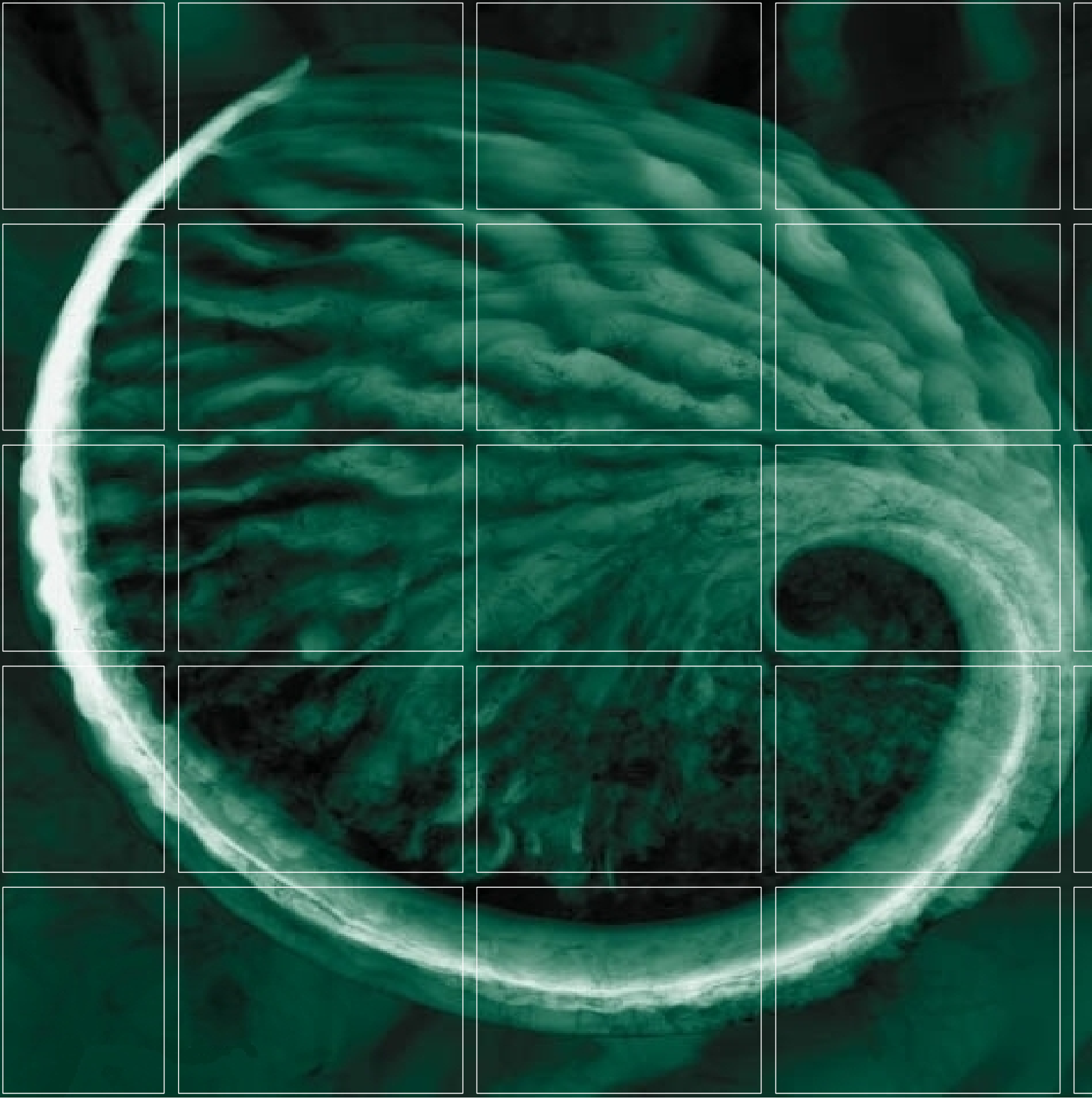

Riverside at Tea Gardens
Construction Environmental Management Plan

Crighton Properties Pty Ltd

January 2009

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Riverside at Tea Gardens

Construction Environmental Management Plan

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January 2009

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Approved by:	*Steve O'Connor*
Position:	Principal Consultant
Signed:	
Date:	*27 January 2009*

Environmental Resources Management Australia Pty Ltd Quality System

CONTENTS

ANNEXURES

LIST OF FIGURES

1 INTRODUCTION

1.1 BACKGROUND

Crighton Properties Pty Ltd (Crighton) is seeking concept approval for a residential, tourist and commercial development at the Riverside site in Tea Gardens and project approval for the initial stages (stages 1, 2, 3, 4, 5, 6, 7, 8 and 9) of the residential and commercial development, under Part 3A of the *Environmental Planning and Assessment Act, 1979 (*EP&A Act).

This Construction Environmental Management Plan (CEMP) has been prepared by Environmental Resources Management (Australia) Pty Ltd (ERM) for the initial stages of the residential and commercial development and details the proposed environmental management procedures that will be implemented during construction.

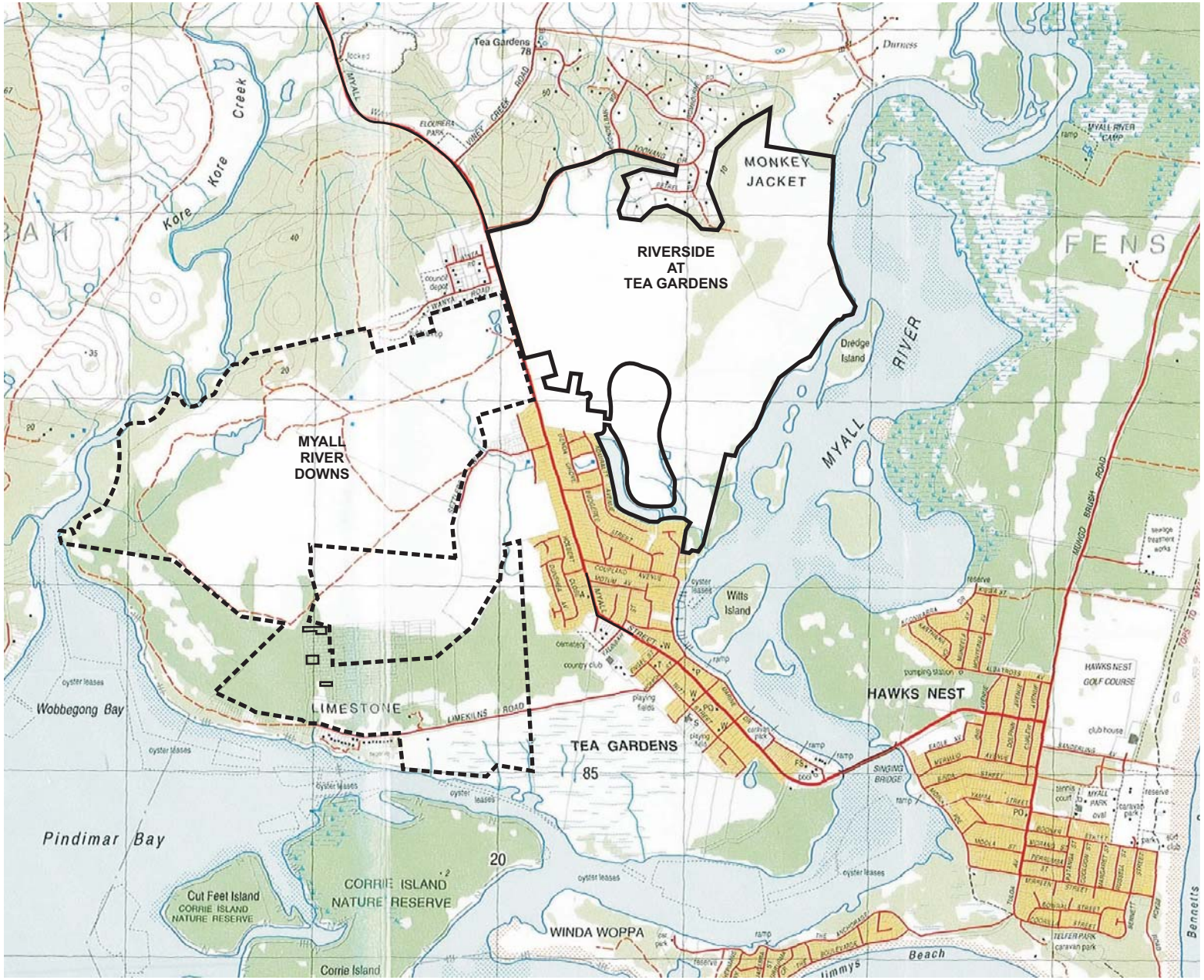
1.2 SITE DESCRIPTION

The Riverside at Tea Gardens site ('the site') comprises Lot 1 DP 270100, Lot 10 DP 270100, Lot 19 DP 270100, Lot 30 DP 270100, Lot 40 DP 270100, lot 5 DP 270561, Pt Lot 1 DP 270561 and Pt Lot 2 DP 270561 and is approximately 229 hectares in area. The site is bounded by Myall River to the east and Myall Street to the west. The Shearwater Residential Estate lies to the north of the site and residential development of Tea Gardens is to the south. The site has approximately a one kilometre frontage to Myall Street and two kilometre frontage to the Myall River. State Environmental Planning Policy No. 14 – Coastal Wetlands (SEPP 14) applies to wetlands within a portion of the eastern boundary of the site adjacent to the Myall River. These wetlands were clearly identified along with a buffer to the wetlands and zoned for environment protection when the site was rezoned in 2000. The remainder of the site is available for urban purposes and zoned for mixed use urban development.

