Dunmore Sand and Soil Quarry

Traffic Management Plan

Prepared for Dunmore Sand and Soil Pty Ltd
July 2021

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Dunmore Sand and Soil Quarry

Traffic Management Plan

Report Number

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Client

Dunmore Sand and Soil Pty Ltd

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25 June 2021

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25 June 2021

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1 Introduction

This Traffic Management Plan (TMP) has been prepared to satisfy the development Condition 56 (a to k) as part of the development approval by NSW Department of Planning Industry and Environment (DPIE) for the development application (DA 195-82004) for Stages 5A and 5B extraction (approval date 16 November 2020).

This TMP outlines the framework of the traffic movements to/ from and within the site, associated with the importation of VENM material to Stage 5A; as recommended in the TIA. The TIA which formed part of the assessment of the proposal, did not require any specific controls for construction activities at the site, given the short nature of the works. The TMP must be approved by the Planning Secretary before implementation by the applicant (Condition 56A).

1.1 Background

Dunmore Sand and Soil Pty Ltd (DSS) operates the Dunmore Sand and Soil Quarry located within the rural suburb of Dunmore within the Shellharbour Local Government Area (LGA).

Sand extraction has been undertaken since the approval of Stage 1 on Swamp Road, Dunmore in 1999. A further application for Stage 2 to Stage 4 was lodged and development consent received from the Minister of Planning in June 2005. The consent approved extraction of up to 800,000 tpa of sand for a period of 25 years.

Dredging for Stages 2 to 4 commenced in June 2007 and since then the majority of sand in Stage 2 has been extracted with dredging recently moving into Stage 3. The sand resource in Stage 3 is expected to be exhausted in 3 to 5 months.

The last extraction stage (Stage 4) encompasses an area containing the site's road access and private rail line and supporting infrastructure for the Stage 2 to 4 operations and Boral's adjacent Dunmore hard rock quarry. Given this, Stage 4 cannot be extracted until these activities have ceased. This has led DSS to investigate other local sources of sand to continue operations beyond Stage 3.

DSS has explored the possibility of extracting sand resource from an adjoining property to the south from two areas (Stage 5A and Stage 5B). As such, a modification application (DA 195-8-2004 Mod 2) was lodged seeking to modify the current Project Approval (DA 195-8-2004) under Section 75W of the Environmental Planning and Assessment Act 1979 (EP&A Act), to provide for an additional extraction area (Stage 5) on adjoining private land, encompassing two separate extraction areas, Stage 5A and Stage 5B.

Stage 5A covers an area of 3.42 ha and comprises a 12m deep extraction pit that would be expected to yield around 234,000 tonnes of sand. Stage 5B covers an area of 8.12 ha and would be expected to yield around 1.12 million tonnes of sand. Extraction in the two areas would take around 3 to 4 years to complete.

On 21 September 2020, DPIE referred the modification application to NSW Independent Planning Commission for assessment. On 16th November 2020, the development modification was approved by the Minister for Planning and the Notice of Modification was issued.

Condition 56(a) of the modification to the development consent requires the preparation of a Traffic Management Plan to the satisfaction of the Planning Secretary. This Traffic Management Plan (TMP) has been prepared to address the requirements of the development conditions.

As part of the approval process, a Traffic Impact Assessment (TIA) report was prepared by The Transport Planning Partnership (TTPP) which was submitted as part of the Dunmore Lakes Sand Extraction Project Modification 2[1]

[1] https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=DA195-8-2004-MOD-2%2120201126T033715.646%20GMT

(Appendix K). For consistency, traffic related information has been extracted from that TIA in preparation of this TMP.

1.2 Project overview

The approved modification allows extraction of a further 1.35 million tonnes of sand product from two new extraction areas, known as Stages 5A and 5B. The new extraction areas are shown in Figure 1.1.

In order to rehabilitate stage 5 areas, DSS has proposed to import up to 325,000 tonnes of Virgin Excavated Natural Material (VENM) per annum by road. This volume of heavy vehicle activity associated with VENM importation generates the need for a new site access to be established at the site.

VENM will be transported to the site by 25m truck and trailer combination and will be tipped directly into the pit(s) and spread with a dozer.

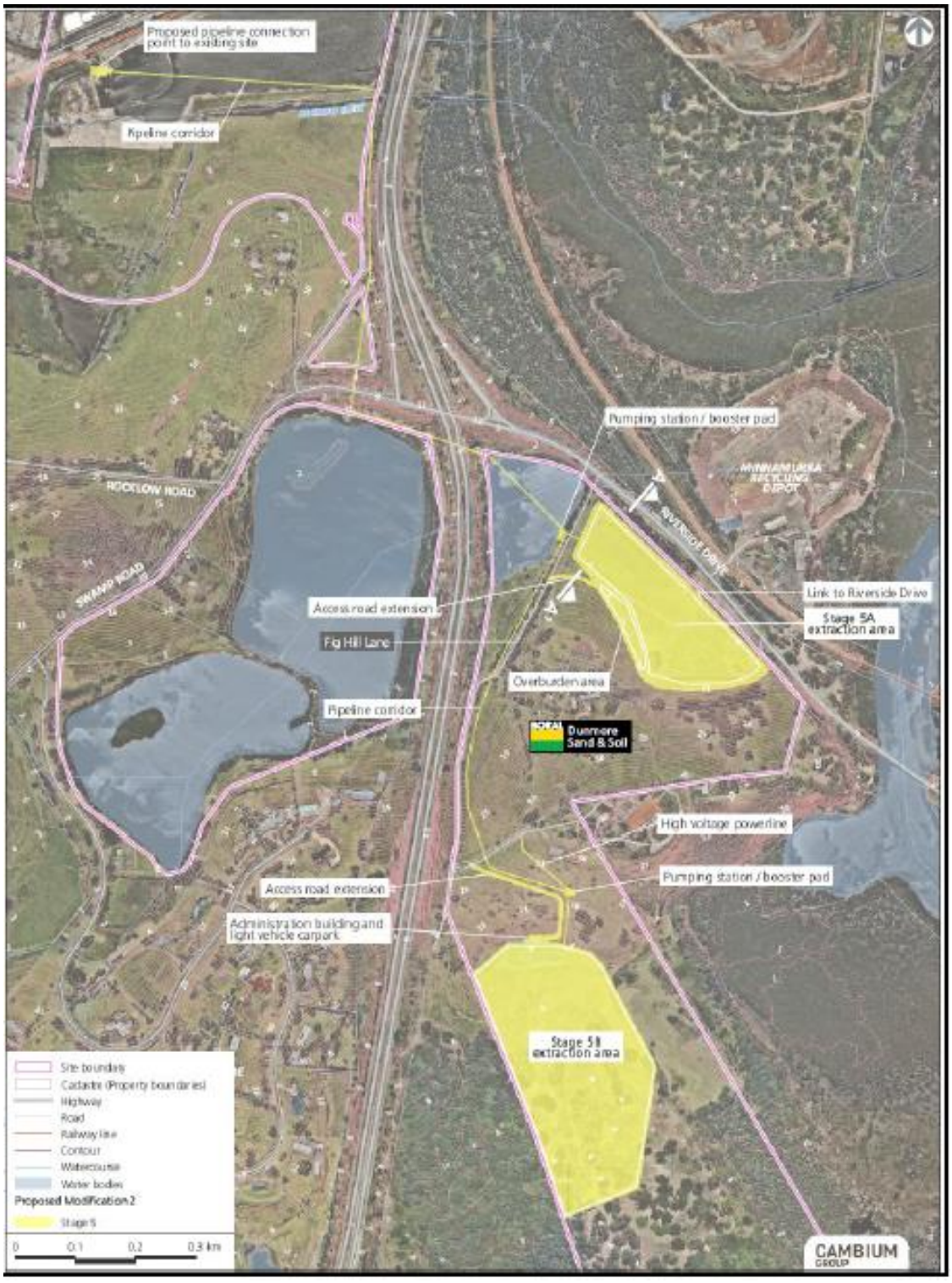

Figure 1.1 Stages 5A and 5B extraction areas

1.3 Stage 5 Operations

The sand extracted from Stage 5A and Stage 5B will be transferred via pipelines from Stage 5 to the existing processing site (Stage 2). From the processing plant, product (sand) will be dispatched to markets via road or rail in accordance with the existing Approved Project.

For clarity, the modification does not involve any changes to the approved processing and dispatch of sand.

1.4 Operating hours

The quarry will operate during the approved hours in accordance with development consent Table 2, Condition 14 (see Table 1.1 below).

Table 1.1 Operating hours

Activity	Day	Time
Dredging and processing	Monday – Saturday	6:00 am to 6:00 pm
	Sunday and Public Holidays	8:00 am to 4:00 pm
Excavator extraction	Monday – Saturday	6:30 am to 6:00 pm
	Sunday and Public Holidays	Nil
Delivery, distribution and maintenance	Monday – Friday	5:00 am to Midnight
	Saturday	6:00 am to 6:00 pm
	Sunday and Public Holidays	8:00 am to 4:00 pm
Delivery and distribution via Shellharbour Road and Riverside Drive	Monday – Friday	7:00 am to 10:00 pm
	Saturday	7:00 am to 6:00 pm
	Sunday and Public Holidays	8:00 am to 4:00 pm
Maintenance (if inaudible at neighbouring residences)	Anytime	Anytime

Condition 15 of the development consent states that where police or other public authorities request that deliveries or dispatching of materials are to be carried out outside operating hours and emergency work to avoid the loss of lives, property or to prevent environmental harm is required, then these activities are permitted outside the normal operating hours. In such circumstances, the Applicant must notify the Department and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

If any truck movements are required outside the approved hours, the Department and the affected residents will be notified by the applicant prior to the truck movements occurring.

1.5 Construction Hours

Construction works on the sand extraction areas will be undertaken during approved construction hours (7 am to 6 pm, Monday to Friday and 8 am to 1 pm on Saturdays). Any departure from the approved construction hours will be agreed with the Planning Secretary.

1.6 Access

1.6.1 Access to the Stage 5 areas

Access to the Stage 5 sand extraction areas is proposed via a new vehicular access to be constructed on Riverside Drive, opposite to the Kiama Waste Recycling Depot (Plate 1.1). The new access will constitute a designated right turn lane from Riverside Drive into the site. The design and safety aspects of the new access were discussed in the Traffic Impact Assessment[2] as part of the DSS Mod 2 application. Based on the conclusion of the Traffic Impact Assessment the new access is proposed to accommodate VENM truck access safely and efficiently to and from the Stage 5 site. The proposed right turn bay has been discussed with Kiama Municipal Council and their in principle support has been obtained. The new access design concept plan is shown in Attachment A.

Before the construction of new site access, crushed rock will be placed on the road verge as an interim measure. This will be done because currently the site is very wet, and the crushed rock will limit the mud going on to the road. A street sweeper will also be used in the interim to minimize dirt going onto Riverside Drive.

Plate 1.1 Location of the proposed vehicular access (opposite to Kiama Waste Recycling Deport)

This new access would be utilised by all heavy vehicle movements for VENM importation, entering and exiting the Stage 5 site. The existing driveway at Fig Hill Lane be retained for emergency and ad hoc access by light vehicles (Plate 1.2).

[2] https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=DA195-8-2004-MOD-2%2120201126T033715.646%20GMT

Plate 1.2 Access to Fig Hill Lane from Riverside Drive

1.6.2 VENM importation

VENM importation is the key traffic generating activating occurring at the site, requiring the establishment of a new access. All outbound excavated material will be transported to the existing site (Stage 2) processing area by pipeline. The estimated truck movements associated with the Stage 5 VENM importation are presented in Table 1.2:

Table 1.2 Stage 5 VENM Importation – Estimated Truck Volumes

Description	Volume
Average Truck Volumes	
Average Daily VENM Trucks	23 trucks / day (23 in + 23 out)
Average Hourly VENM Trucks	3 trucks / hour (3 in + 3 out)
Peak Truck Volumes	
Maximum Daily VENM Trucks	45 trucks / day (45 in + 45 out)
Peak Hourly VENM Trucks	5 trucks / hour (5 in + 5 out)

With the commencement of truck movements associated with the Stage 5 VENM importation, two VMS boards will be installed along Riverside Drive for a maximum of 1 month period. For the southbound traffic, the VMS board will be placed 240 metres from the new access opposite Fig Hill Lane access. For the northbound traffic, the VMS board will be placed 140 metres from the site access. The reduced distance for the northbound traffic is due to the narrow road shoulder and vegetation constraints. The VMS board will include the text 'Changed Traffic Conditions' to inform motorists about the increase in turning trucks in the area.

1.6.3 Construction Activities

Construction activities associated with the establishment of Stage 5A are too small in scale and sporadic, to be considered to have a potential impact to the road network.

The construction of the Stage 5 access will be regulated by conditions contained in the Traffic Control Plan, which will be approved by the relevant road authority as part of the construction activity for the new site access. Access to the Stage 5A site during the initial construction phase will be via the existing Fig Hill Lane access and utilise the area of the proposed new site access, where deemed necessary. Vehicles seeking to access the new site access, will

have to travel further south on Riverside Drive, and perform a u-turn where safe to do so. Construction activities in the Stage 5A area are expected to be completed within 3 months of the approval of this TMP.

1.7 Report preparation

This report has been prepared by Abdullah Uddin who has 17 years of experience in the traffic engineering and transport planning. Abdullah has been endorsed by DPIE and the Planning Secretary to prepare this report.

1.8 Consultation

Approval Condition 56 (b) stipulates that this TMP is be prepared in consultation with:

- Transport for NSW (TfNSW);
- Shellharbour City Council (SCC); and
- Kiama Municipal Council (KMC).

A copy of the draft TMP was forwarded to TfNSW, SCC and KMC for comment on 24 May 2021 and comments were requested to be provided within a two week period. Comments were received from SCC, who liaised with Kiama Council, and TfNSW and have been presented in Table 1.3 and Table 1.4 along with EMM responses. The email correspondence from EMM to the agencies is provided in Attachment B.

Table 1.3 Combined SCC and KCC comments and EMM responses

Item no	Comments	Responses
1.	The CHR intersection shown on dwg EMM-C03 appears to have the end of the new right turn lane to the site too close to the existing right turn lane to the waste depot. There is concern there will be vehicle conflict should two trucks be turning simultaneously into each site. Dwg C04 should show the equivalent right turn manoeuvring template into the waste depot.	The updated drawing EMM-C08 (Attachment A) includes two simultaneous swept paths, the right turn movement into the site and the right turn movement into the waste depot. The swept paths have been redrawn while keeping the vehicle paths within the right turn lane up to a maximum extent before crossing the BB line. The turning point of the swept path is controlled by the trucks turning radii to enter both the facilities. There is no vehicle conflict between the two simultaneous movements as shown in the swept path.
2.	Dwg C04 shows the truck turning template entering the site, tracking over a substantial portion of the proposed BB line shown on Dwg C03. If there are any vehicles exiting the site & waiting to turn right onto Riverside Drive, they will be impacted by this manoeuvre.	The updated drawing EMM-C07 (Attachment A) shows the previous BB line has been replaced by S1 line. The new S1 line has been offset from the centre and drawn inclined at an angle. Additionally, the TB line has been set back by 2.5 metres. The above changes will reduce the impact the right turning truck will have on the exiting vehicles from the site.
3.	On Dwg C03 there are no dimensions provided that show a truck entering the site will be wholly contained off the Riverside Dr travel lane, if a gate is installed at the existing property fence line.	The updated TMP includes control provisions (section 5.8) that will ensure no truck approaches the Stage 5A site, without first receiving confirmation at the weighbridge, after being weighed that the gate is open to allow trucks entering the site to enter the site without interruption. Thereby there is no need for trucks to be waiting in the verge of riverside drive, as trucks will wholly enter the site.

Table 1.4 TfNSW comments and EMM responses

Item no	Comments	Responses
1.	There may be an increased risk to experience damage to the asphalt pavement during the increased movement of heavy loads, specifically on Riverside Drive. Has the local council been consulted and/or stated any concerns regarding this?	The asphalt pavement has been assessed in the dilapidation report (Attachment C). The dilapidation report has been approved by Kiama Council. The report satisfies condition 53B of the consent.
2.	Were there any discussions regarding speed reductions for Riverside Dr? Being that trucks will be entering and exiting the site, was it considered to provide ample room for the labelled manoeuvres for truck drivers? Was a 60km/h zone considered?	The proposed intersection design was considered as part of the assessment of the DSS Mod 2 application (section1.6.1). The Traffic Impact Assessment and post Response To Submissions addendum further clarify the matters considered as part of the solution. Speed reductions were not considered, as the design (the channelised right turn solution), provides sufficient room for vehicles to pass the trucks entering the Stage 5A, in a safe manner. Both Councils have not requested a reduction in the speed along Riverside Drive.
3.	The traffic committee of TfNSW recommends that once truck movement first increases, that VMS' be installed temporarily to inform motorists about the increase in turning trucks/vehicles in the area and changed traffic conditions approaching the entrance on Riverside Drive.	Two VMS boards will be installed (section 1.6.2) in a suitable location for a maximum of 1 month period. The VMS board will include the text 'Changed Traffic Conditions'.

2 Environmental requirements

2.1 Legislative framework

The legislation that applies to the implementation of this TMP is listed below:

- *Environmental Planning and Assessment Act 1979*;
- *Roads Act 1993*;
- *Road Transport Act 2013*;
- *Work Health and Safety Act 2011*; and
- *NSW Road Rules 2008*.

2.2 Standards and guidelines

The following guidelines are relevant to this TMP:

- *Manual of Uniform Traffic Control Devices: AS1742*;
- *Austroads Guides to Traffic Management*; and
- RMS (now TfNSW) *Traffic Control at Worksites*, Issue 6, October 2020.

