Colac Otway Shire

Draft Wye River and Separation Creek Construction, Traffic and Environment Management Plan

Contract No. Q2016/17-40

3 March 2017

Pour trust
into your
foundations
and you
can build
anything

Draft Wye River and Separation Creek Construction, Traffic and Environment Management Plan

Prepared for
Colac Otway Shire

Prepared by
Coffey Services Australia Pty Ltd
Level 1, 436 Johnston Street
Abbotsford VIC 3067 Australia
t: +61 3 9290 7000 f: +61 3 9290 7499
ABN: 55 139 460 521

3 March 2017

754-ENAUABTF11650AA_1_CTEMP_v3

Quality information

Revision history

Revision	Description	Date	Originator	Reviewer	Approver
v1 draft	Draft	23/12/2016	G. Heath	C. Balint	C. Balint
v2 draft	Draft for consultation	06/02/2017	G. Heath	C. Balint	C. Balint
v3 draft	Draft for consultation	03/03/2017	G. Heath	C. Balint	C. Balint

Distribution

Report Status	No. of copies	Format	Distributed to	Date
v1 draft	1	PDF	Colac Otway Shire	23/12/2016
v2 draft	1	PDF	Colac Otway Shire	06/02/2017
v3 draft	1	PDF	Colac Otway Shire	03/03/2017

Table of contents

Tables

Figures

Appendices

1. Introduction

This construction, traffic and environment management plan (CTEMP) has been developed support the rebuilding of the Wye River and Separation Creek communities. The CTEMP sets out the operating framework and specific procedures for minimising potential impacts and managing amenity, traffic and environmental issues associated with post-bushfire construction for private landowners and government agencies and authorities. It was developed in consultation with landholders, local residents, regulatory authorities and other relevant stakeholders.

1.1. Project overview

The residents of Wye River and Separation Creek have been affected and displaced by the 25 December 2015 bushfires. After the bushfires, a clean-up of bushfire-affected areas was undertaken by the State Government. As residents begin the process of rebuilding their homes and government agencies and authorities replace and repair public infrastructure, there is a need for a CTEMP to manage construction activity. The plan is intended to provide guidance, during the rebuilding stage, to Council, council contractors and staff, builders and building subcontractors as well as the local community.

As the clean-up of bushfire debris, removal of hazardous trees and reinstatement of retaining walls by Grocon nears completion, the next stage in the recovery effort is being managed by The Colac Otway Shire (COS). The management of construction traffic and noise control has been given special consideration in this CTEMP to ensure that appropriate measures are in place to manage the cumulative effects of conflict between rebuilding and maintain the community's amenity.

1.2. Purpose and objectives of the CTEMP

The overriding purpose of the CTEMP is to enable COS and the State Government to facilitate orderly re-establishment of fire damaged areas in Wye River and Separation Creek.

The key objectives of the CTEMP are to:

- Ensure safe movement and orderly management of construction and local traffic.
- Ensure air and noise emissions are in accordance with Environment Protection Authority (EPA) guidelines.
- Minimise amenity impacts to the local community, businesses and tourists.
- Protect human health and minimise the risk of injury to construction workers and the general public.
- Minimise damage to the environment including the protection of vegetation and fauna.
- Manage potential erosion and sedimentation issues.
- Manage private construction activity on road reserves.
- Protect COS assets.

1.3. Implementation of the CTEMP

COS will ultimately be responsible for the implementation of the CTEMP for Wye River and Separation Creek. This will involve:

- Restrictions on construction activities (e.g. permissible construction times) to moderate the impact of construction activities on the local community's amenity.

- Implementation of a temporary traffic management plan to ensure the safe movement of traffic and minimise the risks to vehicle operators and pedestrians.
- Enforcement of current legislation and if required higher control standards stipulated within this plan to minimise damage to the environment and amenity.

The CTEMP will be administered through the use of planning and building permits within the Wye River and Separation Creek townships. Landowners wishing to rebuild will have to comply with the requirements of the CTEMP and ensure that all contractors also strictly adhere to the plan. All activity within the Wye River and Separation Creek Township Zones must also comply with the COS General Laws (Local Law No.2 – September 2013, see Appendix A). The purpose of the local law is to:

- Provide for the peace, order and good government of the municipality district.
- Promote a physical and social environment free from hazards to health, in which the residents of the municipal district can enjoy a quality of life that meets the general expectations of the community.
- Prevent and supress nuisances which may adversely affect the enjoyment of life within the municipal district of the health, safety and welfare of persons within the municipal district.

Penalties will be issued for non-compliances with planning and building permit conditions.

1.4. Document control

The underlying principles of this CTEMP will remain unchanged, however a yearly review will be undertaken to ensure that the regulations and guidelines within this plan are current. Should any guidelines or legislation be updated within this CTEMP, it will be issued as a new revision to reflect those updates. If and when a new revision of the CTEMP is issued, COS will notify all relevant stakeholders. Planning and building permits issued with reference to the CTEMP will only apply to the v CTEMP at the time of issuing the permit.

It is the individual's responsibility to ensure they are adhering to requirements of the CTEMP, which will available from COS via the following methods:

- Online at http://www.colacotway.vic.gov.au.
- Telephone – (03) 5232 9400 between 8:30am and 5pm, Monday to Friday.
- Fax – (03) 5232 9586 between 8:30am and 5pm, Monday to Friday
- Mail – PO Box 283, Colac, Victoria 3250.
- Email – inq@colacotway.vic.gov.au.

Alternatively, copies of the CTEMP will be made available at the following COS offices:

- 2-6 Rae Street, Colac, between 8.30am and 5pm, Monday to Friday.
- 101-105 Gellibrand Street, Colac, between 8.30am and 5pm, Monday to Friday.
- 69-71 Nelson Street, Apollo Bay, between 8:45am and 1:15pm, Monday to Friday.

2. Context

2.1. Township Zones

This CTEMP covers the fire affected township Zones of Wye River and Separation Creek which are located approximately 160 km southwest of Melbourne and 20 km southwest of Lorne on the Great Ocean Road (Figure 2.1, 2.2 and 2.3). Wye River is located approximately 1 km southwest of Separation Creek, and both settlements are located in the local government area of COS. Prior to the 2015 bushfire, Wye River and Separation Creek consisted of a total of 442 dwellings and 76 vacant lots within the township boundaries, with approximately 120 permanent residents.

Construction activity has the potential to impact surrounding properties and residents. In some instances, particularly for noise, these impacts may extend a significant distance from the source. Other impacts relating to parking, traffic and waste generation have the potential to impose upon residents, holiday makers, local businesses and people previously not affected by the bushfire. A large number of the residences in the settlements are used for holiday accommodation as well as caravan parks and camping areas, with the population reaching approximately 3,500 during summer months. This almost 3000% increase in population during the summer months has a high potential to result in conflict and cumulative impacts from construction activities and traffic movements.

2.2. 2015 bushfire

The Wye River and Separation Creek bushfire took hold on the 19th of December 2015 and had a significant breakaway on Christmas Day when it reached the townships of Wye River and Separation Creek. The severity of the bushfire was rated as high or moderate in parts of the towns (Figure 2.4). The bushfire destroyed 109 houses at Wye River and Separation Creek and burnt approximately 2,500 ha of bushland. As well as the loss of these houses, the bushfire created new hazards, including increased land instability caused by damage to retaining walls, loss of vegetation and erosion.

2.3. Clean-up and re-building activities

Throughout 2016, clean-up of bushfire debris has been conducted by Grocon, COS and their contractors. Emergency Management Victoria (EMV) has engaged Grocon to re-instate retaining walls with a High or Very High risk rating. COS and the State Government will continue the recovery effort by beginning to re-establish public infrastructure.

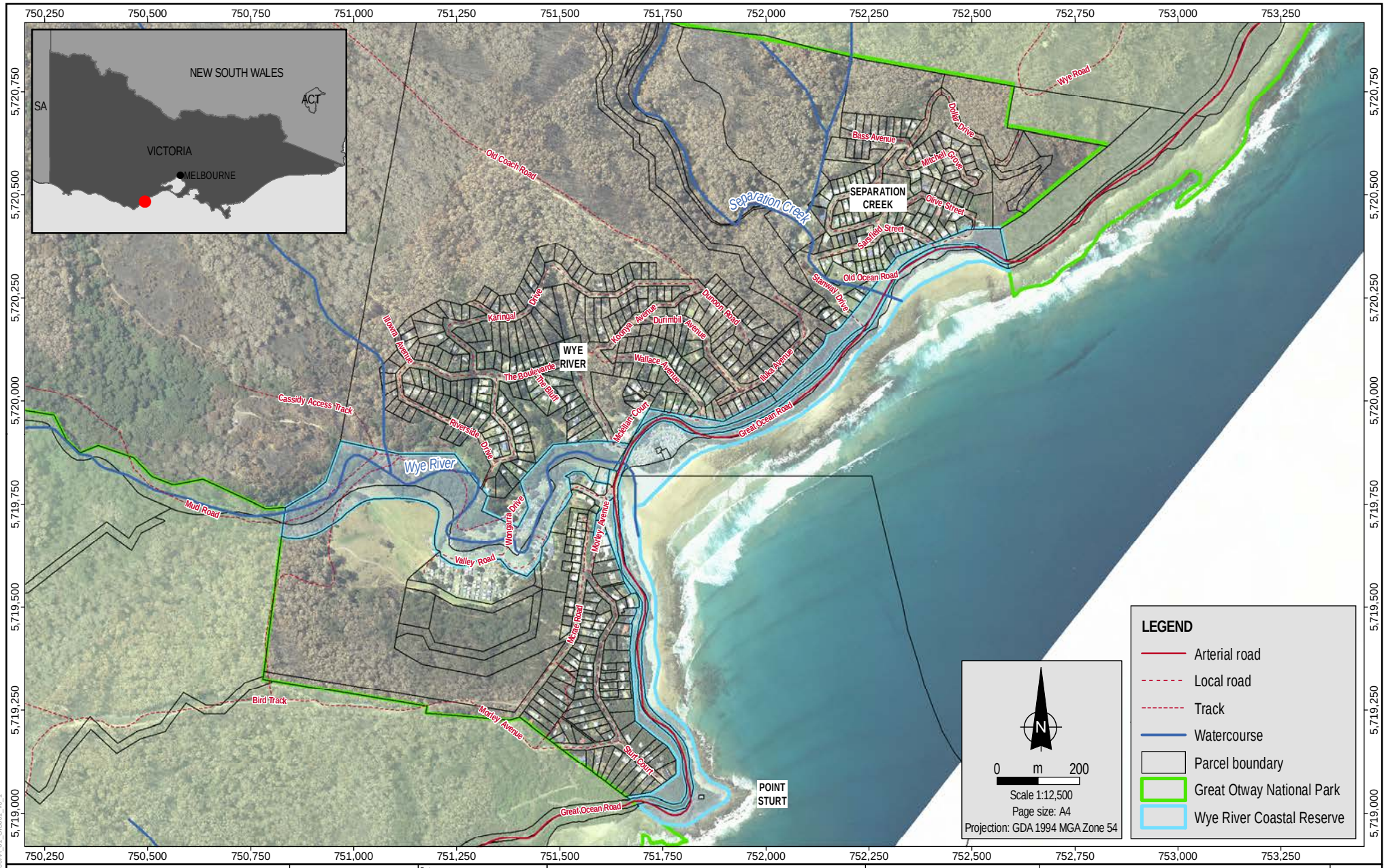
Owners are commencing the rebuilding of their homes and construction in some areas has begun. It is possible that not all of the destroyed houses will be rebuilt, however in the short term there is likely to be significantly higher than normal building activity and traffic.

In addition to the rebuilding of individual homes there will continue to be significant public infrastructure and clean-up works including:

- Repairs to damaged roads and roadside retaining structures (by both COS and Grocon).
- Installation of underground drainage.
- Open space infrastructure such as pathways, fencing, park furniture and waste bins.
- Utility infrastructure including power and telecommunication.
- Revegetation and pest plant control.

2.4. Current traffic management

Currently there are little or no traffic management measures in place for the general public. This CTEMP will explore the possible implementation of traffic management measures to improve the safe movement of pedestrian and vehicle traffic.



Source:
Roads, watercourses, parcel boundaries and parks/reserves from VICMAP.
Imagery from DEWLP (captured 9 January 2016).

coffey
A TETRA TECH COMPANY

Date: 20.12.2016
Project: 754-ENAUABTF11650AA
File Name: 11650AA_01_F002_GIS

Colac Otway Shire

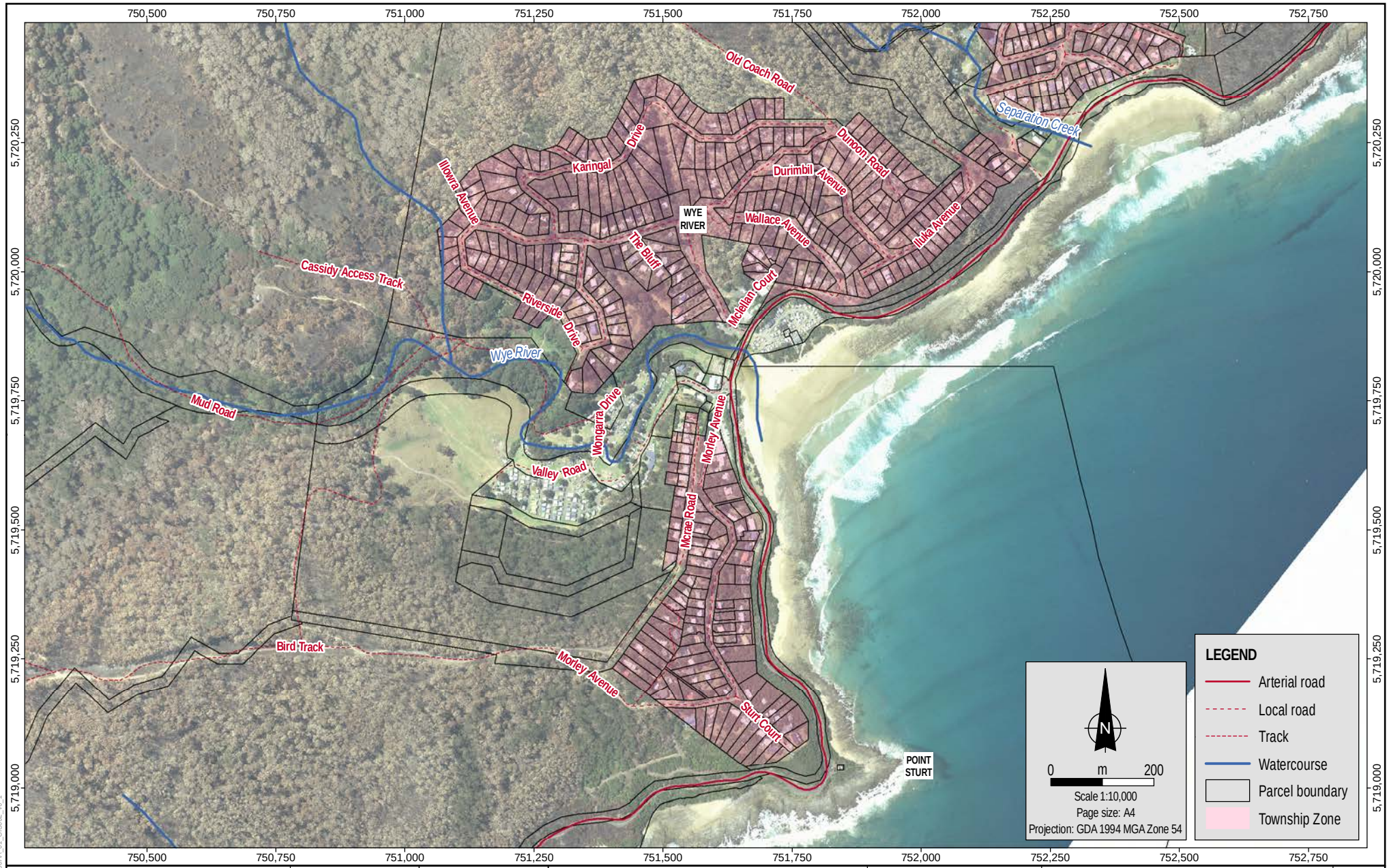
Wye River and Separation Creek CEMP

Colac Otway SHIRE

Wye River and Separation Creek location

Figure No: 2.1

MXD Reference: 11650AA_01_GIS001_v0_1



Source:
Roads, watercourses, parcel boundaries and parks/reserves from VICMAP.
Imagery from DEWLP (captured 9 January 2016).

coffey
A TETRA TECH COMPANY

Date: 20.12.2016
Project: 754-ENAUABTF11650AA
File Name: 11650AA_01_F002_GIS

Colac Otway Shire

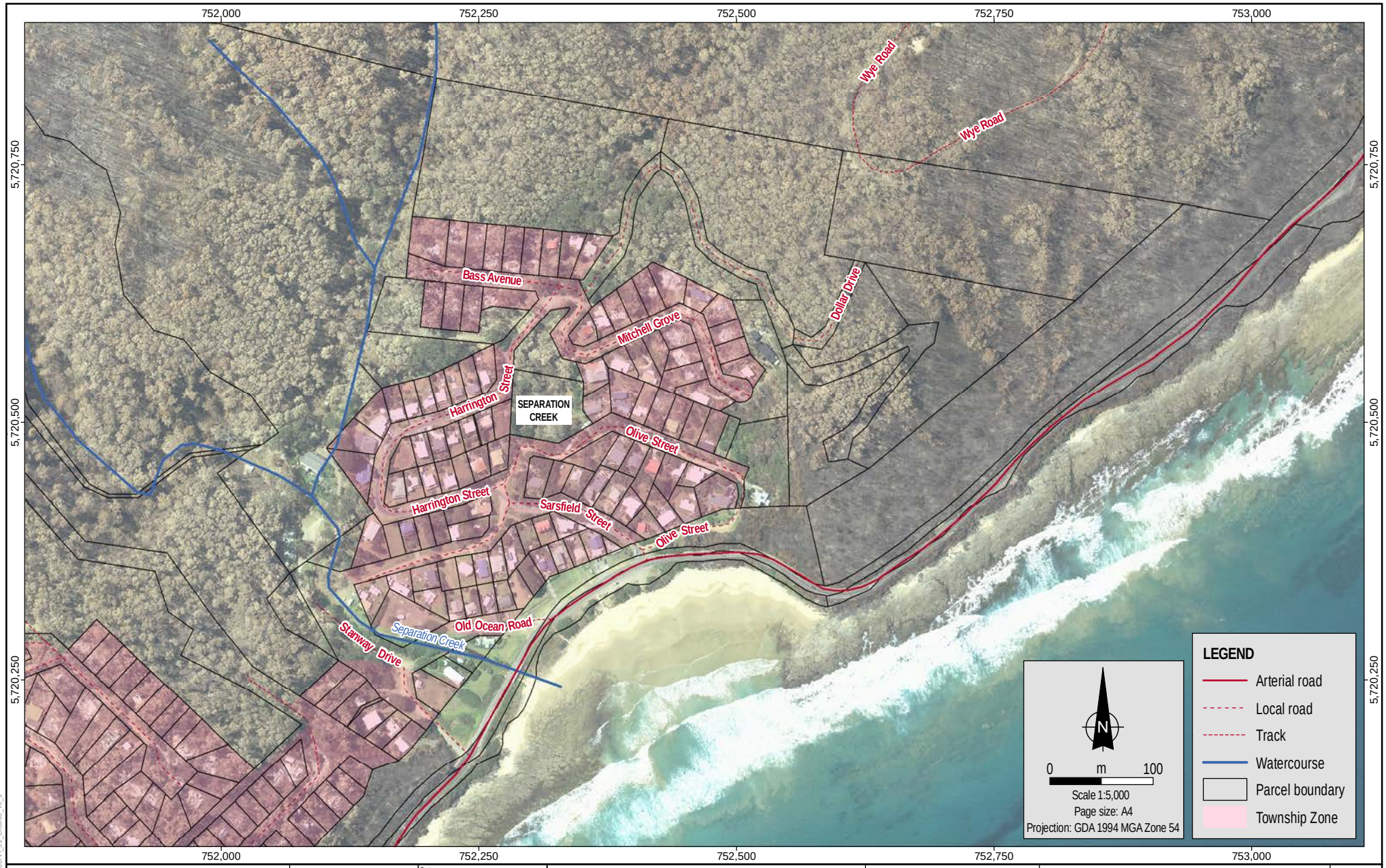
Wye River and Separation Creek CEMP

Colac Otway SHIRE

Wye River township

Figure No: 2.2

MXD Reference: 11650AA_01_GIS002_v0_1



Source:
Roads, watercourses, parcel boundaries and parks/reserves from VICMAP.
Imagery from DEWLP (captured 9 January 2016).

coffey
A TETRA TECH COMPANY

Date: 20.12.2016
Project: 754-ENAUABTF11650AA
File Name: 11650AA_01_F003_GIS

Colac Otway Shire

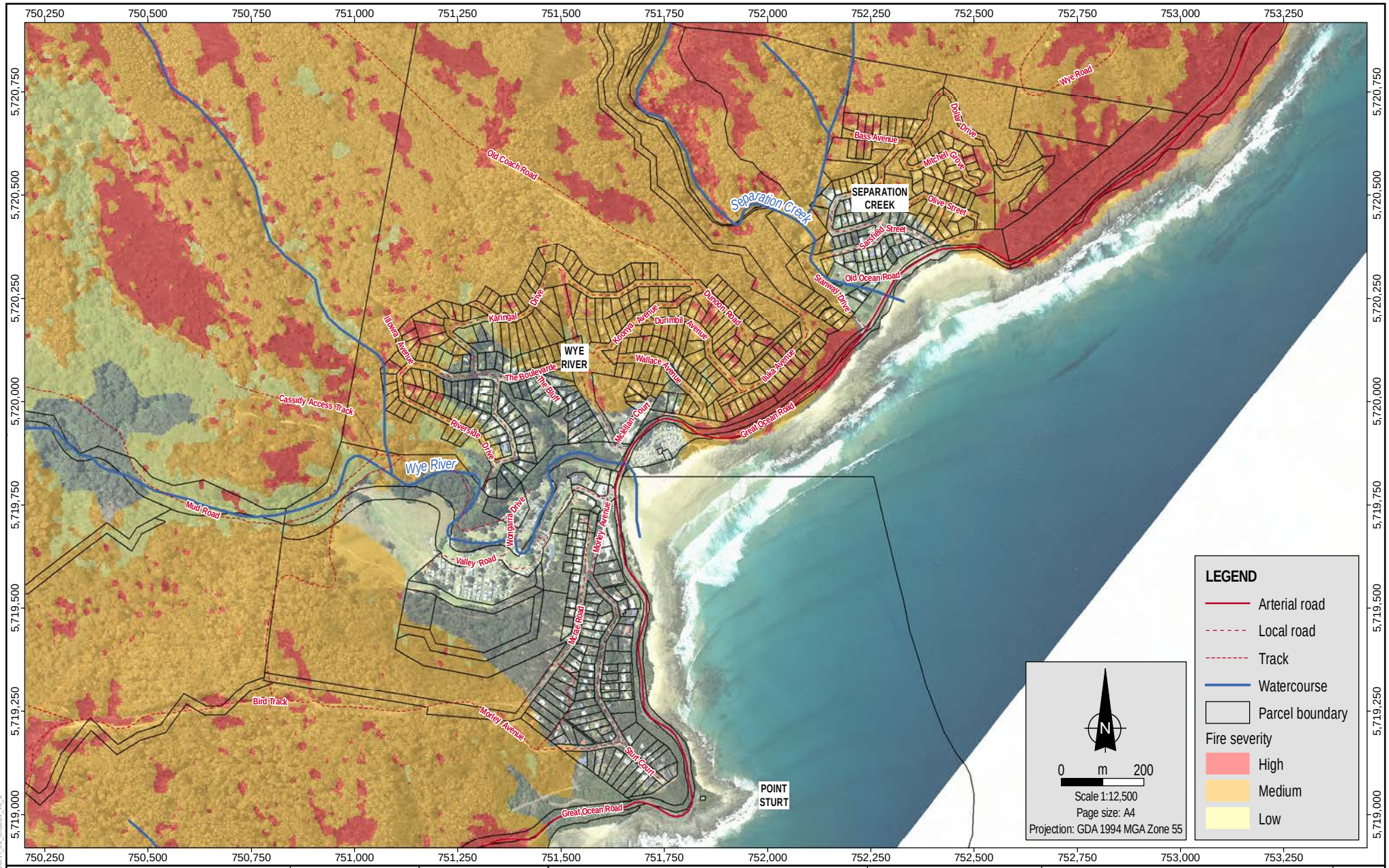
Wye River and Separation Creek CEMP

Colac Otway SHIRE

Separartion Creek township

Figure No: **2.3**

MXD Reference: 11650AA_01_GIS003_v0_1



Source:
Fire severity from DEWLP.
Roads, watercourses, parcel boundaries and parks/reserves from VICMAP.
Imagery from DEWLP (captured 9 January 2016).

coffey
A TETRA TECH COMPANY

Date: 20.12.2016
Project: 754-ENAUABTF11650AA
File Name: 11650AA_01_F004_GIS

Colac Otway Shire

Wye River and Separation Creek CEMP

Colac Otway SHIRE

Fire severity

Figure No: 2.4

MXD Reference: 11650AA_01_GIS004_v0_1

3. Legislative and statutory requirements

3.1. Commonwealth and State legislation, guidelines and codes

Commonwealth and State legislation, guidelines and codes relevant to the Wye River and Separation Creek CTEMP are provided in Appendix B.

3.2. Statutory planning framework

The statutory planning framework for approvals to enable rebuilding to take place in the fire affected areas of Wye River and Separation Creek is provided by the provisions of the *Planning and Environment Act 1987* and, more specifically, by the provisions of the Colac Otway Planning Scheme.

3.2.1. Planning and Environment Act 1987

The Planning and Environment Act 1987 sets the legislative framework for statutory and strategic planning in Victoria. The Act provides the legal framework for development approval by means of planning permits by the relevant responsible authority (in this instance, COS). Planning permits to allow the use or development of a specified parcel of land in accordance with the applicable provisions of the relevant planning scheme are usually issued with conditions.

The CTEMP will be enforced through the conditions of approval for planning and building permits issued by COS for development within Wye River and Separation Creek.

3.2.2. Colac Otway Planning Scheme

A summary of planning controls applying to Wye River and Separation Creek is provided in Appendix C.

Anyone seeking to rebuild, who does not have a valid existing planning permit, will require a new planning permit under the streamlined process. Landowners who have recently obtained permits which have expired will be able to utilise the plans and supporting documentation from the previous process to assist in preparing a new application, although they will need to be updated.

Planning and building approval processes

COS is the responsible authority for the administration of the Scheme. Under the provisions of the Scheme, planning approval will be required to enable construction of new dwellings (except where it is deemed that a valid planning permit exists).

On its WyeSep Connect website (http://wyesepconnect.info/), COS and EMV provides guidance for applicants for a planning permit in relation to steps including:

- Pre-application consultation with One Stop Shop.
- Other steps to assist the preparation of applications.
- Information requirements to accompany an application.
- The steps in the planning permit process.

A planning permit condition of all new dwelling applications within the Incorporated Plan Area will require applicants comply with the CTEMP. Issues to note in this plan for compliance are:

- Days and hours of construction.
- Management of impacts outside of individual construction zones including noise, dust, stormwater run-off and sediment control, protection of adjoining properties and Council infrastructure assets.
- Any impact upon adjacent roads and pedestrian walkways, ensuring there is adequate movement and circulation of vehicles and pedestrian adjacent to the land during the construction phase.
- Access routes for construction vehicles, including the weight and length of heavy vehicles. It is the builder's responsibility to ensure that the local road network is capable of supporting the construction vehicles proposed.
- Parking locations for construction vehicles and construction workers' vehicles.
- Temporary fencing works.
- Type and location of facilities and amenities for construction site workers.
- Disposal of litter and building waste, and methods for containing all waste on the construction site.
- Disposal of displaced soil excavated from the construction site.

Once a planning permit is issued, application can be made for building permit which is required under the Building Regulations for (among other things):

- Demolition/removal of a building.
- Construction of a new dwelling.
- Construction of a range of related works including retaining walls on boundaries or over 1 metre in height, most fences, decks and bushfires shelters.

4. Stakeholder engagement

4.1. Identification of stakeholders

Stakeholders for the rebuilding of Wye River and Separation Creek are not just residents of these communities. Local businesses and accommodation facilities also have an interest in what occurs during the rebuilding of Wye River and Separation Creek. Other stakeholders include the many landowners who are residents of Melbourne and other surrounding districts and visitors and tourists to the region.

The following organisations have also been identified as stakeholders for the development of this CTEMP:

- Department of Environment, Land, Water and Planning (DWELP).
- State Emergency Services (SES).
- Emergency Management Victoria (EMV).
- Country Fire Authority (CFA).
- Colac Otway Shire (COS).
- Community Resilience Committee (CRC).
- Wye River Foreshore Committee of Management.
- VicRoads.

4.2. Methods of engagement

Stakeholder engagement regarding this plan will be conducted in a number of methods. This will be to ensure that stakeholders have the opportunity to engage and review potential management measures to mitigate against the impacts of reconstruction in Wye River and Separation Creek. It is likely that the management measures within this CTEMP will become planning and building permit approval requirements from COS.

The CTEMP will be hosted on the COS website and will be referred to on WyeSep Connect. This will provide easy access for members of the public to view the TMP and the general principles of the CTEMP.

The CEMP will also be presented at two community meetings in Wye River comprising:

- An initial meeting during the development of the CTEMP to clearly define and refine issues and seek community feedback.
- A second meeting upon completion of the first draft of the CTEMP to present it to the community and seek further feedback.

COS will organise the meetings including advertising and manage the receipt and collation of community feedback.

4.3. Community feedback and complaints

Feedback and complaints about the CTEMP and its implementation will be invited by COS. All stakeholders are responsible for the successful implementation of the plan. Residents are welcome to provide feedback based on their view of the success and effectiveness of the plan in managing environmental and other construction impacts.

5. Structure of CTEMP

The CTEMP for Wye River and Separation Creek needs to consider three main factors. The amenity of residents and visitors to the area, traffic management and management and mitigation of environmental factors.

The plan will provide residents planning to develop or construct residences on their land with guidance on meeting the planning approval requirements of COS. Many of the management measures provided in this plan are based on Victorian government policy or legislation, others have been introduced by COS to meet the requirements of the communities of Wye River and Separation Creek.

All construction site arrangements and operations at a minimum must comply with the COS General Laws (Local Law No.2 – September 2013, see Appendix A). The purpose of the local law is to:

- Provide for the peace, order and good government of the municipality district.
- Promote a physical and social environment free from hazards to health, in which the residents of the municipal district can enjoy a quality of life that meets the general expectations of the community.
- Prevent and supress nuisances which may adversely affect the enjoyment of life within the municipal district of the health, safety and welfare of persons within the municipal district.

All landowners and principal contractors are responsible for compliance with the CTEMP and communication with all relevant stakeholders. This includes safety briefings or inductions for all contractors and visitors. Site signage requirements for principal contractors are provided in the Occupational Health and Safety Regulations 2007. The following requirements outlined in Work Safe Victoria's Site Establishment Checklist for Builders and Building Trades Contractors (2005) should also be met where applicable/appropriate:

- A prominent sign advising all visitors to report to the site supervisor before entering the site.
- Signs depicting the necessary types of personal protective equipment (such as hearing protection and safety helmets, glasses and footwear) required for the site.
- Contact name and number.

Additionally, any site hazards such as unstable areas, hazardous trees etc. should be appropriately signed and fenced.

The table below is a summary of the key risks and issues and objectives of this plan. There is also a summary of the detailed management and mitigation measures for each aspect. Landowners and principal contractors should refer to the full list of management measures and not rely upon the summary to determine compliance.

Table 5.1 Summary of CTEMP

	Key risks and issues	Objectives	Management measures
Protection of Amenity			
Noise	Increased noise and vibration through construction activities leading to detrimental effects on the health and amenity of residents, visitors, contractors and COS employees.	• Avoid, minimise and manage noise generated from construction • Protect the health and amenity of residents, visitors, contractors and COS employees from noise impacts	• No construction noise during Sundays and Public Holidays (above statutory requirements) • Restricted hours of construction work for peak holiday period (above statutory requirements) • Compliance with EPA construction work hours
Air quality	Potential health and amenity impacts to residents, visitors, contractors and COS employees.	• Avoid, minimise and manage dust generated from construction • Protect the health and amenity of residents, visitors, contractors and COS employees from dust	• Management of fugitive dust • Reduced speed limits for unsealed roads • Rehabilitation of disturbed areas
Traffic Management			
	Safety of pedestrians and traffic using the road network	• Provide a safer road network despite competing uses	• Traffic management plan implemented • Advisory 20 km/hr speed limit • One-way traffic flow restrictions • Parking zones • Approval of laydown areas
Environmental Management			
Soil and water	Erosion and landslips leading to sediment runoff and water quality impacts	• Limit soil instability through the management of surface water flow	• Specific soil and erosion measures • Revegetate cleared ground to prevent sediment runoff
Hazardous materials	Contamination of land, groundwater and surface water through inappropriate storage, handling, transport and disposal of materials.	• Manage hazardous materials in accordance with regulatory requirements	• Management of hazardous materials in accordance with relevant Safety Data Sheets (SDS)

	Key risks and issues	Objectives	Management measures
Asbestos	Non-compliant handing, management and disposal practices for asbestos	• Avid the potential for human exposure to asbestos and associated health risks.	• Ensure asbestos management and disposal is in accordance with relevant legislation and regulations
Waste	Pollution of land and water environments and potential health risks to humans	• Manage all waste in accordance with the waste hierarchy and in compliance with statutory requirements	• Minimise and manage wastes in accordance with the principles of avid, reduce, reuse, recycle, treat and dispose
Contamination and remediation	Contamination issues and human health risks associated with the decommissioning of septic tanks	• Prevent contamination of land, groundwater and surface water • Control risks to human health and the environment	• Compliance with EPA Victoria's Code of Practice – Onsite Wastewater Management
Biosecurity	Introduction and spread of pest plants and soil bore pathogens	• Prevent the introduction and minimise the spread of pest plants and soil borne pathogens	• Wash-down vehicles and machinery • Clean construction materials
Fire	Construction activities increasing the potential for wildfires through ignition	• Minimise risk of fires • Avoid human health and environmental impacts	• Manage hot work activities • Use of earthmoving and excavation equipment • Use of chainsaws and gardening equipment
Vegetation	Unauthorised clearing of vegetation and increased competition from pest plants	• Minimise disturbance to vegetation • No unauthorised clearance of vegetation	• All removal of vegetation subject to permit • Encourage rehabilitation and revegetation of cleared areas • Implementation of Bushfire Vegetation Restoration Plan
Indigenous heritage	Disturbance or damage to Indigenous heritage sites through construction activities	• Minimise adverse impacts to Indigenous heritage	• Established protocols in the event of unexpected discovery
Non-Indigenous heritage	Disturbance or damage to non-Indigenous heritage sites through construction activities	• Minimise adverse impacts to non-Indigenous heritage	• Established protocols in the event of unexpected discovery

6. Amenity

COS are committed to protecting the amenity of residents and visitors to Wye River and Separation Creek. Construction activities have the potential to impact people with noise and dust. These impacts can be mitigated through compliance with Victorian and local legislation and additional measures implemented by COS.