The site is flat with generally sandy soils. The majority of the site was previously used for a pine plantation and has been substantially cleared of native vegetation. Some scattered isolated occurrences of both pines and natives currently exist on the site. A locality plan is provided in *Figure 1.1*.

1.3 PROJECT DESCRIPTION

Riverside at Tea Gardens will include a residential / mixed use development over the majority of the site and a tourist and residential component located within the north eastern portion of the site. The key elements of the overall concept plan includes:



Legend

Riverside at Tea Gardens
Site Boundary

Figure 1.1

Locality Plan

Client:	Crighton Properties Pty Ltd		
Project:	Environmental Assessment Riverside at Tea Gardens		
Drawing No:	0043707hv_EA_CEMP_01		
Date:	25/08/08	Drawing size:	A4
Drawn by:	JD	Reviewed by:	AA
Source:	1:25,000 Topo Series Port Stephens Sheet		
Scale:	Refer to Scale Bar		

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- an extension of the existing town centre on the north side of Shoreline Drive;
- a residential subdivision to accommodate 1045 dwellings;
- an internal road network, upgrading of intersections and associated road and other construction works, such as cycleways;
- an open space network of approximately 127 hectares;
- water sensitive urban design (WSUD) measures including a two hectare extension of the existing detention lake and the creation of three new freshwater detention basins and numerous additional ponds surrounded by parklands and widening of the existing channel linking the detention lake to the Myall River to provide water quality management; and
- an 8 hectare tourist/residential development (including a conference centre and accommodation) and a foreshore park of 5.6 hectares.

The concept plan for Riverside at Tea Gardens is provided in *Figure 1.2*.

The area proposed to be developed has been defined by a detailed analysis of the constraints and opportunities of the site to determine the most appropriate development footprint.

The project application relates to stages 1, 2, 3, 4, 5, 6, 7, 8 and 9 of the residential subdivision as illustrated in *Figure 1.3*. The project application yield, facilities and associated urban structure is detailed in *Figure 1.4*.

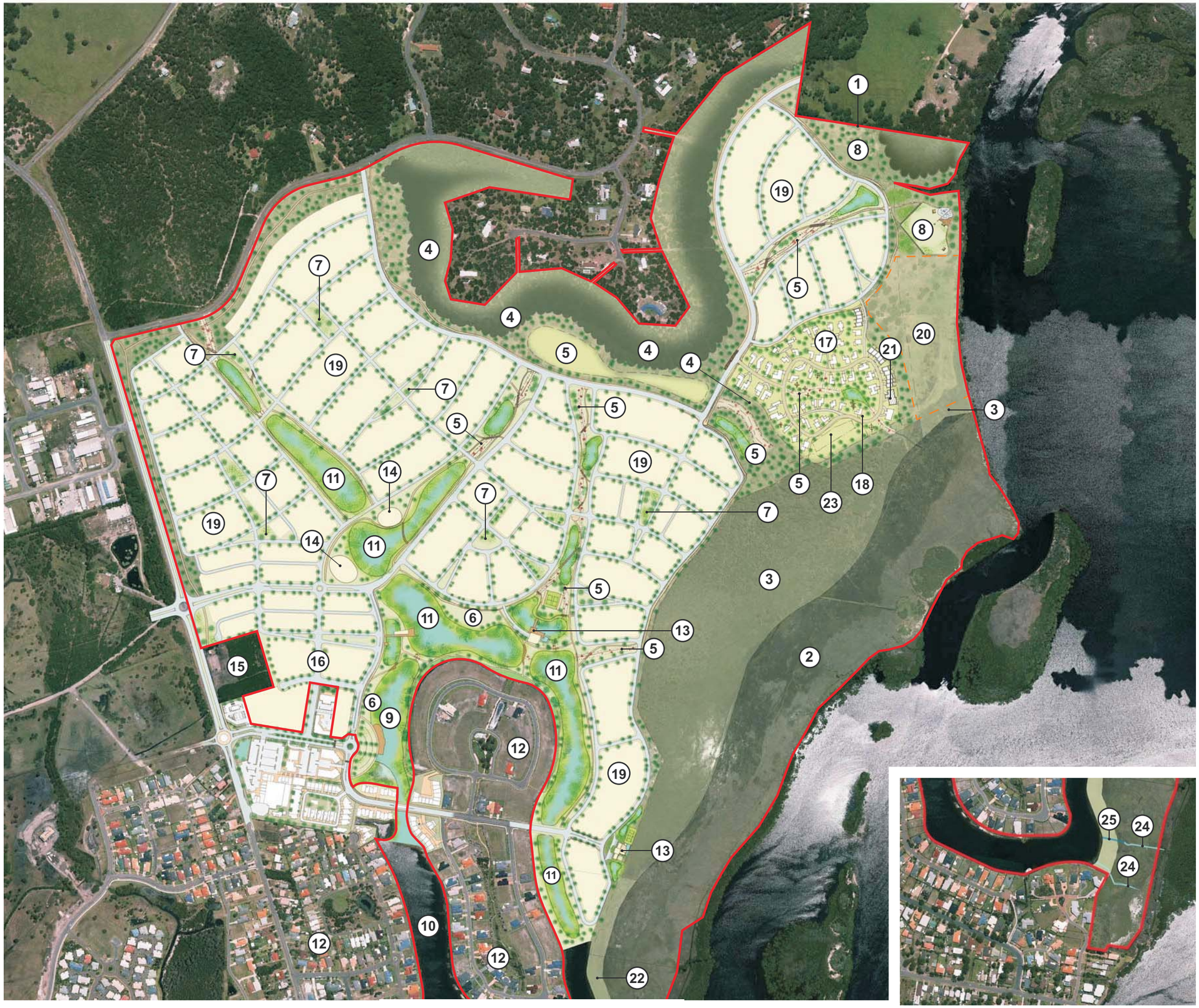
The subdivision will be created under Community Title, as part of the existing approved Community Title residential development.

This Construction Environmental Management Plan (CEMP) is for the project plan application which involves the construction of a residential estate to accommodate 381 dwellings on residential lots ranging in area from greater than 650m^2 to less than 450m^2 and associated infrastructure and access roads as shown on *Figure 1.4*. The CEMP relates to the construction of the subdivision and associated infrastructure only and does not address construction of dwellings once the construction of the subdivision is complete.

1.4 CONSTRUCTION ACTIVITIES

Activities associated with the construction of the subdivision, and which are covered by this plan include:

- clearing of vegetation in accordance with the project approval;
- stripping and stockpiling of topsoil;



Item	Description
1	Extent of concept plan area 'Riverside' at Tea Gardens.
2	Existing 7(a) wetland zone.
3	Existing 7(b) buffer zone.
4	Wildlife movement corridor.
5	Water management & open space corridors.
6	Community parks incorporating walking/cycle ways, BBQs, children's play area equipment.
7	Community pocket parks.
8	Myall foreshore park including structured and unstructured open space.
9	Extended lake area for water detention & water quality management (2.0 Ha).
10	Existing detention and water quality lake.
11	New fresh water water quality management & detention ponds.
12	Existing residential development.
13	Precinct community facilities.
14	Future precinct community facilities.
15	Site area currently owned by Great Lakes Council.
16	Super Lots for future development.
17	Tourist lodgings precinct.
18	Conference & community facilities, associated low rise town house accommodation.
19	Proposed residential lot development to be developed under community title.
20	Future development site.
21	Existing house.
22	DCP buffer.
23	Location of known midden & buffer.
24	Existing drain outlet to Myall River.
25	Existing drain to Myall River to be extended to connect with existing lake.

