







Wallum Estate

Torakina Road, Brunswick Heads Lot 13 DP 1251383

Revised Wallum Froglet Management Plan

Project control

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Torakina Road, Brunswick Heads

Revised Wallum Froglet Management Plan

Project #: 1-211400

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Table of Contents

Projec	t control	iii
Table	of Contents	iv
1	Introduction and Background	1
1.1	Introduction	1
1.2	Property Details	6
1.3	Proposed Development	
1.4	Previous Studies	
1.5	Species Profiles	
1.5.1	Wallum Froglet (<i>Crinia tinnula</i>) species profile	
1.5.2	Wallum Sedge Frog (<i>Litoria olongburensis</i>) species profile	
1.5.3	Species sightings	
1.6	Management Plan Objectives	10
2	Habitat Assessment	14
2.1	Vegetation	14
2.2	Groundwater Considerations	
2.3	Supplementary Hydrological Assessments	18
3	Habitat Restoration	20
3.1	Habitat Loss and Retention	
3.2	Habitat Creation and Improvement	
3.3	Translocation of Material	
3.4	Habitat Translocation Plan	21
4	Integration with Stormwater Management	27
4.1	Introduction	27
4.2	Stormwater management	
4.2.1	Management Zone 2	
4.2.2	Management Zone 3	
4.2.3	Management Zone 4	28
4.3	Access and Contamination Mitigation	28
5	Habitat Management	29
5.1	Introduction	
5.2	Wallum Froglet Habitat Creation and Translocation	
5.3	Management Zones	
5.3.1	Management Zone 2 - Actions	

5.3.2	Management Zone 3 - Actions	30
5.3.3	Management Zone 4 - Actions	30
5.4	General Construction Stage - Management Actions	30
5.4.1	Staging	30
5.4.2	Contractor Actions	33
5.4.3	Habitat Protection	33
5.4.4	Filling	33
5.4.5	Compensatory Habitat	
5.5	Occupation stage - Management Actions	34
5.5.1	Habitat Protection	34
5.5.2	Water Quality	34
5.5.3	Cane Toads	34
5.5.4	Mosquito Fish	34
5.5.5	Weed Control	34
5.5.6	Monitoring	35
5.5.7	Long-term Management	35
6	Monitoring and Reporting	36
6.1	Introduction	36
6.2	Monitoring Requirements	
6.3	Monitoring Phases:	
6.3.1	Prior to translocation sampling:	
6.3.2	Translocated Habitat Monitoring:	
6.3.3	Retained Habitat Monitoring:	
6.4	Performance Criteria	
7	Compliance	41
8	References	44
Appeı	ndix A Subdivision Plans (CivilTech, 2023)	46
	ndix B AWC Wallum Estate Brunswick Heads – Early Ecological Works Package – REV C pproval Draft	
Appei	ndix C Bayside Brunswick: Wallum Froglet Monitoring Pro-forma	48
Apper	ndix D Trigger Response Plan for Created WF Habitat	49
Appei	ndix E Wallum Froglet and Wallum Sedge Frog Sightings	51



List of Tables

able 1.1 Development Application approvals and Statement of Commitments	2
able 2.1 Summary statistics - groundwater levels	17
able 3.1 Wallum Froglet habitat to be retained and created at the site	20
able 3.2 Habitat Translocation Plan	22
Table 5.1 Staging and timing sequence	31
Table 5.2 Summary of mitigation strategies for potential impacts on acid frog habitats during construction phase	_
able 6.1 Monitoring requirements for development phases	38
Fable 6.2 Monitoring tasks during maintenance period	39
able 6.3 Summary of monitoring performance criteria	40
able 7.1 Compliance with Concept Approval	41
<u>list of Figures</u>	
igure 1.1 Site plan	11
Figure 1.2 Land Dedication Plan	12
Figure 1.3 Wallum froglet habitat mapping	13
Figure 2.1 Locations of ground water monitoring bores	19
<u>list of Plates</u>	
Plate 2.1 Wallum Froglet habitat in the south-west of the site with fringing Melaleuca quiquen and regrowth Leptospermum juniperinum.	
Plate 2.2 Good quality Wallum Froglet habitat in the south-east of the site	15
Plate 2.3 Central drain showing lack of macrophyte or sedge cover and steep partly eroded b	anks 16
	16



1 Introduction and Background

1.1 Introduction

Australian Wetlands Consulting (AWC) has completed this *Revised Wallum Froglet Management Plan* (WFMP) to comply with the Byron Shire Council (BSC) – Conditions of Consent for DA10.2021.575.1. The consent conditions in the concept plan approval were previously issued by the NSW Department of Planning and Infrastructure (DPI) (now Department of Planning, Industry & Environment; 'DPIE') for a residential subdivision at Lot 13 DP 1251383 Torakina Road, Brunswick Heads (refer Section 1.3). The consent conditions were addressed in previous versions of this plan but has now been updated to address the BSC conditions of consent.

In 2013 AWC completed an assessment of acid frog habitat at the site. Byron Shire Council (BSC) gave in-principle support to the assessment and the proposed strategies for stormwater treatment and acid frog management at the site. As such this WFMP has been prepared to incorporate the revised treatment of the central drain and clarify matters regarding the integration of stormwater works and Wallum Froglet habitat. The *Water Cycle Management Stormwater Concept* (Fletcher & Pfaeffli, 2014) and the *Stormwater and Acid Frog Habitat Management Strategy* (AWC, 2014) developed by AWC were previously approved by DPI.

Concept Plan Approvals and Statement of Commitments relevant to this WFMP are detailed in Table 1.1.

In response to approval conditions, this plan originally focused on the Wallum Froglet (*Crinia tinnula*) provides key management responses to ensure the conservation of this species. The plan details monitoring and management actions to ensure the long-term survival of the species across the subject site. In the summer of 2023-2024, an additional acid frog, the Wallum Sedge Frog (*Litoria olongburensis*) was detected at the site. Although this plan only refers to the Wallum Froglet, prescribed actions are applicable to the Wallum Sedge since they occur in the same Wallum habitat.

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Table 1.1 Development Application approvals and Statement of Commitments

Reference	Requirement	Reference
Concept Appro	val	
B4	The Stormwater Concept and associated Wallum Froglet compensatory habitat rehabilitation as described in the PPR is not approved. A revised Stormwater Concept for the project must be prepared by a suitably qualified person in consultation with council to achieve the following objectives: a) retention of the existing north-south drain alignment with a buffer of 20m either side of the channel such that the existing wallum froglet habitat in this area is conserved and enhanced. Minor infringements of up to 5m into the buffer area can occur provided they are offset on the other side of the channel. For example, a buffer may be 15m on one side of the channel provided this is offset by increasing the other side to 25m (i.e. a total width of 40m plus channel width); b) the buffer areas should not contain stormwater management facilities other	Refer Stormwater Management Plan (Martens (2021) and CivilTech (2022) Engineering Plans for DA (Appendix A).
	than a stormwater treatment basin at the southern end of the channel, where required; c) no significant change to the flow regimes from the pre-development regime.	
B5	The existing north-south drain alignment and buffer (as determined under modification B4 of this approval) is to become a public reserve.	Refer Figure 1.2 and CivilTech (2022) Engineering Plans for DA (Appendix A).
Statement of C	commitments	
S1	Development to be generally in accordance with the concept application plans and the recommendations of the appendices of the Environmental Assessment and Preferred Project Report, including but not limited to: a) development footprint not extending outside the 2(a) Residential zone pursuant to Byron LEP 1988;	Refer CivilTech (2022) Engineering Plans for DA (Appendix A).

Reference	Requirement	Reference
	b) the number of lots; c) the mixture of lot sizes; d) conservation of ecologically sensitive areas; e) location and dimensions of Park 1 and Park 2; f) retention of trees on public land including road reserves and drainage reserves; g) location of stormwater treatment and disposal areas; and h) extent of earthworks.	
B1	The width of the road corridors will be minimised where roads traverse significant habitats and vegetation.	Refer CivilTech (2022) Engineering Plans for DA (Appendix A).
B3	An area of constructed Wallum Froglet habitat is proposed within reserves which will be dedicated to Council. Those areas will be incorporated into the Stormwater management plan and will result in the net gain of almost 3000m² of Wallum Froglet habitat. A Wallum Froglet Compensatory Management Plan will guide the construction and management of this habitat.	A 7000m² (0.7ha) net gain in Wallum Froglet habitat is proposed, refer Section 3 and Table 3.1.
B4	A Wallum Froglet Compensatory Habitat Plan will be prepared to the satisfaction of the Office of Environment and Heritage prior to approval of the first stage construction certificate. The WFCHP is to be generally in accordance with information prepared by James Warren and Associates and submitted for approval prior to the release of the CC.	This document incorporates a plan for compensatory Wallum Froglet habitat.
SW4	Prepare resident information package regarding prevailing soil conditions the most ecologically sustainable methods for gardening in these conditions and any other sensitivities of the local ecosystem, including information on local endangered species such as the Wallum Froglet.	To be provided at Subdivision Works Certificate stage.
SW7	In the event that excavations are required outside of the proposed development footprint or below 2.0m below surface level within the building envelope	

Reference	Requirement	Reference			
	additional testing should be considered by the consent authority.	N/A to this plan.			
Byron Shire Co	ouncil – Conditions of Consent DA10.2021.575.1				
contain a revi	An amended Wallum Froglet Management Plan to be submitted to Council for approval prior to the issue of the Subdivision works certificate. The amended WFMP m contain a review of engineering plans including Basin Layout Plans prepared by Civil Tech Ref: 1133-GW5_A (Sheet 5 of 7), and Hydrological Assessment F P2008063JR02V03 prepared by Martens P/L dated 25 August 2021. In particular the amended plan is to address:				
A	Modeling results in terms of potential zero drawdown of groundwater levels in the retained habitat area (MZ-3A) adjacent to the proposed new stormwater drain, and a description of how such changes to hydrology and water quality/ chemistry will be managed in the context of recreating Wallum froglet habitat and the existing habitat within the existing drain.	Refer to Martens, 2023			
В	Illustrate on maps of a suitable scale (1:200 or better) detailed engineering plans and word form identifying the donor Wallum Froglet habitat areas which includes the vegetation suite and dimensions (H/L/D) of the individual habitat areas and overall area of the habitat earmarked for translocation.	Appendix B			
С	Detailed engineering plans indicating the location of the translocated habitat plots as indicated in Northwest Landscape Plan, Southwest Landscape Plan Central Drain Habitat & Rehabilitation Zone Plan and Eastern Habitat & Rehabilitation Zone Plan of the Revised Vegetation Management Plan (Revision J - 09/11/22)	Appendix B			
D	Prior to the translocation of any Wallum Froglet habitat from the proposed house lot area, Wallum Froglet population surveys are to be carried out before and after rainfall events at these sites to establish both population size and density of existing Wallum Froglets in the Wallum Froglet habitat areas to be moved (Fig 1.3 – Wallum Froglet Habitat Mapping – Revised Wallum Froglet Management Plan). This will be used as a benchmark to rate success of	Section 6.3.1.			

Reference	Requirement	Reference
	planned translocation.	
E	A Habitat Translocation Plan to include WF survey methodology, Wallum Froglet translocation methodology, translocation timing and timeframes with Key Performance Indicators for the seven stages of the development, benchmarking completion and success at the end of each stage and mitigation measures if KPI at the end of that stage is not met. The KPIs must reflect current WF population and density benchmarks, with reporting and monitoring to be provided to Council as required including with each Subdivision Works Certificate (from early Stage 2, Civil Stage 1 to 5) and Subdivision Certificate (from Civil Stage 1 to 5).	
F	Mitigation measures should the translocated habitat not survive and function as intended and how it is to be replaced over the seven stages of the development.	

Approvals were given for the first stage of development (Stage 1A) to commence which involved a 1.514ha (12 lot Subdivision). Stage 1A has been completed and this area does not form part of the subject site (Lot 13 DP1251383). This WFMP relates to the creation and retention of Wallum Froglet (WF) Habitat within Lot 13 only.

NOTES

- 1. This WFMP has been prepared collaboration with the *Stormwater Management Plan* (Martens & Associates 2021) and the *Surface Water and Groundwater Management Plan* (AWC, 2021) to ensure consistency in approach and to achieve best outcomes.
- 2. AWC have prepared a *Revised Vegetation Management Plan* (VMP) (AWC 2023) for the site which designates actions within several Management Zones. Actions in the VMP are separate to those prescribed in this WFMP and are not referenced further. Conversely, none of the actions prescribed in this WFMP are referenced in the VMP.

1.2 Property Details

The subject site (Lot 13 DP1251383) is located immediately south of the township of Brunswick Heads and has an area of approximately 30.5 ha (refer Figure 1.1 Site plan). Most of the site is dominated by low heath which is maintained by slashing. The site is bound by residential development to the north with areas of undisturbed forest to the west and south of the site. The eastern boundary of the site is bound by Simpsons Creek. The property is bisected north-south by a constructed drainage line ('the central drain') which feeds into Everitts Creek to the south which connects to Simpsons Creek in the east. A road reserve of 20 metres width occurs in the eastern portion of the site (refer Figure 1.1) and continues into adjacent land at Lot 4 DP576360.

Coastal Wetlands gazetted under State Environmental Planning Policy (Resilience and Hazards) 2021 occur in the east of the site flanking Simpsons Creek.

Actions in this Plan relate to undeveloped parts of the site in the east, the central drain and the west. A substantially vegetated part of the site occurs in the east flanking Simpsons Creek. No actions in this Plan are proposed within this land.

1.3 Proposed Development

The Proposal is for the subdivision of 15 Torakina Road, Brunswick Heads (Lot 13 in DP 1251383) in 3 stages comprising, 123 residential lots, three (3) medium density lots and four (4) public reserves together with associated public roads and infrastructure services (water, sewer, drainage and stormwater management works), bulk earthworks, tree removal and vegetation management works.

The development footprint occupies approximately 13.33 ha (43.7 %) of the site. Residual land outside of the development footprint (~17.2 ha) will be managed for biodiversity. Residual land in the east and west of the site will remain in private ownership once the development is complete. The portion of the site east of the road reserve flanking Simpsons Creek (10.24 ha) will also be dedicated to Council.

The proposed development is shown at Figure 1.2; subdivision design plans are provided in Appendix A.

The refined development footprint provides substantial gains with regard to protection and enhancement of Wallum Froglet habitat at the site including:

- A substantial increase in the retention of habitat within the central drain (Management Zone 3). In the revised concept the buffer width has increased to 50m+ and the total area of frog habitat in this portion of the site is now approximately three hectares.
- All habitat in the east and west will remain under private covenant at the completion of the development.
- There will be no dual use of drainage channels for stormwater conveyance and acid frog habitat; dual use drainage lines were a point of concern in the previous application and subsequently the stormwater, frog habitat and conveyance channels have been separated.

Areas of Wallum Froglet habitat impacted and retained by the proposed subdivision are outlined in Figure 1.3, whereby:

- 1.3 ha of Wallum Froglet habitat will be removed.
- 2.6 ha of Wallum Froglet habitat will be retained.
- A further 1.9 ha of habitat will be created, achieving a net increase of approximately 0.6 ha.

1.4 Previous Studies

An Amended Ecological Assessment Report was prepared by James Warren and Associates (JWA, 2011) and accompanied the initial submission to DPIE. The surveys and assessments conducted by JWA across the site consisted of opportunistic sightings (random meanders), active searches and habitat assessments for Wallum Froglet (*Crinia tinnula*) and Wallum Sedge Frog (*Litoria olongburensis*). In response to requests by DPIE for revisions to the existing Acid Frog Management Strategy and Stormwater Management Plan, ecological, hydrological and groundwater assessments have been completed by AWC (2013) as well as a revised Stormwater Management Strategy (AWC 2016) in collaboration with CivilTech Consulting Engineers.

In early 2022 AWC prepared a Biodiversity Development Assessment Report (BDAR) for the project. During targeted surveys several additional threatened fauna species were recorded including the Wallum Sedge Frog identified during the targeted surveys. Targeted surveys were conducted in according with the NSW Survey Guide for Threatened Frogs *A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method* (DPIE 2020). As noted in the BDAR, the Wallum Sedge Frog was recorded in two locations (Feb 2022). In the west, a single individual was recorded calling every night within a small patch of PCT 1290 within historically disturbed regrowth Wet Heath (WH). In the south-east corner of the site, a small area of PCT 1290 occurs within surrounding WH. Up to four frogs were recorded calling at this location on a number of occasions. Other wet vegetation at the site is not suitable for the species as it lacks the qualities of PCT 1290, ie. slightly deeper areas of ponded water with robust erect sedges (*Baloskion pallens, Schoneus brevifolius*). An area of high quality habitat suitable for the Wallum Sedge Frog is known to occur south west of the site (Lot 14 DP 881230) adjacent to the Pacific Highway and this habitat is well connected to the site. It is suspected the species may utilise this habitat and disperse into surrounding areas of suitable habitat during inundation events.

The recent finding of the Wallum Sedge Frog at the site has partially informed the revised layout (habitat in the west is now retained in-situ). While habitat is not impacted several habitat ponds have been designed with depths of up to 0.4 m to suit the species.

1.5 Species Profiles

The species profiles for the Wallum Froglet and Wallum Sedge Frog are outlined in the sections below.

1.5.1 Wallum Froglet (Crinia tinnula) species profile

Wallum Froglet - listed as vulnerable under the Biodiversity Conservation Act 2016 Habitat The Wallum Froglet typically occurs in sedgelands and wet heathlands, usually associated with acidic Requirements swamps on coastal sand plains. The species can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests. Acidic swamps and lakes in these areas provide essential breeding habitat for wallum-dependent frog species. Wallum Froglets breed in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Breeding is thought to peak in the colder months but can occur throughout the year following rain. Eggs are deposited in nutrient poor water with a pH of <6 and tadpoles take 2-6 months to develop into frogs. Wallum Froglets shelter under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp and often located near the water's edge. Males may call throughout the year and at any time of day, peaking following rain. Threats Destruction and degradation of coastal wetlands as a result of roadworks, coastal developments and sandmining. Reduction of water quality and modification to acidity in coastal wetlands. Changes to hydrology of coastal wetlands as a result of a changing climate and/or sea level Nutrient enrichment and chemical run off from urban and agricultural areas and as a result of mosquito control. Predation of tadpoles and eggs by the Plague Minnow (Gambusia holbrooki). While little is known of the extent of Plague Minnow predation on Wallum Froglets, it must be considered a potential threat. Habitat disturbance by feral pigs. Species photo

1.5.2 Wallum Sedge Frog (Litoria olongburensis) species profile

Wallum Sedge Frog or Olongburra Frog - listed as vulnerable under the Biodiversity Conservation Act 2016 and Environment Protection and Biodiversity Conservation Act 1999 Confined to the coastal lowlands and sand islands of southeast Queensland and New South Wales. Requirements Occurs from Fraser Island (Queensland), south to Woolgoolga (New South Wales) inhabits coastal ephemeral and semipermanent swamps (pH < 5.5) with sedges, emergent reeds and/or ferns. The species can also be found around freshwater lakes and drainage lines on sandy, low nutrient soils in coastal wallum. Breeding occurs after rain, in spring, summer and autumn (potentially all year round). Males call from sedges above water. Usually, the Wallum Sedge Frog breeds in ephemeral and semi-permanent swamps with thick emergent vegetation. Water at breeding sites is usually clear, heavily tanninstained and acidic (pH< 6.0) and free of fish species . Threats Destruction and degradation of wallum habitat for coastal development. Reduction of water quantity and/or quality (including changes to pH) in coastal wetland Changes in average and extreme temperatures and the amount and timing of rainfall due to climate change. Severe fires in very dry periods that result in insufficient refuge remaining post-fire. Roadkill (it has been estimated that >10,000 Olongburra Frogs are killed annually on one 4km stretch of road near Lennox Head). Predation of tadpoles and eggs by the Plague Minnow (Gambusia holbrooki). While little is known of the extent of Plague Minnow predation on Olongburra Frogs, it must be considered a potential threat. Species photo

1.5.3 Species sightings

The species sightings GPS coordinates and locations identified during the previous targeted surveys by AWC are outlined Appendix E .

1.6 Management Plan Objectives

The objectives of this plan are:

- To retain Wallum Froglet/Wallum Sedge Frog habitat wherever possible within the four proposed management zones
- To enhance acid frog habitat within management zones by a variety of methods
- Provide suitable water quality and hydroperiod conditions for acid frogs.

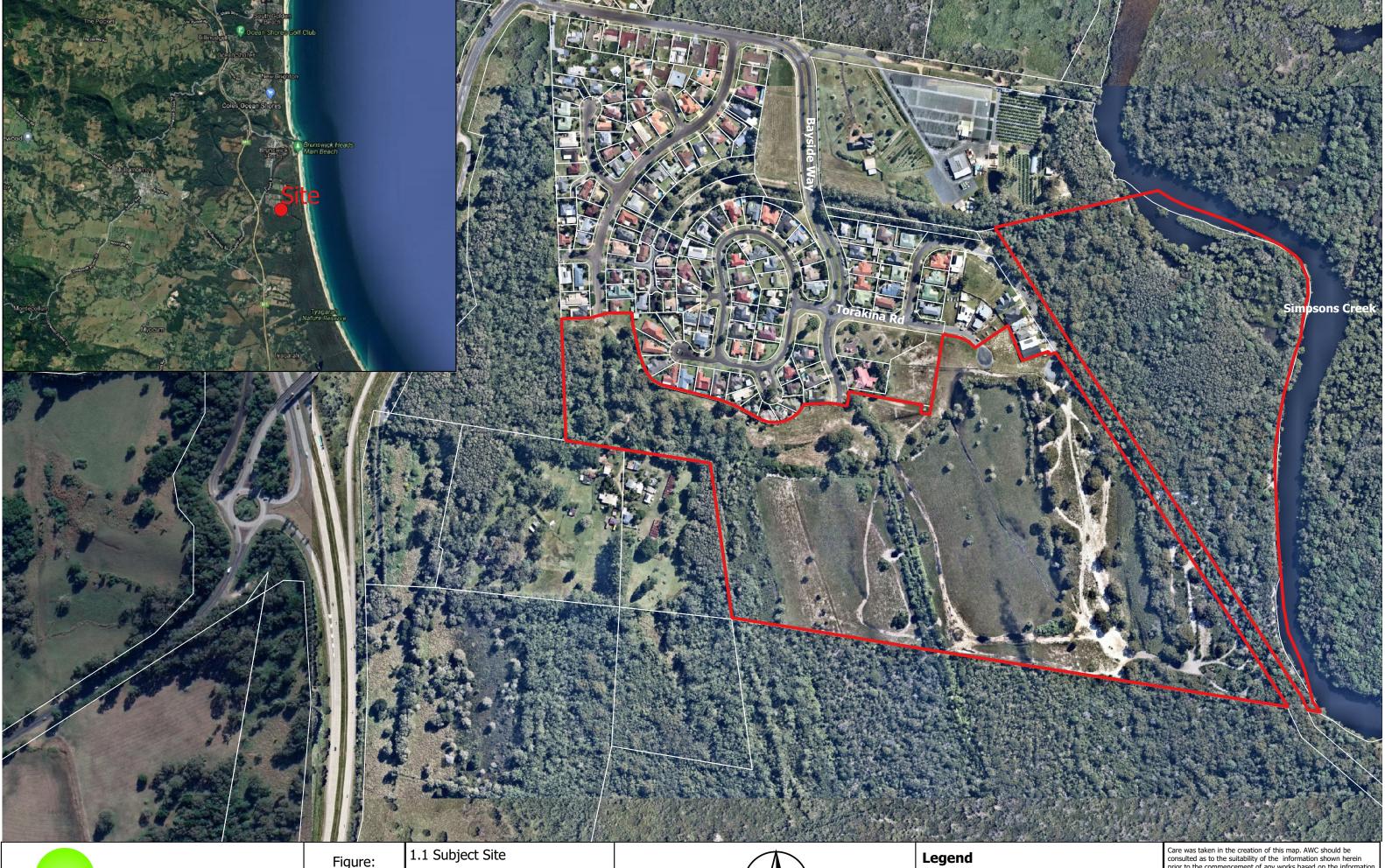


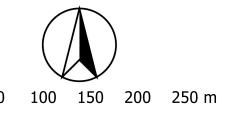


Figure: 1-211400-BaysideBrunswick_ClarenceProperty

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Source:

Aerial Image - Near Maps 2021

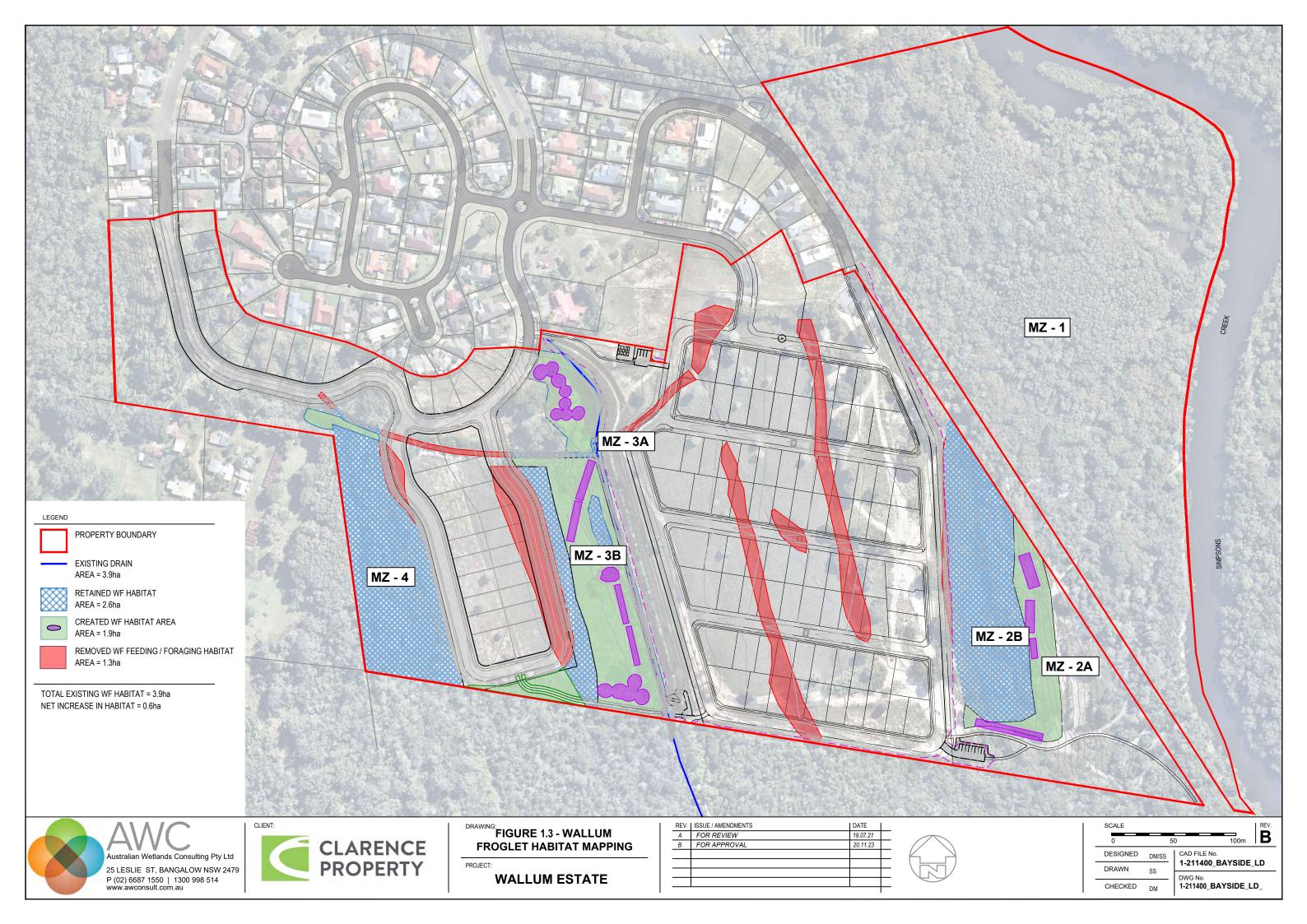


Site Boundary

Care was taken in the creation of this map. AWC should be consulted as to the suitability of the information shown herein prior to the commencement of any works based on the information provided. AWC cannot accept any responsibility for errors, omissions or positional accuracy. There are no warranties expressed or implied as to the suitability of this map for a particular purpose. However, notification of any errors will be appreciated.

A3 Scale 1:4000 Coordinate System: MGA 56 Projection: Transverse Mercator





2 Habitat Assessment

2.1 Vegetation

Wallum Froglet (WF) habitat occurs at several locations at the site where wet heath and drainage areas in shallow swales are present. Typical vegetation in these areas includes: *Gahnia clarkei, Sporadanthus caudatus, Empodisma minus, Baloskion tetraphyllum subsp. meiostachyum, Gonocarpus micranthus subsp. ramosissima, Gleichenia dicarpa, Drosera spatulata, Xanthorrhoea fulva, Leptospermum liversidgei, Baumea rubiginosa, Schoenus brevifolius, Callistemon pachyphyllus, Villarsia exaltata, Boronia falcifolia, Goodenia paniculata, Xyris complanata and Haemodorum tenuifolium.* The topography of the site (shallow undulating swales from remnant back-barrier dunes) provides suitable areas for wet heath in slightly lower drainage areas where soils are peaty and acidic and where sedges are common (principally *Schoenus brevifolius, Empodisma minus* and *Baumea rubiginosa*).

A substantial portion of the property is maintained through slashing which degrades WF habitat. It is anticipated that any slashed areas located within proposed habitat zones will improve post development when the vegetation regenerates naturally.

The presence of sedges and the wetland species Erect Marsh Flower (*Liparophyllum exaltatum*) indicates water persists in some parts of the site for a reasonable time (the duration of inundation however has not been confirmed within this study). Slightly elevated 'ridge' communities do not provide Wallum Froglet habitat due to an inability to retain water, with soils in these areas generally being exposed sands with little organic matter and an absence of sedges and wet heath species.