6.1. Noise

Noise and vibration from construction activities have the potential to impact upon nearby residents. Noise and vibration will principally result from activities such as earthworks, machinery operation, public infrastructure works, rebuilding of residential dwellings and increased traffic. Given the proximity of local residents to construction areas and the expected influx of tourists over the summer months, noise and vibration must be managed in order to minimise amenity impacts.

6.1.1. Key issues and risks

Key issues and risks relating to noise and vibration are:

- Increased noise and vibration from construction activities including building, machinery operation and increased construction-related traffic.
- Structural damage and erosion due to vibration.
- Detrimental effects on the health and amenity of construction workers, contractors, residents and tourists.

6.1.2. Objectives

The objectives of noise and vibration management measures are to:

- Avoid, minimise and manage noise generated from construction.
- Comply with EPA noise limits and COS limits outlined in Table 6.1 at nearby residences, or that noise emissions are acceptable to residents.
- Protect built structures from structural and cosmetic damage due to vibration.
- Protect the health and amenity of residents, visitors, COS employees and contractors due to potential noise and vibration impacts.

6.1.3. Management measures

In general construction noise is prohibited by the EPA regulation outside inside of the following times (Section 6, Group 2):

- 8 p.m. to 7 a.m. Monday to Friday
- 8 p.m. to 9 a.m. Saturdays, Sundays and public holidays.

These prohibited times are a minimum requirement and do not mean that all construction work will be acceptable outside of these times. Although the Environment Protection (Residential Noise) Regulations 2008 refers to prescribed items in Group 2 it is likely that any construction related noise, including vehicle movements, loading and unloading and other construction site preparation within the times above would not be considered acceptable.

Specific management measures recommended by the EPA and supported by the Environment Protection (Residential Noise) Regulations 2008 and COS requirements are outlined in Table 6.1.

Restrictions on work hours relate to the potential for unreasonable noise impacts to the local community. Permissible working hours applicable to Wye River and Separation Creek are provided in Table 6.1.

Table 6.1 Construction work hours

Period	Permissible working hours
Monday to Friday	7 a.m. to 8 p.m.
Saturday	9 a.m. to 8 p.m.
Sunday and Public Holidays	Not permitted
Peak holiday periods (Christmas and Easter school holidays)	9 a.m. to 6 p.m. Monday to Saturday

These permissible times are a minimum requirement and do not mean that all construction work will be acceptable within these times. To protect public amenity, COS has chosen to extend the hours when construction noise is not permitted to include Sundays and Public Holidays. This is exceeding the guidelines from EPA in response to requests from the local community.

EPA Publication 480 (Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites, 1996) provides guidance on managing noise from major construction projects. During dense periods of construction activity at Wye River and Separation Creek these guidelines should be followed to manage noise rather than the Environment Protection (Residential Noise) Regulations 2008, which are focused on managing noise from less intensive construction activity associated with individual houses. These management measures include:

- Fit and maintain appropriate mufflers on earth-moving and other vehicles.
- Enclose noisy equipment.
- Provide noise attenuation screens, where appropriate.
- Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 a.m. and 6 p.m. weekdays and 7 a.m. to 1 p.m. Saturday, except where, for practical reasons, the activity is unavoidable.
- Noise should not be above background levels inside any adjacent residence between 10 p.m. and 7 a.m.
- Advise local residents when unavoidable out-of-hours work will occur.
- Schedule deliveries to the construction site so that disruption to local amenity and traffic are minimised.
- Conduct a study on the impact of ground vibration from construction activities, where these operations occur within 50 m of a building and take appropriate action.
- Minimise air vibrations.

Wye River and Separation Creek are popular tourist destinations with the communities receiving a large influx of tourists during the summer months. Therefore, the potential for impacts on local community and tourist amenity, particularly in terms of noise and traffic congestion, will be greatest during the Christmas and Easter holiday periods. For this reason, in addition to the Environment Protection (Residential Noise) Regulations 2008, the CTEMP includes the following additional management measures during these periods (see Table 6.2).

Table 6.2 Peak holiday period noise management measures

Period	Permissible working hours
Peak holiday periods (Christmas and Easter school holidays) – excluding Sundays and Public Holidays	9 a.m. to 6 p.m. Monday to Saturday
Sundays and Public Holidays	Not permitted

6.2. Air quality and greenhouse gases

Construction related activities are likely to generate dust and greenhouse gases which have the potential impact the air quality of nearby residents and contribute to global warming. Dust and greenhouse gases will principally result from activities such as traffic movements along unpaved roads, earthworks and machinery operation. Given the proximity of local residents to construction areas and the expected influx of tourists over the summer months, air quality and greenhouse gases must be managed in order to minimise amenity impacts.

6.2.1. Key issues and risks

Key issues and risks relating to air quality are:

- Dust emissions from traffic movements along unsealed roads, exposed surfaces and stockpiles.
- Water quality effects from dust deposition.
- Generation of greenhouse gases from construction machinery, mobile plant and equipment.
- Potential health and amenity impacts to construction workers, contractors, residents and visitors.

6.2.2. Objectives

The objectives of air quality and greenhouse gas management measures are to:

- Minimise air and greenhouse gas emissions from construction.
- Minimise the impacts of dust generated from vehicle movements and exposed soils, including the prevention of dust deposition on nearby houses and properties.
- Minimise potential health and amenity risks for construction workers, nearby residents and the general public.
- Comply with EPA air quality requirements outlined in Section 6.2 at nearby residences.

6.2.3. Management measures

The State Environment Protection Policy (Air Quality Management) 2001 establishes the framework for managing emissions into the air environment in Victoria from all sources of air pollutants, so that the air quality objectives outlined in The State Environment Protection Policy (Ambient Air Quality) 1999 are met. In addition Section 59E of the Environment Protection Act 1970 provides for an indictable offence where a person intentionally, recklessly, or negligently pollutes the environment or causes or permits an environmental hazard which results in a serious threat to public health or a substantial risk of a serious threat to public health.

In order to manage dust, odour emissions and greenhouse gas emissions the below management measures should be adopted at Wye River and Separation Creek.

Dust prevention

Dust prevention measures shall:

- Ensure that the management of fugitive dust complies with the relevant legislation and regulations listed in Section 3, including the State Environment Protection Policy (Ambient Air Quality) 1999.
- Adhere to speed limits outlined in Section 7 to reduce dust generation.
- Rehabilitate disturbed areas not in use to minimise potential for airborne dust.

Additionally, *Clause 74* in Part 4 of COS Local Law Number 2 2013 (Appendix A) is applicable to dust prevention.

7. Traffic management

The cumulative impact of heavy vehicle movements associated with the site clean-up, residential construction traffic and increased patronage to the townships during holiday periods (Christmas/New Year, school holidays, Easter and long weekends) necessitates a traffic management strategy to ensure safety and efficiency of the road network. This section summarises the traffic management plan developed by GTA consultants (2017) for Wye River and Separation Creek (see Appendix G).

The area is highly constrained in terms of using roads and road reserves for laydown areas or waste skip bins, and there is high potential for damage to roads or incidents due to erosion (both existing and future) and the steep road network. Works on Council land and roads is covered under Part 3 of COS Local Law Number 2 2013 (Appendix A).

Construction work combined with erosion and physical constraints such as lack of laydown areas and steep roads has the potential to damage COS assets including soils and retaining walls, roads, drainage systems and watercourses. Protection of COS assets is covered by Part 3 of COS Local Law Number 2 2013 (Appendix A).

7.1. Existing road network

7.1.1. Wye River

Wye River is located abutting the Great Ocean Road. Great Ocean Road is an arterial road under VicRoads jurisdiction and generally aligned along the Victorian southwest coast stretching between Torquay and Allansford.

The Boulevard provides the primary connection between Great Ocean Road and the Wye River residential area. Its intersection with Great Ocean Road does not have traffic signals with provision of full turning movements. Wallace Ave also connects Wye River to Great Ocean Road however its predominant purpose is a secondary access.

The greater local road network in Wye River comprises predominantly narrow, winding and/or undulating/steep roads. Limited signage, road safety barriers and lighting exists and a number of the roads are located on slopes supported by retaining walls.

There currently exists an informal road connection between Wye River and Separation Creek, however during a recent inspection this connection was closed to vehicles. Advice provided to GTA indicates this road was used to shuttle residents and visitors between Wye River and the Great Ocean Road via Separation Creek whilst the Great Ocean Road was under restricted operation.

7.1.2. Separation Creek

Separation Creek is also located abutting the Great Ocean Road, with Sarsfield Street providing the primary connection to the town.

The Great Ocean Road/Sarsfield Street intersection does not have traffic signals and allows for full turning movements. The two other minor local road network connections to Great Ocean Road are Stanway Drive and Old Ocean Road which are both dead-end roads.

The greater local road network in Separation Creek is mostly narrow, however with less undulation in comparison to Wye River. Limited road infrastructure is present and the road surface quality varies throughout the township.

7.2. Key issues and risks

Key issues and risks relating to traffic management are:

- Safety of pedestrians and traffic using the road network due to significantly higher than normal building activity resulting in large volumes of trucks, cranes, and contractor and delivery vehicles in a constrained area.
- Traffic congestion caused by vehicles and machinery associated with construction, residents and visitors.
- Peak period traffic volumes within a constrained road network.
- Increased likelihood of conflicts between vehicles.
- Increased likelihood of conflict between pedestrians and vehicles.
- Lack of appropriate parking areas for construction workers, contractors, Council workers and tourists.
- Heavy and over dimensional vehicle movements on narrow roads with eroded verges resulting in vehicle rollover.
- Lack of turning circles.

7.3. Objectives

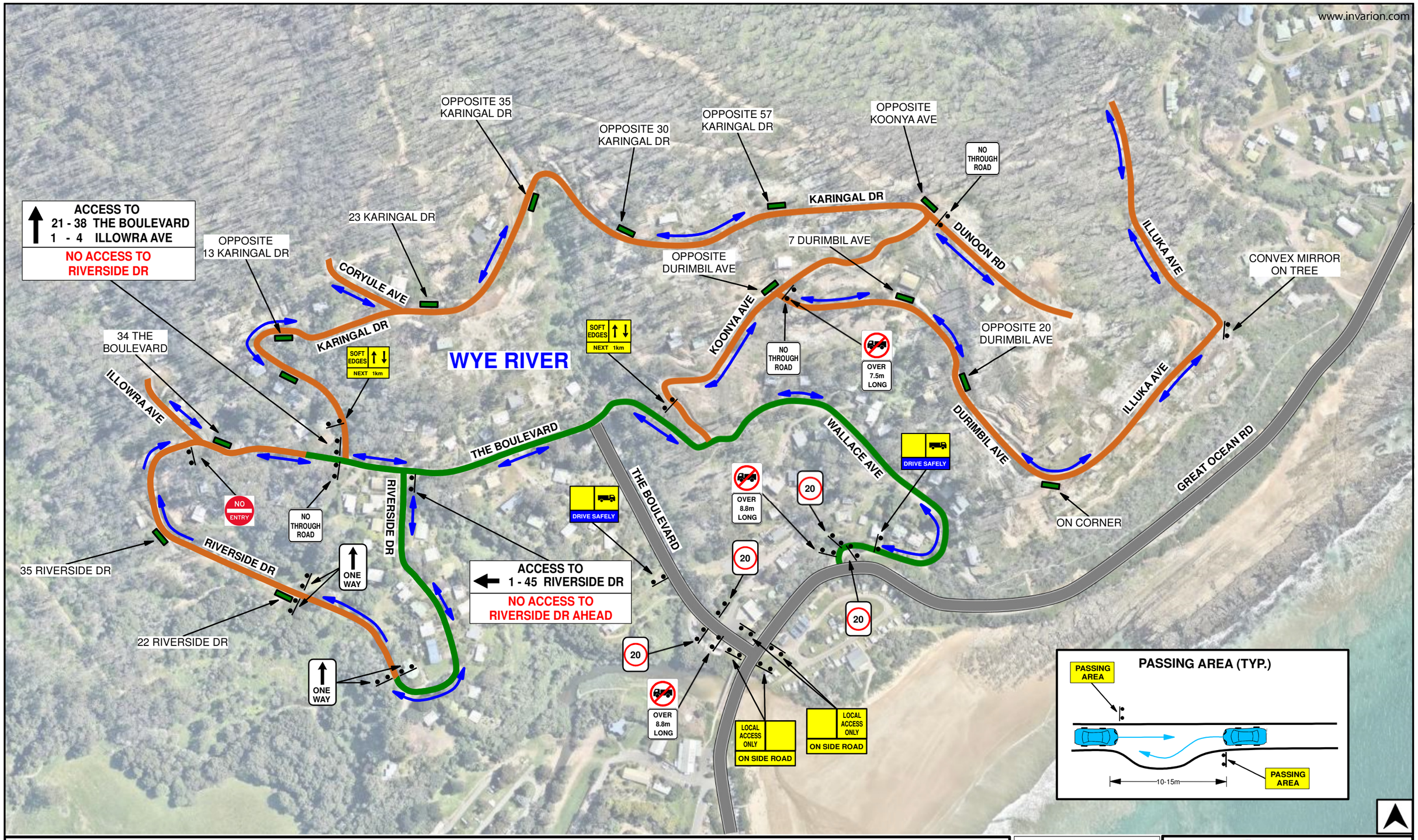
The ultimate objective of the traffic management plan is to minimise the above key issues and risks and in-turn provide a safer road network.

7.4. Management measures

The traffic management plan (see Figures 7.1 and 7.2) has been prepared with consideration for construction over the next 12 months, noting the short timeframes for implementation. It is largely an extension to the existing traffic management plan facilitated by Grocon during the post-bushfire clean-up. During this time, the ability to remain flexible will be essential with the re-construction of retaining walls and the proposed construction of the stormwater drainage system.

Features of the traffic management plan include:

- A distinguished road network hierarchy (largely determined by the anticipated traffic volumes and quality of the road in regard to observed width, undulation, surface, etc.).
- One-way traffic flow restrictions in the southwest portion of Riverside Drive (Wye River) and two way traffic flow in the remaining road network.
- Investigation into formalised passing areas in strategic locations where there appears to be adequate width and/or moderately flat terrain to allow vehicles to safely pass one another.
- Potential ‘parking zones’ or ‘no parking areas’ to delineate appropriate parking areas within the road network.
- Advisory 20 km/hr speed limit for all roads within each township.
- Advisory signage on Great Ocean Road to restrict access to The Boulevard and Sarsfield Street to local traffic only.
- Advance signage as it relates to dynamic road network conditions.
- Requirement for contractors to provide a traffic management plan when working from the road reserve for activities such as crane lifts etc.



NOTES

- THE GREEN 'UNDAMAGED CARRIAGEWAY' FOR THE PURPOSES OF THIS PLAN REFERS TO THE SECTIONS OF ROADS OBSERVED TO BE RELATIVELY UNAFFECTED BY THE BUSH FIRES AND REMAIN LARGELY SIMILAR TO PRE-FIRE CONDITIONS.
- THE BROWN 'DAMAGED CARRIAGEWAY' FOR THE PURPOSES OF THIS PLAN REFERS TO THE SECTIONS OF ROADS OBSERVED TO HAVE NOTICEABLY DETERIORATED DUE TO THE BUSH FIRES OR ARE LARGELY UNSEALED AND CONSIDERED NARROW/UNDULATING AND/OR WITH A LOOSE SURFACE, ETC.
- 'TRAFFIC FLOW' IS LARGELY PROPOSED TO REMAIN AS TWO-WAY. THIS IS PREDOMINANTLY DUE TO THE INABILITY TO ENFORCE ONE-WAY OPERATION IN THE AVAILABLE ROAD NETWORK LOOPS AND THE DIFFICULTY TO ACCESS INDIVIDUAL PROPERTIES DUE TO THE ORIENTATION OF VEHICLE ACCESS POINTS. ONE-WAY TRAFFIC FLOW ALONG RIVERSIDE DRIVE COULD BE INVESTIGATED AS A LONG TERM OPTION TO MANAGE VEHICLE/VEHICLE CONFLICT IN THIS LOCATION.
- CAR PARKING RESTRICTIONS, A 'NO PARKING AREA' AND/OR YELLOW LINE MARKING COULD BE IMPLEMENTED TO MINIMIZE THE LIKELIHOOD OF VEHICLES PARKING WITHIN THE ROAD RESERVE AND OBSTRUCT TRAFFIC FLOW.
- A 'PASSING AREA' FOR THE PURPOSES OF THIS PLAN REFERS TO THE OBSERVED OPPORTUNITY TO FORMALIZE PASSING AREAS WHERE THERE APPEARS ADEQUATE WIDTH AND/OR MODERATELY FLAT TERRAIN TO ALLOW VEHICLES TO PASS ONE ANOTHER. THESE LOCATIONS ARE SUBJECT TO THE NECESSARY GEOTECHNICAL INVESTIGATIONS AND ROAD SAFETY REVIEW.
- A VEHICLE LENGTH LIMIT OF BETWEEN 7.5m AND 8.8m IS PROPOSED THROUGHOUT THE TOWN IN LINE WITH THE LENGTH LIMITS IMPOSED DURING THE BUSHFIRE CLEAN-UP. THE LENGTH LIMITS SHOULD BE REVIEWED AS ROAD NETWORK RESTORATION WORKS ARE UNDERTAKEN.

Legend

- SIGN
- UNDAMAGED CARRIAGEWAY
- DAMAGED CARRIAGEWAY
- PROPOSED TRAFFIC FLOW
- PASSING AREA

GTAconsultants · Colac Otway SHIRE · coffey

WYE RIVER & SEPARATION CREEK SHORT TERM TRAFFIC MANAGEMENT PLAN

DRAFT

DRAWING NO. V112000-01

DATE: 28 FEBRUARY 2017

Figure 7.1

www.invarion.com

BASS AVE
NEDS LN
MITCHELL GROVE
DOLLAR DR
HARRINGTON ST
SEPARATION CREEK
NO THROUGH ROAD
OLIVE ST
SARSFIELD ST
20
DRIVE SAFELY
SARSFIELD ST
DRIVE SAFELY
GREAT OCEAN RD
LOCAL ACCESS ONLY
ON SIDE ROAD
LOCAL ACCESS ONLY
ON SIDE ROAD
OVER 8.8m LONG
OLD OCEAN RD
STANWAY RD
GREAT OCEAN RD

NOTES

- THE GREEN 'UNDAMAGED CARRIAGEWAY' FOR THE PURPOSES OF THIS PLAN REFERS TO THE SECTIONS OF ROADS OBSERVED TO BE RELATIVELY UNAFFECTED BY THE BUSH FIRES AND REMAIN LARGELY SIMILAR TO PRE-FIRE CONDITIONS.
- THE BROWN 'DAMAGED CARRIAGEWAY' FOR THE PURPOSES OF THIS PLAN REFERS TO THE SECTIONS OF ROADS OBSERVED TO HAVE NOTICEABLY DETERIORATED DUE TO THE BUSH FIRES OR ARE GENERALLY NARROW/UNDULATING AND/OR WITH A LOOSE SURFACE ETC.
- 'TRAFFIC FLOW' IS PROPOSED TO REMAIN AS TWO-WAY. THIS IS PREDOMINANTLY DUE TO THE INABILITY TO ENFORCE A ONE-WAY OPERATION IN THE ROAD NETWORK WHICH COMPRISES PREDOMINANTLY OF DEAD-END ROADS.
- CAR PARKING RESTRICTIONS, A 'NO PARKING AREA' AND/OR YELLOW LINE MARKING COULD BE IMPLEMENTED TO MINIMIZE THE LIKELIHOOD OF VEHICLES PARKING WITHIN THE ROAD RESERVE AND OBSTRUCT TRAFFIC FLOW.
- A VEHICLE LENGTH LIMIT OF 8.8m IS PROPOSED THROUGHOUT THE TOWN IN LINE WITH THE LENGTH LIMITS IMPOSED DURING THE BUSHFIRE CLEAN-UP. THE LENGTH LIMITS SHOULD BE REVIEWED AS ROAD NETWORK RESTORATION WORKS ARE UNDERTAKEN.

Legend

- SIGN
- UNDAMAGED CARRAIGEWAY
- DAMAGED CARRAIGEWAY
- PROPOSED TRAFFIC FLOW

GTAconsultants · Colac Otway SHIRE · coffey

WYE RIVER & SEPARATION CREEK SHORT TERM TRAFFIC MANAGEMENT PLAN

DRAFT

DRAWING NO. V112000-02

DATE: 28 FEBRUARY 2017

Figure 7.2

7.4.1. Peak holiday periods

The traffic management plan has been prepared with consideration to the large influx of visitors to the townships during holiday periods. Holiday periods are not restricted to Christmas and New Year period but could include Easter, school holidays and long weekends. In maintaining a consistent strategy, traffic management during peak periods would feature additional traffic controller personnel and accompanying signage to manage the anticipated increase in traffic flow as required.

7.4.2. Speed limits

The steep, narrow and windy road network within Wye River and Separation does not allow for high speeds. The addition of construction sites, machinery, vehicles and workers will result in the need for reduced speed limits throughout the townships. As per the traffic management plan an advisory speed limit of 20 km/hr will be implemented throughout the Wye River and Separation Creek townships.

7.4.3. Parking

Particularly during the summer months, parking is congested in Wye River and Separation Creek with a high visitor numbers. Parking is highly constrained due to:

- The road network comprising narrow winding and steep roads.
- Lack of road reserves and public car parks, particularly in the residential areas but also on the foreshore.
- The volume of tourists over the summer holidays.
- Increased risk of vehicle rollover.
- Soft edges of roads.

Parking management is covered in the traffic management plan (see Appendix G). In summary, the following measures shall be implemented to manage parking:

- Implementation of ‘parking zones’ or ‘no parking areas’ to delineate appropriate parking areas within the road network.
- Restriction of the amount of trade vehicles at each construction site, with only trade vehicles carrying tools being allowed on site.
- Provision of a parking area (such as in and around The Boulevard in Wye River) for additional trade vehicles, from where workers can leave their vehicles and be picked up by vehicles with permits to get to the construction site.
- Encouraging the use of shared access to the construction work site.

7.4.4. Laydown areas

Due to the steep nature of the area, narrow roads with lack of road verges, existing erosion and lack of flat areas, laydown areas for construction material are scarce. When several houses are being constructed within proximity to each other, coupled with public infrastructure works such as reconstruction of retaining walls and drainage installation, the capacity to accommodate construction materials will be limited.

To manage limitations and conflicts relating access to and use of laydown areas, the following measures shall be implemented:

- The use of road verges as laydown areas must be approved and permitted by Council prior to use.
- A scheme will be made available for landowners with cleared sites that are not currently rebuilding under which they can make their vacant sites available to COS so that they can be used for stockpiling of construction material. COS can then make these sites available to landowners requiring construction stockpiling areas.
- No unauthorised stockpiling of construction materials on road reserves or other people's properties.

8. Environmental management and controls

Construction at the Wye River and Separation Creek has the potential to cause environmental impacts. Environmental aspects that need to be considered at Wye River and Separation Creek include:

- Soil and water.
- Hazardous material.
- Asbestos.
- Waste.
- Contamination and remediation.
- Wastewater.
- Biosecurity.
- Vegetation.
- Heritage.
- Fire management.

This section describes the key issues and risks, objectives and environmental management and control measures for the above environmental aspects.

8.1. Soil and water (including wastewater)

As a result of the bushfires, catchments surrounding the area have lost significant understorey vegetation. This has resulted in increased runoff, and sediment and debris sources overloading the drainage system (GHD, 2016a). Due to the catchment conditions and ongoing works, the functionality of the existing drainage system is currently being compromised. This has resulted in unintended overland flow paths which have placed infrastructure and properties at risk of further damage (GHD, 2016a). Additionally, large volumes of sediment are deposited in various gullies within the area, and ultimately the waterways and coastal foreshore areas (GHD, 2016a).

In addition to erosion and sediment issues, stormwater run-off has the potential to transport contaminants from soils and materials.

8.1.1. Key issues and risks

Key issues and risks relating to soil and water are:

- Erosion and landslips.
- Increased sediment runoff from the erosion of exposed surfaces.
- Sediment runoff from stockpiles of topsoil and construction materials.
- Sediment runoff and disturbance to creeks and drainage lines during works near rivers and creeks.
- Impacts to water quality in surrounding rivers, creeks, groundwater systems and the ocean from incorrect wastewater disposal.
- Spills from on-site fuel tanks or chemicals storage.
- Runoff or leachate from exposure of buried contaminated material or soils.
- Runoff from grass establishment and maintenance activities (e.g. pesticides, herbicides, fertilizers, soil improvers etc.).

- Sediment and contaminants (e.g. oil, grease, metals) from wash down of vehicles and machinery

8.1.2. Objectives

The objectives of soil and water management measures are to:

- Limit soil erosion and exacerbation of land instability.
- Control sediment discharge leaving the construction area.
- Retain sediment laden water within specified site boundaries and prevent sediment from impacting surface water quality.
- Dispose of wastewater in accordance with relevant legislation and guidelines.
- Minimise the potential for impacts to the surrounding environment and human health and safety.

8.1.3. Management measures

After the December 2015, GHD prepared an Erosion and Sediment Control Report (GHD, 2016a; Appendix D) and an Erosion and Sediment Control Plan (GHD, 2016b; Appendix E) providing specific guidance on the erosion and sediment control measures required to be implemented on each property. Table 7.1 provides a summary of GHD's (2016a) proposed site specific management measures for the gully catchments within Wye River and Separation Creek. Implementation methods for the below specific management measures are provided in Appendix D. Landowners are responsible for the implementation of the management measures for erosion and sediment control.

Table 8.1 Specific soil and erosion measures

Gully	Proposed treatment measure
Wye River north (west of Main Gully)	• Gravel reinstatement – stabilisation of individual sites. • Table drain stabilisation – check dams in table drain. • Steep embankment treatment – erosion matting over batters. • Pit protection – mesh gravel roll place around inlet pit. • Slope drain to erosion protection – channel protection using slope drain to rock pad. • Sediment/debris trap (endwall) – sediment fence on endwall. • Erosion protection – erosion control matting and revegetation. • Silt fences. • Hydromulcher – stabilisation through revegetation using a hydromulcher.
Wye River North (East of Main Gully)	• Table drain stabilisation – check dams in table train. • Pit protection – mesh gravel roll place around inlet pit. • Steep embankment treatment – erosion matting over batters. • Erosion protection – erosion control matting and revegetation. • Silt fences. • Slope drain to erosion protection – channel protection using slope drain to rock pad. • Sediment/debris trap – sediment fence on headwall/endwall. • Hydromulcher – stabilisation through revegetation using a hydromulcher.

Gully	Proposed treatment measure
Separation Creek	• Steep embankment treatment – erosion matting over batters. • Silt fences. • Table drain stabilisation – check dams in table train. • Pit protection – mesh gravel roll place around inlet pit. • Hydromulcher – stabilisation through revegetation using a hydromulcher.

Source: GHD, 2016a.

In addition to above specific erosion and sediment control management measures, *Clause 42* under Part 3 of COS Local Law Number 2 2013 (Appendix A) is also applicable to soil and erosion.

Best practice measures to manage potential soil and water issues in Wye River and Separation Creek include:

- Remove topsoil and subsoil using suitable equipment and reuse wherever possible, and transport off-site as soon as practicably possible.
- Minimise the number and size of stockpiles.
- Construct stockpiles with slopes less than 2:1.
- Cover, mulch or seed any topsoil stockpile which is to be maintained for longer than one month.
- Where stockpiles are seeded, a sterile seed combined with native seed mix should be used. After seeding a standard hydromulch consisting of various types of organic fibourous material (e.g. paper or wood pulp, wood fibre, straw fibre) mixed with water, tackifier and soil ameliorants and sprayed on the soil in a slurry to provide a protective layer.
- Surround unstabilised stockpiles and batters with silt fences or a drainage system to collect and correctly dispose of contaminated water
- Do not locate stockpile soils within or close to drainage lines.
- Ensure contaminated soils, affected by fuel or other chemical spills will be removed from site for appropriate disposal in compliance with relevant licences and legislation, as appropriate. Contaminated soils are covered further in Section 8.5.
- Restrict traffic (including machinery) movement to roads to avoid disturbance of soil and creation of bare areas, where practicable.
- Inspect and maintain erosion and sediment control structures (e.g., diversion drains, sediment traps, silt fences etc.) regularly and prior to, and after, heavy rain invents.
- Do not clear steep slopes and areas of highly erodible soils and progressively rehabilitate cleared areas.
- Manage work schedules of multiple contractors to minimise delays in construction activity that may prolong the duration of disturbed land remaining unstabilised.
- Do not direct surface water or stormwater flow to areas of unprotected soil such as driveways. This includes water from erosion treatment areas.
- All builders and contractors working longer-term (e.g. greater than one week) at a construction site will be required to provide a port-a-loo onsite. Wastewater from all port-a-loos must be disposed of in accordance with manufacturer requirements.

8.2. Hazardous materials

Construction activities at Wye River and Separation Creek will involve the use of hazardous materials such as fuels, lubricants, paints and adhesives. These materials require appropriate handling,

storage, transport and disposal to keep the construction area safe, and to prevent to occurrence of a hazardous incident. Uncovering of asbestos is covered in Section 8.3.

8.2.1. Key issues and risks

Key issues and risks relating to hazardous materials are:

- Inappropriate storage, handling, transport and disposal of hazardous materials increasing the risk of a hazardous incident with the potential to result in health and environmental impacts.
- Contamination of land, groundwater and surface water through inappropriate storage, handling, transport and disposal of materials.
- Inadequate spill response procedures resulting in potential health and environmental impacts.
- Exposing hazardous materials previously buried under soil through earthmoving.

8.2.2. Objectives

The objectives of hazardous materials management measures are to:

- Avoid the release of hazardous substances to land and water.
- Manage hazardous materials in a safe and environmentally appropriate manner and in accordance with regulatory requirements.
- Ensure hazardous materials are identified, stored, transported and handled correctly to minimise the risk of spills.
- Minimise waste through efficient use of resources and recycling.

8.2.3. Management measures

Hazardous material management measures shall:

- Ensure that hazardous materials are managed in accordance with the legislation and guidelines listed in Section 3.
- Ensure that all personnel are trained in procedures for the safe handling, transport, storage and disposal of hazardous materials if they are required to use hazardous materials
- Ensure that all relevant Safety Data Sheets (SDS) are available at each site for hazardous chemicals used.
- Ensure that all spill response kits and clean up materials are well stocked.
- Ensure that all relevant personnel are trained in spill responses.
- Ensure all personnel have appropriate PPE to work with hazardous materials.

8.3. Asbestos

Most of the asbestos in materials from destroyed dwellings was removed by Grocon during the post-bushfire clean-up, however there remains the potential for residual asbestos-containing material to be present on construction sites. Exposure to asbestos fibres can cause a range of debilitating medical conditions affecting the respiratory system, including mesothelioma, asbestosis and lung cancer. Many asbestos-related conditions are life threatening or associated with a marked reduction in life expectancy, therefore the potential presence of asbestos must be taken seriously.

8.3.1. Key issues and risks

Key issues and risks relating to asbestos are:

- Non-compliant asbestos handling, management and disposal practices leading to health and safety risks to construction workers, contractors and the local community.

8.3.2. Objectives

The objectives asbestos management measures are to:

- Avoid the potential for human exposure to asbestos and associated health risks.
- Comply with relevant legislation and guidelines relating to asbestos handling, management and disposal practices.

8.3.3. Management measures

The Occupational Health and Safety Act 2004, Occupational Health and Safety (Asbestos) Regulations 2003 and the Occupational Health and Safety Regulations 2007 provide guidance on duties and obligations in relation to asbestos management. The management of asbestos is also summarised in Work Safe Victoria Compliance Code, Managing Asbestos in Workplaces 2008.

Asbestos management measures shall:

- Ensure that asbestos and any items contaminated with asbestos are managed in accordance with the legislation and guidelines listed in Section 3, in particular the Occupational Health and Safety (Asbestos) Regulations 2003 and the Work Safe Victoria Compliance Code, Managing Asbestos in Workplaces 2008.
- Ensure that asbestos removal is only undertaken by a licensed removalist and involves a non-friable asbestos-containing material with an area that does not exceed 10 square metres in total.
- Ensure that the total time of all asbestos removal does not exceed one hour in any period of seven days.
- Prevent the use of brooms, brushes, high-pressure water jets, power tools, compressed air or other gases on asbestos-containing material.
- Stop work and evacuate the area if asbestos-containing material is suspected and:
  - Secure the potential affected area using asbestos warning tape and signs.
  - Wet down the material and seal or encapsulate the affected area using plastic sheeting and adhesive tape.
  - Restrict commencement of works until the area or asbestos has been secured and made safe.
- Ensure the suppression of dust when working in the vicinity of suspected asbestos-containing material.

8.4. Waste

Construction and presence of the construction workforce will result in generation of industrial and general waste. Mismanagement of waste on construction areas has the potential to contaminate land on-site or result in the transport of litter and other waste materials off-site by wind or water. Waste management is covered in Part 8 of COS Local Law Number 2 2013 (Appendix A).

8.4.1. Key issues and risks

Key issues and risks relating to waste are:

- Pollution of land and water environments.
- Non-compliant waste management and disposal practices leading to contamination of soils, surface water and groundwater.
- Health and safety risks to construction workers, contractors and the local community.

8.4.2. Objectives

The objectives of waste management measures are to:

- Manage and dispose of all waste properly and in compliance with relevant legislation and guidelines.
- Maximise recycling and reuse of industrial and general waste.
- Minimise waste generation, landfill disposal and contamination associated with construction.

8.4.3. Management measures

Industrial and general waste management is covered by Part 3 and Part 8 of COS Local Law Number 2 2013 (Appendix A).

General waste management measures shall:

- Ensure no burning of construction waste within Wye River and Separation Creek.
- Manage wastes in accordance with the principles of avoid, reduce, reuse, recycle, treat and dispose.
- Ensure that recyclable materials are stored separately from general waste.
- Ensure unused solid materials that are excess to requirements are stored and disposed of according to their safety data sheets (SDS) and in such a manner as to avoid health and safety risks and spillage or leakage to the environment.
- Return waste and unused oils to suppliers, where practicable and encourage suppliers to take responsibility for unwanted waste packaging.
- Ensure bins are present at all construction sites for workers and contractors.
- Ensure that construction workers do not use public, local residence or business waste or recycling bins for disposal of construction waste.

8.5. Contamination and remediation

During rebuilding, on-site wastewater treatment systems damaged by the bushfires may require decommissioning. Decommissioning of wastewater treatment systems has the potential to contaminate land, surface water and groundwater systems through the release of and exposure to sludge, scum and black water. This section focuses on contamination and remediation associated with decommissioning on-site wastewater treatment systems.

8.5.1. Key issues and risks

Key issues and risks relating to contamination and remediation are:

- Contamination issues and risks associated with decommissioning septic tanks.
- Health and safety risks to construction workers, contractors and the local community.

8.5.2. Objectives

The objectives of contamination and remediation management measures are to:

- Prevent contamination of land, groundwater and surface water in accordance with relevant legislation and guidelines.
- Control risks to human health and the environment from existing contamination, i.e. septic tanks.
- Minimise transport of existing contamination throughout the environment.
- Ensure that no contaminated material is moved off-site without the required approvals or permits.