2.3 Approval conditions

Independent Planning Commission Mod 2 approval condition 56 states that the applicant must prepare a TMP for the development to the satisfaction of the Planning Secretary. The relevant approval conditions and EMM's responses are provided in Table 2.1.

Table 2.1 Independent Planning Commission Mod 2 approval condition and EMM responses

Condition No 56	Condition relating to TMP	Relevant report section
(a)	be prepared by suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	Section 0
(b)	be prepared in consultation with TfNSW, Shellharbour Council and Kiama Council;	Section 1.8
(c)	include details of all transport routes and traffic types to be used for development-related traffic;	Section 4.9, 4.10
(d)	describe the processes in place for the control of truck movements entering and exiting the site;	Section 4
(e)	include details of the measures to be implemented to minimise traffic safety issues and disruption to local road users associated with quarry operations;	Section 5

Table 2.1 Independent Planning Commission Mod 2 approval condition and EMM responses

Condition No 56	Condition relating to TMP	Relevant report section
f)	detail the specific protocols to be observed for the construction of ancillary site infrastructure and preparation works, including hours of operation, traffic controls and mitigation measures to ensure traffic on Riverside Drive is not significantly impeded by site traffic during construction;	Sections 1 & 4
(g)	include a Drivers' Code of Conduct that includes procedures to ensure that drivers: (i) adhere to posted speed limits or other required travelling speeds; (ii) adhere to designated transport routes; and (iii) implement safe and quiet driving practices;	Section 5
(h)	describe the measures to be put in place to ensure compliance with the Drivers' Code of Conduct; and	Section 5
(i)	propose measures to minimise the transmission of dust and tracking of material onto the surface of public roads from vehicles exiting the site.	Sections 4.4 & 4.8
(j)	propose measures (such as the installation of inclinometers) to monitor and detect any ground movement adjacent to the Princes Highway as a result of the extraction in Stage 5B; and	Section 4.11
(k)	Outline the procedures that would be implemented to respond to and address any material ground movements detected under paragraph (j) and demonstrate the long - term stability and safety of stage 5B extraction area on the Princess Highway road reserve.	Section 4.11

3 Existing conditions

3.1 Road network

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy as follows:

- state roads – freeways and primary arterials (TfNSW managed);
- regional roads – secondary or sub arterials (council managed and part funded by the State); and
- local roads – collector and local access roads (council managed).

An overview of each of the key roads which are shown in Figure 3.1, is provided in the tables and photographs in this chapter.

Source: Carto

Figure 3.1 Road hierarchy near site

Table 3.1 Princes Highway

Aspect	Description
Road classification and connectivity	State road extending from Sydney to Melbourne
Alignment	Generally north-south
Number of lanes	Generally two lanes each way at the vicinity of the site
Carriageway type	Sealed road, dual carriageway
Carriageway width	Approximately 30 m with 3.5 m travel lane each way, 10m median strip and 3m shoulders on each side
Posted speed limit	100 km/h at the vicinity of the site
Heavy vehicle access	26 m B-double approved
Traffic function	Provides arterial connection

Source: Google Maps

Plate 3.1 Princes Highway (west of the site looking south)

Table 3.2 Riverside Drive

Aspect	Description
Road classification and connectivity	Local road between Swamp Road and Hutchinson Street
Alignment	Generally north west-south east
Number of lanes	One lane each way
Carriageway type	Sealed road,
Carriageway width	Approximately 7.4 m with 3.7 m travel lane
Posted speed limit	80 km/h
Heavy vehicle access	Yes
Traffic function	Provides local and regional connection

Source: EMM

Plate 3.2 Riverside Drive (north of the site looking north-west)

4 Traffic management

4.1 Site access

As stated earlier, the vehicular access and egress to the site will be provided via a new access, located opposite to Kiama Community Recycling Depot, having a designated right turn lane from Riverside Drive into the site (Plate 4.1).

Construction activities within the Stage 5 areas, will be wholly contained on the site, to not impact on the functioning of Riverside Drive.

Construction of the new site access will be regulated through the relevant Road Opening Permit (ROP) and Traffic Control Plan (TCP), issued by the relevant Councils. The ROP and TCP will contain conditions pertaining to the hours of operation, traffic control measures and other associated activities.

Plate 4.1 Site access from Riverside Drive

4.2 Site operation

The site access and circulation has been designed to operate in a safe manner. There will be a portable site office for Stage 5B. There will be no site visitors except regulatory authorities eg EPA, DPIE etc. In total 10 car parking spaces will be provided next to the office.

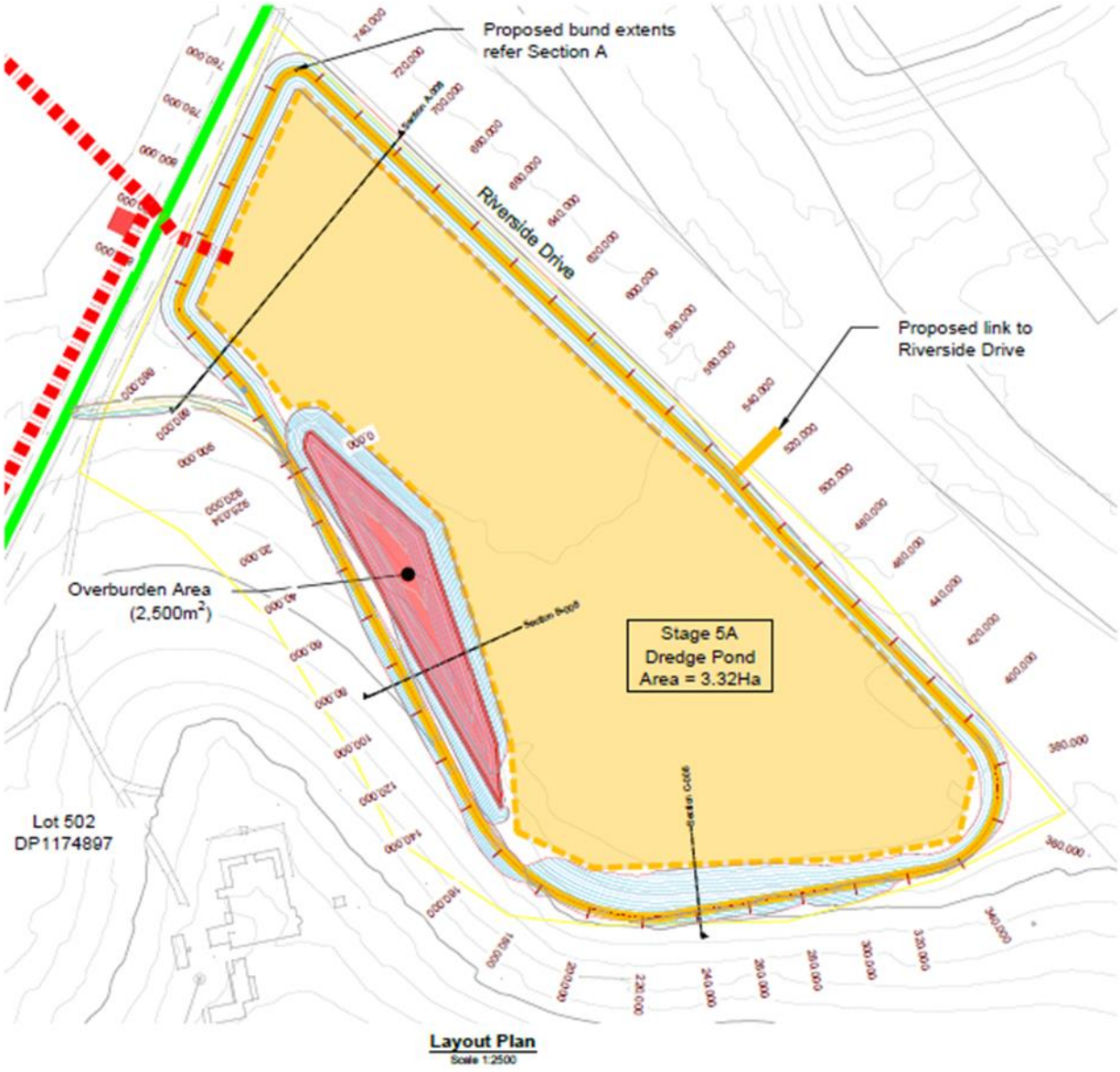

Figure 4.1 Site layout Stage 5A

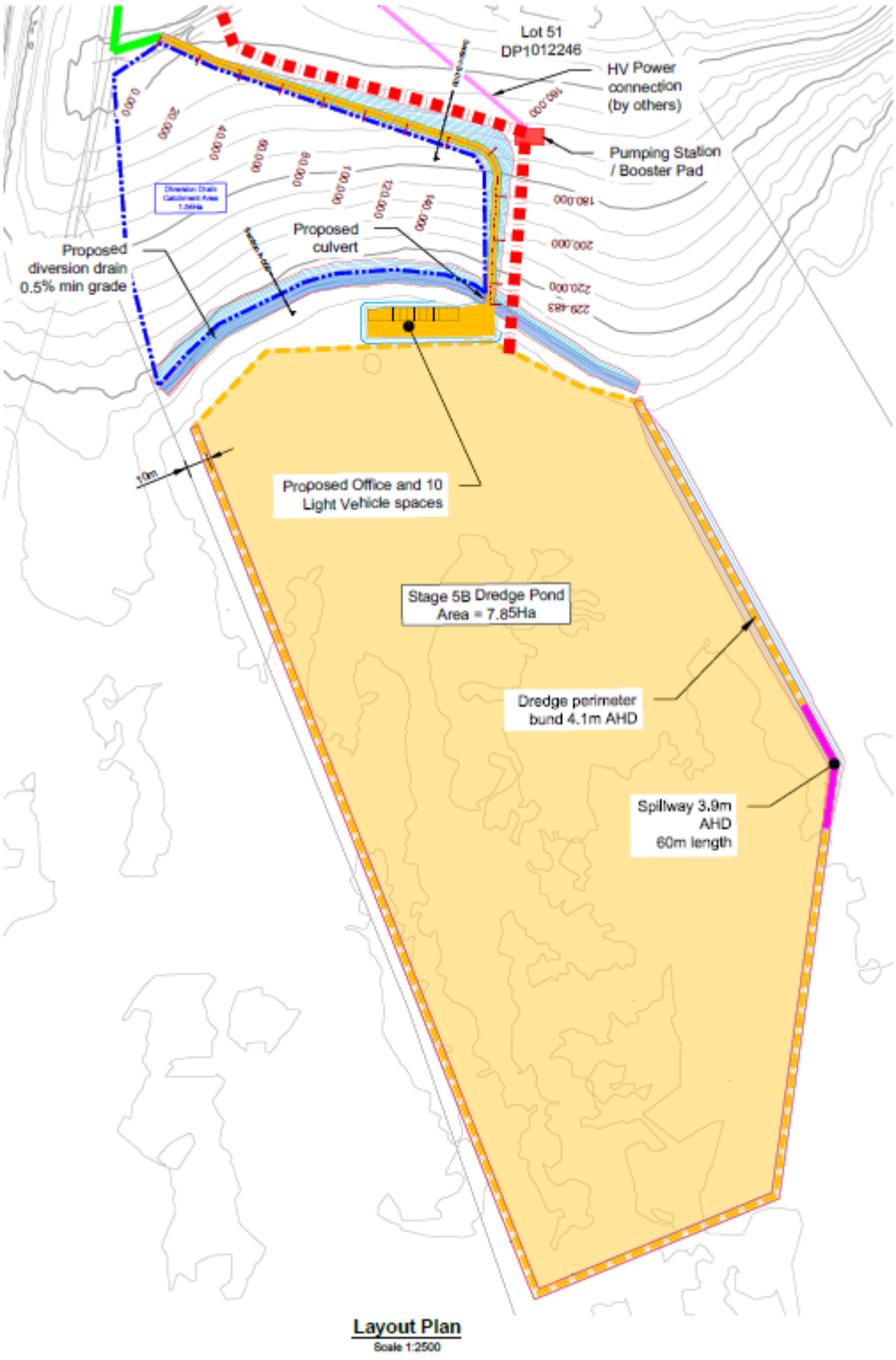

Figure 4.2 Site layout Stage 5B

4.3 Weighbridge

There will be no weighbridge at the Stage 5 site as weight checks will occur for all incoming loaded trucks at the point of origin, as well as the Tabbitta Road site, and outbound material will be transported to the current site (Stage 2 area) by pipeline.

4.4 Wheel wash bay

There will be no need for wheel wash bay upon entry. A wheel wash bay will be provided upon exit so that all trucks are clean before departing. The wheel wash bay will be located south west of the new intersection on the access track next to the project boundary.

4.5 Vehicle Covers

All loaded vehicles will be covered while using the public road network.

4.6 Site safety

Site safety within the site will be ensured by Safe Working Guidelines. All regulatory visitors must report to the site office upon entering the site. The speed limit within the site is to be restricted to 20 km/h.

All site safety procedures will be signposted at the entrance to the site. All exiting vehicles must stop before approaching the driveway crossover to Riverside Drive.

All vehicles will enter and exit the site in a forward direction to/ from Riverside Drive.

4.7 Queuing on Riverside Drive

As stated in Section 1.6.2, there will be a maximum 5 truck movements entering the site from Riverside Drive during the peak hour, which equates to one truck in every 12 minutes. The right turn bay will be 85m long which will easily accommodate any 25m truck and trailer combination. Therefore, the likelihood of trucks queuing on Riverside Drive will be minimal. Trucks will also be required to attend the Tabbitta Road site, prior to approaching the Stage 5 areas, to confirm queuing is not occurring at the site.

4.8 Dust control

The site will operate under an Air Quality Management Plan.

The site will be regularly watered to minimise dust, with an irrigation system installed along key site roads. After completion, site areas will be rehabilitated with vegetation to minimise dust and improve erosion control.

4.9 Haulage routes

It is expected that majority of the trucks transporting VENM to Stage 5 areas will approach the site from north along Princes Highway in a southbound direction, use the Princes Highway off-ramp onto Riverside Drive, and then travel southbound along Riverside Drive before turning right into the site.

Trucks approaching from the south will travel along Princes Highway in a northbound direction, use the Princes Highway/Shellharbour Road off and on-ramps and roundabouts for the u-turn movement to then travel southbound along Princes Highway to Riverside Drive.

For exiting trucks to the north or south, all trucks will use the northbound on-ramp from Riverside Drive to Princes Highway. Southbound trucks would use the Shellharbour Road off and on ramps and roundabouts for the u-turn movement, similarly to the approach route.

Construction vehicles will utilise a similar route to that described above, and will be required to complete induction at the existing DSS operations at Tabbitta Road, prior to coming to the Stage 5 areas.

The VENM truck haulage routes are shown in Figure 4.3.

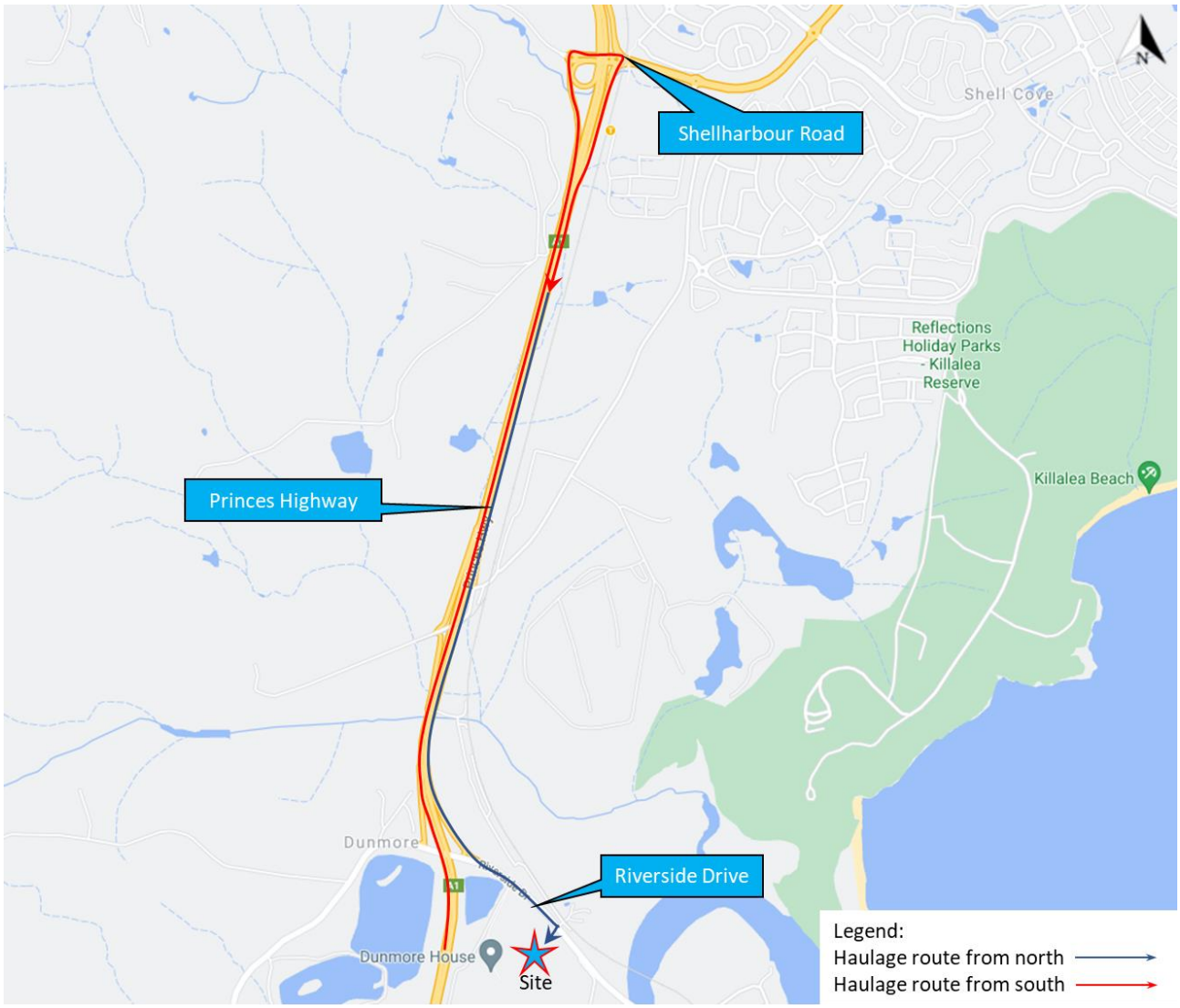

Figure 4.3 Haulage routes to/ from the site

4.10 Vehicle types

The heavy vehicle types accessing the site would vary between an 8.8-m long Medium Rigid Vehicle (MRV) and a 25m truck and trailer combination. The maximum size of vehicle accessing the site would be a 25m truck and trailer combination. Vehicles associated with construction activities are expected to be consistent with and will not exceed the above parameters.