Extensive areas of swamp sclerophyll forest dominated by Broad-leaved Paperbark (*Melaleuca quiquenervia*) in the east of the site are not considered to provide Wallum Froglet habitat based on a lack of any historic records (JWA, 2011), extensive tree cover and proximity to estuarine environments. As such, acid frog habitat is essentially restricted to heathland and fringing vegetation, such as open swamp sclerophyll forest in the south-west of the site where an extensive ground layer of sphagnum moss (*Sphagnum cristatum*) occurs in combination with a matrix of sedge land and wet heath (refer Plate 2.1). Two small areas of sedgeland within this community provide habitat for the Wallum Sedge Frog.

The best quality Wallum Froglet habitat occurs in the south-east of the site, where a substantial area (~1 ha) of good quality habitat occurs within a shallow swale and where numerous records occur (refer Plate 2.2). Breeding habitat commonly occurs in ephemeral and intermittent shallow water found in informal vehicular accessways and wheel ruts (refer Plate 2.3) and within the existing central drain (Plate 2.3).



Plate 2.1 Wallum Froglet habitat in the south-west of the site with fringing Melaleuca quiquenervia and regrowth Leptospermum juniperinum.



Plate 2.2 Good quality Wallum Froglet habitat in the south-east of the site



Plate 2.3 Central drain showing lack of macrophyte or sedge cover and steep partly eroded banks

As previously noted (and acknowledged by BSC in their letter of 10th February 2014), the central drain comprises poor quality habitat due to extensive disturbance, presumably from maintenance activities (refer Plate 2.3). The floor of the drain typically comprises bare sand with infrequent sedges/macrophyte cover (*Juncus planifolius, Philydrum lanuginosum, Utricularia gibba*). The drain floor sits relatively deep (up to 1.8m deep in places), with fringing regrowth vegetation on spoil banks comprising woody regrowth (Satinwood, Black She-oak, Banksia) and providing unsuitable habitat for Wallum Froglets. Coral Fern (*Gleichenia dicarpa*) is a common feature on sandy exposed banks.

2.2 Groundwater Considerations

Habitat creation requires groundwater expression over a sufficient period to ensure that breeding conditions for Wallum Froglets occur (i.e., a minimum 30-100 days (refer Meyer *et al.* 2006)). To assist in understanding groundwater behavior at the site, several groundwater level monitoring bores have been installed across the site. Two historic bores had data collected between 2012 and 2014-15 with a short block of data collected during 2020. Four newer bores were constructed in 2017 to further understanding groundwater behavior in the western section of the development site to inform the WFMP. The locations of the bores are shown at **Error! Reference source not found.**.

Groundwater behavior across the site groundwater level has been monitored using Odyssey and HOBO water level data loggers, with data points collected generally hourly. Groundwater level data has been calibrated to mAHD to aid in the assessment and design of constructed WSF ponds. A summary of the groundwater data is provided in Table 2.1 which includes water level percentile values and other relevant data. Monitoring is ongoing.

	mAHD					
	MW-113	MW-102	MW-104	MW-109	MW-112	MW-120
Min	3.36	3.61	3.12	2.80	3.59	3.76
Max	4.14	4.49	4.07	4.09	4.76	4.79
Median	3.83	4.10	3.69	3.22	4.02	4.20
Average	3.80	4.07	3.65	3.24	4.03	4.23
20 th %ile	3.61	3.92	3.45	2.86	3.83	4.01
80 th %ile	3.98	4.22	3.82	3.55	4.19	4.51

Table 2.1 Summary statistics - groundwater levels

Previous investigations reveal two groundwater sources – a perched shallow aquifer underlain by partly indurated sands which occurs approximately 1-2m below ground level. A deeper groundwater layer is below the indurated sand layer. Bores were formed to different depths to capture the groundwater levels of the two aquifers at two sites (refer Bores 3A/B and 4A/B at Error! Reference source not found.).

Percolation of rainfall through the upper layers of the soil profile results in acidification of the perched aquifer with a mean pH value range of 3.47-3.96 recorded. Bore monitoring indicates increased rainfall results in rapid elevation of groundwater level, while during lower rainfall periods the groundwater level is reduced.

Based on this information frog habitat design for breeding areas has shallow excavation at depths which ensure groundwater interception and allow for windows of groundwater expression to provide breeding habitat for Wallum Froglets. While rainfall varies annually, it is important to recognise that habitat areas do not require permanent water to perform adequately but provide 30-100 days of surface water ponding for breeding to occur. Guided by groundwater fluctuations over wet and dry periods, the design will ensure that a combination of groundwater and surface water will achieve hydrological requirements where habitat is created or embellished.

Breeding habitat areas (ponds) will be created as discussed further below and shown on the plans in Appendix B within extensive areas of created or retained habitat that include foraging habitat.

2.3 Supplementary Hydrological Assessments

A supplementary hydrological assessment has been conducted by Martens & Associates Pty Ltd (Martins 2023). The updated and refined pre-development groundwater model commence in 2022 and has produced a groundwater data set that has produced similar results in groundwater level to the longer-term groundwater monitoring conducted by AWC.

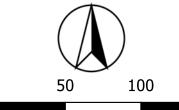
The conclusions outlined from the hydrological assessment have indicated that the proposed development is not predicted to adversely impact groundwater levels within or in proximity to the GDE and retained WF habitat. The proposed WF pond designs (AWC 2023) have therefore been designed with consideration to the outcomes of this hydrological assessment (refer Appendix B).

Recommendations stipulated in the hydrological assessment include reiterating the requirement for a suitably qualified ecologist to supervise the construction of the WF ponds and ground water levels monitored for a period of 12 months post construction.





Figure:	2-1 Location of groundwater monitoring bores
File:	1-211400- BaysideBrunswick_ClarenceProperty
Source:	Aerial Image - Near Maps 2021



150 m

GDE Monitoring

 Groundwater monitoring bores Site

Care was taken in the creation of this map. AWC should be consulted as to the suitability of the information shown herin prior to the commencement of any works based on the info rrnation provided. AWC cannot accept any responsibility for errors, omissions or positional accuracy. There are no warranties expressed or implied as to the suitability of this map for a particular purpose. However. notification of any errors will be appreciated.

A3 Scale 1:2500 Coordinate System: MGA 56 Projection: Transverse Mercator

3 Habitat Restoration

3.1 Habitat Loss and Retention

Development of the site as per the amended concept (refer Figure 1.2, Appendix A) will result in the loss of 1.3 ha of Wallum Froglet habitat within shallow swales in the slashed heathland community and the connecting eastern and western drains. The lost habitat areas, as mapped (JWA, 2014) are typically in isolated ribbons within existing swales and depressions which will be improved through consolidation of much larger areas of created and retained habitat incorporating foraging and breeding habitat features.

As shown at Figure 1.3, 2.6 ha of Wallum Froglet habitat will be retained, with a further 1.9 ha of habitat created/restored. Habitat to be retained comprises some good quality and some degraded habitat due to impacts including slashing and motorbikes. Degraded habitat will be restored and additional habitat areas will be created. Table 3.1 provides details of WF habitat loss and retention.

Table 3.1 Wallum	Froglet habitat to	be retained and	d created at the site
	3		

Wallum Froglet habitat portion	Area (ha)
Existing WF habitat	3.9 ha
Retained WF habitat	2.6 ha
Created/offset WF habitat	1.9 ha
Removed WF habitat	1.3 ha
Net habitat increase (created – removed)	0.6 ha

3.2 Habitat Creation and Improvement

The footprint of the proposed development has been carefully orientated to minimise impacts on the existing Wallum Froglet Habitat. The three largest areas mapped as WF habitat have largely been retained. Suitable areas adjacent to these habitats will be embellished to create further habitat and linkages to existing. It is important that overland water flow from the development into WF habitat is minimised. Stormwater runoff from perimeters roads will be directed into swales for treatment and detention and is contained for all rainfall events up to 15-minute 5yr ARI event.

Factors critical to the success of constructed Wallum Froglet habitat are:

- Proximity to known areas of habitat.
- Appropriate excavation levels such that groundwater is intercepted and a 'window' for groundwater expression is created at depths corresponding to existing habitat areas.
 - Maximum water depth of any breeding habitat areas should be no greater than 0.3 metres.
- Delivery of water to ponds via groundwater to ensure a pH less than 5
- Translocation and/or provision with suitable vegetation
- Suitable measures to ensure AF habitat areas are not impacted by trampling or disturbance
- Groundwater dynamics in the post-development scenario are substantially maintained

All proposed breeding habitat areas are to be excavated as per the concept plans (AWC, 2021) and with reference to the construction notes above. Any excavated material must be placed at a

minimum of 10m from known Wallum Froglet habitat and must not be placed into any habitat areas which are to be retained.

Following shaping and inspection/approval of the created habitat, 100mm of finely mulched organic matter should be evenly spread over the swale surface. Organic material should be sourced from the site where vegetation requires removal (e.g., woody regrowth along the central drain). Areas of created habitat will not be lined to ensure groundwater expression. Constructed habitat will be planted with appropriate native species to ensure greater than 80% vegetation cover (refer Appendix B).

A variety of sedges/wet heath species from tube stock will be planted around the perimeter of each restoration area, with species selection based on habitat at the site. Revegetation within the buffers to the central drain will use the species schedule at Appendix B.

3.3 Translocation of Material

Translocation of existing Wallum vegetation from within the development footprint is a method of habitat creation when proximity and availability of suitable material exists. Following preliminary preparation (as above) translocation of material to habitat areas may commence generally as follows:

- Translocation of suitable material from donor areas by using 'slabs' of sedges and 'live soil' removed with a positrack and slab bucket or similar, is a proven methodology and may also be beneficial in translocating individuals directly into habitat areas.
 - The project ecologist is to nominate the most suitable donor plots.
- Removal of donor vegetation and 'live soil' to a minimum depth of 300mm of organic matter is necessary to ensure that root systems and rhizomes are 'captured'
- Ideally donor material shall be removed and placed directly into receiving ponds, or temporarily placed on the site in proximity to retained WF habitat and watered daily until placed within habitat areas.
 - A maximum of 3 days in-situ care is recommended to reduce stress to slabbed donor material.
- Following placement within receiving habitat areas, these areas must be flooded, and this treatment repeated for a minimum of five consecutive days.
 - Water used for flooding must be sourced from the central drain and treated (town) water must not be used.
 - Following initial aftercare, habitat areas shall be watered once weekly for a minimum four (4) week period, with this increased to a six (6) week period if works occur during the summer months.

3.4 Habitat Translocation Plan

The habitat translocation plan is outlined in Table 3.2 and includes translocation timing, monitoring requirements, Key Performance Indicators (KPIs) and adaptive management and mitigation measures. Section 6 details the monitoring methods for the translocated habitat.

Table 3.2 Habitat Translocation Plan

Construction Phase/Timing	Translocation Objective	Monitoring Requirements	KPI	Responsibility	Adaptive Management and Mitigation Measures
Prior translocation monitoring	 Establish baseline WF density and distribution including existing habitat characteristics and requirements. Preliminary preparation of created WF habitat (mark out by survey donor material). Baseline vegetation assessment of WF habitat 	 Completion of four WF monitoring events prior to donor material translocation as outlined in Section 6 and Table 6.1 Survey of species cover as a percentage of the donor location 	 Establishment of baseline WF density and distribution estimates including habitat requirements i.e., water quality and vegetation. Baseline monitoring report must be provided to council prior to commencement of Stage 1 Donor area must have >80% cover and be weed free 	Ecologist and/or appointed contractors.	 If no WF are recorded within the area where donor material will be stripped a follow up survey with the methods outlined in Section 6 should occur prior to donor material stripping. If insufficient suitable donor areas are identified, develop a habitat creation strategy using appropriate topsoils and planting.

Construction Phase/Timing	Translocation Objective	Monitoring Requirements	KPI	Responsibility	Adaptive Management and Mitigation Measures
Stage 1 - Pre-Construction	Translocated WF habitat will be removed and placed directly into constructed ponds. Flood receiving constructed ponds with water sourced from the drain in MZ3 and repeat for a minimum of five consecutive days. Daily field monitoring of physical/chemical parameters with a calibrated water quality meter will be included as part of the monitoring process and will include monitoring of both sourced water quality and receiving environment water quality.	 Monitoring the health of the translocated WF donor material i.e., signs of dieback/desiccation Conduct WF monitoring in alignment with section 6 and Table 6.1 once translocated material has been inundated for five days. 	 Successful uptake of translocated donor material within receiving ponds. 80% coverage by 3 months Sourced water used to flood created WF ponds meet water quality objectives meets values shown in Table 6.3 Successful implementation and maintenance of habitat protection controls in accordance with section 5.4.3. Stage 1 monitoring report provided to council prior to commencement of Stage 2. The report must highlight that noncompliance issues are addressed prior to proceeding to the next stage. 	Site foreman/ Ecologist and/or appointed contractors.	Stockpile of surplus translocated WF donor material in proximity to retained WF habitat to be used as a contingency if portions of translocated material fails within the created WF habitat. Stockpile locations are shown in the Early Works Plan (Refer Appendix B). Stockpiled donor material should be seeded with sterile grass seed to reduce weed gemination. Undertake weed control via non chemical weed control techniques (hand pull) An alternative source of water to be utilised to flood constructed WF ponds if the main drain is dry or does not meet water quality criteria. An alternative water source may include site groundwater, subject to testing to confirm



Construction Phase/Timing	Translocation Objective	Monitoring Requirements	KPI	Responsibility	Adaptive Management and Mitigation Measures
					suitable water quality. Town reticulated water must not be used as an alternative water source. Daily field monitoring of physical/chemical parameters will be included as part of the monitoring process and will include monitoring of both sourced water quality and receiving environment water quality
Stage 2 – Construction	Water translocated habitat once a week minimum four (4) week period. Water should be sourced from the drain in MZ3. Daily field monitoring of physical/chemical parameters with a calibrated water	Monitor translocated donor material for WF habitat in accordance with Section 6 and Table 6.1. Including observations of translocated habitat for signs of dieback, desiccation or weed and exotic species incursions.	 Sourced water used to flood created WF ponds meet water quality objectives meets shown in Table 6.3. Monitoring of WF populations in accordance with section 6 and Table 6.1 show no decline in WF population from 	Site foreman/ Ecologist and/or appointed contractors.	 Extend water frequency of translocated habitat to a six (6) week period if work occurs during the summer months. Conduct pest animal control if identified utilising a suitably qualified pest animal contractor. Maintenance and reestablishment of failed



Construction Phase/Timing	Translocation Objective	Monitoring Requirements	KPI	Responsibility	Adaptive Management and Mitigation Measures
	quality meter will be included as part of the monitoring process and will include monitoring of both sourced water quality and receiving environment water quality • Facilitate natural regeneration of constructed frog ponds through weed control.	 Monitor for pest animal incursions notably Cane Toads and Mosquito Fish. Facilitate natural regeneration of constructed frog ponds through weed control. Implement WF habitat protection controls in accordance with section 5.4.3. 	baseline population estimates. • Weed and exotic plant species cover <5%. • No incursions of pest animal species. • Successful implementation and maintenance of habitat protection controls in accordance with section 5.4.3. • Stage 2 monitoring report provided to council prior to commencement of the occupational stage. The report must highlight that noncompliance issues are addressed prior to proceeding to the next stage.		habitat protection controls in accordance with section 5.4.3. • Undertake weed control via non chemical weed control techniques (hand pull) • If natural regeneration is poor and the overall plant community health is low within the created WF breeding ponds, install suitable plant species to achieved at least 80% vegetation cover within 3 months. Guidance in regard to planting areas, densities and schedules will be provided by AWC. • Conduct infill planting of plant species representative of Wet heath (species outlined in section 2.1).



Construction Phase/Timing	Translocation Objective	Monitoring Requirements	KPI	Responsibility	Adaptive Management and Mitigation Measures
Occupation (Five years)	Monitor the success of the habitat translocation.	 Monitor translocated habitat for WF in accordance with Section 6 and table 6.1. Including observations of translocated habitat for signs of dieback, desiccation or weed and exotic species incursions. Monitor for pest animal incursions notably Cane Toads and Mosquito Fish. Facilitate natural regeneration of constructed frog ponds through weed control. 	 Successful monitoring of WF in accordance with section 6. No decline in WF previous monitoring population estimates. Weed and exotic plant species cover <5%. No incursions of pest animal species. Annual monitoring report provided to council. Each report must highlight that noncompliance issues are addressed prior to hand over to council on year 5. 	Ecologist and/or appointed contractors.	 Increase monitoring of translocated habitat to two events/year during appropriate survey periods. If no WF are recorded within the proposed house lot area conduct a follow up survey in alignment with the methods outlined in Section 6 Conduct infill planting of plant species representative of Wet heath (species outlined in section 2.1). Undertake weed control via non chemical weed control techniques (hand pull) Conduct pest animal control if identified utilising a suitably qualified pest animal contractor.



4 Integration with Stormwater Management

4.1 Introduction

Stormwater controls proposed for the development include:

- · Kerb and gutter
- Bioretention swale with underdrain
- Bioretention swale with no underdrain

Liaison with CivilTech Consulting Engineers has been completed as part of the preparation of this plan to ensure the proposed stormwater measures can be integrated with WF habitat creation and management. Stormwater treatments proposed in each of the retained/created WF habitat areas are discussed below. This Plan should be read in conjunction with the (revised) Stormwater Management Plan.

4.2 Stormwater management

Infiltration of surface water into the soil and recharge of the perched groundwater reserves is a key aim of the stormwater strategy with the intent of retaining groundwater hydrology behaviour and WF habitat preservation. Swales are designed to limit the amount of surface water that enters the created Wallum Frog Habitats. A summary of the stormwater works in relation to WF habitat in each of the proposed management zones (refer Figure 1.2) is provided below. No stormwater works are planned with relation to WF habitat in Management Zone 1.

4.2.1 Management Zone 2

The perimeter road (Road 2 East) has a one-way crossfall with the downslope side falling directly to the bioretention swale (with no underdrain). This will maximise the infiltration of surface flow to the soil and the groundwater reserves up to the Q5 stormflow. Once the Q5 is exceeded, the bioretention swale will overtop with flow spread evenly over the surface into the swale planting buffer strip, and beyond to the retained WF habitat. The catchment for this swale is relatively small at 14,650m².

Refer Sheets 1133-DA6 & 7 in Appendix A (CivilTech, 2023) and Sheets 04 and 07 in Appendix B (AWC, 2023).

4.2.2 Management Zone 3

Two swales will be constructed. The first is to the west of Road 2 (west). The bioretention swale (with underdrain) will be constructed immediately downslope of the road. The bioretention swale underdrain outlets are spaced evenly along the swale and discharge to the constructed realigned north south drain that conveys flow to the central south of the site and into the existing north south drain. The eastern side of the western residential portion of the development discharges to the bioretention swale (with underdrain). An existing open drain conveys the discharge from the bioretention swale to the primary north south drain.

Refer Sheets 1133-DA6 & 7 in Appendix A (CivilTech, 2023) and Sheets 02, 04 and 06 in Appendix B (AWC, 2023).

4.2.3 Management Zone 4

The western and northwestern side of the western residential portion of the development discharges to the bioretention swale (with underdrain). The swale underdrain outlets discharge at the north into portions of the retained and created/offset WF habitat in the P3 zone.

4.3 Access and Contamination Mitigation

In areas of proposed clearing of WF habitat pre-clearing surveys will be undertaken; if WF are detected they will be captured and relocated to suitable habitat in proximity. During the construction phase and continuing into the establishment phases sediment and erosion control is a priority. An erosion and sediment control plan (E&SCP) for the project has been outlined for the bulk earthworks by Civiltech (2023). Details and locations of sediment and erosion controls for the early ecological works are detailed in Appendix B. The following general recommendations are made:

- Staff on the site should be provided with an understanding of environmental management and incident reporting
- Timing of works should coincide with dry weather as far as practical. Winter months are generally the driest however weather forecasts should be monitored and works programmed accordingly (i.e. postponed if intense rainfall and/or storms are imminent)
- Stage the works to minimise the area of proposed transportable sediment and any stage
- Provide cover (vegetation, mulch or jute mat etc.) to areas of soil disturbance as soon as possible.
- Restrict machinery access to site to nominated access points.
- Use sediment and erosion control measures as detailed in the E&SCP
- Clearly delineate areas of retained WF habitat to be undisturbed, to ensure encroachment is prevented.

5 Habitat Management

5.1 Introduction

Retained and embellished acid frog habitat requires active management to ensure Wallum Froglet populations are sustained. Threats to WF habitat from development of the site may occur during both the construction and occupation stages of the development.

Potential impacts from construction include:

- Introduction of weed and pathogen species by machinery.
- Erosion and sedimentation
- Stormwater in flow
- Accidental filling of habitat areas
- Accidental removal/disturbance of habitat
- Dust creation
- Chemical/fuel spills
- Mortality of individuals from vehicle movements.

Potential impacts from occupation include:

- Mortality from vehicle movements.
- Reduced water quality within retained and compensatory habitats.
- · Habitat disturbance for increased human activity.
- Introduction of aquatic pest/weed species.
- · Rubbish dumping.
- Hydrological changes to both ground and surface waters.

Management actions to address these impacts are further discussed in the following sections.

5.2 Wallum Froglet Habitat Creation and Translocation

Areas of WF habitat creation/offset will include the construction of WF breeding ponds. Pond base levels will be designed to replicate a hydroperiod suitable for WF through groundwater expression. Each pond will have batters surrounding each constructed pond and have a grade of 1:3-1:6. WF breeding ponds and batters will be planted with species representative of WF habitat (refer Appendix B). Planting and vegetation management should not occur within constructed WF habitat zones until ground works have taken place and ponds have been established.

WF habitat creation follows four general stages:

- 1. Construction mark-out
- 2. Topsoil stripping and bulk earth works
- 3. Topsoil spreading
- 4. Pond and batter planting.

Further management actions include:

- Define the perimeter of all WF habitat areas
- Exotic species control
- Monitor and maintain vegetation
- Management of Chytrid Fungus via adoption of suitable hygiene measures.

These actions will be addressed via the CEMP.

5.3 Management Zones

Of the four management zones (refer Figure 1.2) on the site, WH management will be undertaken in three. Management for WF in each zone is summarised in the sections below. Note: there are no works for WF habitat proposed in Management Zone 1.

5.3.1 Management Zone 2 - Actions

Existing/retained and created/offset WH habitat is proposed in this zone (Refer Sheet 07 in Appendix A). Six constructed WF breeding ponds have been proposed though this will be confirmed during detailed design phase.

This area is generally in poor condition with many informal tracks exposing areas of compacted sand. Much of this area has been previously cleared with regrowth occurring patchily throughout. Restoration of WF habitat is to be undertaken in this zone.

5.3.2 Management Zone 3 - Actions

This zone includes the retention of the primary and lateral drainage line and associated WF habitat. Two large areas of existing WH habitat are retained with the remaining land to be created/offset WF habitat. Eighteen constructed WF breeding ponds have been proposed though this will be confirmed during detailed design phase.

5.3.3 Management Zone 4 - Actions

There is approximately 2.6ha of existing retained WF habitat proposed; this is high quality habitat with many depressions and suitable flora species present.

5.4 General Construction Stage - Management Actions

The following management actions apply to general aspects applying to the construction/establishment of the site. Specific management actions relating to the works associated with VMZ 2 and 3 are discussed in Section 4 of this report.

5.4.1 Staging

The construction staging plan for the development is shown at Appendix A. Staging and timing matters associated with the development relevant to acid frog habitat protection and creation are summarised at Table 5.1. A summary of all management actions for the construction period is shown in Table 5.2.

Table 5.1 Staging and timing sequence

Stage No.	Works required. (WF Mgt)	Wallum Froglet mitigation actions
1	Management Zone 2 & (part) 3 North South (N/S) Drain works	 a) Preparation and approval of CEMP incorporating strategies and recommendations in this Plan and reviewed by a suitably qualified ecologist b) Fencing of all protected WF habitat in Management Zones 2 and 3 c) Erosion and sediment controls installed along N/S drain d) Project ecologist to nominate translocation slabs from areas of removed/existing WF habitat e) Installation of WF breeding ponds f) Monitoring of created habitat areas for WF presence, vegetation establishment, water quality (etc.)
2	none	-
3	Management Zone 3 (west of N/S drain) and Management Zone 4	a) Installation of required erosion and sediment controls b) Fencing of all protected WF habitat in Management Zone 3 and Management Zone 4 c) Installation of WF breeding ponds d) Project ecologist to nominate translocation slabs from areas of removed/existing WF habitat e) Installation of translocated material to WF habitat f) Monitoring of created habitat areas for Wallum Froglet presence, vegetation establishment, water quality (etc.)
-	General construction works (earthworks, services etc.)	a) Maintenance of exclusion fencing and signage (as installed previously) during construction until permanent fencing and signage is installed around habitat areas b) Installation and maintenance of erosion and sediment controls c) Wallum Froglet habitat monitoring (retained and created habitat)
Post Con	struction phase	
-	Stage releases and occupation	a) Monitoring and maintenance of all WF habitat in Management Zones 2, 3 and 4 prior to handover to Council
-	Ongoing occupation	 a) Hand-over of Wallum Froglet habitat in Management Zones 2 & 3 to Council b) Ongoing monitoring and maintenance by Council to ensure wallum habitats are maintained

Table 5.2 Summary of mitigation strategies for potential impacts on acid frog habitats during the construction phase

Matter	Objective	Mitigation	Responsibility
Environmental induction	All personnel are clearly aware of environmental matters relating to the site with specific information on acid frog habitats.	- Ecologist to provide input to induction material - Copies of relevant maps provided	Site foreman/principal contractor/ Ecologist
'No go' zones are clearly marked and maintained	Acid frog habitats are protected from disturbance by plant, machinery and vehicles.	- 'No go' zones are clearly marked and checked on a regular basis - Updates to all personnel are provided where any changes to 'No go' zones occur	Site foreman/principal contractor/ Ecologist
Appropriate signage is in place Acid frog habitats are protected from disturbance by plant, machinery, vehicles		- Appropriate signage is in place to demarcate 'No go' zones, refueling points, erosion and sediment protection zones (etc.) and is maintained and/or amended during the life of the project	Site foreman/principal contractor/ Ecologist
The CEMP is consistent with the WFMP CEMP is aligned recommendations and practice to reduce potential for ambiguity/confusion regarding works in or near acid frog habitat.		- Liaison between project ecologists and consultant preparing the CEMP	Ecologist/ principal contractor
Sediment and erosion controls	Acid frog habitats are appropriately protected from activities likely to result in sediment/erosion.	- Preparation of Sediment and Erosion Control Plan (SECP) in consultation with this Plan and/or project ecologists - SECP not to be implemented until approved by relevant authorities - Implementation and maintenance of all sediment and erosion control as per the approved plan for the life of the project	Principal contractor
Habitat translocation	Removal of suitable acid frog vegetation, and potentially translocate individuals, for use in compensatory habitat areas.	- Translocation measures defined within VMP - Identification of suitable donor material where acid frog habitat will be removed - Establishment of on-site nursery if required - Translocation process supervised by project ecologist or other appropriately qualified personnel in liaison with site foreman	Ecologist/consultant

5.4.2 Contractor Actions

For the construction phase of the project, several amelioration measures should be enforced/maintained throughout the construction period by appointed contractors. These include:

- Appropriate induction of all construction personnel
- Fencing of all 'no go' areas prior to construction commencing and maintenance throughout the construction period and installation of appropriate signage (refer Section 4)
- A Construction Environmental Management Plan (CEMP) is prepared which incorporates the recommendations within this plan for implementation with the Subdivision Works Certificate
- Installation and maintenance of sediment and erosion controls throughout the construction period guided by an approved Sediment and Erosion Control Plan
- Use of sterile grasses (e.g., sorghum, millet) for erosion control and stockpile stabilisation if required
- Translocation of vegetation (sedges/reeds) out of habitat areas to be removed either directly into compensatory habitat areas or established nursery areas on-site until receiving compensatory environments are established.
- NPWS Frog Hygiene Protocol (DPIE 2022) to be followed when working within WF habitat and handling WF to ensure no risk of Chytrid Fungus to the population.

It should be noted that it is the responsibility of the lead contractor to provide a CEMP for the site to address mitigation measures concerning the above-mentioned activities. Any provisions within the CEMP with potential impacts on acid frogs must be reviewed by a suitably qualified ecologist prior to implementation.

5.4.3 Habitat Protection

All Wallum Froglet habitat to be retained on-site must be clearly fenced and signposted to exclude machinery and personnel. This must be completed prior to any work being initiated at the site. Exclusion fencing and signage must remain in place until construction works are complete. Similarly, exclusion fencing must be installed and maintained to protect all habitat within the eastern portion of the site zoned for environmental protection.

5.4.4 Filling

As the site requires low volumes of fill, it is essential that fill is sourced locally and certified as free from contaminants, weed propagules etc. If fill is stockpiled on site, stockpiling protocols stated in the CEMP must be complied with. Filling must not occur in any areas of Wallum Froglet habitat within the development footprint until suitable donor material is translocated into areas of created habitat.

5.4.5 Compensatory Habitat

Compensatory habitat adjacent to the central drain and in the south-east of the site must be established in accordance with approved plans and signed off by the site supervisor and project ecologist.

5.5 Occupation stage - Management Actions

5.5.1 Habitat Protection

To provide information to residents, signage will be installed at strategic locations to provide information about the Wallum Froglet and the need to retain the integrity of habitat areas.

5.5.2 Water Quality

As acid frogs breed in oligotrophic waters, increased nutrients from urban run-off may adversely affect habitat by reduction of water quality and the creation of conditions conducive to weed establishment. Toxicants such as oils and surfactants may also negatively affect wetland areas in which acid frogs occur where they accumulate following urban runoff.

Changes in hydrology may occur through changes in water quality (i.e., water chemistry), water drainage and hydroperiod (water persistence). Changes in water chemistry make conditions unsuitable for acid frog species (e.g., from elevated pH levels), while diversion of drainage lines or alteration to groundwater ecology may have significant effects on the suitability of habitat areas in the long term.