8.5.3. Management measures

EPA Victoria's Code of Practice – Onsite Wastewater Management, summarises requirements under the *Environment Protection Act 1970* for decommissioning wastewater treatment systems. Decommissioning of wastewater treatment must be in accordance with this Code of Practice, including:

- Before decommissioning, any remaining contents of the septic tank must first pumped out by a sewage sludge contractor.
- The contractor must also hose down all inside surfaces of the tank and extract the resultant water.
- Where the tank will no longer be used but will remain in the ground, the contractor must first disinfect the tank by spreading (broadcasting) hydrated lime over all internal surfaces in accordance with the WorkSafe safety precautions associated with using lime (i.e. wearing gloves, safety goggles and not using lime on a windy day).
- Under no circumstances should anyone enter the tank to spread the lime or for any other reason, as vapours in confined spaces can be toxic.
- A licensed plumbing practitioner must disconnect the tank from the premises and from the absorption trench system, and permanently seal or plug the inlet and outlet plugs.
- To demolish a tank, the bottom of the tank is broken and then the lid and those parts of the walls that are above ground are collapsed into the tank. The tank is then filled with clean earth or sand.
- Before a tank may be used to store stormwater a licensed plumbing practitioner must disconnect it from the premises and the trench system, and connect an overflow pipe from the tank to the stormwater legal point of discharge. The tank must be filled with fresh water and disinfected, generally with 100 mg/L of pool chlorine (calcium hypochlorite or sodium hypochlorite) to provide a resultant minimum 5 mg/L of free residual chlorine after a contact time of 30 minutes.
- All treatment systems must be decommissioned by a licensed plumbing practitioner.

In addition to the requirements of the Environment Protection Act 1970 it is also necessary to obtain approval from COS prior to decommissioning by submitting an Application to Install a Septic Tank System form to COS.

8.6. Biosecurity

Pest plants and animals threaten environmental values and can result in expensive control methods. Construction machinery used in areas where pest plants and pathogens such as phytophthora are present has the potential to spread pest plants and pathogens at Wye River and Separation Creek. Earthworks also has the potential to spread existing plants and pathogens throughout the area.

8.6.1. Key issues and risks

Key issues and risks relating to biosecurity are:

- Introduction and spread of pest plants and soil borne pathogens through contaminated construction machinery and equipment.
- The introduction of pest plants leading to an increase in pest animal habitat.
- Displacement of native fauna and vegetation species.
- Pest plants and animals outcompeting native flora and fauna.
- The inappropriate disposal of food wastes leading to an increase in pest animals.
- The movement of soil resulting in fresh habitat for rabbits and foxes.
- The introduction of domestic dogs accompanying construction workers which may predate on native fauna.
- Degradation of the native environment and wildlife habitat.

8.6.2. Objectives

The objectives of biosecurity management measures are to:

- Prevent the introduction and spread of new pest plants and animals and soil pathogens due to construction at the site.
- Minimise the spread of existing pest plant and animal species.

8.6.3. Management measures

The following management measures shall be implemented to prevent the introduction and spread of new pest plants and animals:

- Ensure that all construction machinery used in other areas is sufficiently cleaned before entering Wye River and Separation Creek using one or more of the following methods:
  - Wash-down: achieved by applying water to machinery and equipment at a high pressure using a pressure cleaner or spray tank and pump.
  - Air blast: assists decontamination in hard to reach areas.
  - Physical removal: most appropriate for contaminants that adhere to machinery or equipment, usually undertaken prior to wash-down or air blasting.
- Undertake cleaning of machinery and vehicles off-site at an appropriate are, e.g. on site where pest plants occur and clear of water courses and drainage lines.
- Keep machinery and equipment log books to keep a record of cleaning activities.
- Obtain guarantees from suppliers that any construction materials with the potential to be contaminated with invasive weed species or plant pathogens, e.g. topsoil, are free of contaminants.

The following management measures shall be implemented to reduce spread of existing pest plants and animals:

- Operate in compliance with the Wye River and Separation Creek Bushfire Vegetation Restoration (Short-term) Plan (Appendix F).
- Ensure that soil is not stockpiled in or in proximity to water courses and drainage lines.

- Avoid the spread of soils that potentially contain pathogens throughout the area and limit ground disturbance as far as reasonably practicable.
- If phytophthora has been identified, all sites will require the use of Phytoclean in the wash-down of all mobile plant and equipment.

8.7. Fire from construction activities

Construction activities have the potential to generate fires (e.g. welding, grinding) at Wye River and Separation Creek. Given that the area has recently experienced and is being rebuilt because of a bushfire, extreme precaution must be undertaken to ensure that construction activities do not result in bushfires. This section focuses on fires associated with construction activities. Bushfire management is not covered in this CTEMP.

8.7.1. Key issues and risks

Key issues and risks relating to fire from construction activities are:

- Activities such as welding, grinding, fuel handling increasing the potential for accidental fires.
- Fire spreading through the area resulting in human injury or death, damage to property and public infrastructure and loss of vegetation species.
- Additional trauma and hardship for those affected by the December 2015 bushfires.

8.7.2. Objectives

The objectives fire management measures for construction activity are to:

- Minimise the risk of bushfires starting as a result of construction activities.
- Prevent fires resulting from construction activities.
- Avoid human health and environmental impacts associated with fires.

8.7.3. Management measures

Due to the sensitive nature of the site, no work will be permitted at Wye River and Separation Creek during total fire ban days.

The below management measures for specific works shall be implemented during the CFA declared Fire Danger Period to prevent fires being started from construction activities.

Hot work including welding, grinding and soldering

- Use of fire-resistant shield or guard to stop sparks or hot metal.
- Ensure an area of at least 1.5 m from the operation is clear of flammable material or wetted down sufficiently to prevent the spread of fire.
- Presence of a reticulated water supply or water spray knapsack containing at least 9 litres of water.
- All cut-offs and hot materials from the operation are to be placed in fire-proof receptacles.

Earthmoving and excavating equipment

- Ensure that equipment is free from faults and mechanical defects that could cause a fire outbreak.

- Ensure equipment is fitted with a spark arrester in working order (unless it is fitted with a turbocharger or an exhaust aspirated air-cleaner).
- All vehicles to carry fire suppression equipment, e.g., fire extinguisher, knapsack spray pump.

Chainsaw, plant trimmer or lawnmower

- Ensure that equipment is free from faults and mechanical defects that could cause a fire outbreak and fitted with a sufficient spark arrester.
- Have an area of at least 3 m around the machine cleared of flammable material.
- Person operating the equipment must carry fire suppression equipment, e.g., fire extinguisher, knapsack spray pump.

8.8. Vegetation

The clearing of hazardous trees at Wye River and Separation Creek following the bushfire has impacted the landscape and amenity of the area. Competition from pest plants, continued erosion and further unauthorised tree removal has the potential to reduce the viability of remaining trees and wildlife habitat present.

8.8.1. Key issues and risks

Key issues and risks relating to vegetation are:

- Unauthorised clearing of vegetation.
- Increased competition from pest plants.
- Hazardous tree removal leading to bare ground and increased runoff.
- Management of fire fuel loads including treatments to control landslips and erosion.

8.8.2. Objectives

The objectives of vegetation management measures are to:

- Minimise disturbance to vegetation, particular conservation significant vegetation, whilst balancing the need to provide for asset protection from bushfires.
- Protect staff, contractors and the local community from hazardous trees.
- Avoid damage to dwellings, machinery and vehicles from hazardous trees.
- Ensure there is no unauthorised vegetation clearance.
- Ensure that cleared areas are revegetated and reduce the potential for soil erosion and land slips.

8.8.3. Management measures

Vegetation management measures shall:

- Require anyone planning to undertake tree removal within Wye River and Separation Creek to consult with COS and obtain a permit prior to doing so.
- Ensure vegetation removal and ground disturbance is minimised and restricted to only what is required for safe construction.
- Encourage rehabilitation of areas that have been exposed by tree removal and understorey clearance associated with the bushfire.

- Ensure compliance with the Wye River and Separation Creek Bushfire Vegetation Restoration (Short-term) Plan (Appendix F).

8.9. Indigenous heritage

The Gadubanud people lived in the Cape Otway region until the mid-nineteenth century (Otway Coast Tourism, 2016), and the Wye River and Separation Creek region is known to contain registered Aboriginal archaeological sites that are considered highly sensitive for their cultural heritage values (Dahlhaus et al, 2003). Due to limited ground disturbance associated with site construction activities, it is unlikely that Aboriginal heritage material will be encountered. However, minor earthworks associated with additional site clearing and installation of retaining walls and drainage infrastructure has the potential to disturb Aboriginal heritage material, which must be managed in accordance with the relevant legislation and guidelines in Section 3.

8.9.1. Key issues and risks

Key issues and risks relating to Indigenous heritage are:

- Disturbance or damage to Indigenous cultural heritage sites through construction activities and site personnel.

8.9.2. Objectives

The objectives of Indigenous heritage management measures are to:

- Minimise adverse impacts to Indigenous cultural heritage during construction activities.
- Outline actions to be implemented if Indigenous cultural heritage is detected during construction activities.
- Ensure that Indigenous cultural heritage is managed in accordance with statutory requirements.

8.9.3. Management measures

In the event that suspected Indigenous cultural heritage (that has not been previously identified) is discovered, the following procedures will be adopted:

- All activity in the vicinity must cease immediately.
- In no circumstances will material from the location be removed or interfered with in any way without authorisation.
- The person discovering the material must immediately notify the person in charge.
- The person in charge of the activity must suspend any relevant works within a 50 m radius of the location of the discovery and must isolate that area with a protective barrier.
- Works may continue outside the 50 m barrier.
- The person in charge must notify Aboriginal Victoria (AV) within 24 hours.
- Representatives of the Registered Aboriginal Party (RAP) or nominated Aboriginal stakeholder must be given access to site to inspect the discovery and deal with material found.
- Within three days, the RAP or nominated Aboriginal stakeholder must consult with a cultural heritage adviser to determine how to manage the discovery.
- If agreement cannot be reached the parties must apply the Dispute Resolution Procedure (or resort to VCAT if this process fails).
- Works can recommence within the exclusion zone when:

  - The agreed protective measures have been implemented.
  - The relevant Aboriginal cultural records have been updated.
  - All parties agree and any dispute has been resolved.
- If the material is deemed to be artefactual, an Indigenous Cultural Heritage Site Card will be completed by an archaeologist and the Indigenous Cultural Heritage Database updated accordingly. An Indigenous Cultural Heritage Site Card will also be submitted to Aboriginal Victoria for inclusion in the Victorian database.
- Any cultural heritage recovered remains the property of the RAP or nominated Aboriginal stakeholder for that area.

Where human remains (or suspected human remains) are discovered, the following procedures will be adopted:

- All activity in the vicinity must cease immediately.
- The remains must be left in place and protected from harm or damage.
- The Coroner's office, Victoria Police and the Commonwealth Representative must be notified immediately.
- If there are grounds to believe the remains may be Aboriginal, Aboriginal Victoria must be notified.
- All details on the location and nature of the remains must be provided to the authorities.
- If the remains are confirmed as Aboriginal, Aboriginal Victoria must be notified.
- The relevant authority, after consulting relevant Aboriginal groups, will determine the appropriate course of action.
- The mitigation and/or salvage strategy determined by the relevant authority must be implemented.
- All efforts to minimise disturbance to the remains must be examined.
- Any salvaged Aboriginal human remains must be treated in accordance with the relevant authority's directions.
- Any reburial must be fully documented by COS and the site clearly marked and all details provided to the relevant authority.
- Where the reburial is within or close to the site measures must be implemented to ensure the remains are not subject to further disturbance.

8.10. Non-Indigenous heritage

The first European settlement was made by Alexander and Donald McRae in 1882 (Otway Coast Tourism, 2016). Given the area's European history, including the construction of the Great Ocean World post World War I, there is the potential for non-Indigenous archaeological material to be present. Due to limited ground disturbance associated with site construction activities, it is unlikely that European heritage material will be encountered. However, minor earthworks associated with additional clean-up and installation of retaining walls and drainage infrastructure has the potential to disturb European heritage material, which must be managed in accordance with the relevant legislation and guidelines in Section 3.

8.10.1. Key issues and risk

Key issues and risks relating to non-Indigenous heritage are:

- Disturbance or damage to non-Indigenous cultural heritage sites through construction activities and construction workers.

8.10.2. Objectives

The objectives of non-Indigenous heritage management measures are to:

- Minimise adverse impacts to non-Indigenous cultural heritage during construction activities.
- Outline actions to be implemented if non-Indigenous cultural heritage is detected during construction activities.
- Ensure that non-Indigenous cultural heritage is managed in accordance with statutory requirements.

8.10.3. Management measures

In the event that suspected non-Indigenous cultural heritage (that has not been previously identified) is discovered, the following procedures will be adopted:

- In no circumstances will material from the location be removed or interfered with in any way without authorisation.
- Any discovery of non-Indigenous cultural artefacts will be reported immediately to the person in charge.
- The status of the non-Indigenous cultural heritage material shall be ascertained. The location will remain as an interim listing until a qualified archaeologist can make confirmation.
- The site will be flagged as a 'no-go zone' until the site assessment has been completed by an archaeologist (if deemed necessary by archaeologist). A buffer exclusion zone of 50 m will be established around the site.
- Work will not recommence in the affected area until the site is appropriately viewed and approval given, following outcomes of the archaeologist survey and consultation with any authorities, as required.
- If the material is deemed to be a site, a Non-Indigenous Cultural Heritage Site Card will be completed by an archaeologist and the Non-Indigenous Cultural Heritage Database updated accordingly. A Non-Indigenous Cultural Heritage Site Card will also be submitted to relevant state agency and authority for inclusion in the respective state database.
- Where a site is found and further disturbance is unavoidable, approval will be sought under either the *Victorian Heritage Act 1995* for the appropriate management measure.

Where human remains (or suspected human remains) are discovered, the following procedures will be adopted:

- All activity in the vicinity must cease immediately.
- The remains must be left in place and protected from harm or damage.
- The Coroner's office, State Police and the Commonwealth Representative must be notified immediately.
- All details on the location and nature of the remains must be provided to the authorities.
- The relevant authority will determine the appropriate course of action.
- The mitigation and/or salvage strategy determined by the relevant authority must be implemented.
- All efforts to minimise disturbance to the remains must be examined.
- Any salvaged human remains must be treated in accordance with the relevant authority's directions.
- Any reburial must be fully documented by COS and the site clearly marked and all details provided to the relevant authority.

- Where the reburial is within or close to the site measures must be implemented to ensure the remains are not subject to further disturbance.

9. Induction and implementation

Construction worker, contractor and local resident awareness of the required construction and environmental management measures will be critical to managing potential construction and environmental impacts.

9.1. CTEMP induction

Prior to undertaking works at Wye River and Separation Creek all construction workers, contractors and local residents rebuilding their homes must review the construction and environmental management measures in this CTEMP. Before issuing a planning permit, COS is responsible for notifying local residents rebuilding their homes about the requirement to review this CTEMP before issuing a planning permit.

Local residents are responsible for notifying construction companies rebuilding their homes about the requirement to review this CTEMP, and construction companies are responsible for notifying any contractors undertaking works at the site. Ultimately, it is the responsibility of all personnel undertaking works at Wye River and Separation Creek to know and implement the management measures within this CTEMP.

This CTEMP is available from COS via the following methods:

- Online at http://www.colacotway.vic.gov.au
- Telephone – (03) 5232 9400 between 8:30 a.m. and 5 p.m., Monday to Friday.
- Fax – (03) 5232 9586 between 8:30 a.m. and 5 p.m., Monday to Friday.
- Mail – PO Box 283, Colac, Victoria 3250.
- Email – inq@colacotway.vic.gov.au.

Alternatively, copies of the CTEMP will be made available at the following COS offices:

- 2-6 Rae Street, Colac, between 8.30 a.m. and 5 p.m., Monday to Friday.
- 101-105 Gellibrand Street, Colac, between 8.30 a.m. and 5 p.m., Monday to Friday.
- 69-71 Nelson Street, Apollo Bay, between 8:45 a.m. and 1:15 p.m., Monday to Friday.

10. Compliance and monitoring

Monitoring will be conducted by COS by-laws and environmental staff to ensure that construction and environmental procedures are correctly implemented and adequate to:

- Minimise potential environmental and amenity impacts associated with construction at Wye River and Separation Creek.
- Ensure that construction activities comply with legislation and guidelines in Section 3.
- Traffic management measures are being complied with i.e. parking requirements.

A compliance and monitoring program will be developed to ensure regular and effective monitoring of construction and environmental procedures outlined within this CTEMP.

11. References and bibliography

Coffey. 2011. Geotechnical Assessment, Proposed Pressure Sewer Scheme, Wye River and Separation Creek. December 2011. Prepared for Barwon Water by Coffey Geotechnics. Abbotsford, Victoria.

Coffey. 2016. Wye River and Separation Creek – Geotechnical, Land Capability and Wastewater Solutions. Prepared for the Department of Environment, Land, Water and Planning. Melbourne, Australia.

Colac Otway Tourism. 2016. Wye River Heritage Walk trail information. Accessed online on the 15 of December at [http://otwaycoast.com.au/wp-content/uploads/2012/09/wyeheritage.pdf].

Dahlhaus Environmental Geology Pty Ltd and A.S Miner Geotechnical Pty Ltd. 2003. Coastal Community Revitalisation Project - Kennett River, Separation Creek and Wye River. Prepared for Colac Otway Shire. Buninyong, Victoria.

GHD. 2016a. Wye River and Separation Creek Draft Erosion and Sediment Control Report. Prepared for Colac Otway Shire. Melbourne, Victoria.

GHD. 2016b. Wye River and Separation Creek Draft Erosion and Sediment Control Plan. Prepared for Colac Otway Shire. Melbourne, Victoria.

GTA Consultants. 2017. Wye River and Separation Creek Traffic Management Plan. Prepared for the Colac Otway Shire. Melbourne, Victoria.

Appendix B

Commonwealth and State legislation, guidelines and codes

This page has been left intentionally blank

Commonwealth and State legislation, guidelines and codes

Aspect	Legislation, guidelines and codes
General	• *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* • *Environment Protection Act 1970* • *Occupational Health and Safety Act 1996* • Environment Protection and Biodiversity Conservation Regulation 2000 • Environmental Guidelines for Major Construction Site • s, Victoria EPA, Publication 480, February 1996 • Colac Otway Shire Environment Strategy • Victoria's 2020 Tourism Strategy
Soil and water	• *Water Act 1989* • *Catchment and Land Protection Act 1996.* • *State Environment Protection Policy (Waters of Victoria) (1988)* • *State Environment Protection Policy (Groundwaters of Victoria) (1997)* • Construction Techniques for Sediment Pollution Control (EPA 1991)
Noise and vibration	• State Environment Protection Policy (Residential Noise) Regulations 2008 • EPA Noise Control Guidelines Publication 1254, 2008. • Noise from Industry in Regional Victoria October 2011 • EPA Technical Guidelines TG 302/92, Noise Control Guidelines, 1992 • EPA Information Bulletin 280, A guide to the measurement and Analysis of Noise, 1991 • Interim Guidelines for Control of Noise from Industry in Country Victoria N3/89, 1989
Air quality	• State Environment Protection Policy (Ambient Air Quality) 1999 • State Environment Protection Policy (Air Quality Management) 2001
Greenhouse gases	• National Greenhouse Strategy - Strategic Framework for Advancing Australia's Greenhouse Response (Commonwealth of Australia 1998) • Victorian Greenhouse Strategy (Department of Sustainability and Environment 2002) • Protocol for Environmental Management: Greenhouse Gas Emissions and Energy Efficiency in Industry (2002)
Hazardous materials including asbestos	• *Dangerous Goods Act 1985* • *Health Act 1958* • *Occupational Health and Safety Act 2004* • Occupational Health and Safety Regulations 2007 • Dangerous Goods (Storage and Handling) Regulations 2012 • EPA Information Bulletin 364d, September 2004, The Transport and Disposal of Waste Asbestos • Worksafe Australia, 2008, Managing asbestos in workplaces compliance code • Worksafe Australia, 2008, Removing asbestos in workplaces compliance code • WorkSafe Australia, 1992, National Code of Practice for the Safe Removal of Asbestos
Waste, contamination and remediation	• *Occupational Health and Safety Act 2004* • Occupational Health and Safety (Hazardous Substances) Regulations (1999) • State Environmental Protection Policy (Prevention and Management of Contamination of Land) (2002) • Australian Standard 1940-2004: Storage and handling of flammable and combustible liquids (Standards Australia 2004) • EPA Victoria's Code of Practice – Onsite Wastewater Management • Bunding Guidelines (EPA 1992) • Classification of Wastes (EPA 2004) • Classification for Contaminated Soil (EPA 2002) • Dangerous Goods Act 1985: – Dangerous Goods (Prescribed List) Regulations (1986) – Dangerous Goods (Transport) Regulations (1987) – Dangerous Goods (Storage and Handling) Regulations (2000). • *Environmental Protection Act 1970:* – Environmental Protection (Schedule Premises and Exemptions) Regulations (1994)

Aspect	Legislation, guidelines and codes
	– Environmental Protection (Prescribed Waste) Regulations (1998) • Industrial Waste Management Policy (Prescribed Industrial Waste) (2000) • Industrial Waste Management Policy (Waste Minimisation) (1990) • State Environment Protection Policy (Prevention and Management of Contaminated Land) 2002 • Industrial Waste Resource Guidelines 2009 Publication 621 • Soil Hazard Categorisation and Management. Industrial Waste Resource Guidelines 2009 Publication 701 • Industrial Waste Resource Guidelines 2009 Publication 702, Soil Sampling • EPA Information Bulletin 383, June 1993, Guidelines for preparation of waste management plans • EPA Publication 448.1, Classification of Wastes • EPA Publication 472, July 1995, Potential contaminating land uses • EPA Publication 441.7, March 2000, Guide to the Sampling and Analysis of Waters, Wastewater, Soils and Waste • EcoRecycle Victoria, Guidelines for Preparing Waste Reduction Strategy for Construction • Environmental Guidelines for Major Construction Sites (EPA 1996) • List of Treatment and Disposal Facilities for Prescribed Waste (EPA 2001) • Sampling and Analysis of Waters, Wastewaters, Soils and Wastes (EPA 2009)
Flora, fauna and biosecurity	• *Catchment and Land Protection Act 1994* • *Flora and Fauna Guarantee Act 1988* • *Prevention of Cruelty to Animals Act 1986* • *Wildlife Act 1975* • Victorian Biodiversity Strategy 1997 • National Framework for the Management and Monitoring of Australia's Native Vegetation (ANZECC 1999) • Victoria's Native Vegetation Management – A Framework for Action (2003)
Aboriginal cultural heritage	• *Native Title Act 1993* • *Aboriginal Heritage Act 2006* • *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* • *Heritage Act 1995* • *Coroner's Act 1985* • *Victorian Archaeological and Indigenous Relics Preservation Act 1972*
Non-indigenous cultural heritage	• *Heritage Act 1995* • *Coroner's Act 1985* • Heritage Victoria Draft Guidelines To The Assessment Of Heritage Planning Applications
Fire	• *Country Fire Authority Act 1958* • *Fire Protection Regulations 1992* • *Forests Act 1958* • Code of Practice for Fire Management on Public Land (Department of Conservation and Natural Resources 1995) • Emergency Management Planning Guideline (Country Fire Authority 1999) • Colac Otway Shire Management Plan • Colac Otway Shire Municipal Emergency Management Plan
Traffic	• *Victorian Road Management Act 2004* • *Local Government Act 1994*

Appendix C

Summary of planning controls applying to Wye River and Separation Creek

This page has been left intentionally blank

Summary of planning controls applying to Wye River and Separation Creek

Zones	Relevance	Planning permit trigger
Township Zone (TZ) **(Clause 32.05)**	Applies to the residential subdivisions within the two township areas - most of the fire affected properties are located within this zone.	• A permit for the use of a lot for a dwelling is only required if the requirements of Clause 32.05-2 cannot be met in relation to onsite wastewater treatment, potable water supply and electricity supply. • A permit is required to construct or extend one dwelling on a lot of less than 300 square metres. (Clause 32.05-5). • A permit is required to construct or extend two or more dwellings on a lot dwellings on common property and residential buildings (Clause 32.05-6). NOTE: For properties within the Incorporated Plan Area exemption apply in accordance with the Incorporated Plan – Wye River and Separation Creek Bushfire Affected Properties.
Rural Conservation Zone (RCZ) **(Clause 35.06)**	Applies to larger allotments outside the township areas	• A permit is required for a dwelling which must be the only dwelling on a lot. This does not apply to the replacement of an existing dwelling if the existing dwelling is removed or altered (so it can no longer be used as a dwelling) within one month of the occupation of the replacement dwelling. • A dwelling must meet requirements in relation to all weather access, onsite wastewater treatment, potable water supply for domestic and firefighting purposes and reticulated electricity supply (see Clause 35.06-2). NOTE: For properties within the Incorporated Plan Area exemption apply in accordance with the Incorporated Plan – Wye River and Separation Creek Bushfire Affected Properties.
Overlays		
Erosion Management Overlay (EMO)	Applies to all fire affected areas within the two townships and beyond. Schedule 1 to the EMO (EMO1) sets out the information requirements in relation to permit applications for land susceptible to landslip and erosion.	A permit is required to construct a building or to construct or carry out works including: • Roadworks. • Buildings and works associated with a dependent person's unit. • A domestic swimming pool or spa and associated mechanical and safety equipment. • Any matter specified in Clause 62.02-3 if specified in a schedule to the EMO.
Heritage Overlay (HO)	None of the following areas covered by the HO are within the construction areas: • HO 312 applies to the Great Ocean Road as it passes through and beyond the two townships to both the south and north. • HO 243 applies to the War Memorial Cairn, Great Ocean Road, Wye River.	A permit is required for development and uses set out in Clause 43.01-1 including to demolish or remove a buildings and to construct a building.

Zones	Relevance	Planning permit trigger
	• HO 244 applies to the Wye River Hotel, 19 Great Ocean Road, Wye River. • HO 227 applies to the Stanway Harrington Memorial Cairn, Separation Creek.	
Land Subject to Inundation Overlay (LSIO)	Applies to sections of and adjacent to the lower reaches of the Wye River and Separation Creek largely outside the residential and bushfire affected areas of the townships.	A permit is required to construct a building or to construct or carry out works.
Wildfire Management Overlay (WMO)	Applies to all fire affected areas within the two townships and beyond.	NOTE: For properties within the Incorporated Plan Area no Bushfire Management Statement is required as the Incorporated Plan includes designated BAL rating for each property within the Incorporated Plan Area.
Environmental Significance Overlay 2 (ESO2)	Applies to all Wye River watercourses within Wye River township and covered by the PCRZ. No fire affected properties covered by this Overlay.	A permit is required to construct a building or carry out works not listed in Clause 3.0 of Schedule 2 to the ESO.
Environmental significance Overlay 4 (ESO4)	Applies to lower reaches of the Wye River watercourse within the PCRZ.	A permit is required to construct a building or carry out works.

Appendix D

Erosion and Sediment Control Report

This page has been left intentionally blank

Colac Otway Shire

Wye River and Separation Creek
Draft Erosion and Sediment Control Plan

August 2016

Table of contents

Table index

Figure index

Appendices

1. Introduction

1.1 Background

GHD was commissioned by Colac Otway Shire (COS) to develop an Erosion and Sediment Control Plan (ESCP) for the existing Wye River and Separation Creek townships as part of the ongoing Bushfire Recovery program. The townships' areas are currently controlled construction sites that have been established to manage the demolition and infrastructure repair works.

Following the bushfires, the surrounding catchments have lost significant understorey vegetation and has resulted in increased runoff, and sediment and debris sources further overloading the drainage system. The functionality of the existing system is currently being compromised by the additional sediment and debris loading, due to the ongoing works and catchment conditions. This is leading to unintended overland flow paths placing infrastructure and properties further at risk of damage. Furthermore, large volumes of sediment are currently ending up in the various gullies and ultimately the waterways and coastal foreshore areas.

This ESCP incorporates readily implementable short term measures that includes sediment source prevention, improves connectivity to drainage infrastructure, protects drainage infrastructure from blockage (from debris and sediment) and protects the gullies and receiving waterways. The ESCP is intended to provide improvement in management of drainage connectivity, overland flows, erosion and sediment and debris capture. The plan also includes a detailed maintenance regime that will be relied upon to maintain the effectiveness of the plan and associated functionality of the infrastructure.

The stages of this Project can be divided into the following phases:

- Existing conditions assessment
- Preparation of the ESCP
- Overseeing the Implementation of the ESCP by GHD

1.2 Scope of Works

The scope of the project is to develop the ESCP focusing on short term actions in accordance with the standards outlined in the *International Erosion Control Association, Best Practice Erosion and Sediment Control Guidelines (IECA 2008).* The following tasks will be delivered within the ESCP -

- Detailed site inspections of targeted areas within Wye River and Separation Creek township, to be coordinated and in combination with the Bushfire Recovery Engineer at COS.
- Review of supplied information.
- Close liaison with relevant COS staff, government organisations and other consultants as required throughout the development and approval of the ESCP.
- The development of the ESCP including the following information:
  - Drawings that include all works.
  - Product specifications.
  - Maintenance requirements.
- Approval of the ESCP including

  - Two revisions (in addition to the original) of the plans so that stakeholders can provide any comment/input into the development of the plans
  - ESC endorsement by the nominated CPESC and issuing of the final ESCP
- Preparation of the supporting documentation to the plan
  - Design Basis Report
  - Price estimate provided for the implementation (supply and install) of the plan including any costs comparisons for similar/alternative conforming products
- Allowance and incorporation for other short and long term works currently being undertaken or planned for the future

The scope of overseeing the implementation of the ESCP will involve the following:

- Site audit and report (draft and final) to review the implemented ESCP actions to confirm compliance with the approved plans
- Implementation phase support including:
  - Minor design updates,
  - Responding to technical quires (TQ's) or requests for general advice

1.3 Available Data

The following data was obtained and used for this assessment:

- Cadastral data
- Aerial imagery
- Photographs taken during site visits
- Rainfall Intensity-Frequency-Duration data from the Bureau of Meteorology
- GIS data of existing erosion and landslide issues supplied by COS
- Environmental GIS data supplied by COS
- Soil GIS data supplied by COS
- Flow accumulation GIS data supplied by COS
- LiDAR data supplied by COS

1.4 Relevant Guidelines

This ESCP report has been prepared in reference to the following guidelines:

- Best Practice Erosion and Sediment Control. International Erosion Control Association (Australasia) (IECA 2008)

1.5 Qualifications

The determination of the required erosion and sediment control measures outlined in the ESCP is based on assumed conservative values (soil and rainfall data) as sourced from IECA guidelines. The Contractor's preparation of the site/task specific erosion and sediment works instructions should be informed by additional soil data required from appropriate localised site verification and additional geotechnical investigation.

As part of the Environment Management Plan (EMP) for the works, the Contractor should prepare detailed, task specific erosion and sediment control measures to compliment this Erosion and Sediment Control Plan (ESCP). Site conditions may require:

- Construction of any or all of the measures described in this report to differ from their on-site application described in this document;
- Design and implementation of additional long or short term controls and designs, consistent with the concepts contained within this ESCP; and

Geotechnical investigations to support the implementation of the ESCP.

1.6 Key Considerations

The key drivers of the plan include the following:

- To maintain functionality of the existing drainage infrastructure.
- Develop an integrated solution.
- Avoid causing other issues (e.g. unintended diverted flows due to blocked infrastructure).
- Protection of the downstream environment from sedimentation (the gullies, mouth of Wye River/Separation Creek and coastal foreshore areas).

1.7 Scope and limitations

This report: has been prepared by GHD for Colac Otway Shire and *may only be used and relied on by Colac Otway Shire for the purpose agreed between GHD and the Colac Otway Shire as set out in section 1.1 of this report.*

GHD otherwise disclaims responsibility to any person other than Colac Otway Shire arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section 1.5 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Colac Otway Shire and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD has prepared the preliminary cost estimates/prices set out in section 4 of this report ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD (refer Section 5.1).

The Cost Estimate has been prepared for the purpose of budgeting and must not be used for any other purpose.

The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the [works/project] *can or will be undertaken at a cost which is the same or less than the Cost Estimate.*

Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The user should therefore select appropriate confidence levels to suit their particular risk profile.

2. Existing Conditions

2.1 General

The site is located on the coast of southern Victoria, approximately 130 km south-west of Melbourne. The close proximity of the site to the Wye River and to Separation Creek which both discharge into the Bass Strait result in a high risk associated with erosion and sediment control.

2.2 Site Description

The township settings are in steep terrain, particular the Wye River township, and the drainage systems typically consist of the following:

- Property connections (to roadside drains and/or direct connections to gullies)
- Road side table trains (typically with driveway piped crossovers)
- Road crossing culverts
- Discharge points into Gullies
- Defined gully flow paths discharging to mouth of Wye River/Separation Creek or directly to the coastal foreshore (refer Figure 28 and Figure 29).

2.3 Site Inspection

Three site inspections were undertaken by GHD with COS officers on the 14, 21 and 28 July to:

- Gain an understanding of the conditions of the catchment including the current works being undertaken, the general level of vegetation cover on the ground, the level of ground and soil disturbance and the location and function of key stormwater systems,
- Identify with COS officers their current erosion concerns within the Wye River and Separation Creek bushfire affected areas
- Identify potential mitigation measures to manage the erosion from the site

The site inspections identified a number of erosion and sedimentation issues within the catchments which would be considered typical of a construction site and can be best summarised as follows.

Building Pads

Areas where houses have been removed typically consist of a level or near level earthen pad of a reasonable compacted material. It was observed that runoff from these sites mobilise sediments and suspended solids.

General Allotment Condition

Lots where there have been, or in the process of clearing of debris, tree removal and rebuilding typically exhibit a disturbed topsoil profile. In a majority of sites, the surface has been cleared of all understory vegetation leaving the soil profile unbound and prone to dislodgment and mobilisation.

Roads and Driveway

The roads around the site typically have an earthen drain on the upside of the road. Observations of these drains show the following issues:

- Wheel ruts in and adjacent to the drain. These deformations appeared to reduce flow capacity and pushing soil material into the drain and becoming a continual source of sediment material being mobilised. In some cases, the drain has been compromised and were completely blocked resulting in stormwater discharging uncontrolled on to other areas.
- Some drains where they were adjacent to a steep upstream slope have material slumping in from the batters. This appeared to reduce the capacity of the drain and the loose material becoming a source of sediment.
- Some sections of the roads and adjacent driveways were not paved and as a result have been churned up creating a source of sediment material through direct erosion into the stormwater system but also from vehicular traffic transporting mud from these areas and distributing them on the roadways within the development and out onto the unaffected areas.

Stockpiles

Around the site it was observed that there were a number of stockpiles of gravel, soil, timber mulch located in and adjacent to stormwater flow paths. When visiting the site during rain events, it was observed that sediment laden water running off the stockpiles as well as material blocking drainage pits resulting in uncontrolled stormwater discharge.

Drainage Lines

The sites drainage system consists of:

- Formal system consisting of pipes, culverts and overland flows in easements.
- Informal drainage system with uncontrolled flows over lots and building pads sheeting downhill.

Under both situations, the majority of vegetation has been removed leaving exposed soils prone to erosion from concentrated flow paths. Further adding to the vulnerability for erosion is the works associated in debris removal and tree lopping have left the soil profile churned and loose increasing the probability that material can be mobilised.

2.3.1 Other Issues Identified by COS

In undertaking the site inspections and ongoing communications with COS, it was identified that there were other areas of concern with the site that relates to the mobilisation of sediment and stormwater. Although these issues are not caused by erosion and sedimentation, these are captured in this report to document the conditions of the site at the time of inspection.

Land Slips on Paddy's Path and the Great Ocean Road

GHD were escorted onto Paddy's Path to view a land slip below the path onto the Great Ocean Road as well as areas of previous landslips which have resulted in the initial relocation and subsequent closure of the path.