4.11 Condition 56j and 56k

Conditions 56j and 56k relate to monitoring of the ground movement adjacent to the Princes Highway. This would be addressed after commencement of operation of Stage 5B. It is not possible for ground movement monitoring to be undertaken before site operations start to take place.

5 Driver code of conduct

5.1 Purpose of the code

The Driver Code of Conduct (Code) outlines procedures to ensure that truck drivers adhere to the designated transport routes and implement safe driving practices, while travelling to/from the quarry site

It is a condition of employment at Dunmore Sand and Soils that all employees and contractors are aware of the Code and that they drive responsibly and adhere to the code. All drivers are trained in the requirements of the Code and audits of their compliance with the Code are regularly conducted. All drivers reported or found to be acting in a manner contrary to the Code are subject to disciplinary action.

5.2 General requirements

Heavy vehicle drivers accessing the site must:

- undertake a site induction carried out by an approved member of the facility's staff or suitably qualified person under the direction of the facility's management;
- hold a valid driver's licence for the class of vehicle they are driving;
- operate the vehicle in a safe manner within and external to the site;
- adhere to designated transport routes; and
- comply with the direction of authorised site personnel when within the site.

5.3 Heavy vehicle speed

The following speed restrictions apply in relation to travel to/from the site:

- Princes Highway – speed limit is restricted to 100 km/h;
- Riverside Drive – speed limit is restricted to 80 km/h; and
- Within the site – speed limit is restricted to 20km/h for all vehicles.

Drivers are to observe the posted speed limits on all public roads with speed adjusted appropriately to suit the road environment and prevailing weather conditions, to comply with the Australian Road Rules. The vehicle speed must be appropriate to ensure the safe movements of the vehicle based on the vehicle configuration.

In addition, all drivers and truck operators working for or on behalf of Dunmore Sand and Soils are to be made aware of the Three Strikes Scheme (https://www.aic.gov.au/sites/default/files/2020-05/tandi446.pdf) introduced by Australian government which applies to all vehicles over 4.5 tonnes.

When a heavy vehicle is detected travelling at 15 km/h or more over the posted or relevant heavy vehicle speed limit by a mobile police unit or fixed speed camera, TfNSW will record a strike against that vehicle. If three strikes are recorded within a three-year period, TfNSW will act to suspend the registration of that vehicle (up to three months).

5.4 Driver fatigue

Fatigue is one of the biggest causes of crashes for heavy vehicle drivers. The National Heavy Vehicle Accreditation Scheme (https://www.nhvr.gov.au/safety-accreditation-compliance/national-heavy-vehicle-accreditation-scheme) allows heavy vehicle operators the choice of operating under three fatigue management schemes: Standard Hours of Operation; Basic Fatigue Management (BFM); and Advanced Fatigue Management (AFM). All heavy vehicle drivers operating at the site are to be aware of their adopted fatigue management scheme and operate within its requirements.

Fatigue includes (but is not limited to) the following:

- feeling sleepy;
- feeling physically or mentally tired, weary or drowsy;
- feeling exhausted or lacking energy; and
- behaving in a way consistent with any of the above.

5.5 Heavy vehicle control

In order to minimise the impact of noise from truck transport, the following controls will apply to truck operators at Dunmore Sand and Soils:

- compression brakes not to be used in the vicinity of residential areas;
- tailgates must be locked and secured to avoid noise or spillage;
- always observe the posted speed on site and the local road network;
- no tailgating is permitted – a 3 second gap is to be observed at all times;
- equipment to be used must be fit for the purpose; and
- drivers to obey the operating hours outlined in Section 1.4.

5.6 Load covering

Loose material on the road surface has the potential to cause road crashes and vehicle damage. All loaded vehicles using the site must be effectively covered for the duration of the trip. The load cover may be removed upon arrival at the delivery site. All care is to be taken to ensure that all loose debris from the vehicle body and wheels is removed prior to leaving the site and again after unloading.

Drivers must ensure that the tailgate is locked before leaving the site. Facility management is to monitor loose material on the side of the vehicle route from facility operations and take appropriate action (removal or suppression) regularly.

5.7 Cleanness

All vehicles are to be inspected prior to leaving the site for cleanliness. Loaded vehicles will be checked before leaving the point of origin so that no loose material may fall on the road surface. Empty trucks will traverse through a wheel wash to ensure cleanliness before leaving the site.

5.8 Vehicle arrival and departure

All VENM trucks will travel to/ from the site in accordance with their prescribed travel routes. All VENM trucks origin and destination points will be recorded. The following controls will apply to trucks arriving to the site:

- VENM trucks proposing to enter Stage 5A will be required to attend the existing weighbridge at Tabitta Road ;
- once weighed, trucks will need to confirm the entry gate to Stage 5A is open, prior to commencing their approach to site; and
- once confirmed, trucks may proceed to Stage 5A, and wholly enter the site.

5.9 Vehicle departure and arrival (avoiding convoys)

Heavy vehicles leaving the facility will be separated to minimise impact on the public roads. This will be controlled as far as practicable by the wheelwash operator. However, it is important for all drivers to be aware of the requirement to avoid travelling in convoys after leaving the facility.

All trucks arriving to the facility would be coming from the existing weighbridge at Tabitta Road. The weighbridge operator will first receive confirmation at the weighbridge that the gate at Stage 5A site is open to allow trucks. The weighbridge operator will ensure trucks do not arrive in convoys to the Stage 5A site.

5.10 Breakdown and incidents

In the case of a breakdown the vehicle must be towed to the nearest breakdown point as soon as possible. All breakdowns must be reported to the Dunmore Sand and Soil management and the vehicle protected in accordance with the Heavy Vehicle Drivers handbook.

Emergency contact numbers have been provided in Table 5.1 for reference.

Table 5.1 Emergency contact details

Organisation	Contact details
Transport Management Centre	(02) 8396 1400
Shellharbour City Council	(02) 4221 6111
Dunmore Sand and Soil	(02) 4237 8414
Lake Illawarra Police Station	(02) 4232 5599
Kiama Council	(02) 4232 0444

5.11 Complaint management

A complaint management system to engage in active community consultation and maintain positive relations with local residents will be implemented for the site. The purpose of this system is to minimise complaints by addressing their concerns upfront and monitor the environmental performance of the site.

5.11.1 Registering complaints

Any enquiries or complaints made by members of the public to site personnel will be directed to the Quarry Manager.

Complaints may be made to the quarry's direct line during business hours (02 4237 8414) which will be forwarded to a site representative outside of business hours or for emergencies. This number will be provided on a sign at the site entrance.

5.11.2 Complaint response

Any complaint received by Dunmore Sand and Soil regarding driver conduct, road condition and noise impacts from the quarry will be acted on within 24-hours in the following manner:

- details of the complaint (date, time, specifics, complainants contact details) will be recorded;
- activities occurring during the complaint period will be investigated;
- findings of operations during the complaint period will be recorded in the complaints register;
- relevant management practices will be reviewed as necessary; and
- with findings of the review will be communicated to the complainant.

5.11.3 Complaints register

The details of any complaint will be logged in the complaints register, with investigation findings and actions noted. The record of a complaint will be kept for at least 4 years after the complaint was made. The record will be produced to any authorised officer of the EPA who asks to see them.

The complaints register will be available on the project website and will be updated monthly.

Should the complaint be relevant to any of the conditions of the Approval, it will be handled as per the Approval conditions relevant to that environmental aspect.

5.12 Pedestrian management within the site

There will be minimal pedestrian activity within the site, except for the site employees or truck drivers. All regulatory visitors must report at the Tabbita Road site office upon arriving at the site.


Attachment A

Concept design for site proposed access




A1

A1

BORAL, DUNMORE QUARRY, RIVERSIDE DRIVE, DUNMORE SITE ACCESS WORKS

LOCALITY PLAN

N.T.S.

SHEET INDEX

SHEET No	DESCRIPTION	REV
EMM - C00	COVER SHEET AND SHEET INDEX	A
EMM - C01	NOTES	A
EMM - C02	SURVEY AND SERVICES PLAN	A
EMM - C03	EROSION AND SEDIMENT CONTROL PLAN	A
EMM - C04	CONSTRUCTION PLAN	A
EMM - C05	LONGITUDINAL SECTIONS	A
EMM - C06	CROSS SECTION	A
EMM - C03	SIGNS AND LINEMARKING PLAN	A
EMM- C04	SWEPT PATHS PLAN	A

NOT FOR CONSTRUCTION

EMM creating opportunities

SYDNEY | Suite 01
Ground Floor
20 Chandos Street,
St Leonards NSW 2065

Phone # 02 9493 9500

www.emmconsulting.com.au

REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
A	17/6/21	FOR COMMENT	C.J.	C.J.					
-	12/5/21	FOR COMMENT	P.B.	C.J.					

PROJECT:
BORAL, DUNMORE QUARRY
RIVERSIDE DRIVE, DUNMORE.
ACCESS WORKS

DRAWING TITLE:
COVER SHEET & SHEET INDEX

CLIENT: BORAL LTD.

DRG. #: EMM - C00

PROJECT #: J210315

SCALE: AS SHOWN

REV: A

A1

GENERAL

1. THE DRAWINGS ARE A DIAGRAMMATIC REPRESENTATION ONLY OF THE WORK TO BE CARRIED OUT AND DIMENSIONS SHALL NOT BE OBTAINED BY SCALING.
2. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT KMC GUIDELINES AND SPECIFICATIONS. ROADS AND MARITIME THEN AUSTRALIAN STANDARDS TO BE USED IN OTHER INSTANCES.
3. PROVISION FOR TRAFFIC DURING CONSTRUCTION TO BE IN ACCORDANCE WITH KMC CONSTRUCTION SPECIFICATION C201 - CONTROL OF TRAFFIC.
4. ALL LOCATION, ORIENTATION AND LEVELS SHALL BE VERIFIED ON SITE BEFORE COMMENCING ANY WORK. ANY DISCREPANCIES IN THE DRAWINGS AND/OR SPECIFICATIONS SHALL BE REFERRED TO THE PRINCIPAL FOR CLARIFICATION BEFORE PROCEEDING. NATURAL SURFACE LEVELS ARE INDICATIVE ONLY.
5. ALL INVESTIGATION & WORK TO BE UNDERTAKEN IN ACCORDANCE WITH KMC CONSTRUCTION SPECIFICATION - DEVELOPMENT CONSTRUCTION - GENERAL
6. PRIOR TO COMMENCEMENT OF WORKS THE CONTRACTOR SHALL SATISFY HIMSELF OF THE CORRECT LOCATION OF EXISTING SERVICES WHETHER INDICATED OR NOT ON THE DRAWINGS.
7. ADJUST ALL UTILITY SERVICE COVERS TO SUIT NEW GRADES & LEVELS, FLUSH WITH SURROUNDING AREA.
8. EXISTING STATE SURVEY MARKS AFFECTED BY THE WORKS ARE TO BE RECOVERED IN ACCORDANCE WITH SURVEYOR GENERAL'S DIRECTION No. 11 - "PRESERVATION OF SURVEY INFRASTRUCTURE".

SITE MANAGEMENT:

1. PROVIDE BARRIERS AROUND ALL CONSTRUCTION WORKS WITHIN THE FOOTPATH AREA TO PROVIDE SAFE ACCESS FOR PEDESTRIANS.
2. CONCRETE PUMPS AND CRANES ARE TO OPERATE FROM WITHIN THE DESIGNATED WORK AREA AND ARE NOT TO OPERATE FROM THE PUBLIC ROADWAY UNLESS SPECIFIC COUNCIL PERMISSION IS OBTAINED.
3. DELIVERY VEHICLES MUST NOT STAND WITHIN THE PUBLIC ROADWAY FOR MORE THAN 20 MINUTES AT A TIME.
4. TOILET FACILITIES MUST BE EITHER FLUSHING TYPE OR APPROVED PORTABLE CHEMICAL CLOSET. CHEMICAL CLOSETS ARE TO BE MAINTAINED AND SERVICES ON A REGULAR BASIS SO THAT OFFENSIVE ODOUR IS NOT EMITTED.
5. TRAFFIC MANAGEMENT MEASURES ARE REQUIRED TO BE IMPLEMENTED AND MAINTAINED DURING CONSTRUCTION IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE RMS TRAFFIC CONTROL AT WORKSITES MANUAL AND AS1742, MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
6. PEDESTRIAN CONTROL MEASURES ARE REQUIRED TO BE IMPLEMENTED AND MAINTAINED DURING CONSTRUCTION IN ACCORDANCE WITH AS1742, MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
7. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT ALL WORK CARRIED OUT AT THE SITE IS IN ACCORDANCE WITH COUNCIL'S WORK HEALTH & SAFETY POLICY.
8. DO NOT STORE OR PLACE MATERIALS INSIDE THE DRIP LINE OF ANY TREE. CONSTRUCTION ACTIVITIES, VEHICLE PARKING OR MAINTENANCE, MATERIALS STORAGE OR LOCATING OF CONTAINERS AND SITE SHEDS MUST NOT OCCUR WITHIN THE DRIP LINE OF ANY TREES OR WITHIN 5M OF TREES WHERE THE DRIP LINE RADIUS IS LESS THAN 5M.
9. THE CONTRACTOR SHALL EFFECT TEMPORARY DRAINAGE MEASURES TO AVOID LOCALISED PONDING.

EARTHWORKS:

1. EARTHWORKS ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE DRAWINGS AND GEOTECHNICAL ENGINEERS RECOMMENDATIONS. THE DESIGN AS DETAILED ON THESE DRAWINGS ASSUMES A PROPERLY PREPARED UNIFORM AND STABLE SUBGRADE.
2. THE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH ANY GEOTECHNICAL REPORT PREPARED FOR THE WORKS.
3. STRIP OFF ALL VEGETATION, RUBBISH AND TOPSOIL CONTAINING ORGANIC OR ROOT MATTER FROM THE AREA OF THE WORKS AND REMOVE FROM SITE/STOCKPILE FOR RE-USE.
4. PRIOR TO ANY FILLING, THE EXPOSED SUBGRADE SHALL BE PROOF ROLLED WITH A MINIMUM OF 10 PASSES OF A 5 TONNE (MIN) DEAD WEIGHT VIBRATING ROLLER IN THE PRESENCE OF THE SUPERINTENDENT OR GEOTECHNICAL ENGINEER AND ANY SOFT OR YIELDING MATERIALS REMOVED AND REPLACED WITH APPROVED FILLING COMPACTED AS HEREAFTER SPECIFIED.
5. FILL SHALL BE SOUND WELL GRADED MATERIAL WITH A HIGH GRANULAR CONTENT AND SHALL BE THE BEST OF EXCAVATED MATERIALS FROM THE SITE, OR APPROVED SOUND IMPORTED MATERIAL FREE OF RUBBISH, PLASTIC CLAY OR LARGE PIECES THAT WOULD PRECLUDE COMPACTION.
6. FILL SHALL BE SPREAD IN LAYERS NOT EXCEEDING 200MM AND COMPACTED USING SUITABLE MECHANICAL EQUIPMENT AT OPTIMUM MOISTURE CONTENT ±2 % TO NOT LESS THAN 98% MAXIMUM STANDARD DRY DENSITY (MSDD) IN ACCORDANCE WITH AS1289 - E11 UNLESS OTHERWISE NOTED.
7. FINISH FILLING LEVELS TO SUIT CONSTRUCTION OVER, ALLOWING FOR MIN 75MM OF BASE COURSE (DGB20) COMPACTED TO 98% MAXIMUM MODIFIED DRY DENSITY (MMDD) WHERE NOTED ON DRAWINGS.
8. DENSITY TESTING OF FILLING (AND BASE COURSE WHERE APPLICABLE) SHALL BE CARRIED OUT AT THE RATE OF 1 TEST PER 200 SQUARE METRES EACH LAYER (MINIMUM 2 TESTS). TESTING SHALL BE BY A NATA REGISTERED LABORATORY AND SHALL BE ALLOWED FOR BY THE CONTRACTOR.
9. THE CONTRACTOR SHALL PROGRAM AND UNDERTAKE THE EARTHWORKS OPERATIONS SUCH THAT WORKING AREAS ARE ADEQUATELY DRAINED DURING CONSTRUCTION. THE SURFACE SHALL BE GRADED AND SEALED OFF TO REMOVE DEPRESSIONS WHICH WOULD ALLOW WATER TO POND AND PENETRATE THE UNDERLYING MATERIAL. ANY DAMAGE RESULTING FROM FAILURE TO COMPLY WITH THESE REQUIREMENTS SHALL BE RECTIFIED AT THE CONTRACTORS EXPENSE.