Groundwater considerations are particularly important regarding compensatory wetland ponds, where the intent is to excavate 'windows' into the groundwater layer whereby groundwater expression provides an appropriate water source rather than surface water flows. Impacts to water quality will be minimised through sediment and erosion control, stormwater management and monitoring during the construction and occupation establishment phases of the development. Twelve months of groundwater monitoring will be conducted post construction phase at the locations outlined in Figure 2.1.

5.5.3 Cane Toads

Cane Toads occur at the site and may respond well to further development due to increased lighting, open spaces and scavenging opportunities. While Wallum Froglet habitat areas will be ephemeral and are unlikely to contain standing water for any extended period, Cane Toads may occupy and shelter within these areas. Dense fringing plantings of species of sedges, rushes and grasses (refer Appendix B for a planting list) around all areas of created habitat shall be installed to limit access to Cane Toads and hence reduce breeding opportunities and movement.

5.5.4 Mosquito Fish

The Mosquito Fish (*Gambusia holbrooki*) is an introduced species common within NSW waterways which occurs within the central drain on the site. Mosquito Fish are known to predate on the eggs and tadpoles of young froglets and compete for habitat and food sources. This raises concern about the potential impacts that this species may have on the Wallum Froglet population. Seasonal drying within constructed drains and WF breeding ponds will control Mosquito Fish, however monitoring for this species within retained and created habitats will be ongoing.

5.5.5 Weed Control

Although the site occurs on low-nutrient sands, increased nutrients and earthworks/disturbance may enhance conditions for the establishment of weed species within acid frog habitat areas (e.g., Setaria, Vasey Grass). Where invasive weed species are recorded, appropriate control methods will be implemented as required.

5.5.6 Monitoring

A monitoring program is required to ensure project objectives are met, (i.e., that retained habitat areas continue to support Wallum Froglets and that created habitat areas recruit Wallum Froglets and maintain suitable habitat values - vegetation, water quality, hydroperiod etc). Monitoring is further discussed in Section 6.

5.5.7 Long-term Management

As Council and private land owners will ultimately be responsible for the management of Wallum Froglet habitat areas there is a need to develop Key Performance Indicators (KPI) prior to the handover of habitat areas. These are prescribed in Section 6.4. A key requirement is to ensure appropriate vegetation is maintained such that frog habitat is not lost via regeneration of incompatible species.

6 Monitoring and Reporting

6.1 Introduction

To determine the success of habitat compensation measures and the persistence of Wallum Froglets at the site, monitoring will need to be undertaken. The purpose of monitoring is to:

- Document the persistence of Wallum Froglets within retained areas of known habitat
- Determine whether areas of regenerated Wallum Froglet habitat are being utilised by the species
- Determine whether Wallum Froglets are utilising areas of created compensatory habitat
- Determine the presence/influence of Cane Toads
- Determine that suitable pH, temperature dissolved oxygen, turbidity, salinity (conductivity) and nutrients occur within all areas of Wallum Froglet habitat
- Record fluctuations in water depth and quality of groundwater in addition to surface water to assess potential impacts of urban development on the local hydrological regime
- Document persistence of habitat present within compensatory habitat areas, including the presence of any weed species
- Document the persistence of Mosquito Fish and the impact they are having on the Wallum Froglet population and habitat.

Monitoring results will inform adaptive management practices including weed and pest animal control and habitat enhancement.

6.2 Monitoring Requirements

For monitoring to be successful, the various phases of development must be defined and the roles and responsibilities for each of the seven construction phases clearly identified. Monitoring requirements for the phases of development (Prior to translocation sampling, Pre-Construction (including habitat translocation), Construction and Occupation), are outlined in Table 6.1. Monitoring post construction should continue for five years.

6.3 Monitoring Phases:

6.3.1 Prior to translocation sampling:

Prior to translocation of any Wallum Froglet (WF) habitat for the proposed house lot area, four Wallum froglet population sampling events must be completed one year prior to the development commencing using the following methodology:

- Population surveys before and after rainfall events. Before rainfall monitoring events will
 be determined by a 50% chance of rainfall and optimal weather conditions consisting of
 temperatures greater than 15°C, low wind strength <20km/h and when humidity levels are
 high >50%. This will be outlined by current meteorological data provided by the Bureau of
 Meteorology (BOM).
- WF populations will be determined by density and distribution within the habitat proposed for translocation (refer Figure 1.3). The density and distribution of the existing population will be identified using call playbacks and opportunistic observations within audio strip transect surveys. A 30 x 2 meter wide transect will be established within each of the areas

of habitat proposed to be removed with sampling proportionate to the area surveyed i.e., increased over larger areas.

- Aural and any visual observations will be counted over the transect at 10-meter intervals to determine areas of high, medium and low density and therefore distribution. Low density will consist of 1-5 individuals, medium density 5-20 and high density >20 individuals.
- Surveys and sampling should be conducted during the peak breeding season, within optimal weather conditions and repeated once across sampling locations.
- Water quality sampling and vegetation assessments will also be conducted over the sampling period and consist of temperature, pH, conductivity, turbidity, tannin.
 Vegetation assessments will consist of observations of vegetation condition, structure and weed presence.

6.3.2 Translocated Habitat Monitoring:

Baseline monitoring will be conducted prior to the translocation of any WF habitat as outlined in the Prior to Translocation Sampling. The prior to translocation sampling methodology will be replicated in areas of translocated habitat in order to determine the success of the habitat translocation and for consistency. Translocation monitoring will be conducted within 6 months of the establishment of translocated habitat constructed during the early ecological works of the development as detailed in Appendix B.

6.3.3 Retained Habitat Monitoring:

- Baseline monitoring recorded at retained WF habitat areas vegetation assessment and water quality sampling (temperature, pH, conductivity, turbidity, tannin) prior to any works commencing at the site.
- Monitoring of retained WF habitat areas quarterly nocturnal survey and counting of WF within the two retained habitat areas; call playback used to elicit response; water quality sampled if standing water present; records of incidental species records at the site to be included; basic weather conditions recorded (temperature, relative humidity, rainfall).
 - o Brief summary to be completed, with annual report provided to Council/DPIE
- Frog surveys should be conducted during periods of peak breeding activity and only during suitable weather conditions (habitat inundated with water, night-time air temperatures exceed 15°C, and wind strength is low and humidity levels are high).
- Surface and groundwater depth should be routinely recorded during each population monitoring event using permanent ground and surface water depth markers, which should be installed at several representative sites throughout the range of retained, rehabilitated and created Wallum Froglet habitats.
- Monitoring of created habitat areas in lateral benches as soon as vegetation translocation is completed.
- Install six water level loggers in constructed WF breeding ponds, and existing depressions in retained WF habitat, spread generally spatially evenly over the development site.
- Monitoring as for retained habitat areas.
- For monitoring during maintenance periods refer to Table 6.2.



Table 6.1 Monitoring requirements for development phases

Phase	Monitoring requirements	WF Habitat Type	Timing	Responsibility
Prior translocation monitoring	 Identify suitable areas for audio strip transect surveys prior to sampling period. Conduct one sampling event across each of the proposed translocation habitat areas. Establish a baseline WF density and distribution within proposed translocated habitat areas. 	Removed habitat.	Four monitoring events prior to translocation	Ecologist
Pre-Construction	 'No-go' areas maintained, and frog habitat protected. Implementation and maintenance of sediment and erosion controls Establish baseline data for all factors identified in the nominated monitoring objectives 	Retained and created habitat.	Quarterly depending on climatic conditions	Site foreman/ Ecologist and/or appointed contractors
Construction	 'No-go' areas maintained, and frog habitat protected. Water quality monitoring Vegetation condition including weed control. Implementation and maintenance of sediment and erosion controls Monitoring of retained and created habitat areas 	Retained and created habitat.	Quarterly depending on climatic conditions	Site foreman/ Ecologist and/or appointed contractors
Occupation (Five years)	 'No-go' areas maintained, and frog habitat protected. Water quality monitoring Vegetation condition including weed control. Pest species control as required. Hydrology – water level loggers in constructed WF breeding ponds. Monitoring of retained and created habitat areas. Conduct ground water monitoring of the retained and created habitat areas for 12 months post construction. 	Retained and created habitat.	Quarterly depending on climatic conditions	Ecologist

If no Wallum Froglets are recorded within either of the compensatory habitat areas within two years following monitoring commencement, (and prevailing climatic conditions are considered suitable for frog activity) more intensive sampling using pitfall trapping should be completed for three nights in succession, three times annually. If Wallum Froglets are detected by this means, sampling may revert to aural detection methods as implemented previously after the completion of the three pitfall trapping events.

In the event of the failure of compensatory habitat areas to establish, an adaptive response should be implemented, with the developer having the option to complete further habitat works where suitable donor material remains in undeveloped portions of the construction site, or planting of tube stock consisting of species of sedges, rushes and grasses (refer species schedule at Appendix B). A combination of both approaches may be utilised following advice from the project ecologist.

An example of the monitoring pro-forma is attached (refer Appendix C).

Table 6.2 Monitoring tasks during maintenance period

Monitoring Requirements	Monitoring Tasks	Frequency, timing and length
Measure pond water quality and hydroperiod	At six monthly intervals the quality of water will be measured in all created and retained Wallum Sedgefrog/acidf frog habitat ponds/polygons. Hydroperiod data from the six installed loggers will also be downloaded biannually.	Six monthly
Survey Vegetation	A sample of created Wallum Sedgefrog/acid frog habitat ponds will be surveyed every six (6) months, randomly selected from the created Wallum Sedgefrog/acid frog ponds. Vegetation type and cover will be assessed within each pond, of which is defined from top of bank to top of bank. A sample of 20m² nested vegetation monitoring quadrats will be permanently established and monitored on a six (6) monthly basis for % cover of native and non-native species consistent with Success Criteria 7 and 8. Photographic monitoring locations will be established on the northeast corner of each quadrat, shooting to the south-west.	
Wallum Froglet monitoring	Survey both created and retained Wallum Sedgefrog habitats for the presence of Wallum Sedgefrog/acid frog or predator/ competitor species.	
Wallum Froglet presence assessment (retained habitat)	Undertake Wallum Froglet presence/absence assessment to determine the extent of habitat use.	Biannually, between October and April depending on climatic
Wallum Froglet density and distribution (constructed habitat) Undertake Wallum Froglet density and distribution assessment to determine the density and distribution of WF in the constructed Monitor years o address		Monitoring period of 3 years or until KPI's are addressed (refer to
Vegetation assessment	Undertaken quantitative vegetation assessment of to ensure created compensatory Wallum Froglet habitat supports semi-aquatic emergent vegetation consistent with a vegetation community consistent with that measured within existing Wallum Froglet habitat (as per methods outlined in Table 7.1 Compliance with Concept Approval).	Table 7.1 Compliance with Concept Approval
Water quality assessment and hydroperiod	Undertake pH, conductivity and Tannin measurements of water within both created compensatory and existing retained Wallum Froglet habitat area to confirm suitability. Download data from the hydroperiod loggers	

6.4 Performance Criteria

To ensure monitoring results achieve desired objectives, performance criteria are required to determine success or otherwise. Recommended performance criteria for the monitoring program are summarised in Table 6.3 and may be adapted for pre-construction, construction and occupation periods of the development. Monitoring will be conducted over several breeding seasons after completion of the urban development to detect potential impacts of the completed urban stormwater design at full capacity on surface and groundwater hydrology and water quality. Monitoring will be performed for five consecutive years after completion of the final project stage to ensure that such potential impacts have been assessed adequately.

Performance criteria must consider prevailing climatic conditions which may adversely affect created habitat and Wallum Froglet populations. There is a strong possibility that no individuals will be detected during low rainfall periods. A trigger Response Plan in the event that performance criteria's are not met for retained and constructed habitat areas is provided in Appendix D.

Note that management of frog habitat zones 3A and 3B will become the responsibility of Council after initial restoration and monitoring works by the developer.

Table 6.3 Summary of monitoring performance criteria

Item	Performance Criteria	Responsibility			
	Retained habitat areas				
Water quality	Water chemistry: pH in a range of $3-5$, and low values/concentrations of turbidity (<50 NTU), salinity (conductivity 1500/ μ S/cm), and nutrients (TN <0.5mg/L, P < 0.05 mg/L) Water quality monitoring includes both surface and groundwater	Appointed ecologist/consultant			
Vegetation	Native vegetation continues to persist and is not degraded or disturbed. The results of the vegetation monitoring collected as part of the VMP will be referred to when analysing the results of the wallum froglet population and habitat monitoring.	Appointed ecologist/consultant			
Weed control	Environmental weeds comprise < 10% total within each Wallum Froglet habitat area	Appointed contractor for implementation of the VMP			
Wallum Froglet populations	Existing/known habitat areas continue to be utilised by Wallum Froglets.	Appointed ecologist/consultant			
Cane Toads	Threshold numbers remain low, appropriate control measures are implemented if required.	Appointed ecologist/consultant			
Mosquito Fish	Monitor Mosquito Fish population – to include the drying out of water courses to control fish numbers.	Appointed ecologist/consultant			
	Constructed habitat areas				
Water quality	As above	Appointed ecologist/consultant			
Weed control	Environmental weeds comprise < 10% total within each identified frog compensation area per precinct.	Appointed contractor for implementation of the VMP			
Habitat Survival rate of greater than 90% of all plantings establishment and translocated material		Appointed contractor for implementation of the VMP			
Wallum Froglet populations	Utilisation by Wallum Froglets and persistence at constructed habitat areas over time.	Appointed ecologist/consultant			
Cane toads	Exclusion buffer plantings correctly installed with 90% survival rate achieved.	Appointed contractor for implementation of the VMP			

7 Compliance

This WFMP address requirements of the Concept Approval and Statement of Commitments, through the various actions prescribed. A summary response to WFMP requirements is provided at Table 7.1.

Table 7.1 Compliance with Concept Approval

Requirement	Demonstration of Compliance
Concept Approval	
A revised Stormwater Concept for the project must be prepared by a suitably qualified person in consultation with council to achieve the following objectives: a) retention of the existing north-south drain alignment with a buffer of 20m either side of the channel such that the existing wallum froglet habitat in this area is conserved and enhanced. Minor infringements of up to 5m into the buffer area can occur provided they are offset on the other side of the channel. For example, a buffer may be 15m on one side of the channel provided this is offset by increasing the other side to 25m (i.e. a total width of 40m plus channel width) b) the buffer areas should not contain stormwater management facilities other than a stormwater treatment basin at the southern end of the channel, where required c) no significant change to the flow regimes from the predevelopment regime.	Refer Stormwater Management Plan (Martens (2021) and part of CivilTech (2022) Engineering Plans for DA (Appendix A).
B5 The existing north-south drain alignment and buffer (as determined under modification B4 of this approval) is to become a public reserve.	Refer Figure 1.2 and CivilTech (2022) Engineering Plans for DA (Appendix A).
Statement of Commitments	
S1 Development to be generally in accordance with the concept application plans and the recommendations of the appendices of the Environmental Assessment and Preferred Project Report, including but not limited to: a) development footprint not extending outside the 2(a) Residential zone pursuant to Byron LEP 1988; b) the number of lots; c) the mixture of lot sizes; d) conservation of ecologically sensitive areas; e) location and dimensions of Park 1 and Park 2; f) retention of trees on public land including road reserves and drainage reserves;	Refer CivilTech (2022) Engineering Plans for DA (Appendix A).

Requirement	Demonstration of Compliance
g) location of stormwater treatment and disposal areas; and h) extent of earthworks.	
B1 The width of the road corridors will be minimised where roads traverse significant habitats and vegetation.	Refer CivilTech (2022) Engineering Plans for DA (Appendix A).
An area of constructed Wallum Froglet habitat is proposed within reserves which will be dedicated to Council. Those areas will be incorporated into the Stormwater management plan and will result in the net gain of almost 3000m2 of Wallum Froglet habitat. A Wallum Froglet Compensatory Management Plan will guide the construction and management of this habitat.	A 7000m² (0.7ha) net gain in Wallum Froglet habitat is proposed, refer Section 3 and Table 3.1.
B4 A Wallum Froglet Compensatory Habitat Plan will be prepared to the satisfaction of the Office of Environment and Heritage prior to approval of the first stage construction certificate. The WFCHP is to be generally in accordance with information prepared by James Warren and Associates and submitted for approval prior to the release of the CC.	This document incorporates a plan for compensatory Wallum Froglet habitat.
SW4 Prepare resident information package regarding prevailing soil conditions the most ecologically sustainable methods for gardening in these conditions and any other sensitivities of the local ecosystem, including information on local endangered species such as the Wallum Froglet.	To be provided at Subdivision Works Certificate stage.
SW7 In the event that excavations are required outside of the proposed development footprint or below 2.0m below surface level within the building envelope additional testing should be considered by the consent authority.	N/A to this plan.
Byron Shire Council - Conditions of Consent DA10.2021.575.1	
An amended Wallum Froglet Management Plan to be submitted	ed to Council for approval prior to the
issue of the Subdivision works certificate. The amended WFMI	
plans including Basin Layout Plans prepared by Civil Tech Ref	
Hydrological Assessment Ref: P2008063JR02V03 prepared by	Martens P/L dated 25 August 2021. In
particular the amended plan is to address:	Defects Mark 2000
A) Modeling results in terms of potential zero drawdown of groundwater levels in the retained habitat area (MZ-3A)	Refer to Martens, 2023
adjacent to the proposed new stormwater drain, and a	
description of how such changes to hydrology and water	
quality/ chemistry will be managed in the context of recreating	

Requirement	Demonstration of Compliance
Wallum froglet habitat and the existing habitat within the	
existing drain.	
B) Illustrate on maps of a suitable scale (1:200 or better)	Appendix B
detailed engineering plans and word form identifying the donor	
Wallum Froglet habitat areas which includes the vegetation	
suite and dimensions (H/L/D) of the individual habitat areas	
and overall area of the habitat earmarked for translocation.	
C) Detailed engineering plans indicating the location of the	Appendix B
translocated habitat plots as indicated in Northwest	
Landscape Plan, Southwest Landscape Plan Central Drain	
Habitat & Rehabilitation Zone Plan and Eastern Habitat &	
Rehabilitation Zone Plan of the Revised Vegetation	
Management Plan (Revision J - 09/11/22)	
D) Prior to the translocation of any Wallum Froglet habitat	Section 6.3.1.
from the proposed house lot area, Wallum Froglet population	
surveys are to be carried out before and after rainfall events at	
these sites to establish both population size and density of	
existing Wallum Froglets in the Wallum Froglet habitat areas	
to be moved (Fig 1.3 – Wallum Froglet Habitat Mapping –	
Revised Wallum Froglet Management Plan). This will be used	
as a benchmark to rate success of planned translocation.	
E) A Habitat Translocation Plan to include WF survey	Section 3.4
methodology, Wallum Froglet translocation methodology,	
translocation timing and timeframes with Key Performance	
Indicators for the seven stages of the development,	
benchmarking completion and success at the end of each	
stage and mitigation measures if KPI at the end of that stage is	
not met. The KPIs must reflect current WF population and	
density benchmarks, with reporting and monitoring to be	
provided to Council as required including with each Subdivision	
Works Certificate (from early Stage 2, Civil Stage 1 to 5) and	
Subdivision Certificate (from Civil Stage 1 to 5).	
F) Mitigation measures should the translocated habitat not	Section 3.4
survive and function as intended and how it is to be replaced	
over the seven stages of the development.	

8 References

Australian Wetlands Consulting (2013). *Stormwater and Acid Frog Habitat Management Strategy*. Concept Design Report to Codlea Ply Ltd.

Australian Wetlands Consulting (2014) *Bayside Brunswick Estate Water Monitoring Report.* Report to Codlea Pty Ltd.

Australian Wetlands Consulting (2016). Stormwater and Acid Frog Habitat Management Strategy (amended). Concept Design Report to Codlea Ply Ltd.

Australian Wetlands Consulting (2022). Wallum Estate Lot 13 DP 1251383 Torakina Road Brunswick Heads Biodiversity Development Assessment Report. Report to Bayside Brunswick Pty Ltd.

Australian Wetlands Consulting (2023). Bayside Brunswick Landscape Documentation and Habitat Creation for Development Application. REV C.2 - For Approval, 19th August, 2021

Byron Shire Council (2023) - Conditions of Consent DA 10.2021.575

CivilTech (2023) Subdivision Layout Plan, 126 Lot Subdivision of Lot 13 DP 1251383 15 Torakina Road, Brunswick Heads

CivilTech (2023) Erosion and Sediment Control Plan, Wallum Estate Subdivision Works Certificate Plans for Stage 1 to 3 Bulk Earthworks 15 Torakina Road, Brunswick Heads

Department of the Environmental, Water, Heritage and the Arts (DEWHA) Survey guidelines for Australia's threatened frogs Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

Department of Planning, Industry and Environment (DPIE) (2020) NSW Survey Guide for Threatened Frogs A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method

Department of Planning, Industry and Environment (DPIE) (2022) *Hygiene guidelines for wildlife Protocols to protect priority biodiversity areas in NSW from Phytophthora cinnamomi, myrtle rust, amphibian chytrid fungus and invasive plants*

Fletcher, W. & Pfaeffli, J. (2014) Water Cycle Management Stormwater Concept Bayside Brunswick. Proposed Subdivision of 1 Lot 73 DP851902 Bayside Way Brunswick Heads for Codlea Pty Ltd. Report by CivilTech Consulting Engineers.

James Warren & Associates (2011) *Amended Ecological Assessment Volume 1 Lot 73 DP851902* Bayside Way Brunswick Heads. A report to Codlea Pty Ltd.

James Warren & Associates (2011) *Appendices to Ecological Assessment Volume 2 Lot 73 DP851902 Bayside Way Brunswick Heads.* A report to Codlea Pty Ltd.

Martens Consulting Engineers (2021) Concept Stormwater Management Plan: Proposed



Subdivision, 15 Torakina Road, Brunswick Heads, NSW. Prepared for Clarence Property Pty Ltd

Martens & Associates Pty Ltd (2023) Supplementary Hydrogeological Assessment: Proposed Residential Subdivision, 15 Tora kina Road, Brunswick Heads, NSW. Prepared for Clarence Property Pty Ltd.

Meyer, E., Hero, J-M., Shoo, L. & Lewis, B. (2006) *National recovery plan for the wallum sedge frog and other wallum-dependent frog species.* Report to Department of the Environment and Water Resources, Canberra. Queensland Parks and Wildlife Service, Brisbane.



Appendix A Subdivision Plans (CivilTech, 2023)

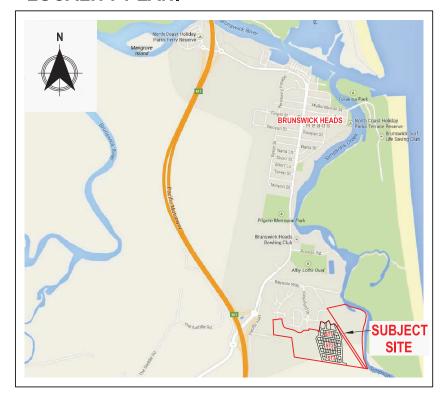




Subdivision Design
Civil Engineering
Town Planning
Project Management

CivilTech Consulting Engineers
Ph. 0431 065 645
PO BOX 4285. Goonellabah NSW 2480

LOCALITY PLAN:



WALLUM ESTATE
STAGE 1 - 30 Lots & 3 M.D. Lots
STAGE 2 - 23 Lots
STAGE 3 - 33 Lots
15 Torakina Road, Brunswick Heads
Lot 13 DP 1251383

DRAWING INDEX:

SHEET 1	EW1	DRAWING INDEX & COVER SHEET
SHEET 2	EW2	BULK EARTHWORKS CONSTRUCTION NOTES SHEET
SHEET 3	EW3	SUBJECT SITE AERIAL OVERLAY
SHEET 4	EW4	STAGE 1 SUBDIVISION LAYOUT PLAN
SHEET 5	EW5	EROSION AND SEDIMENT CONTROL PLAN
SHEET 6	EW6	BULK EARTHWORKS CUT FILL PLAN
SHEET 7	EW7	EARTHWORKS ROAD ALIGNMENT PLAN - NORTH
SHEET 8	EW8	EARTHWORKS ROAD ALIGNMENT PLAN - SOUTH
SHEET 9	EW9	BIO-RETENTION BASIN & LEVELS PLAN - NORTH
SHEET 10	EW10	BIO-RETENTION BASIN & LEVELS PLAN - SOUTH
SHEET 11	EW11	LANDSCAPING PLAN - NORTH
SHEET 12	EW12	LANDSCAPING PLAN - SOUTH
SHEET 13	EW13	PROPOSED NORTH SOUTH DRAIN PLAN & SECTIONS
SHEET 14	EW14	ROAD 1 LONG SECTION & CROSS SECTIONS
SHEET 15	EW15	ROAD 2 LONG SECTION - START TO CH600
SHEET 16	EW16	ROAD 2 LONG SECTION - CH600 TO END
SHEET 17	EW17	ROAD 2 CROSS SECTIONS - START TO CH500
SHEET 18	EW18	ROAD 2 CROSS SECTIONS - CH550 TO END
SHEET 19	EW19	ROAD 3 LONG SECTION & TYPICAL SECTION
SHEET 20	EW20	ROAD 3 CROSS SECTIONS
SHEET 21	EW21	ROAD 4 LONG SECTION & TYPICAL SECTION
SHEET 22	EW22	ROAD 4 CROSS SECTIONS
SHEET 23	EW23	ROAD 5 LONG SECTION & TYPICAL SECTION
SHEET 24	EW24	ROAD 5 CROSS SECTIONS
SHEET 25	EW25	EROSION AND SEDIMENT CONTROL STANDARD DRAWINGS
SHEET 26	EW26	ENGINEERING DETAILS
SHEET 27	EW27	PLANTING DETAILS & SCHEDULES
SHEET 28	EW28	TRAFFIC CONTROL PLAN
SHEET 29	EW29	DA 10.2021.575.1 CONSTRUCTION CONDITIONS

DA 10.2021.575.1
STAGE 1 TO 3 - EARTHWORKS
SUBDIVISION WORKS CERTIFICATE
DRAWING INDEX & COVER SHEET
1133-ST1-EW1A

GENERAL NOTES:

- G1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE NORTHERN RIVERS LOCAL GOVERNMENT CONSTRUCTION MANUAL (NRLG) AND COUNCILS STANDARD SPECIFICATION FOR ENGINEERING WORKS AS AMENDED BY THE APPROVED PLANS.
- G2. THE CONTRACTOR SHALL VERIFY THE LOCATION AND LEVEL OF ALL EXISTING SERVICES, REGARDLESS OF WHAT IS SHOWN ON THESE DRAWINGS, PRIOR TO COMMENCING CONSTRUCTION AND MAKE ARRANGEMENTS WITH THE PRINCIPAL AND THE RELEVANT AUTHORITY TO RELOCATE OR ADJUST IF
- G3. THE CONTRACTOR SHALL NOT ENTER UPON NOR DO ANY WORK WITHIN ADJACENT LANDS WITHOUT THE WRITTEN PERMISSION OF THE LAND OWNER
- G4. CONSTRUCTION NOISE IS TO BE LIMITED AS FOLLOWS: THE L10 NOISE LEVEL MEASURED OVER A PERIOD OF NOT LESS THAN FIFTEEN (15) MINUTES WHEN THE CONSTRUCTION SITE IS IN OPERATION MUST NOT EXCEED THE BACKGROUND LEVEL BY MORE THAN 10 DB(A).
- THE CONTRACTOR SHALL DISPOSE ON SITE OF ANY SURPLUS EXCAVATED MATERIAL AS DIRECTED BY THE
- G6. THE CONTRACTOR SHALL GIVE 2 DAYS WRITTEN NOTICE TO COUNCIL IN THE REQUIRED FORM OF THE COMMENCEMENT OF WORK AND SUCH NOTICE SHALL BE ACCOMPANIED BY EVIDENCE OF PUBLIC LIABILITY &
- G7. CONSTRUCTION WORKS MUST NOT UNREASONABLY INTERFERE WITH THE AMENITY OF THE NEIGHBOURHOOD, IN PARTICULAR CONSTRUCTION NOISE, WHEN AUDIBLE FROM ADJOINING RESIDENTIAL PREMISES, CAN ONLY OCCUR:
- a) MONDAY TO FRIDAY, FROM 7 AM TO 6 PM.
- b) SATURDAY, FROM 8 AM TO 1 PM.
 c) NO CONSTRUCTION WORK TO TAKE PLACE ON SUNDAYS OR PUBLIC HOLIDAYS.
- G8. THE CONTRACTOR SHALL OBSERVE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT AND ANY OTHER ACTS AND REGULATIONS PERTAINING TO THE WORKS. THE PRINCIPAL ACCEPTS NO RESPONSIBILITY FOR ANY FINES OR LEGAL ACTION THAT MAY BE INSTIGATED AS A RESULT OF ACTIONS OF THE CONTRACTOR.
- THE CONTRACTOR AND THEIR SUBCONTRACTORS SHALL PROVIDE THEIR "SAFE WORK METHOD STATEMENT" TO THE PRINCIPAL REFORE THE
- G10. THE CONTRACTOR SHOULD NOTE CAREFULLY THAT THE SITE IS SURROUNDED BY BUILT ASSETS OF THE COUNCIL AND OTHER SERVICE PROVIDERS. THE CONTRACTOR IS TOTALLY RESPONSIBLE FOR THE PROTECTION OF THESE ASSETS DURING CONSTRUCTION THE PRINCIPAL ACCEPTS NO RESPONSIBILITY FOR DAMAGE CAUSED BY THE CONTRACTOR OR THEIR SUBCONTRACTORS
- G11. ALL WORK CARRIED OUT IN CONFINED SPACES IS TO BE DONE BY PERSONNEL SPECIFICALLY QUALIFIED FOR CONFINED SPACES WORK
- G12 THE CONTRACTOR SHALL ENSURE SAFE WORKING IN COMPLIES WITH AS2865 (SAFE WORKING IN CONFINED
- G13 CONTRACTOR MUST KEEP CLEAR RECORDS OF ALL SERVICES AND PROVIDE COPIES TO THE PRINCIPAL FOR WORK AS EXECUTED PURPOSES.
- G14. ALL WORKMANSHIP AND MATERIALS TO BE IN ACCORDANCE WITH ALL RELEVANT AUSTRALIAN STANDARDS CURRENT EDITION WITH AMENDMENTS. EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS

WARNING NOTES:

- Δ1 THESE PLANS ARE NOT TO BE USED FOR CONSTRUCTION UNLESS THEY HAVE CONSTRUCTION APPROVAL OF COUNCIL
- A FULL SET OF APPROVED PLANS AND A COPY OF THE RELEVANT DEVELOPMENT CONSENT ARE TO BE READ BY THE CONTRACTOR AND ARE TO BE RETAINED ON SITE BY THE CONTRACTOR AT ALL TIMES WHEN WORK IS BEING CARRIED
- DIMENSIONS AND LEVELS OF ALL DRAINAGE LINES, CENTRE LINES, RECOVERY MARKS AND BENCH MARK LEVELS SHOULD BE VERIFIED BY THE CONTRACTOR AND ANY DISCREPANCIES SHOULD BE CLARIFIED IN WRITING WITH THE PRINCIPAL PRIOR TO COMMENCEMENT OF THE WORK
- THE CONTOURS SHOWN ON THESE PLANS ARE SUITABLE ONLY FOR THE PURPOSES OF THIS DESIGN AND MAY CHANGE WITH CONSTRUCTION. NO RELIANCE SHOULD BE PLACED UPON SUCH CONTOURS FOR ANY PURPOSE OTHER THAN FOR THE PURPOSE OF THESE DRAWINGS
- A5 SERVICES ON THESE PLANS WERE LOCATED WHERE POSSIBLE BY FIELD SURVEY. IF NOT ABLE TO BE SO LOCATED, KNOWN SERVICES HAVE BEEN PLOTTED FROM THE RECORDS OF RELEVANT AUTHORITIES WHERE AVAILABLE AND HAVE BEEN NOTED ACCORDINGLY ON THESE PLANS. WHERE SUCH RECORDS EITHER DO NOT EXIST OR ARE CONSIDERED TO BE INADEQUATE A NOTATION HAS BEEN MADE HEREON. PRIOR TO ANY RECONSTRUCTION, EXCAVATION OR CONSTRUCTION ON THE SITE. THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES, NOTWITHSTANDING ANYTHING SHOWN OR IMPLIED ON THESE PLANS, LOCATION OF SERVICES IS THE RESPONSIBILITY OF THE CONTRACTOR.
- NO SHEET OF THESE PLANS MAY BE REPRODUCED UNLESS THE REPRODUCTION INCLUDES THESE NOTES. THESE NOTES ARE AN INTEGRAL PART OF THESE PLANS
- CIVILTECH ACCEPTS NO RESPONSIBILITY FOR ARISING TO ANY PERSON OR CORPORATION WHO MAY USE OR RELY ON ANY PART OF THESE PLANS IN CONTRAVENTION TO THE TERMS OF THESE
- DRAWINGS ARE NOT TO BE USED FOR CONSTRUCTION SETOUT OF SERVICES AS THE LOCATION OF SOME SERVICES IS SCHEMATIC FOR PLAN CLARITY.
- THE PRINCIPAL ACCEPTS NO RESPONSIBILITY FOR DISTURBANCE TO ANY MARKS OR FOR ANY ADDITIONAL MARKS PLACED BY OTHERS. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL BENCHMARKS

FILL NOTE:

BULK EARTHWORKS TO BE CARRIED OUT IN ACCORDANCE WITH AS3798 UNDER SUPERVISION OF NATA ACCREDITED GEOTECHNICAL CONSULTANT AS FILL WITHIN RESIDENTIAL LOTS : LEVEL 1

FILL WITHIN ROAD RESERVES : LEVEL 2

COMPACTION REQUIREMENTS: EMBANKMENT FILL - 98% STANDARD. ROAD SUBGRADE (FILL) - 100% STANDARD.