It was observed that flows that pass through 13 Iluka Avenue and down towards the Great Ocean Road have generated significant gullies down to Paddies Path. These have eroded under the root mass of the existing trees.

It was also pointed out by COS of the seepage of groundwater across the path from the upslope of the path.

In addition to our inspection, we were provided by COS field assessments from A.S. Miner Geotechnical after storm events between 24 and 27 July. These reports included photos which have been attached in Figure 22 to Figure 25.

Private Property

Email from the resident of 31 Wallace Ave identified that rainfall in the two day prior to 22 July had caused sedimentation within their lot which had to be cleaned after each rainfall event. Photos of this have been included in Figure 26 and Figure 27

2.3.2 Ongoing Adaptation

The ESC Plan proposed in this report and on the ESC drawings has been developed for implementation during and immediately after the demolition and site stabilisation phase of the project, as the soils and debris have been significantly disturbed during this phase.

During the re-construction phase, it is recommended that the ESC plan be revised and adapted to reflect the changes in the drainage system and the construction on the individual lots.

In addition, the ESC plan relies on the assumption that it is temporary in nature and the site will transition back to a stable system either though revegetation and formalisation of the drainage system one the construction phase has finished so that it is more reflective of the conditions prior to the bushfires of December 2015..

Table 1 Site Visits Photographs

Existing Issues and Photographs Taken During Site Visit (21 July 2016)		
Cleared building pads unstable		
		
Figure 1 Lot Number 1\TP135521	**Figure 2 Lot Number 1\TP215233**	**Figure 3 Lot Number 19\LP22243**
Unbound soil on cleared allotments		
		
Figure 4 Lot Number RES5\LP502	**Figure 5 Lot Number 161\LP50268**	**Figure 6 Lot Number 19\LP22243**

Figure 7 Lot Number 24\LP22243

Existing Issues and Photographs Taken During Site Visit (21 July 2016)

Damage to drain or material in drain

Figure 8 Lot Number 156\LP50268

Figure 9 Lot Number 123\LP50268

Figure 10 Lot Number PC372706

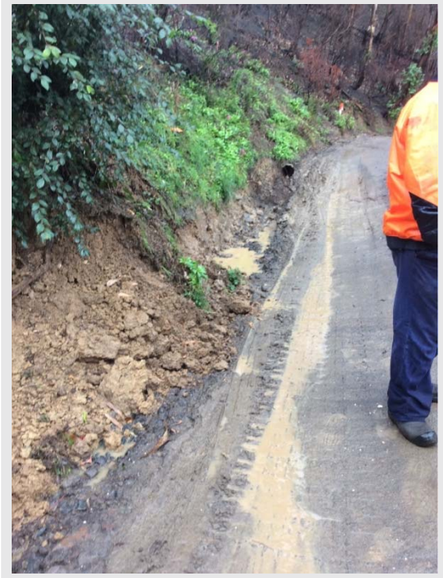


Figure 11 Lot Number 1\TP215233

Unsealed road rutting

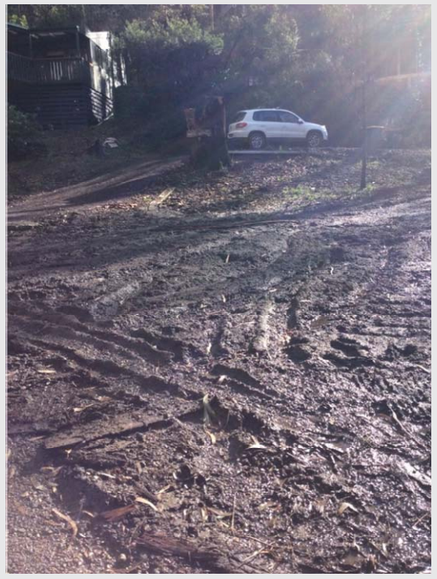


Figure 12 Lot Number 81\LP27735

Figure 13 Lot Number 5\TP810967

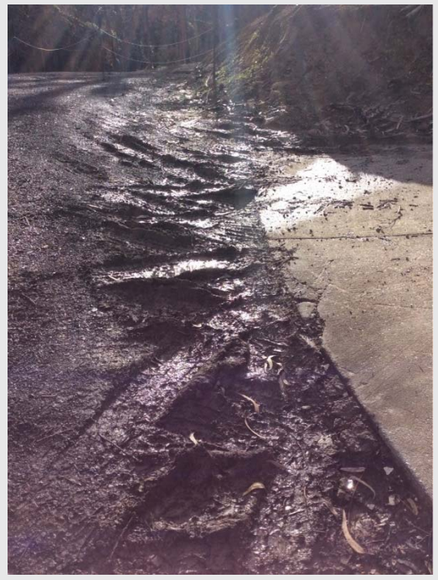


Figure 14 Lot Number 34\LP43437

Existing Issues and Photographs Taken During Site Visit (21 July 2016)

Unconfined stockpiles

Figure 15 Lot Number 28\LP22243

Figure 16 Lot Number 191\LP5026

Figure 17 Lot Number 187\LP50268

Drainage System

Figure 18 Lot Number 150\LP50268

Figure 19 Lot Number 1\TP215233

Figure 20 Lot Number 1\TP546792

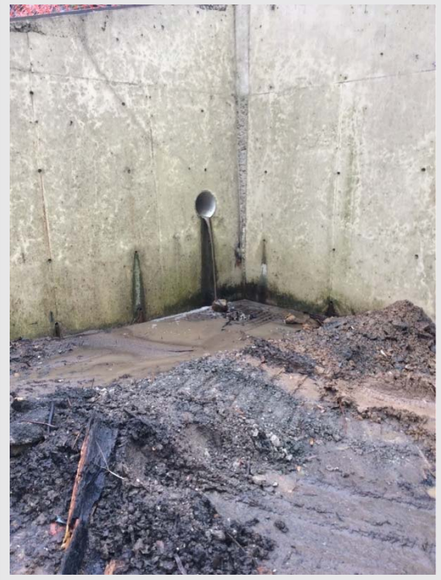


Figure 21 Lot Number 149\LP50268

Note: Lot locations are sourced from the photographs georeferenced location and may not be accurate.

Table 2 Photographs Supplied by COS

Existing Issues and Photographs Supplied by COS			
Land Slips and Paddy's Path			
			
Figure 22 Landslip below Paddy's Path	**Figure 23 Tree and soil mobilisation**	**Figure 24 Landslip Below Paddy's Path**	**Figure 25 Landslip within Wye River Precinct**
Sediment Deposits			
			
Figure 26 Sediment Deposition with private Property 31 Wallace Street Wye River	**Figure 27 Sediment Deposition with private Property 31 Wallace Street Wye River after overnight rain**		

2.4 Summary of Relevant Land Features

2.4.1 Climate

In accordance with the IECA 2008 Guidelines the Rainfall Erosivity for the Geelong area, which can safely be adopted for this project, is 1027.

Statistical climate data of the monthly rainfall was available at a nearby BOM station (090001 Apollo Bay) and is provided in Table 3 below. The mean daily evaporation data was not available for this station.

Table 3 Monthly Rainfall Statistics

Month	Mean Rainfall (mm)	Mean number of days of rain ≥ 10mm	Mean number of days of rain ≥ 25mm
January	52	1.6	0.4
February	50	1.5	0.4
March	67.4	1.9	0.4
April	81.8	2.6	0.6
May	98.5	3.1	0.5
June	109.2	3.5	0.7
July	116.7	3.9	0.6
August	127.1	4.4	0.7
September	108.8	3.5	0.5
October	97.9	3.1	0.5
November	80.7	2.4	0.5
December	63.9	1.8	0.4

More recently, rainfall observations at the Lorne (Mount Cowley) BOM Station were found to be some of the highest in the recorded observations. Table 4 provides the past three months' monthly rainfall as a percentile of the available historic monthly rainfall data at each station. This data shows that the recent rainfall has been significantly higher than normal rainfall for this area with the months of May and July being in the wettest 10% recorded.

Table 4 Monthly Rainfall Observations

Month	Location: Lorne (Mount Cowley) - 9.3 km away [1]		Location: Haines Junction (Mount Sabine) - 13.8 km away [2]		Location: Apollo Bay - 23.5 km away [3]	
	Monthly Rainfall (mm)	Percentile (%)	Monthly Rainfall (mm)	Percentile (%)	Monthly Rainfall (mm)	Percentile (%)
May	205.0	93.5	366.2	99.4	180.6	94.9
June	124.0	70.0	259.6	92.4	138.1	84.2
July	239.2	97.8	358.2	98.3	196.1	96.8
3 Month Total	568.2		984		514.8	

2.4.2 Soils

The soil in the area is classified as 'Brown duplex soils, Brown earths'. No geotechnical testing was undertaken as part of this ESCP.

2.4.3 Topography

The Wye River and Separation Creek sites range in elevation from sea level up to 230 m AHD. The sub-catchments of the affected areas under study are steep and extend from the waterway outlets to up to 1600 m inland (in plan). There are a number of steep gullies within the catchments that flow to the Wye River and Separation Creek tributaries within each respective catchment.

2.5 Existing Issues

A number of existing issues that contribute to the erosion and loss of sediment in the study area were identified on site during the two site visits undertaken by GHD. These issues are summarised in Table 5 and Table 6 below and are separated into gully catchments. Refer to Figure 28 and Figure 29 for the gully catchment delineation.

[1] 16 years of monthly rainfall data available

[2] 16 years of monthly data available for this station

[3] 118 years of monthly data available for this station

Table 5 Wye River Existing Issues

Location	Drainage Infrastructure	Existing Issues
North-West Wye River The Boulevard Illowara Ave Riverside Drive	• Table drains • Culvert under road	• Erosion at culvert outlet • Stormwater seeps into the ground and discharges into the gully. Rills caused by overland from paths • High velocity water in table drain • Saturated ground indicating inadequate drainage • Steep batter slopes • Cleared building pads unstable
South-West Wye River Riverside Drive	• Table drains • Culvert under road	• High velocity water in table drain • Cleared building pads unstable
Central Wye River Karingal Dr Coryule Ave The Boulevard	• Table drains • Culvert under road	• High velocity water in gully / table drain • Cleared building pads unstable • Failed embankment • Steep batter slopes
Central Wye River The Buff Karingal Dr The Boulevard	• Table drains • Culvert under road • Underground pipe drainage	• High velocity water in gully / table drain • Blocked culvert • Steep batter slopes • Loss of table drain shape

Location	Drainage Infrastructure	Existing Issues
Walllace Ave		
East Wye River Karingal Dr Koonya Ave Durumbil Ave Dunoon Ave Wallace Ave	• Table drains • Culvert under road • Underground pipe drainage	• Bank and batter damage • Steep drop off into a gully • High velocity water in gully / table drain • Blocked culvert / pit and outlet pipe • Steep batter slopes • Poorly graded table drain • Lack of ground cover • Flows piped under house building pad • Lot and stockpiles exposed • Fire track concentrating overland flows • Building pad not compacted well • Loose material in table drains easily mobilised • Cleared building pads unstable • Loss of table drain shape and drain stopping short of outlet • Vehicle rutting
South - East Wye River Iluka Ave	• Table drains • Culvert under road	• Stockpiles exposed • Bank and batter damage • Cleared building pads unstable • Vehicle rutting • High velocities in table drains / gully

Location	Drainage Infrastructure	Existing Issues
		• Cleared building pads unstable • Steep slopes • No drainage in areas

Table 6 Separation Creek Existing Issues

Location	Drainage Infrastructure	Existing Issues
West Separation Creek Harington St	• Table drains • Culvert under road	• Steep slopes • No drainage in areas
Central Separation Creek Bass Ave	• Table drains • Culvert under road	• Steep slopes • No drainage in areas • Loose material in table drains easily mobilised • Vehicle rutting • High velocities on unsealed road • Saturated ground indicating inadequate drainage
East Separation Creek Olive St	• Table drains • Culvert under road • Underground pipe drainage	• Steep slopes • Damage to gully

DRAFT

KARINGAL DRIVE
CORYULE AVENUE
DUNOON ROAD
KOONYA AVENUE
DURIMBIL AVENUE
WALLACE AVENUE
THE BOULEVARDE
THE BLUFF
ILUKA AVENUE
MCLELLAN COURT
RIVERSIDE DRIVE
UNNAMED
WONGARRA DRIVE
GREAT OCEAN ROAD
TRACK

0 0.25
kilometres
Scale: 1:3,001

1:3,000 (at A3)

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 54

N

LEGEND

- Photograph Location
- Gully Flow Line
- VM_Road_MGA54
- VM_Parcel_MGA54
- Sub-Catchment Boundary

COLAC OTWAY SHIRE
WYE RIVER AND SEPARATION CREEK

Erosion and Sediment Control Plan
Wye River Existing Issues

Job Number	31-34316
Revision	A
Date	31 08 2016

Figure 28

G:\DIR\JOBDIR\WORKSPACENAME.WOR

Data Source - COS - Aerial Imagery (2016); GHD - Photographs (2016); VicMap - Parcel, Roads (2016). Created by: hlhartenthaler

180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com.au W www.ghd.com.au

DRAFT

BASS AVENUE
MITCHELL GROVE
DOLLAR DRIVE
HARRINGTON STREET
SARSFIELD STREET
OLIVE STREET
OLD OCEAN ROAD
STANWAY

0 0.1
kilometres
Scale: 1:2,000

1:2,000 (at A3)

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 54

N

LEGEND

Photograph Location
Gully Flow Line
VM_Road_MGA54
VM_Parcel_MGA54
Sub-Catchment Boundary

COLAC OTWAY SHIRE
WYE RIVER AND SEPARATION CREEK

Erosion and Sediment Control Plan
Separation Creek Existing Issues

Job Number 31-34316
Revision A
Date 31 08 2016

Figure 29

G:\DIR\JOBDIR\WORKSPACENAME.WOR

Data Source - COS - Aerial Imagery (2016); GHD - Photographs (2016); VicMap - Parcel, Roads (2016). Created by: hlhartenthaler

180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com.au W www.ghd.com.au

3. Erosion and Sediment Control Plan

3.1 Overview

The objective of the erosion and sediment control plan is to:

1. Limit soil erosion; and
2. Control sediment discharge leaving the site.

A number of control measure options have been adopted in the ESCP. The appropriate selection is important to best-achieve the desired outcomes. The ESCP has been based on the principle that erosion prevention is more environmentally sound, cost effective and easier than controlling the capture of sediment, especially where soils have a high proportion of fines or clays. However, in situations where erosion occurs, appropriate controls should be implemented to minimise the runoff of sediment laden water from the site.

The philosophy of the proposed erosion and sedimentation plan is to primarily stabilise the site to prevent erosion and secondly to provide additional measures that slow down flows and facilitate sedimentation for material that has been dislodged. The plan relies on the assumption that the site will transition to a more permanent natural drainage control solution.

The erosion and sediment control measures that have been identified for the Wye River and Separation Creek catchments include:

- Sediment fences
- Table drain stabilisation (check dams, jute matting / grass seeding)
- In-gully treatment
- Steep batter treatment (soil, erosion matting
- Stabilisation of cleared blocks
- Outfall protection
- Inlet pit protection
- Gully connection works

Proposed locations for these at treatment measures are presented on the Wye River and Separation Creek ESCP drawings.

3.2 Site Specific Measures

The site specific measures and their relevant drawing number are summarised in Table 7 below and are separated into gully catchments. The drawings numbers are in reference to the ESCP drawings developed for the Wye River and Separation Creek sites.

Table 7 Site Specific Measures

Drawing Number	Proposed Treatment Measure	Treatment Code
31-34316-C001 Location: Wye River North (West of Main Gully)	• Gravel Reinstatement – Stabilisation of individual sites • Table drain stabilisation – Check dams in table drain • Steep embankment treatment – Erosion matting over batters • Pit protection – Mesh gravel roll placed around inlet pit • Slope drain to erosion protection – Channel protection using slope drain to rock pad • Sediment / Debris Trap (Endwall) – Sediment Fence on endwall • Erosion Protection – Erosion control matting and revegetation • Silt Fences • Hydromulch – Stabilisation through revegetation using a hydromulcher	• GR • TD • SB • PP • SD / EP • SDT • EP • SF • HM
31-34316-C002 Location: Wye River North (East of Main Gully)	• Table drain stabilisation – Check dams in table drain • Pit protection – Mesh gravel roll placed around inlet pit • Steep embankment treatment – Erosion matting over batters • Erosion Protection – Erosion control matting and revegetation • Silt Fences • Slope drain to erosion protection – Channel protection using slope drain to rock pad • Sediment / Debris Trap – Sediment Fence on headwall / endwall • Hydromulch – Stabilisation through revegetation using a hydromulcher	• TD • PP • SB • EP • SF • SD / EP • SDT • HM
31-34316-C003 Location: Separation Creek	• Steep embankment treatment – Erosion matting over batters • Silt Fences • Table drain stabilisation – Check dams in table drain • Pit protection – Mesh gravel roll placed around inlet pit • Hydromulch – Stabilisation through revegetation using a hydromulcher	• SB • SF • TD • PP • HM

3.3 Overview of Implementation

The proposed erosion and sedimentation plan consists of a number of individual treatment measures that aim to firstly stabilise the site to prevent erosion and then additional measures to slow down flows and facilitate sedimentation for material that has been mobilised in the system.

The measures proposed as part of this ESCP are readily implementable short term measures that includes sediment source prevention, improves connectivity to drainage infrastructure, protects drainage infrastructure from blockage (from debris and sediment) and protects the gullies and receiving waterways. As the proposed works are temporary in nature, the ESCP relies on the assumption that the site will transition back to natural / existing conditions where a formal stormwater management system is implemented in the long term. The plan includes a detailed maintenance regime that will also be relied upon to maintain the effectiveness of the plan and associated functionality of the infrastructure.

A key aim of the methodology adopted for this ESCP was to retain the natural flow systems in order to not worsen other areas. This was incorporated into the plan by protecting existing channels and gullies instead of diverting flows.

3.3.1 Erosion Minimisation Measures

The site has a significant area of disturbed soils with little to no cover to protect it from water movement. Under these conditions, heavy rainfall on the site would be enough to dislodge soil particles and erode the site. To minimise the volume of material dislodged from these exposed areas a number of treatment measures have been recommended

Hydromulching.(HM)[4]

It is recommended that these disturbed sites have vegetation established as quickly as possible to absorb the energy from raindrops prior to hitting the soil and then binding the top soil to minimise dislodgment from sheet flows. For sites where the slopes are less than 10%, it is recommended that a hydromulch with a quick growing grasses get distributed on all of the exposed areas. The seeds should be a sterile annual type to only last long enough to stabilise for one season and allow more native species to establish thereafter in the next growing season.

Steep batter Protection (SB)

For areas that have been exposed and are steeper than 5%, then there is a chance that a sprayed mix will be easily dislodged. These sites have been recommended to have a more structural treatment. This involves a two stage process (refer Figure 30).

1. The top of the steep batters is to have a coir log installed to minimise concentrated flows over the batters and capture sediments. The arrangement of the logs would be to direct flows to a location where they can be best controlled down the slope such as a driveway.
2. a protective cover material that is pinned to the batter slopes to provide protection for soil dislodgement while providing a medium for vegetation to be held to the slope. This treatment will maximise the potential for vegetation to establish on slope.
   In selecting the use of the batter protection on individual sites, it will be important that the site superintendent carefully weighs up the benefits of using structural measures to protect soils, against the potential damage the soils in preparing for the installation of the projection measures. For many of the erosion protection options, the nominated

[4] Shorthand reference used on Wye River and Separation Creek ESCP

protection treatment needs a good contact with the underlying soils which will typically require some trimming back. This action may cause more damage sediment generation than what is currently occurring and hence not represent good management.

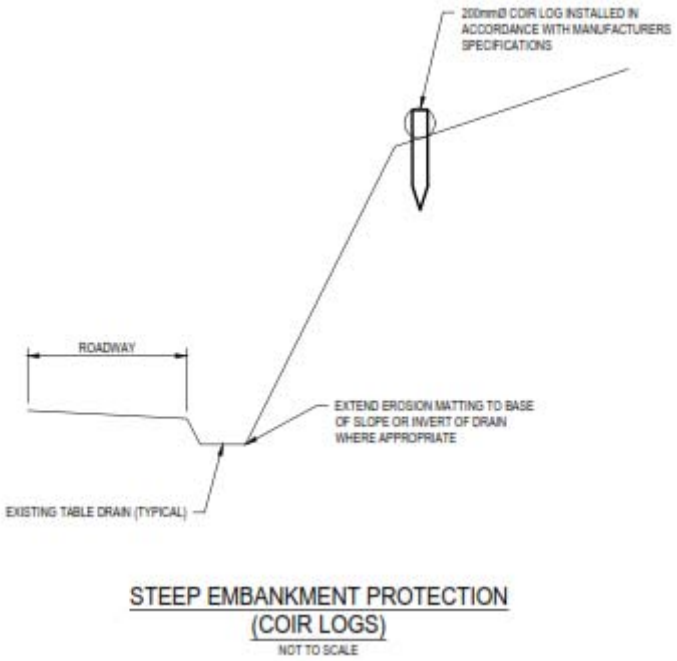


Figure 30 Steep Batter Protection

Gravel Reinstatement (GR)

As noted in Section 2.3 there are areas where ongoing traffic will continually disturb the soils and as such vegetation establishment will not be sufficient to stabilise the individual sites. In these locations it has been recommended that the use of gravel reinstatement to provide the protection to the soils. These sites are located adjacent to the main streets and driveways of the site.

Exclusion from Areas

A key component of the ESCP is to allow reestablishment of vegetation to cover bind the soils. As evidenced in the site inspections of the two townships was the difference between an active construction zone (Wye River) and that of Separation Creek where works had ceased for approximately 3 months. When moving forward, it will be critical to manage access to the site so that to prevent continual disturbance to the soils. It is recommended that COS review the areas within the Wye River precinct and use temporary (parraweb) fences around regeneration areas that are located adjacent to the roadsides and drainage channels to limit vehicle access.

3.3.2 Sediment Management

Sediment management measures aim to trap and retain sediment displaced by up-slope erosion processes. It is acknowledged that the erosion control measures proposed can minimise erosion process but cannot eliminate erosion on site and protect the downstream environment.

Silt Fences (SF)

Silt fences have been nominated on areas downstream of building platforms where there is the expectation of stormwater sheeting of the batters down the slopes mobilising material from

those batters. The silt fences (refer Figure 31) retain the sheet flows preventing concentration of flows onto the downstream properties. It is recommended that some of the hydromulch and associated seed will be collected upstream of the silt fence and form a vegetation filter strip to further remove sediments from stormwater flows.

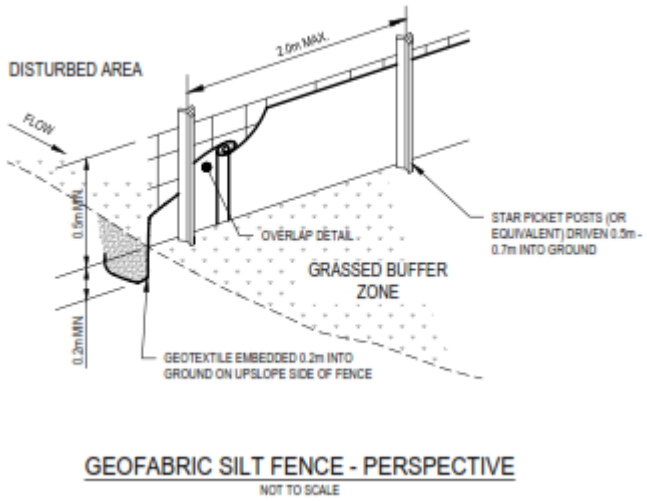


Figure 31 Silt Fences

Inlet Protection (PP) and Sediment Traps (TD)

A main concern from Council is the deposition of sediment material into the road pits resulting in reduced flow capacity and uncontrolled flows onto private property. To manage the risk, it has been proposed to use inlet protection works (refer Figure 32) and sediment traps in the form of Check Dams to minimise the volume of sediments getting to the pits (refer Figure 33).

The aim of this measure it to capture the volume of sediment material along each of the table drains before it reaches the pits and causes a failure of the drainage system. Consequently, the volume of sediment intercepted does not change, but spreads the load along each of the table drains. As a result, each of the table drains will require frequent maintenance to clean the check dams to retain their function, else the load will continue downstream to the pit.

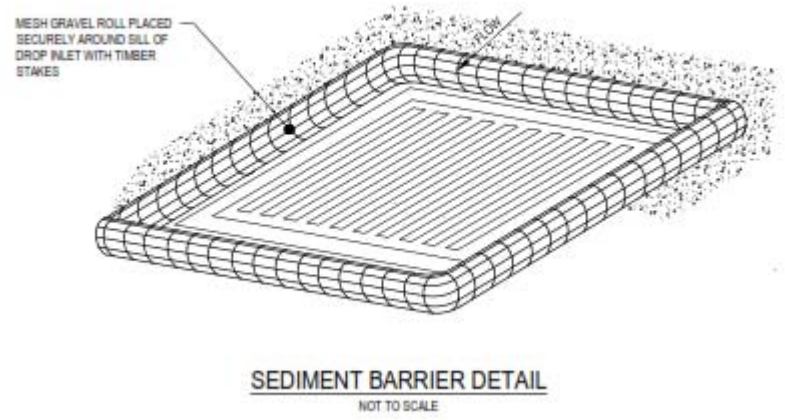


Figure 32 Inlet Protection Works

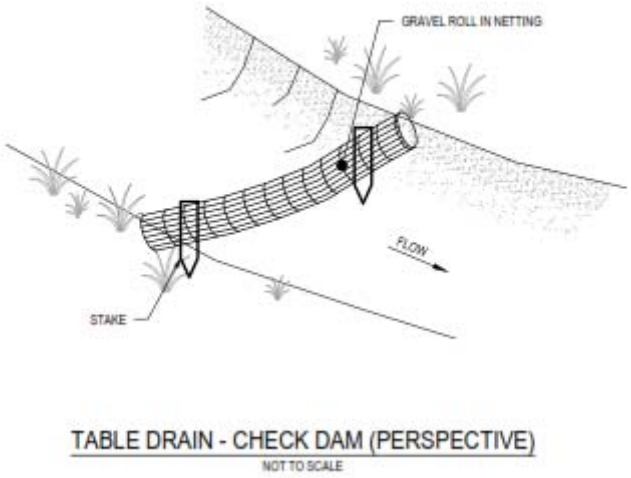


Figure 33 Sediment Trap

3.3.3 Temporary Drainage Management

A common issue identified on the site inspection is the disturbance of the soil along formal and informal flow paths down the catchment resulting in high levels of erosion. It is understood that COS are going to implement a more formal drainage system to better manage stormwater from the site. As the ESCP focus on short term works and managing the current issues, GHD have recommended utilising systems that can be quickly installed on steep slopes with minimal machinery requirements. These measures should provide a reduction in the erosion of these flow paths until a more permanent solution can be implemented.

Erosion Protection (EP)

On active flow areas down a defined flow depression, it is recommended that erosion blankets be used to cover the exposed soils. The locations that these are to be installed need to be trimmed to a uniform profile and lightly compacted to create a clean surface for placement of the blankets. Prior to laying, the surface is seeded with the blankets laid over the top. These are then pinned down and stapled together to for a continuous system. Over time the vegetation with the blanket will bind the soils so that erosion will be limited until a more permanent system can be installed.

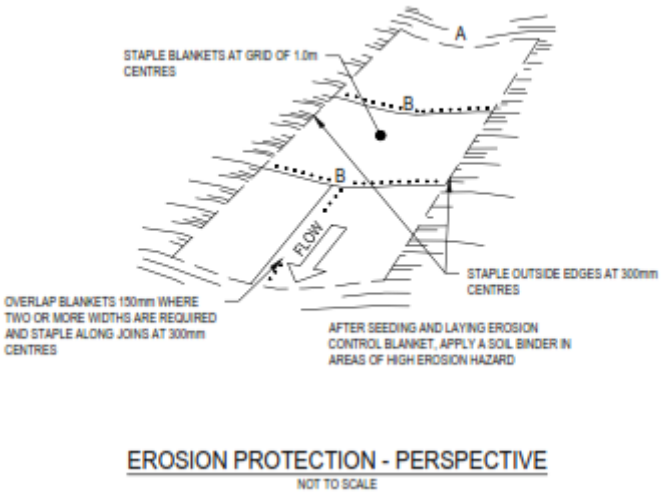


Figure 34 Erosion Protection Blankets

Pipe Slope Drain (SD)

In other areas where water discharges from a piped culvert down a property in an uncontrolled manner, it is recommended that flows get conveyed via a pipe slop drain. This is considered important as there are locations where this concentrated from the cross culvert then spreads and creates widespread erosion gullies as the stormwater makes its way down the slopes. The pipe should be installed such that it is well anchored in the slope and where discharges downstream do not create nuisance flows to other (previously) unaffected properties. The locations and placements of these shall be confirmed with Council prior to implementation to ensure that the works meet the overall requirements of the system.

Two pipe drain types are recommended for this site, refer Figure 35 and Figure 36.

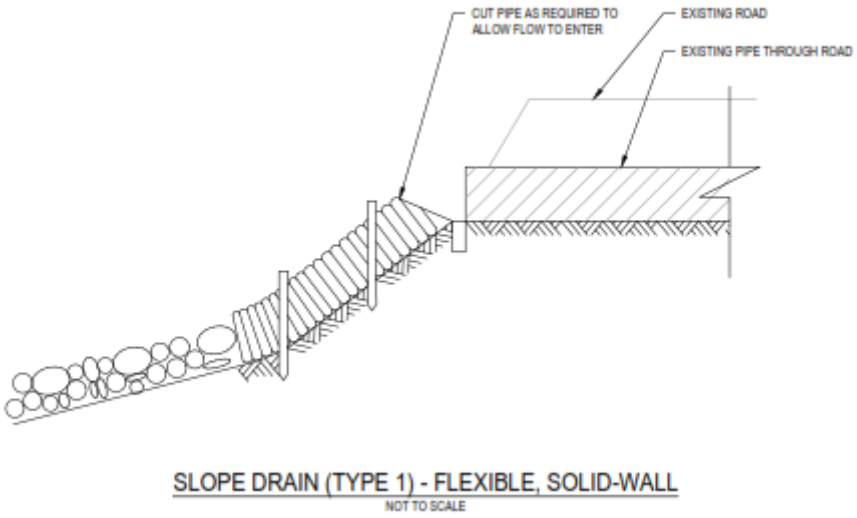


Figure 35 Slope Drain (Type 1)

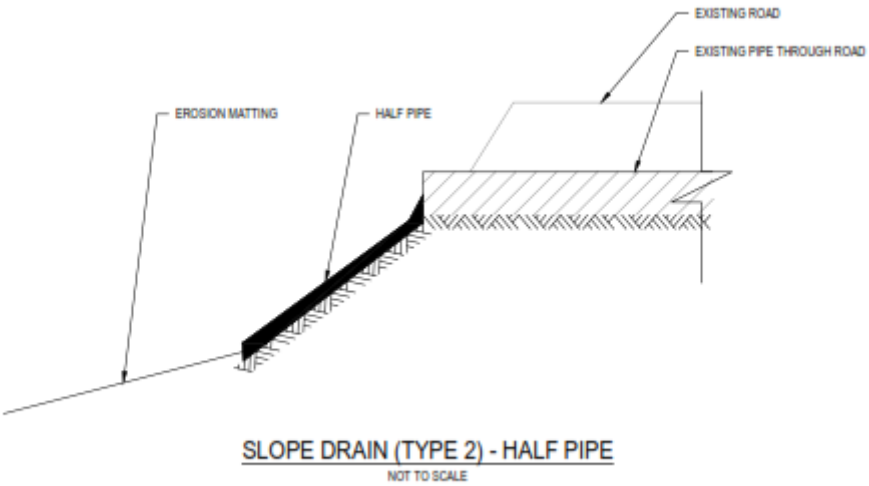


Figure 36 Slope Drain (Type 2)

Inlet Protection (SDT)

A key concern identified by COS was the level of erosion occurring around 15 Koonya Ave and 42 Karingal Drive. It was observed that there was considerable erosion of the drainage line and deposition of material within the headwall. Further to this it was observed that there has been overflows over the headwall causing further erosion within 15 Koonya Ave depositing a large volume of sediment around the retaining wall located on Koonya Ave (Figure 38).

Inspection of this headwall identified a fine screen over the pipe inlet and sediment material slumped in on the apron (Figure 39). For this site is recommended that a gabian basket be placed to stop the slumping of material into the culver apron and provide some form of screening of debris. The grate on the headwall would be prone to ongoing blockages with vegetation material that would be a continual issue given the nature of the contributing catchment. We would recommend that this screen be removed allow a more open culvert. There would be an ongoing issue with larger debris (like sticks) causing blockages, however this can be temporary managed by a shallow diversion screen consisting of an angled lightweight mesh to screen litter and debris away from the headwall. Refer to Figure 37 for details on the configuration.

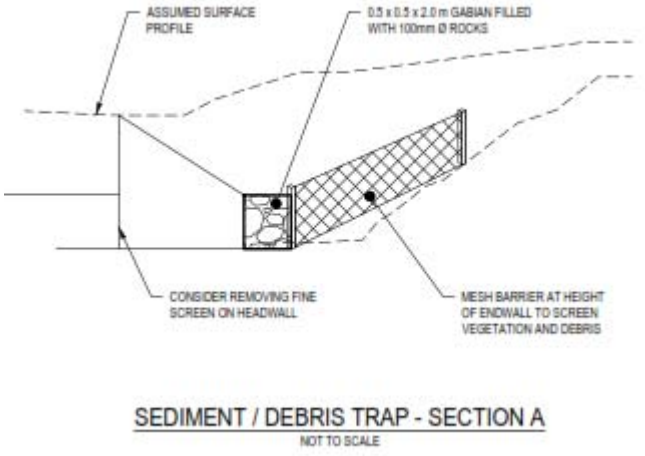


Figure 37 Sediment / Debris Trap

Table 8 Inlet Protection

Photographs of Affected Inlets Requiring Inlet Protection	
	
Figure 38 15 Koonya Sediment Deposition	**Figure 39 15 Koonya Ave Culvert Inlet**

3.4 Supporting Documentation

The drawings developed as part of this ESCP make reference to IECA 2008 standard drawings.

4. Monitoring and Maintenance Plan

4.1 Monitoring

Monitoring requirements are listed below:

- Appropriate procedures and personnel should be engaged to plan and conduct site inspections and water quality monitoring by COS or the Contractor.
- All ESC measures should be inspected in accordance with the IECA 2008 guidelines.
- All site monitoring data including rainfall records, dates of water quality testing, testing results and records of controlled water releases for the site, should be documented on-site. The documentation should be maintained up to date and be available on-site for inspection by the Assessing Authority on request.
- All environmental incidents should be documented, and should remain accessible to the relevant regulatory authorities on request. When an Environmental Incident (i.e. breach of limits) or exceedance of trigger value occurs, it is the responsibility of the site manager to investigate and initiate remedial actions commensurate with the severity of the incident (refer to Section 9 for typical remedial actions).
- A system should be implemented and maintained that monitors and records site compliance and non-compliance with the ESCP requirements.

4.2 Maintenance

4.2.1 General

Maintenance requirements are listed below.

- All materials removed from ESC devices during maintenance, whether solid or liquid, should be disposed of in a manner that does not cause ongoing soil erosion or environmental harm. Solid materials removed from ESC devices are to be stockpiled onsite in accordance with IECA 2008 stockpile guidelines.
- Written records of erosion and sediment control monitoring and maintenance activities should be maintained on site. Original copies of such records shall be provided on request to COS.
- Maintenance of erosion and sediment control measures must occur in accordance with the ESCP drawings.