DEMOLITION:

1. CARRY OUT ALL DEMOLITION WORK IN ACCORDANCE WITH AS 2601.
2. UNTIL PERMANENT SUPPORT IS PROVIDED, PROVIDE TEMPORARY SUPPORT FOR SECTIONS OF EXISTING STRUCTURES WHICH ARE TO BE ALTERED AND WHICH NORMALLY RELY FOR SUPPORT ON WORK TO BE DEMOLISHED.
3. SUPPORT EXCAVATIONS FOR DEMOLITION OF UNDERGROUND SERVICES.
4. PROVIDE SUPPORT TO ADJACENT STRUCTURES WHERE NECESSARY, SUFFICIENT TO PREVENT DAMAGE RESULTING FROM THE WORKS.
   - LATERAL SUPPORTS: PROVIDE LATERAL SUPPORT AT LEAST EQUAL TO THAT GIVEN BY THE STRUCTURE TO BE DEMOLISHED, USING SHORING.
   - VERTICAL SUPPORTS: PROVIDE SUPPORT WHERE NECESSARY USING PILING OR UNDERPINNING, OR BOTH.
5. PROVIDE DUST PROOF SCREENS, BULKHEADS AND COVERS TO PROTECT EXISTING FINISHES AND THE IMMEDIATE ENVIRONMENT FROM DUST AND DEBRIS.
6. DO NOT USE EXPLOSIVES.
7. HAZARDOUS MATERIALS. GIVE NOTICE IMMEDIATELY IF HAZARDOUS MATERIALS OR CONDITIONS ARE FOUND, INCLUDING THE FOLLOWING:
   - ASBESTOS OR MATERIAL CONTAINING ASBESTOS.
   - FLAMMABLE OR EXPLOSIVE LIQUIDS OR GASES.
   - TOXIC, INFECTIVE AND CONTAMINATED MATERIALS.
   - RADIATION OR RADIOACTIVE MATERIALS.
   - NOXIOUS OR EXPLOSIVE CHEMICALS.
   - TANK OR OTHER CONTAINERS WHICH HAVE BEEN USED FOR STORAGE OF EXPLOSIVE, TOXIC, INFECTIVE OR CONTAMINATED SUBSTANCES.

ROAD WORKS

GENERAL

1. EXISTING VEGETATION TO BE REMOVED WITHIN EXTENTS OF WORKS UNLESS NOTED OTHERWISE
2. ALL PIT GRATES TO SUIT KMC STANDARDS KERB INLET ARRANGEMENTS SHOWING KMC STANDARDS DRAWINGS
3. KERB TYPES AND KERB RAMPS REFER TO KMC STANDARDS.

SET OUT PLANS AND COORDINATES TABLES

4. DESIGN HAS BEEN BASED ON LAND SURVEY COMPLETED BY EMM.
5. SURVEY DATUM IS AHD.
6. SURVEY AZIMUTH IS BASED ON MGA ZONE 56.
7. SURVEY MARKS ARE NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR
8. ALL LOCATIONS, ORIENTATION AND LEVELS SHALL BE VERIFIED ON SITE BEFORE COMMENCING ANY WORK. ANY DISCREPANCIES IN THE DRAWINGS AND/OR SPECIFICATIONS SHALL BE REFERRED TO THE PRINCIPAL FOR CLARIFICATION BEFORE PROCEEDING. NATURAL SURFACE LEVELS ARE INDICATIVE ONLY.
9. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED WITH ANOTHER PM OR SSM TO LANDS DEPARTMENT STANDARDS. IT ALSO SHOULD BE DOCUMENTED AND COORDINATED TO EQUIVALENT LANDS DEPARTMENT STANDARDS.

PAVEMENT

1. PAVEMENT INTERFACES TO BE EITHER MID LANE OR AT LANE LINE UNLESS NOTED OTHERWISE ON THESE DRAWINGS OR INSTRUCTED BY THE PRINCIPAL.
2. LOCATION AND AREA OF MILL AND RE-SHEET PAVEMENT ARE INDICATIVE ONLY. FINAL LOCATIONS AND VOLUMES ARE TO BE DETERMINED ON SITE DURING CONSTRUCTION BY THE CONTRACTOR WITH AGREEMENT FROM THE PRINCIPAL.

STORMWATER DRAINAGE

1. STORMWATER DRAINAGE SHALL BE GENERALLY IN ACCORDANCE WITH CURRENT AUSTRALIAN STANDARDS AND COUNCIL'S SPECIFICATION.
2. PIPES OF 225mm DIA. AND UNDER SHALL BE UPVC. PIPES OF 300mm DIA. AND LARGER SHALL BE FRC OR CONCRETE CLASS 2 RUBBER RING JOINTED UNO.
3. ALL FRC OR RCP STORMWATER PIPES WITHIN ROAD RESERVE AREAS TO BE CLASS 3 U.N.O.
4. PIPES SHALL GENERALLY BE LAID AT THE GRADES INDICATED ON THE DRAWINGS.
5. MINIMUM COVER TO PIPES 300mm DIA. AND OVER GENERALLY SHALL BE 600mm IN CARPARK & ROADWAY AREAS UNO.
6. PIPES UP TO 150mm DIA SHALL BE LAID AT 1.0% MIN. GRADE U.N.O. PIPES 225mm DIA AND OVER SHALL BE LAID AT 0.5% MIN. GRADE U.N.O.
7. BACKFILL TRENCHES WITH APPROVED FILL COMPACTED IN 200MM LAYERS TO 98% OF STANDARD DENSITY
8. ANY PIPES OVER 16% GRADE SHALL HAVE CONCRETE BULKHEADS AT ALL JOINTS
9. PITS SHALL BE AS DETAILED WITH METAL GRATES AT LEVELS INDICATED. ALL PITS DEEPER THAN 1000mm TO HAVE CLIMB IRONS.
10. INSTALL TEMPORARY SEDIMENT BARRIERS TO INLET PITS, TO COUNCIL'S STANDARDS UNTIL SURROUNDING AREAS ARE PAVED OR GRASSED.
11. PIT LOCATIONS AND LEVELS MAY BE VARIED TO SUIT SITE CONDITIONS AFTER CONSULTING COUNCIL'S REPRESENTATIVE.
12. HAND-EXCAVATE STORMWATER PIPES IN VICINITY OF TREE ROOTS.
13. TRENCHING AND BEDDING DETAILS TO BE IN ACCORDANCE WITH AS3500 TO HS2 DETAIL UNLESS OTHERWISE NOTED.

SUBSURFACE DRAINAGE

1. LOCATION OF SUBSURFACE DRAINAGE SHOWN ON PLANS IS INDICATIVE ONLY. DRAWINGS TO BE READ IN CONJUNCTION WITH PAVEMENT DETAILS SECTIONS AND PLANS AND KMC CONSTRUCTION SPECIFICATION.
2. CONSTRUCTION OF TRENCH DRAINS TO BE IN ACCORDANCE WITH KMC CONSTRUCTION SPECIFICATION
3. DEPTH OF TRENCH AND PAVEMENT INTERFACE DRAINS TO BE CONFIRMED ONSITE BY THE CONTRACTOR WITH AGREEMENT FROM THE PRINCIPAL AND TO BE MEASURED FROM LOWEST POINT OF THE EXISTING OF NEW PAVEMENT SMZ.
4. GEOTEXTILE FOR TRENCH AND PAVEMENT INTERFACE DRAINS TO BE LAPPED ON THE TOP FACE.
5. MINIMUM GRADE OF SUBSURFACE DRAINAGE TO BE 0.5%.

REINFORCEMENT:

1. REINFORCEMENT SYMBOLS:
   - R DENOTES GRADE 250 R HOT ROLLED PLAIN BARS TO AS1302
   - F DENOTES GRADE 450 F HARD-DRAWN WIRE REINFORCING FABRIC TO AS1304
   - W DENOTES GRADE 450 W HARD-DRAWN PLAIN WIRE TO AS1303
   - N DENOTES DEFORMED BAR NORMAL DUCTILITY TO AS/NZS 4671 GRADE D500N
   - L DENOTES DEFORMED BAR LOW DUCTILITY TO AS/NZS 4671 GRADE D500L
   - RN DENOTES RECTANGULAR WIRE MESH NORMAL DUCTILITY TO AS/NZS 4671
   - RL DENOTES RECTANGULAR WIRE MESH LOW DUCTILITY
   - SN DENOTES SQUARE WIRE MESH NORMAL DUCTILITY
   - SL DENOTED SQUARE WIRE MESH LOW DUCTILITY TO AS/NZS 4671
2. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
3. THE SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN OR OTHERWISE APPROVED IN WRITING BY THE ENGINEER.
4. R4. LAPS SHALL BE IN ACCORDANCE WITH AS 3600 AND NOT LESS THAN THE DEVELOPMENT LENGTH FOR EACH BAR.
5. WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED UNLESS SHOWN ON THE DRAWINGS OR APPROVED BY THE SUPERINTENDENT.
6. MINIMUM FABRIC LAP SHALL BE TWO TRANSVERSE WIRES PLUS 50MM. WHERE FABRIC LAPS, SHEETS TO HAVE MAXIMUM 2 LAYERS AT ANY POINT, CUT BACK FABRIC AT CORNERS AS REQUIRED.
7. WHERE TRANSVERSE TIE BARS ARE NOT SHOWN PROVIDE N12-400 SPLICED WHERE NECESSARY AND LAP WITH MAIN BARS 400MM UNLESS NOTED.
8. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON PLASTIC CHAIRS OR CONCRETE CHAIRS, AT NOT GREATER THAN 1 METRE CENTRES BOTH WAYS, AND 800 EACH WAY FOR FABRIC. WHEN POURED ON GROUND AS FORMWORK PROVIDE PLATES UNDER ALL BAR CHAIRS. PLASTIC TIPPED STEEL CHAIRS SHALL NOT BE USED ON EXPOSED FACES IN EXPOSURE CLASSIFICATION B2 AND C.

CONCRETE:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 AND AS 3610 CURRENT EDITIONS WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. ALL CEMENT TO BE TYPE GP, GENERAL PURPOSE CEMENT IN ACCORDANCE WITH AS3972
3. PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 3600
4. DETAILS OF THE PROPOSED MIX ARE TO BE SUBMITTED & APPROVAL OBTAINED PRIOR TO POURING ANY CONCRETE.
5. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING.
6. MINIMUM CLEAR COVER TO ALL REINFORCEMENT SHALL BE AS FOLLOWS UNLESS SHOWN OTHERWISE:

ELEMENT	STRENGTH GRADE (MPa)	SLUP (mm)	MAX. AGGREG. SIZE (mm)	CAST AGAINST GROUND (mm)	CAST IN FORMS AND NOT EXPOSED (mm)	CAST IN FORMS AND EXPOSED (mm)
PATH	25	80	20	40	40	40

7. CONCRETE SIZES/DIMENSIONS SHOWN DO NOT INCLUDE THE THICKNESS OF ANY APPLIED FINISHES. NO FINISH THAT DECREASES COVER IS PERMITTED WITHOUT THE WRITTEN APPROVAL OF THE SUPERINTENDENT/ENGINEER.
8. MAINTAIN COVER TO REINFORCEMENT AT CHAMFERS, DRIP GROOVED, REGLETS ETC
9. NO HOLES, CHASES, BLOCKOUT, DUCTS OR EMBEDMENT OF PIPES OTHER THAN THOSE SHOWN ON THE DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE SUPERINTENDENT/ENGINEER.
10. CONSTRUCTION JOINTS WHERE NOT SHOWN SHALL BE LOCATED TO THE APPROVAL OF THE SUPERINTENDENT/ENGINEER.
11. ALL CONCRETE MEMBERS SHALL BE MECHANICALLY VIBRATED TO ACHIEVE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK AND THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS.
12. CURING OF ALL CONCRETE IS TO BE ACHIEVED BE KEEPING SURFACES CONTINUOUSLY WET FOR A PERIOD OF THREE DAYS, AND THE PREVENTION OF LOSS OF MOISTURE FOR A TOTAL OF 7 DAYS FOLLOWED BY A GRADUAL DRYING OUT.
13. CONSTRUCTION SUPPORT PROPPING IS TO BE LEFT IN PLACE WHERE NEEDED TO AVOID OVERSTRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING.
14. ALL CONCRETE SHALL BE PLACED IN SUCH A MANNER SO AS TO AVOID SEGREGATION OR LOSS OF MATERIALS.
15. UNDER NO CIRCUMSTANCES SHALL EXCESS CONCRETE BE DISPOSED OF ON-SITE. ALL EXCESS CONCRETE MUST BE CARTED FROM SITE AND DISPOSED OF IN AN APPROPRIATE MANNER.
16. WATER USED FOR FLUSHING CHUTES AND FOR CLEANING OF CONCRETE TRUCKS AND EQUIPMENT MUST BE DISCHARGED IN AN AREA DESIGNATED FOR THAT PURPOSE AND WHICH HAS EROSION AND SEDIMENT CONTROL MEASURES IN PLACE.

FORMWORK:

1. RESPONSIBILITY FOR DESIGN, CERTIFICATION, CONSTRUCTION AND PERFORMANCE OF FORMWORK AND FALSEWORK LIES WITH CONTRACTOR.
2. DO NOT SUPPORT OR RESTRAIN FORMWORK ON PERMANENT WORKS WITHOUT SUPERINTENDENTS WRITTEN APPROVAL.
3. CONSTRUCT FORMWORK TO COMPLY WITH AS3610 AND CLAUSE 19.6.2 OF AS3600 WHERE THIS IS MORE STRINGENT SO CONCRETE WILL HAVE DIMENSIONS, SHAPE, LOCATION AND FINISH SPECIFIED. PROVIDE OPENINGS OR REMOVABLE PANELS FOR INSPECTION AND CLEANING. APPLY RELEASE AGENT COMPATIBLE WITH CONTACT SURFACES TO INTERIOR OR FORMWORK (EXCEPT WHERE CONCRETE IS TO RECEIVE AND APPLIED FINISH FOR WHICH THERE IS NO COMPATIBLE RELEASE AGENT). WHERE NECESSARY CLEAN REINFORCEMENT TO REMOVE TRACES OF RELEASE AGENT. SEAL JOINT BETWEEN FORMWORK PANELS, AND TO HARDENED CONCRETE WITH FLEXIBLE RUBBER STRIP. SET OUT FORMWORK TO GIVE A REGULAR ARRANGEMENT OF PANELS, JOINT, BOLT HOLES ETC.
4. DO NOT USE FORMWORK HARDWARE THAT FORMS A COMPLETE HOLE THROUGH CONCRETE ELEMENTS. DO NOT USE REINFORCEMENT TO SUPPORT FORMWORK.
5. PROVIDE HOLES IN REBATE FORMERS ETC AS REQUIRED TO PREVENT AIR ENTRAPMENT.
6. CONSTRUCTION TOLERANCES TO BE TO AS3610.
7. STRIP FORMWORK TO AS3600 CLAUSE 19.6. REMOVE FROM TIE BOLTS WITHOUT DAMAGING CONCRETE. PARTS OF BOLTS LEFT IN CONCRETE MUST NOT INTRUDE INTO COVER CONCRETE. FLUSH FILL HOLES USING PRE-MIXED NON-SHRINK CEMENTITIOUS REPAIR MORTAR MATCHING CONCRETE SURFACE COLOUR, STRENGTH AND DURABILITY AND ADEQUATE BOND.

WORK NEAR EXISTING TREES AND TREE PROTECTION

GENERAL:

- TREES MUST NOT BE REMOVED OR LOPPED OR OTHERWISE DAMAGED, UNLESS SPECIFIED AND APPROVAL TO DO SO IS GIVEN BY THE SUPERINTENDENT. ALL CARE MUST BE TAKEN NOT TO DAMAGE OR INJURE ANY EXISTING TREES THAT ARE TO BE RETAINED. A QUALIFIED ARBORIST OR TREE PRESERVATION OFFICER IS TO BE CONSULTED PRIOR TO ANY EARTHWORKS BEING CONDUCTED NEAR EXISTING TREES WITHIN THE CONSTRUCTION ZONE. ANY DAMAGE INCURRED TO TREES THAT ARE TO BE RETAINED IS TO BE MADE GOOD AS SOON AS POSSIBLE FOLLOWING ADVICE BY AN APPROVED ARBORIST.

PROTECTION:

- IT IS THE SITE SUPERVISOR'S RESPONSIBILITY TO PROTECT ALL TREES IDENTIFIED FOR RETENTION.
- TREES TO BE RETAINED ARE TO BE PROTECTED WITH FENCING AND/OR TREE ARMOUR AS INDICATED ON THE DRAWINGS.
- COMPACTION OF SOIL IS TO BE AVOIDED WITHIN THE TREE PROTECTION ZONES SHOWN ON THE DRAWINGS.
- WHERE WORK IS REQUIRED TO BE UNDERTAKEN WITHIN THE TREE PROTECTION ZONES, TREE ARMOUR IS TO BE ERECTED AROUND THE TRUNK OF THE TREES AS INDICATED ON PLAN.

TREE PROTECTION FENCING:

- TREES ARE TO BE PROTECTED BY TEMPORARY CHAIN-WIRE CONSTRUCTION FENCING INSTALLED AT THE DRIPLINE IF POSSIBLE. TEMPORARY SIGNAGE LABELLED "TREE PROTECTION AREA. NO STORAGE OF MATERIALS OR MACHINERY" IS TO BE INSTALLED ON ALL TREE PROTECTION FENCING.