Land Use Legend

Total Site	Ha	%
Open Space		
- Wetlands (zoned 7a)	28.4	12.4
- Buffer Zones (zoned 7b)	20.6	9.0
- Additional Conservation Buffer	1.4	0.6
- Wildlife Corridors	27.3	11.9
- Myall Foreshore Park	5.6	2.4
- Drainage Corridors, Ponds & Large Parks	35.1	15.4
- Pocket Parks	2.6	1.1
- Existing detention & water quality lake	6.7	2.9
Total	**127.7 Ha**	**55.7%**
Built Upon Area		
- Residential (including roads & community facilities)	83.6	36.5
- Tourist/Residential (Lodgings)	8.4	3.7
- Future Development Site	5.0	2.2
- Commercial/Retail	4.3	1.9
Total	**101.3 Ha**	**44.3%**
Total	**229.0 Ha**	**100%**

Figure 1.2

Concept Plan for Riverside at Tea Gardens

Client:	Crighton Properties Pty Ltd		
Project:	Environmental Assessment Riverside at Tea Gardens		
Drawing No:	0043707hv_EA_CEMP_02		
Date:	27/01/09	Drawing size:	A3
Drawn by:	JD	Reviewed by:	AA
Source:	Crighton Properties - Plan R.C - 03		
Scale:	Refer to Scale Bar		

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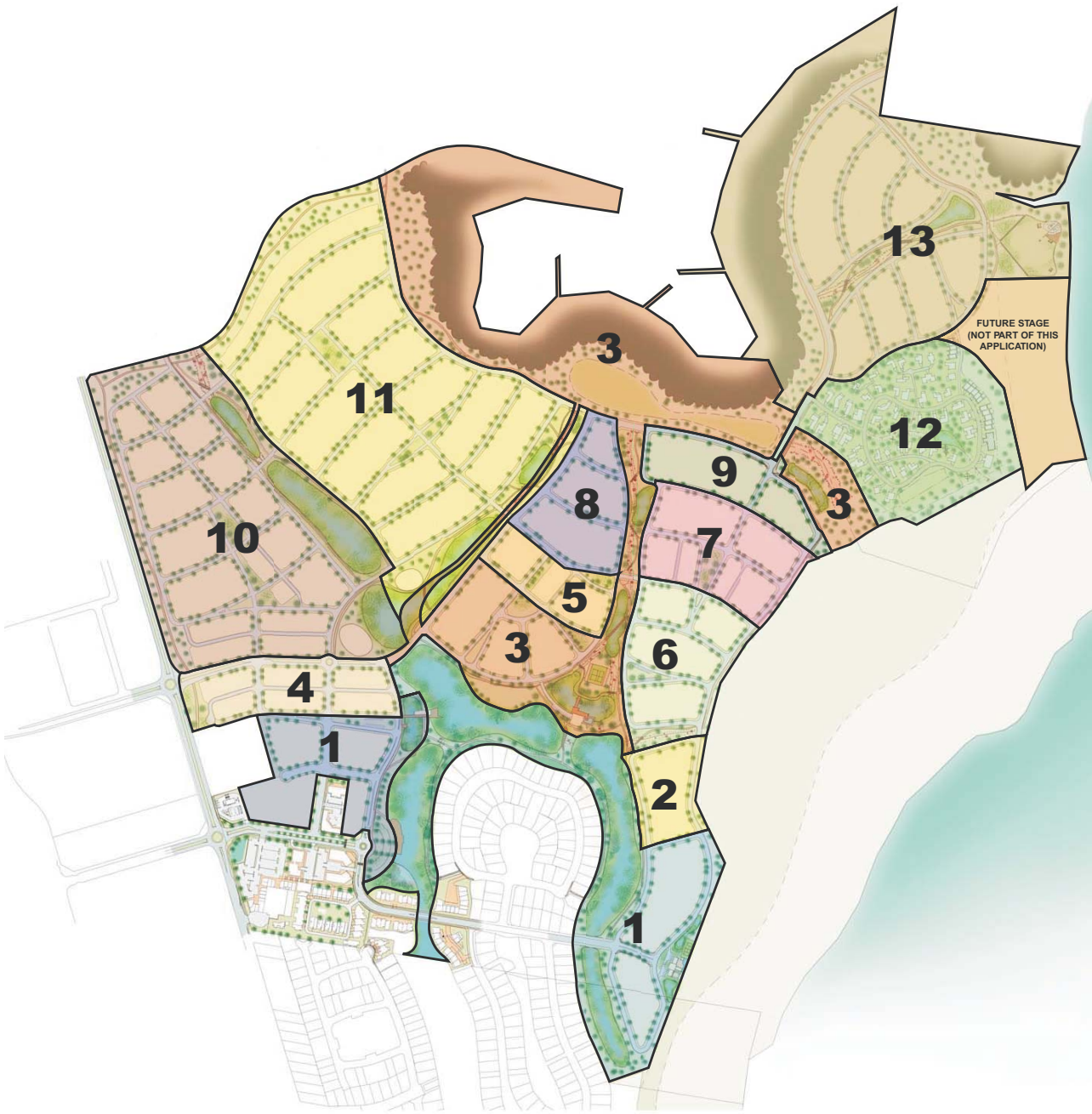

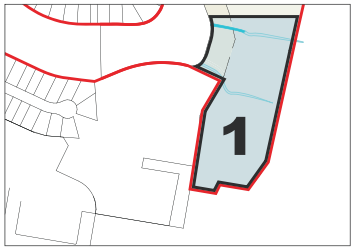

INSET 1 - DRAIN OUTLETS TO MYALL RIVER

STAGING DETAILS (INDICATIVE)

Stage	No. of Dwellings	Details other Inclusions	Approx Registration Date (year)
1	48	Stage 1 to include establishment & partial embellishment of primary community water management ponds & commercial centre infrastructure. Northern drain to Myall River to be extended.	2008
2	23		2009
3	44	Includes completion of embellishment of community park, wildlife movement corridor & temporary drainage line establishment through stage 8 & 11. Includes provision of second community facility. Second access to Riverside.	2009
4	37		2009
5	28		2010
6	53		2010
7	62		2011
8	45	Includes finalisation of temporary drainage line.	2011
9	41		2012
10	166 (Approx)	Includes new access to Toonang Drive & 4th community facility.	2013
11	293 (Approx)	Includes final access to Toonang Drive.	2015
12	65 (Approx) Lodge/ Townhouse		2016
13	140 (Approx)		2017
Total	1045		

Figure 1.3

Staging Plan

Client:	Crighton Properties Pty Ltd		
Project:	Environmental Assessment Riverside at Tea Gardens		
Drawing No:	0043707hv_EA_CEMP_03		
Date:	27/01/09	Drawing size:	A4
Drawn by:	JD	Reviewed by:	AA
Source:	Crighton Properties- Plan R.C - 08		
Scale:	Refer to Scale Bar		