4.2.2 Maintenance Plan

The maintenance requirements for erosion and sediment control measures are summarised in Table 9. Refer to the ESC drawings for detailed maintenance requirements.

Table 9 Maintenance requirements for erosion and sediment control measures

Control	Maintenance Trigger	Timeframe
Hydromulch	Inspect during construction, replace if necessary	Fortnightly and after runoff-producing rainfall.

Control	Maintenance Trigger	Timeframe
	Watering to start immediately after planting. Watering should vary according to weather and soil conditions.	Immediately and during construction
Gravel Reinstatement	Inspect during construction, replace if necessary	Fortnightly and after runoff-producing rainfall.
Steep Embankment Protection	Inspect during active construction period. Replace as necessary.	Prior to forecast rainfall, daily during extended periods of rainfall, after significant runoff producing rainfall, and on a weekly basis.
Sediment Trap in Table Drain – Check Dam	Inspection during construction, replace if necessary. If significant erosion between check dams occurs, check the spacing of dams. Remove sediment accumulation.	Minimum weekly intervals and after runoff-producing rainfall.
Pit Protection	Inspect, make repairs and remove sediment accumulation.	After runoff-producing rainfall.
Erosion Protection Blankets	Inspect during active construction period. Repair as necessary.	Fortnightly for at least the first three months and after runoff-producing rainfall.
Slope Drains	Inspect during active construction period. Repair as necessary.	Prior to forecast rainfall, daily during extended periods of rainfall, after significant runoff producing rainfall, and on a weekly basis.
Other ESC measures	The capacity of ESC measures falls below 75%.	By end of the day during any stay in rainfall.

4.3 Storm Event

Prior to and following an approaching storm event, the site management should undertake a full maintenance inspection and make any necessary repairs to prevent an environmental incident.

4.4 Contingency Actions

The following remedial actions have been adapted from IECA (2008).

After any identification of incident or failure, the source/cause is to be immediately located and the following measures implemented:

- Build-up of sediment off the site – the material must be collected and disposed of in a manner that should not cause ongoing environmental nuisance or harm. Following this, on-site ESC measures are to be amended, where appropriate, to reduce the risk of further sedimentation.
- Excessive sediment build-up on the site – collect and dispose of material and then amend up-slope drainage and/or erosion control measures as appropriate to reduce further occurrence.
- Severe or excessive rill erosion – investigate cause, control up-slope water movement, re-profile surface, provide stabilisation by covering with 75 mm of topsoil seeded with grass mix, erosion control blankets and vegetation as necessary.
- Off-stream erosion – fill rills, vegetate and install velocity control measures.
- In-stream erosion – consult appropriate hydraulic/waterway engineer for advice and corrective action as required.
- Release of materials from the site – collected and placed in a manner that should not cause ongoing environmental nuisance or harm; then inspect litter and waste receptacles.
- Poor vegetation growth or soil coverage – plant new vegetation and/or mulch as required. Newly planted and previously planted areas may require supplementary watering and replanting.
- Sediment fence failure. Replace and monitor. Repeated failures may mean that the sediment fence location, alignment or installation may need to be amended.

If the release of excessive sediment and/or other materials off the site occurs, or water quality monitoring indicates levels are not within the discharge criteria, clean up deposition and inspect all control measures.

If the release of excessive sediment and/or other materials off the site is identified during two consecutive site inspections, or water quality monitoring indicates levels not within the discharge criteria on two consecutive tests, review and revise the control measures, or otherwise reduce the rate, extent and/or duration of soil exposure.

5. Cost Estimate

An itemised schedule of quantities has been produced for each portion of the ESCP; Wye River North – West of Main Gully, Wye River North - East of Main Gully and Separation Creek, this is detailed within the cost schedule included as Appendix B.

The ESCP price estimate has been developed based on rates obtained from product suppliers, Rawlinson's Australian Construction Handbook (2016) as well as GHD experience on similar projects. GHD has prepared the preliminary cost estimate / prices set out in this section of the report using information reasonably available and based on assumptions and judgements made by GHD. The cost estimates provided are best estimates based on the conceptual arrangements proposed and outlined in the preceding sections of this report. These may change in future detailed design phases. Therefore, the cost estimate should only be taken as indicative for planning purposes and the accuracy is not expected to be better than about ±30%.

Further to this, cost estimates developed for the project represent the capital cost only and exclude any on-going operation and maintenance costs.

5.1 Cost Summary

Table 10 and Table 11 below respectively present the total estimated direct costs, and the total project costs including contingencies and overheads. Refer to the cost breakdown in Appendix B for detailed estimates.

Table 10 Direct Project Costs

Section	Amount
Wye River North (West of Main Gully)	$47,316
Wye River North (East of Main Gully(	$111,361
Separation Creek	$14,810
Total Direct Project Costs	$173,488

The following contingencies and overhead costs have been applied to the total direct costs

Table 11 Total Project Costs

Description	Amount
Construction Overhead Costs	10%
Regional Cost	15%
Contingencies	30%
Tender and Supervision	15%
Total Estimated Project Cost (excl GST)	$330,000

As detailed in the cost schedule in Appendix B the total direct project cost was found to be heavily influenced by the following works:

- Hydromulch

- Slope Drains
- Erosion Matting
- Coir Logs
- Gravel

The hydromulch component in particular contributed to almost 50% of the direct project costs, this was based on an adopted supply and place rate of $2.20/m^2. This rate is considered to be high for standard hydro mulching, however it may be insufficient for hydromulching with bonded fibre matrix (BFM). Whilst standard hydro-mulching is expected to be appropriate for majority of areas within the Wye River project site, where slopes steepen to greater than 2H:1V, it is likely that hydromulching with BFM is required. Should BFM hydro-mulching be required the rate is more likely to be $3-4/m^2. For the purpose of this cost estimate, a standard hydromulching rate ($2.20/m^2) has been adopted for the entire hydromulching component of the works. The preferred hydromulching method should be confirmed prior to detailed design, and the cost estimate revised.

Whilst specialist product supply companies such as Geofabrics Australasia Pty Ltd were consulted for rates estimate, in many cases they were unable to provide rates which incorporated the cost to place the product. As such experience and judgement was applied to estimate the total labour required for placement, and rates provided were increased relatively. Table 12 below details these assumptions for a number of products.

Table 12 Assumed Labour Rates

Product Type	Quantity	Labour	Relative Increase
Fibre rolls	595 m	2 days	10%
Silt fence	1,080 m	2 days	20%
Mesh gravel roll (PP)	120 No.	½ day	10%
Mesh gravel roll (TD)	116 No.	½ day	10%
Erosion Protection matting	2,114 m^2	3 days	20%
Slope Drain	355 m	5 days	20%

6. Supporting Documentation

This ESCP report has been prepared in reference to the following guidelines:

- Best Practice Erosion and Sediment Control. International Erosion Control Association (Australasia) (IECA 2008)

Appendices

Appendix A – IFD Data

Intensity-Fequency Duration Data (mm/h)

http://www.bom.gov.au

DURATION	1 Year	2 years	5 years	10 years	20 years	50 years	100 years
5Mins	48.2	63.6	84.9	99.6	120.0	149.0	173.0
6Mins	45.1	59.6	79.4	93.2	112.0	139.0	162.0
10Mins	36.9	48.6	64.1	74.7	89.2	110.0	128.0
20Mins	26.5	34.7	45.1	52.1	61.7	75.5	87.0
30Mins	21.4	27.9	36.0	41.4	48.9	59.5	68.3
1Hr	14.7	19.1	24.2	27.6	32.3	38.9	44.4
2Hrs	10.4	13.3	16.4	18.4	21.3	25.2	28.4
3Hrs	8.6	11.0	13.2	14.6	16.7	19.5	21.8
6Hrs	6.3	7.9	9.1	9.9	11.1	12.7	13.9
12Hrs	4.4	5.4	6.2	6.6	7.4	8.4	9.1
24Hrs	2.7	3.4	4.0	4.3	4.9	5.6	6.2
48Hrs	1.5	2.0	2.4	2.7	3.1	3.7	4.2
72Hrs	1.1	1.4	1.8	2.0	2.4	2.9	3.3

Appendix B – Cost Estimate

www.ghd.com.au
Tel. (03) 8687800
180 Lonsdale Street Melbourne Vic 3000

Colac Otway Shire - Wye River and Seperation Creek

Erosion and Sediment Control Plan

Cost Estimate

Item	Description	Code	Quantity	Unit	Rate $	Lump Sum	Amount $
1	**C001 - Wye River North (West of Main Gully)**					**Subtotal**	$ 47,316.14
1.1	**Sediment Source prevention/Control**					Subtotal	$ 35,460.46
1.1.1	Steep Embankment protection	SM	210	m	22.00	-	$ 4,620.00
	Item 4 (part)		100	m			
	Item 11 (part)		50	m			
	Item 29 (part)		30	m			
	Item 125 (part)		30	m			
1.1.2	Exposed Areas on properties	HM	10,610.33	m²	2.20	-	$ 23,342.73
	Item 18		230	m²			
	Item 20		750	m²			
	Item 21		1,000	m²			
	Item 22		1,400	m²			
	Item 23		1,300	m²			
	Item 24		790	m²			
	Item 25		270	m²			
	Item 26		420	m²			
	Item 27		2,900	m²			
	Item 28		350	m²			
	Item 126		400	m²			
	Item 127		800	m²			
1.1.3	Gravel reinstatement on road	GR	75	m³	100.00	-	$ 7,497.73
	Item 1		100	m²			
	Item 10		110	m²			
	Item 17		300	m²			
	Item 18		240	m²			
1.2	**Sediment Debris Management**					Subtotal	$ 920.00
1.2.1	Silt fence	SF	140	m	2.00	-	$ 280.00
	Item 15		30	m			
	Item 16		110	m			
1.2.2	Sediment debris Trap	SDT	1	no.	400.00	-	$ 400.00
	Item 7		1	no.			
1.2.4	Pit protection	PP	12	no.	20.00	-	$ 240.00
	Item 5		6	no.			
	Item 12		6	no.			
1.3	**Drainage**					Subtotal	$ 10,935.68
1.2.5	Table Drain (check dams)	TD	34	no.	20.00	-	$ 680.00
	Item 2		130	m			
	Item 3		80	m			
	Item 13		60	m			
	Item 17 (part)		70	m			
	Item 30		60	m			
1.3.1	Erosion Protection (Multiplied length by 5m wide)	EP	822.24	m²	7.00	-	$ 5,755.68
	Item 6 (part)		9	m			
	Item 9		16	m			
	Item 14 (part)		13	m			
	Item 15		14	m			
	Item 16		15	m			
	Item 11 (part)		5	m			
	Item 4 (part)		5	m			
	Item 19		13	m			
	Item 125		6	m			
	Item 128		10	m			
1.3.2	Slope Drain	SD	45	m	100.00	-	$ 4,500.00
	Item 6 (part)		35	m			
	Item 14 (part)		45	m			
						C001 - Wye River North (Westof Main Gully) - SUBTOTAL:	$ 47,316.14

www.ghd.com.au
Tel. (03) 8687800
180 Lonsdale Street Melbourne Vic 3000

Colac Otway Shire - Wye River and Seperation Creek

Erosion and Sediment Control Plan

Cost Estimate

Item	Description	Code	Quantity	Unit	Rate $	Lump Sum	Amount $
2	**C002 - Wye River North (East of Main Gully)**					**Subtotal**	$ 111,361.84
2.1	**Sediment Source prevention/Control**					Subtotal	$ 67,220.00
2.1.1	Steep Batter Treatment	SM	340	m	22.00	-	$ 7,480.00
	Item 34		60	m			
	Item 36		50	m			
	Item 50		25	m			
	Item 62		40	m			
	Item 65		55	m			
	Item 91		50	m			
	Item 92		60	m			
2.1.2	Hydromulch Exposed Area	HM	26,700.00	m²	2.20	-	$ 58,740.00
	Item 70-83		15,200	m²			
	Item 93-106		11,300	m²			
	Item 92		200	m²			
2.1.3	Gravel Reinstatement	GR	10	m3	100.00	-	$ 1,000.00
	Item 60 (done)		-	m²			
	Item 132		100	m²			
2.2	**Sediment Debris Management**					Subtotal	$ 3,319.41
2.2.1	Silt fence	SF	540	m	2.00	-	$ 1,079.41
	Item 53		25	m			
	Item 55		60	m			
	Item 64		55	m			
	Item 69		130	m			
	Item 86		200	m			
	Item 87		70	m			
2.2.2	Sediment debris Trap	SDT	2	no.	400.00	-	$ 800.00
	Item 63		1	no.			
	Item 131		1	no.			
2.2.4	Pit protection	PP	72	No	20.00	-	$ 1,440.00
	Item 32		6	No			
	Item 35		6	No			
	Item 39		6	No			
	Item 42		6	No			
	Item 45		6	No			
	Item 46		6	No			
	Item 51		6	No			
	Item 56		6	No			
	Item 68		6	No			
	Item 91		6	No			
	Item 129		6	No			
	Item 131		6	No			
2.3	**Drainage**					Subtotal	$ 40,822.43
2.3.1	Table Drain (check dams)	TD	67	no.	20.00	-	$ 1,340.00
	Item 31		50	m			
	Item 33		70	m			
	Item 37		40	m			
	Item 41		40	m			
	Item 49		80	m			
	Item 52		50	m			
	Item 54		60	m			
	Item 58 (part)		60	m			
	Item 88		165	m			
	Item 91		46	m			
2.3.3	Erosion Protection	EP	1,212	m²	7.00	-	$ 8,482.43
	Item 34 (part)		8	m			
	Item 36 (part)		8	m			
	Item 38 (part)		16	m			
	Item 40 (part)		16	m			
	Item 43		12	m			
	Item 44		15	m			
	Item 47		16	m			
	Item 48 (part)		16	m			
	Item 58 (part)		15	m			
	Item 60 (part)		21	m			
	Item 61 (part)		16	m			
	Item 62 (part)		8	m			
	Item 67		10	m			
	Item 84 (part)		42	m			
	Item 85 (part)		20	m			
	Item 91		5	m			
2.3.4	Slope Drain	SD	310	m	100.00	-	$ 31,000.00
	Item 38		15	m			
	Item 40		15	m			
	Item 48		30	m			
	Item 57		15	m			
	Item 60 (part)		40	m			
	Item 61		10	m			
	Item 66		15	m			
	Item 84 (part)		70	m			
	Item 85 (part)		100	m			
					C002 - Wye River North (East of Main Gully) - SUBTOTAL:		$ 111,361.84

www.ghd.com.au
Tel. (03) 8687800
180 Lonsdale Street Melbourne Vic 3000

Colac Otway Shire - Wye River and Seperation Creek

Erosion and Sediment Control Plan

Cost Estimate

Item	Description	Code	Quantity	Unit	Rate $	Lump Sum	Amount $
3	**C003 - Separation Creek**					**Subtotal**	$ 14,810.00
3.1	**Sediment Source prevention/Control**					Subtotal	$ 12,430.00
3.1.1	Steep Batter Treatment	SM	45	m²	22.00	-	$ 990.00
	Item 107		45	m²			
	Item 107		20	m²			
3.1.2	Hydromulch Exposed Area	HM	5,200	m²	2.20	-	$ 11,440.00
	Item 119 - 126		5,200	m²			
3.1.3	Gravel Reinstatement (none)	GR	-			-	$ -
3.2	**Sediment Debris Management**					Subtotal	$ 1,520.00
3.2.1	Sediment/Debris Trap (none)	SDT	-			-	$ -
			-				
3.2.3	Inlet Pit Protection	PP	36	No	20.00	-	$ 720.00
	Item 116		6	No			
	Item 117		6	No			
	Item 118		6	No			
	Item 133		6	No			
	Item 134		6	No			
	Item 138		6	No			
3.2.3	Silt Fences	SF	400		2.00	-	$ 800.00
	Item 108 - 114		400				
3.3	**Drainage**					Subtotal	$ 860.00
3.3.1	Table Drain Works	TD	15	m	20.00	-	$ 300.00
	Item 115		100	m			
	Item 137		50	m			
3.3.3	Erosion Protection	EP	80.00		7.00	-	$ 560.00
	Item 107 (part)		8	m			
	Item 135 (part)		8	m			
3.3.4	Slope Drain (none)	SD	-			-	$ -
			-			-	$ -
						C003 - Separation Creek- SUBTOTAL:	$ 14,810.00

GHD

www.ghd.com.au
Tel. (03) 8687800
180 Lonsdale Street Melbourne Vic 3000

Colac Otway Shire - Wye River and Seperation Creek

Erosion and Sediment Control Plan

Cost Estimate

Item	Description	Code	Quantity	Unit	Rate $	Lump Sum	Amount $
						C001 - Wye River North (Westof Main Gully) - SUBTOTAL:	$ 47,316.14
						C002 - Wye River North (East of Main Gully) - SUBTOTAL:	$ 111,361.84
						C003 - Separation Creek- SUBTOTAL:	$ 14,810.00
						Total	**$ 173,487.97**

ITEM	DESCRIPTION	Amount $	Sub-totals $	Totals $	
1	Total Costs	173,488			
	Sub-total Direct Costs			**170,000**	
2	Add 10% construction overhead costs	20,000			10%
	Sub-total		190,000		
3	Add 15% regional cost	30,000			15%
	Sub-total		220,000		
4	Add 30% contingencies	70,000			30%
	Sub-total		290,000		
5	Allow 15% for Tender and Supervision	40,000			15%
	Sub-total Indirect Costs			**160,000**	
	TOTAL ESTIMATED PROJECT COST (excl. GST)			**330,000**	
6	Add GST 10%	33,000			10%
	TOTAL ESTIMATED PROJECT COST (incl. GST)			**360,000**	

* All values rounded

GHD

180 Lonsdale Street
Melbourne, Victoria 3000
T: (03) 8687 8000 F: (03) 8687 8111 E: melmail@ghd.com.au

G:\31\34316\WP\253450.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Draft A	H. Hartenthaler					31.08.16

www.ghd.com

Appendix E

Erosion and Sediment Control Plan

This page has been left intentionally blank

COLAC OTWAY SHIRE
WYE RIVER AND SEPARATION CREEK ESCP
31-34316

AERIAL IMAGERY PROVIDED BY COLAC OTWAY SHIRE

LOCALITY PLAN

SCALE 1:5000

DRAWING LIST

DRG No.	DRAWING TITLE
31-34316-G001	COVER SHEET, DRAWING LIST AND LOCALITY PLAN
31-34316-G002	GENERAL NOTES
31-34316-C001	WYE RIVER NORTH (WEST OF MAIN GULLY)
31-34316-C002	WYE RIVER NORTH (EAST OF MAIN GULLY)
31-34316-C003	SEPARATION CREEK
31-34316-C004	ESCP DETAILS, SHEET 1 OF 2
31-34316-C005	ESCP DETAILS, SHEET 2 OF 2

FINAL

No	Revision	Job Manager	Project Director	
B	FINAL REVISION	RGC	AGR*	RPM*	15.09.16
A	ISSUED FOR CLIENT REVIEW	RGC	AR*	RM*	09.08.16

Note: * indicates signatures on original issue of drawing or last revision of drawing

0 50 100 150 200 250m
SCALE 1:5000 AT ORIGINAL SIZE

Colac Otway SHIRE
Naturally Progressive

GHD
Level 8, 180 Lonsdale Street, Melbourne VIC 3000 Australia
T 61 3 8687 8000 **F** 61 3 8687 8111
E melmail@ghd.com.au **W** www.ghd.com

DO NOT SCALE

Drawn	R. CASACLANG	Designed	J. BERNARDI
Drafting Check	P.C. WONG*	Design Check	A.KAMAL*(CPESC)
Approved (Project Director)	R. MICKELSON*		
Date	15.09.16		
Scale	1:5000	This Drawing must not be used for Construction unless signed as Approved	

Client: COLAC OTWAY SHIRE
Project: WYE RIVER AND SEPARATION CREEK ESCP
Title: COVER SHEET, DRAWING LIST AND LOCALITY PLAN

Original Size: A1
Drawing No: 31-34316-G001
Rev: B

Plot Date: 15 September 2016 - 1:34 PM Plotted by: Pc Wong Cad File No: G:\31\34316\CADD\Drawings\DRGS COPIED FROM MANILA_FOR REV B ISSUE\31-34316-G001.dwg

EROSION AND SEDIMENT CONTROL NOTES

LIMITATIONS

THIS ESCP HAS BEEN PREPARED BY GHD FOR COLAC OTWAY SHIRE AND MAY ONLY BE USED AND RELIED ON BY COLAC OTWAY SHIRE FOR THE PURPOSE AGREED BETWEEN GHD AND THE COLAC OTWAY SHIRE. GHD OTHERWISE DISCLAIMS RESPONSIBILITY TO ANY PERSON OTHER THAN COLAC OTWAY SHIRE ARISING IN CONNECTION WITH THIS ESCP. GHD ALSO EXCLUDES IMPLIED WARRANTIES AND CONDITIONS, TO THE EXTENT LEGALLY PERMISSIBLE.

THE SERVICES UNDERTAKEN BY GHD IN CONNECTION WITH PREPARING THIS ESCP WERE LIMITED TO THOSE SPECIFICALLY DETAILED IN THE ESCP AND ARE SUBJECT TO THE SCOPE LIMITATIONS SET OUT IN THE GHD DOCUMENT "WYE RIVER AND SEPARATION CREEK EROSION AND SEDIMENT CONTROL PLAN 2016". THE OPINIONS, CONCLUSIONS AND ANY RECOMMENDATIONS IN THIS ESCP ARE BASED ON CONDITIONS ENCOUNTERED AND INFORMATION REVIEWED FOLLOWING THE DATE OF THE INSPECTIONS IN PREPARATION OF THE ESCP. GHD HAS NO RESPONSIBILITY OR OBLIGATION TO UPDATE THIS ESCP TO ACCOUNT FOR EVENTS OR CHANGES OCCURRING SUBSEQUENT TO THE DATE THE SITE INSPECTIONS EWERE CONDUCTED (REFER TO SITE INSPECTION BELOW). THE OPINIONS, CONCLUSIONS AND ANY RECOMMENDATIONS IN THIS ESCP ARE BASED ON QUALIFICATIONS DESCRIBED THROUGHOUT THIS ESCP. GHD DISCLAIMS LIABILITY ARISING FROM ANY OF THE ASSUMPTIONS BEING INCORRECT.

GHD HAS PREPARED THIS ESCP ON THE BASIS OF INFORMATION PROVIDED BY COLAC OTWAY SHIRE, WHICH GHD HAS NOT INDEPENDENTLY VERIFIED OR CHECKED BEYOND THE AGREED SCOPE OF WORK. GHD DOES NOT ACCEPT LIABILITY IN CONNECTION WITH SUCH UNVERIFIED INFORMATION, INCLUDING ERRORS AND OMISSIONS IN THE REPORT WHICH WERE CAUSED BY ERRORS OR OMISSIONS IN THAT INFORMATION.

GHD HAS NOT BEEN INVOLVED IN THE PREPARATION OF THE BID DOCUMENTS FOR THIS PROJECT AND HAS HAD NO CONTRIBUTION TO, OR REVIEW OF THE BID DOCUMENTS OTHER THAN IN THIS REPORT. GHD SHALL NOT BE LIABLE TO ANY PERSON FOR ANY ERROR IN, OMISSION FROM, OR FALSE OR MISLEADING STATEMENT IN, ANY OTHER PART OF THE BID DOCUMENTS.

GENERAL NOTES

1. READ THESE DRAWINGS IN CONJUNCTION WITH ENGINEERING DRAWINGS, SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED.
2. NOMINATION OF PROPRIETARY DEVICES DOES NOT INDICATE EXCLUSIVE REFERENCE BUT INDICATES THAT SIMILAR ALTERNATIVES HAVING THE REQUIRED PROPERTIES MAY BE OFFERED FOR APPROVAL BY A SUITABLY QUALIFIED PROFESSIONAL (PREFERABLY WITH CPESC ACCREDITATION).
3. REFER ANY DISCREPANCY TO THE DESIGNER BEFORE PROCEEDING WITH THE WORK.
4. DO NOT OBTAIN DIMENSIONS BY SCALING FROM THE DRAWINGS.
5. VERIFY SETTING OUT DIMENSIONS SHOWN ON THE DRAWINGS BEFORE CONSTRUCTION AND FABRICATION IS COMMENCED.
6. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE SAA CODES, SPECIFICATIONS AND BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITY.
7. THE CONTRACTOR SHALL MAINTAIN ACCURATE RECORDS OF LEVELS AND LOCATIONS OF SERVICES TO FULLY COMPLY WITH LOCAL AUTHORITY "AS CONSTRUCTED" INFORMATION REQUIREMENTS.
8. IT IS EXPECTED THAT PRIOR TO ANY ACTIVITY, A DETAILED WORK SPECIFIC ESCP WILL BE DEVELOPED BY THE CONTRACTOR AS PART OF THE CONSTRUCTION ENVIRONMENT MANAGEMENT PLAN (CEMP). THE CONTRACTOR WILL REVISE THIS ESCP TO PROVIDE GREATER DETAIL BASED ON CONSTRUCTION METHODOLOGY AND TIMING OF WORKS BY THE CONTRACTOR.
9. TYPICAL DETAILS OF EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN OBTAINED FROM THE IECA,2008.

GENERAL REINSTATEMENT

THE STABILISATION REQUIREMENTS FOR THE PROJECT ARE AS FOLLOWS:

1. DISTURBED SOIL SURFACES ARE TO BE STABILISED;
2. ALL TEMPORARY EARTH BANKS, FLOW DIVERSION SYSTEMS, AND EMBANKMENTS WHERE RUNOFF SHOULD FLOW UNCONTROLLED OFF SITE ARE TO BE STABILISED;
3. A SUCCESS CRITERION FOR GROUND COVER IS A MINIMUM OF 75% COVER;
4. FOOT AND VEHICULAR TRAFFIC SHOULD BE KEPT AWAY FROM ANY REHABILITATED AREAS.
5. LARGE, UNPROTECTED AREAS SHALL BE KEPT MOIST (NOT WET) TO CONTROL DUST.

SITE INSPECTIONS

EXTENT OF WORKS ESTIMATED BASED ON AERIAL PHOTOS FROM JANUARY 2016 AND SITE INSPECTIONS UNDERTAKEN ON THE 14, 21, AND 28 JULY 2016. DUE TO THE POTENTIAL CHANGE IN SITE CONDITIONS DUE TO ONGOING DEMOLITION AND REBUILDING WORKS, SPECIFIC SITE EXTENTS ARE TO BE CONFIRMED WITH THE SUPERINTENDENT.

MONITORING REQUIREMENTS

APPROPRIATE PROCEDURES AND QUALIFIED PERSONNEL SHOULD BE ENGAGED TO PLAN AND CONDUCT SITE INSPECTIONS AND WATER QUALITY MONITORING

1. ALL ESC MEASURES SHOULD BE INSPECTED IN ACCORDANCE WITH THE IECA 2008 GUIDELINES.
2. ALL SITE MONITORING DATA INCLUDING RAINFALL RECORDS, DATES OF WATER QUALITY TESTING, TESTING RESULTS AND RECORDS OF CONTROLLED WATER RELEASES FOR THE SITE, SHOULD BE DOCUMENTED ONSITE. THE DOCUMENTATION SHOULD BE MAINTAINED UP TO DATE FOR THE DURATION OF THE APPROVED WORKS AND BE AVAILABLE ON-SITE FOR INSPECTION BY THE ASSESSING AUTHORITY ON REQUEST.
3. ALL ENVIRONMENTAL INCIDENTS SHOULD BE DOCUMENTED, AND SHOULD REMAIN ACCESSIBLE TO THE RELEVANT REGULATORY AUTHORITIES ON REQUEST. WHEN AN ENVIRONMENTAL INCIDENT (I.E. BREACH OF LIMITS) OR EXCEEDANCE OF TRIGGER VALUE OCCURS, IT IS THE RESPONSIBILITY OF THE ENVIRONMENTAL MANAGER TO INVESTIGATE AND INITIATE REMEDIAL ACTIONS COMMENSURATE WITH THE SEVERITY OF THE INCIDENT.
4. A SYSTEM SHOULD BE IMPLEMENTED AND MAINTAINED THAT MONITORS AND RECORDS SITE COMPLIANCE AND NON-COMPLIANCE WITH THE ESCP REQUIREMENTS.

SEDIMENT SOURCE PREVENTION

MAINTENANCE REQUIREMENTS

ALL MATERIALS REMOVED FROM ESC DEVICES DURING MAINTENANCE, WHETHER SOLID OR LIQUID, SHOULD BE DISPOSED OF IN A MANNER THAT DOES NOT CAUSE ONGOING SOIL EROSION OR ENVIRONMENTAL HARM. SOLID MATERIALS REMOVED FROM ESC DEVICES ARE TO BE STOCKPILED ONSITE OR REMOVED AS DIRECTED BY THE SUPERINTENDENT.

WRITTEN RECORDS OF EROSION AND SEDIMENT CONTROL MONITORING AND MAINTENANCE ACTIVITIES CONDUCTED DURING THE CONSTRUCTION AND MAINTENANCE PERIODS SHOULD BE MAINTAINED ON SITE. ORIGINAL COPIES OF SUCH RECORDS SHALL BE PROVIDED ON REQUEST TO THE ASSESSING AUTHORITY OR SUPERINTENDENT.

MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES MUST OCCUR IN ACCORDANCE WITH IECA 2008 GUIDELINES.

HYDROMULCH

HYDROSEEDING FOLLOWED BY HYDROMULCHING IS TO BE APPLIED ON THE INDICATED EXPOSED AREAS TO PROVIDE EROSION CONTROL PROTECTION:

SEED SPECIES - A STERILE SEED COMBINED WITH NATIVE SEED MIX SHALL BE USED IN THE HYDROSEED APPLICATION. IF POSSIBLE THE CONTRACTOR SHALL SOURCE SEED FROM WITHIN 25 KM OF THE SITE AND FROM AREAS WITH SIMILAR SOIL TYPE (SAME PARENT MATERIAL).

HYDROMULCH - HYDROMULCHING IS TO BE APPLIED FOLLOWING HYDROSEEDING USING A STANDARD HYDROMULCH THAT CONSISTS OF VARIOUS TYPES OF ORGANIC FIBROUS MATERIAL (EG PAPER/WOOD PULP, WOOD FIBRE, STRAW FIBRE ETC) MIXED WITH WATER, TACKIFIER AND SOIL AMELIORANTS AND SPRAYED ON THE SOIL IN SLURRY FORM TO PROVIDE A PROTECTIVE LAYER.

INSTALLATION

1. ENSURE ALL NECESSARY SOIL TESTING (E.G. SOIL PH, NUTRIENT LEVELS) AND ANALYSIS HAS BEEN COMPLETED, AND REQUIRED SOIL ADJUSTMENTS PERFORMED PRIOR TO PLANTING.
2. APPLY SOIL CONDITIONERS AND FERTILISER AS SPECIFIED ON THE APPROVED PLANS. RIP THE SOIL 100 TO 150MM TO THE COMPONENTS INTO THE SOIL AND TO LOOSEN AND SOUGHEN THE SOIL SURPHACE BEFORE SEEDING.
3. WHERE POSSIBLE, THERE SHOULD BE SUFFICIENT SOIL DEPTH TO PROVIDE AN ADEQUATE ROOT ZONE. THE DEPTH TO ROCK OR IMPERMEABLE LAYERS SUCH AS HARDPANS SHOULD BE 300MM OR MORE, EXCEPT ON SLOPES STEEPER THAN 2:1(H:V) WHERE SUCH SOIL DEPTH MAY NOT BE FEASIBLE.
4. APPLY SEED UNIFORMLY WITH A HYDROMULCHER AS SPECIFIED.
5. APPLY SEED AT THE RECOMMENDED RATE, AND DISC OR OTHERWISE MECHANICALLY TREAT THE SURFACE TO BRING THE SEED INTO CONTACT WITH THE SOIL.

MAINTENANCE

1. DURING CONSTRUCTION, INSPECT THE TREATED AREA FORTNIGHTLY AND AFTER RUNOFF-PRODUCING RAINFALL. MAKE REPAIRS AS NEEDED.
2. WATERING SHOULD START IMMEDIATELY AFTER PLANTING. WATERING SHOULD COMPLY WITH THE RELEVANT SPECIFICATIONS. WATERING SHOULD VARY ACCORDING TO WEATHER AND SOIL CONDITIONS.
3. MONITOR SITE REVEGETATION PARTICULARLY AFTER RAINFALL, AND APPROPRIATE MAINTENANCE AND/OR AMENDMENT TO ENSURE THAT THE REVEGETATION IS CONTROLLING EROSION AND STABILISING SOILD SLOPES AS REQUIRED.
4. AREAS MUST BE RE-SEEDED AND MULCHED IF THE VEGETATION FAILS TO ESTABLISH OR IS DAMAGED BY RUNOFF OR CONSTRUCTION ACTIVITIES.
5. IF THE MULCH COVER SHOULD FAIL FOR ANY REASON BEFORE ESTABLISHMENT OF THE PERMANENT VEGETATION COVER, THEN IT MUST BE REPLACED WITH AN APPROPRIATE TYPE OF COVER SUFFICIENT TO CONTROL SOIL EROSION.
6. MAINTAIN GRASS BLADE LENGTH AT A MINIMUM 50MM HEIGHT WITHIN MEDIUM TO HIGH VELOCITY DRAINAGE SREAS, AND 20 TO 50MM WITHIN LOW VELOCITY FLOR PATHS.
7. WHERE MULCH IS USED TO CONTROL WEED GROTH, INSPECT AND WHERE NECESSARY, RENEW AT MAINTENANCE PERIODS NOT EXCEEDING 4 TO 6 MONTHS.
8. DISPOSE OF CLEARED VEGETATION IN AN APPROPRIATE MANNER SUCH AS CHIPPING OR MULCHING, ON-SITE BURIAL, OR OFF-SITE DISPOSAL. CLEARED VEGETATION SHOULD NOT BE DUMPED NEAR A WATERCOURSE WHERE IT COULD BE REMOVED BY FLOODWATERS.

GRAVEL REINSTATEMENT

GRAVEL REINSTATEMENT AT LOT AND ROAD ENTRY AND EXIT LOCATIONS SHOULD HAVE THE FOLLOWING DIMENSIONS

1. ROCK D50= 100 MM (MINIMUM) OVER GEOTEXTILE (*TERRATEX E1 PP* OR APPROVED EQUIVALENT)
2. THICKNESS OF ROCK PROTECTION LAYER = 200 MM (MINIMUM)

INSTALLATION

1. SPREAD ENOUGH GRAVEL TO COMPLETELY COVER THE SURFACE OF THE SOIL AT THE DENSITY OR THICKNESS SPECIFIED IN THE APPROVED PLAN. IF THE APPLICATION DENSITY IS NOT SUPPLIED, THEN APPLY AT A THICKNESS OF AT LEAST TWICE THE MEAN ROCK SIZE.
2. MAKE ALL NECESSARY ADJUSTMENTS TO ENSURE ANY RUN-ON STORMWATER FLOW IS ALLOWED TO PASS FREELY ACROSS THE TREATED AREA FOLLOWING ITS NATURAL DRAINAGE PATH.

