.00
1	6/05/2021	289	10	0.04	0.01	0.27	0.27	0.8	1.1	0.76	0.10	0.04	5.51	390.00	52.70	18.40	8.90	211
1	9/07/2021	266.00	59	0.05	0.01	2.23	2.24	2.8	5	2.75	0.75	0.26	6.55	289	95.7	17.9	275	141
2	21/03/2017	198	5	0.02	0.01	0.01	0.01	1.3	1.3	1.28	0.2	0.12	5.93	323	15.4	25.3	5.1	191
2	31/03/2017	153	5	0.03	0.01	0.01	0.01	1.5	1.5	1.47	0.27	0.22	5.94	254	15.4	25.1	7.9	156
2	27/02/2018	338	7	0.03	0.01	0.01	0.01	3.9	3.9	3.87	0.68	0.26	6.11	387	9.3	23.9	93.8	120
2	7/03/2018	194	6	0.03	0.01	0.01	0.01	1.3	1.3	1.27	0.2	0.1	7.41	253	33.4	23.9	14.8	29.2
2	23/03/2018	225	5	0.03	0.01	0.01	0.01	1.8	1.8	1.77	0.3	0.19	6.21	314	44.8	25.4	15.1	125
2	6/04/2018	301	9	0.01	0.01	0.01	0.01	2.7	2.7	2.69	1.79	1.51	6.26	356	5.1	22.5	3.7	0.1
2	27/08/2018	237	17	0.01	0.01	0.01	0.01	1.1	1.1	1.09	0.1	0.02	6.14	800	20.4	16	10.5	79.2
2	07/09/2018	335	10	0.02	0.01	0.01	0.01	0.4	0.4	0.38	0.06	0.01	5.38	508	35	15.8	34.1	228
2	15/10/2018	211	8	0.02	0.01	0.01	0.01	1.2	1.2	1.18	0.14	0.06	5.93	31.5	69.7	20.4	16.2	271
2	22/01/2020	325	9	0.01	0.01	0.01	0.01	1.1	1.1	1.09	0.1	0.01	6.63	407	97.2	30.6	2.7	171
2	07/02/2020	244	5	0.01	0.01	0.02	0.02	1.5	1.5	1.49	0.22	0.08	5.46	290	17.5	25.2	11.2	229
2	11/02/2020	234	5	0.02	0.01	0.01	0.01	1.4	1.4	1.38	0.26	0.15	5.57	253	19.2	27.6	2.9	173
2	12/03/2020	205	46	0.01	0.01	0.01	0.01	1.6	1.6	1.59	0.39	0.1	5.87	223	37.2	22.4	16.6	136
2	27/07/2020	168	5	0.01	0.01	0.01	0.01	0.9	0.9	0.89	0.17	0.04	5.29	227	43.2	15.7	3.6	145
2	28/10/2020	164	5	0.01	0.01	0.01	0.01	0.9	0.9	0.89	0.09	0.02	6.53	252	69.8	26.1	1.2	73
2	15/12/2020	178	5	0.04	0.01	0.01	0.01	1.1	1.1	1.06	0.15	0.02	6.59	283	84.4	31.3	8.2	200
2	20/01/2021	188	6	0.01	0.01	0.01	0.01	1.4	1.4	1.39	0.21	0.08	5.61	215	19.4	25.7	1.4	200
2	18/02/2021	297	26	0.05	0.01	0.01	0.01	0.9	0.9	0.85	0.44	0.08	5.56	391	32.6	22.8	56	182
2	23/03/2021	105	17	0.01	0.01	0.01	0.01	1.1	1.1	1.09	0.3	0.28	5.63	85.1	71.1	23.2	57.1	164
2	07/04/2021	109	11	0.03	0.01	0.01	0.01	1.3	1.3	1.27	0.32	0.23	5.87	99	79.6	24	20.8	170
2	6/05/2021	146	8	0.01	0.01	0.01	0.01	1.4	1.4	1.39	0.39	0.2	5.66	169	58.2	18.1	9.5	175

Site #	Sample date	Total Dissolved Solids @180°C	Suspended Solids (SS)	Ammonia as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Total Kjeldahl Nitrogen as N	Total Nitrogen as N	Organic N	Total Phosphorus as P	Reactive Phosphorus as P	pH	Electrical Conductivity	Dissolved Oxygen	Temperature	Turbidity	Redox Potential
2	9/07/2021	184	12	0.02	0.01	0.01	0.01	0.8	0.8	0.78	0.21	0.02	5.72	281	70.4	15.7	76.6	142