TREE ARMOUR:

- PROVIDE TREE ARMOUR AROUND TRUNKS OF TREES AS INDICATED ON PLAN BEFORE COMMENCEMENT OF ANY WORKS. ARMOUR IS TO CONSIST OF JUTE MATTING AND TIMBER BATTENS WRAPPED AROUND TREE TRUNKS AS INDICATED IN DRAWINGS.
- INSTALL A PROTECTIVE LAYER OF JUTE MAT AROUND TREE TRUNKS PRIOR TO INSTALLING TIMBER BATTENS AROUND TREE TRUNKS.
- TIMBER BATTENS ARE TO BE 1800 X 90 X 20mm. SECURE BATTENS INTO POSITION WITH THREE STRANDS OF WIRE OR NYLON WEBBING STAPLED OR NAILED TO CREATE A CONTINUOUS STRING, LONG ENOUGH TO SURROUND EACH TREE.
- ENSURE ARMOUR IS ATTACHED SECURELY AROUND THE TREE. AMOUR SHOULD BE ATTACHED TO ITSELF. NAILS OR FASTENERS ARE NOT TO BE ATTACHED DIRECTLY TO THE TREE TRUNK. ARMOUR IS TO REMAIN IN PLACE AS LONG AS MACHINERY IS REQUIRED ON SITE.

STORAGE OF MATERIALS:

- DO NOT STORE OR OTHERWISE PLACE BULK MATERIALS AND HARMFUL MATERIALS UNDER OR NEAR TREES WITHIN THE TREE PROTECTION ZONE. STORAGE OF MATERIALS, MIXING OF MATERIALS, VEHICLE PARKING, DISPOSAL OF LIQUIDS, MACHINERY REPAIRS AND REFUELLING, SITE OFFICE AND SHEDS MUST NOT OCCUR WITHIN THE DRIP LINE OF ANY EXISTING TREES, OR WITHIN 5M OF ANY EXISTING TREES WHERE THE DRIP LINE RADIUS IS LESS THAN 5m.
- DO NOT PLACE SPOIL FROM EXCAVATIONS AGAINST TREE TRUNKS, EVEN FOR SHORT PERIODS. PREVENT WIND-BLOWN MATERIALS SUCH AS CEMENT FROM HARMING TREES AND PLANTS.

WORK UNDER TREES:

- MINIMISE EXCAVATION OR FILLING AROUND TREES. IF CONSTRUCTION WORKS ARE NECESSARY AROUND TREES THEN MINIMISE THE USE OF MACHINERY. LEAVE TRENCHES OR EXCAVATED AREAS EXPOSED FOR AS SHORT A PERIOD AS POSSIBLE.

ROOTS:

- TREE ROOTS EXCEEDING 100mm DIAMETER ARE NOT TO BE CUT UNLESS ADVICE IS FIRST SOUGHT FROM AN ARBORIST.
- USE HAND TOOLS OR A CHAINSAW TO MAKE CLEAN CUTS TO ROOTS THAT REQUIRE CUTTING.

BACKFILLING:

- MINIMISE CHANGES TO SOIL SURFACE LEVELS AROUND TREES.
- RETURN NATURAL SOILS TO EXCAVATED AREAS OR USE OTHER VIRGIN EXCAVATED NATURAL MATERIAL (VENM) TO BACKFILL.
- ROAD MILLINGS, WASTE CONCRETE, ASPHALT OR OTHER FOREIGN MATERIALS ARE NOT TO BE USED FOR BACKFILLING WITHIN TREE ROOT ZONES.
- DO NOT BACKFILL AROUND TREE TRUNKS TO A HEIGHT GREATER THAN 300MM ABOVE THE ORIGINAL GROUND SURFACE UNLESS AUTHORISED.
- THOROUGHLY WATER THE SOIL FOLLOWING EXCAVATION WITHIN TREE ROOT ZONES.

REMOVAL OF TREES:

- WHEN REMOVING TREES, TAKE CARE NOT TO DAMAGE ANY ADJACENT EXISTING STRUCTURES, SERVICES OR TREES TO BE RETAINED.
- WHERE TREES BEING REMOVED ARE LOCATED IN FUTURE PLANTING AREAS AS SHOWN ON THE PLANTING PLAN, FULLY REMOVE THE TREES AND ALL THEIR PARTS INCLUDING THE ROOT SYSTEM.
- WHERE THIS IS NOT PRACTICAL CUT TRUNKS CLOSE TO THE EXISTING SOIL SURFACE LEVEL AND IMMEDIATELY APPLY UNDILUTED GLYPHOSATE HERBICIDE TO THE CUT SURFACES.

UTILITIES

1. THE LOCATION OF EXISTING UTILITIES SHOWN ON THE PLANS ARE INDICATIVE ONLY. THE CONTRACTOR IS TO REFER TO UTILITY RELOCATION PLANS APPROVED BY APPROPRIATE AUTHORITY FOR DETAILS ON PROPOSED UTILITY WORKS.
2. THE CONTRACTOR IS TO CONFIRM THE PRESENCE OF ALL UTILITIES ON SITE PRIOR TO THE COMMENCEMENT OF ROAD WORKS, REFERENCE MUST BE MADE TO THESE DRAWINGS PRIOR TO THE COMMENCEMENT OF ROAD WORKS, AND THE RELEVANT UTILITY PLANS OBTAINED BY CONTACTING DIAL BEFORE YOU DIG. CAUTION SHALL BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.
3. LOCATION AND LEVEL OF ALL SERVICES CROSSING THE PROPOSED WORKS MUST BE OBTAINED PRIOR TO CONSTRUCTION. ALL LEVELS MUST BE CHECKED FOR CONFLICT WITH ANY SERVICES, AND ANY CONFLICTS TO BE RAISED WITH PRINCIPAL.
4. PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES.
5. UNDERGROUND SERVICES HAVE BEEN PLOTTED FROM RECORDS SUPPLIED BY THE PUBLIC AUTHORITIES TO SHIRE CIVIL DESIGN IN DECEMBER 2019 LOCATIONS HAVE BEEN INTERPRETED FROM THESE RECORDS AND ARE APPROXIMATE ONLY. EXTREME CAUTION SHOULD BE TAKEN BY PERSONS EXCAVATING.

EROSION AND SEDIMENT CONTROL

1. GENERAL MEASURES
   - SOIL EROSION AND SEDIMENTATION CONTROL MEASURES DURING CONSTRUCTION SHALL CONFORM WITH GUIDELINES IN ACCORDANCE WITH "MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION - VOLUME 1, LANDCOM 2004" AND COUNCIL'S POLICY
   - PERIMETER CONTROL MEASURES SHALL BE PLACED PRIOR TO OR IN CONJUNCTION WITH THE FIRST PHASE OF THE EARTHWORKS. THESE MEASURES SHALL BE APPLIED TO PROTECT ADJOINING PROPERTIES FROM EROSION AND SILT DAMAGE.
   - EARTH STOCKPILES SHALL BE CONFINED TO ONE CENTRAL AREA WHERE POSSIBLE. ALL STOCKPILES OF EXCAVATED OR CONSTRUCTION SOILS MUST HAVE A SILT FENCE ERECTED IMMEDIATELY DOWNHILL FOR THE FULL EXTENT OF THE STOCKPILE. WHERE SITE REGRADING OR FILLING IS BEING UNDERTAKEN PROVISION SHALL BE MADE TO ENSURE THAT NO WATER IS PONDED IN ANY LOT.
   - ALL AREAS NOT SUBJECT TO CONSTRUCTION WORKS SHALL BE RETAINED FREE FROM DISTURBANCE OR DAMAGE DURING THE CURRENCY OF THE WORK. SHOULD THESE AREAS BECOME DISTURBED OR DAMAGED THEY SHALL BE REINSTATED AS DIRECTED BY THE SUPERINTENDENT.
2. SEDIMENT CONTROL DEVICES (S.C.D.)
   - THESE DEVICES SHALL BE CONSTRUCTED AT INLETS TO STORMWATER SYSTEMS TO TRAP THE SEDIMENT IN RUN-OFF.
3. STABILISATION OF DISTURBED AREAS
   - STABILISATION OF DISTURBED AREAS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS INDICATED IN GENERAL NOTES ABOVE.
   - THE FOLLOWING SHALL BE APPLIED FOR THE CONTROL OF EROSION AND SEDIMENTATION:-
     a. STABILISATION OF DENUDED AREAS SHALL COMMENCE AS SOON AS POSSIBLE AFTER THE AREAS HAVE BEEN DISTURBED.
     b. STABILISATION OF ALL CUT AND FILL SLOPES SHALL BE COMMENCED AS SOON AS PRACTICABLE AFTER COMPLETION OF FORMATION.
     c. ALL STABILISATION MEASURES SHALL BE TAKEN PRIOR TO THE END OF THE MAINTENANCE PERIOD.
4. MAINTENANCE
   - ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE MAINTAINED IN A SATISFACTORY WORKING ORDER THROUGHOUT THE CONTRACT, MAINTENANCE AND DEFECTS LIABILITY PERIODS OR UNTIL SUCH EARLIER TIME AS THE AREA HAS BEEN STABILISED AND COUNCIL'S ENGINEER DIRECTS THAT THE DEVICE BE REMOVED.
   - ALL DEVICES SHALL BE INSPECTED AFTER EACH STORM FOR STRUCTURAL DAMAGE OR CLOGGING BY SILT AND OTHER DEBRIS AND MAKE PROMPT REPAIRS OR REPLACEMENT.

SIGNAGE AND LINEMARKING

1. INSTALLATION OF PAVEMENT MARKING RRPM'S AND SIGNAGE TO BE IN ACCORDANCE WITH KMC CONSTRUCTION SPECIFICATION, GUIDELINES AND STANDARDS.
2. CONTRACTOR TO OBTAIN WRITTEN APPROVAL FROM KMC PRIOR TO INSTALLATION OF ANY SIGNAGE OR LINEMARKING.
3. LOCATION OF ALL SIGNAGE TO BE CONFIRMED ON SITE IN COORDINATION WITH THE PRINCIPAL PRIOR TO MANUFACTURE.
4. ALL SIGNS TO BE SIZE 'B' UNLESS NOTED OTHERWISE.
5. EXISTING SIGNS DESIGNATED REMOVAL TO BE STORED IN CONTRACTOR'S COMPOUND FOR WCC RECOVERY.
6. SIGNAGE TO BE LOCATED IN ACCORDANCE WITH AS1742 APPENDIX B
7. SIGNS TO BE MOUNTED A MINIMUM 2.5M ABOVE FSL.
8. CONTRACTOR TO CONFIRM LOCATION OF ALL SERVICES, DRAINAGE WORKS AND UNDERGROUND INFRASTRUCTURE PRIOR TO COMMENCING WORK. CONTRACTOR TO ENSURE ADOPTED METHOD OF CONSTRUCTION AND PROPOSED WORK WILL AVOID DAMAGE TO ALL SERVICES AND DRAINAGE WORKS, INCLUDING CLEARANCE TO OVERHEAD POWERLINES.
9. INSTALL PAINTED CHEVRONS IN ACCORDANCE WITH RMS DELINEATION GUIDELINES.
10. ALL PERMANENT ROAD LINEMARKING AND PAVEMENT MESSAGES INCLUDING ARROWS TO BE NON-PROFILE REFLECTIVE THERMO-PLASTIC MATERIAL IN ACCORDANCE WITH WCC CONSTRUCTION SPECIFICATIONS.
11. ALL TEMPORARY LINEMARKING TO BE WATERBORNE PAINT.

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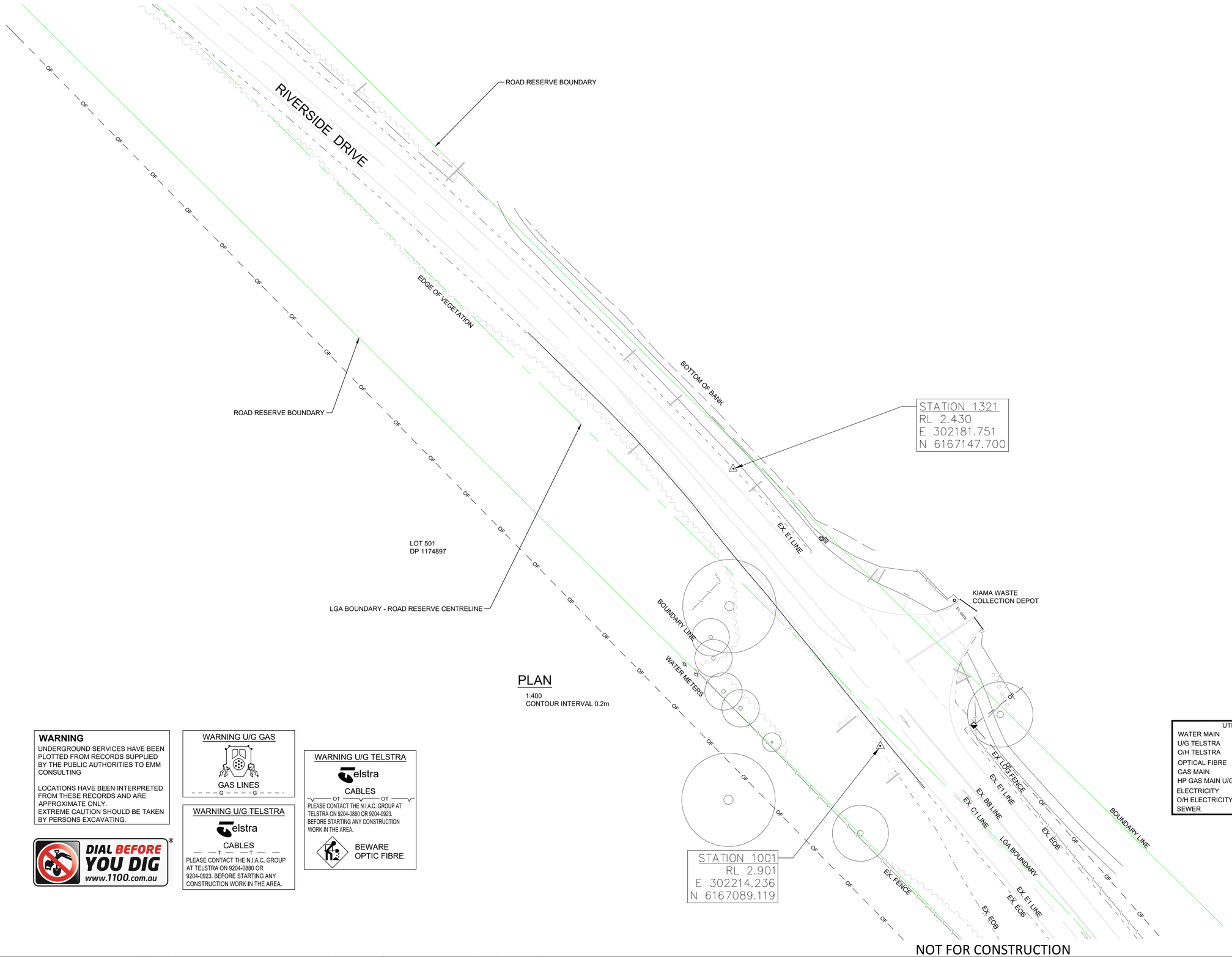
REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
A	17/6/21	FOR COMMENT	C.J.	C.J.					
-	12/5/21	FOR COMMENT	P.B.	C.J.					

PROJECT:
BORAL, DUNMORE QUARRY
RIVERSIDE DRIVE, DUNMORE.
ACCESS WORKS

DRAWING TITLE:
NOTES

CLIENT: BORAL LTD.
DRG. #: EMM - C01
PROJECT #: J210315
SCALE: AS SHOWN
REV: A

A1



PLAN

1:400
CONTOUR INTERVAL 0.2m

WARNING
UNDERGROUND SERVICES HAVE BEEN PLOTTED FROM RECORDS SUPPLIED BY THE PUBLIC AUTHORITIES TO EMM CONSULTING

LOCATIONS HAVE BEEN INTERPRETED FROM THESE RECORDS AND ARE APPROXIMATE ONLY.
EXTREME CAUTION SHOULD BE TAKEN BY PERSONS EXCAVATING.

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WARNING U/G GAS
GAS LINES
G G

WARNING U/G TELSTRA
Telstra
CABLES
T T
PLEASE CONTACT THE N.I.A.C. GROUP AT TELSTRA ON 9204-0880 OR 9204-0923. BEFORE STARTING ANY CONSTRUCTION WORK IN THE AREA.

WARNING U/G TELSTRA
Telstra
CABLES
OT OT
PLEASE CONTACT THE N.I.A.C. GROUP AT TELSTRA ON 9204-0880 OR 9204-0923. BEFORE STARTING ANY CONSTRUCTION WORK IN THE AREA.
BEWARE OPTIC FIBRE

UTILITIES			
WATER MAIN	W	TELSTRA PILLAR	
U/G TELSTRA	T	TELSTRA PIT	
O/H TELSTRA	OT	HYDRANT	
OPTICAL FIBRE	OF	STOP VALVE	
GAS MAIN	G	POWER POLE	
HP GAS MAIN U/G	HG	ELECTRICAL PILLAR	
ELECTRICITY	E	POWER LIGHT POLE	
O/H ELECTRICITY	OH	LIGHT POLE	
SEWER	S	GAS STOP VALVE	
		SEWER MANHOLE	

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A	17/6/21	FOR COMMENT	C.J.	C.J.
-	12/5/21	FOR COMMENT	P.B.	C.J.