TRAFFIC CONTROL PLAN:

- T1 A TRAFFIC CONTROL PLAN IS TO BE IMPLEMENTED FOR THE LOCAL AND CONSTRUCTION SITE TRAFFIC AT THE INTERSECTION END OF EXISTING ROADS.
- T2. IT IS THE CONTRACTORS RESPONSIBILITY TO: - ASSUME THE ROLE OF WORKS SUPERVISOR IN ACCORDANCE WITH THE RTA "TRAFFIC CONTROL AT WORKSITES" MANUAL (TCWS) AND TO: - ENSURE THAT ALL PERSONNEL EMPLOYED ON TRAFFIC CONTROL ARE APPROPRIATELY TRAINED AND HOLD CERTIFICATES FOR THE DUTIES PERFORMED - ENSURE THAT THE TRAFFIC CONTROL PLAN IS IMPLEMENTED, THE REQUIRED CHECKS & AUDITS ARE CARRIED OUT AND RECORDED ON FORMS AS SHOWN IN APPENDIX 'E' OF THE MANUAL. - INFORM THE RESIDENTS INSIDE THE TRAFFIC CONTROL AREA OF THE CHANGED CONDITIONS AND ASSIST WITH VEHICLE MOVEMENTS IN AND OUT OF DRIVEWAYS. - INFORM THE LOCAL AUTHORITIES AND/OR POLICE AS REQUIRED OF THE LOCATION AND DURATION OF THE TRAFFIC CONTROL TO BE IMPLEMENTED ENSURE THAT THE REQUIREMENTS OF TRAFFIC CONTROL AT WORK SITES SECTION 3.6. SAFE CLEARANCES BETWEEN WORKERS AND THROUGH TRAFFIC, ARE MET FOR THE PEDESTRIANS
- T3. ALL SIGNS TO BE REFLECTIVE AND DESIGNED FOR DAY AND NIGHT USE

CONSTRUCTION NOTES:

- ALL FINISHED SURFACES TO BE SELF DRAINING, THAT
- C2. ALL NEW WORKS SHALL MAKE A SMOOTH
- EXISTING SERVICES TO BE PROTECTED. SUPPORTED AND/OR REMOVED AS REQUIRED IN ACCORDANCE WITH THE RELEVANT AUTHORITY'S SPECIFICATIONS.
- ALL EXISTING SERVICE COVERS TO BE ADJUSTED TO NEW FINISHED SURFACES AS REQUIRED.
- PLACE 80mm MIN THICK TOPSOIL ON ALL BATTERS & EARTHWORK AREAS AND ROLL AND GRASS WITHOUT DELAY. 80% GRASS COVER TO BE ACHIEVED BY END OF PROJECT UNLESS DIRECTED OTHERWISE
- EXISTING FENCES TO BE PRESERVED, RELOCATED AND/OR REMOVED AS DIRECTED BY THE PRINCIPAL
- C7. CONTRACTOR WILL BE HELD RESPONSIBLE FOR DAMAGE TO EXISTING ROADS CAUSED BY CONSTRUCTION EQUIPMENT.
- SURFACES OF EXISTING ROADS THAT ARE USED AS ACCESS BY CONTRACTOR SHALL BE KEPT FREE OF OBSTRUCTION MATERIALS, DIRT AND OTHER FOREIGN MATTER AT ALL TIMES.
- THE CONTRACTOR SHALL REINSTATE AND/OR MAKE WORK TO THE SATISFACTION OF THE PRINCIPAL AND
- C10. INSTALL SIGNAGE, STREET SIGNS, BIKEPATH AND

LANDSCAPING NOTES:

- L2. 80% GRASS COVER IS ACHIEVED ON ALL EXPOSED SURFACES PRIOR TO REMOVAL OF EROSION AND SEDIMENT CONTROL DEVICES. TO BE CONFIRMED ON SITE BY SUPERINTENDENT & COUNCIL ENGINEER.
- TREE REMOVAL IS TO BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED VEGETATION MANAGEMENT PLAN.

CONDITIONS OF CONSENT:

THE CONTRACTOR IS ADVISED TO CAREFULLY REVIEW THE D.A. CONDITIONS OF CONSENT ISSUED BY COUNCIL FOR ALL CONDITIONS APPLICABLE TO THE WORKS.



The Essential First Step.

THE PRINCIPAL CIVIL CONTRACTOR IS TO ORDER A NEW DIAL BEFORE YOU DIG SEARCH A MINIMUM OF 2 WORKING DAYS BEFORE COMMENCING CONSTRUCTION. THE CONTRACTOR & ALL SUB CONTRACTORS SHOULD CONFIRM THE LOCATION AND LEVEL OF ALL SERVICES PRIOR TO CONSTRUCTION OR EXCAVATION WOR



WALLUM ESTATE

SUBDIVISION WORKS CERTIFICATE PLANS FOR STAGE 1 TO 3 BULK EARTHWORKS 15 TORAKINA ROAD, BRUNSWICK HEADS

BULK EARTHWORKS CONSTRUCTION NOTES

Scale: -Datum: - CAD file: 1133-ST1-EW2A.dwg CivilCAD file: 1133-ENG



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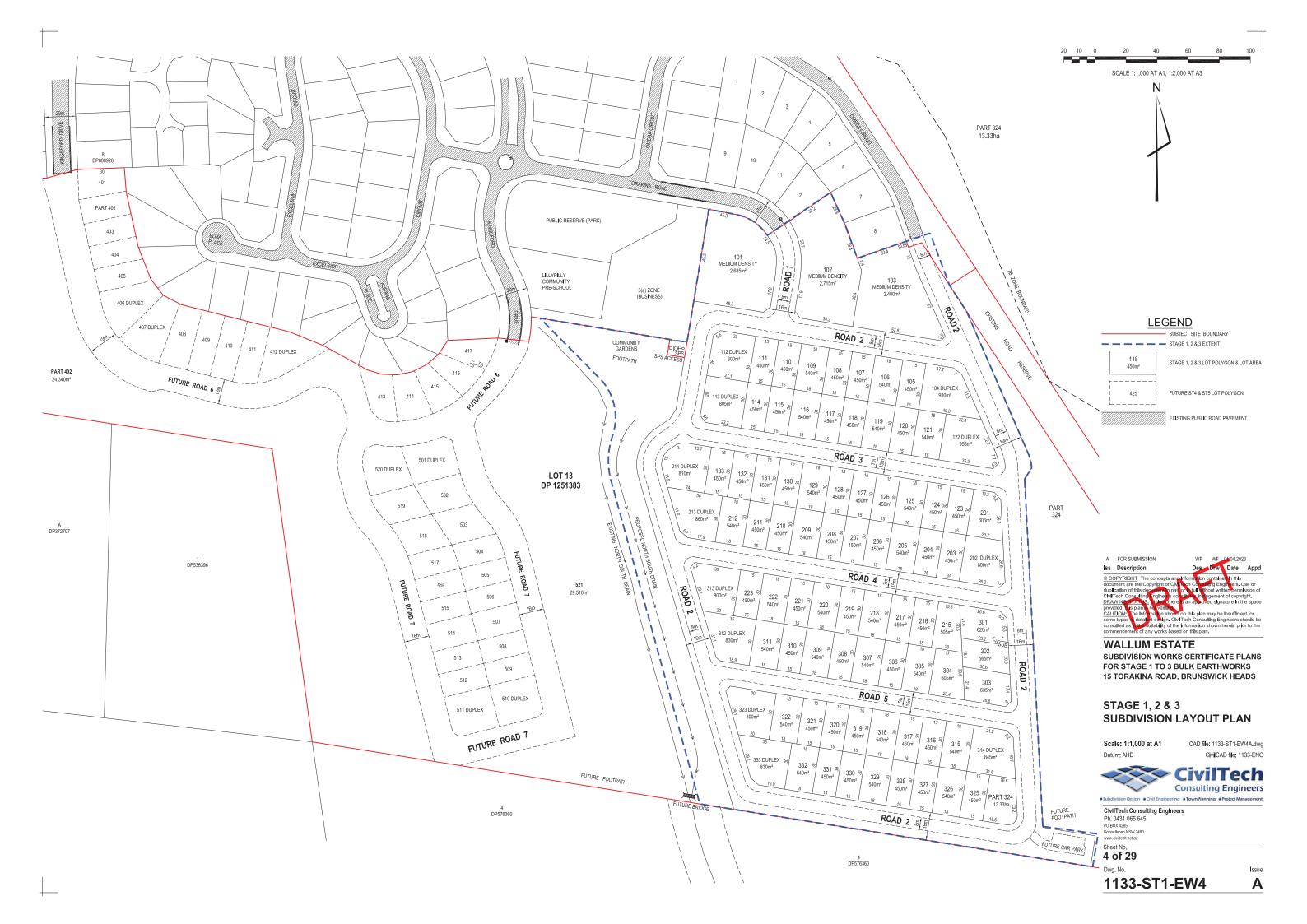
PO BOX 4285 Goonellabah NSW 248

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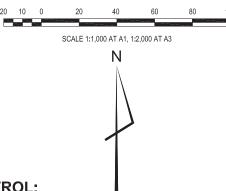
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1133-ST1-EW2

Issue Α







EROSION CONTROL:

WORKS ON THE SITE SHALL BE CARRIED OUT IN THE FOLLOWING SEQUENCE:

- INSTALL BARRIER AND SILT FENCES
- STRIP AND STOCKPILE TOPSOIL UNDERTAKE APPROVED BULK EARTHWORKS

- UNDERTIANE APPROVED BULE EART INVORMS
 REHABILITATE SITE, CLEANUP & REMOVE
 RUBBISH DEBRIS
 MAINTAIN TEMPORARY SOIL AND WATER
 MANAGEMENT WORKS FOR PHASE 2 CIVIL WORKS.
- E1. THE PURPOSE OF THE SOIL AND WATER MANAGEMENT PLAN IS TO PROTECT THE DEVELOPMENT AREA AND THE SURROUNDING AREA FROM SOIL EROSION AND SUBSEQUENT POLLUTION AND SEDIMENTATION OF WATERWAYS.
- E2. THE PRINCIPAL STRATEGY IS TO PROVIDE "SILT" FENCES, STRAW BALE FENCES OR SOIL BERMS DOWNSLOPE OF ALL UNPROTECTED DISTURBED AREAS TO CAPTURE ANY SEDIMENT PASSING FROM THE SITE.
- E3. ALL WORKS TO BE IMPLEMENTED AND INSTALLED IN ACCORDANCE WITH LANDCOM & HOUSING NSW'S "BLUE BOOK", MANAGING URBAN STORM WATER, SOILS AND CONSTRUCTION AND ANY SPECIFIC DIRECTIONS OF COUNCIL.
- E4. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE OTHER ENGINEERING PLANS AND ANY WRITTEN INSTRUCTIONS THAT MAY BE ISSUED. REFER TO THE EROSION AND SEDIMENT CONTROL PLAN FOR DETAILS.
- E5. LAND DISTURBANCE SHALL BE LIMITED TO THAT NECESSARY FOR IMPLEMENTATION OF THE PLANS OF WORKS. BUFFER ZONES AND LANDS NOT TO BE DISTURBED SHALL BE CLEARLY MARKED WITH BARRIER FENCES. "SILT" FENCES OR STRAW BALE SEDIMENT TRAPS SHALL BE PLACED IMMEDIATELY DOWNSLOPE OF ALL UNPROTECTED DISTURBED LANDS.
- E6. TEMPORARY REHABILITATION SHALL BE UNDERTAKEN ON DISTURBED AREAS WHERE WORKS HAVE STOPPED AND SOILS ARE EXPECTED TO REMAIN EXPOSED FOR MORE THAN ONE MONTH.
- E7. THE CONTRACTOR SHALL MAINTAIN DAILY ALL WATER AND SOIL MANAGEMENT DEVICES.
- E8. ALL VEGETATION SHALL BE RETAINED BEYOND LIMIT OF WORKS.
- E9. VEHICULAR ACCESS POINTS ONTO CONSTRUCTION SITE TO INCLUDE A GRAVEL PAD/STABILISED ACCESS.

ESCP LEGEND

PROPOSED SUBDIVISION BOUNDARY — — — — EXTENT OF STAGE 1, 2 & 3 EARTHWORKS AREA SEDIMENT CONTROL FENCE OR TOPSOIL BUND (SEE SD6-7 ON EW25) STABILISED SITE ACCESS (SEE SD5-7 ON EW25) ROCK CHECK DAM (OR STRAW BALES)

REFER TO EW25 FOR EROSION AND SEDIMENT CONTROL DETAILS.

EXACT REQUIREMENTS FOR EROSION CONTROL TO BE DETERMINED ON SITE IN CONSULTATION WITH BYRON SHIRE COUNCIL STAFF.

A FOR SUBMISSION Iss Description

WALLUM ESTATE

SUBDIVISION WORKS CERTIFICATE PLANS FOR STAGE 1 TO 3 BULK EARTHWORKS 15 TORAKINA ROAD, BRUNSWICK HEADS

EROSION & SEDIMENT CONTROL PLAN 0.2m FINISHED CONTOURS

Scale: 1:1.000 at A1

CAD file: 1133-ST1-EW5A.dwg CiviCAD file: 1133-ENG



CivilTech Consulting Engineers Ph. 0431 065 645 PO BOX 4285 Goonellabah NSW 2480 www.civiltech.net.au

5 of 29

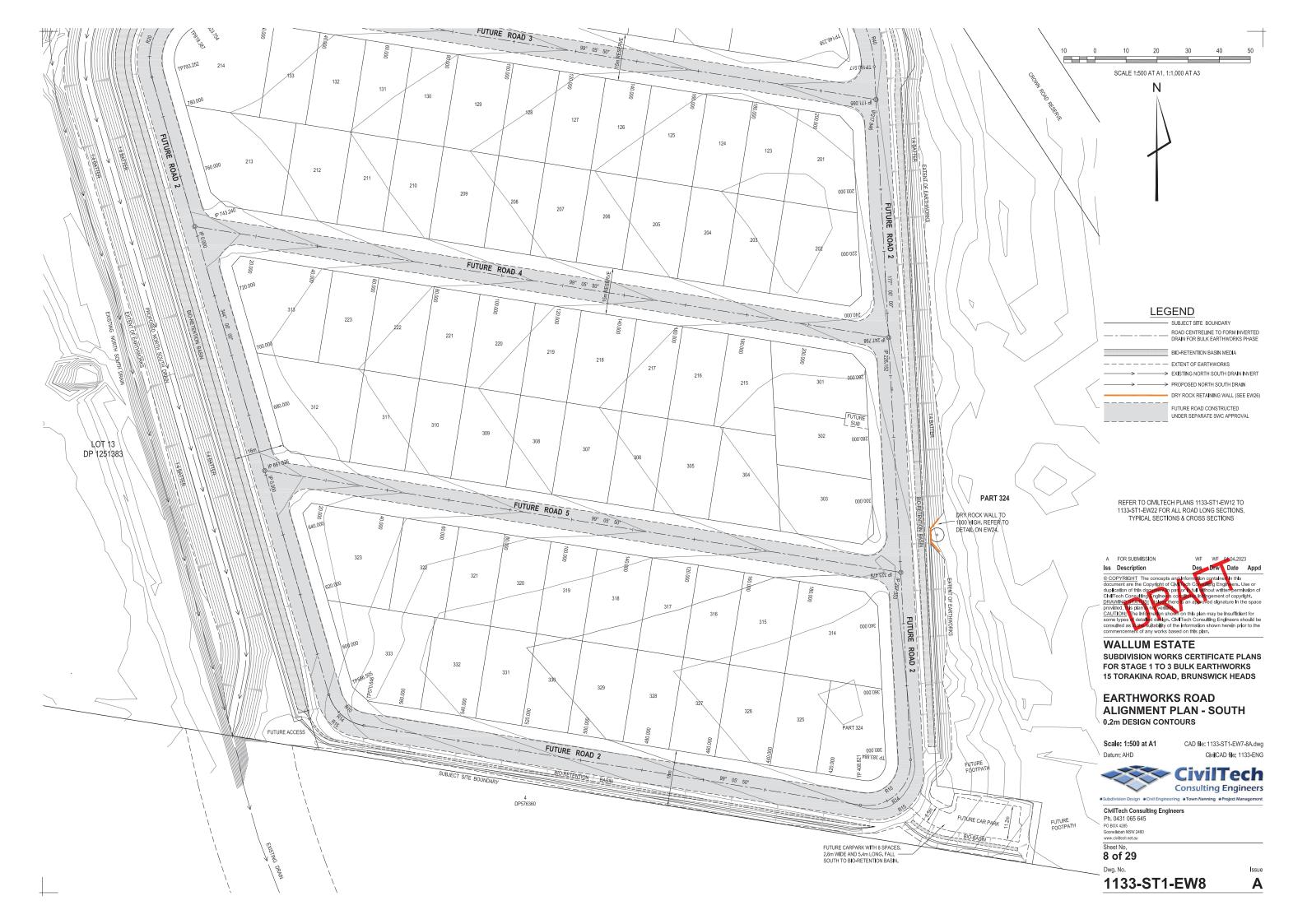
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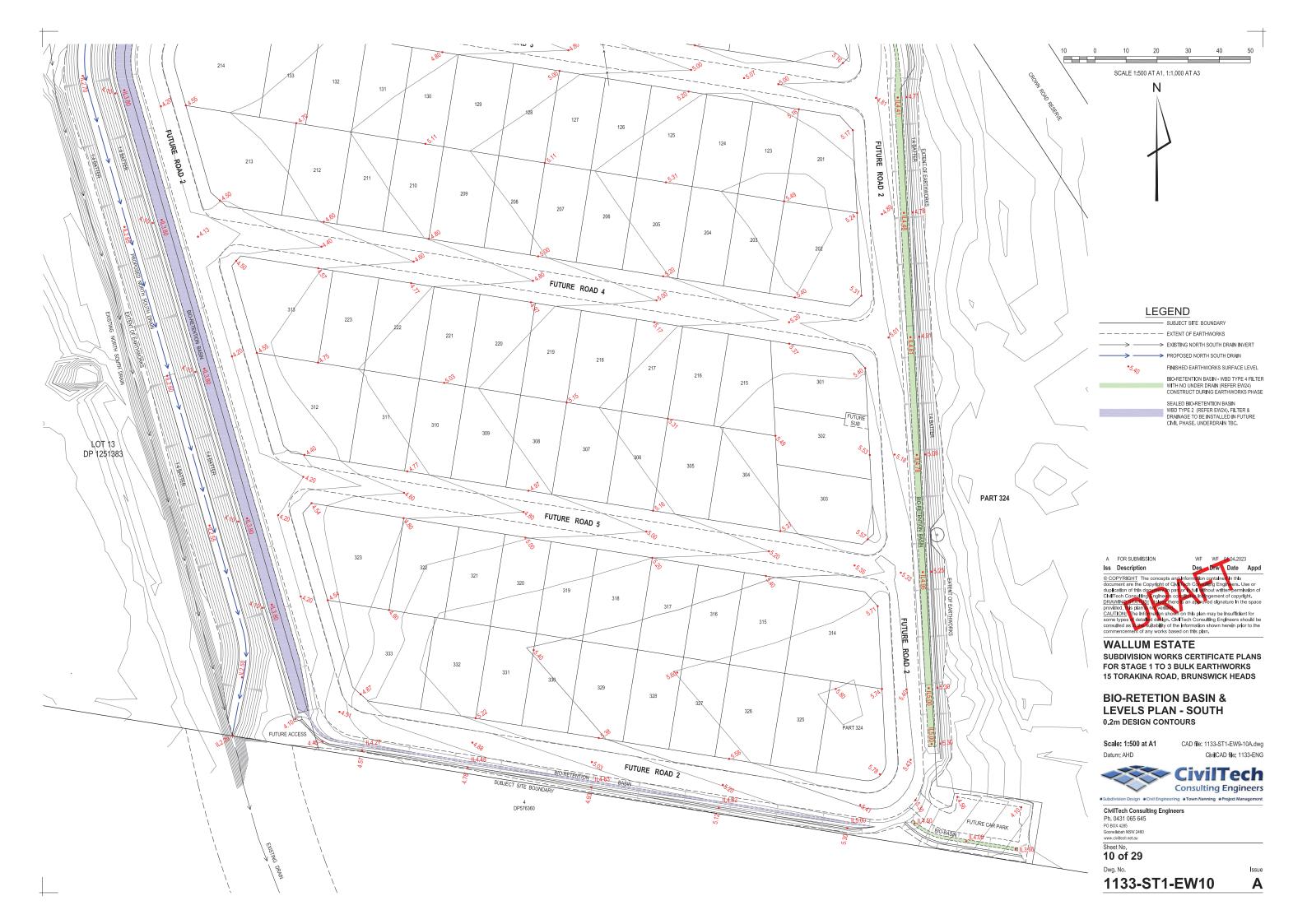
Α











Appendix B AWC Wallum Estate Brunswick Heads - Early Ecological Works Package - REV C - For Approval Draft





WALLUM ESTATE BRUNSWICK HEADS

EARLY ECOLOGICAL WORKS PACKAGE

REV E - FOR APPROVAL - 21.11.23

DRAWING LIST

1-211400_EW_00 - LOCALITY PLAN & DRAWING INDEX

1-211400_EW_01 - GENERAL ARRANGEMENT AND ACCESS PLAN

1-211400 EW 02 - CENTRAL DRAIN HABITAT REHABILITATION ZONE

1-211400_EW_03 - NORTH WEST WF PONDS & SECTION AA

1-211400_EW_04A - STOCKPILE CUT - SECTIONS BB - DD

1-211400_EW_04B - STOCKPILE CUT - SECTIONS EE

1-211400_EW_05A - SOUTH WEST WF PONDS

1-211400 EW 05B - SOUTH WEST WF PONDS

1-211400 EW 06 - EASTERN HABITAT & REHABILITATION ZONE

1-211400_EW_07 - EASTERN WF BREEDING PONDS - SECTION HH

1-211400_EW_08 - DETAILS SHEET

1-211400 EW 09 - "LIVE SOIL" WF PONDS DONOR MATERIAL PLAN

1-211400 EW 10 - "LIVE SOIL" WF PONDS DONOR MATERIAL PLAN

1-211400_EW_11 - "LIVE SOIL" WF PONDS DONOR MATERIAL PLAN

1-211400 EW 12 - NORTH WEST WF PONDS PLANTING PLAN

1-211400_EW_13 - EASTERN WF PONDS PLANTING PLAN

1-211400_EW_14 - SOUTH WESTERN WF POND PLANTING PLAN 01 & 02

1-211400 EW 15 - SOUTH WESTERN WF POND PLANTING PLAN 03

1-211400_EW_16 - EASTERN HABITAT & REHABILITATION ZONES

1-211400 EW 17 - EASTERN WF BREEDING PONDS PLANTING PLAN 01

1-211400_EW_18 - PLANTING NOTES AND DETAILS

1-211400_EW_19 - TRAFFIC MANAGEMENT PLAN

1-211400_EW_20 - DA 10.2021.575.1 CONSTRUCTION CONDITIONS 01

1-211400_EW_21 - DA 10.2021.575.1 CONSTRUCTION CONDITIONS 02







LOCALITY PLAN AND DRAWING INDEX

WALLUM ESTATE EARLY ECO WORKS PACKAGE

1	REV.	ISSUE / AMENDMENTS	DATE
	Α	FOR DISCUSSION	16.02.22
	В	FOR REVIEW	12.04.22
	С	FOR APPROVAL	20.06.23
	D	FOR APPROVAL	16.08.23
	Ε	FOR APPROVAL	21.11.23