3	21/03/2017	205	5	0.02	0.01	0.01	0.01	1.7	1.7	1.68	0.32	0.22	5.9	260	16.6	25.8	8.3	186
3	31/03/2017	137	5	0.02	0.01	0.01	0.01	1.3	1.3	1.28	0.33	0.13	5.82	209	23.9	23.7	7.5	187
3	27/02/2018	251	44	0.03	0.01	0.01	0.01	2.6	2.6	2.57	0.47	0.11	5.83	378	10.5	24.9	17.5	135
3	7/03/2018	173	6	0.03	0.05	1.37	1.42	2.2	3.6	2.17	0.42	0.28	7.16	175	42.6	25	29.7	61.6
3	23/03/2018	171	20	0.04	0.01	0.01	0.01	2	2	1.96	0.34	0.16	6.28	264	53.3	27.1	46	114
3	6/04/2018	256	452	0.01	0.01	0.01	0.01	21.3	21.3	21.29	9.34	0.67	6.61	350	5.5	23.1	9.6	0.1
3	27/08/2018	297	24	0.01	0.01	0.02	0.02	0.6	0.6	0.59	0.15	0.03	5.15	456	22.8	17	36.2	289
3	07/09/2018	271	42	0.01	0.01	0.01	0.01	1	1	0.99	0.36	0.02	5.43	385	7.12	17	29.4	223
3	15/10/2018	80	12	0.02	0.01	0.01	0.01	1	1	0.98	0.25	0.16	5.53	90	71.5	20.8	15.2	304
3	22/01/2020	344	5	0.04	0.01	0.01	0.01	3.4	3.4	3.36	0.57	0.31	5.5	529	32.7	26.9	6.4	-43.5
3	07/02/2020	192	14	0.04	0.01	0.01	0.01	1.6	1.6	1.56	0.32	0.17	5.22	268	21.1	29.6	16.4	248
3	11/02/2020	202	5	0.01	0.01	0.01	0.01	2.3	2.3	2.29	0.5	0.35	5.54	159	11.9	25.8	4.3	184
3	12/03/2020	182	17	0.01	0.01	0.01	0.01	1.1	1.1	1.09	0.27	0.03	5.9	260	57.6	23.1	22.6	155
3	27/07/2020	144	13	0.01	0.01	0.01	0.01	0.3	0.3	0.29	0.05	0.01	5.29	330	46.9	15	4.6	155
3	28/10/2020	148	18	0.03	0.01	0.01	0.01	0.8	0.8	0.77	0.1	0.03	5.86	163	61.5	22.8	89.9	132
3	15/12/2020	111	18	0.02	0.01	0.01	0.01	1	1	0.98	0.15	0.04	5.45	222	57.2	27.8	33.9	208
3	20/01/2021	188	14	0.01	0.01	0.01	0.01	0.9	0.9	0.89	0.12	0.02	6.07	212	38.7	25.9	52.7	171
3	18/02/2021	292	422	0.01	0.01	0.01	0.01	1.2	1.2	1.19	0.57	0.01	7.15	149	75	27.4	1360	218
3	23/03/2021	66	7	0.01	0.01	0.01	0.01	0.8	0.8	0.79	0.83	0.7	6.29	40.6	82.7	23.2	20.6	124
3	07/04/2021	138	21	0.01	0.01	0.01	0.01	1.1	1.1	1.09	0.19	0.09	5.85	82	41.9	23.8	76.8	169
3	6/05/2021	127	22	0.01	0.01	0.01	0.01	0.7	0.7	0.69	0.22	0.02	4.85	145	60.1	16.1	21.8	278
3	9/07/2021	145	111	0.03	0.01	0.01	0.01	1.1	1.1	1.07	0.31	0.02	6.08	131	77.9	17	461	154
4	21/03/2017	409	14	0.07	0.22	15.6	15.8	2.7	18.5	2.63	1.68	1.84	6.09	1100	20.1	25.1	61.6	166
4	31/03/2017	215	12	0.53	0.09	3.72	3.81	2	5.8	1.47	0.92	0.58	6.82	392	68.9	27.9	40.2	103
4	27/02/2018	488	39	0.07	0.26	6.85	7.11	3.7	10.8	3.63	1.09	0.46	7.58	695	97.3	27.7	38.5	158
4	7/03/2018	505	8	0.28	0.01	0.21	0.22	2.4	2.6	2.12	1	0.51	6.85	607	11.8	24	13.9	0.1
4	23/03/2018	337	17	0.11	0.05	2.21	2.26	1.9	4.2	1.79	0.32	0.07	7.49	625	85.6	26	24.9	111
4	6/04/2018	451	164	0.18	0.04	0.8	0.84	3.4	4.2	3.22	0.86	0.14	6.67	651	12.5	24.5	10.8	0.1