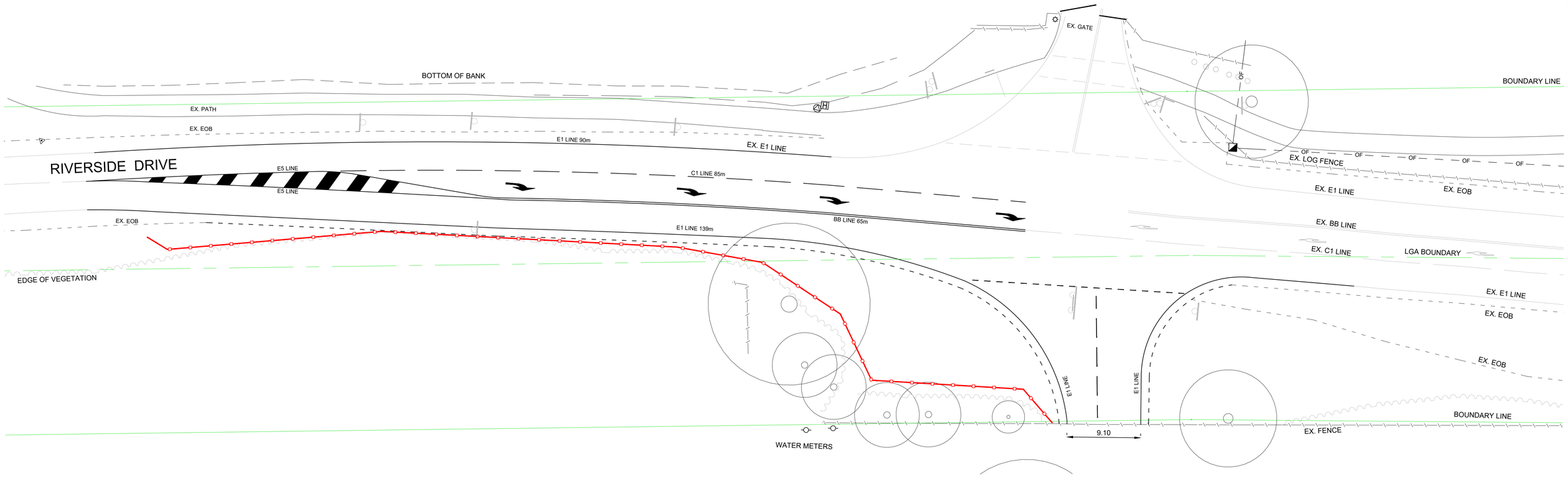
PROJECT:
BORAL, DUNMORE QUARRY
RIVERSIDE DRIVE, DUNMORE.
ACCESS WORKS

DRAWING TITLE:
SURVEY & SERVICES PLAN

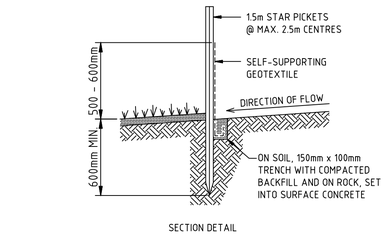
CLIENT: BORAL LTD.
DRG. #: EMM - C02
PROJECT #: J210315
SCALE: AS SHOWN

REV: A

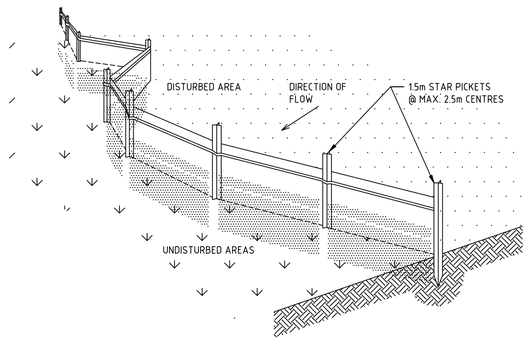
A1



PLAN
SCALE 1:250



SECTION DETAIL



SEDIMENT FENCE
SCALE N.T.S.

SEDIMENT FENCE CONSTRUCTION NOTES:

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND @ 2.5m INTERVALS (MAX.) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

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COMMENTS

LEGEND

SEDIMENT FENCE

UTILITIES			
WATER MAIN	W	TELSTRA PILLAR	Ⓣ
U/G TELSTRA	T	TELSTRA PIT	◪
O/H TELSTRA	OT	HYDRANT	H
OPTICAL FIBRE	OF	STOP VALVE	Ⓥ
GAS MAIN	G	POWER POLE	Ⓟ
HP GAS MAIN U/G	HG	ELECTRICAL PILLAR	■
ELECTRICITY	E	POWER LIGHT POLE	✱
O/H ELECTRICITY	OH	LIGHT POLE	☼
SEWER	S	GAS STOP VALVE	Ⓖ
		SEWER MANHOLE	Ⓢ

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-	12/5/21	FOR COMMENT	P.B.	C.J.					

PROJECT:
BORAL, DUNMORE QUARRY
RIVERSIDE DRIVE, DUNMORE.
ACCESS WORKS

DRAWING TITLE:
EROSION AND SEDIMENT CONTROL PLAN

CLIENT: BORAL LTD.

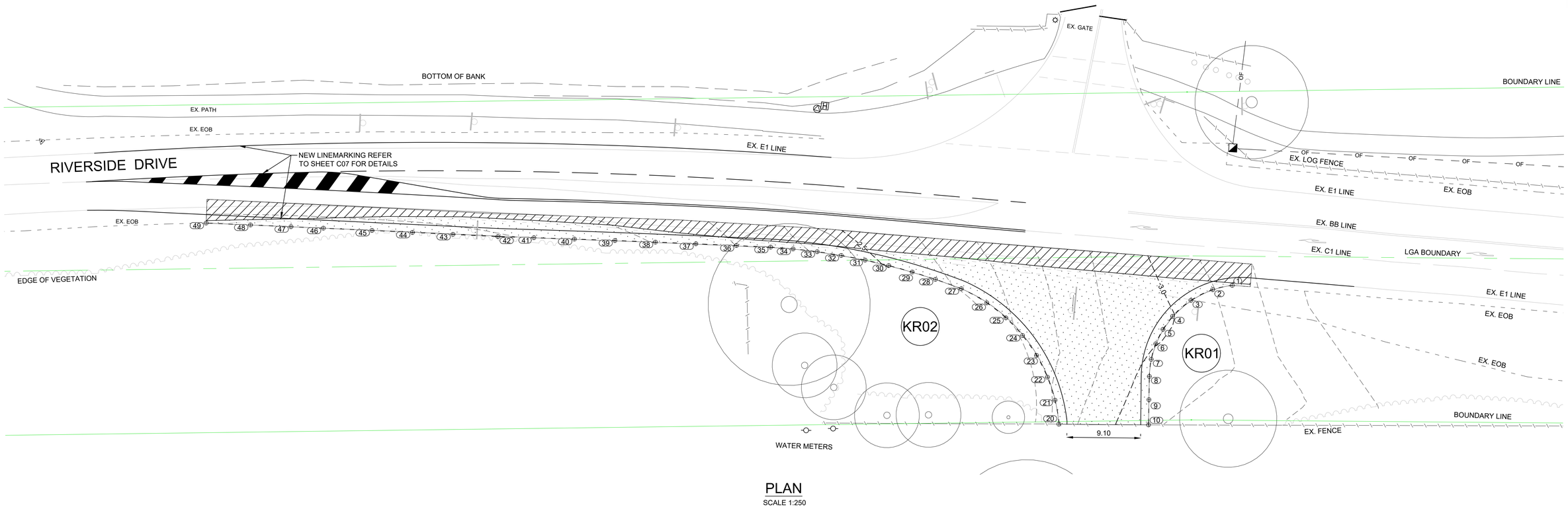
DRG. #: EMM - CO3

PROJECT #: J210315

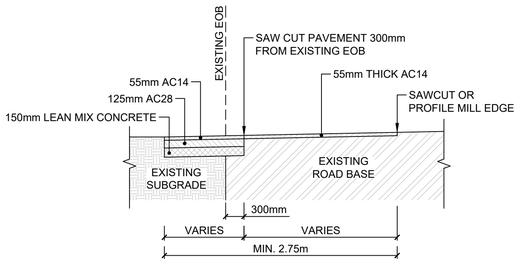
SCALE: AS SHOWN

REV: A

A1



PLAN
SCALE 1:250



PAVEMENT DETAIL
SCALE 1:50

SETOUT TABLE - EDGE OF BITUMEN (KR01)

POINT No.	EASTING	NORTHING	R.L.	DESCRIPTION
1	302222.227	6167081.817	3.144	T.P.
2	302220.123	6167083.122	3.094	
3	302217.281	6167084.054	3.035	
4	302214.294	6167084.221	2.997	
5	302212.322	6167083.900	2.990	
6	302210.436	6167083.242	2.995	
7	302208.692	6167082.269	3.015	
8	302207.054	6167080.920	3.034	T.P.
9	302205.011	6167078.898	3.060	
10	302202.801	6167076.710	3.088	

R = 11.5m

SETOUT TABLE - EDGE OF BITUMEM (KR02)

POINT No.	EASTING	NORTHING	R.L.	DESCRIPTION
20	302194.955	6167084.503	2.851	T.P.
21	302196.677	6167086.951	2.818	
22	302197.994	6167089.643	2.785	
23	302198.905	6167092.499	2.752	
24	302199.391	6167095.457	2.719	
25	302199.440	6167098.454	2.686	
26	302199.053	6167101.426	2.653	
27	302198.024	6167104.871	2.613	T.P.
28	302196.542	6167107.931	2.576	
29	302195.126	6167110.575	2.543	
30	302193.611	6167113.164	2.510	
31	302191.998	6167115.693	2.477	
32	302190.290	6167118.160	2.444	
33	302188.490	6167120.559	2.411	
34	302186.600	6167122.889	2.378	
35	302184.773	6167124.979	2.348	T.P.

R = 20.6m

R = 79.0m

SETOUT TABLE - EDGE OF BITUMEM (KR02)

POINT No.	EASTING	NORTHING	R.L.	DESCRIPTION
36	302181.892	6167128.067	2.301	
37	302178.472	6167131.715	2.251	
38	302175.042	6167135.354	2.206	
39	302171.604	6167138.983	2.168	
40	302168.155	6167142.604	2.135	
41	302164.698	6167146.216	2.109	
42	302161.617	6167149.418	2.091	
43	302157.842	6167153.495	2.076	
44	302154.440	6167157.159	2.068	
45	302151.033	6167160.819	2.064	
46	302146.939	6167165.205	2.062	
47	302144.206	6167168.126	2.063	
48	302140.786	6167171.773	2.067	
49	302137.036	6167175.760	2.072	

COMMENTS

LEGEND

PAVEMENT RECONSTRUCTION
AC14 55mm THICK OR EQUAL
TO EXISTING, ON 250mm DGB

PAVEMENT CONSTRUCTION
55mm AC14
125mm AC28
150mm LEAN MIX CONCRETE
150mm ROAD BASE IN AREAS OF FILL

–3.0– DESIGN CONTOURS

UTILITIES			
WATER MAIN	W	TELSTRA PILLAR	T
U/G TELSTRA	T	TELSTRA PIT	
O/H TELSTRA	OT	HYDRANT	H
OPTICAL FIBRE	OF	STOP VALVE	
GAS MAIN	G	POWER POLE	P
HP GAS MAIN U/G	HG	ELECTRICAL PILLAR	
ELECTRICITY	E	POWER LIGHT POLE	
O/H ELECTRICITY	OH	LIGHT POLE	
SEWER	S	GAS STOP VALVE	G
		SEWER MANHOLE	S

NOTES:
1. The right turn bay lane has been designed based on and in accordance with Austroads guides to traffic engineering practice.
2. Design speed is 80km/h and lanes typically 3.5m wide.
3. The right turn bay provides for storage of 11 vehicles.
4. The right turn bay is 85m long including a 20m taper.

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-	17/6/21	FOR COMMENT	C.J.	C.J.
-	12/5/21	FOR COMMENT	P.B.	C.J.

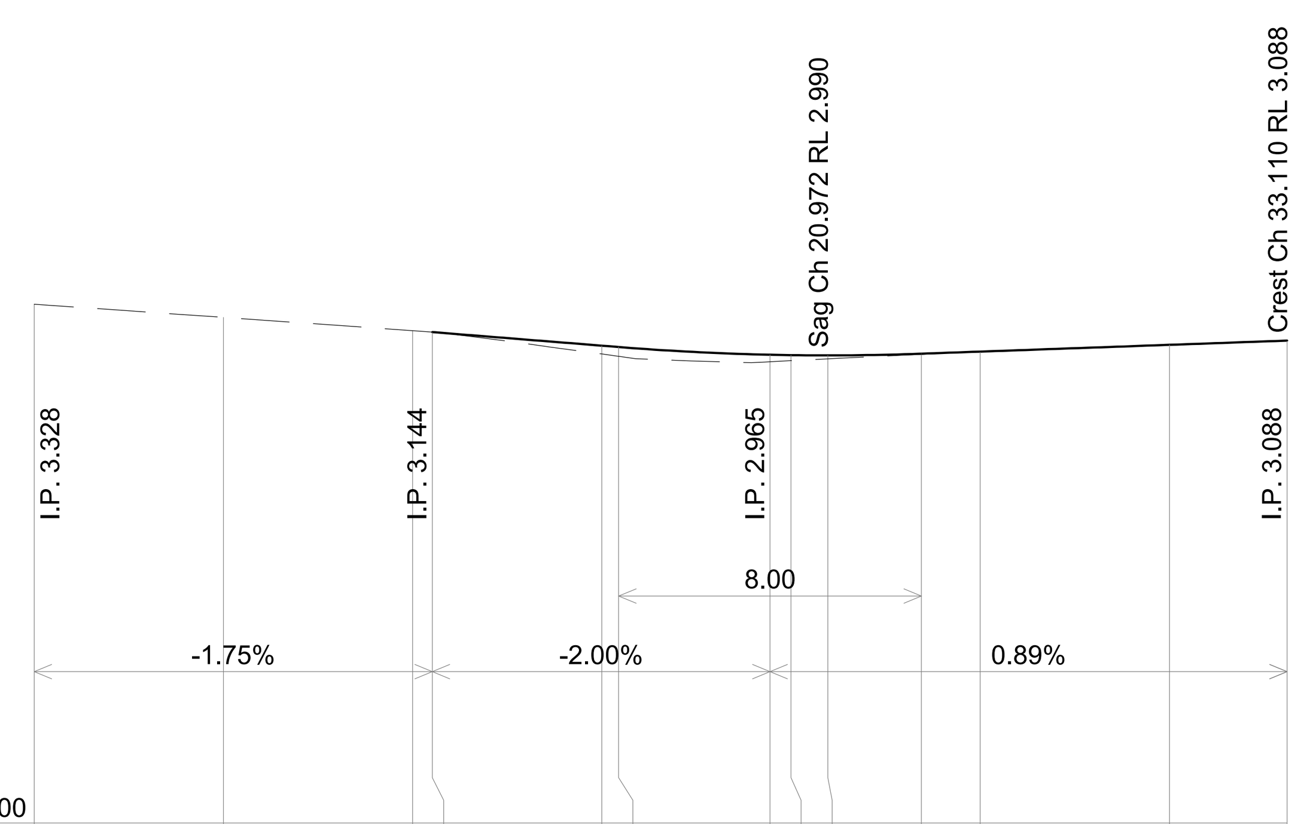
PROJECT:
BORAL, DUNMORE QUARRY
RIVERSIDE DRIVE, DUNMORE.
ACCESS WORKS

DRAWING TITLE:
CONSTRUCTION PLAN

CLIENT: BORAL LTD.
DRG. #: EMM - CO4
PROJECT #: J210315
SCALE: AS SHOWN

REV: A

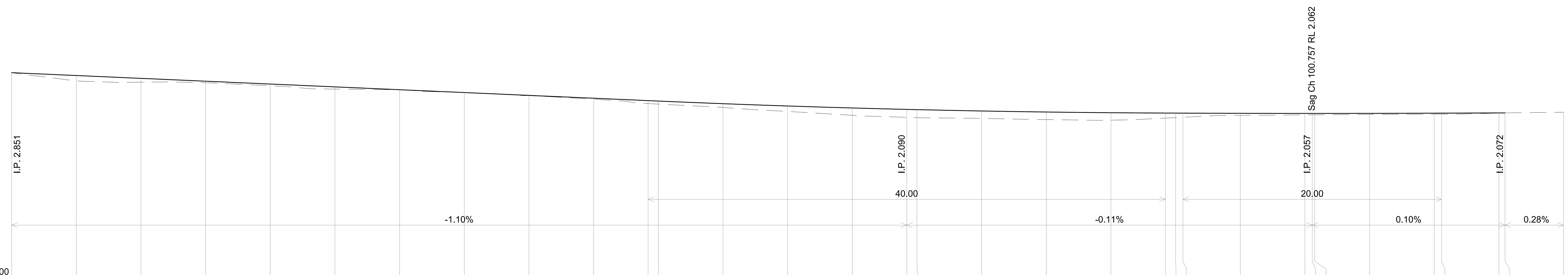
A1



CHAINAGE	DESIGN EOB LEVELS	EXISTING LEVELS
0.000		3.328
5.000		3.241
10.000	3.153	3.153
10.520	3.144	3.144
15.000	3.054	3.000
15.445	3.045	2.984
19.445	2.994	2.948
20.000	2.992	2.955
20.972	2.990	2.967
23.445	3.001	2.997
25.000	3.015	3.014
30.000	3.060	3.060
33.110	3.088	3.088

LONGITUDINAL SECTION - KR01

SCALES: HORIZONTAL 1:200 VERTICAL 1:50



CHAINAGE	DESIGN EOB LEVELS	EXISTING LEVELS
0.000	2.851	2.851
5.000	2.796	2.690
10.000	2.741	2.667
15.000	2.686	2.656
20.000	2.631	2.597
25.000	2.576	2.534
30.000	2.521	2.518
35.000	2.466	2.465
40.000	2.411	2.406
45.000	2.356	2.338
49.211	2.310	2.252
50.000	2.301	2.242
55.000	2.251	2.179
60.000	2.206	2.100
65.000	2.168	2.026
69.211	2.140	1.986
70.000	2.135	1.980
75.000	2.109	1.967
80.000	2.089	1.942
85.000	2.076	1.931
89.211	2.069	1.972
90.000	2.068	1.981
90.567	2.068	1.988
95.000	2.064	2.024
100.000	2.062	2.034
100.567	2.062	2.035
100.757	2.062	2.036
105.000	2.063	2.042
110.000	2.067	2.047
110.567	2.067	2.048
115.000	2.072	2.069
115.473	2.072	2.072
120.000	2.085	2.085

LONGITUDINAL SECTION - KR02

SCALES: HORIZONTAL 1:200 VERTICAL 1:50

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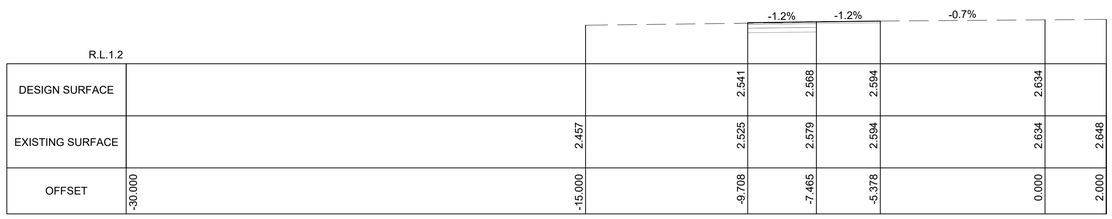
-	12/5/21	FOR COMMENT	P.B.	C.J.					