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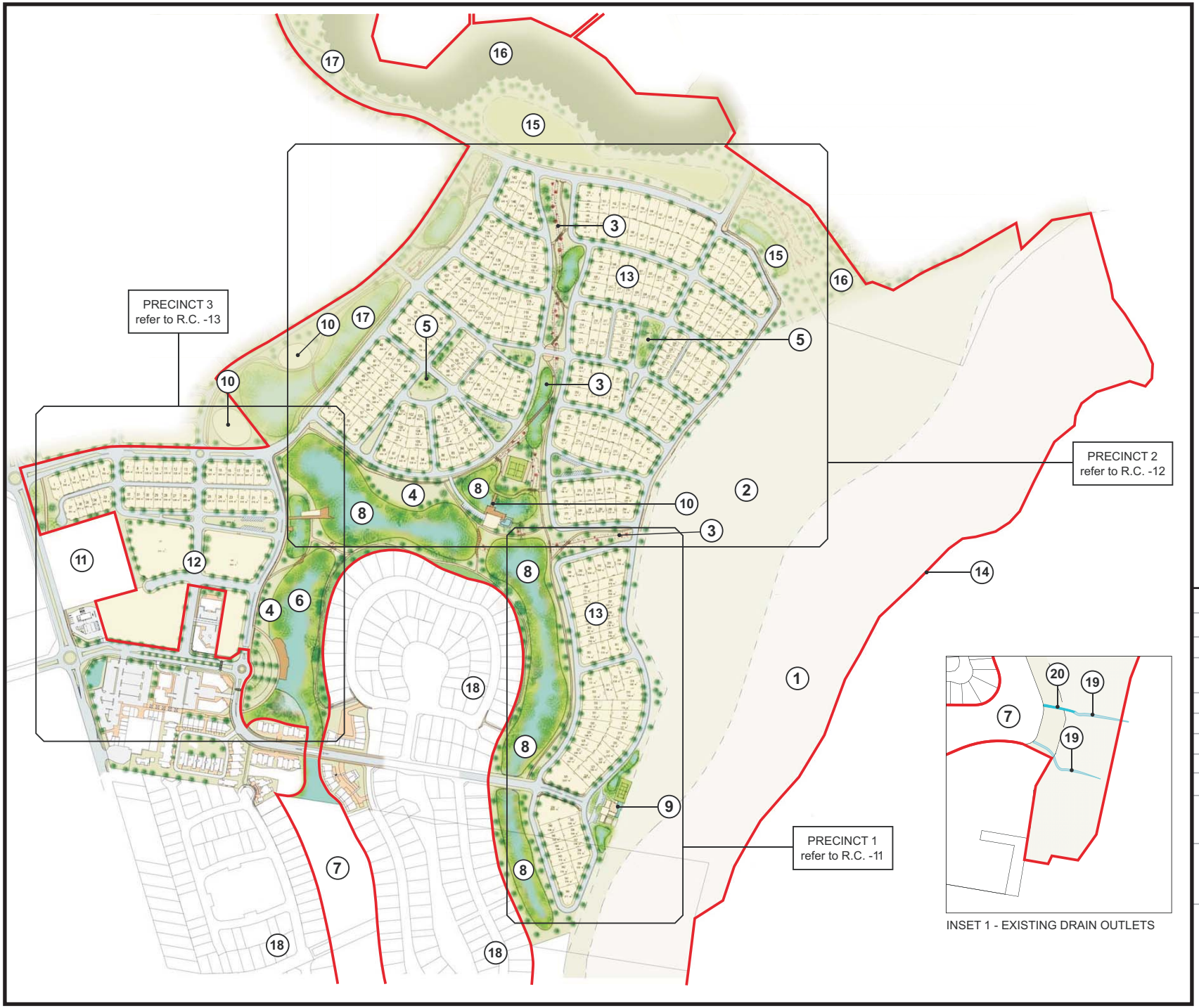

INSET 1 - EXISTING DRAIN OUTLETS

PROJECT APPLICATION YIELD TABLE

Lot Size Range	No. of Dwellings	% of Total
Multiple Dwellings <450m^2	61	16.0%
<450m^2	17	4.5%
450-550m^2	74	19.4%
550-650m^2	150	39.4%
>650m^2	79	20.7%
Total	381	100%

Note: *Total Area 29.3 Ha @ 13 Dwellings per Ha*

Item	Description
1	Existing 7(a) wetland zone (to be further protected as community land).
2	Existing 7(b) wetland buffer zone (to be further protected as community land).
3	Water management & open space corridors.
4	Community parks incorporating walking/cycle ways, BBQs, children's play area equipment.
5	Community pocket parks.
6	Extended lake area for water detention & water quality management (2.0 Ha).
7	Existing detention and water quality lake.
8	New fresh water quality management & detention ponds.
9	Precinct community facilities. Refer to R.C. -31, R.C. -32 , R.C. -33, & R.C. -34
10	Future precinct community facilities.
11	Site area currently owned by Great Lakes Council.
12	Super Lots for future development.
13	Proposed residential lot development to be developed under community title.
14	Extent of project application.
15	Establishment of upper catchment. Dry & wet basins, as well as swales.
16	Augmentation & management of wildlife movement corridor.
17	Temporary works required in these areas to establish drainage & diversions (refer to engineering drawings).
18	Existing residential development
19	Existing drain outlet to Myall River
20	Existing drain to Myall River to be extended to connect with existing lake.

Figure 1.4

Project Application Plan

Client:	Crighton Properties Pty Ltd		
Project:	Environmental Assessment Riverside at Tea Gardens		
Drawing No:	0043707hv_EA_CEMP_04		
Date:	27/01/09	Drawing size:	A4
Drawn by:	JD	Reviewed by:	AA
Source:	Crighton Properties - Plan R.C -10		
Scale:	Refer to Scale Bar		

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- widening of the existing drainage channel;
- construction of road pavements, kerb and guttering, and associated piped stormwater drainage and water quality controls;
- construction of telecommunications, electricity, and reticulated water and sewer services and infrastructure;
- earthworks; and
- revegetation of exposed soils following completion.

1.5 OPERATING HOURS

Proposed operating hours are within the following:

- Monday to Friday, 7:00 am to 6:00 pm;
- Saturday, 8:00 am to 4:00 pm if inaudible at residential premises, alternatively hours will be 8:00 to 1:00pm; and
- no construction on Sundays or public holidays.

2 CONSTRUCTION MANAGEMENT

2.1 OBJECTIVES OF THE CEMP

The objectives of the CEMP are to:

- ensure that the construction activities comply with current environmental legislation and best practice environmental management;
- comply with the relevant project approval for the site; and
- minimise the risk to public safety, and to protect the amenity of adjoining residents and the public generally.

2.2 ENVIRONMENTAL MANAGEMENT STRUCTURE AND RESPONSIBILITIES

This plan is to be updated prior to the commencement of construction with appropriate roles and responsibilities relating to environmental management. Tasks and responsibilities are summarised in *Annex A* of this CEMP.

2.3 APPROVAL AND LICENSING REQUIREMENTS

The project requires approval from the NSW Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Construction and subdivision certificates will be required to be obtained once the Minister for Planning has granted approval under Part 3A.

2.4 TRAINING AND SITE INDUCTION

All employees and subcontractors will undergo environmental awareness training as part of the site induction to ensure they understand their obligations and responsibilities under this CEMP. The site induction will include:

- familiarisation with the requirements of the CEMP and other relevant management plans (ie erosion and sediment control plan);
- environmental emergency response procedures; and
- familiarisation with site environmental controls.

Records of all site inductions will be kept and maintained by the site supervisor.

2.5 *EMERGENCY CONTACT AND RESPONSE*

In the event of an environmental emergency, the following person can be contacted 24 hours per day, seven days per week:

Name:	Peter Childs
Position/Responsibility:	Crighton Project Manager
Contact Number:	02 4352 4352
Alternative Contact Number:	0419 971 666

Emergency services contact details are as follows:

Emergency Hotline:	000
Ambulance:	000
NSW Fire Service:	000
(Tea Gardens) Police Station:	(02) 4997 0244
SES:	13 2500
WIRES (injured wildlife):	0500 559 559

All on-site information relating to hazardous materials, including Material Safety Data Sheets and spill containment materials will be kept at the Site Office.

3 SITE CONTROLS

3.1 PUBLIC SAFETY, AMENITY, AND SITE SECURITY

Procedures for the management of public safety, amenity and site security include:

- all vehicular access/egress associated with the construction works will be via the main site entrance (refer to Sheet 66, *Volume 2* of the Environmental Assessment Report);
- main entrance and site office will be appropriately signposted;
- signage will be placed at site boundary to provide appropriate safety warnings, and include contact details of construction company and/or site supervisor;
- no materials will be stored within the road reserve or placed where it will hinder public access across adjoining public land;
- exposed areas will be kept to a minimum to minimise visual impact as well as reduce air and water pollution; and
- safety fencing will be erected and maintained around specific areas of the work site as appropriate (to be identified in an occupational health and safety plan).