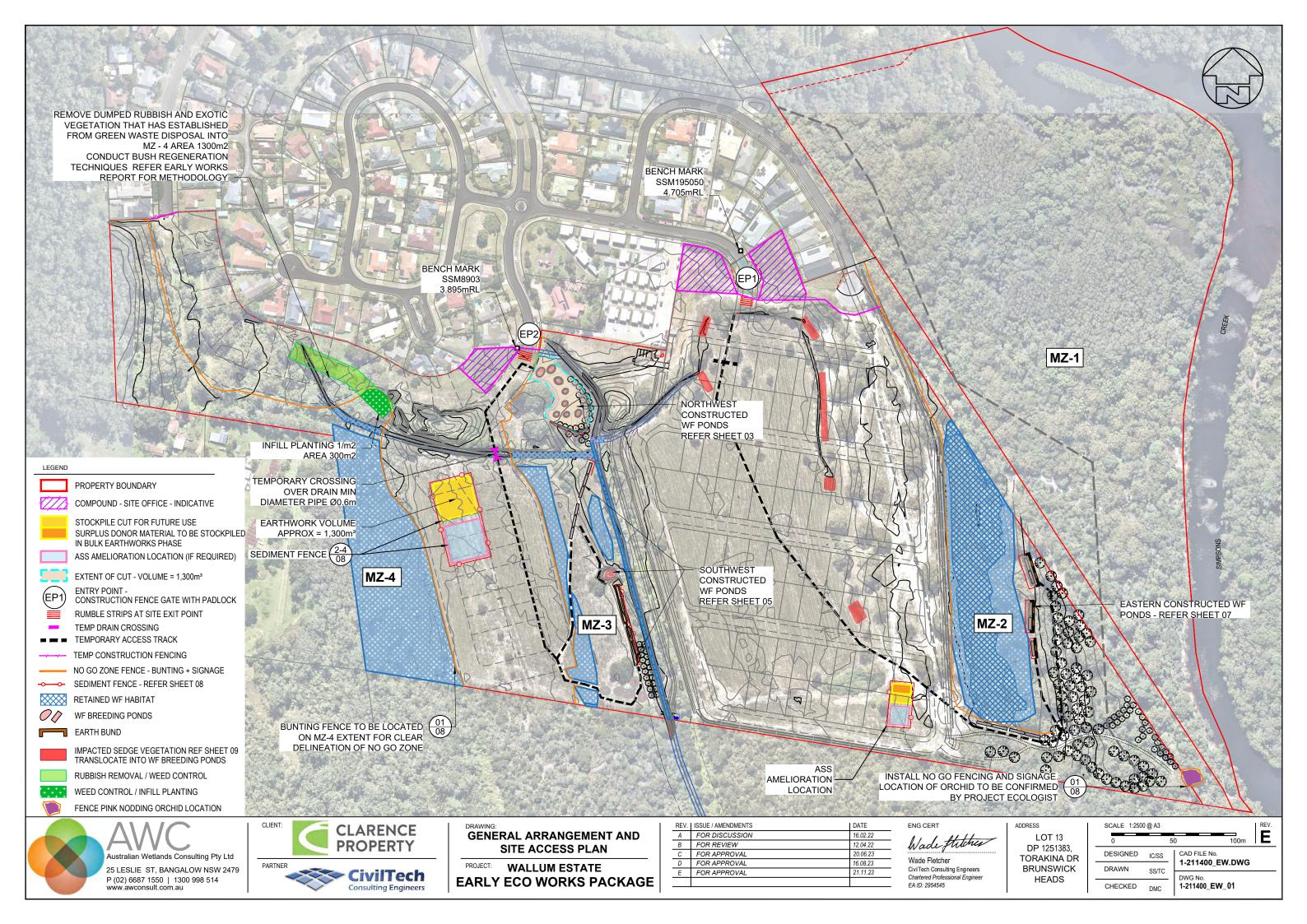
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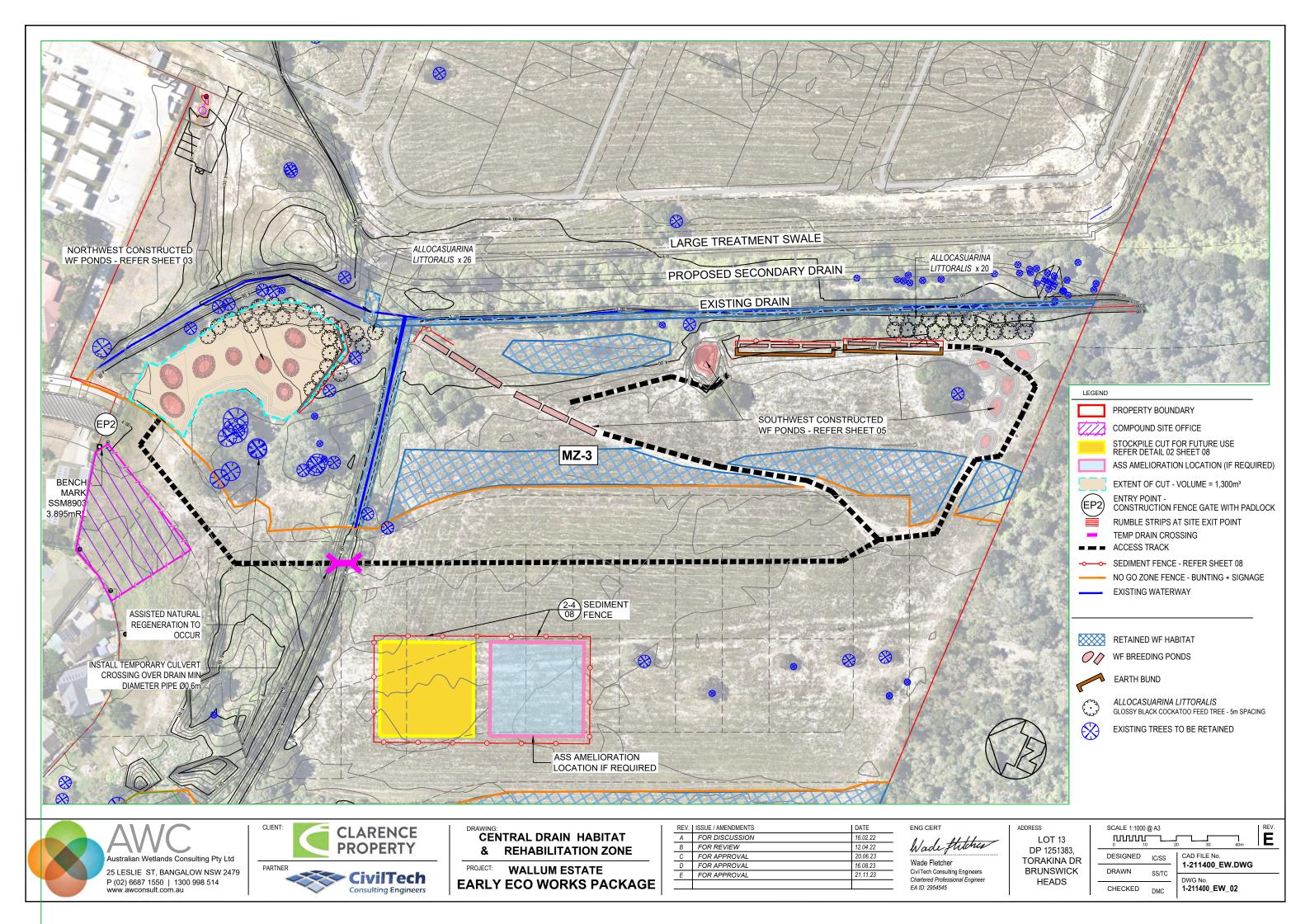
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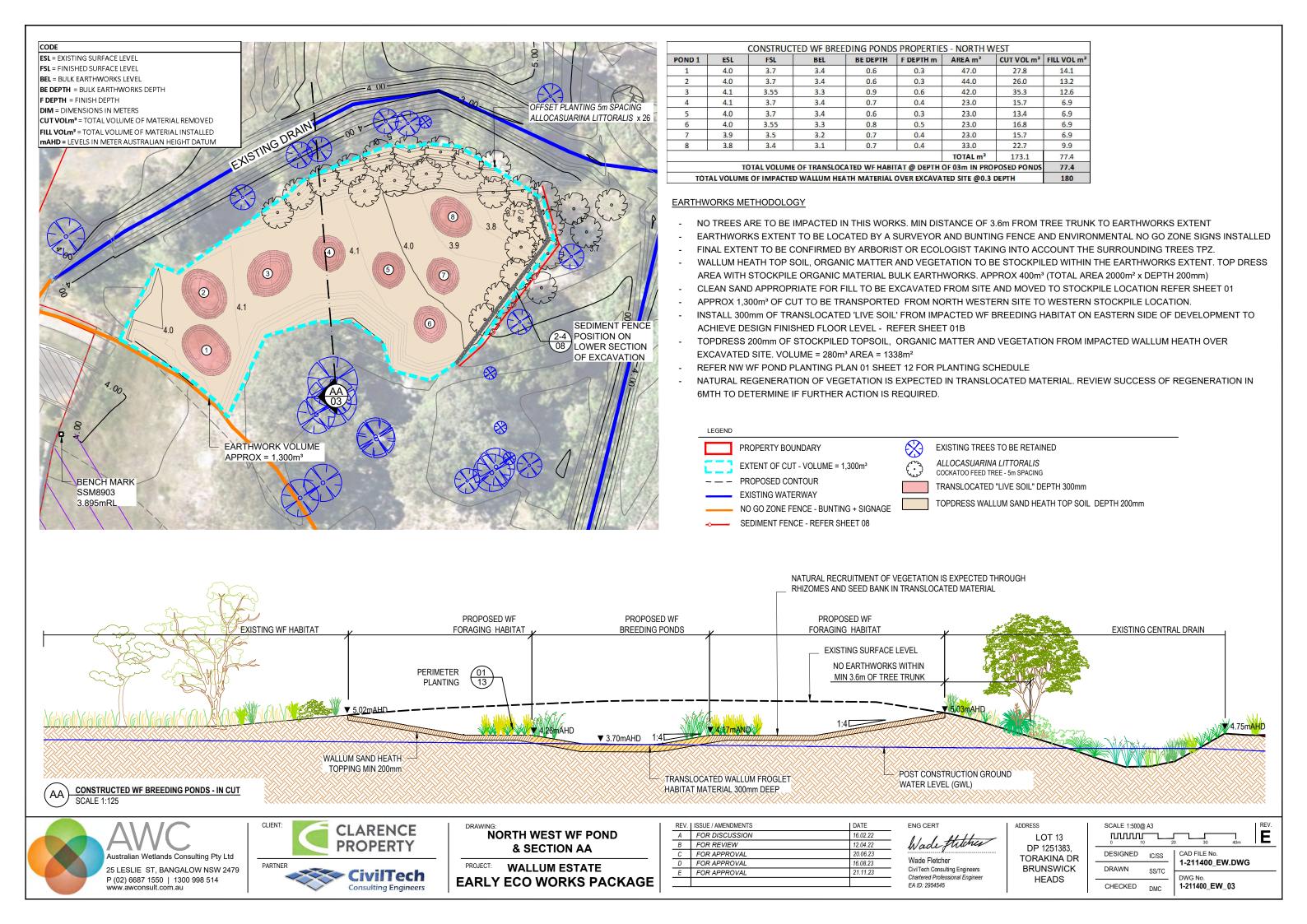
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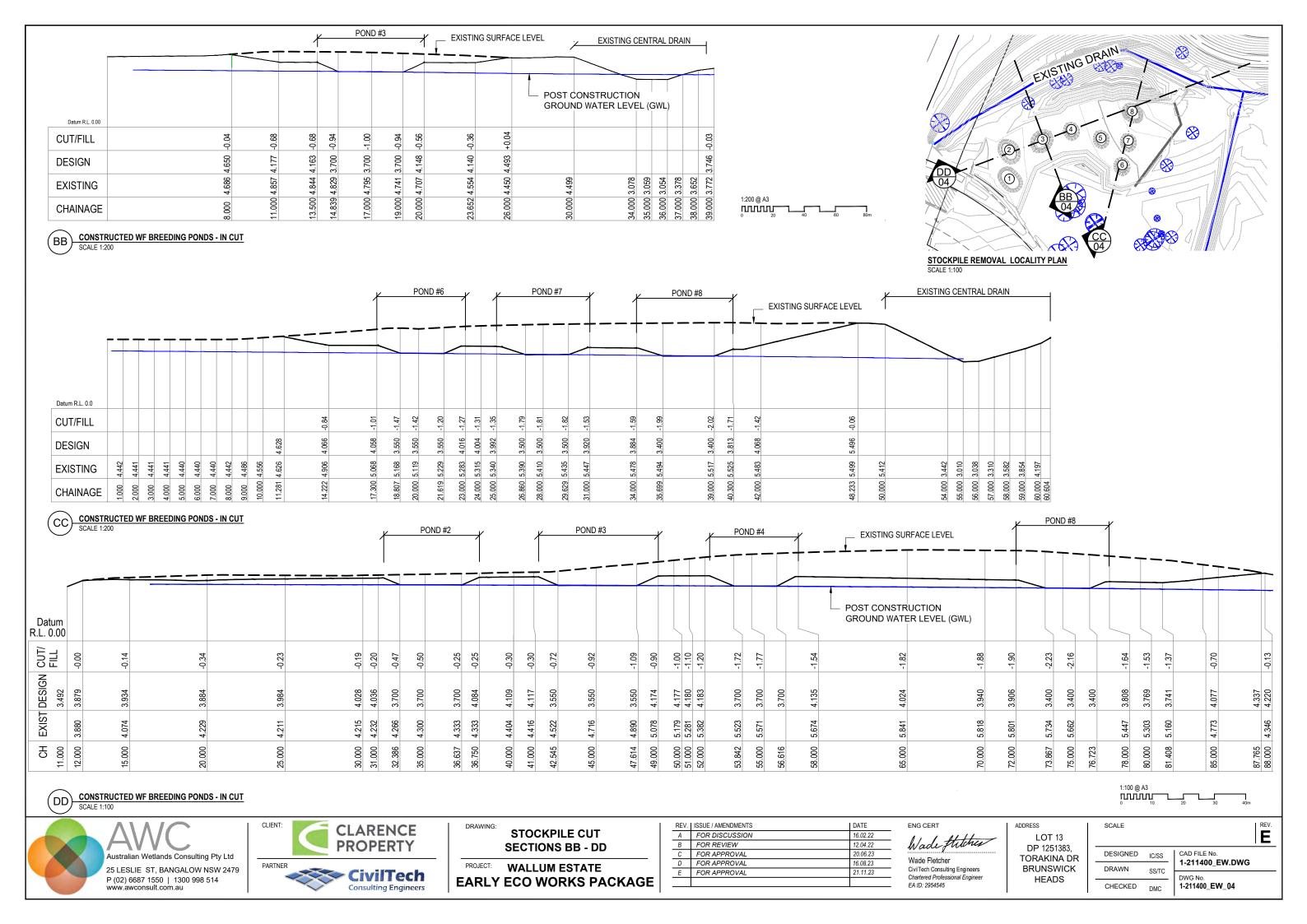
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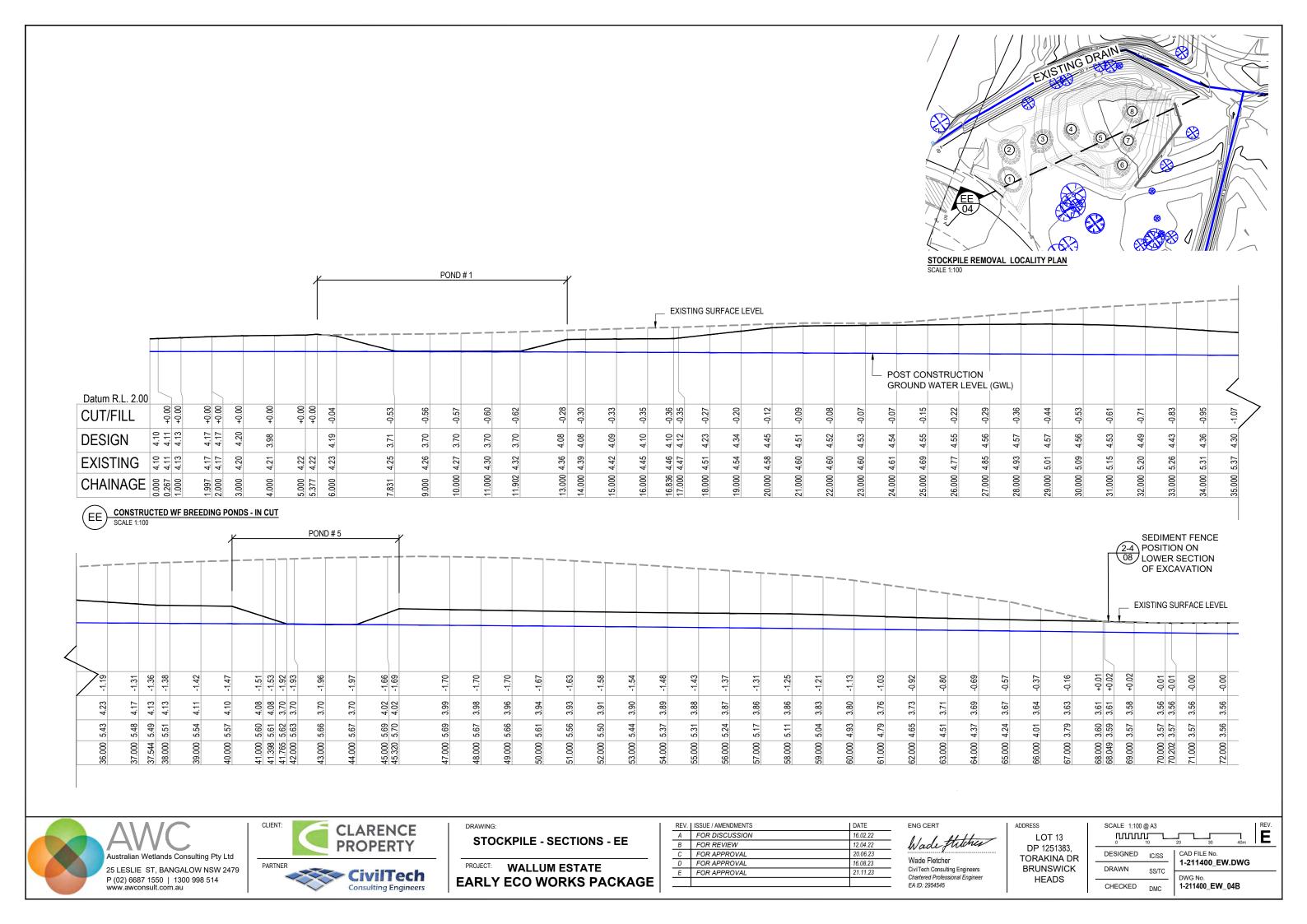
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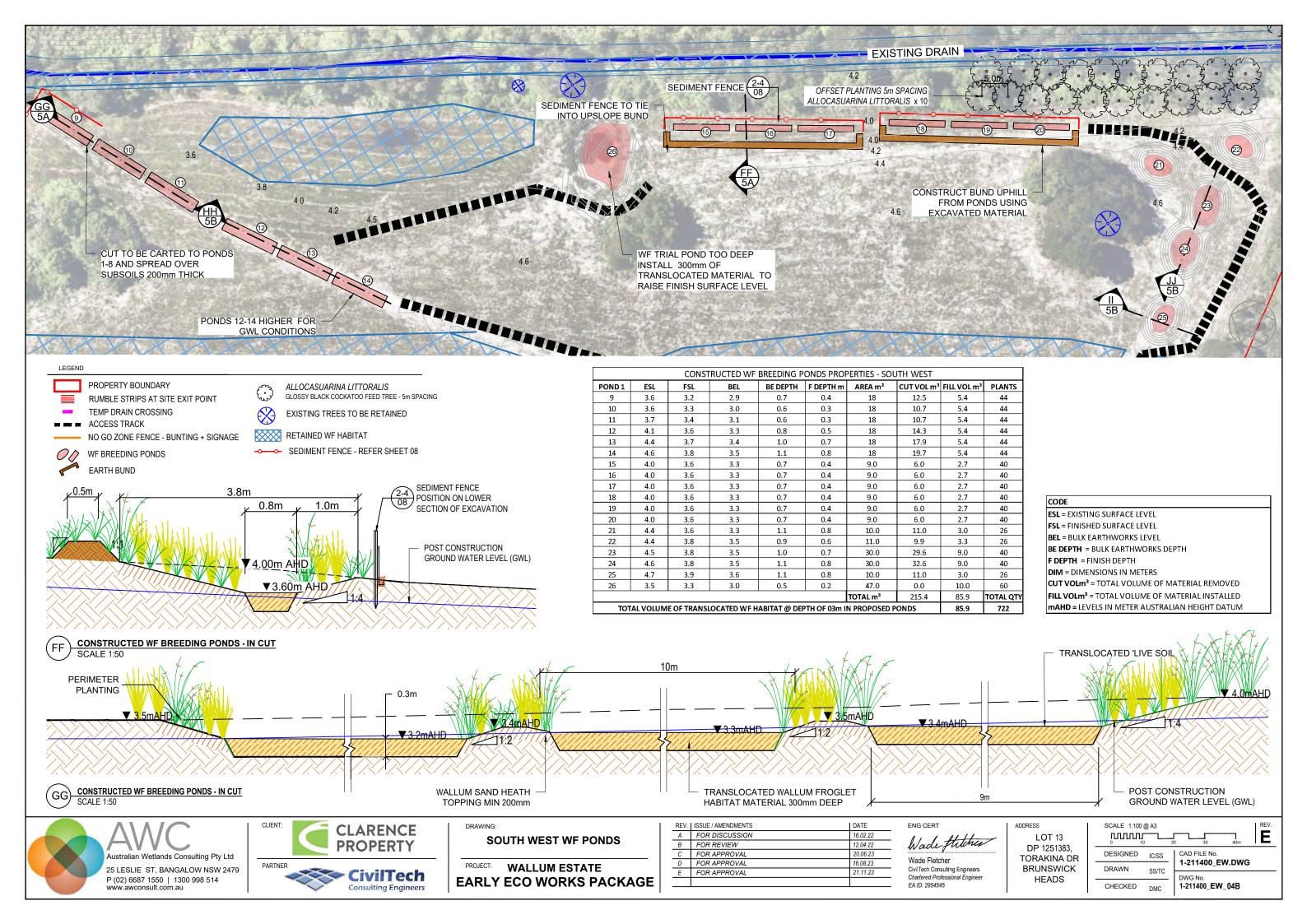


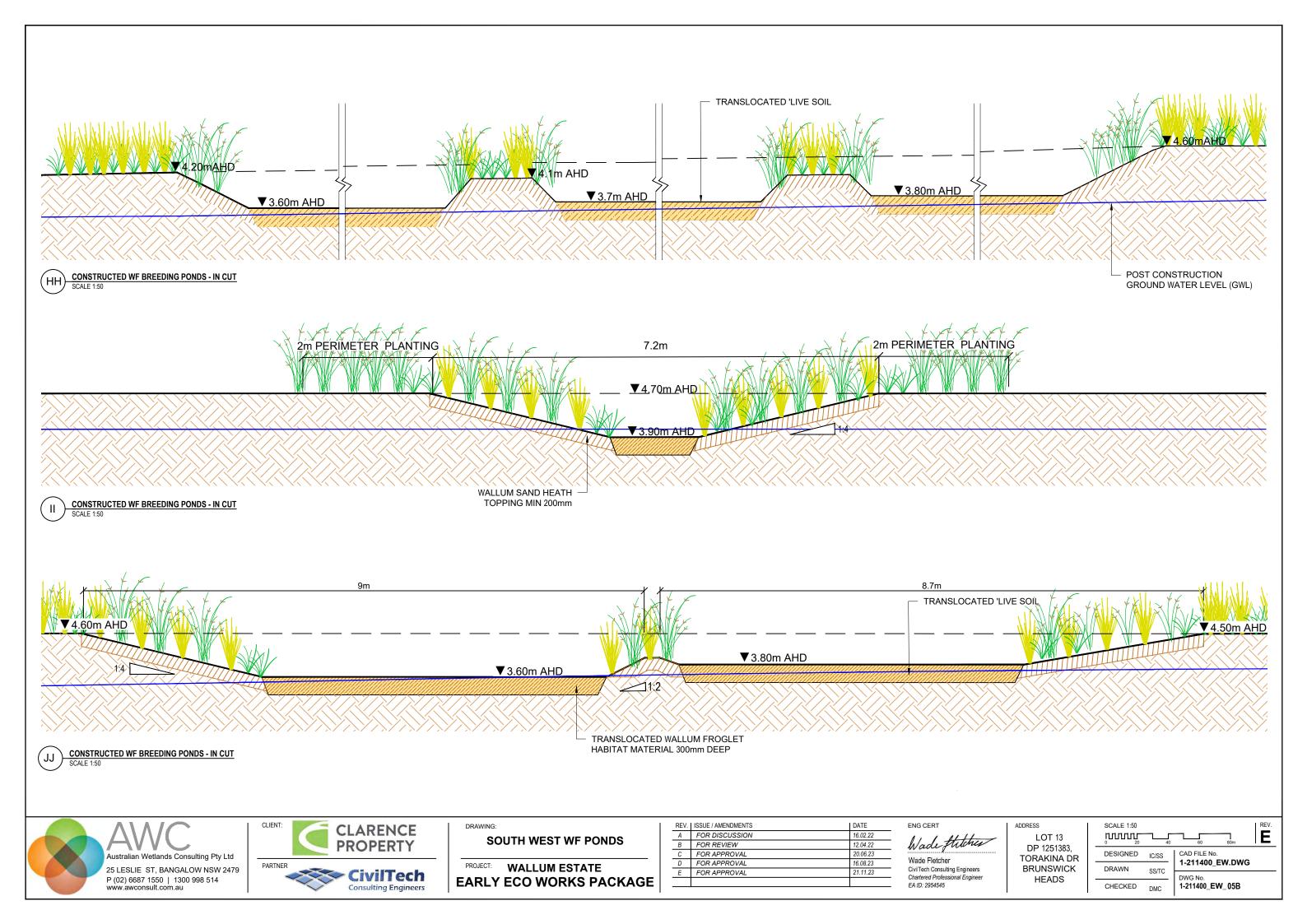


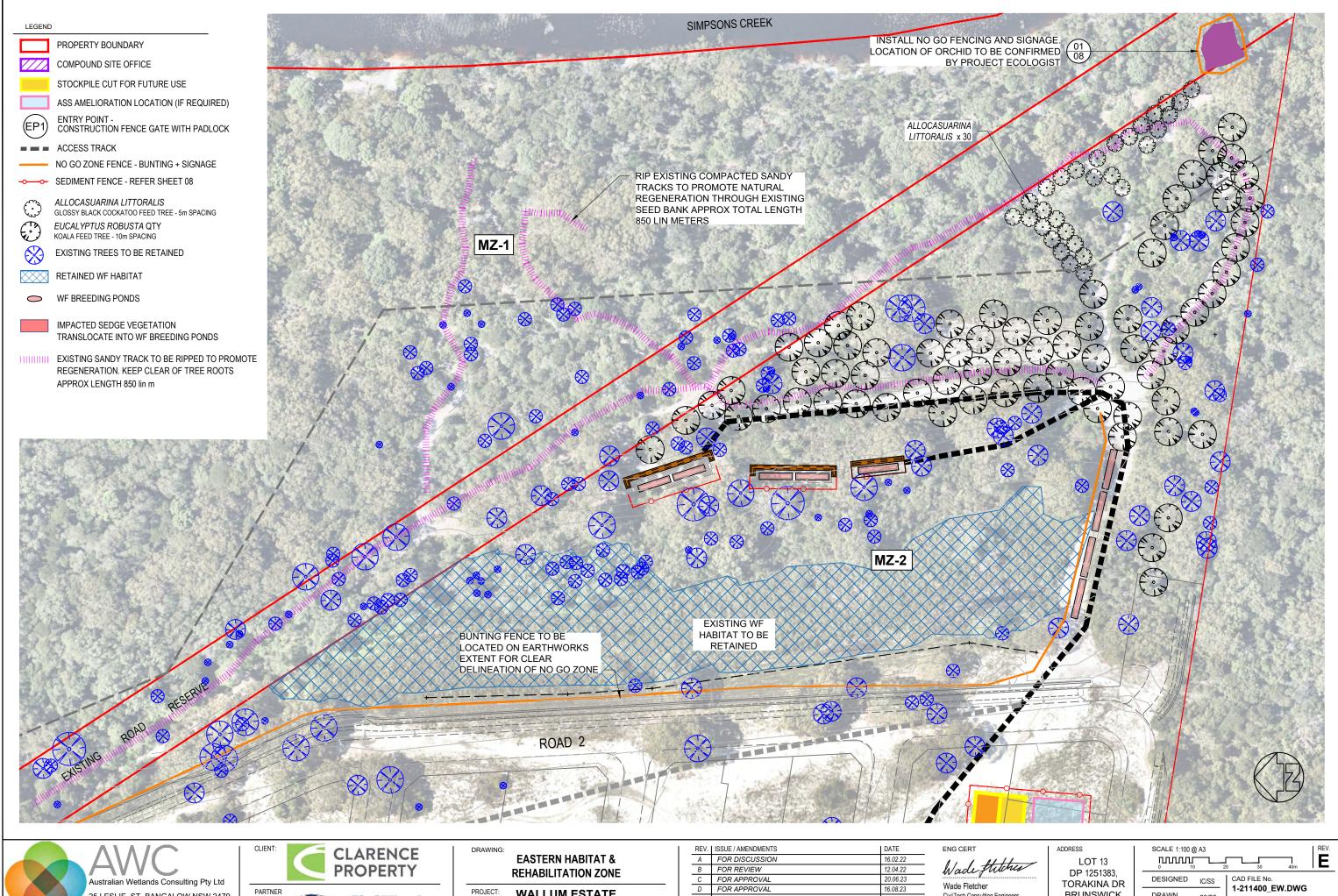
















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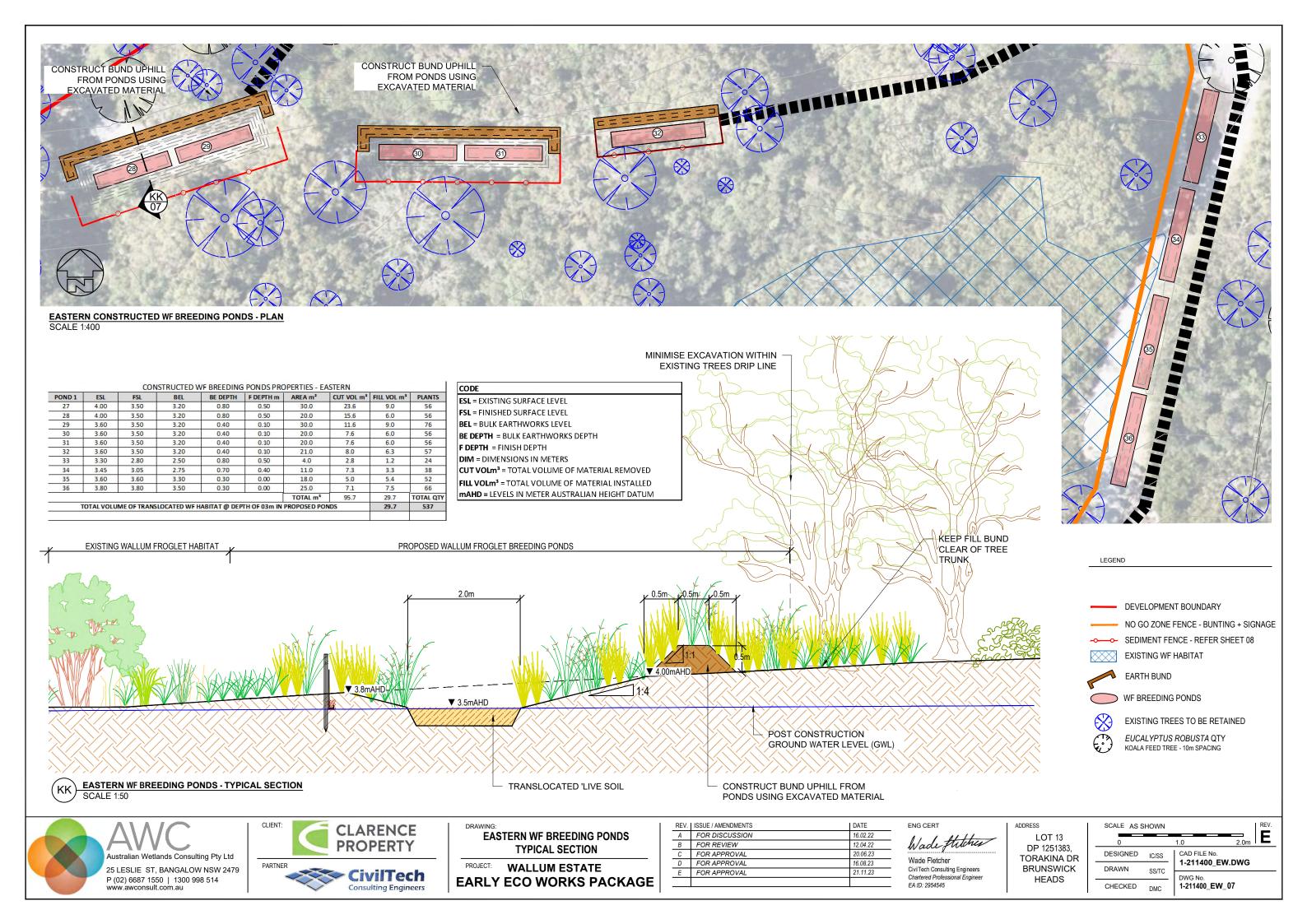
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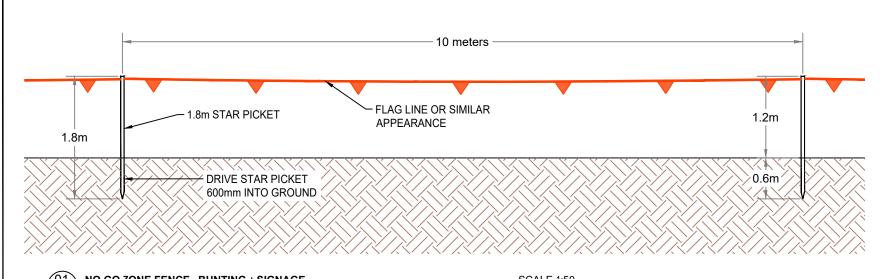
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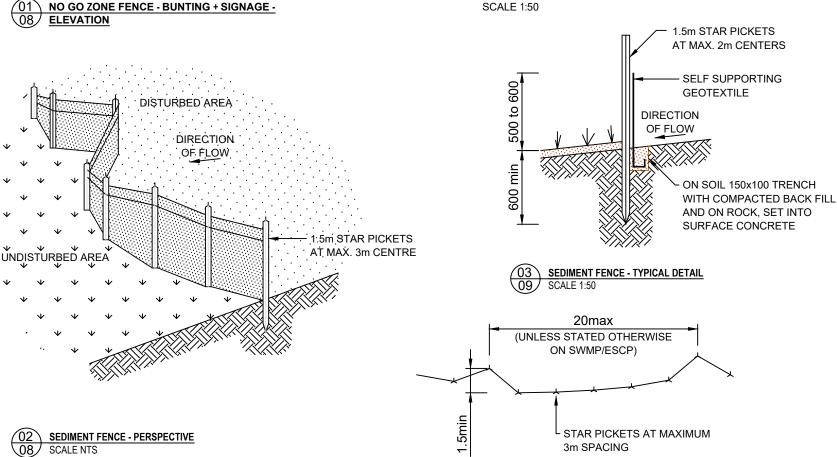
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BRUNSWICK HEADS

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SEDIMENT FENCE CONSTRUCTION NOTES:

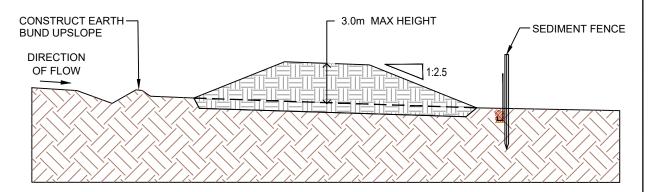
- 1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE.
- 2. DRIVE 1.5 METER LONG STAR PICKETS INTO GROUND, 3 METERS APART.
- 3. DIG A 150 DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
- 4. BACK FILL TRENCH OVER BASE OF FABRIC
- 5. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
- 6. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150 OVERLAP.