PROJECT:
BORAL, DUNMORE QUARRY
RIVERSIDE DRIVE, DUNMORE.
ACCESS WORKS

DRAWING TITLE:
LONGITUDINAL SECTIONS

CLIENT: BORAL LTD.
DRG. #: EMM-C05
PROJECT #: J210315
SCALE: AS SHOWN
REV: A

A1



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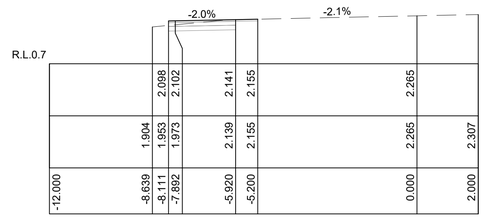

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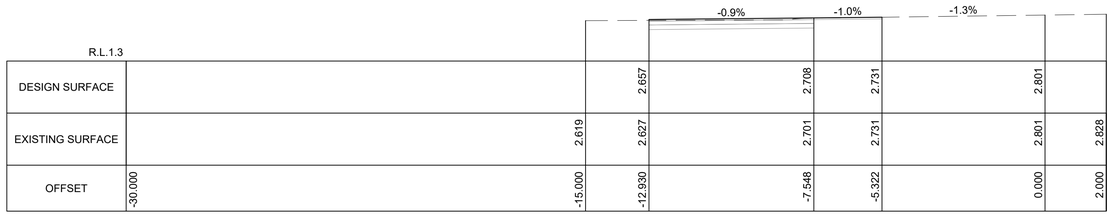

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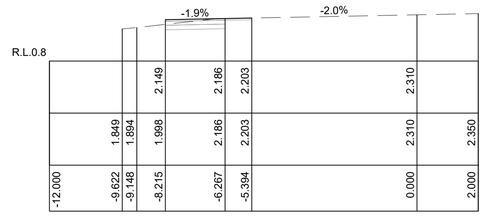

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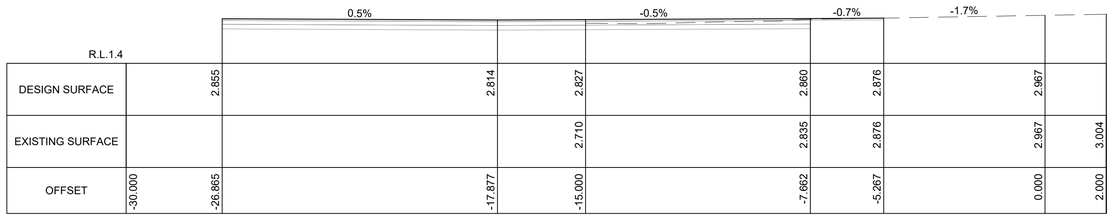

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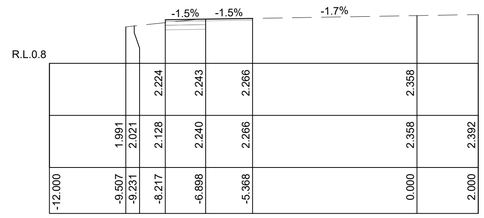

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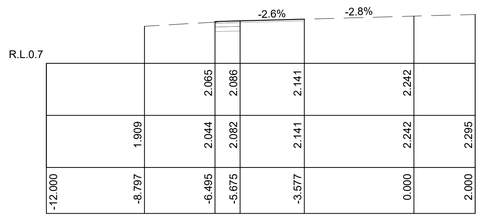

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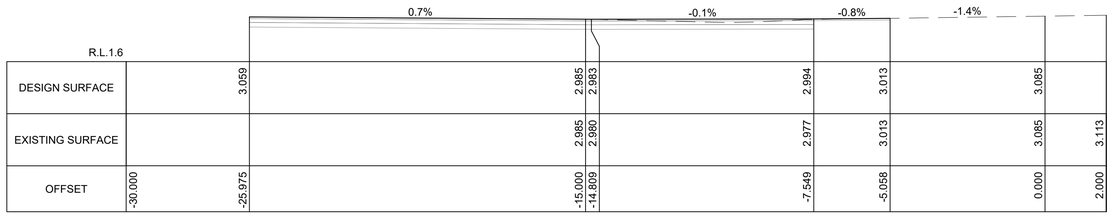

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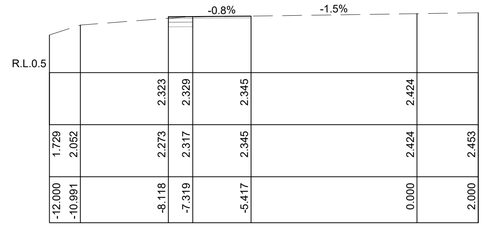
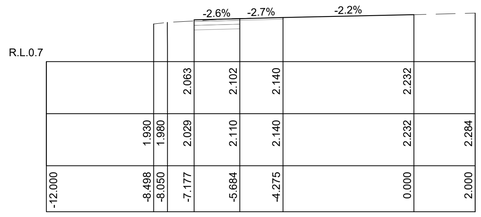
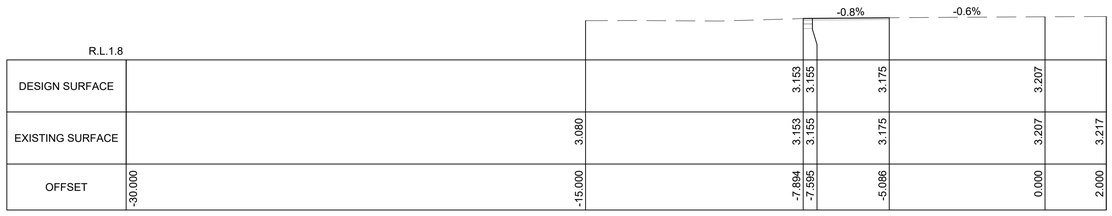


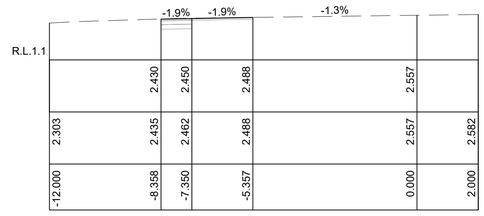
CH 70.00



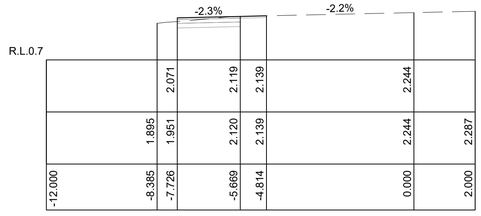
CH 120.00



CH 10.00



CH 60.00



CH 110.00

NOT FOR CONSTRUCTION

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REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
-	17/6/21	FOR COMMENT	C.J.	C.J.					
-	12/5/21	FOR COMMENT	P.B.	C.J.					

PROJECT:
BORAL, DUNMORE QUARRY
RIVERSIDE DRIVE, DUNMORE.
ACCESS WORKS

DRAWING TITLE:
CROSS SECTIONS

CLIENT: BORAL LTD.
DRG. #: EMM-C06
PROJECT #: J210315
SCALE: AS SHOWN

REV: A

A1

INSTALL TRUCK TURNING SIGN 60m APPROXIMATELY FROM START OF RIGHT TURN BAY. LOCATION TO BE CONFIRMED ON SITE WITH COUNCILS REPRESENTATIVE

RETAIN SIGN

RETAIN SIGN

RETAIN SIGNS

BOTTOM OF BANK

EX. PATH

EX. EOB

E1 LINE 90m

MATCH EXISTING LINEMARKING

EX. E1 LINE

RIVERSIDE DRIVE

E5 LINE

E5 LINE

85.0

C1 LINE 85m

3.5

3.5

3.5

1.0

E1 LINE 139m

BB LINE 65m

TB LINE

EX. EOB

MATCH EXISTING LINEMARKING

INSTALL CHEVRON PAVEMENT MARKING

EDGE OF VEGETATION

RELOCATE SIGN 0.6m CLEAR OF ROAD AS SHOWN

INSTALL FOUR UA3 PAVEMENT MARKERS AS SHOWN

JOINS BELOW

PLAN
SCALE 1:200

KIAMA WASTE COLLECTION DEPOT

EX. GATE

BOUNDARY LINE

EX. LOG FENCE

EX. E1 LINE

EX. EOB

EX. BB LINE

EX. C1 LINE

LGA BOUNDARY

RIVERSIDE DRIVE

RELOCATE WASTE DEPOT DIRECTIONAL SIGN AS SHOWN

MATCH EXISTING LINEMARKING

TB LINE

2.5

3.50

19.5

S1 LINE

E1 LINE

E1 LINE

JOINS ABOVE

9.10

EX. E1 LINE

EX. EOB

EX. EOB

RELOCATE SIGN AS SHOWN

INSTALL TRUCK TURNING SIGN 60m APPROXIMATELY FROM START OF RIGHT TURN BAY. LOCATION TO BE CONFIRMED ON SITE WITH COUNCILS REPRESENTATIVE

BOUNDARY LINE

EX. FENCE

INSTALL SIGN

PLAN
SCALE 1:200

NOT FOR CONSTRUCTION

UTILITIES			
WATER MAIN	W	TELSTRA PILLAR	Ⓣ
U/G TELSTRA	T	TELSTRA PIT	◪
O/H TELSTRA	OT	HYDRANT	Ⓗ
OPTICAL FIBRE	OF	STOP VALVE	Ⓥ
GAS MAIN	G	POWER POLE	Ⓟ
HP GAS MAIN U/G	HG	ELECTRICAL PILLAR	■
ELECTRICITY	E	POWER LIGHT POLE	⊛
O/H ELECTRICITY	OH	LIGHT POLE	☼
SEWER	S	GAS STOP VALVE	Ⓖ
		SEWER MANHOLE	Ⓢ

SIGNPOSTING AND LINEMARKING

1. ALL WARNING (W), REGULATORY (R) AND TEMPORARY SIGNS (T) TO BE SIZE 'A', UNLESS NOTED OTHERWISE.
2. EXISTING SIGNS AND STEMS MAY BE REUSED PROVIDED THEY ARE IN GOOD CONDITION.
3. ALL SIGNPOSTING TO BE INSTALLED USING V-LOCK INSERTS IN CONCRETE, UNLESS NOTED OTHERWISE.
4. ALL DISTANCES GIVEN FOR SIGNS ARE MINIMUM DISTANCES.
5. GRIND OFF ALL REDUNDANT LINE MARKINGS.
6. ALL LINE MARKING AND SIGNPOSTING TO BE INSTALLED TO RMS DELINEATION GUIDELINES AND STANDARDS AS SOON AS PRACTICABLE.
7. RAISED REFLECTIVE PAVEMENT MARKERS ARE TO BE INSTALLED TO RMS DELINEATION GUIDELINES AND STANDARDS AT THE FOLLOWING CENTRES, UNLESS NOTED OTHERWISE:
   - **S1 LINES** - BI-DIRECTIONAL YELLOW MARKERS AT MIN 12m CENTRES.
   - **BB LINES** - BI-DIRECTIONAL YELLOW MARKERS AT MIN 12m CENTRES OR AT 3m CENTRES WHERE LINE IS 12m LONG OR LESS.
   - **E1 LINES** - MONO-DIRECTIONAL RED MARKERS AT MIN 24m CENTRES OR AT 6m CENTRES WHERE LINE IS 12m LONG OR LESS.
   - **E4 LINES** - MONO-DIRECTIONAL YELLOW (LHS OF ISLAND) OR RED (RHS OF ISLAND) MARKERS AT MIN 6m CENTRES OR AT 3m CENTRES WHERE LINE IS 12m LONG OR LESS.
   - **E5 LINES** - BI-DIRECTIONAL YELLOW MARKERS AT MIN 6m CENTRES OR AT 3m CENTRES WHERE LINE IS 12m LONG OR LESS.
   - **C1 LINES** - MONO-DIRECTIONAL WHITE MARKERS AT MINIMUM 8m CENTRES OR AT 3m CENTRES WHERE LINE IS 6m LONG OR LESS.
   - **L1 LINES** - MONO-DIRECTIONAL WHITE AT MINIMUM 12m CENTRES.
8. ALL KERB FACES OF MEDIANS, SPLITTER ISLANDS AND PEDESTRIAN REFUGES TO BE PAINTED WITH WHITE REFLECTIVE BEADED PAINT.
9. ALL TEMPORARY LINEMARKING TO BE MARKED WITH REMOVABLE LINEMARKING TAPE (3M STALMARK REMOVEABLE ALL WEATHER LINE MARKING TAPE SERIES 710 OR EQUIVALENT).
10. ALL EXISTING LINEMARKING, TEMPORARILY NOT REQUIRED, TO BE BLACKED OUT WITH REMOVABLE BLACK MASKING TAPE (3M STALMARK REMOVABLE BLACK MAKING TAPE SERIES 715 OR EQUIVALENT).

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REV	DATE	COMMENT	DRAWN	REVIEWED
B	21/6/21	COUNCIL COMMENT	C.J.	C.J.
A	17/6/21	FOR COMMENT	C.J.	C.J.
-	12/5/21	FOR COMMENT	P.B.	C.J.

PROJECT:

BORAL, DUNMORE QUARRY
RIVERSIDE DRIVE, DUNMORE.
ACCESS WORKS

DRAWING TITLE:

SIGNS AND LINEMARKING PLAN

CLIENT: BORAL LTD.