3.2 FLORA AND FAUNA

The following measures are intended to minimise the impact of construction activities on flora and fauna in accordance with the requirements of the Ecological Site Management Strategy for Riverside at Tea Gardens (Conacher Environmental Group, 2008) (refer to *Annex B*):

- clearing activities will be restricted to only those areas nominated on construction plans for each stage;
- cleared vegetation is to be chipped / mulched on site for reuse in landscaping;
- vehicle movements within uncleared areas will be restricted;
- weed control will be undertaken during construction as required to ensure there is no spread of weeds on or off site;
- prior to construction commencing, areas that are to be retained as corridors and reserves and their adjacent APZ's are to be delineated on site plans and

survey marked in the field. This will minimise the risk of damage to vegetation contained within retained areas and APZ's during construction;

- where trees are identified for retention and are in areas adjacent to construction areas, tree protection fencing will be erected to eliminate risk of damage during construction. Fencing will be erected to adequately protect the critical root zone of trees from excavation or compaction damage;

- where corridor or reserve areas are adjacent to construction areas temporary fencing will be erected to indicate these as no go areas. This will be supported by site contractor inductions notifying personnel of protection areas and restricted access to these;

- to minimise the impact on hollow dependant fauna during tree felling operations the following measures will be used were considered appropriate;

  - identification and marking of hollow bearing trees required to be cleared;

  - inspection of tree hollows prior to clearing to determine if hollows are being utilised by tree dwelling fauna, including threatened species. Fauna occupying hollows will be carefully removed by an experienced and licensed fauna expert and relocated to another tree away from the area of clearing;

  - implementation of a trapping program prior to tree clearing to trap any mammal fauna within areas proposed for staged clearing. Any trapped animals will be released into appropriate areas on dusk;

  - restriction of clearing hollow bearing trees during the breeding season for microchiropteran bats and the Squirrel Glider (September-March);

  - implementation of hollow log salvage and re-erection program in order to retain roosting and nesting opportunities for hollow dependent fauna, including Owls, Squirrel Gliders and threatened bat species; and

- two options are available for removing tree hollows or felling hollow bearing trees. These are:

  - hollow bearing trees containing fauna are to be sectionally dismantled. This will be carried out in accordance with Council's established procedure and involve a representative from WIRES and/ or the Project Ecologist;

  - where machinery is required to fell hollow trees, the blade or bucket of the machinery will be tapped against the base of the tree to disturb any fauna present. The tree will then be felled as gently as possible. All

hollow limbs will be inspected after felling for occupation by fauna. Any fauna will be removed and relocated to adjoining bushland;

- any felling of hollow bearing trees will be supervised by a qualified fauna ecologist with experience in the handling of fauna;

- all hollow limbs will be removed from those trees felled by a licensed contractor. These hollow limbs will be returned to the fauna ecologist for re-use at a later date within the corridor areas of the site; and

- any injured wildlife will be reported to WIRES or similar organisation immediately for rescue.

3.3 NOISE AND VIBRATION CONTROLS

Noise emissions associated with bulk earth works, particularly in relation to the construction of the fresh stormwater quality management and detention ponds at the proposed Riverside Estate, Tea Gardens have the potential to impact on the acoustic amenity of several adjacent residential receptors. The EPA criteria for noise from construction sites are assessed at residential properties and the following are applicable during construction of the subdivision:

- for a cumulative period of exposure to noise from construction activity of between 4 weeks and 26 weeks duration, the LA10 (15minute) noise level emitted by the works, when measured at a residential receiver, should not exceed the LA90 (15minute) RBL more than 10 dBA; and

- for a cumulative period of exposure to noise from construction activity in excess of 26 weeks duration, the LA10 (15minute) noise level emitted by the works, when measured at a residential receiver, should not exceed the LA90 (15minute) RBL by more than 5 dBA.

The Construction Noise Assessment for Riverside at Tea Gardens undertake by ERM (2008) (refer to *Annex C*) recommends the implementation of the following mitigation and management procedures during construction activities:

- where practical, pushing topsoil or fill to form earth mounds between the construction site and residences during initial stripping. Barrier calculations identify that noise levels may be reduced by up to 15 dBA if a 3.5 metre earth mound is established between the sources and residences;

- where possible barriers should be placed nearest to plant and equipment to maximise barrier attenuation;

- maximise the offset distance between noisy plant items and nearby noise sensitive receivers;

- avoiding any coincidence of noisy plant working together in close proximity simultaneously near to sensitive receivers;
- minimising the occurrence of consecutive days works in the same locality;
- orienting noisy plant or equipment away from sensitive areas;
- carrying out loading and unloading away from noise sensitive areas, if loading near sensitive receivers acoustic enclosures or barriers of a suitable height should be constructed to minimise the noise impacts;
- where noise complaints arise, monitor construction noise levels to quantify potential impact at most sensitive residences; and
- the contractor must take reasonable steps to manage and control noise from all plant and equipment. Examples of appropriate noise management and control may include installation of acoustic silencers, low noise mufflers and alternatives to reversing alarms.

No construction activities are to be undertaken outside the operating hours nominated in this plan to minimise the impact of noise on nearby residences.

All combustion engine plants, such as generators, compressors and welders, will be maintained and kept in good working order to ensure they produce minimal noise. Where practical, machines will be operated at low speed or power and switched off when not being used rather than be left idling for prolonged periods.

Machines found to produce excessive noise compared to industry best practice will be removed from the site or stood down until repairs or modifications can be made.

Once noisy construction activity commences close to any residence, it is to be completed with the minimum of undue delay. In any case, all reasonable attempts will be made to complete significant noisy activities within a short period.

While the above measures will not necessarily result in meeting the construction noise criteria, they will serve to reduce impacts to levels most residents will find acceptable considering the relatively short-term nature of construction work.

3.4 AIR AND DUST MANAGEMENT

Management of air quality and dust impacts on the site during construction will include:

- exposed soil areas will be regularly watered down during hot and windy days, or as needed;

- vehicle movements will be restricted to sealed or dedicated areas;
- truck and vehicle speeds will be below 20km/hr on unsealed roads;
- all vehicles containing loads that may generate dust travelling to or from the site will be covered to prevent dust emissions; and
- all site vehicles and machinery will be kept in good working order to minimise exhaust emissions.

3.5 SOIL AND WATER MANAGEMENT

All management measures outlined in the Erosion and Sediment Control Plan and the Soil and Water Management notes (refer to *Annex D*) will be implemented and maintained on site prior to and during construction activities. All soil, water and sediment control and management will be undertaken generally in accordance with the requirements of the *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) (Blue Book). Erosion and sediment control measures will be in place as required until exposed areas are appropriately stabilized following construction.

General requirements for stormwater and sediment control during construction activities include:

- the estate should be developed in stages to minimise the potential for soil erosion and water pollution and enable progressive rehabilitation as the development proceeds;
- sediment control measures are to be installed and maintained throughout all construction areas prior to and during construction activities in accordance with the erosion and sediment control plan;
- all erosion and pollution control devices will be inspected at least weekly and following every rainfall event greater than 5mm, with appropriate maintenance or additional measures initiated as required;
- erosion and sediment control measures must be maintained until landscaping has been completed and becomes established;
- temporary rehabilitation is to be undertaken on disturbed areas where works have stopped and soils are expected to remain exposed for two months;
- as soon as practicable after the completion of earthworks for each stage, lots will be re-seeded to establish a fast growing cover crop which will minimise erosion and movement of sediment across and off site;
- wherever possible, the site will remain grassed and otherwise undisturbed until construction commences;

- topsoil and excess soil will be stockpiled separately in designated areas and protected from surface run off by diversion drains or similar and surrounded on downstream sides by silt fencing. Stockpiles will be suitably compacted in inhibit erosion. Where the stockpiling period exceeds four weeks, the stockpile shall be seeded to encourage vegetative regrowth; and

- entry into the site during construction will be restricted to designated ingress and egress areas.

All rubbish and waste materials will be stored appropriately to ensure they do not enter nearby drains and waterways. Chemicals, oils, and fuels will not be stored on site, or alternatively, will be stored in suitable containers, in a secure storage area.

3.6 ACID SULPHATE SOILS

All measures detailed within the Acid Sulphate Soils Management Plan (Coffey, 2007) provided within Annex E are to be implemented, including:

- management of exposed acid sulphate soils through neutralisation methods (the application of lime for example);

- management of dewatering processes to minimise the impact of acidic groundwater;

- monitoring pH levels of soils;

- monitoring pH levels of groundwater removed during dewatering operations; and

- contingencies for use of additional neutralising agents as required.

3.7 WASTE AND MATERIALS RE-USE

The objectives of waste management during construction activities will be to:

- ensure that the construction activities comply with current environmental legislation and best practice environmental management;

- comply with all relevant approvals for the site; and

- minimise the risk to public safety, and protect the amenity of adjoining residents and the public generally.

The consideration of waste minimisation during the design and planning phases of a project is more likely to maximise reuse opportunities and minimise the waste generated.

There are a number of practical techniques outlined in the 'WasteWise Construction Program – Handbook Techniques for reducing construction waste' (Department of the Environment and Heritage, 2005) that assist with construction managers with site waste management. Various procedures will be implemented by the successful contractor including the nomination of an appropriate person to be responsible for waste management.