4	27/08/2018	561	13	1.34	0.03	0.04	0.07	3	3.1	1.66	0.22	0.04	7.24	1010	25.3	21.2	32.5	66.1
4	07/09/2018	561	6	0.97	0.04	0.01	0.05	2.8	2.8	1.83	0.27	0.02	7.43	969	32.7	22.5	5.9	103
4	15/10/2018	515	194	0.42	0.06	0.74	0.8	3.7	4.5	3.28	2.84	0.46	7.19	648	82	21.5	843	242
4	22/01/2020	406	45	0.02	0.01	0.01	0.01	1.3	1.3	1.28	1.53	0.78	6.54	505	53.7	30.6	134	95.7
4	07/02/2020	323	30	0.28	0.4	4.53	4.93	3.4	8.3	3.12	1.91	1.48	6.49	399	10.2	25	133	95.9
4	11/02/2020	237	29	0.04	0.02	1.47	1.49	2	3.5	1.96	0.63	0.32	6.52	291	86.2	31.1	88.9	178
4	12/03/2020	255	12	0.33	0.04	1.61	1.65	2.2	3.8	1.87	0.39	0.07	6.7	399	90.9	23.4	17.7	137
4	27/07/2020	417	26	0.22	0.08	3.77	3.85	2.4	6.2	2.18	1.21	0.56	6.74	600	54.8	16	199	132
4	28/10/2020	537	20	0.01	0.01	0.01	0.01	1.8	1.8	1.79	0.33	0.02	7.38	932	111	27.2	25.9	80.1
4	15/12/2020	485	46	0.05	0.06	3.78	3.84	3.6	7.4	3.55	0.79	0.5	7.73	777	128	27.4	90.8	168
4	20/01/2021	341	18	0.03	0.02	0.71	0.73	0.2	0.9	0.17	0.15	0.17	7.22	586	109	28.3	12.6	152
4	18/02/2021	496	22	0.02	0.01	0.01	0.01	2.4	2.4	2.38	0.54	0.14	7.39	836	88.4	27.4	12.3	74.2
4	23/03/2021	170	90	0.44	0.02	1.33	1.35	2.4	3.8	1.96	0.98	0.48	6.67	182	70.9	23.1	248	113
4	07/04/2021	189	20	0.68	0.1	1.94	2.04	2.7	4.7	2.02	0.59	0.34	6.59	249	50.4	25	63.7	97.8
4	6/05/2021	267	19	0.36	0.08	3.92	4	2.1	6.1	1.74	0.39	0.1	6.63	408	73	18.1	27.8	149
4	9/07/2021	323	19	0.07	0.01	0.17	0.18	1.7	1.9	1.63	0.3	0.1	7.2	559	80	16.8	50.5	134
5	21/03/2017	202	5	0.06	0.07	1.75	1.82	2.5	4.3	2.44	3.6	3.96	6.63	285	23.8	27.1	6.1	131

Site #	Sample date	Total Dissolved Solids @180°C	Suspended Solids (SS)	Ammonia as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Total Kjeldahl Nitrogen as N	Total Nitrogen as N	Organic N	Total Phosphorus as P	Reactive Phosphorus as P	pH	Electrical Conductivity	Dissolved Oxygen	Temperature	Turbidity	Redox Potential
5	31/03/2017	330	5	0.14	0.06	6.76	6.82	4.8	11.6	4.66	5.52	5.73	6.89	497	77.4	30	6.2	122
5	27/02/2018	341	182	0.03	0.01	0.01	0.01	4.4	4.4	4.37	7.16	6.5	6.92	462	39.8	25.4	41.9	140
5	7/03/2018	171	5	0.02	0.01	0.5	0.5	2.3	2.8	2.28	3.72	3.94	7.35	230	52.8	25.4	6.8	29
5	23/03/2018	226	5	0.1	0.04	0.25	0.29	3.2	3.5	3.1	3.15	3.01	6.86	430	38.5	24.3	8.1	108
5	6/04/2018	328	248	0.01	0.01	0.01	0.01	5.1	5.1	5.09	7.59	3.52	6.56	429	3.6	23.7	2.6	0.1
5	07/09/2018	799	18	0.03	0.01	0.01	0.01	3	3	2.97	4.43	4.2	6.96	1160	59.2	23.1	96.4	216
5	15/10/2018	121	17	0.02	0.01	0.05	0.05	1.6	1.6	1.58	2.95	2.9	6.82	106	81.2	23.1	16.2	254