MAINTENANCE

1. INSPECT ALL TREATED SURFACES FORTNIGHTLY AND AFTER RUNOFF-PRODUCING RAINFALL.
2. CHECK FOR RILL EROSION, OR DISLODGEMENT OF THE GRAVEL.
3. REPLACE ANY DISPLACED GRAVEL TO MAINTAIN THE REQUIRED COVERAGE.
4. IF WASH-OUTS OCCUR, REPAIR THE SLOPE AND REINSTALL SURFACE COVER.
5. IF THE GRAVEL IS NOT EFFECTIVE IN CONTAINING THE SOIL EROSION IT SHOULD BE REPLACED, OR AN ALTERNATIVE EROSION CONTROL PROCEDURE ADOPTED.

STEEP EMBANKMENT PROTECTION

FIBRE ROLLS (e.g. COIR LOGS) ARE TO BE PLACED ABOVE IDENTIFIED STEEP EMBANKMENTS, AND ARRANGED OVER THE INDICATED LENGTH SO THAT ANY OVERLAND RUNOFF IS REDIRECTED TO EXISTING FLOW PATHS (e.g. DRIVEWAYS) OR TO EXISTING TABLE DRAINS.

MATERIALS

- FIBRE ROLLS: TYPICALLY 200 TO 250mm JUTE, COIR, OR STRAW ROLL TIED WITH SYNTHETIC OR BIODEGRADABLE MESH.
- STAKES: TYPICALLY MINIMUM 25 x 25mm TIMBER STAKES.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND MANUFACTURERS INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
2. WHEN PLACED ACROSS NON-VEGETATED OR NEWLY-SEEDED SLOPES, THE ROLLS MUST BE PLACED ALONG THE CONTOUR.
3. IF PLACED ON OPEN OR LOOSE SOIL, ENSURE THE FIBRE ROLLS ARE TRENCHED 50 TO 75mm.
4. ENSURE THE OUTERMOST ENDS OF THE FIBRE ROLL ARE TURNED UP THE SLOPE TO ALLOW WATER TO ADEQUATELY POND UP-SLOPE OF THE ROLL, AND TO MINIMISE FLOW BYPASSING.
5. ENSURE THE ANCHORING STAKES ARE DRIVEN INTO THE END OF EACH ROLL AT A SPACING NOT EXCEEDING 1.2m OR SIX TIMES THE ROLL DIAMETER, WHICHEVER IS THE LESSER. A MAXIMUM STAKE SPACING OF 0.3m APPLIES WHEN USED TO FORM CHECK DAMS.
6. ADJOINING ROLL MUST BE OVERLAPPED AT LEAST 100mm, NOT ABUTTED.

MAINTENANCE

1. INSPECT ALL FIBRE ROLLS PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING STORMS OR OTHERWISE AT WEEKLY INTERVALS.
2. REPAIR OR REPLACE DAMAGED FIBRE ROLLS.
3. REMOVE COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL

1. ALL EXCESSIVE SEDIMENT TRAPPED BY THE ROLLS MUST BE REMOVED FROM THE DRAIN OR SLOPE IF SUCH SEDIMENT IS LIKELY TO BE WASHED AWAY BY EXPECTED FLOWS.
2. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.
3. THE BIODEGRADABLE CONTENT OF THE STRAW ROLLS MAY NOT NECESSARILY NEED TO BE REMOVED FROM THE SITE.

SEDIMENT DEBRIS MANAGEMENT

STOCKPILE MANAGEMENT

ALL STOCKPILES ARE TO:

1. BE SEPARATED INTO SOIL AND USE TYPES;
2. BE LOCATED FURTHER THAN 20 METRES FROM WATERWAYS;
3. BE LOCATED AT LEAST ONE METRE FROM SITE BOUNDARY FENCING;
4. NOT BE LOCATED AGAINST THE BASE OF SIGNIFICANT TREES;
5. BE WATERED AND / OR PROTECTED THROUGH EFFECTIVE EROSION CONTROL EMULSIONS (*VITAL BON-MATT STONEWALL* OR EQUIVALENT), AS REQUIRED, TO MINIMISE DUST EMISSIONS;
6. HAVE SEDIMENT FENCES AND COIR LOGS LOCATED DOWN SLOPE TO MINIMISE THE RISK OF SEDIMENT LADEN RUNOFF

SILT FENCE

MATERIALS

1. THE SILT FENCE RECOMMENDED FOR THIS PROJECT IS *TERRASTOP TS 1780* OR APPROVED EQUIVALENT.

INSTALLATION

1. SEDIMENT FENCE TO BE INSTALLED ALONG A LINE OF CONSTANT GROUND ELEVATION WHEREVER PRACTICAL.
2. BOTH END OF THE SEDIMENT FENCE TO EXTEND UP THE SLOPE AT LEAST 1M.
3. SUPPORT POST TO BE SPACED A MAXIMUM 2M UNLESS THE FENCE IS SUPPORTED BY A TOP WIRE OR WIRE MESH BACKING, IN WHICH CASE 3M MAXIMUM SPACING.
4. FENCE 'RETURNS' SHALL BE INSTALLED AT MAXIMUM 20M SPACING IF FENCE IS INSTALLED ALONG THE CONTOUR, OTHERWISE 5 TO 10M MAXIMUM SPACING.
5. MINIMUM 4 TIE WIRES PER STAR PICKET.
6. ENSURE THE EXTREME ENDS OF THE FENCE ARE TURNED UP THE SLOPE AT LEAST 1.5M, OR AS NECESSARY, TO MINIMISE WATER BYPASSING AROUND THE FENCE.
7. UNLESS DIRECTED BY THE SITE SUPERVISOR OR THE APPROVED PLANS, EXCAVATE A 200MM WIDE BY 200MM DEEP TRENCH ALONG THE PROPOSED FENCE LINE, PLACING THE EXCAVATED MATERIAL ON THE UP-SLOPE SIDE OF THE TRENCH.
8. ALONG THE LOWER SIDE OF THE TRENCH, APPROPRIATELY SECURE THE STAR PICKETS INTO THE GROUND SPACED NO GREATER THAN 3M IF SUPPORTED BY A TOP SUPPORT WIRE OR WEIR MESH BACKING, OTHERWISE NO REATER THAN 2M.
9. WHEREVER POSSIBLE, CONSTRUCT THE SEDIMENT FENCE FROM A CONTINUOUS ROLL OF FABRIC. TO JOIN FABRIC EITHER:
   (I) ATTACH EACH END TO TWO OVERLAPPING STAKES WITH THE FABRIC FOLDING AROUND THE ASSOCIATED TAKE ONE TURN, AND WITH THE TWO STAKES TIED TOGETHER WITH WIRE; OR
   (II) OVERLAP THE FABRIC TO THE NEXT ADJACENT SUPPORT POST.
10. ENSURE THE COMPLETED SEDIMENT FENCE IS AT LEAST 500MM, BUT NOT MORE THAN 700MM HIGH.
11. BACKFILL THE TRENCH AND TAMP THE FILL TO FIRMLY ANCHOR THE BOTTOM OF THE FABRIC AND MESH TO PREVENT WATER FROM FLOWING UNDER THE FENCE.

MAINTENANCE

1. INSPECT THE SEDIMENT FENCE AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY.
2. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 1/3 THE HEIGHT OF THE FENCE.
3. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.
4. REPLACE THE FABRIC IF THE SERVICE LIFE OF THE EXISTING FABRIC EXCEEDS 6-MONTHS.

REMOVAL

10. WHEN DISTURBED AREAS UP-SLOPE OF THE SEDIMENT FENCE ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE FENCE MUST BE REMOVED.
11. REMOVE MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.
12. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

SEDIMENT TRAP IN TABLE DRAIN - CHECK DAM

WIRE MESH FILLED WITH SMALL ROCKS ARE TO BE USED FOR CHECK DAMS (e.g. SACK GABIONS). IT IS NOTED THAT SEDIMENT LADEN WATER SHALL BE TRAPPED AT CHECK DAMS. CHECK DAMS HAVE BEEN SHOWN AT SEVERAL LOCATIONS IN THE ESC DRAWINGS AND HAVE BEEN CONSERVATIVELY DESIGNED.

MATERIALS

1. ROCK: 80 TO 150mm NOMINAL DIAMETER, HARD, EROSION RESISTANT ROCK. SMALLER ROCK MAY BE USED IF SUITABLE LARGE ROCK IS NOT AVAILABLE.
2. NETTING: THE WIRE MESH ARE TO BE 150mm DIAMETER AND MANUFACTURED TO SPECIFIED LENGTH.
3. THE MATERIALS (e.g. MESH, LACING WIRE, RING FASTENERS) TO BE SUPPLIED BY THE MANUFACTURER.

INSTALLATION

1. PRIOR TO PLACEMENT OF THE CHECK DAMS, ENSURE THE TYPE AND SIZE OF EACH CHECK DAMS WILL NOT CAUSE A SAFETY HAZARD OR CAUSE WATER TO SPILL OUT OF THE DRAIN.
2. LOCATE THE FIRST CHECK DAM AT THE DOWNSTREAM END OF THE SECTION OF CHANNEL BEING PROTECTED. LOCATE EACH SUCCESSIVE CHECK DAM SUCH THAT THE CREST OF THE IMMEDIATE DOWNSTREAM DAM IS LEVEL WITH THE TOE OF THE CHECK DAM BEING INSTALLED.
3. ENSURE THE CHANNEL SLOPE IS NO STEEPER THAN 10:1 (H:V). OTHERWISE CONSIDER THE USE OF A SUITABLE CHANNEL LINER INSTEAD OF THE CHECK DAMS.
4. EACH CHECK DAM SHALL BE EXTENDED UP THE CHANNEL BANK (WHERE PRACTICABLE) TO AN ELEVATION AT LEAST 150MM ABOVE THE CREST LEVEL OF THE DAM.
5. WHEN PLACED ALONG A TABLE DRAIN, DO NOT RECESS THE LOG MORE THAN 1/3 THE LOG DIAMETER INTO THE BANK.
6. SECURE THE ROLL BY DRIVING THE STAKES BETWEEN THE OUTER NETTING AND THE CORE MATERIAL EACH SIDE OF THE ROLLS AND SECURED INTO THE GROUND, NOT THROUGH THE CENTRE OF THE ROLL.
7. ENSURE THE SPACING OF STAKES (ONE ON EITHER SIDE) DOES NOT EXCEED AN INTERVAL OF 1M.
8. ONCE DRIVEN INTO THE GROUND, THE STAKES SHOULD IDEALLY SIT AT LEAST TWO-THIRDS BELOW THE GROUND AND ONE-THIRD ABOVE, AND IDEALLY SIT FLUSH WITH THE TOP OF THE ROLL.
9. FILL AND SHAPE BEHIND THE LOGS IF REQUIRED.

MAINTENANCE

1. INSPECT EACH CHECK DAM AND THE DRAINAGE CHANNEL AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.
2. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN ANY OF THE CHECK DAMS, THEN CHECK THE SPACING OF DAMS AND WHERE NECESSARY INSTALL INTERMEDIATE CHECK DAMS OR A SUITABLE CHANNEL LINER.
3. REMOVE ANY SEDIMENT ACCUMULATED BY THE CHECK DAMS, UNLESS IT IS INTENDED THAT THIS SEDIMENT WILL REMAIN WITHIN THE CHANNEL. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL

1. WHEN CONSTRUCTION WORK WITHIN THE DRAINAGE AREA ABOVE THE CHECK DAMS HAS BEEN COMPLETED, AND THE DISTURBED AREAS AND THE DRAINAGE CHANNEL ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, ALL TEMPORARY CHECK DAMS MUST BE REMOVED.
2. REMOVE THE CHECK DAMS AND ASSOCIATED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

PIT PROTECTION

WIRE MESH FILLED WITH SMALL ROCKS ARE TO BE USED FOR CHECK DAMS (e.g. SACK GABIONS).

INSTALLATION

1. ENSURE THAT THE INSTALLATION OF THE SEDIMENT TRAP WILL NOT CAUSE UNDESIRABLE SAFETY OR FLOODING ISSUES.
2. SECURE THE ROLL BY DRIVING THE STAKES BETWEEN THE OUTER NETTING AND THE CORE MATERIAL EACH SIDE OF THE ROLLS AND SECURED INTO THE GROUND, NOT THROUGH THE CENTRE OF THE ROLL.
3. ONCE DRIVEN INTO THE GROUND, THE STAKES SHOULD IDEALLY SIT AT LEAST TWO-THIRDS BELOW THE GROUND AND ONE-THIRD ABOVE, AND IDEALLY SIT FLUSH WITH THE TOP OF THE ROLL.

MAINTENANCE

1. INSPECT THE BARRIER AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT AND MAKE REPAIRS AS NEEDED TO THE SEDIMENT TRAP.
2. REMOVE COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLTUION HAZARD.

REMOVAL

1. WHEN THE UP-SLOPE DRAINAGE AREA HAS BEEN STABILISED, REMOVE ALL MATERIALS INCLUDING DEPOSITED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

DRAINAGE AND EROSION PROTECTION

EROSION PROTECTION

MATERIALS

1. GEOTEXTILE BLANKETS:
   (I) WOVEN POLYPROPYLENE FABRIC.
   (II) MINIMUM THICKNESS OF 1.5MM.
   (III) MINIMUM WIDTH OF 3.6M.
2. STAPLES:
   (I) MINIMUM 11 GAUGE STEEL WIRE.
   (II) U-SHAPED WITH 200MM LEG LENGTH AND 50MM CROWN.

INSTALLATION

1. PREPARE A SMOOTH SEEDBED OF APPROXIMATELY 75MM OF TOPSOIL.
2. APPLY SEED, SOIL AMELIORANTS AND WATER AS SPECIFIED, THEN RAKE TO REMOVE ANY REMAINING SURFACE IRREGULARITIES.
3. COMMENCE PLACEMENT OF THE BLANKETS AT THE TOP OF THE SLOPE. BURY THE UPPER EDGE OF THE BLANKET WITHIN A 300MM DEEP TRENCH AND STAPLE AT 150MM CENTRES.
4. DO NOT LAY BLANKETS DIAGONALLY ACROSS THE SLOPE.
5. OVERLAP END OF TOP BLANKET 300 MM AND STAPLE AT 150 MM CENTRES.
6. WHERE MORE THAN ONE BLANKET IS USED DOWN THE SLOPE, OVERLAP EACH BLANKET BY AT LEAST 300MM WITH THE UPPER BLANKET PLACED OVER THE LOWER BLANKET (SHINGLE STYLE).
7. STAPLE THE EXPOSED FABRIC SURFACE AT 1M CENTRES.
8. BLANKETS, ONCE FIXED, MAY BE ROLLED WITH A ROLLER WEIGHING 60 TO 90KG/M LENGTH, THEN WATERED.
9. THE INSTALLATION PROCEDURE MUST ENSURE THAT THE BLANKET ACHIEVES AND RETAINS INTIMATE CONTACT WITH THE SOIL.
10. DAMAGED FABRIC SHALL BE REPAIRED OR REPLACED.

MAINTENANCE

1. DURING THE ACTIVE CONSTRUCTION PERIOD, INSPECT THE TREATED AREA FORTNIGHTLY FOR AT LEAST THE FIRST 3 MONTHS AND AFTER RUNOFF-PRODUCING STORM EVENTS AND MAKE REPAIRS AS NEEDED.
2. IF DAMAGED, REPAIR OR REPLACE THE DAMAGED SECTION. IF WATER IS UNDERMINING THE FABRIC, REPAIR ANY HOLES OR JOINTS OR RE-BURY THE UPPER ENDS OF THE DAMAGED SECTIONS.

SLOPE DRAINS

SLOPE DRAINS ARE TO BE USED WHERE INDICATED ON THE DRAWINGS TO MANAGED RUNOFF TO EXISTING GULLY FLOW PATHS. TWO TYPES HAVE BEEN INDICATED IN THE DETAIL DRAWINGS:

(A) FLEXIBLE, SOLID WALL PIPE, OR
(B) HALF PIPE, WITH THE SELECTION TO BE CONFIRMED WITH THE ENGINEER OR RESPONSIBLE SITE OFFICER.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
2. PLACE PIPES ON UNDISTURBED SOIL OR WELL-COMPACTED FILL AT LOCATIONS SHOWN ON THE APPROVED PLAN.
3. EXTEND THE SLOPE DRAIN DOWN THE SLOPE ENSURING THAT IT IS PLACED PERPENDICULAR TO THE SLOPE CONTOURS.
4. ENSURE THAT ALL PIPE CONNECTIONS ARE WATERTIGHT.
5. ENSURE THAT ALL FILL MATERIAL IS WELL-COMPACTED.
6. SECURELY FASTEN THE PIPE DOWN THE SLOPE WITH ANCHORS SPACED NO MORE THAN 3m APART.
7. EXTEND THE PIPE BEYOND THE TOE OF THE SLOPE AND ADEQUATELY PROTECT THE OUTLET OF THE PIPE FROM EROSION. DO NOT DIRECT THE OUTLET TO A FILL SLOPE OR UNSTABLE GROUND.
8. SLOPE DRAINS ARE TO BE COMBINED WITH EROSION PROTECTION WHERE INDICATED ON THE DRAWINGS. AT A MINIMUM EROSION PROTECTION MATTING WILL BE USED BELOW THE OUTLET OF THE SLOPE DRAIN, AND WHERE DEEMED NECESSARY A ROCK OUTLET WILL BE USED FOR ENERGY DISSIPATION. WHERE INDICATED EROSION MATTING IS TO BE PLACED DIRECTLY UNDER THE PLACEMENT OF THE SLOPE DRAIN.
9. WHERE REQUIRED A STABILISED OUTLET STRUCTURE, SUCH AS A ROCK PAD (AS DETAILED ON THE PLANS), TO CONTROL SOIL SCOUR.
10. IMMEDIATELY STABILISE ALL DISTURBED AREAS FOLLOWING INSTALLATION OF THE SLOPE DRAIN.

MAINTENANCE

1. WHILE CONSTRUCTION WORKS CONTINUE ON THE SITE, INSPECT ALL SLOPE DRAINS PRIOR TO FORECAST RAINFALL, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING RAINFALL, AND ON A WEEKLY BASIS.
2. INSPECT FOR:
   (I) SOIL EROSION AT THE INLET AND OUTLET;
   (II) SEDIMENT OR DEBRIS BLOCKAGE OF THE INLET;
   (III) WATER DAMAGE CAUSED BY LEAKAGE FROM PIPE JOINTS;
   (IV) DAMAGE OR SLUMPING OF THE ASSOCIATED INLET CONTROL FLOW DIVERSION BANK;
   (V) LEAKAGE OF WATER THROUGH THE FLOW DIVERSION BANK ALONG THE OUTER SURFACE OF THE PIPE.
3. PROMPTLY MAKE ALL NECESSARY REPAIRS.

REMOVAL

1. SLOPE DRAINS SHOULD BE REMOVED ONLY WHEN AN ALTERNATIVE, STABLE, DRAINAGE PATH IS AVAILABLE.
2. REMOVE ALL MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AND EROSION OR POLLUTION HAZARD.
3. GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION.
4. STABILISE THE AREA AS SPECIFIED IN THE GENERAL REINSTATEMENT.

FINAL

No	Revision		Job Manager	Project Director	
B	FINAL REVISION	RGC	AGR*	RPM*	15.09.16
A	ISSUED FOR CLIENT REVIEW	RSD	AR*	RM*	09.08.16

Note: * indicates signatures on original issue of drawing or last revision of drawing

Colac Otway SHIRE
Naturally Progressive

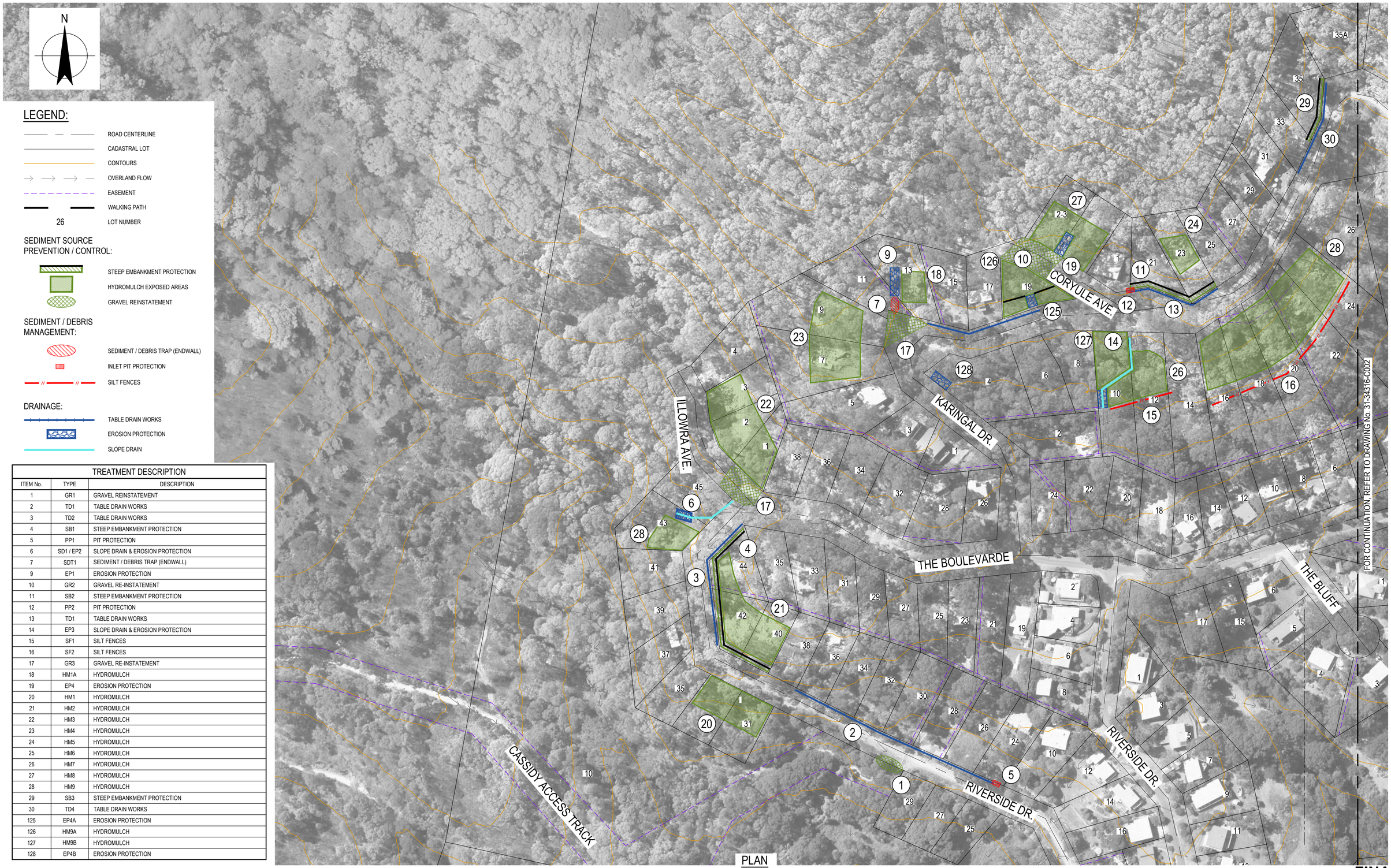
GHD
Level 8, 180 Lonsdale Street, Melbourne VIC 3000 Australia
T 61 3 8687 8000 F 61 3 8687 8111
E melmail@ghd.com.au W www.ghd.com

DO NOT SCALE

Drawn	R. DELA CRUZ	Designed	J. BERNARDI
Drafting Check	P.C. WONG*	Design Check	A.KAMAL*(CPESC)
Approved (Project Director)	R. MICKELSON*		
Date	15.09.16		
Scale	NTS	This Drawing must not be used for Construction unless signed as Approved	

Client **COLAC OTWAY SHIRE**
Project **WYE RIVER AND SEPARATION CREEK ESCP**
Title **GENERAL NOTES**

Original Size **A1** Drawing No: **31-34316-G002** Rev: **B**



TREATMENT DESCRIPTION		
ITEM No.	TYPE	DESCRIPTION
1	GR1	GRAVEL REINSTATEMENT
2	TD1	TABLE DRAIN WORKS
3	TD2	TABLE DRAIN WORKS
4	SB1	STEEP EMBANKMENT PROTECTION
5	PP1	PIT PROTECTION
6	SD1 / EP2	SLOPE DRAIN & EROSION PROTECTION
7	SDT1	SEDIMENT / DEBRIS TRAP (ENDWALL)
9	EP1	EROSION PROTECTION
10	GR2	GRAVEL RE-INSTATEMENT
11	SB2	STEEP EMBANKMENT PROTECTION
12	PP2	PIT PROTECTION
13	TD1	TABLE DRAIN WORKS
14	EP3	SLOPE DRAIN & EROSION PROTECTION
15	SF1	SILT FENCES
16	SF2	SILT FENCES
17	GR3	GRAVEL RE-INSTATEMENT
18	HM1A	HYDROMULCH
19	EP4	EROSION PROTECTION
20	HM1	HYDROMULCH
21	HM2	HYDROMULCH
22	HM3	HYDROMULCH
23	HM4	HYDROMULCH
24	HM5	HYDROMULCH
25	HM6	HYDROMULCH
26	HM7	HYDROMULCH
27	HM8	HYDROMULCH
28	HM9	HYDROMULCH
29	SB3	STEEP EMBANKMENT PROTECTION
30	TD4	TABLE DRAIN WORKS
125	EP4A	EROSION PROTECTION
126	HM9A	HYDROMULCH
127	HM9B	HYDROMULCH
128	EP4B	EROSION PROTECTION

PLAN
SCALE 1:1000

FINAL

No	Revision					
B	FINAL REVISION	RGC	AGR*	RPM*	15.09.16	
A	ISSUED FOR CLIENT REVIEW	RGC	AR*	RM*	09.08.16	
No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing		Job Manager	Project Director		

0 10 20 30 40 50m
SCALE 1:1000 AT ORIGINAL SIZE

Colac Otway SHIRE
Naturally Progressive

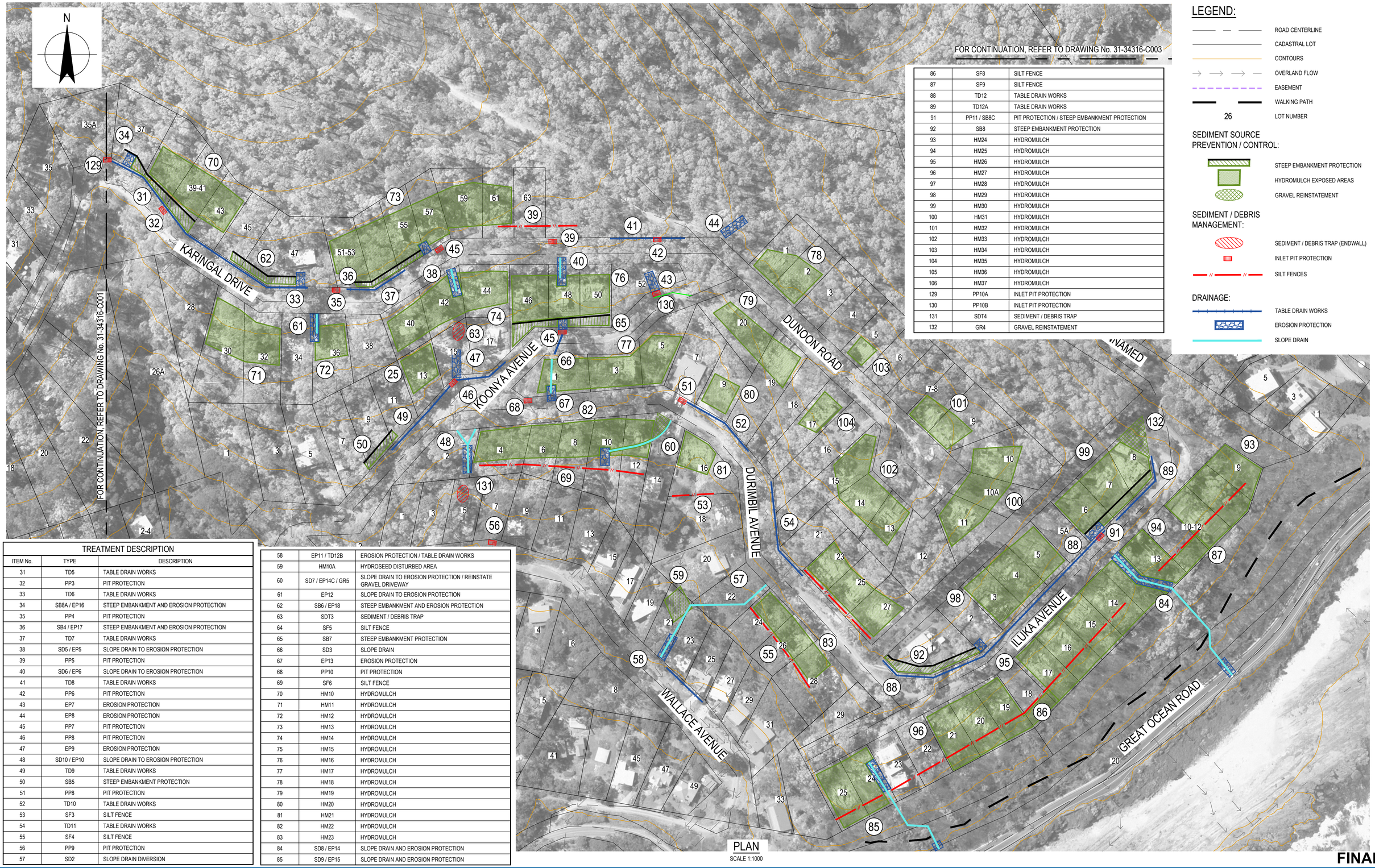
GHD
Level 8, 180 Lonsdale Street, Melbourne VIC 3000 Australia
T 61 3 8687 8000 F 61 3 8687 8111
E melmail@ghd.com.au W www.ghd.com

Drawn	R. CASACLANG	Designed	J. BERNARDI
Drafting Check	P.C. WONG*	Design Check	A.KAMAL*(CPESC)
Approved (Project Director)	R. MICKELSON*		
Date	15.09.16		
Scale	1:1000	This Drawing must not be used for Construction unless signed as Approved	

Client COLAC OTWAY SHIRE
Project WYE RIVER AND SEPARATION CREEK ESCP
Title WYE RIVER NORTH (WEST OF MAIN GULLY)

Original Size A1
Drawing No: 31-34316-C001
Rev: B

Plot Date: 15 September 2016 - 1:34 PM Plotted by: Pc Wong
Cad File No: G:\31\34316\CADD\Drawings\DRGS COPIED FROM MANILA_FOR REV B ISSUE\31-34316-C001.dwg



86	SF8	SILT FENCE
87	SF9	SILT FENCE
88	TD12	TABLE DRAIN WORKS
89	TD12A	TABLE DRAIN WORKS
91	PP11 / SB8C	PIT PROTECTION / STEEP EMBANKMENT PROTECTION
92	SB8	STEEP EMBANKMENT PROTECTION
93	HM24	HYDROMULCH
94	HM25	HYDROMULCH
95	HM26	HYDROMULCH
96	HM27	HYDROMULCH
97	HM28	HYDROMULCH
98	HM29	HYDROMULCH
99	HM30	HYDROMULCH
100	HM31	HYDROMULCH
101	HM32	HYDROMULCH
102	HM33	HYDROMULCH
103	HM34	HYDROMULCH
104	HM35	HYDROMULCH
105	HM36	HYDROMULCH
106	HM37	HYDROMULCH
129	PP10A	INLET PIT PROTECTION
130	PP10B	INLET PIT PROTECTION
131	SDT4	SEDIMENT / DEBRIS TRAP
132	GR4	GRAVEL REINSTATEMENT

LEGEND:

- ROAD CENTERLINE
- CADASTRAL LOT
- CONTOURS
- OVERLAND FLOW
- EASEMENT
- WALKING PATH
- 26 — LOT NUMBER

SEDIMENT SOURCE PREVENTION / CONTROL:

- STEEP EMBANKMENT PROTECTION
- HYDROMULCH EXPOSED AREAS
- GRAVEL REINSTATEMENT

SEDIMENT / DEBRIS MANAGEMENT:

- SEDIMENT / DEBRIS TRAP (ENDWALL)
- INLET PIT PROTECTION
- SILT FENCES

DRAINAGE:

- TABLE DRAIN WORKS
- EROSION PROTECTION
- SLOPE DRAIN

TREATMENT DESCRIPTION

ITEM No.	TYPE	DESCRIPTION
31	TD5	TABLE DRAIN WORKS
32	PP3	PIT PROTECTION
33	TD6	TABLE DRAIN WORKS
34	SB8A / EP16	STEEP EMBANKMENT AND EROSION PROTECTION
35	PP4	PIT PROTECTION
36	SB4 / EP17	STEEP EMBANKMENT AND EROSION PROTECTION
37	TD7	TABLE DRAIN WORKS
38	SD5 / EP5	SLOPE DRAIN TO EROSION PROTECTION
39	PP5	PIT PROTECTION
40	SD6 / EP6	SLOPE DRAIN TO EROSION PROTECTION
41	TD8	TABLE DRAIN WORKS
42	PP6	PIT PROTECTION
43	EP7	EROSION PROTECTION
44	EP8	EROSION PROTECTION
45	PP7	PIT PROTECTION
46	PP8	PIT PROTECTION
47	EP9	EROSION PROTECTION
48	SD10 / EP10	SLOPE DRAIN TO EROSION PROTECTION
49	TD9	TABLE DRAIN WORKS
50	SB5	STEEP EMBANKMENT PROTECTION
51	PP8	PIT PROTECTION
52	TD10	TABLE DRAIN WORKS
53	SF3	SILT FENCE
54	TD11	TABLE DRAIN WORKS
55	SF4	SILT FENCE
56	PP9	PIT PROTECTION
57	SD2	SLOPE DRAIN DIVERSION
58	EP11 / TD12B	EROSION PROTECTION / TABLE DRAIN WORKS
59	HM10A	HYDROSEED DISTURBED AREA
60	SD7 / EP14C / GR5	SLOPE DRAIN TO EROSION PROTECTION / REINSTATE GRAVEL DRIVEWAY
61	EP12	SLOPE DRAIN TO EROSION PROTECTION
62	SB6 / EP18	STEEP EMBANKMENT AND EROSION PROTECTION
63	SDT3	SEDIMENT / DEBRIS TRAP
64	SF5	SILT FENCE
65	SB7	STEEP EMBANKMENT PROTECTION
66	SD3	SLOPE DRAIN
67	EP13	EROSION PROTECTION
68	PP10	PIT PROTECTION
69	SF6	SILT FENCE
70	HM10	HYDROMULCH
71	HM11	HYDROMULCH
72	HM12	HYDROMULCH
73	HM13	HYDROMULCH
74	HM14	HYDROMULCH
75	HM15	HYDROMULCH
76	HM16	HYDROMULCH
77	HM17	HYDROMULCH
78	HM18	HYDROMULCH
79	HM19	HYDROMULCH
80	HM20	HYDROMULCH
81	HM21	HYDROMULCH
82	HM22	HYDROMULCH
83	HM23	HYDROMULCH
84	SD8 / EP14	SLOPE DRAIN AND EROSION PROTECTION
85	SD9 / EP15	SLOPE DRAIN AND EROSION PROTECTION

PLAN
SCALE 1:1000

FINAL

No	Revision	Job Manager	Project Director	
B	FINAL REVISION	AGR*	RPM*	15.09.16
A	ISSUED FOR CLIENT REVIEW	AR*	RM*	09.08.16

Note: * indicates signatures on original issue of drawing or last revision of drawing