It is estimated that approximately 460,200m^3 of soil will be generated through site cutting during the construction of the subdivision. The majority of this, approximately 422,200m^3, will be reused on site for the following purposes:

- filling and shaping in areas of the site where fill material is required, including roads, east / west drainage basin, commercial site regrading, allotments, level spreader and diversion bank construction;

- the creation of earth mounds proposed to be constructed between the Riverside at Tea Gardens construction site and existing residences within the adjacent Myall Quays residential area. The earth mounds will be created at the commencement of construction of the water detention lake as a noise mitigation measure and following construction the mounds will be reshaped to remove the mound and provide a shaped, landscaped area adjacent to the water storage lake; and

- shaping of landscaped and open space areas throughout the Riverside at Tea Gardens site.

The Bulk Earthworks Plan for the development detailing quantities and location of cut and fill works is provided in *Annex F*.

The bulk of topsoil stripped will be reused on the Riverside at Tea Gardens site during rehabilitation and landscaping works. All green waste generated through clearing will be chipped / mulched on site and used in landscaping throughout the site.

The remaining excess topsoil, being approximately 38,000m^3 will be transported to the site of the proposed sporting complex on the western side of Myall Street to facilitate site filling and improvement works required for the construction of the sporting complex. The transport of this material will be undertaken in accordance with the Bulk Haulage and Traffic Control Plans detailed on Sheet 66 within *Volume 2* of the EA.

To achieve adequate reuse and recycling of materials, appropriate areas for the separation and storage of waste will be provided.

Appropriate training and supervision of staff will be conducted to ensure that the objectives of the waste management plan are implemented and that contamination of the recyclable waste streams is avoided.

The successful construction contractor will ensure any subcontractor's waste streams are also included in the planning process and comply with the CEMP.

Waste segregation is the practice of classifying waste and placing it into the appropriate waste container immediately after the waste is generated. In order to achieve effective recycling and reuse, appropriate waste segregation will be carried out on site.

3.7.1 Avoidance

Purchasing policies will ensure that excessive waste is avoided through simple product substitutions for those with less packaging (or packaging that can be recycled), and avoiding over-ordering of items with expiry periods.

3.7.2 Reduction

Products will be assessed prior to purchase in terms of potential to generate excess waste. Products that include minimal packaging would be favoured, without compromising product performance. Pre-fabricated products that avoid the production off-cuts will be preferred.

3.7.3 Re-Use

Whenever possible, practical and cost effective to do so, re-usable waste from the construction of the first stage of the subdivision will be utilised later in the development. Items that will be considered for reuse include:

- green waste will be mulched, stockpiled, and used in landscaping;
- topsoil will be stripped, stockpiled and reused to revegetate exposed areas following construction and in landscaping;
- excess fill will be used onsite for filling purposes, with remaining soil to be transported to the proposed sporting complex site on the western side of Myall Street and reused in the filling and improvement works required at that site; and
- waste timber, and other suitable items will be reused as formwork.

3.7.4 Recycling

Plastic, paper, cardboard and other recyclable products will be disposed of in dedicated receptacles, and, stored for recycling collection. Pallets, if used, will be stored and returned to the supplier, or recycled.

3.7.5 Waste Management Plan

A preliminary waste management plan has been prepared as shown in *Table 3.1.* It outlines the waste streams expected to be generated during the construction of the subdivision, and outlines the proposed reuse/recycling/ or disposal methods for those waste streams.

Specific areas on site will be dedicated to the storage and segregation of waste. This will include skip bins dedicated to particular recyclable materials (ie scrap metal) with a separate receptacle for mixed waste.

Prior to the construction phase commencing, this plan will be finalised in more detail – including nomination of contractors and specific destinations.

Table 3.1 Preliminary Construction Waste Management Plan

Materials Generated On-Site	Destination		
	Reuse and Recycling		Disposal
	On-Site (proposed reuse/recycling method)	Off-Site (contractor/recycling outlet)	Contractor / disposal site
Green waste (from clearing)	Green waste will be chipped / mulched and stockpiled for later use in site landscaping.		
Excavated material	Engineering design will aim to minimised excess fill by balancing cut and fill. Approximately 422,200m^3 of excavated soil will be reused on site.	Remaining excavated topsoil of approximately 38,000m^3 will be stockpiled for reuse at the proposed sporting complex site on the western side of Myall Street.	
Topsoil	Stockpiled on site for reuse in site rehabilitation and landscaping		
Weathered rock	Stockpiled on site for reuse in site landscaping.		
Concrete	Any excess used for footpaths/minor works.	Place in dedicated skip bin – excess will be taken to nearest recycling contractor.	
Timber pallets		To be collected by supplier.	
Timber - other	Ordered to suit - offcuts reused on site ie formwork	Suitable pieces will be taken to nearest recycling contractor.	Only pieces not suitable for recycling will be sent to landfill.
Steel reo	Ordered to suit - offcuts reused.	Place in dedicated skip bin – remove to a metal recycling facility.	
Scrap metal		Place in dedicated skip bin – remove to a metal recycling facility.	
Other - mixed waste			Skip bins will be placed on site, taken to landfill as required.

3.8 EXTENSION OF EXISTING DRAINAGE CHANNEL

Riverside at Tea Gardens development incorporates an extension to an existing drainage channel connecting the lake to the Myall River to facilitate the management of water. The proposed extension of the drainage channel is detailed in *Annex G*. A Wetland Management Plan is to be prepared prior to the commencement of construction. The plan will identify mitigation and management measures for the protection of the SEPP 14 wetland from construction activities. Works associated with the extension of an existing drainage channel adjacent to the SEPP 14 wetland will involve:

- construction works will be short term, occurring over a period of two days;
- approximately 60m^3 of material, including 150m^2 of vegetation removal will occur as a result of the extension to the drainage channel; and
- the proposed construction method involves the use of a small dredge which will be floated out to the site on a barge. The existing temporary water treatment pond constructed for Stage 5 could be utilised to contain and treat the dredge water.

The erosion and sediment control measures to be implemented during the channel extension works are detailed in *Annex H*. These works will include sediment fencing on each side of the excavation, a straw bale sediment trap across the front of the existing channel and a sediment curtain around the excavation area and along the length of the lake edge to the spoil area.

3.9 TRAFFIC MANAGEMENT

Pedestrian and cycle access is available along Myall Street adjacent to the site. Construction works will impact vehicular traffic and pedestrian flows as the site access way enters Myall Street. The accessway will be signposted with warning signage to alert pedestrians, cyclists and drivers.

The following measures will be taken to minimise any disruption to local traffic during the demolition works:

- all vehicular access/egress associated with the construction works will be via the Myall Street entrance (to be noted to personnel during site inductions);
- staggering the arrival of vehicles where possible;
- heavy vehicle movements to/from the site shall be restricted to the operating hours noted in *Section 1.5*;

- oversize vehicle movements will obtain appropriate permits from the Roads & Traffic Authority and comply with any conditions contained therein;

- all vehicles will be accommodated within on-site parking areas;

- all loading and unloading will be carried out within the boundaries of the site;

- use of advisory signage to warn pedestrians and cyclists of heavy vehicle movements; and

- where traffic movements associated with the construction works will cause delays in traffic flows on the surrounding road network, appropriate traffic control plans will be developed and implemented.

REFERENCES

Department of the Environment and Heritage (2005) **WasteWise Construction Program – Handbook Techniques for Reducing Construction Waste.** Australian Government.

Coffey Geotechnics (Coffey), 2007, **Proposed Subdivision, Riverside Estate Project Application and Subsequent Stages, Tea Gardens, General Acid Sulphate Soil Management Plan.** Report prepared for Crighton Properties Pty Ltd.

Conacher Environmental Group, 2008, **Ecological Site Management Strategy, Riverside, Tea Gardens.** Report prepared for Crighton Properties Pty Ltd.

Environmental Resources Management Australia Pty Ltd (ERM), 2008, **Riverside at Tea Gardens Construction Noise Assessment.** Report prepared for Crighton Properties Pty Ltd.

Landcom (2004) **Managing Urban Stormwater: Soils and Construction**, 4th Edition.

Winning, G., 2009, **Wetlands Assessment for "Riverside", Tea Gardens.** Report to Crighton Properties by Hunter Wetlands Research Pty Ltd.