'NO GO ZONE FENCING'

- INSTALL WF PROTECTIVE FENCE AS INDICATED ON
 SHEET 1-211400_EW_ 01
- 2. CONSTRUCT FENCE AS SHOWN IN SECTION LEFT
- 3. WHERE POSSIBLE ALIGN FENCE ALONG EXISTING ROADS, ON SIDE OF CONSTRUCTED PONDS
- 4. ALIGNMENT TO WORK AROUND EXITING VEGETATION
- 5. INSTALL 'NO GO ZONE' SIGNS AS SHOWN BELOW, EVERY 50m ALONG PROTECTIVE FENCE
- 6. SIGN TO BE A4 AND LAMINATED

ENVIRONMENTAL NO GO ZONE AUTHORISED ACCESS ONLY

05 NO GO ZONE FENCE -SIGN 8 SCALE 1:50



04 SEDIMENT FENCE - TYPICAL DETAIL 08 SCALE NTS

STOCKPILE CONSTRUCTION NOTES:

- 1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METERS FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
- 2. CONSTRUCT ON CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
- THIS AREA IS TO BE STRIPPED OF ORGANIC MATERIAL AND CLEAN SAND AND TOPSOIL TO BE KEPT SEPARATE FOR REUSE.
- 4. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 3m IN HEIGHT.
- 5. BATTER SLOPE MAXIMUM 1:2.5
- 6. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METERS DOWNSLOPE





DRAWING: **DETAILS SHEET**

PROJECT: WALLUM ESTATE
EARLY ECO WORKS PACKAGE

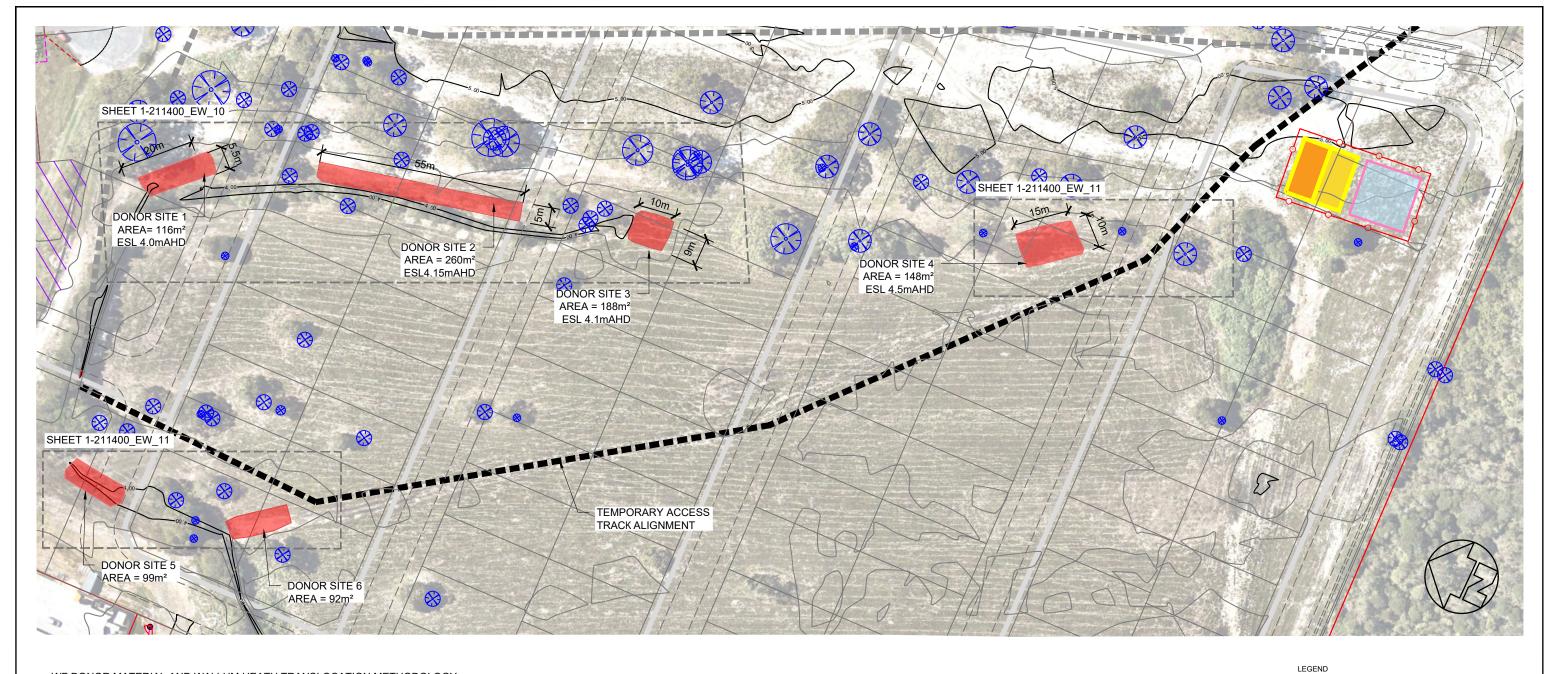
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CiviTech Consulting Engineers

LOT 13
DP 1251383,
TORAKINA DR
BRUNSWICK
HEADS

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WF DONOR MATERIAL AND WALLUM HEATH TRANSLOCATION METHODOLOGY

PRIOR TO THE TRANSLOCATION OF ANY WALLUM FROGLET HABITAT FROM THE PROPOSED HOUSE LOT AREA, WALLUM FROGLET POPULATION SURVEYS ARE TO BE CARRIED OUT BEFORE AND AFTER RAINFALL EVENTS AT THESE SITES TO ESTABLISH BOTH POPULATION SIZE AND DENSITY OF EXISTING WALLUM FROGLET'S IN THE WALLUM FROGLET HABITAT AREAS TO BE MOVED. REFER WALLUM MANAGEMENT PLAN FOR SURVEY METHODOLOGY.

AREA OF HIGH VALUE WF BREEDING HABITAT THAT ARE TO BE REMOVED IN PROPOSED DEVELOPMENT WORKS HAVE BEEN IDENTIFIED BY A QUALIFIED ECOLOGIST. SEE PLAN ABOVE IN RED.

- THE PROPOSED CONSTRUCTED WF BREEDING PONDS REQUIRES A TOTAL OF 215m3
- AREA OF "LIVE SOIL" DONOR MATERIAL AVAILABLE IS 240m3
- EXCAVATE 300mm OF TRANSLOCATED MATERIAL INCLUDING VEGETATION AND PLACE IN CONSTRUCTED WF BREEDING PONDS, TO A DEPTH OF 300mm.
- REFER SHEETS 03, 05 & 07 FOR BREEDING POND DESIGNS.

REQUIRED WF BREEDING PONDS DONOR MATERIAL			
CONSTRUCTED POND	AREA	TOTAL m ²	TOTAL m ³
NORTH WEST WF PON	IDS	258	77.4
SOUTH WEST WF PONDS EASTERN WF PONDS TOTAL		300.0	85.9
		271.0	51.3
		829	214.6
FILL PONDS 300mm FROM BAULK EARTHWORKS LEVEL WI			LEVEL WITH

TRANSLOCATED DONOR MATERIAL.

IMPACTED WF BREEDING PONDS DONOR MATERIAL AVAILABLE				
TOTAL m ²	TOTAL m ³			
116	34.8			
260	78			
88	26.4			
148	44.4			
99	29.7			
92	27.6			
803	240.9			
	116 260 88 148 99 92			

LIVE SOIL TO BE EXCAVATED AT A DEPTH OF 300mm. INCLUDING WALLUM HEATH VEGETATION FOR

THERE IS APPROX 26m³ OF SURPLUS DONOR MATERIAL TO BE

ESL = EXSTING SURFACE LEVEL

PROPERTY BOUNDARY
COMPOUND - SITE OFFICE - INDICATIVE
STOCKPILE CUT FOR FUTURE USE
SURPLUS DONOR MATERIAL TO BE STOCKPILED STOCKPILE IN BULK EARTHWORKS PHASE FOR POTENTIAL RECTIFICATION PURPOSES
AGG AMELIODATION LOGATION (IF DEGLIDED)

ASS AMELIORATION LOCATION (IF REQUIRED)

ACCESS TRACK

EXISTING TREES TO BE RETAINED

IMPACTED SEDGE VEGETATION

FINAL EXTENT OF "LIVE SOIL" DONOR MATERIAL TO BE MARKED OUT BY PROJECT ECOLOGIST PRIOR TO EXCAVATION





Consulting Engineers

"LIVE SOIL" WF BREEDING PONDS **DONOR MATERIAL PLAN 01**

WALLUM ESTATE EARLY ECO WORKS PACKAGE

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_	D	FOR APPROVAL	16.08.23
	Ε	FOR APPROVAL	21.11.23
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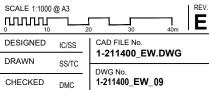
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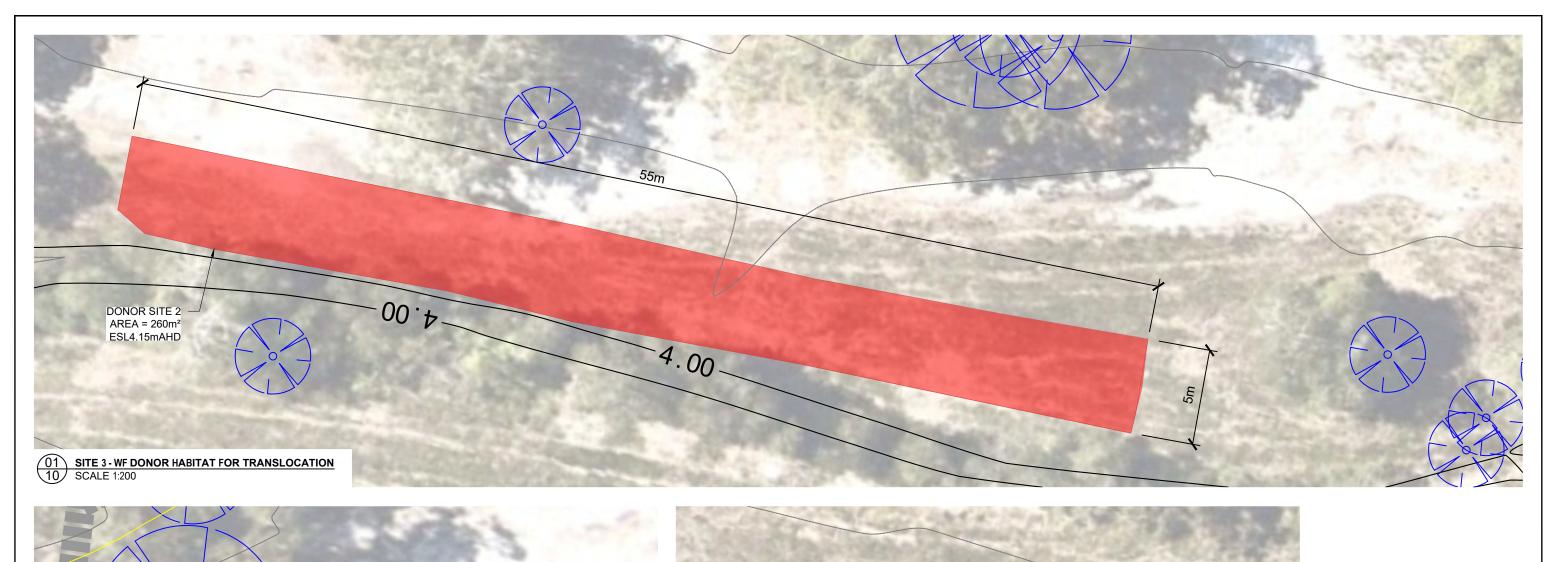
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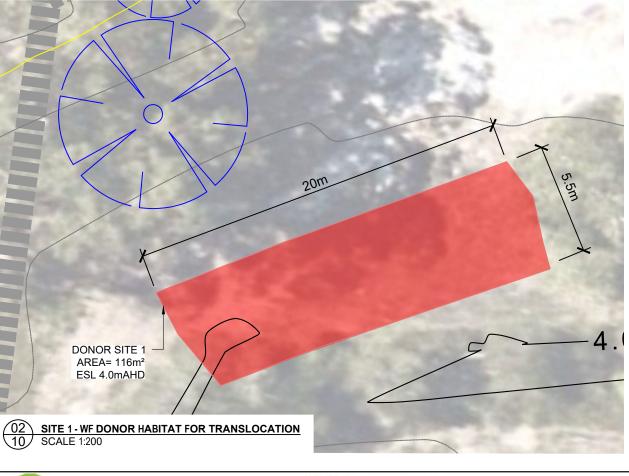
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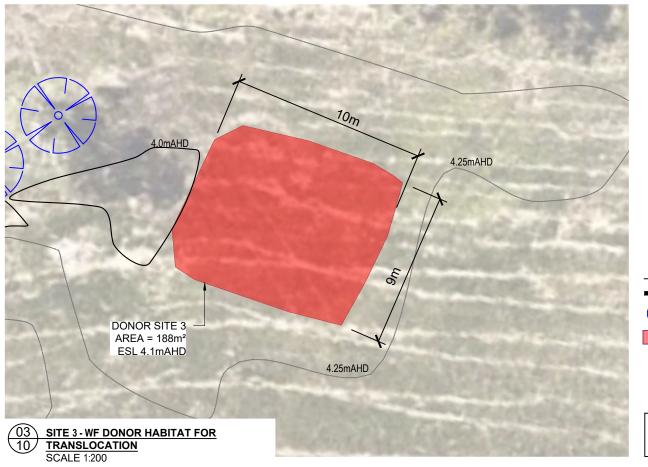
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LEGEND

■ ■ TEMP ACCESS TRACK

EXISTING TREES TO BE RETAINED

IMPACTED SEDGE VEGETATION TRANSLOCATE INTO WF BREEDING PONDS EXCAVATE AT DEPTH OF 300mm

FINAL EXTENT OF "LIVE SOIL" DONOR MATERIAL TO BE MARKET OUT BY PROJECT ECOLOGIST PRIOR TO EXCAVATION





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DRAWING: "LIVE SOIL" DONOR MATERIAL **DETAILED PLAN 01**

PROJECT: WALLUM ESTATE **EARLY ECO WORKS PACKAGE**

	REV.	ISSUE / AMENDMENTS	DATE
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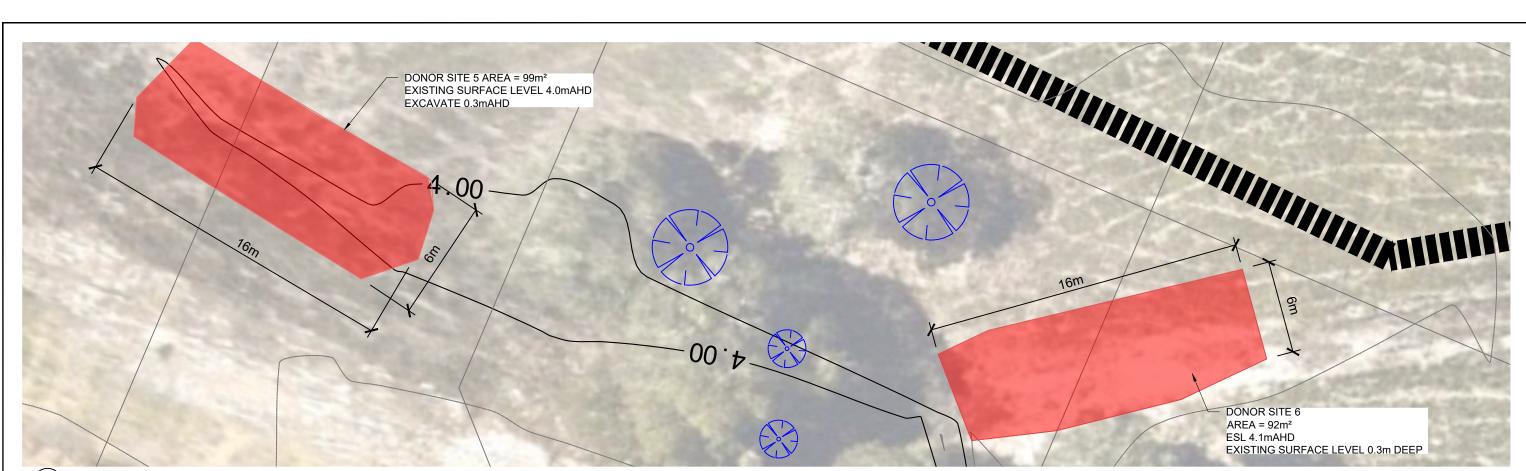
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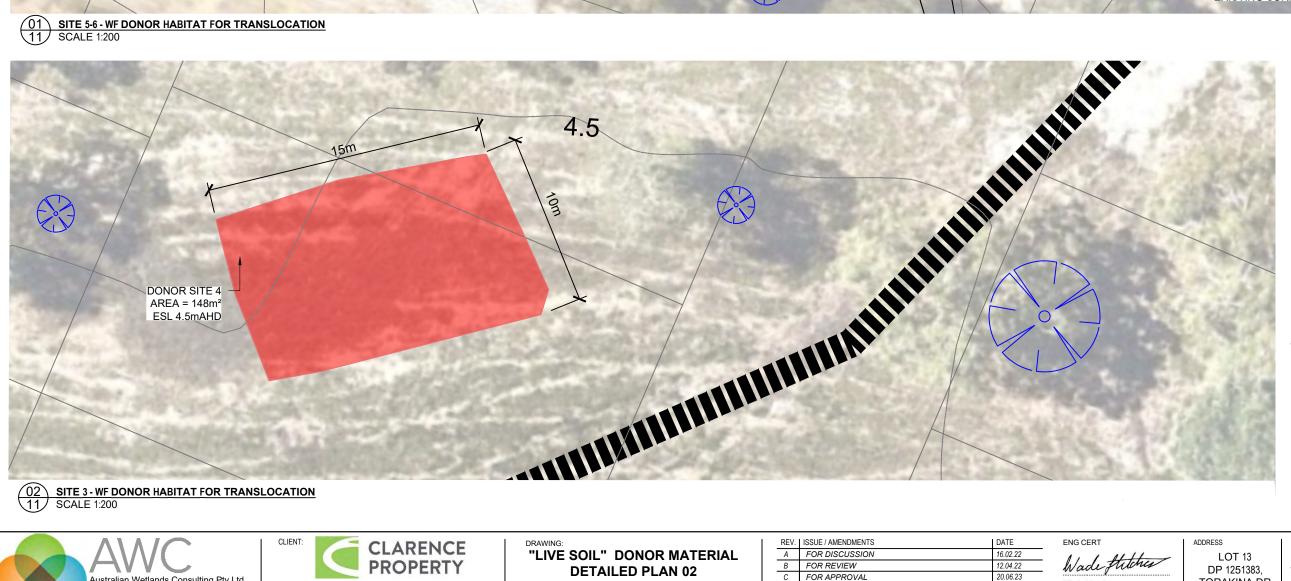
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DRAWN SS/TC 1-211400_EW_10 CHECKED



01 SITE 5-6 - WF DONOR HABITAT FOR TRANSLOCATION 11 SCALE 1:200



REV.

LEGEND

■ ■ TEMP ACCESS TRACK

EXISTING TREES TO BE RETAINED

IMPACTED SEDGE VEGETATION TRANSLOCATE "LIVE SOIL 300mm DEEP INTO WF BREEDING PONDS

FINAL EXTENT OF "LIVE SOIL" DONOR MATERIAL TO BE MARKET OUT BY PROJECT ECOLOGIST PRIOR TO EXCAVATION





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"LIVE SOIL" DONOR MATERIAL **DETAILED PLAN 02**

WALLUM ESTATE EARLY ECO WORKS PACKAGE

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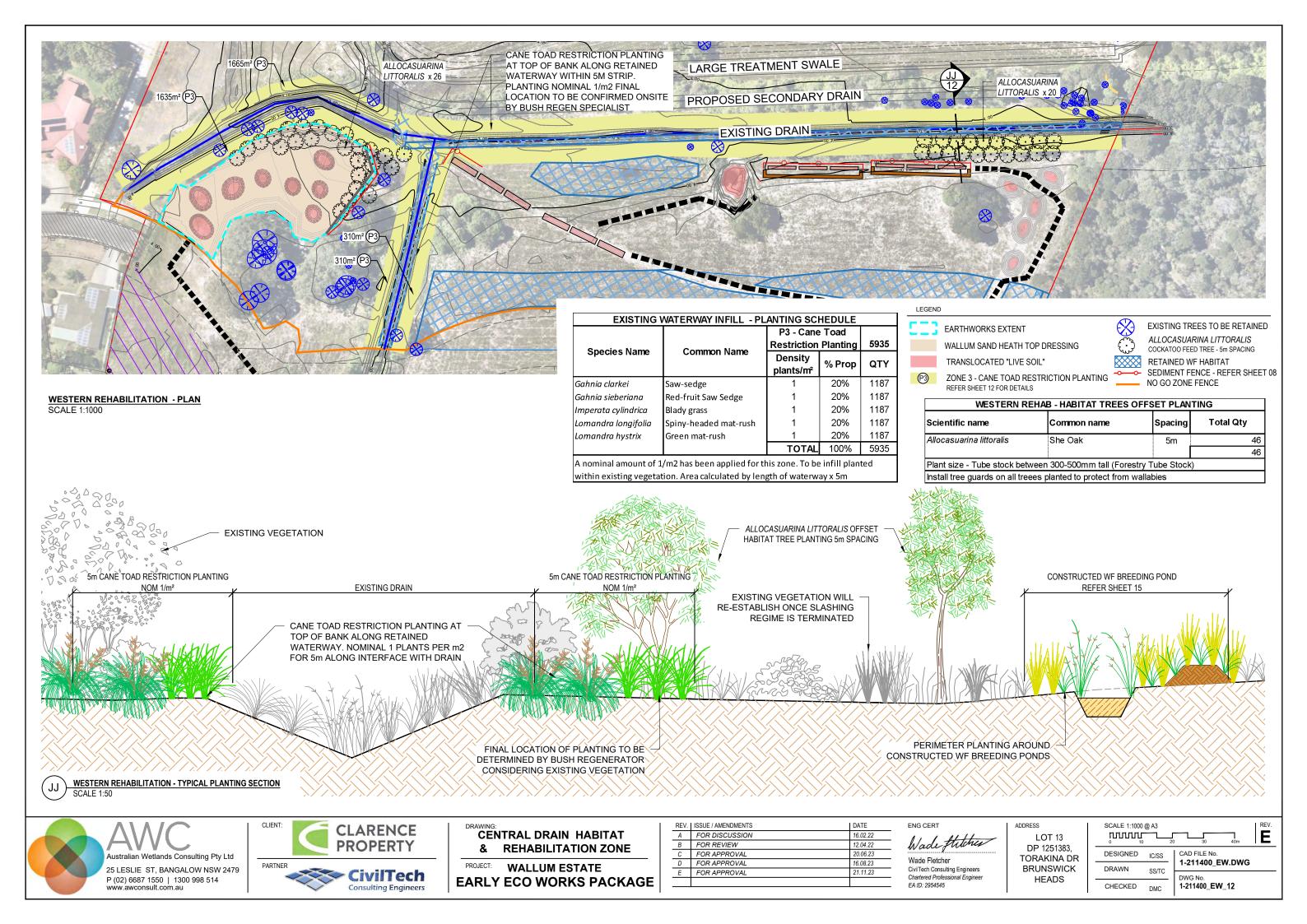
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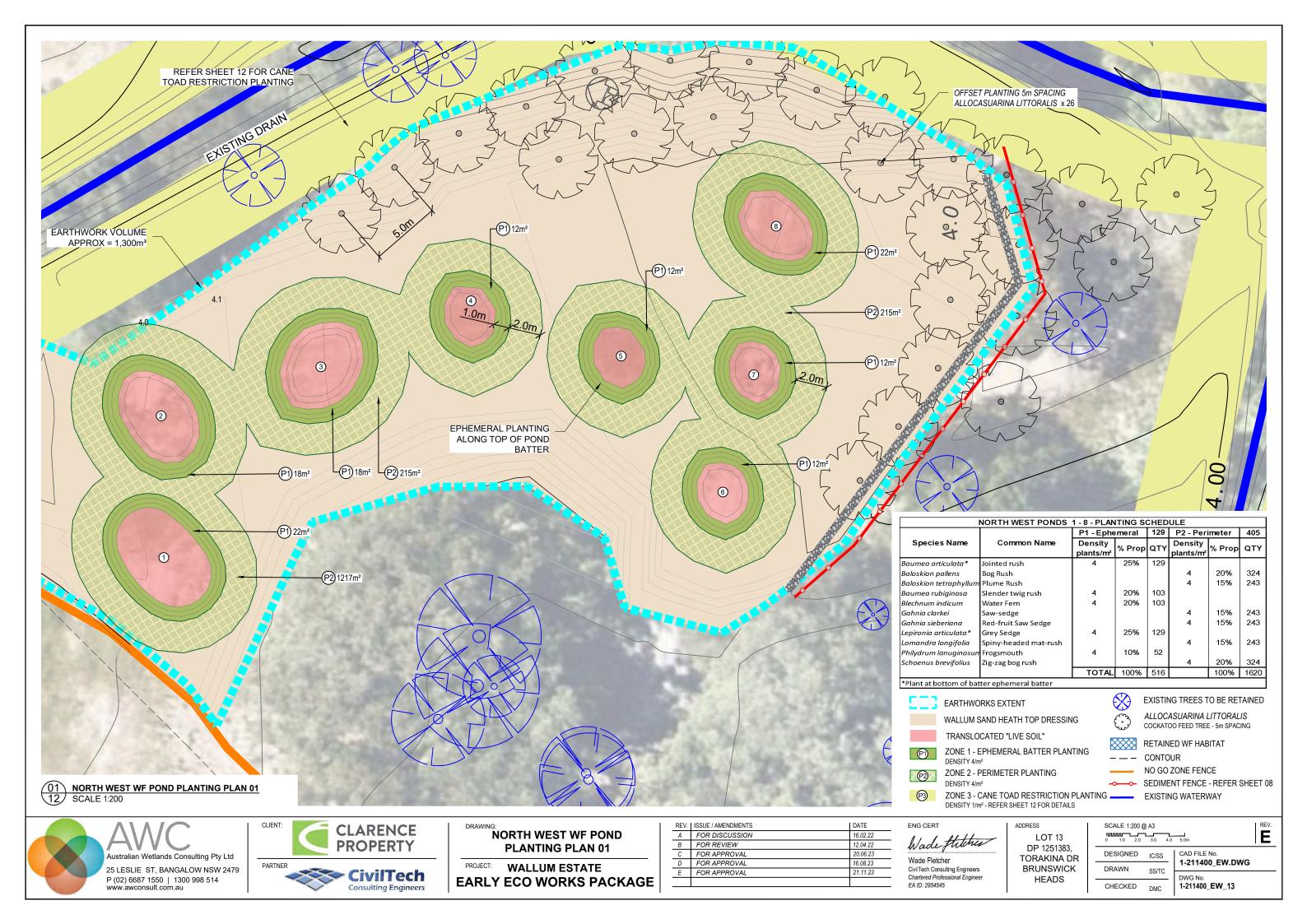
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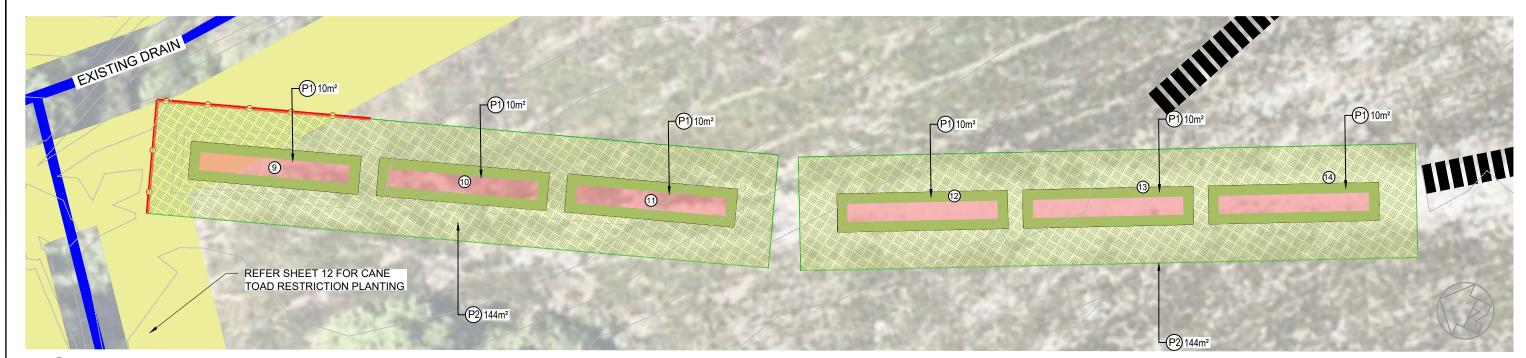
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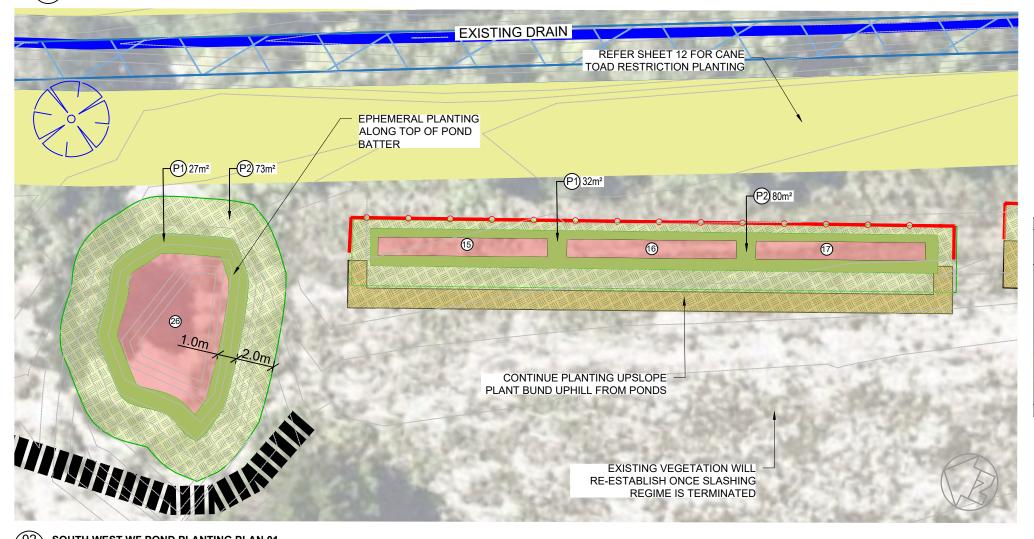
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01 SOUTH WEST WF POND PLANTING PLAN 01 14 SCALE 1:200