0 10 20 30 40 50m
SCALE 1:1000 AT ORIGINAL SIZE

Colac Otway SHIRE
Naturally Progressive

GHD
Level 8, 180 Lonsdale Street, Melbourne VIC 3000 Australia
T 61 3 8687 8000 F 61 3 8687 8111
E melmail@ghd.com.au W www.ghd.com

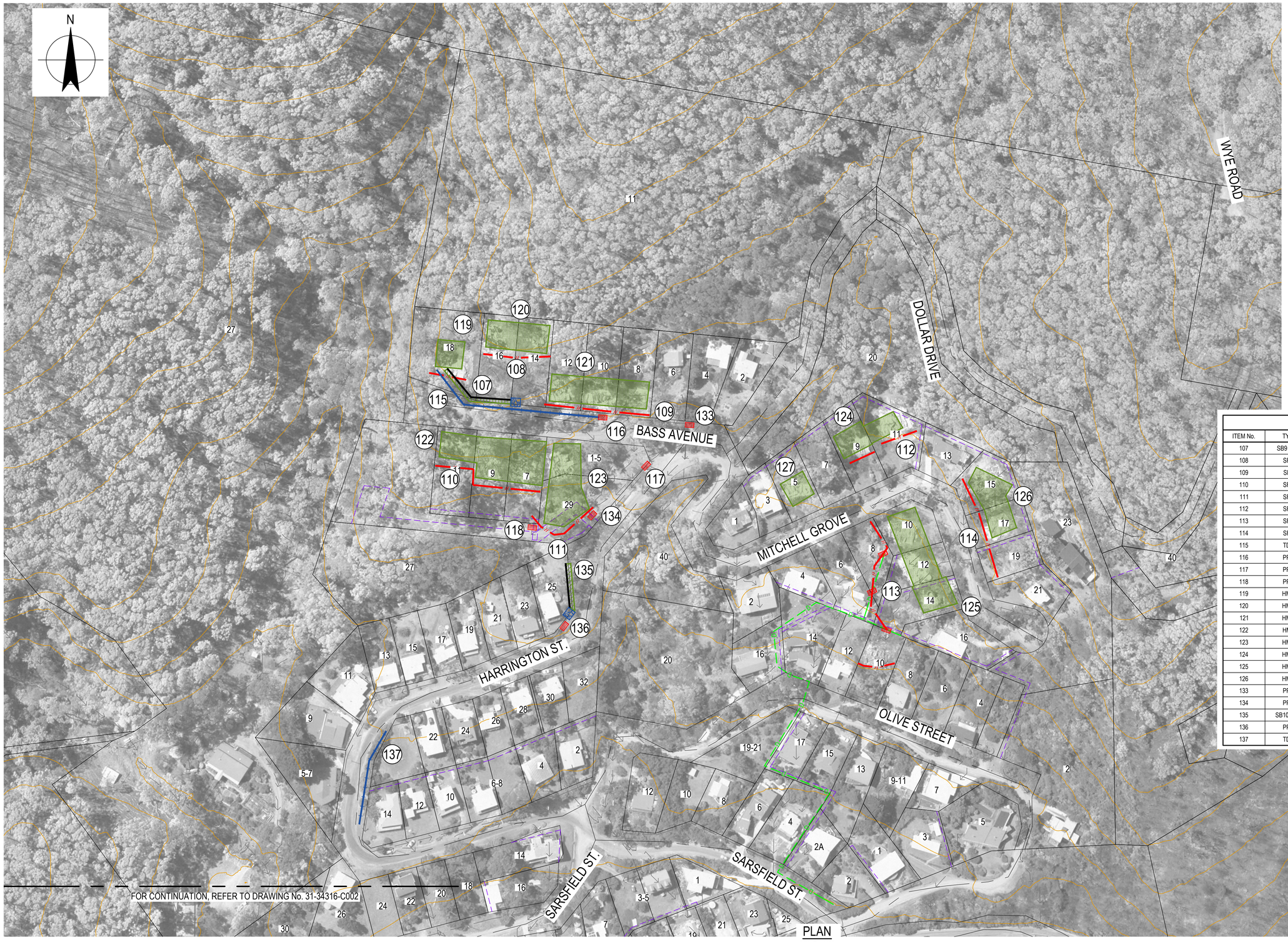
DO NOT SCALE

Drawn	R. CASACLANG	Designed	J. BERNARDI
Drafting Check	P.C. WONG*	Design Check	A.KAMAL*(CPESC)
Approved (Project Director)	R. MICKELSON*		
Date	15.09.16		
Scale	1:1000	This Drawing must not be used for Construction unless signed as Approved	

Client: COLAC OTWAY SHIRE
Project: WYE RIVER AND SEPARATION CREEK ESCP
Title: WYE RIVER NORTH (EAST OF MAIN GULLY)

Original Size: A1
Drawing No: 31-34316-C002
Rev: B

Plot Date: 15 September 2016 - 1:35 PM Plotted by: Pc Wong Cad File No: G:\31\34316\CADD\Drawings\DRGS COPIED FROM MANILA_FOR REV B ISSUE\31-34316-C002.dwg



PLAN
SCALE 1:1000

LEGEND:

- ROAD CENTERLINE
- CADASTRAL LOT
- CONTOURS
- OVERLAND FLOW
- EASEMENT
- WALKING PATH
- 26 LOT NUMBER

SEDIMENT SOURCE PREVENTION / CONTROL:

- STEEP EMBANKMENT PROTECTION
- HYDROMULCH EXPOSED AREAS
- GRAVEL REINSTATEMENT

SEDIMENT / DEBRIS MANAGEMENT:

- SEDIMENT / DEBRIS TRAP (ENDWALL)
- INLET PIT PROTECTION
- SILT FENCES

DRAINAGE:

- TABLE DRAIN WORKS
- EROSION PROTECTION
- SLOPE DRAIN

TREATMENT DESCRIPTION

ITEM No.	TYPE	DESCRIPTION
107	SB9 / EP8	STEEP EMBANKMENT PROTECTION & EROSION PROTECTION
108	SF10	SILT FENCE
109	SF11	SILT FENCE
110	SF12	SILT FENCE
111	SF13	SILT FENCE
112	SF14	SILT FENCE
113	SF15	SILT FENCE
114	SF16	SILT FENCE
115	TD14	TABLE DRAIN WORKS
116	PP12	PIT PROTECTION
117	PP13	PIT PROTECTION
118	PP14	PIT PROTECTION
119	HM38	HYDROMULCH
120	HM39	HYDROMULCH
121	HM40	HYDROMULCH
122	HM41	HYDROMULCH
123	HM42	HYDROMULCH
124	HM43	HYDROMULCH
125	HM44	HYDROMULCH
126	HM45	HYDROMULCH
133	PP15	INLET PIT PROTECTION
134	PP16	INLET PIT PROTECTION
135	SB10 / EP9	STEEP EMBANKMENT PROTECTION & EROSION PROTECTION
136	PP17	INLET PIT PROTECTION
137	TD15	TABLE DRAIN WORKS

FINAL

No	Revision				
B	FINAL REVISION	RGC	AGR*	RPM*	15.09.16
A	ISSUED FOR CLIENT REVIEW	RGC	AR*	RM*	09.08.16
	Note: * indicates signatures on original issue of drawing or last revision of drawing		Job Manager	Project Director	

0 10 20 30 40 50m
SCALE 1:1000 AT ORIGINAL SIZE

Colac Otway SHIRE
Naturally Progressive

GHD
Level 8, 180 Lonsdale Street, Melbourne VIC 3000 Australia
T 61 3 8687 8000 **F** 61 3 8687 8111
E melmail@ghd.com.au **W** www.ghd.com

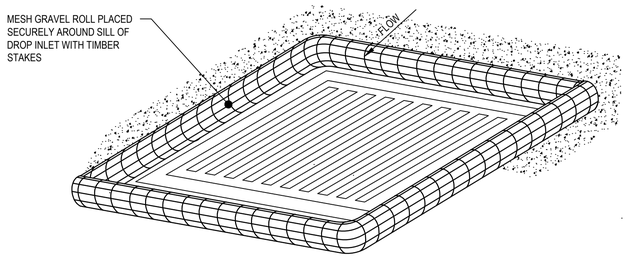
DO NOT SCALE

Drawn	R. CASACLANG	Designed	J. BERNARDI
Drafting Check	P.C. WONG*	Design Check	A.KAMAL*(CPESC)
Approved (Project Director)	R. MICKELSON*		
Date	15.09.16		
Scale	1:1000	This Drawing must not be used for Construction unless signed as Approved	

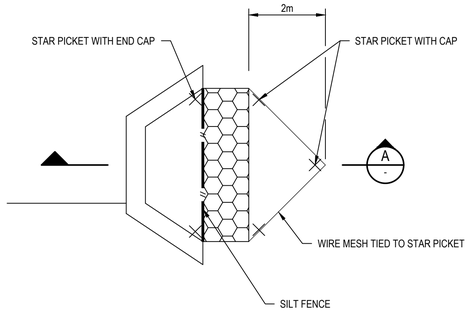
Client: COLAC OTWAY SHIRE
Project: WYE RIVER AND SEPARATION CREEK ESCP
Title: SEPARATION CREEK

Original Size: A1
Drawing No: 31-34316-C003
Rev: B

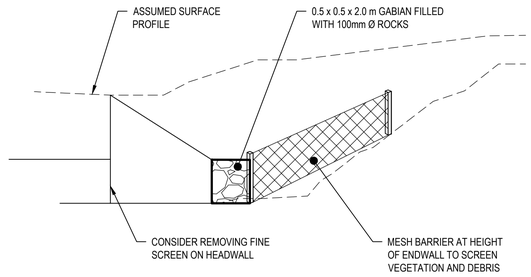
Plot Date: 15 September 2016 - 1:35 PM Plotted by: Pc Wong
Cad File No: G:\31\34316\CADD\Drawings\DRGS COPIED FROM MANILA_FOR REV B ISSUE\31-34316-C003.dwg



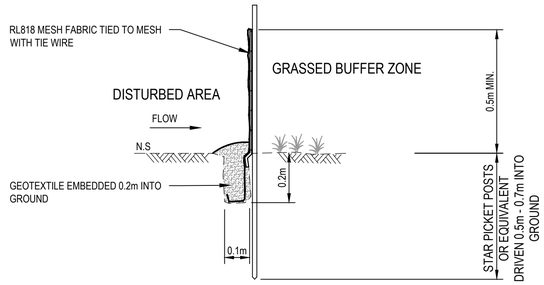
SEDIMENT BARRIER DETAIL
NOT TO SCALE



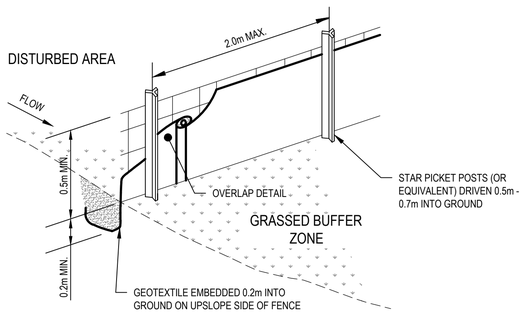
SEDIMENT / DEBRIS TRAP - PLAN
NOT TO SCALE



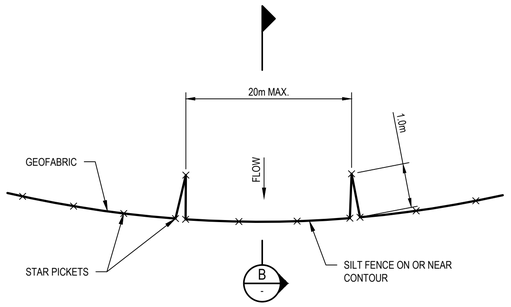
SEDIMENT / DEBRIS TRAP
B - SECTION
NOT TO SCALE



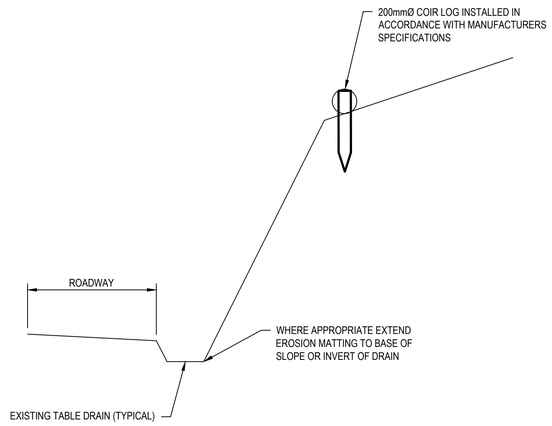
GEOFABRIC SILT FENCE
B - SECTION
NOT TO SCALE



GEOFABRIC SILT FENCE - PERSPECTIVE
NOT TO SCALE



GEOFABRIC SILT FENCE - PLAN
NOT TO SCALE



STEEP EMBANKMENT PROTECTION (COIR LOGS)
NOT TO SCALE

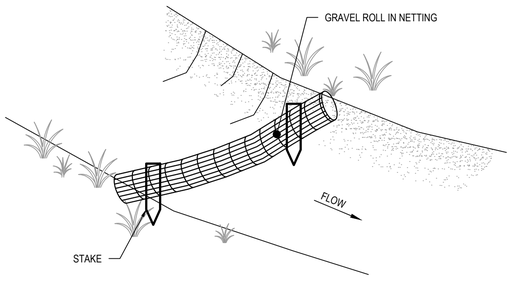


TABLE DRAIN - CHECK DAM (PERSPECTIVE)
NOT TO SCALE

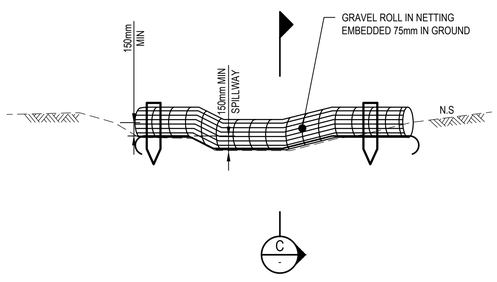


TABLE DRAIN - CHECK DAM (ELEVATION)
NOT TO SCALE

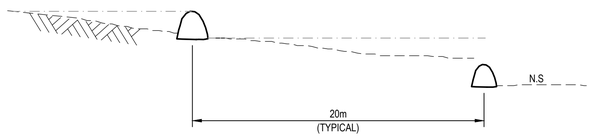


TABLE DRAIN - CHECK DAM
C - SECTION
NOT TO SCALE

NOTE: SPACING OF CHECK DAMS TO BE TYPICALLY 20m APART (UNLESS OTHERWISE INDICATED).

FINAL

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing		Job Manager	Project Director	
B	FINAL REVISION		RGC	AGR*	RPM*	15.09.16
A	ISSUED FOR CLIENT REVIEW		RSD	AR*	RM*	09.08.16

Colac Otway SHIRE
Naturally Progressive

GHD
Level 8, 180 Lonsdale Street, Melbourne VIC 3000 Australia
T 61 3 8687 8000 F 61 3 8687 8111
E melmail@ghd.com.au W www.ghd.com

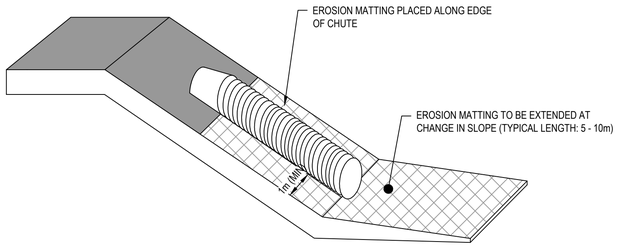
DO NOT SCALE

Drawn	R. DELA CRUZ	Designed	J. BERNARDI
Drafting Check	P.C. WONG*	Design Check	A.KAMAL*(CPESC)
Approved (Project Director)	R. MICKELSON*		
Date	15.09.16		
Scale	NTS	This Drawing must not be used for Construction unless signed as Approved	

Client: COLAC OTWAY SHIRE
Project: WYE RIVER AND SEPARATION CREEK ESCP
Title: ESCP DETAILS, SHEET 1 OF 2

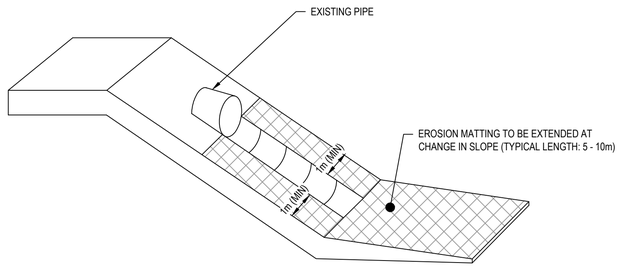
Original Size: A1
Drawing No: 31-34316-C004
Rev: B

Plot Date: 15 September 2016 - 1:46 PM Plotted by: Pc Wong
Cad File No: G:\31\34316\CADD\Drawings\DRGS COPIED FROM MANILA_FOR REV B ISSUE\31-34316-C004.dwg



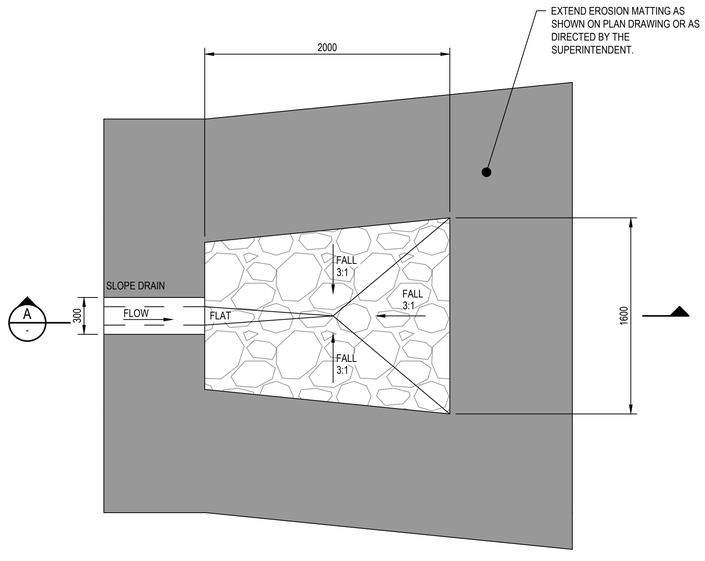
TEMPORARY SLOPE DRAIN WITH ROCK PAD OUTLET STRUCTURE

NOT TO SCALE



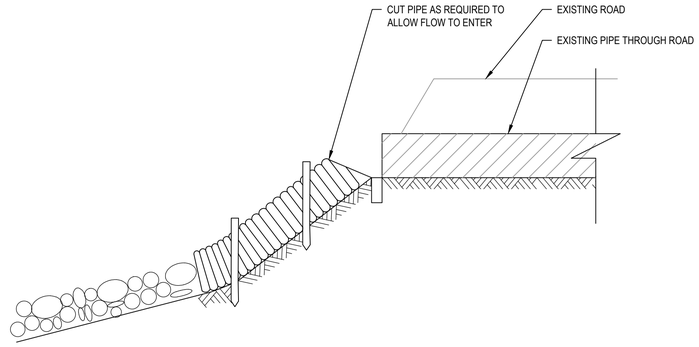
TEMPORARY SLOPE DRAIN (TYPE 2)

NOT TO SCALE



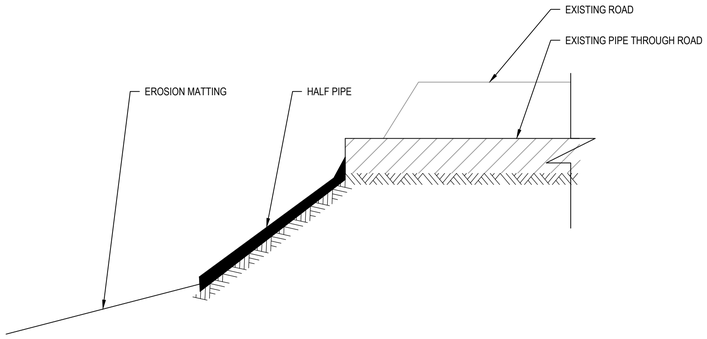
ALTERNATIVE OUTLET ENERGY DISSIPATOR FOR A SLOPE DRAIN (IF REQUIRED)

SCALE 1:25mm



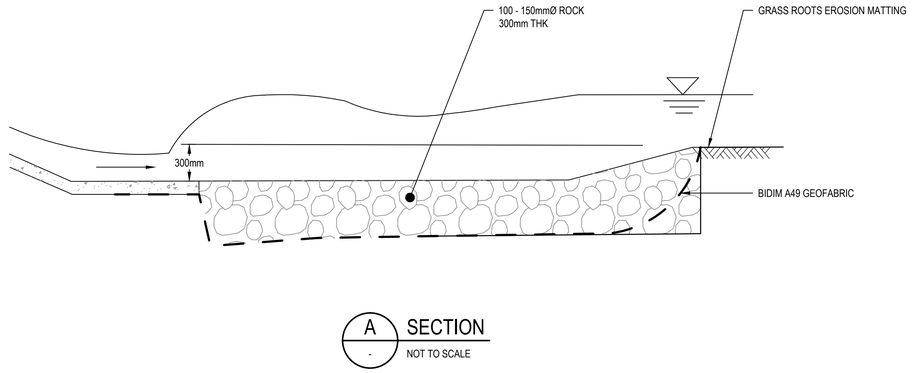
SLOPE DRAIN (TYPE 1) - FLEXIBLE, SOLID-WALL

NOT TO SCALE



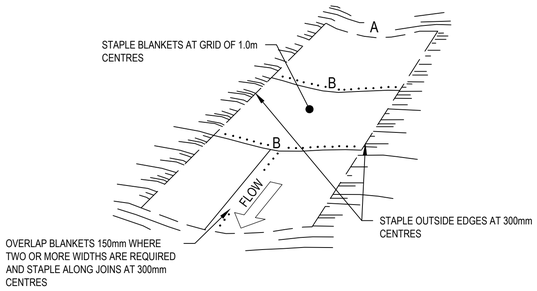
SLOPE DRAIN (TYPE 2) - HALF PIPE

NOT TO SCALE



A - SECTION

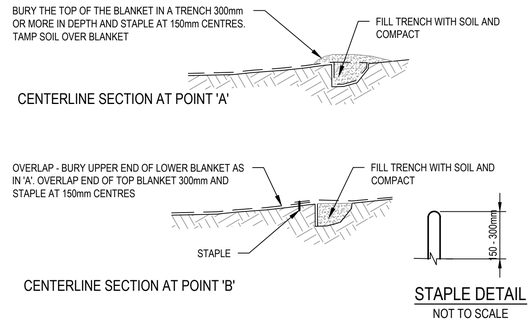
NOT TO SCALE



EROSION PROTECTION - PERSPECTIVE

NOT TO SCALE

NOTE: AFTER SEEDING AND LAYING EROSION CONTROL BLANKET, APPLY A SOIL BINDER IN AREAS OF HIGH EROSION HAZARD



STAPLE DETAIL

NOT TO SCALE

EROSION PROTECTION - SECTIONS

NOT TO SCALE

NOTE:

1. DRAWINGS APPLICABLE TO TEMPORARY DRAINAGE CHUTES NOT PERMANENT DRAINAGE SOLUTION.

FINAL

No	Revision	Drawn	Job Manager	Project Director	Date
B	FINAL REVISION	RGC	AGR*	RPM*	15.09.16
A	ISSUED FOR CLIENT REVIEW	RSD	AR*	RM*	09.08.16

Note: * indicates signatures on original issue of drawing or last revision of drawing

Colac Otway SHIRE
Naturally Progressive

Level 8, 180 Lonsdale Street, Melbourne VIC 3000 Australia
T 61 3 8687 8000 F 61 3 8687 8111
E melmail@ghd.com.au W www.ghd.com

DO NOT SCALE

Drawn	R. DELA CRUZ	Designed	J. BERNARDI
Drafting Check	P.C. WONG*	Design Check	A.KAMAL*(CPESC)
Approved (Project Director)	R. MICKELSON*		
Date	15.09.16		
Scale	NTS		

This Drawing must not be used for Construction unless signed as Approved

Client: COLAC OTWAY SHIRE
Project: WYE RIVER AND SEPARATION CREEK ESCP
Title: ESCP DETAILS - SHEET 2 OF 2

Original Size: A1
Drawing No: 31-34316-C005
Rev: B

Plot Date: 15 September 2016 - 1:36 PM Plotted by: Pc Wong
Cad File No: G:\31\34316\CADD\Drawings\DRGS COPIED FROM MANILA_FOR REV B ISSUE\31-34316-C005.dwg

Appendix F

Wye River and Separation Creek Bushfire Vegetation Restoration (Short-term) Plan

This page has been left intentionally blank

Wye River & Separation Creek Bushfire Vegetation Restoration (Short-term)

Scope of Works

Version 1.1

10 October 2016

Authors:	Mike Nurse & Libby Riches Executive Officer, Southern Otway Landcare Network P: (03) 5237 6904 E: libby.landcare@soln.org Kelly Boladeras Environment Officer, Colac Otway Shire Council P: (03) 5232 9512 E: kelly.boladeras@colacotway.vic.gov.au

Revision history

Revision date	Version No.	Author	Description of changes
10/10/2016	1.1	L Riches & K Boladeras	General review and update of all sections.

Contents

1 Project Background

This plan informs an eight-month strategy for weed control and vegetation restoration in the Wye River and Separation Creek area (Wye/Sep) following the Christmas Day fires in 2015-2016. The overarching goal of the project is to enhance and protect the area's natural values and provide community resilience for future wildfire events. This project is considered to be 'tenure-blind', and is supported by the following organisations:

- Southern Otway Landcare Network (SOLN)
- Colac Otway Shire Council (COS)
- Corangamite Catchment Management Authority (CCMA)
- Parks Victoria
- Department of Environment, Land, Water and Planning (DELWP)
- Otway Coast Committee (OCC)
- VicRoads
- Community representatives

2 Objectives

The key objectives of the short-term plan are to deliver both environmental and social outcomes as follows:

- Control priority weeds in identified community asset areas.
- Identify, locate and where possible treat priority weeds, as well as new and emergent high-threat weeds within the Wye/Sep residential areas (including the Donleavy Estate).
- Develop a plan to manage these weeds in the long-term in the broader township areas, including restoration of habitats through weed management and revegetation.
- Rebuild confidence within the Wye/Sep community.

3 Project Scope

3.1 Items Included

The scope of this project includes:

- Short-term weed control targeting identified priority species and areas over an eight-month period.
- Revegetation with indigenous species.
- Monitoring the success of weed control and revegetation.
- Development of the *Landscaping Your Coastal Garden for Bushfire* booklet to inform the COS coastal communities of suitable species and landscaping designs.
- Planning for Long-term works scope.

3.2 Project Manager

The Southern Otway Landcare Network, represented by Libby Riches, manages the budget and coordinates on-ground works for this short-term project.

3.3 Steering Committee

To support this Scope of Works and to represent the key agencies involved, a Steering Committee has been appointed with the following members:

- Libby Riches (SOLN)
- Stewart Anderson (COS)

- Kelly Boladeras (COS)
- Nick McCristal (CCMA)
- Peter Hay (Parks Victoria)
- Simon White (DELWP)
- Anthony Alfirenko (OCC)
- Jess Aldridge (VicRoads)
- Rex Brown (Wye Weed Warriors)
- Yvonne Sheppard (Flora, Fauna and Beachscape sub-committee)
- Joanne Tyler (Flora, Fauna and Beachscape sub-committee)

To date, committee meetings have been held on the following dates:

1. Monday 2 May 2016
2. Wednesday 15 June 2016
3. Monday 15 August 2016
4. Monday 19 September 2016
5. Monday 17 October 2016

Following the October meeting, the committee plan to convene at least every two to three months as necessary.

3.4 Reporting Requirements

A reporting template has been provided (Appendix B), which is to be completed by SOLN and distributed to Steering Committee members according to the following deadlines:

- Report 1 – 31 July 2016
- Report 2 – 31 October 2016
- Report 3 – 31 January 2017 (FINAL)

4 Project Parameters

4.1 Target Weed Species

The following species list has been informed by feedback from the Colac Otway Shire Weeds Consultative Committee as well as from the community via DELWP's One Stop Shop sessions in Wye River during March and April 2016.

Scientific Name	Common Name
Asparagus scandens	Asparagus Fern
Passiflora tarminiana	Banana Passionfruit
Pittosporum undulaum	Sweet Pittosporum
Cytisus scoparius	English/Scotch Broom
Genista linifolia	Flax-leaf Broom
Genista monspessulana	Montpellier/Cape Broom
Chrysabthemoides monilifera	Boneseed
Vinca major	Blue Periwinkle
Asparagus asparagoides	Bridal Creeper
Billardiera fusiformis	Bluebell Creeper
Ulex europaeus	Gorse

Delairea odorata	Cape Ivy
Hedera helix	English Ivy
Rubus fruticosus	Blackberry
Tradescantia fluminensis	Wandering Trad

4.2 Priority Treatment Locations

The immediate scope of works (Appendix C) identifies treatment of priority weeds in identified locations, as well as providing scope to survey and treat priority, new, and emergent weeds in community asset and township areas. The initial focus of the immediate works will be three identified assets: Paddys Path, Wye River drainage reserve, and Separation Creek drainage reserve. The short-term scope of works seeks to extend the immediate program temporally and physically, by treating those new infestations discovered during the initial works.

4.3 Monitoring

SOLN has an existing Community Based Monitoring Program, which is designed to collect data over the long term and involve our communities in ongoing learning and management to improve biodiversity outcomes on private land. The monitoring protocol includes components to monitor both vegetation quality and fauna (species richness and frequency) and currently takes place over four EVCs. We chose two sites in each EVC: one Landcare planting and one area of high quality reference forest that acts as a benchmark against which to assess the quality of the Landcare planting. Vegetation is assessed every five years using Habitat Hectares and fauna (ground dwelling birds, small and large mammals) through camera trapping, annually in spring. We hope that through this process we will not only continuously improve Landcare revegetation and management practices; we will also draw on, share and build the knowledge of local community.

SOLN will establish an additional monitoring site at Paddy's Path (EVC Coastal Headland Scrub) and utilise data from a Landcare reference site in the same EVC to restore Paddy's Path to its optimal vegetation and habitat quality.

4.4 Revegetation

SOLN will source 300 true to EVC tube-stock seedlings for Paddy's Path, which will be planted on Queen's Birthday weekend as a community engagement and education activity.

In the longer term, seedlings will be required each winter as part of an ongoing weed management regime and as part of the management of habitat restoration.

4.5 Booklet: *Landscaping Your Coastal Garden for Bushfire*

This Colac Otway Shire publication (modelled on Surf Coast Shire's booklet *Landscaping Your Surf Coast Garden for Bushfire*) will include recommended indigenous species for planting, garden design principles to reduce bushfire risk, and example garden styles for high fire risk areas. The booklet will be made available to the wider COS coastal community, along with Council's Significant Weeds Coast brochure.

4.6 Community Engagement

A great deal of work has been done over the last few months to connect with and seek feedback from the Wye/Sep community regarding target weed species and priority locations. This work has

included Community Meetings, One Stop Shops, and online surveys facilitated by DELWP, as well as direct communication between Council and volunteer weed control groups in Wye River and Separation Creek.

The Community Resilience Committee (CRC) is recognised as a key group representing the Wye/Sep community. As such, SOLN will work with the CRC throughout this project to maximise community engagement opportunities. SOLN will also continue to work closely with the Wye Weeds Warriors via Rex Brown, and other community members who have an interest in weed management. SOLN will continue to liaise with DELWP and Council staff with responsibilities for community engagement.

4.7 Long-term Plan

It is acknowledged that this short-term scope of works is the first stage of a larger project, and that further resources will be required to develop and implement a longer-term project plan. It is expected that these initial on-ground works will provide essential data to inform a long-term plan. Funding for a long-term project will be sought before the end of the current short-term works plan, ideally enabling valuable on-ground works to continue uninterrupted. A portion of budget from the Short-term work scope will assist in planning for long-term delivery.

5 Schedule

The project schedule, together with a breakdown of the stages for this project, is shown in Appendix A.

The schedule should be regarded as indicative for the later stages as these are, as with any project, likely to vary with progressive experience gained in undertaking the project work.

Key points from this Project Schedule are:

Start date of the project:	18 April 2016
End date of the project:	31 December 2016
Total resource effort:	Eight months

6 Budget

6.1 Funding Contributions

A summary of contributions to this Scope of Works is provided in the table below. Additional funding opportunities will continue to be identified throughout this project.

Agency/Group	**Cash amount** (ex GST)	**In-kind**	**Timing**
COS	$5,000	-	April 2016
COS	$5,000	-	July 2016
COS	$3000		September 2016
COS	-	$2,000[1]	N/A

COS	-	$3,700[2]	
DELWP	$4,545	-	April 2016
DELWP	$30,000	-	August 2016
Parks Victoria	$10,000	-	May 2016
CCMA	$10,000	-	September 2016
Wye Weed Warriors	$3,552.59	-	April 2016
VicRoads	-	-	-
OCC	-	TBC	TBC
SOLN	-	$5,000[3]	N/A
TOTALS	**$71,097.59**	**$10,700.00**	

[1] Project support – Kelly Boladeras (COS).
[2] Weed control (37 hours) reallocated from COS weeds packages.
[3] Project management – Mike Nurse (SOLN).

6.2 Financial Summary

A summary of project costs is provided in the table below.

	Description	Estimated Costs
ITEM		
Project management	8 months (grant rate: $45 per hour)	$5,000
Venue Hire and catering	Wye River Surf Club and catering	$1000
Weed Control	Over an 8-month period	$32,687.59
Revegetation	300 plants and tree guards	$900
	1000 recalcitrant seedlings (for 2017 planting)	$1,800
	1000 orthodox seedlings (for 2017 planting)	$1,300
	Tree guards (for 2017 planting)	$2,300
	Contractor planting and guarding	-
Monitoring	5 days staff time (grant rate: $45 per hour)	$1,800
	4 wildlife camera traps	$800
	Safety boxes ($40 each), padlock cables ($40 each) and rechargeable batteries ($15 each)	$800
Booklet: *Landscaping Your*	Design	$560

	Description	Estimated Costs
Coastal Garden for Bushfire	Photos Print-run 500 copies	$700 $2,450
Bird Box materials and installation	Materials for Men's Sheds Arborist Installation Artificial Hollows	$10,000
Project Planning: Long term works	Assistance with developing the Long term works project	$10,000 (quarantined from budget / upper limiting fee)
TOTAL		**$71,097.59**

Notes:

1. Financial summary total reflects funds received or confirmed to date.
2. Financial summary weed control amount does not include reallocation of 37 hours from COS's weed control program.