Annex A

Construction Environmental Management Plan Checklist

Table A.1 Construction Environmental Management Plan Checklist

Environmental Management Control	Person Responsible	Timing/Frequency	Completed (Initials/date)	Reference/Notes
General Site Issues				
Conduct site induction training for all personnel to alert them to sensitive work areas, explain the requirements of this CEMP, outline each individual's responsibilities, outline emergency response procedures. Documented evidence to be kept and maintained of site inductions.	Environmental Manager	Before commencing work and ongoing during operations		
Public Safety, Amenity and Site Security				
Ensure all vehicles access site via Myall Street entrance only.	Site Supervisor	Ongoing during operations		CEMP Section 3.1, CEMP Section 3.5
Ensure site compound and Myall Street entrance are clearly signposted.	Site Supervisor	Before commencing work		CEMP Section 3.1
Safety signage erected around site compound and at site entrance.	Safety Manager	Before commencing work		CEMP Section 3.1
No materials are to be stored/placed within public road reserve.	Site Supervisor	Ongoing during operations		CEMP Section 3.1
Areas of work to be kept to minimum required to minimise visual impact (as well as dust emissions and sediment generation).	Site Supervisor	Ongoing during operations		CEMP Section 3.1
Safety fencing erected around work areas in accordance with the site safety plan.	Safety Manager	Before commencing work and ongoing during operations		CEMP Section 3.1
Flora and Fauna				
Clearing activities restricted to only those areas nominated on construction plans for each stage	Site Supervisor	Ongoing during operations		CEMP Section 3.2
Cleared vegetation chipped / mulched on site and reused in landscaping	Environmental Manager	Ongoing during operations		CEMP Section 3.2
Vehicle movements in uncleared areas restricted	Site Supervisor	Before commencing work and ongoing during operations		CEMP Section 3.2

Environmental Management Control	Person Responsible	Timing/Frequency	Completed (Initials/date)	Reference/Notes
Weed control undertaken as required to control spread of weeds on or off site	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.2
Delineation of retained areas (corridors, reserves, APZ's) on site plans and field survey	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.2
Ensure conservation areas are protected with polyweb fencing or similar before commencing vegetation clearing. Maintain fencing during works to keep vehicles out of designated areas.	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.2
Tree protection fencing installed around trees to be retained, including protection of tree root zone	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.2
Temporary fencing installed where construction is adjacent to corridors or reserve areas to delineate area as no go areas	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.2
Hollow bearing trees identified and marked in field prior to clearing	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.2
Inspection of tree hollows prior to clearing to determine use by fauna	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.2
Removal and release (nearby) of fauna from hollows by experienced and licensed fauna expert	Environmental Manager	Ongoing during operations		CEMP Section 3.2
Trapping program undertaken prior to tree clearing to trap any mammal fauna wihtin areas proosed for staged clearing. Fauna to be released in appropriate areas on dusk.	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.2
No clearing of hollow bearing trees during the breeding season for microchiropteran bats and the Squirrel Glider (Sept – Mar)	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.2
Hollow logs cleared are salvaged and re-erected to create roosting / nesting opportunities	Environmental Manager	Ongoing during operations		CEMP Section 3.2
Clearing of hollow bearing trees via sectional dismantling including inspection of each section by a fauna ecologist and removal, released of fauna by qualified expert.	Environmental Manager	Ongoing during operations		CEMP Section 3.2

Environmental Management Control	Person Responsible	Timing/Frequency	Completed (Initials/date)	Reference/Notes
Clearing of hollow bearing trees via felling to include tapping of base of tree to disturb any fauna present prior to felling. All limbs to be inspected following feeling and fauna removed and released in appropriate areas.	Environmental Manager	Ongoing during operations		CEMP Section 3.2
All felling of hollow bearing trees to be supervised by qualified fauna ecologist	Environmental Manager	Ongoing during operations		CEMP Section 3.2
Any injured wildlife is to be reported to a fauna rescue organisation for rescue and care.	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.2
Noise and Vibration				
Plant and equipment maintained and kept in good working order to reduce potential noise impacts	Site Supervisor	Before commencing work and ongoing during operations		CEMP Section 3.3
Where practical, machines operated at low speed or power and switched off when not being used and not left idling for prolonged periods	Site Supervisor	Ongoing during operations		CEMP Section 3.3
Machines producing excessive noise (in comparison to industry standards) removed from the site or stood down until repairs / modifications made	Site Supervisor	Ongoing during operations		CEMP Section 3.3
Barriers placed nearest to plant and equipment to maximise barrier attenuation where possible in areas in close proximity to residences	Site Supervisor	Before commencing work and ongoing during operations		CEMP Section 3.3
Avoiding any coincidence of noisy plant working together in close proximity simultaneously near to sensitive receivers	Site Supervisor	Ongoing during operations		CEMP Section 3.3
Minimising the occurrence of consecutive days work in the same locality	Site Supervisor	Ongoing during operations		CEMP Section 3.3
Maximise the offset distance between noisy plant items and nearby noise sensitive receivers, orienting noisy plant or equipment away from sensitive areas	Site Supervisor	Ongoing during operations		CEMP Section 3.3

Environmental Management Control	Person Responsible	Timing/Frequency	Completed (Initials/date)	Reference/Notes
Carrying out loading and unloading away from noise sensitive areas. If loading near sensitive receivers, acoustic enclosures or barriers of a suitable height constructed to minimise the noise impacts;	Site Supervisor	Ongoing during operations		CEMP Section 3.3
Where noise complaints arise, monitor construction noise levels to quantify potential impact at most sensitive residences	Environmental Manager	Ongoing during operations as required		CEMP Section 3.3
Check that all work is being conducted within prescribed operation hours.	Site Supervisor	Daily		CEMP Section 1.5
Air Quality				
Check vehicles are keeping to sealed and/or designated areas.	Site Supervisor	Ongoing during operations		CEMP Section 3.4
Check machines are complying with emission standards (i.e. emissions not visible for more than 10 seconds).	Site Supervisor	Ongoing during operations		CEMP Section 3.4
Enforce 20km/h speed limit on unsealed tracks/roads.	Site Supervisor	Ongoing during operations		CEMP Section 3.4
Ensure a mobile water tanker equipped with a pump and sprays is used to suppress dust from unsealed roads when in use and other areas as required.	Site Supervisor	Ongoing during operations		CEMP Section 3.4
All vehicles leaving and entering a site with loads that may generate dust will be covered at all times except during loading/unloading.	Site Supervisor	Ongoing during operations		CEMP Section 3.4
Stormwater and Sediment Control				
Construction works undertaken in stages to minimise potential soil erosion and water pollution and enable progressive rehabilitation	Site Supervisor	Ongoing during operations		CEMP Section 3.5
Sediment control measures installed and maintained throughout all construction areas in accordance with Erosion and Sediment Control Plan and maintained until landscaping is established	Site Supervisor	Prior to commencement of work and inspected weekly thereafter and following every rainfall event greater than 5mm		

Environmental Management Control	Person Responsible	Timing/Frequency	Completed (Initials/date)	Reference/Notes
Temporary rehabilitation undertaken on disturbed areas where works are stopped and soils are expected to remain exposed for two months	Site Supervisor	Ongoing during operations		
Lots re-seeded with a fast growing cover crop immediately following completion of earthworks	Site Supervisor	Ongoing during operations		
Site remained grassed and undisturbed until construction commences, wherever possible	Site Supervisor	Prior to commencement of work		
Topsoil / excess soil stockpiles separated in designated area and sediment control devices installed (eg diversion drains, silt fencing). Stockpiles compacted to reduce erosion and where stockpiling exceeds four months, stockpile is seeded to encourage vegetative growth	Site Supervisor	Ongoing during operations		
Ensure all hazardous materials are appropriately stored.	Site Supervisor	Prior to commencement of work		CEMP Section 3.5
Acid Sulphate Soils				
All measures detailed within the Acid Sulphate Soils Management Plan (Coffey, 2007) are implemented.	Environmental Manager	Before commencing work and ongoing during operations		CEMP Section 3.6
Waste Management				
During clearing, vegetation will be stockpiled for mulching and use in landscaping on-site.	Environmental Manager	During clearing operations		CEMP Section 1.5, CEMP Section 3.6
Topsoil and excess fill will be reused on site wherever possible.	Site Supervisor	Prior to commencement of work		CEMP Section 3.6
Waste materials will be reused on site wherever possible prior to recycling or disposal.	Site Supervisor	Prior to commencement of work		CEMP Section 3.6
Provide an area for the segregation, storage and recycling of waste.	Site Supervisor	Prior to commencement of work		CEMP Section 3.6