EARTHWORKS EXTENT

WALLUM SAND HEATH TOP DRESSING

TRANSLOCATED "LIVE SOIL"

EXISTING TREES TO BE RETAINED

RETAINED WF HABITAT

---- CONTOUR

ZONE 1 - EPHEMERAL PLANTING DENSITY 4/m²

ZONE 2 - PERIMETER PLANTING

ZONE 3 - CANE TOAD RESTRICTION PLANTING REFER SHEET 12 FOR DETAILS

		P1 - Epheme	ral Batter	368	P2 - Peri	meter	731
Species Name	Common Name	Density plants/m²	% Prop	QTY	Density plants/m²	% Prop	QTY
Baumea articulata*	Jointed rush	4	25%	368	•		
Baloskion pallens	Bog Rush				4	20%	585
Baloskion tetraphyllum	Plume Rush				4	15%	439
Baumea rubiginosa	Slender twig rush	4	20%	294			
Blechnum indicum	Water Fern	4	20%	294			
Gahnia clarkei	Saw-sedge				4	15%	439
Gahnia sieberiana	Red-fruit Saw Sedge				4	15%	439
Lepironia articulata*	Grey Sedge	4	25%	368			
Lomandra longifolia	Spiny-headed mat-rush				4	15%	439
Philydrum lanuginosum	Frogsmouth	4	10%	147			
Schoenus brevifolius	Zig-zag bog rush				4	20%	585
		TOTAL	100%	1472		100%	2924

02 SOUTH WEST WF POND PLANTING PLAN 01
14 SCALE 1:200





SOUTH WEST WF POND PLANTING PLAN 01 - 02

PROJECT: WALLUM ESTATE
EARLY ECO WORKS PACKAGE

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Chartered Professional Engineer

EA ID: 2954545

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BRUNSWICK
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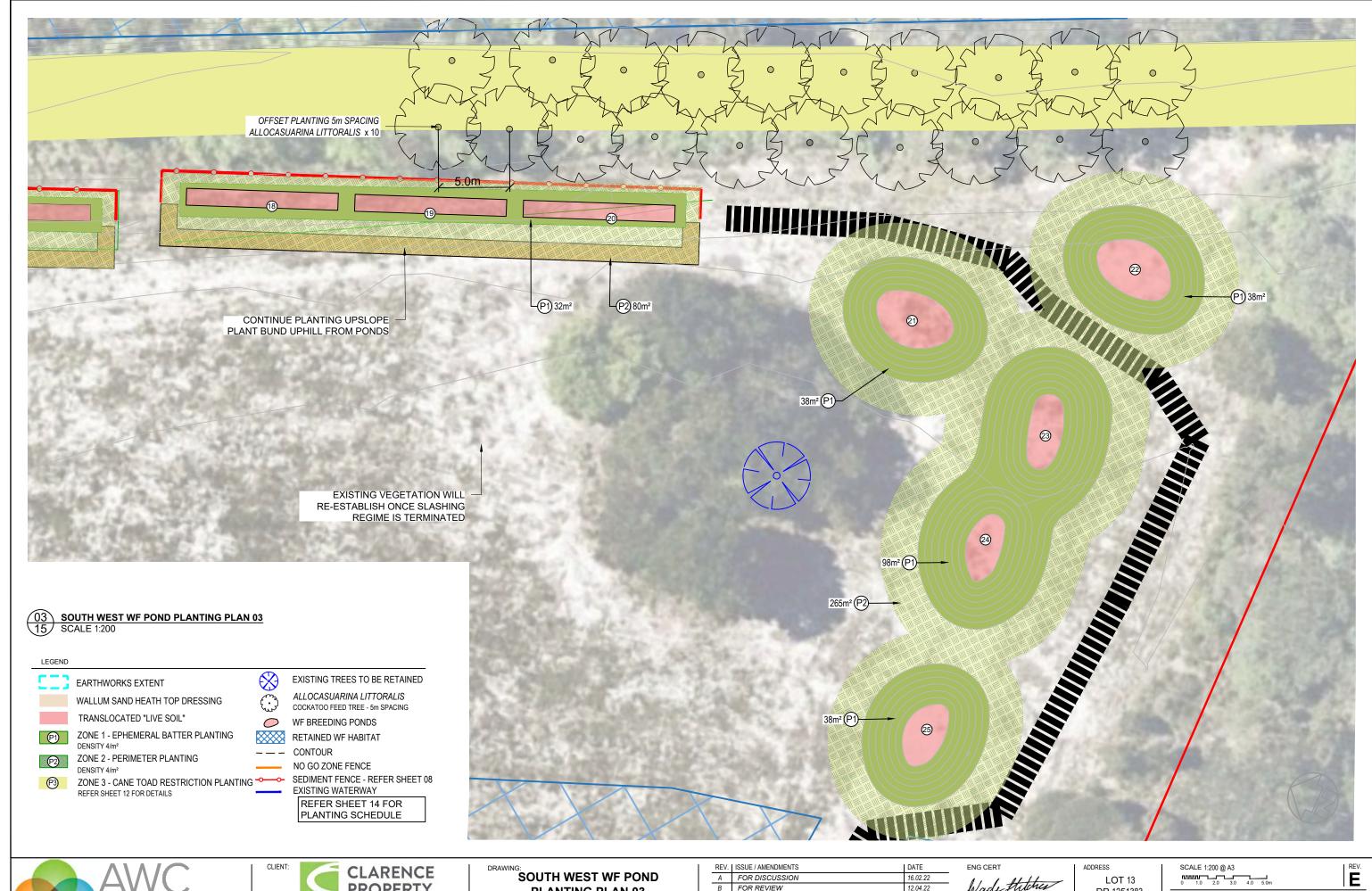
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NO GO ZONE FENCE

EXISTING WATERWAY

SEDIMENT FENCE - REFER SHEET 08







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PLANTING PLAN 03

WALLUM ESTATE EARLY ECO WORKS PACKAGE

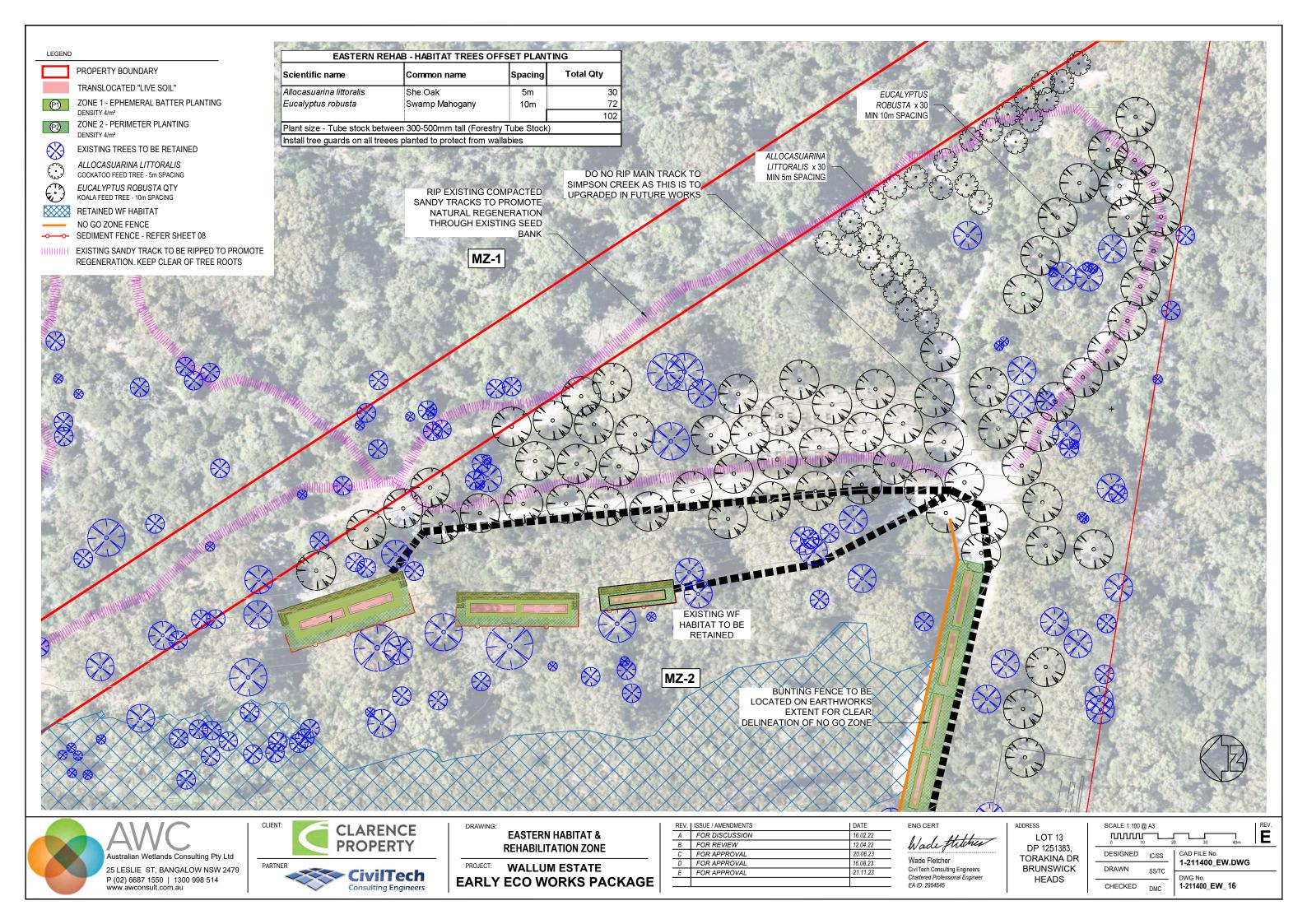
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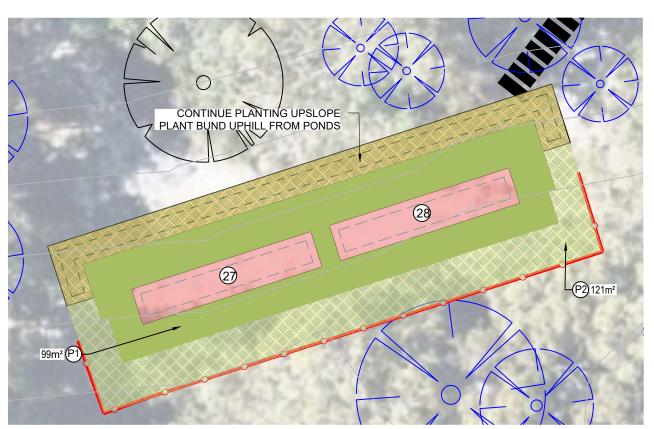
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Chartered Professional Engineer
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DP 1251383, TORAKINA DR **BRUNSWICK HEADS**

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0 1.0 2.0	3.0 4.0	5.0m			
DESIGNED	IC/SS	CAD FILE No. 1-211400 EW.DWG			
DRAWN	SS/TC	1-211400_EW.DWG			
	33/10	DWG No.			
CHECKED	DMC	1-211400_EW_15			





		P1 - Ephemeral Batter		206	P2 - Perimeter		518
Species Name	Common Name	Density plants/m²	% Prop	QTY	Density plants/m²	% Prop	QTY
Baumea articulata*	Jointed rush	4	25%	368			
Baloski on pallens	Bog Rush				4	20%	585
Baloski on tetraphyllum	Plume Rush				4	15%	439
Baumea rubiginosa	Slender twig rush	4	20%	294			
Blechnum indicum	Water Fern	4 4	20%	294			
Gahnia clarkei	Saw-sedge	8000	ACTION DATE.		4	15%	439
Gahnia sieberiana	Red-fruit Saw Sedge				4	15%	439
Lepironia articulata*	Grey Sedge	4	25%	368			
Lomandra longifolia	Spiny-headed mat-rush				4	15%	439
Philydrum lanuginosum	Frogsmouth	4	10%	147		(10)	
Schoenus brevifolius	Zig-zag bog rush				4	20%	585
		TOTAL	100%	1472		100%	2924

LEGEND

P1

TRANSLOCATED "LIVE SOIL"

ZONE 1 - EPHEMERAL BATTER PLANTING

ZONE 2 - PERIMETER PLANTING

EXISTING TREES TO BE RETAINED ALLOCASUARINA LITTORALIS

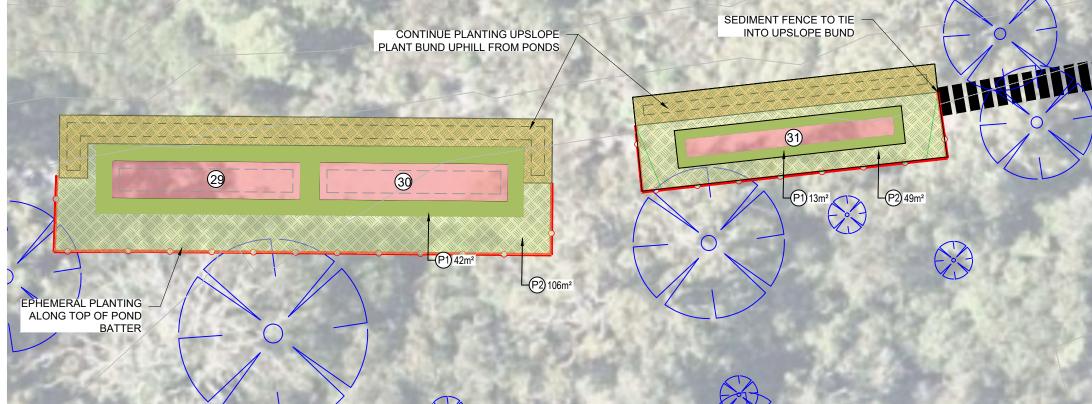
COCKATOO FEED TREE - 5m SPACING

RETAINED WF HABITAT

NO GO ZONE FENCE SEDIMENT FENCE - REFER SHEET 08 TEMPORARY ACCESS TRACK

EUCALYPTUS ROBUSTA QTY KOALA FEED TREE - 10m SPACING





03 EASTERN CONSTRUCTED WF BREEDING PONDS SCALE 1:400

02 EASTERN CONSTRUCTED WF BREEDING PONDS 17 SCALE 1:200

stralian Wetlands Consulting Pty Ltd 25 LESLIE ST, BANGALOW NSW 2479 P (02) 6687 1550 | 1300 998 514 www.awconsult.com.au



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EASTERN WF BREEDING PONDS PLANTING PLAN 03

WALLUM ESTATE EARLY ECO WORKS PACKAGE

REV.	ISSUE / AMENDMENTS	DATE
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ENG CERT Wade Hitches Wade Fletcher CivilTech Consulting Engineers Chartered Professional Enginee EA ID: 2954545

LOT 13 DP 1251383 TORAKINA I BRUNSWIC HEADS

13m² (P1)

3, DR CK	SCAL TUTUTU 0
	DESI
	DRAV
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ALE 1:200 @	3.0 4.0	5.0m REV.	
SIGNED	IC/SS	CAD FILE No.	
AWN	SS/TC	1-211400_EW.DWG	
	33/10	DWG No.	
ECKED	DMC.	1-211400_EW_17	

32

EARTHWORKS

- REFER TO AWC 1 211400 EW 01-07 FOR EARTHWORKS DOCUMENTATION.
- THE EXTENT OF THE WORKS ARE SUSCEPTIBLE TO FINISHED CONSTRUCTION TOLERANCES. AS SUCH, A TOLERANCE OF +/-50MM APPLIES.

STOCKPILES

- THE POSITION OF ANY STOCKPILES MUST BE APPROVED BY THE SITE SUPERINTENDENT.
- ADEQUATE PROTECTION FOR PILED MATERIAL MUST BE SUPPLIED TO PREVENT WIND AND WATER EROSION
- NOTHING MAY BE REMOVED FROM THE STOCKPILE EXCEPT NOXIOUS WEEDS THAT MAY GERMINATE DURING THE STORAGE PERIOD.
- ALL STOCKPILES SHALL BE ENCLOSED WITHIN A SEDIMENT FENCE.

NATURAL REGENERATION TECHNIQUE

TRANSLOCATED SLABS & 'LIVE' TOPSOIL SOURCED FROM IMPACTED WF HABITAT

IT IS ANTICIPATED THAT SEED AND RHIZOME BANK WITHIN THE "LIVE" TOPSOIL AND TRANSLOCATED SLABS WILL STRIKE AND NATURALLY REGENERATE THE CREATED HABITAT.

INDICATIVE STOCKPILE LOCATIONS ARE IDENTIFIED ON SHEET AWC 1 211400 EW 01

WEED CONTROL

- WEEDS ARE LIMITED ON SITE. CONTRACTORS MUST BE CAREFUL NOT TO IMPORT WEEDS VIA INTRODUCED PLANT STOCK OR MACHINERY
- WHISKEY GRASS IS THE DOMINANT WEED SPECIES ON SITE, FOUND IN BOTH MZ1 AND MZ2.
- ONLY CONTRACTORS THAT ARE EXPERIENCED AND TRAINED IN PLANT IDENTIFICATION AND WEED REMOVAL TECHNIQUES SHALL BE EMPLOYED TO REMOVE VEGETATION AND WEEDS.

PLANTING EXTENTS

PERIMETER PLANTING IS TO BE IMPLEMENTED AROUND ALL CONSTRUCTED FROG PONDS. REFER SHEET OFFSET TREES ARE TO BE INSTALLED ARE PER SHEET AWC_1_211400_EW_12 & 16

PLANT ESTABLISHMENT

IF NATURAL REGENERATION IS POOR AND THE OVERALL PLANT COMMUNITY HEALTH IS LOW WITHIN THE CREATED WF BREEDING PONDS. PONDS MUST BE PLANTED.

IN THIS SCENARIO AN AUDIT WILL BE UNDERTAKEN OF ALL PONDS AND GUIDANCE FROM AWC WILL BE PROVIDED IN REGARDS TO PLANTING AREAS, DENSITIES AND SCHEDULE.

PRE-ORDERING

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL PLANT MATERIAL IS

AVAILABLE TO SIZE AND SPECIES TYPE NOMINATED IN THE PLANT SCHEDULES.

FOR SPECIES IN LARGE QUANTITIES THIS WILL REQUIRE THE PRE ORDERING AND GROWING ON OF SPECIES

BY A SELECTED NURSERY. PROPOSED PRE ORDER PLANTS ARE TO BE SOURCED AND APPROVED IN CONSULTATION WITH THE DESIGNER. CONFIRM ANY CHANGES WITH THE DESIGNERS AND DOCUMENT THE CHANGE IN THE AS-CONSTRUCTED DRAWINGS. PLANT AVAILABILITY SHOULD BE DISCUSSED AT THE SITE INCEPTION MEETING. NO SUBSTITUTION OF PLANT SPECIES SHOULD BE MADE WITHOUT WRITTEN APPROVAL FROM THE DESIGNER OR AN ECOLOGIST.

PLANT STOCK

PLANT SPECIES REFER TO AWC_1_211400_EW_12-17

DAMAGED OR FAILED PLANTS MUST BE REPLACED WITH PLANTS OF THE SAME TYPE AND SIZE.

PLANTS

GENERAL: PROVIDE LOCAL PROVENANCE PLANTS WHERE AVAILABLE WITH LARGE HEALTHY ROOT SYSTEMS, NO EVIDENCE OF ROOT CURL, RESTRICTION OR DAMAGE. PLANTS SHOULD BE VIGOROUS, WELL ESTABLISHED, FREE FROM PEST AND DISEASE AND OF A FORM CONSISTENT WITH THE SPECIES OR VARIETY.

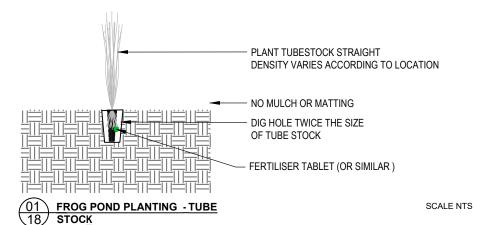
- PLANT STOCK SHOULD BE HARDENED OFF IN A NURSERY WITH CLIMATE SIMILAR TO THE SUBJECT SITE.
- PLANTS SHOULD BE AN AVERAGE 300-500MM HIGH INCLUDING POT AND NOT LESS THAN 200MM IN HEIGHT
- PLANT STOCK TO BE IN "TUBE STOCK" OR SIMILAR
- REPLACEMENT: REPLACE DAMAGED OR FAILED PLANTS WITH PLANTS OF THE SAME TYPES AND SIZE.

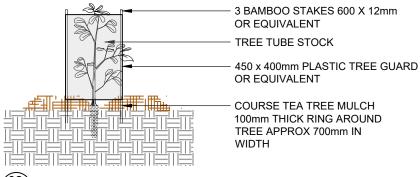
PLANTING TIMING

DO NOT PLANT IN UNSUITABLE WEATHER CONDITIONS SUCH AS EXTREME HEAT, COLD, WIND OR RAIN. IN OTHER THAN SANDY SOILS, SUSPEND EXCAVATION WHEN THE SOIL IS WET.

PLANTING TECHNIQUE

PLANT HOLES SHOULD BE TWICE THE SIZE OF THE TUBE STOCK. PLANTS SHOULD BE CAREFULLY REMOVED FROM THE TUBE TO ENSURE THEIR STEMS ARE NOT BROKEN FROM THE ROOT BALL. THE TOP OF THE ROOT BALL SHOULD BE SLIGHTLY LOWER THAN THE SURFACE LEVEL AFTER TOPSOIL HAS BEEN FIRMLY PLACED IN THE PLANTING HOLE AND AROUND THE PLANT. WATER CRYSTALS AND FERTILISER MAY BE USED TO ASSIST WITH ESTABLISHMENT; HOWEVER FERTILISER SHOULD NOT BE NECESSARY IN AMELIORATED SOILS.





HABITAT TREES - TUBE STOCK & TREE GUARD 18 / SCALE NTS





Consulting Engineers

PLANTING NOTES & DETAILS

PROJECT: WALLUM ESTATE **EARLY ECO WORKS PACKAGE**

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Wade Stetches Wade Fletcher

EA ID: 2954545

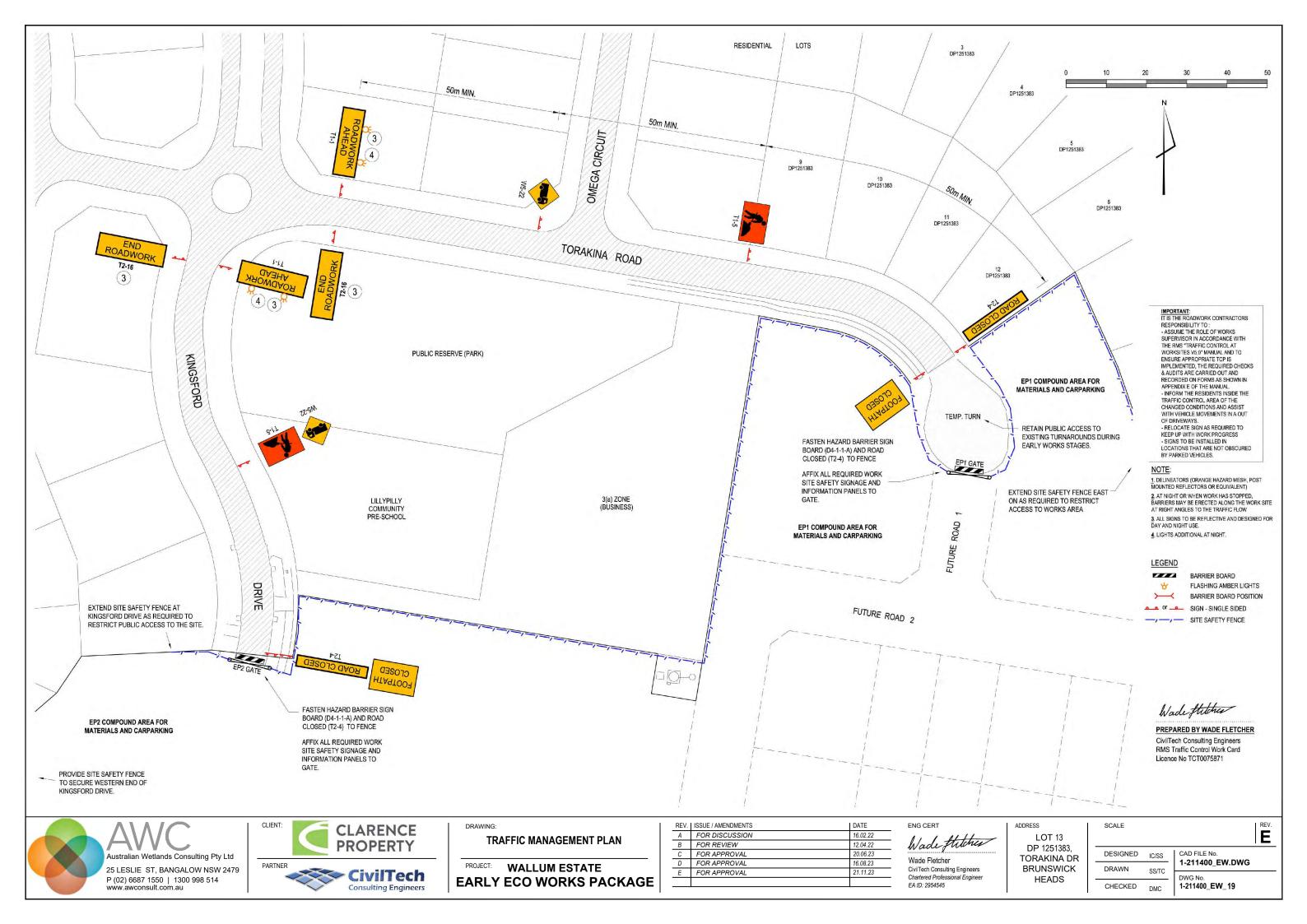
CivilTech Consulting Engineers Chartered Professional Engineer

LOT 13 DP 1251383, TORAKINA DR **BRUNSWICK** HEADS

DRAWN

CAD FILE No DESIGNED IC/SS 1-211400 EW.DWG SS/TC CHECKED DMC

1-211400 EW 18



DA 10.2021.575.1 CONDITIONS

3. Vegetation Removal

This development consent does not authorise any native tree to be ringbarked, cut down, lopped, removed, or damaged, or caused to be ringbarked, cut down, lopped, removed or damaged beyond those in the area identified as "extent of works" on the Vegetation Management Plan (VMP). No native trees or vegetation may be cleared or removed until a Subdivision Certificate has been issued relevant to those trees and vegetation.