5	22/01/2020	217	14	0.05	0.01	0.01	0.01	2.8	2.8	2.75	3.79	3.5	6.88	226	111	31.2	60.8	164
5	07/02/2020	375	5	0.17	0.01	0.41	0.41	3.9	4.3	3.73	2.56	2.41	6.59	455	59.8	31.9	2.7	196
5	11/02/2020	347	5	0.03	0.01	0.08	0.08	3.1	3.2	3.07	5.24	5.35	6.85	433	54	28.6	4.2	114
5	12/03/2020	192	18	0.01	0.01	0.01	0.01	3.3	3.3	3.29	1.46	1.01	6.19	199	55.9	22.7	7.5	183
5	27/07/2020	301	13	0.01	0.04	2.05	2.09	3	5.1	2.99	2.74	2.36	6.42	252	51.3	17.4	188	143
5	28/10/2020	328	402	0.04	0.01	0.01	0.01	5.1	5.1	5.06	5.99	2.84	6.65	159	45.9	27.8	601	99.4
5	15/12/2020	275	6	0.06	0.05	0.05	0.01	3.8	3.8	3.74	2.87	2.92	6.67	248	56.9	30.5	6.9	143
5	20/01/2021	265	58	0.02	0.05	0.05	0.01	4.6	4.6	4.58	5.29	4.88	6.51	229	47.6	27.5	21.6	149
5	18/02/2021	229	74	0.26	0.02	0.18	0.2	2.2	2.4	1.94	2.11	1.38	6.72	258	51.9	24.4	123	198
5	23/03/2021	73	6	0.01	0.01	0.01	0.01	1.2	1.2	1.19	0.48	0.48	6.85	58.1	61.9	23.1	10.4	63.5
5	07/04/2021	86	5	0.01	0.01	0.01	0.01	1.2	1.2	1.19	0.38	0.27	6.34	158	42.6	26.9	1.2	156
5	6/05/2021	124	5	0.01	0.01	0.01	0.01	0.7	0.7	0.69	0.5	0.23	6.1	163	55.9	16.2	1.6	237
5	9/07/2021	462	35	0.71	0.01	0.23	0.23	3.7	3.9	2.99	2.63	1.69	5.97	658	60.9	17.2	201	188
6	07/09/2018	342	5	0.01	0.01	0.01	0.01	0.5	0.5	0.49	0.03	0.01	4.78	510	36.9	23.4	18.4	298
6	15/10/2018	121	11	0.01	0.01	0.01	0.01	0.7	0.7	0.69	0.1	0.04	6.02	166	87.1	20	26.2	285
6	22/01/2020	249	12	0.11	0.01	0.01	0.01	3	3	2.89	0.25	0.04	6.13	256	88.9	28.6	18.4	160
6	07/02/2020	206	5	0.01	0.01	0.13	0.13	1	1.1	0.99	0.06	0.02	5.19	237	70.1	27.2	4.3	212
6	11/02/2020	184	5	0.01	0.01	0.04	0.04	0.9	0.9	0.89	0.05	0.03	5.01	197	74.6	28.4	1.9	245
6	12/03/2020	167	14	0.04	0.01	0.05	0.05	1	1	0.96	0.1	0.02	5.41	202	67.7	23.6	11.4	170
6	27/07/2020	127	5	0.01	0.01	0.12	0.12	0.6	0.7	0.59	0.14	0.06	5.29	156	72.9	17.2	6.8	133
6	28/10/2020	119	10	0.01	0.01	0.01	0.01	1	1	0.99	0.12	0.03	5.73	133	77.5	24.4	11.8	97.8
6	15/12/2020	159	5	0.01	0.01	0.01	0.01	0.8	0.8	0.79	0.02	0.02	5.4	180	78	29.7	6.1	220
6	20/01/2021	191	10	0.02	0.01	0.01	0.01	1.1	1.1	1.08	0.17	0.07	5.14	247	67.8	29.1	3.1	219
6	18/02/2021	230	58	0.03	0.01	0.01	0.01	1.4	1.4	1.37	0.24	0.02	5.74	146	58.5	26.3	4.3	284
6	23/03/2021	78	11	0.01	0.01	0.05	0.05	0.8	0.8	0.79	0.11	0.13	5.12	51.7	88.5	23.5	40.4	196
6	07/04/2021	131	6	0.01	0.01	0.04	0.04	1.3	1.3	1.29	0.05	0.02	5.43	104	76.2	24.3	25	213
6	6/05/2021	130	8	0.01	0.01	0.04	0.04	0.8	0.8	0.79	0.22	0.02	5.67	139	69.9	18.7	13.8	183
6	9/07/2021	228	7	0.07	0.01	0.08	0.08	0.8	0.9	0.73	0.08	0.01	5.41	346	86.6	17	14.1	156