Environmental Management Control	Person Responsible	Timing/Frequency	Completed (Initials/date)	Reference/Notes
Traffic Management				
Heavy vehicle movements to/from the site shall be restricted to the operating hours.	Site Supervisor	Ongoing during operations		CEMP Section 3.7
Oversize vehicle movements will obtain appropriate permits from the Roads & Traffic Authority and comply with any conditions contained therein.	Site Supervisor	Ongoing during operations		CEMP Section 3.7
Ensure the main access is not used for parking, loading, marshalling or standing of any semi-trailer, heavy plant floats or wide loads.	Site Supervisor	Ongoing during operations		CEMP Section 3.7
Ensure all vehicles can be accommodated within on-site parking areas.	Site Supervisor	Prior to commencement		CEMP Section 3.7
All loading and unloading will be carried out within the boundaries of the site.	Site Supervisor	Ongoing during operations		CEMP Section 3.7
Erect advisory signage to warn pedestrians and cyclists of heavy vehicle movements.	Site Supervisor	Prior to commencement		CEMP Section 3.7
Where traffic movements associated with the construction works will cause delays in traffic flows on the surrounding road network, appropriate traffic control plans will be developed and implemented.	Site Supervisor	Ongoing during operations		CEMP Section 3.7

Annex B

Ecological Site Management Strategy

Annex C

Construction Noise Assessment

Annex D

Erosion and Sediment Control Plan and Soil and Water Management Notes

Annex E

Acid Sulphate Soil Management Plan

Annex F

Bulk Earthworks Plan

Annex G

Channel Extension Plans

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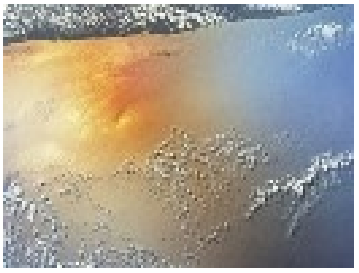
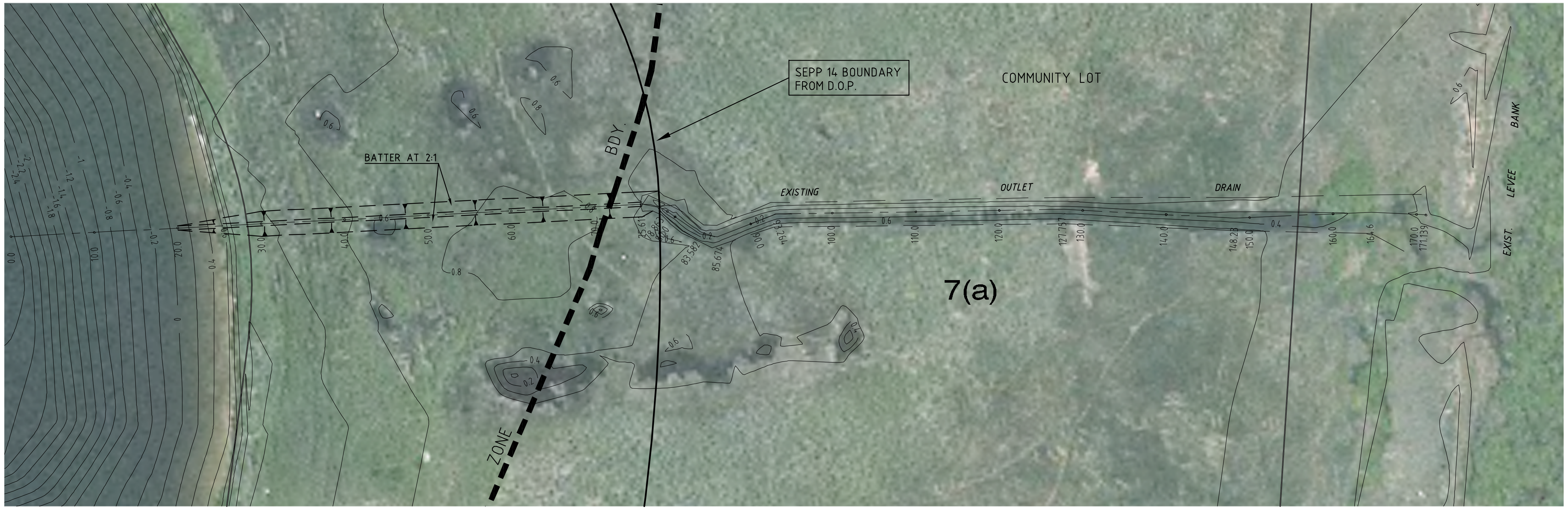


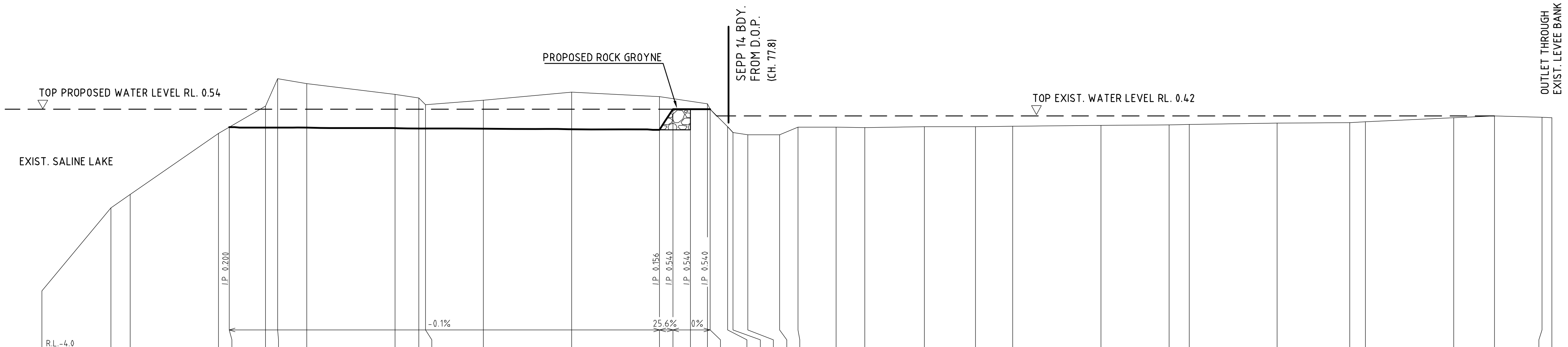


PLAN - PROP. EXTENSION OF EXISTING OUTLET DRAIN

SCALE 1:300

ESTIMATED EARTHWORKS

AREA OF EXCAVATION = 150 m²
VOLUME OF EXCAVATION = 60 m³



CHAINAGE	DESIGN LEVEL	EXISTING LEVEL
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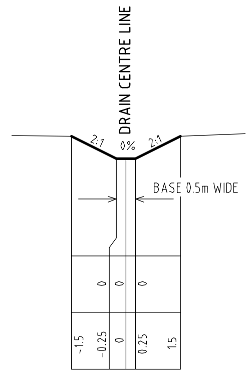
7.812		-1.317
10		-1.063
20		0.084
21.2	0.2	
25.311	0.196	0.603
26.687	0.195	1.118
30	0.192	1.028
40	0.183	0.823
42.695	0.181	0.758
43.464	0.18	0.623
50	0.174	0.709
60	0.165	0.862
70	0.156	0.783
71.5	0.54	
73.5	0.54	
75.4	0.54	0.646
75.7	0.54	0.54
77.686		0.212
78.329		0.106
80		0.059
83.582		0.057
85.674		0.203
90		0.2
93.264		0.197
100		0.208
105.779		0.216
110		0.223
120		0.238
127.757		0.25
130		0.255
140		0.276
148.23		0.292
150		0.306
160		0.383
164.6		0.418
170		0.393
171.139		0.384

LONG. SECTION - PROP. EXTENSION OF EXISTING OUTLET DRAIN

H=1:300 V=1:50



TYPICAL SECTION - PROP. OUTLET DRAIN EXTENSION

SCALE 1:100 (NAT.)

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
B	Revised Outlet Drain Extention	GH	GH			
A	Original Issue	GH	GH	AV*	BL*	06/08/08*

* Denote the original signature and date when revision was issued.

TATTERSALL SURVEYORS DEVELOPMENT CONSULTANTS	SCALE : 0 5 10m (1:500 for A1 Size Plot)	SHEET No. : 77	FILE : 20800132	SHEET SIZE
		JOB No. : 201479	DATE : Plotted 16:24 10/11/08	A1
	COMPUTER FILE : S:\projects\Myall Quays\dwg\STG9\Basin Plans.dwg			

Xref: Stg 9 [Stg 9.dwg] Xref: 202400-ComSite [202400-ComSite.dwg] Xref: 201478 - Stg 8 Bdy [201478 - Stg 8 Bdy.dwg] Xref: Stg9-10__design_Contors__2__INTERVAL [Stg9-10__design_Contors__2__INTERVAL.dwg] Xref: 910370 - BDY [910370 - BDY.dwg] Xref: MQ-STAGE6 [MQ-STAGE6.dwg]