4. Discovery of Aboriginal Relics

Upon discovery of any Aboriginal relics within the meaning of the National Parks and Wildlife Act 1974, the developer shall immediately notify the NSW Department of Planning Industry and Environment (DPIE), Tweed Byron Local Aboriginal Land Council and the Bundjalung of Byron Bay Aboriginal Corporation (Arakwal) and must immediately cease works within the vicinity until such time as the necessary permits have been obtained from DPIE to continue the work. The developer must comply with any further request made by DPIE to cease work for the purposes of archaeological assessment AND recording.

5. Integrated Approvals from other State Government Approval Bodies

This development consent includes an Integrated development approval under Sections 4.46 and 4.47 of the Environmental Planning and Assessment Act 1979, an authorisation under section 100B of the Rural Fires Act 1997 in respect of bush fire safety for subdivision for the purpose of creating residential land, and is subject to the General Terms of Approval from the RFS dated 23 December 2021 contained in **Schedule 1** of this Notice of Determination.

THE FOLLOWING CONDITIONS MUST BE COMPLIED WITH PRIOR TO **COMMENCEMENT OF SUBDIVISION WORKS**

The following conditions apply to all stages.

47. Prestart Meeting - ecological restoration works

The Environmental Manager must arrange a prestart site meeting with Council Ecologist/ Environmental Health Officer prior to commencement of any ecological restoration works.

Advisory note: A minimum 2 weeks' notice must be given to Council prior to the meeting.

48. CEMP - Reporting and Review

An independent environmental audit of CEMP implementation is to be undertaken by a suitably qualified person/s and submitted to Council for approval prior to the commencement of each Stage of the development. Any non-compliance/s are to be documented along with contingency measures undertaken with suggested alterations to future stages and the CEMP updated accordingly.

The review of compliance with the CEMP should include but not be limited to:

- a. Surface water quality monitoring and impacts;
- b. Adequacy of erosion and sediment control measures;
- c. Groundwater level and quality;
- d. Acid frog monitoring and habitat health;
- e. Threatened species monitoring and health;
- f. Vegetation rehabilitation and management progress;
- g. Mosquito management;
- h. Dust control;
- Noise and vibration management;
- Acid sulfate soil management: and
- k. Contaminated land management.

49. Trees to be retained and fenced

Trees to be retained are to be protected by a fence so as to minimise disturbance to existing ground conditions within the dripline of the trees. The fence is to be constructed:

- a. with a minimum height of 1.2 metres,
- b. outside the dripline of the tree,
- c. of steel star pickets at a maximum distance of 2 metres between pickets,
- d. using a minimum of 3 strands of steel wire,
- e. to enclose the tree, and
- f. with orange barrier mesh, or similar, attached to the outside of the fence and continuing around its perimeter

The fence is to be maintained for the duration of the site clearing, preparation and construction works.

50. Signs to be erected on building and demolition sites

A sign must be erected in a prominent position on the work site:

- a. stating that unauthorised entry to the work site is prohibited, and
- b. showing the name of the person in charge of the work site and a telephone number at which that person may be contacted outside working hours.

Any such sign is to be removed when the work has been completed.

51. Copies of Approved Plans

Copies of approved plans required by conditions of this consent including ASSMP, BPoM CEMP, SMP, SWGMP, UFP, VMP, and WFMP must be keep in a prominent location on site where they can be easily accessed by construction and operational personnel.

52. Approved Environmental Plans must be implemented

All controls and measures must be maintained in accordance with approved plans and reports. The Environmental Manager nominated by the applicant is required to ensure that the construction management and all construction staff are made aware of their responsibility to abide by the plans approved under this consent.

53. Acid Sulfate Soils

Acid sulfate soil controls, and management measures are to be in place in accordance with the approved Management Plans. All treatment and storage facilities be in place prior the commencement of any subdivision works.

54. Dewatering of Excavations

Dewatering of excavations must be conducted in accordance with the approved dewatering management plan. Only clean and unpolluted water is to be discharged to Council's stormwater drainage system or any watercourse to ensure compliance with the Protection of Environment Operations Act.

55. Subdivision Work

Subdivision work in accordance with the development consent must not be commenced until a Subdivision Works Certificate has been issued, a principal certifying authority has been appointed and at least 2 days' written notice for the intention to commence works has been made, in accordance with the requirements of the Environmental Planning and Assessment Act and Regulations. The written notice for the intention to commence works must also include names and contact details of the certifying engineer and principal contractor.

Note. Subdivision work means any physical activity authorised to be carried out under the conditions of this development consent for the subdivision of land, including earthwork, road work, stormwater drainage work, landscaping work, tree/vegetation removal, erosion and sediment control, traffic control, etc.

56. Public Liability Insurance

The developer and/or contractor must produce evidence to the Principal Certifying Authority of public liability insurance cover for a minimum of \$20 million. Council is to be nominated as an interested party on the policy.

57. Erosion and sediment measures

Erosion and sedimentation controls are to be in place in accordance with the approved Erosion and Sediment Control Plan.

No soil or fill material is to be placed within the dripline of a tree so as to cause changes in surface level by more than 50mm from the existing level and such soil is not to be compacted. Such soil fill must not be finer than that being covered in situ, e.g. clay must not be placed over loam soil.

Note: Council may impose on-the-spot fines for non-compliance with this condition.

58. Metered Stand Pipe required

Prior to the commencement of any civil works requiring water from Council water main, a metered Stand Pipe for temporary water supply must be supplied and installed by Council. Contact Council's Water and Recycling Department to arrange for this requirement on 02 6626 7000.

Note: Council may impose on-the-spot fines for non-compliance with this condition.

THE FOLLOWING CONDITIONS MUST BE COMPLIED WITH DURING **CONSTRUCTION OF SUBDIVISION WORKS**

THE CONTRACTOR IS TO READ THE DEVELOPMENT APPLICATION CONSENT DA10.2021.575 FOR A COMPLETE LIST OF CONDITIONS.





DA 10.2021.575.1 **CONSTRUCTION CONDITIONS 01**

WALLUM ESTATE EARLY ECO WORKS PACKAGE

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Wade Hitches Wade Fletcher

CivilTech Consulting Engineers

ADDRESS LOT 13 DP 1251383, TORAKINA DR **BRUNSWICK HEADS**

SCALE

REV. CAD FILE No. DESIGNED IC/SS 1-211400 EW.DWG DRAWN SS/TC 1-211400_EW_20 CHECKED DMC

DA 10.2021.575.1 CONDITIONS

THE FOLLOWING CONDITIONS MUST BE COMPLIED WITH DURING CONSTRUCTION OF SUBDIVISION WORKS

These conditions to apply to all stages of the development.

59. Protection of Native Trees

All trees nominated to be retained by notation or condition as a requirement of the development consent shall be maintained and protected in accordance with AS 4970-2009 - Protection of Trees on Development Sites for the duration of the constriction works.

60. Care to be taken when placing services near trees

To minimise root disturbance where services are to be laid in close proximity to trees, any excavation within the Tree Protection Zone (TPZ) for installation of underground services is to be done by directional drilling or in manually excavated trenches in accordance with Section 4.5.5 of AS4970-2009. Works must be conducted under the supervision of the project arborist (minimum AQF level 5 qualified arborist) and may include the use of pneumatic or hydraulic tools such as air

61. Landscaping

All landscaping on any part of the site must accord with the requirement to plant only appropriate local native species as marked on the stamped plans.

62. Protection of native fauna from disturbance

- a. Any clearing of native vegetation and/or earthworks ('works') as part of any development approval from Council must not commence until the area proposed for such works has been inspected for the presence of all fauna species using the site by a suitably qualified and experienced individual.
- b. Works specified in (a) must be temporarily suspended within a range of 25m from any tree which is concurrently occupied by a koala and other native fauna and must not resume until the koala and other fauna has moved from the tree of its own volition.
- c. Works must not commence until the area proposed for clearing has been inspected for the presence of koalas and other native fauna and approval given in writing by a suitably qualified
- d. Approval to proceed with the clearing of vegetation in accordance with this section is only valid for the day on which the inspection has been undertaken.

The individual referred to in (a and c) above, or a nominated representative, must remain on site during any approved clearing of vegetation.

63. Acid Sulfate Soils Management

Acid sulfate soils must be managed and disposed of in accordance with the approved Construction Environmental Management Plan.

64. Unexpected Findings Protocol - Contamination & Remediation

Construction works must be carried out in accordance with the approved Unexpected Findings Protocol (UFP).

65. Soil disturbance and excavation groundworks

All soil disturbance and excavation groundworks must be carried out in accordance with the approved ASSMP, BPoM, CEMP, SMP, SWGMP, UFP, VMP, and WFMP

66. North South Drain Construction - Role of Environmental Manager

The Environmental Manager must be on site at all times during excavation works for construction of the new north south drain. The approved CEMP must be implemented to ensure all measures and contingencies are upheld to protect the receiving environment beyond the drain excavation, including the Everitt's and Simpson Creek and native wallum frogs and their habitats.

67. Burning of felled trees prohibited

The burning of trees and associated vegetation felled during clearing operations is not permitted. Where possible, vegetation is to be mulched and reused on the site.

68. Builders rubbish to be contained on site

All builder's rubbish is to be contained on the site in a 'Builders Skips' or an enclosure. Footpaths, road reserves and public reserves are to be maintained clear of rubbish, building materials and all other items

69. All excavated soils to be disposed of off-site

All excavated soils to be disposed of off-site and in accordance with NSW EPA Waste Classification Guidelines (2014) and approved environmental management plans.

70. Removal of demolition and other wastes

All wastes, including asbestos and lead-contaminated wastes, associated with these works are to be handled and disposed of in accordance with the requirements of the Work Cover Authority. The applicant/owner is to produce documentary evidence that this condition has been met. Wastes must be disposed of at a Licenced Waste Facility. All wastes removed from the site must be managed and disposed of in accordance with the NSW EPA Waste Classification Guidelines (2014) https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines

71. Excavated natural materials and demolition waste disposal

Any and all excavated natural materials and demolition and builders waste transported from the site must be accompanied (a copy kept with the transporter) by a NSW Protection of The Environment Operations Act s143 Notice

Template s143 Notices are available at

https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wasteregulation/160095notices143-form.docx

72. Destination for all excavated materials during construction

The works contractor responsible for the construction and excavation of the basement must develop and maintain a register of materials that will be taken off-site for treatment, disposal, or any other purpose. The register must accurately record the destination and volume of every load of material (including clean soil, recyclable material, acid sulfate or potential acid sulfate soil, radiological waste, asbestos containing materials, sludge from dewatering treatment tanks, etc.). Individual vehicle registrations associated with off-site transport of materials and excavation waste to be recorded in the register.

Council must be provided with a copy of the completed register prior to the issuing of the Subdivision

Advisory note: No transporting of unclassified waste, hazardous materials or material contaminated by demolition waste is permitted to be delivered to unapproved private land within NSW. Heavy penalties apply under the Contaminated Land Management Act for any failure to manage site waste materials

73. Prevention of water pollution

Only clean and unpolluted water is to be discharged to Council's stormwater drainage system or any watercourse to ensure compliance with the Protection of Environment Operations Act.

74. Site Waste Minimisation and Management

All works must comply with the objectives of waste minimisation and waste management of Part B8.1.2 of DCP 2014.

75. Access must be permitted to Council officers

Access must be permitted to any authorised Council officers during normal business hours for the purpose of ensuring compliance with consent conditions.

76. Noise and Vibration Management Plan

Operations must be undertaken in accordance with the Noise and Vibration Management Plan as approved by Council and any conditions of consent imposed to control operational noise.

77. Construction noise

Construction noise is to be limited as follows:.

- a) For construction periods of four (4) weeks and under, the L10 noise level measured over a period of not less than fifteen (15) minutes when the construction site is in operation must not exceed the background level by more than 20 dB(A).
- b) For construction periods greater than four (4) weeks and not exceeding twenty six (26) weeks, the L10 noise level measured over a period of not less than fifteen (15) minutes when the construction site is in operation must not exceed the background level by more than 10 dB(A).

THE FOLLOWING CONDITIONS MUST BE COMPLIED WITH DURING CONSTRUCTION OF SUBDIVISION

78. Construction times

Construction works must not unreasonably interfere with the amenity of the neighbourhood. In particular construction noise, when audible from adjoining residential premises, can only occur:

- c) Monday to Friday, from 7 am to 6 pm.
- d) Saturday, from 8 am to 1 pm.

No construction work to take place on Saturdays and Sundays adjacent to Public Holidays and Public Holidays and the Construction Industry Awarded Rostered Days Off (RDO) adjacent to Public Holidays.

Note: Council may impose on-the-spot fines for non-compliance with this condition.

79. Public safety requirements

All care is to be taken to ensure the safety of the public in general, road users, pedestrians and adjoining property. Council is not held responsible for any negligence caused by the undertaking of the works.

80. Council Specification

All works to be constructed to at least the minimum requirements of the "Northern Rivers Local Government Design and Construction Manual"

81. Approved Plans to remain on site

A copy of the approved Subdivision Works Certificate including plans, details and specifications must remain at the site at all times during the construction of the subdivision.

84. Conservation Limits on Parts Lot 324 and Lot 402

The eastern residual part of Lot 324 and south western residual part of Lot 402 must be managed to prohibit the following:

- a. the destruction or removal of any local indigenous trees, shrubs, grasses or other vegetation, or the planting of any flora other than local indigenous flora,
- b. any act or omission which may adversely affect any local indigenous flora or any indigenous fauna or their related habitats.
- c. any act or omission which may result in the deterioration in the natural state or in the flow, supply, quantity, or quantity of any body of water or in the natural moisture regime of the area
- d. the creation or maintenance of any tracks through the area,
- e. the removal, introduction or disturbance of any soil, rock, or other minerals,
- f. any structures or dwellings,
- g. the dumping of rubbish or refuse, including garden refuse and weed propagules, nor the use of any of the area for storage of any substance or materia

THE CONTRACTOR IS TO READ THE DEVELOPMENT APPLICATION CONSENT DA10.2021.575 FOR A COMPLETE LIST OF CONDITIONS.





DA 10.2021.575.1 **CONSTRUCTION CONDITIONS 01**

PROJECT:	WALLUM ESTATE				
EARLY ECO WORKS PACKAGE					

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		-

Wade Hitches Wade Fletcher

CivilTech Consulting Engineers Chartered Professional Engine EA ID: 2954545

ADDRESS LOT 13 DP 1251383, TORAKINA DR **BRUNSWICK**

HEADS

DESIGNED CAD FILE No IC/SS 1-211400 EW.DWG DRAWN SS/TC 1-211400_EW_ 21 CHECKED DMC

REV.

Appendix C Bayside Brunswick: Wallum Froglet Monitoring Pro-forma

Date	
Rainfall	(circle): nil/slight/moderate/heavy
Temp.	
Rel. humidity	
Recorder	

In-situ habitat monitoring (tick)	Created habitat monitoring (tick)		
Management Area 2	Management Area 4		
Management Area 3			

WATER QUALITY		
pН		
Temp.		
Conductivity		
Turbidity		
Depth (max)		

CALL PLAYBACK – Crinia tinnula		
Time start		
Time finish		
Results		

FROG RECORDS			
Species	Est. no.	Species	Est. no.
Adelotus brevis		Litoria freycineti	
Crinia parinsignifera		Litoria olongburensis	
Crinia signifera		Litoria nasuta	
Crinia tinnula		Litoria peroni	
Limnodynastes dumerilii		Litoria tyleri	
Limnodynastes peroni		Rhinella marina*	
Limnodynastes tasmaniensis			
Litoria fallax			

Not	:es/	<u>ob</u>	se	rva	<u>ıti</u>	<u>on</u>	S	:
								Π

Weeds:

Condition:

Hydrology:



Appendix D Trigger Response Plan for Created WF Habitat



Item	Performance Criteria	Trigger Response				
Retained Habitat	Retained Habitat					
Public access	Public are deterred from accessing WF areas	Fencing and signage of all protected WF habitat in Management Zones 2 and 3 (refer Fig 1.3) to restrict public access				
WF population	WF populations will be determined by density and distribution within the habitat proposed for translocation (refer Figure 1.3). The density and distribution of the existing population will be identified.	No WF identified within the proposed house lot area conduct a follow up survey in alignment with the methods outlined in Section 6 for prior translocation monitoring.				
Water quality	Water chemistry: pH in a range of 3 – 5, and low values/concentrations of turbidity (<50 NTU), salinity (conductivity 1500/ μ S/cm), and nutrients (TN <0.5mg/L, P < 0.05 mg/L) Water quality monitoring includes both surface and groundwater	Review the Wallum Estate SWGMP (AWC, 2023) to determine if works activities have resulted in the changes in water quality. Where it has been determined that development related impacts have caused a trigger exceedance, implementation of contingency and remedial measures is required. These may include, but not limited to, the following: Review monitoring program and Groundwater Management Plan and revise if necessary Investigate reasonable and feasible remedial measures Review water management infrastructure (e.g. WSUD) and repair/renew if necessary Implementation and maintenance of sediment and erosion controls				
Vegetation	Native vegetation continues to persist and is not degraded or disturbed. The results of the vegetation monitoring collected as part of the VMP will be referred to when analysing the results of the wallum froglet population and habitat monitoring.	Ensure 'no-go' areas maintained, and WF habitat protected				
Weed control	Environmental weeds comprise < 10% total within each Wallum Froglet habitat area	Where invasive weed species are recorded, appropriate control methods will be implemented as required. Non chemical weed control techniques (hand pull) must only be implemented within habitat areas				
Cane Toads	Threshold numbers remain low	Appropriate control measures that include dense fringing plantings of species of sedges, rushes and grasses are implemented if required.				

Item	Performance Criteria	Trigger Response
Mosquito Fish	Threshold numbers remain low	Seasonal drying within retained habitat will control Mosquito Fish.
Constructed hab	itat	
WF population	Utilisation by Wallum Froglets and persistence at constructed habitat areas over time.	See trigger responses below
Water quality	Water chemistry: pH in a range of 3 – 5, and low values/concentrations of turbidity (<50 NTU), salinity (conductivity 1500/ μ S/cm), and nutrients (TN <0.5mg/L, P < 0.05 mg/L) Water quality monitoring includes both surface and groundwater	Review the Wallum Estate SWGMP (AWC, 2023) to determine if works activities have resulted in the changes in water quality. Where it has been determined that development related impacts have caused a trigger exceedance, implementation of contingency and remedial measures is required. These may include, but not limited to, the following: Review monitoring program and Groundwater Management Plan and revise if necessary Investigate reasonable and feasible remedial measures Review water management infrastructure (e.g. WSUD) and repair/renew if necessary
Hydrology	Water level loggers in constructed WF breeding ponds will determine KPIs	Where it has been determined that development related impacts have caused a trigger exceedance, implementation of contingency and remedial measures is required. These may include, but not limited to, the following: Review monitoring program and Groundwater Management Plan and revise if necessary Investigate reasonable and feasible remedial measures Review water management infrastructure (e.g. WSUD) and repair/renew if necessary
Weed control	Environmental weeds comprise < 10% total within each identified frog compensation area per precinct.	Where invasive weed species are recorded, appropriate control methods will be implemented as required. Non chemical weed control techniques (hand pull) must only be implemented within habitat areas

Item	Performance Criteria	Trigger Response
Habitat establishment	Successful uptake of translocated habitat within receiving ponds. Survival rate of greater than 90% of all plantings and translocated material	Stockpiled surplus WF donor material to be used as a contingency measure if portions of translocated donor material fails within the created WF habitat. If natural regeneration is poor and the overall plant community health is low ponds must be planted. Guidance in regard to planting areas, densities and schedules will be provided by AWC
Cane toads	Exclusion buffer plantings correctly installed with 90% survival rate achieved.	Ensure dense Cane Toad restriction plantings are maintained as per 1-211400_EW_12 (refer Appendix C). Infill planting may be required to ensure correct plantings densities are maintained.
Public access	Public are deterred from accessing WF areas	Restriction of public access via signage and fencing

Item	Performance Criteria	Trigger Response				
Retained Habitat	Retained Habitat					
Public access	Public are deterred from accessing WF areas	Fencing and signage of all protected WF habitat in Management Zones 2 and 3 (refer Fig 1.3) to restrict public access				
WF population	WF populations will be determined by density and distribution within the habitat proposed for translocation (refer Figure 1.3). The density and distribution of the existing population will be identified.	No WF identified within the proposed house lot area conduct a follow up survey in alignment with the methods outlined in Section 6 for prior translocation monitoring.				
Water quality	Water chemistry: pH in a range of 3 – 5, and low values/concentrations of turbidity (<50 NTU), salinity (conductivity 1500/ μ S/cm), and nutrients (TN <0.5mg/L, P < 0.05 mg/L) Water quality monitoring includes both surface and groundwater	Review the Wallum Estate SWGMP (AWC, 2023) to determine if works activities have resulted in the changes in water quality. Where it has been determined that development related impacts have caused a trigger exceedance, implementation of contingency and remedial measures is required. These may include, but not limited to, the following: Review monitoring program and Groundwater Management Plan and revise if necessary Investigate reasonable and feasible remedial measures Review water management infrastructure (e.g. WSUD) and repair/renew if necessary Implementation and maintenance of sediment and erosion controls				
Vegetation	Native vegetation continues to persist and is not degraded or disturbed. The results of the vegetation monitoring collected as part of the VMP will be referred to when analysing the results of the wallum froglet population and habitat monitoring.	Ensure 'no-go' areas maintained, and WF habitat protected				
Weed control	Environmental weeds comprise < 10% total within each Wallum Froglet habitat area	Where invasive weed species are recorded, appropriate control methods will be implemented as required. Non chemical weed control techniques (hand pull) must only be implemented within habitat areas				
Cane Toads	Threshold numbers remain low	Appropriate control measures that include dense fringing plantings of species of sedges, rushes and grasses are implemented if required.				

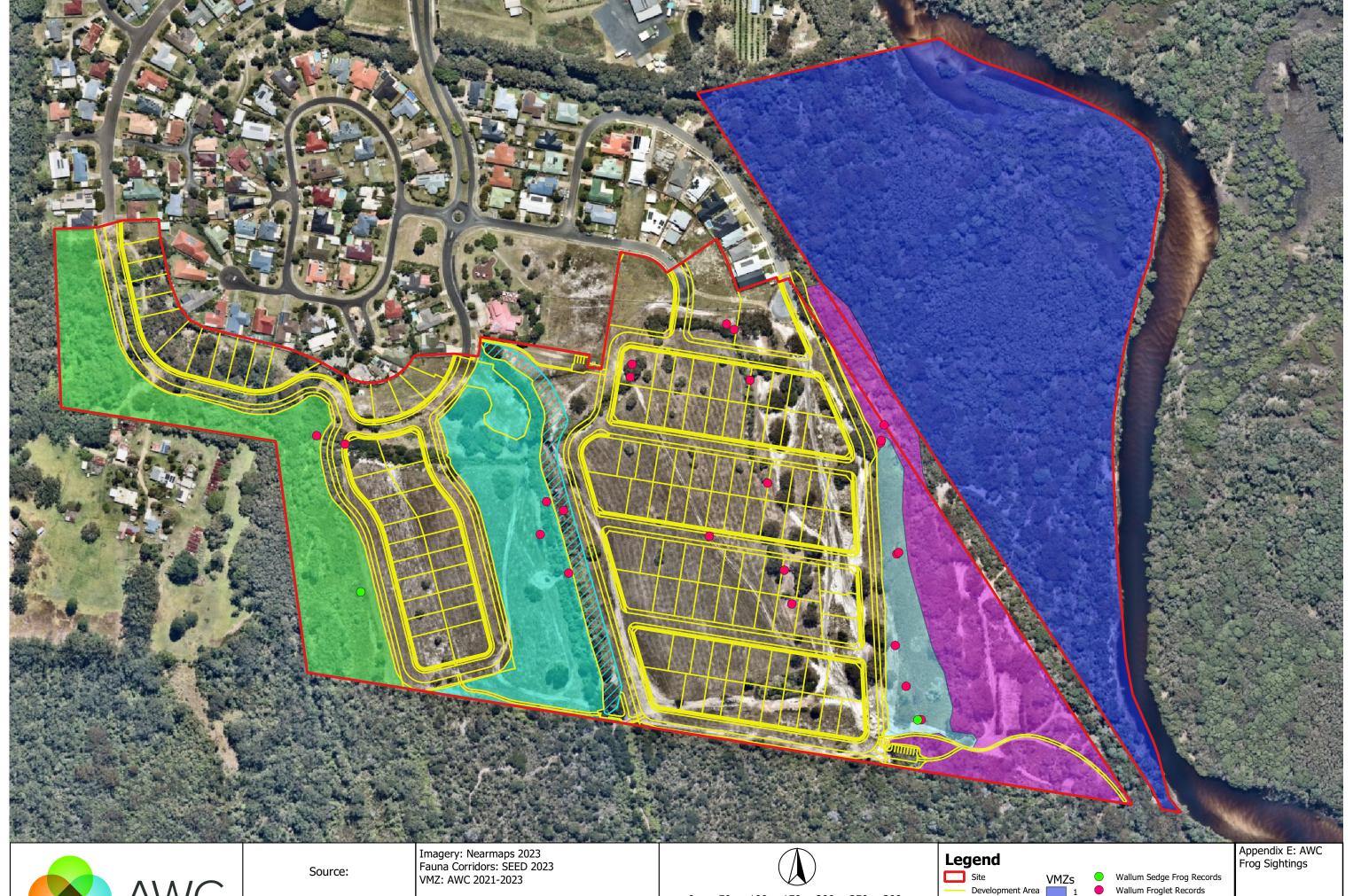
Item	Performance Criteria	Trigger Response
Mosquito Fish	Threshold numbers remain low	Seasonal drying within retained habitat will control Mosquito Fish.
Constructed hab	itat	
WF population	Utilisation by Wallum Froglets and persistence at constructed habitat areas over time.	See trigger responses below
Water quality	Water chemistry: pH in a range of 3 – 5, and low values/concentrations of turbidity (<50 NTU), salinity (conductivity 1500/ μ S/cm), and nutrients (TN <0.5mg/L, P < 0.05 mg/L) Water quality monitoring includes both surface and groundwater	Review the Wallum Estate SWGMP (AWC, 2023) to determine if works activities have resulted in the changes in water quality. Where it has been determined that development related impacts have caused a trigger exceedance, implementation of contingency and remedial measures is required. These may include, but not limited to, the following: Review monitoring program and Groundwater Management Plan and revise if necessary Investigate reasonable and feasible remedial measures Review water management infrastructure (e.g. WSUD) and repair/renew if necessary
Hydrology	Water level loggers in constructed WF breeding ponds will determine KPIs	Where it has been determined that development related impacts have caused a trigger exceedance, implementation of contingency and remedial measures is required. These may include, but not limited to, the following: Review monitoring program and Groundwater Management Plan and revise if necessary Investigate reasonable and feasible remedial measures Review water management infrastructure (e.g. WSUD) and repair/renew if necessary
Weed control	Environmental weeds comprise < 10% total within each identified frog compensation area per precinct.	Where invasive weed species are recorded, appropriate control methods will be implemented as required. Non chemical weed control techniques (hand pull) must only be implemented within habitat areas

Item	Performance Criteria	Trigger Response
Habitat establishment	Successful uptake of translocated habitat within receiving ponds. Survival rate of greater than 90% of all plantings and translocated material	Stockpiled surplus WF donor material to be used as a contingency measure if portions of translocated donor material fails within the created WF habitat. If natural regeneration is poor and the overall plant community health is low ponds must be planted. Guidance in regard to planting areas, densities and schedules will be provided by AWC
Cane toads	Exclusion buffer plantings correctly installed with 90% survival rate achieved.	Ensure dense Cane Toad restriction plantings are maintained as per 1-211400_EW_12 (refer Appendix C). Infill planting may be required to ensure correct plantings densities are maintained.
Public access	Public are deterred from accessing WF areas	Restriction of public access via signage and fencing

Appendix E Wallum Froglet and Wallum Sedge Frog Sightings

Species	Easting	Northing
Wallum Sedge Frog	554023	6840506
Wallum Sedge Frog	553570	6840608
Wallum Froglet	554013	6840533
Wallum Froglet	545024	6840506
Wallum Froglet	553852	6840655
Wallum Froglet	553867	6840830
Wallum Froglet	553874	6840824
Wallum Froglet	553887	6840783
Wallum Froglet	553901	6840699
Wallum Froglet	553915	6840629
Wallum Froglet	553920	6840601
Wallum Froglet	553994	6840747
Wallum Froglet	553992	6840734
Wallum Froglet	554004	6840566
Wallum Froglet	553535	6840739
Wallum Froglet	553555	6840730
Wallum Froglet	553716	6840657
Wallum Froglet	553733	6840677
Wallum Froglet	553736	6840626
Wallum Froglet	553789	6840798
Wallum Froglet	553991	6840732
Wallum Froglet	554006	6840643
Wallum Froglet	554004	6840642
Wallum Froglet	553852	6840655
Wallum Froglet	553867	6840830

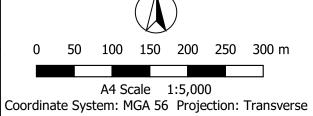






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