Appendix A – Project Schedule

	2016									
Project Scope Items	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Weed Control		Banana Passion Fruit (BPF) at Locations 6, 7,	BPF at Locations 2, 8, 9	Retreat BPF	Find and treat new infestation	Find and treat new infestation	Find and treat new infestation	Find and treat new infestation	Find and treat new infestation	Find and treat new infestation
			Survey and treat at Locations 1, 2, 3, 4, 5, 6, 7, 8, 9 for priority weeds and all areas for Emergents							
			Asparagus Fern (AF) at 1, 2, 3, 4, 5	Re-treat AF	Find and treat new infes-tation	Find and treat new infes-tation	Find and treat new infes-tation	Find and treat new infes-tation	Find and treat new infes-tation	Find and treat new infestation
			Sweet Pittosporum (SP) in Asset Areas	Re-treat SP	Find and treat new infestation	Find and treat new infestation	Find and treat new infestation	Find and treat new infestation	Find and treat new infestation	Find and treat new infestation
		Cape Ivy and deadly nightshade in the Boulevard								
Revegetation				300 seedlings and guards at Paddy's Path						
					Winter germinant seedling order (1000)				orthodox seedling order (1000)	
Monitoring									(Paddy's Path)Establish baseline veg assessment	
									Place cameras	Collect cameras and analyse data
Booklet: Landscaping for Bushfire		Engage designer								
		Make necessary changes								
		Review first proof & make changes								
		Review second proof, send to Steering Committee for comment								
			Make any changes							
			Review and approve final proof							
			Publish & distribute							

Appendix B – Reporting Template

Project Manager: Southern Otway Landcare Network ***Project: Wye River & Separation Creek Bushfire Vegetation Restoration (Short-term)*** ***Due Date:***

Project Report for <dates>

Management Activities

Zone	Season	Activity	Species	Completed (YES/NO)	Description of work undertaken, Comments, Issues or Observations

Attach photos and evidence to this report.

I hereby declare that the supplied information is accurate and complies with reporting requirements as agreed by the Wye/Sep Weeds Steering Committee for Short-term Works.

Signed: **Date:**

Send completed report to Wye/Sep Weeds Steering Committee members (representatives from CCMA, COS, PV, DELWP, OCC, VicRoads, Wye Weed Warriors).

Appendix G

Draft Traffic Management Plan

GTAconsultants

Wye River & Separation Creek Traffic Management Plan

draft

Client // Colac Otway Shire Council
Office // VIC
Reference // V112000
Date // 01/03/17

Wye River & Separation Creek

Traffic Management Plan

Issue: A-Dr3 01/03/17

Client: Colac Otway Shire Council
Reference: V112000
GTA Consultants Office: VIC

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A-Dr3	28/02/17	Draft	Justin Gale	Simon Davies		

GTAconsultants
Melbourne | Sydney | Brisbane
Canberra | Adelaide | Perth
Gold Coast | Townsville

DRAFT

Table of Contents

1. Introduction

1.1 Background

Colac Otway Shire (COS) has sought the services of Coffey to prepare a Construction and Environment Management Plan for the bushfire affected township zones of Wye River and Separation Creek in southern Victoria. GTA Consultants (GTA) is providing Coffey with specialist traffic and transport assistance and specifically in the preparation of a traffic management plan for the study area.

As GTA understand, significant clean-up is being undertaken in Wye River and Separation Creek following the December 2015 bushfire which destroyed 109 homes. As this clean-up nears completion, residents are beginning the process of rebuilding their homes. The cumulative impact of the heavy vehicle movements associated with the clean-up and residential construction traffic in addition to the typical day-to-day traffic activity from residents/visitors requires a traffic management strategy to ensure safety and efficiency of the abutting road network. As such, a traffic management plan has been proposed for the short term (i.e. the next 6 to 12 months).

This report includes traffic management options for consideration and ultimately implementation in the next 6 to 12 months. It should be noted that at this time, the traffic management options are indeed 'options'. It is expected that these options would be refined through community and stakeholder engagement and formally reviewed in an independent road safety audit prior to approval and implementation.

1.2 Site Inspection

GTA Consultants undertook an inspection of the site and the surrounds on Tuesday 8 November 2016. The site inspection was undertaken by:

Justin Gale	BEng (Civil & Infrastructure)(Hons)	Consultant
Goran Mihic	BTech (Engineering in Technology)	Senior Consultant and VicRoads Accredited Road Safety Auditor

The site inspection comprised of the following process:

- Review of relevant background documentation, including those listed in Section 1.4
- A briefing meeting with Colac Otway Shire on Tuesday 8 November 2016, prior to observing to the site
- an inspection of the two townships during the afternoon, where conditions were sunny and mild.

The inspection which forms the basis of this report was carried out for the purposes of assessing the site and its surrounds as it relates specifically to traffic management. Further assessment as it relates to road safety will be addressed in a road safety review of the proposed traffic management plan to be prepared independently of this report.

GTA is not qualified to provide advice as it relates to geotechnical and/or environmental considerations including but not limited to slope stability, road pavement strength and drainage. As such, whilst these elements have been considered, GTA cannot provide endorsement that the recommendations and commentary within this report have technical and complete regard for these elements.

1.3 Purpose of this Report

The report sets out the following in relation to Wye River and Separation Creek:

i an assessment of the anticipated traffic and transport implications associated with the mixture of clean-up vehicle, construction vehicle and general vehicle traffic in the immediate surrounds in the next 6 to 12 months

ii comments and recommendations pursuant to longer term traffic management planning (i.e. greater than 6-12 months into the future) and during peak periods (Christmas/New Year, school holidays, long weekends, peak construction periods, etc.)

iii comments and recommendations pursuant to the management of vehicle traffic which forms the basis for the prepared draft traffic management strategies

iv the acceptability of the traffic impacts, including the need for mitigating road works and appropriate and equitable vehicular access.

1.4 References

In preparing this report, reference has been made to the following:

- Project Brief 'Construction and Environmental Management Plan Wye River and Separation Creek' prepared by Colac Otway Shire
- GHD report 'Wye River and Separation Creek Bushfire Clean-up Access and Geotechnical Assessment', March 2016
- A.S. Miner Geotechnical Report 'Rapid Qualitative Risk to Life for Road Network in Wye River and Separation Creek', February 2016
- Existing MoA's for the townships
- Traffic Management Plans prepared by Go Traffic via Grocon
- historical traffic data as referenced in the context of this report
- an inspection of the site and its surrounds on 8 November 2016
- discussions with Colac Otway Shire
- other documents as nominated.

2. Existing Conditions

2.1 Wye River

2.1.1 Site Characteristics

The Wye River Township east of the Wye River (referred to herein as Wye River) is predominantly a residential area located 160km southwest of Melbourne. The approximate 50ha area consists largely of detached dwellings which provide for a mix of primary residences and holiday houses. Wye River is located immediately south of Separation Creek.

Wye River is shown in Figure 2.1 on the following page.

2.1.2 Road Network

Wye River is located abutting the Great Ocean Road. Great Ocean Road is an arterial road under VicRoads jurisdiction and generally aligned along the Victorian southwest coast stretching between Torquay and Allansford.

The Boulevard provides the primary connection between Great Ocean Road and the Wye River residential area. Its intersection with Great Ocean Road is unsignalised with provision of full turning movements. Wallace Ave also provides a secondary access between Great Ocean Road and Wye River.

The greater local road network in Wye River comprises predominantly narrow, winding and/or undulating/steep roads. Limited signage, road safety barriers and lighting exists and a number of the roads are located on slopes supported by retaining walls.

There currently exists an informal road connection between Wye River and Separation Creek, however during the site inspection this connection was closed to vehicles. Advice provided to GTA indicates this road was used to shuttle residents and visitors between Wye River and the Great Ocean Road via Separation Creek whilst the Great Ocean Road was under restricted operation.

2.2 Separation Creek

2.2.1 Site Characteristics

The Separation Creek Township (referred to herein as Separation Creek) is approximately half the size of the Wye River subject site area. Separation Creek is predominantly a residential area located immediately north of Wye River. The approximate 25ha area consists largely of detached dwellings which provide for a mix of primary residences and holiday houses.

2.2.2 Road Network

Separation Creek is also located abutting the Great Ocean Road, with Sarsfield Street providing the primary connection to the town.

The Great Ocean Road/Sarsfield Street intersection is unsignalised and allows for full turning movements. The two other minor local road network connections to Great Ocean Road are Stanway Drive and Old Ocean Road which are both no-through roads.

The greater local road network in Separation Creek is mostly narrow, however with less undulation in comparison to Wye River. Limited road infrastructure is present and the road surface quality varies throughout the township.

Separation Creek is shown in Figure 2.1 below.

Figure 2.1: Subject Site and its Environs

2.3 Existing Traffic Conditions

2.3.1 Local Road Network

GTA obtained the available traffic volume data for the two townships from Colac Otway Shire. Traffic counts undertaken on Tuesday 8 April 2014 indicates The Boulevard in Wye River carries a daily traffic volume of approximately 160 vehicle movements per day.

It is noted that this data appears to have been collected on a weekday, noting that traffic volumes on the weekend (and furthermore during peak holiday periods) is expected to be higher than recorded in this data set.

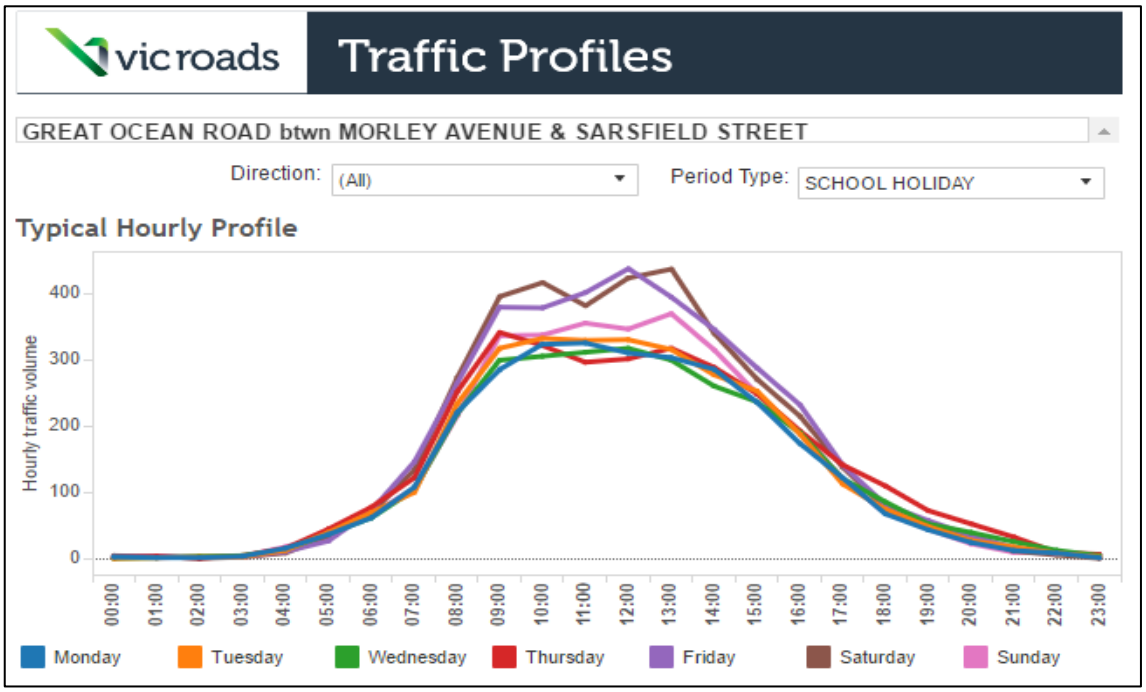
Whilst no data exists for Separation Creek, having regard for the proportion of dwellings accessible from The Boulevard in Wye River, Sarsfield Street in Separation Creek (the main connection to Great Ocean Road) could be expected to carry notably less traffic volumes on a comparative day.

2.3.2 Great Ocean Road

Traffic volume data obtained from VicRoads for the school holiday period[1] suggests peak two-way traffic volumes of approximately 400 vehicles per hour currently exist on Great Ocean Road between Wye River and Separation Creek. Traffic volumes are comparatively higher than non-school holiday periods and are greater on the weekend when compared to regular weekdays (excluding Friday).

The temporal traffic flows for Great Ocean Road are reproduced in Figure 2.2

Figure 2.2: Great Ocean Road Traffic Volumes



2.3.3 Observations

As part of the site inspection, GTA observed a number existing constraints within the road network for the two townships. These have been summarised below:

- The majority of roads exist with unsealed edges contributing to the likelihood of vehicle roll over
- Existence of undulating and winding roads which limit sight lines
- Limited passing areas for vehicles to safely and efficiently pass one another contributing to vehicle-vehicle conflict
- Constrained turning circles for larger vehicles to manoeuvre the network
- Limited signage, lighting, barriers and other infrastructure to guide vehicles appropriately around the network
- Negligible pedestrian path provisions require shared use of the roads for vehicles, pedestrian, bicycles, etc. which contributes to vehicle-pedestrian conflict.

In preparing the traffic management plans to address the existing road network constraints, the above items will ultimately be considered.

[1] The available traffic volume data does not differentiate between or note the particular school holiday period (I.e. the data may not be from the January school holiday period).

2.3.4 Accident Statistics

A detailed review of the crash history data within and in close proximity to Wye River and Separation Creek will be completed as part of the road safety review.

3. Traffic Management Strategy

3.1 Preamble

As previously discussed, both Wye River and Separation Creek are expected to experience increased vehicle traffic in the short term (next 6 to 12 months) due to the presence of construction and clean-up activity in addition to the typical resident/visitor movements.

The predominant concerns from a traffic management perspective are considered to be:

- the increased likelihood of vehicle/vehicle conflict and;
- the increased likelihood of vehicle/pedestrian conflict.

The ultimate goal of the traffic management strategy is to minimise the above conflicts and in-turn provide a safer overall road network during this time. The strategies within this report vary in complexity, cost vs. benefit, enforceability, equity and efficiency. We expect the community consultation and stakeholder engagement process to assist in refining the strategy, along with a selection of suggested policies to minimise vehicle traffic on critical roads. These recommendations are discussed in Section 3.2 of this report.

3.2 Strategies to Reduce Conflict

3.2.1 Construction Traffic Management Plan

Prior to approval of a building permit, the Responsible Authority may condition the preparation of a Construction Traffic Management Plan (CTMP) to accompany the application.

A Template CTMP could be prepared by COS and issued to respective applicants to minimise the burden associated with this extra documentation.

The CTMP should detail as appropriate:

- Period of construction (days of the week, length of works)
- Vehicle requirements (cranes, backhoes, contractor vehicles, etc.)
- Maximum number of workers on site at any one time and likely number of vehicles
- Proposed vehicle access routes having regard for the adopted township TMP
- Whether occupation of the road reserve will be required to undertake works
- Other information as relevant.

Should works require the occupation of the road reserve and impact the operation of the township TMP (e.g. prevent access to the road network beyond the work site), this should be explicitly detailed and subject to COS approval. In such an instance, the provision of additional traffic control and/or a site specific TMP may be requested by COS to equitably manage access to local properties.

3.2.2 Car Parking Restrictions

To assist in minimising the number of vehicles accessing individual properties, investigation into the use of vacant land within each township could be explored to provide additional temporary car parking opportunities (such as in and around The Boulevard in Wye River). Minimising the number of individual vehicles circulating the townships will reduce the likelihood of vehicle-vehicle

conflict, reduce car parking demand in more constrained areas of each township and allow for more efficient and safer journeys across the road network.

A number of options exist to limit car parking within the network including:

- a parking permit scheme, whereby each dwelling would be afforded a limited number of resident/visitor permits
- implementation of parking restrictions
- incorporating 'yellow line marking' to enforce no stopping restrictions without the need for signage
- a town-wide 'no parking area' which would limit parking within the public road reserve unless otherwise signed as public parking (with signage or similar).

The enforceability of parking permits is likely to be a hurdle to the successful implementation of this strategy given the rural landscape and informalities associated.

This implementation of one (or a combination) of these car parking options would reduce the likelihood of vehicles parking within widened carriageway areas best served as passing areas and/or on deteriorated batters. As roads are continually restored, the location of such parking locations could be progressively reviewed to provide safe/alternate/additional parking as required.

3.2.3 One-Way/Two-Way Road Operation

Both Wye River and Separation Creek feature predominantly no-through roads. The only 'loops' allowing for vehicle circulation are Riverside Drive/The Boulevard and The Boulevard/Karringal Drive/Koonya Avenue in Wye River and Sarsfield Street/Olive Street in Separation Creek. Beyond these loops, access to a large proportion of properties is achievable via a single access point only which naturally means that these roads must operate as two-way.

Further to the limitations above, the topography and alignment of vehicle access driveways to individual properties restricts the ability for vehicles to enter/exit their property from multiple directions. Restricting the loops to one way would then impact the ability for some vehicles to enter their adjacent property. As such, only minor amendments to the existing traffic flow directions in each town could be facilitated.

In Wye River, Riverside Drive could potentially operate one-way clockwise only, particularly for the unsealed section between 20 Riverside Drive and Illowra Avenue.

3.2.4 Traffic Controllers

The current traffic management strategy implemented by Grocon provides for a number of traffic controllers strategically located throughout Wye River to manage traffic flow.

The use of human traffic control is considered the most effective tool in managing traffic conflicts. During the site inspection, three to four traffic controllers were observed to communicate forthcoming traffic movements for entering and exiting traffic of the township. Traffic control in The Boulevard was also a 'first line of defence' as it relates to vetting of non-residential and non-site specific vehicles.

Traffic control naturally comes at a significant cost and for this reason is likely not a feasible day-to-day option.

3.2.5 Formalise Road Network Speed

The townships are not currently regulated by signed speed limits. The horizontal and vertical alignment of the existing road network is largely self-regulating, however formally reducing the speed throughout the township would reinforce slower vehicle circulation, particularly for visitors to the area.

It is envisioned that all roads could be reduced to 20km/hr through the appropriate speed signage installation.

3.2.6 Formalise Passing Areas

There exists the opportunity to formalize passing areas on key roads within both townships. Specific locations for these passing areas have been noted following the observations made at the site inspection.

These potential formal passing areas, generally located approx. 50-200m apart would provide a carriageway width approximately equal to or greater than 5.5m which would be adequate to allow two vehicles to pass one another. Additional formal passing opportunities were also observed but would be more notably subject to the applicable geotechnical and structural investigations to ensure these were suitable for two-way vehicle flow at exposed road edges.

3.2.7 Restrictions on Vehicle Types

The GHD report titled 'Wye River and Separation Creek Bushfire Clean-up Access and geotechnical assessment, March 2016' outlined a number of recommendations surrounding restrictions to vehicle sizes accessing each township during the bushfire clean-up.

Specifically, the report concluded for commercial vehicles operated by Grocon:

"It is recommended that trucks no longer than 8.8 m be used unless Grocon accepts the risk of using longer trucks.

For the high risk areas highlighted in Appendix A, it is recommended that trucks no longer than 7.5m be used unless Grocon accepts the risk of using longer trucks."

On the assumption that the 'high risk areas' have been addressed from a geotechnical perspective (i.e. these roads have been satisfactorily reconstructed), it is considered that a vehicle length limit of 8.8m could be implemented within the townships. In no-through roads identified to have inappropriate turn around areas, the shorter 7.5m limit could be implemented.

Whilst length restrictions would be applied under the traffic management plan, it is expected that a contractor could apply to COS to request access for a longer vehicle. In such an instance, confirmation of accessibility would be subject to a swept path assessment and approval from COS. Approval would also naturally be subject to other factors including the proposed time of year (e.g. whether it is outside of peak times), the extent of other construction activity and geotechnical limits, amongst others.

3.3 Draft Traffic Management Plan

3.3.1 Background

GTA has prepared a draft traffic management plan for each of Wye River and Separation Creek. The traffic management plans generally reflect the strategies outlined in Section 3.2 of this report.

3.3.2 Short Term Plan (6 to 12 Months)

A short-term traffic management plan has been prepared with consideration for construction over the next 6 to 12 months. It is proposed to operate as an extension to the existing traffic management plan facilitated by Grocon during the site clean-up, maintaining existing features where possible. During this time, the ability to remain flexible will be essential given the dynamic re-construction of roads and retaining walls and the proposed construction of the stormwater drainage system.

The short-term traffic management plans for Wye River and Separation Creek are provided in Appendix A. Features of the plans include:

- A distinguished road network hierarchy (largely determined by the anticipated traffic volumes and quality of the road – observed width, undulation, surface, etc.).
- One-way traffic flow restrictions in the southwest portion of Riverside Drive (Wye River) and two way traffic flow in the remaining road network.
- Investigation into formalised passing areas in strategic locations where there appears to be adequate width and/or moderately flat terrain to allow vehicles to safely pass one another.
- Parking restrictions (signage and/or line marking and/or permits) to delineate appropriate parking areas within the road network.
- Establishment of a 20 km/hr speed limit for all roads within each township.
- Advisory signage on Great Ocean Road to restrict access to The Boulevard and Sarsfield Street to local traffic only.
- Advance signage throughout each town as it relates to dynamic road network conditions.
- Requirement for contractors to prepare and submit a traffic management plan for approval by COS when working from the road reserve or for significant activities such as crane lifts.

3.3.3 Longer Term Plan

Given the relative unknown in regard to the extent of heightened construction activity in the longer term, it is not considered appropriate at this time to establish a traffic management strategy beyond the next 12 months.

The short term traffic management plan should be reviewed in the next 6 to 12 months to determine a longer term traffic management strategy. A number of the strategies adopted within the short term traffic management plan may not be required in the longer term, whilst some strategies may need to be modified or added to best represent current and anticipated future conditions.

3.3.4 Peak Period Plan

It is expected that the adopted short term plan may need to be at times modified over the next 6 to 12 month period to suit peak period conditions. Peak periods may include (but not limited to):

- Christmas/New Year/January
- School holidays
- Public holidays/long weekends
- Peak construction periods as determined by COS

In such instances and where deemed necessary, amendments to the traffic management plan (or a separate site specific plan) may be requested and/or implemented by COS. Elements of an amended traffic management plan may include (but not limited to):

- Increased parking restrictions/controls
- Requirement for human traffic control
- Alternate access arrangements
- Additional signage, barriers and other temporary infrastructure.

In maintaining a consistent strategy, any peak period plan would where possible maintain a consistent operating principle as the short term plan, with additional/modified elements incorporated to best manage the anticipated increase in traffic flow as required.

4. Conclusions

Based on the analysis and discussions presented within this report, the following preliminary conclusions are made:

i Colac Otway Shire (COS) has sought the services of Coffey to prepare a Construction and Environment Management Plan for the bushfire affected township zones of Wye River and Separation Creek in southern Victoria. GTA Consultants (GTA) is providing Coffey with specialist traffic and transport assistance and specifically in the preparation of a traffic management plan for the study area.

ii Significant clean-up is being undertaken in Wye River and Separation Creek following the December 2015 bushfire which destroyed 109 homes. The cumulative impact of the heavy vehicle movements associated with the clean-up, residential construction traffic and general resident/visitor traffic flows requires a traffic management strategy to ensure safety and efficiency of the abutting road network. The traffic management strategy has been prepared with regard for the anticipated level of activity over the next 6 to 12 months.

iii The available traffic volume data suggests the following traffic volumes for key roads in the vicinity of the townships:

- Great Ocean Road – 400 vehicles per hour
- The Boulevard (Wye River) – 160 vehicles per day
- Sarsfield Street (Separation Creek) – no data available.

iv As part of the site inspection, GTA observed a number existing constraints within the road network for the two townships. These included:

- The majority of roads exist with unsealed edges contributing to the likelihood of vehicle roll over
- Existence of undulating and winding roads which limit sight lines
- Limited passing areas for vehicles to safely and efficiently pass one another
- Constrained turning circles for larger vehicles to manoeuvre the network
- Limited signage, lighting, barriers and other infrastructure to guide vehicles appropriately around the network
- Negligible pedestrian path provisions require shared use of the roads for vehicles, pedestrian, bicycles, etc.

v The predominant concerns associated with the additional mix of construction vehicle traffic movements and which form the basis of the traffic management strategy are considered to be:

- the increased likelihood of vehicle/vehicle conflict and
- the increased likelihood of vehicle/pedestrian conflict.

vi The ultimate goal of the traffic management strategy is to minimise the above conflicts and in-turn provide a safer overall road network. The strategies vary in complexity, cost vs. benefit, enforceability, equity and efficiency. We expect the community consultation and stakeholder engagement process to assist in refining the strategy, along with a selection of suggested policies to consider to minimise vehicle traffic on critical roads.

vii Policies to reduce traffic flow and minimise conflict which are reflected in the draft traffic management plans include:

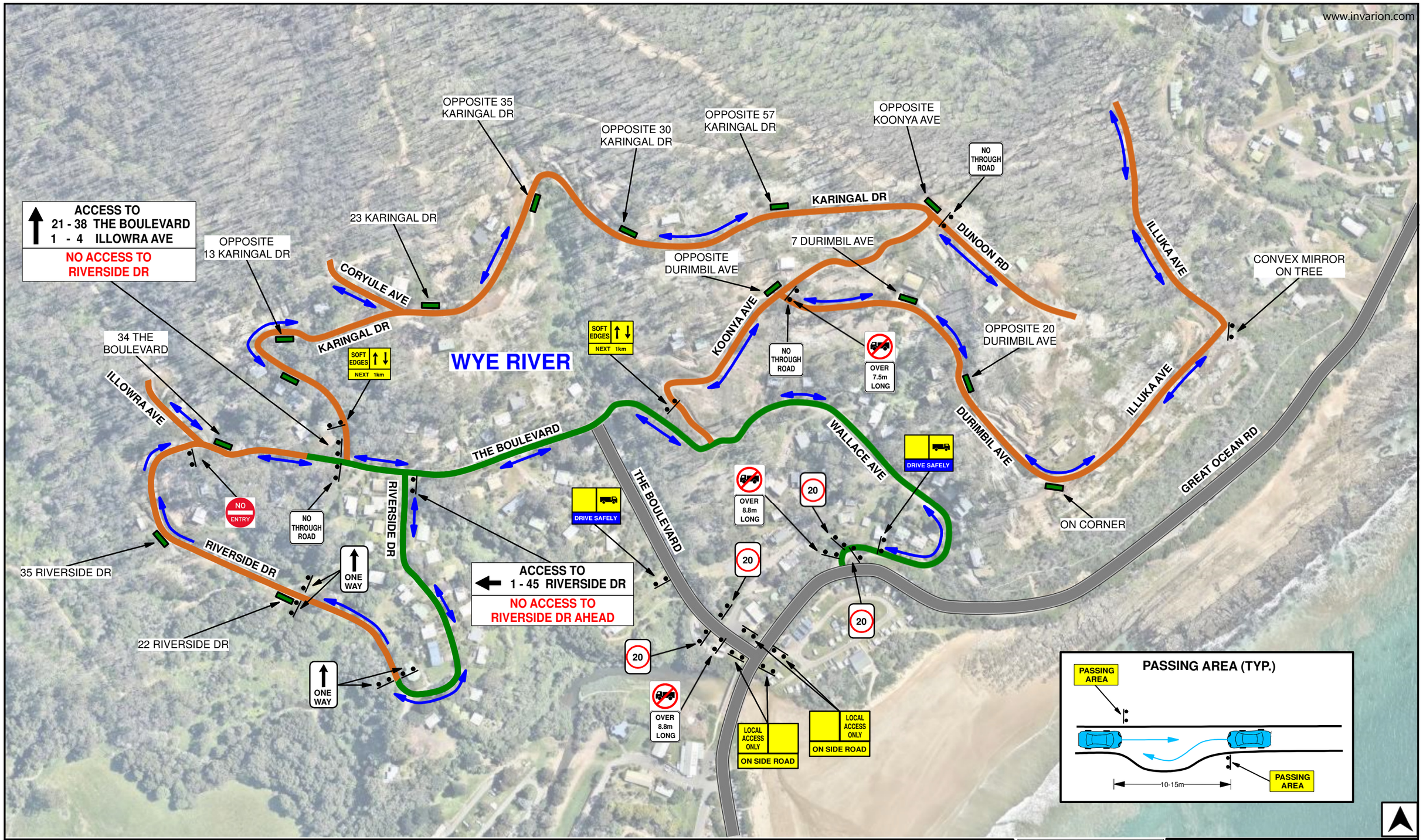
- A requirement to prepare a construction traffic management plan to accompany a building permit application
- car parking restrictions/controls
- Modified one-way and two-way road operations where possible
- Provision of traffic controllers at strategic locations (potential during peak periods)
- Formalising the speed of roads within the local road network
- Formalising passing areas and creating new passing areas on existing roads
- Limiting the length of vehicles accessing each township.

viii A draft short term plan for Wye River and Separation Creek have been prepared for consideration. The traffic management plans reflect the strategies outlined in this report and are subject to an independent road safety audit prior to implementation.

ix It is expected that the adopted short term plan may need to be at times modified over the next 6 to 12 month period to suit peak period conditions. In such instances and where deemed necessary, amendments to the traffic management plan (or a separate site specific plan) may be requested and/or implemented by COS.

Appendix A

Traffic Management Plans – Short Term



NOTES

- THE GREEN 'UNDAMAGED CARRIAGEWAY' FOR THE PURPOSES OF THIS PLAN REFERS TO THE SECTIONS OF ROADS OBSERVED TO BE RELATIVELY UNAFFECTED BY THE BUSH FIRES AND REMAIN LARGELY SIMILAR TO PRE-FIRE CONDITIONS.
- THE BROWN 'DAMAGED CARRIAGEWAY' FOR THE PURPOSES OF THIS PLAN REFERS TO THE SECTIONS OF ROADS OBSERVED TO HAVE NOTICEABLY DETERIORATED DUE TO THE BUSH FIRES OR ARE LARGELY UNSEALED AND CONSIDERED NARROW/UNDULATING AND/OR WITH A LOOSE SURFACE, ETC.
- 'TRAFFIC FLOW' IS LARGELY PROPOSED TO REMAIN AS TWO-WAY. THIS IS PREDOMINANTLY DUE TO THE INABILITY TO ENFORCE ONE-WAY OPERATION IN THE AVAILABLE ROAD NETWORK LOOPS AND THE DIFFICULTY TO ACCESS INDIVIDUAL PROPERTIES DUE TO THE ORIENTATION OF VEHICLE ACCESS POINTS. ONE-WAY TRAFFIC FLOW ALONG RIVERSIDE DRIVE COULD BE INVESTIGATED AS A LONG TERM OPTION TO MANAGE VEHICLE/VEHICLE CONFLICT IN THIS LOCATION.
- CAR PARKING RESTRICTIONS, A 'NO PARKING AREA' AND/OR YELLOW LINE MARKING COULD BE IMPLEMENTED TO MINIMIZE THE LIKELIHOOD OF VEHICLES PARKING WITHIN THE ROAD RESERVE AND OBSTRUCT TRAFFIC FLOW.
- A 'PASSING AREA' FOR THE PURPOSES OF THIS PLAN REFERS TO THE OBSERVED OPPORTUNITY TO FORMALIZE PASSING AREAS WHERE THERE APPEARS ADEQUATE WIDTH AND/OR MODERATELY FLAT TERRAIN TO ALLOW VEHICLES TO PASS ONE ANOTHER. THESE LOCATIONS ARE SUBJECT TO THE NECESSARY GEOTECHNICAL INVESTIGATIONS AND ROAD SAFETY REVIEW.
- A VEHICLE LENGTH LIMIT OF BETWEEN 7.5m AND 8.8m IS PROPOSED THROUGHOUT THE TOWN IN LINE WITH THE LENGTH LIMITS IMPOSED DURING THE BUSHFIRE CLEAN-UP. THE LENGTH LIMITS SHOULD BE REVIEWED AS ROAD NETWORK RESTORATION WORKS ARE UNDERTAKEN.

Legend

- SIGN
- UNDAMAGED CARRIAGEWAY
- DAMAGED CARRIAGEWAY
- PROPOSED TRAFFIC FLOW
- PASSING AREA

GTAconsultants · Colac Otway SHIRE · coffey

WYE RIVER & SEPARATION CREEK SHORT TERM TRAFFIC MANAGEMENT PLAN

DRAFT

DRAWING NO. V112000-01

DATE: 28 FEBRUARY 2017

REV. P3

BASS AVE
NEDS LN
MITCHELL GROVE
DOLLAR DR
HARRINGTON ST
SEPARATION CREEK
NO THROUGH ROAD
OLIVE ST
SARSFIELD ST
20
DRIVE SAFELY
SARSFIELD ST
DRIVE SAFELY
GREAT OCEAN RD
LOCAL ACCESS ONLY
ON SIDE ROAD
LOCAL ACCESS ONLY
ON SIDE ROAD
OVER 8.8m LONG
OLD OCEAN RD
STANWAY RD
GREAT OCEAN RD

NOTES

- THE GREEN 'UNDAMAGED CARRIAGEWAY' FOR THE PURPOSES OF THIS PLAN REFERS TO THE SECTIONS OF ROADS OBSERVED TO BE RELATIVELY UNAFFECTED BY THE BUSH FIRES AND REMAIN LARGELY SIMILAR TO PRE-FIRE CONDITIONS.
- THE BROWN 'DAMAGED CARRIAGEWAY' FOR THE PURPOSES OF THIS PLAN REFERS TO THE SECTIONS OF ROADS OBSERVED TO HAVE NOTICEABLY DETERIORATED DUE TO THE BUSH FIRES OR ARE GENERALLY NARROW/UNDULATING AND/OR WITH A LOOSE SURFACE ETC.
- 'TRAFFIC FLOW' IS PROPOSED TO REMAIN AS TWO-WAY. THIS IS PREDOMINANTLY DUE TO THE INABILITY TO ENFORCE A ONE-WAY OPERATION IN THE ROAD NETWORK WHICH COMPRISES PREDOMINANTLY OF DEAD-END ROADS.
- CAR PARKING RESTRICTIONS, A 'NO PARKING AREA' AND/OR YELLOW LINE MARKING COULD BE IMPLEMENTED TO MINIMIZE THE LIKELIHOOD OF VEHICLES PARKING WITHIN THE ROAD RESERVE AND OBSTRUCT TRAFFIC FLOW.
- A VEHICLE LENGTH LIMIT OF 8.8m IS PROPOSED THROUGHOUT THE TOWN IN LINE WITH THE LENGTH LIMITS IMPOSED DURING THE BUSHFIRE CLEAN-UP. THE LENGTH LIMITS SHOULD BE REVIEWED AS ROAD NETWORK RESTORATION WORKS ARE UNDERTAKEN.

Legend

- SIGN
- UNDAMAGED CARRAIGEWAY
- DAMAGED CARRAIGEWAY
- PROPOSED TRAFFIC FLOW

GTAconsultants · Colac Otway SHIRE · coffey

WYE RIVER & SEPARATION CREEK SHORT TERM TRAFFIC MANAGEMENT PLAN

DRAFT

DRAWING NO. V112000-02
DATE: 28 FEBRUARY 2017
REV. P3

Melbourne

A Level 25, 55 Collins Street
PO Box 24055
MELBOURNE VIC 3000
P +613 9851 9600
E melbourne@gta.com.au

Brisbane

A Level 4, 283 Elizabeth Street
BRISBANE QLD 4000
GPO Box 115
BRISBANE QLD 4001
P +617 3113 5000
E brisbane@gta.com.au

Adelaide

A Suite 4, Level 1, 136 The Parade
PO Box 3421
NORWOOD SA 5067
P +618 8334 3600
E adelaide@gta.com.au

Townsville

A Level 1, 25 Sturt Street
PO Box 1064
TOWNSVILLE QLD 4810
P +617 4722 2765
E townsville@gta.com.au

Sydney

A Level 6, 15 Help Street
CHATSWOOD NSW 2067
PO Box 5254
WEST CHATSWOOD NSW 1515
P +612 8448 1800
E sydney@gta.com.au

Canberra

A Tower A, Level 5,
7 London Circuit
Canberra ACT 2600
P +612 6243 4826
E canberra@gta.com.au

Gold Coast

A Level 9, Corporate Centre 2
Box 37, 1 Corporate Court
BUNDALL QLD 4217
P +617 5510 4800
F +617 5510 4814
E goldcoast@gta.com.au

Perth

A Level 2, 5 Mill Street
PERTH WA 6000
PO Box 7025, Cloisters Square
PERTH WA 6850
P +618 6169 1000
E perth@gta.com.au