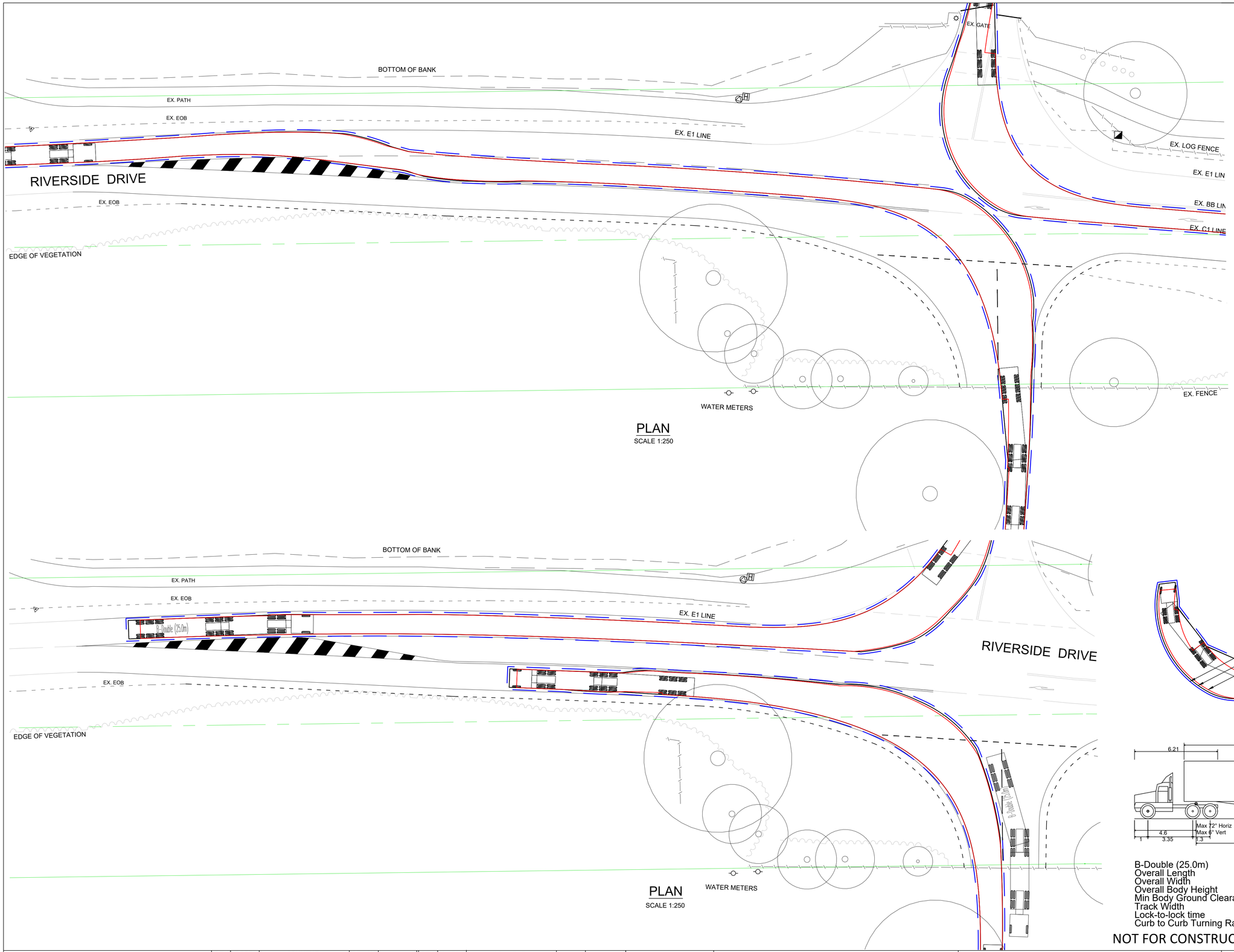
DRG. #: EMM - CO7

PROJECT #: J210315

SCALE: AS SHOWN

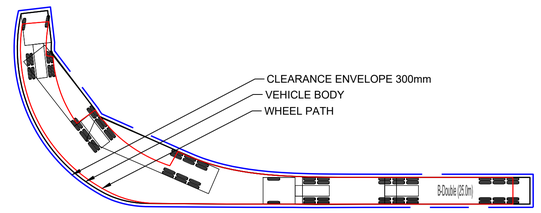
REV: B

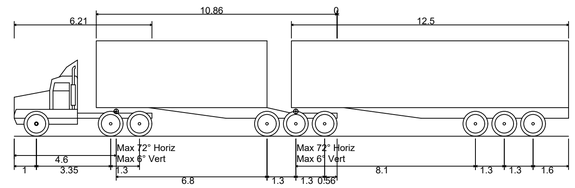
A1



PLAN
SCALE 1:250

PLAN
SCALE 1:250





B-Double (25.0m)	
Overall Length	25.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	15.000m

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REV	DATE	COMMENT	DRAWN	REVIEWED
B	21/6/21	COUNCIL COMMENT	C.J.	C.J.
A	17/6/21	FOR COMMENT	C.J.	C.J.
-	12/5/21	FOR COMMENT	P.B.	C.J.

PROJECT:
BORAL, DUNMORE QUARRY
RIVERSIDE DRIVE, DUNMORE.
ACCESS WORKS

DRAWING TITLE:
SWEPT PATHS
SWEPT PATHS B-DOUBLE 25m LONG

CLIENT: BORAL LTD.
DRG. #: EMM-C08
PROJECT #: J210315
SCALE: AS SHOWN

REV: B


Attachment B

Correspondence from TfNSW, SCC and KMC

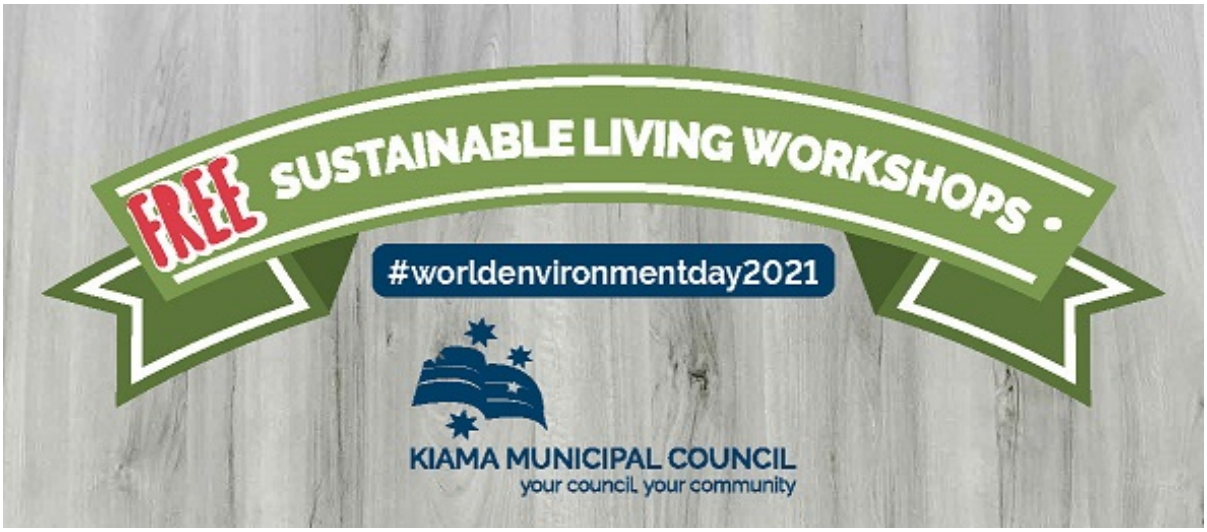



Baqir Husain

From: Mark Biondich <markb@kiama.nsw.gov.au>
Sent: Friday, 4 June 2021 11:07 AM
To: Adnan Voloder
Subject: Dunmore Sand and Soil - Stage 5 Access Design and Associated Reports - Council Reply
Attachments: J210315_Dunmore Quarry_EMM Concept Plan_17 May 21.pdf; Kiama Council - DSS Mod 2 Intersection Design - Feedback.pdf; Dunmore Lakes Mod 2 - Consolidated Consent (DA195-8-2004 Mod 2).pdf; J210315_1_Dunmore Quarry_TMP_v1.pdf

Hello Adnan
As per previous advice (attached) I have no issue with the concept provided. However please lodge a Road Occupancy Permit application and I will provide you with detailed comments on the design (if required) prior to our approval of the access works to be completed and the associated TMP
Kind Regards
Mark

Mark Biondich
Subdivision and Development Engineer
Kiama Municipal Council
P: 02 4232 0444
PO Box 75, Kiama NSW 2533
www.kiama.nsw.gov.au



RESPECT • INNOVATION • INTEGRITY • TEAMWORK • EXCELLENCE

From: Adnan Voloder <adnan.voloder@boral.com.au>
Sent: Thursday, 27 May 2021 4:13 PM
To: Billy Wang <billyw@kiama.nsw.gov.au>; Mark Biondich <markb@kiama.nsw.gov.au>

Cc: Council <council@kiama.nsw.gov.au>; Abdullah Uddin <auddin@emmconsulting.com.au>; Colin Jones <cjones@emmconsulting.com.au>
Subject: Dunmore Sand and Soil - Stage 5 Access Design and Associated Reports

Hi Billy and Mark,

Please find attached a proposed design for the new access point for the DSS Mod 2 project. This concerns condition 53A of consent DA 195-8-2004.

It would be most appreciated if we could receive your feedback on the design at your earliest convenience.

For ease of reference, I have included a copy of the consent, as well as the last correspondence we had with Council concerning the design.

Given we have already submitted a TMP for your consideration, and will be submitting some more documentation in the coming work for additional aspects of the project, it would be beneficial to have a meeting to discuss the project with you, to provide greater clarity. We would also appreciate any guidance can provide us concerning the process moving forward, in obtaining council approval for the detailed design of the works to be completed.

If you could please advise of your availability to have an online meeting with the team on Wednesday the 2nd or Friday the 4th, it would be most appreciated.

In the meantime, should you have any questions or concerns, please feel free to get in touch.

Should you have any specific queries relating to the design put forward, you can reach out to Colin Jones directly, on 0422 008 325 or cjones@emmconsulting.com.au.

Thanks.

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

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Baqir Husain

From: Adnan Voloder <adnan.voloder@boral.com.au>
Sent: Monday, 24 May 2021 4:17 PM
To: Council (council@kiama.nsw.gov.au); Mark Biondich; jessicar@kiama.nsw.gov.au
Cc: Ben Williams; Baqir Husain
Subject: Traffic Management Plan - Condition 56 of consent DA 195-8-2004
Attachments: Dunmore Lakes Mod 2 - Consolidated Consent (DA195-8-2004 Mod 2).pdf; J210315 _1_Dunmore Quarry_TMP_v1.pdf

Dear Jessica and Mark,

I hope this email finds you well.

As part of the modification consent issued in November 2020, we are required to consult with Council, following Condition 56 of consent DA 195-8-2004 , for the preparation of the Traffic Management Plan. A copy of the consent is attached for your reference.

Please find attached a copy of the Traffic Management Plan, prepared in accordance with the requirements of condiction 56 of the consent.

It would be most appreciated if you could send through any comments on the TMP by COB 4 June 2021.

Any questions or concerns, please get in touch.

Kind regards,

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

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North Ryde NSW 2113
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Baqir Husain

From: Adnan Voloder <adnan.voloder@boral.com.au>
Sent: Monday, 21 June 2021 2:18 PM
To: Baqir Husain; Abdullah Uddin
Cc: Colin Jones
Subject: FW: Traffic Management Plan - Condition 56 of consent DA 195-8-2004
Attachments: Dunmore Lakes TMP.pdf

Afternoon gents,

Comments received from Shellharbour – can you please incorporate into the TMP consultation table.

Questions/concerns, please get in touch.

Thanks.

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

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From: Matthew Apolo <Matthew.Apolo@shellharbour.nsw.gov.au>
Sent: Monday, 21 June 2021 2:14 PM
To: Adnan Voloder <adnan.voloder@boral.com.au>
Cc: Grant Meredith <Grant.Meredith@shellharbour.nsw.gov.au>; Wayne Wilson <Wayne.Wilson@shellharbour.nsw.gov.au>; Kate Jackson <Kate.Jackson@boral.com.au>; Wayne Wilson <Wayne.Wilson@shellharbour.nsw.gov.au>; DarrenB@Kiama.nsw.gov.au
Subject: RE: Traffic Management Plan - Condition 56 of consent DA 195-8-2004

Hi Adnan,

We've reviewed the doucments and have no objection to the TMP submitted. However, ownership of Riverside Drive is not clearly defined in this location and both Kiama and Shellharbour Councils own a part of the road. Therefore, it is recommended the proposed CHR treatment be presented to both Councils' Traffic Committees.

Further, we have collaborated with our counterparts in Kiama and offer the following comments:

1. The CHR intersection shown on dwg EMM-C03 appears to have the end of the new right turn lane to the site too close to the existing right turn lane to the waste depot. There is concern

there will be vehicle conflict should two trucks be turning simultaneously into each site. Dwg C04 should show the equivalent right turn manoeuvring template into the waste depot.

2. Dwg C04 shows the truck turning template entering the site, tracking over a substantial portion of the proposed BB line shown on Dwg C03. If there are any vehicles exiting the site & waiting to turn right onto Riverside Drive, they will be impacted by this manoeuvre.
3. On Dwg C03 there are no dimensions provided that show a truck entering the site will be wholly contained off the Riverside Dr travel lane, if a gate is installed at the existing property fenceline.

Thanks, if you'd like further assistance on this please contact Wayne Wilson, Senior Transport Engineer or Darren from Kiama Council – both CC'd in the email.

Sincerely

Shellharbour CITY COUNCIL

Matthew Apolo | Group Manager Built and Natural Environment

76 Cygnet Avenue, Shellharbour City Centre
Locked Bag 155, Shellharbour City Centre, NSW 2529
p. (02) 4221 6104 **m.** 0448 277 283
www.shellharbour.nsw.gov.au

COLLABORATION | ACCOUNTABILITY | INTEGRITY | RESPECT | SUSTAINABILITY

From: Adnan Voloder <adnan.voloder@boral.com.au>
Sent: Friday, 18 June 2021 9:22 AM
To: Matthew Apolo <Matthew.Apolo@shellharbour.nsw.gov.au>
Cc: Grant Meredith <Grant.Meredith@shellharbour.nsw.gov.au>; Wayne Wilson <Wayne.Wilson@shellharbour.nsw.gov.au>; Kate Jackson <Kate.Jackson@boral.com.au>
Subject: RE: Traffic Management Plan - Condition 56 of consent DA 195-8-2004
Importance: High

Hi Matthew,

Just reaching out once again to get your confirmation as to whether Council will be providing comments on the TMP?

Your earliest attention would be most appreciated.

Questions/concerns, please get in touch.

Thanks.

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

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North Ryde NSW 2113
www.boral.com.au

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Baqir Husain

From: Adnan Voloder <adnan.voloder@boral.com.au>
Sent: Friday, 18 June 2021 9:22 AM
To: Matthew Apolo
Cc: Grant Meredith; Wayne Wilson; Kate Jackson
Subject: RE: Traffic Management Plan - Condition 56 of consent DA 195-8-2004

Importance: High

Hi Matthew,

Just reaching out once again to get your confirmation as to whether Council will be providing comments on the TMP?

Your earliest attention would be most appreciated.

Questions/concerns, please get in touch.

Thanks.

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

Boral Land & Property Group
PO Box 6041
North Ryde NSW 2113
www.boral.com.au

From: Adnan Voloder
Sent: Friday, 11 June 2021 10:29 AM
To: Matthew Apolo <Matthew.Apolo@shellharbour.nsw.gov.au>
Cc: Grant Meredith <Grant.Meredith@shellharbour.nsw.gov.au>; Wayne Wilson <Wayne.Wilson@shellharbour.nsw.gov.au>; Kate Jackson <Kate.Jackson@boral.com.au>
Subject: RE: Traffic Management Plan - Condition 56 of consent DA 195-8-2004

Hi Matthew,

I hope you're well, and thanks for your email and detailed response.

You will notice that my email sought comments on the TMP, not the CHR treatment.

The CHR treatment has been considered by Kiama Council, the relevant road authority for the CHR treatment solution, as the works are being completed on land within Kiama Council's LGA.

I've attached Shellharbour Council's previous response concerning this intersection, for your reference. You will notice it confirms the above.

Can you please confirm whether Council will be providing comments on the TMP?

Questions or concerns, please feel free to get in touch.

Thanks.

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

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North Ryde NSW 2113
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From: Matthew Apolo <Matthew.Apolo@shellharbour.nsw.gov.au>
Sent: Thursday, 10 June 2021 8:55 PM
To: Adnan Voloder <adnan.voloder@boral.com.au>
Cc: Grant Meredith <Grant.Meredith@shellharbour.nsw.gov.au>; Wayne Wilson <Wayne.Wilson@shellharbour.nsw.gov.au>
Subject: RE: Traffic Management Plan - Condition 56 of consent DA 195-8-2004

Hi Adnan,

I'm in receipt of your request via Grant to consider your proposed Traffic Management Plan in accordance with Condition 56 of consent DA 195-8-2004 for the approved the Dunmore Lakes Sand Extraction Project (Stages 2, 3, 4, 5A and 5B) by the Minister for Infrastructure and Planning and Minister for Natural Resources.

It is understood that as part of the conditions of consent – you have provided Council an application for a Channalised Right Turn treatment opposite the Minnamurra Recycling Depot on Riverside Drive. An extract of the Stage 5 access conditions is as follows:

Stage 5 Access - *53A. Prior to any heavy vehicle access to the Stage 5 extraction areas, the Applicant must construct a channelized right turn intersection with appropriate line marking from Riverside Drive to the Stage 5A extraction area, to the satisfaction of the relevant roads authority and in accordance with the AustRoads Guide to Road Design Part 4: Intersections and Crossings –General.*

Whilst staff have reviewed the proposed CHR treatment, the proposed junction treatment will need to be approved by Council's Local Traffic Committee to authorise the signs and lines associated with these works. The next meeting of the Shellharbour Local Traffic Committee (LTC) is scheduled for 7 July 2021 and a report will be prepared to that meeting to consider your proposal.

Please note that outcomes of the LTC need to ratified by Council, the next Council meeting following the July LTC meeting is 20 July 2021. Once endorsed by Council, my Group will be able to advise you of approval or otherwise of your request.

If you require further information on this matter please contact Wayne Wilson, Acting Manager Floodplain and Transport on (02) 4221 6164. Wayne has also been copied into this response.

Thanks

Matthew Apolo | Group Manager Built and Natural Environment

76 Cygnet Avenue, Shellharbour City Centre
Locked Bag 155, Shellharbour City Centre, NSW 2529
p. (02) 4221 6104 **m.** 0448 277 283
www.shellharbour.nsw.gov.au

From: Adnan Voloder <adnan.voloder@boral.com.au>
Date: 10 June 2021 at 1:12:55 pm AEST
To: Grant Meredith <Grant.Meredith@shellharbour.nsw.gov.au>
Cc: Information Management <council@shellharbour.nsw.gov.au>
Subject: RE: Traffic Management Plan - Condition 56 of consent DA 195-8-2004

Hi Grant,

Thanks for the reply last week.

I note the response deadline was Friday last week, 4 June.

We have still not received a response from Council. TfNSW and Kiama have already provided us with their response.

Are you able to advise if Council is intending on responding? I'm happy to contact your traffic engineer if you can provide their details?

Thanks.

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

Boral Land & Property Group
PO Box 6041
North Ryde NSW 2113
www.boral.com.au

From: Grant Meredith <Grant.Meredith@shellharbour.nsw.gov.au>
Sent: Wednesday, 2 June 2021 6:50 AM

To: Adnan Voloder <adnan.voloder@boral.com.au>
Subject: Re: Traffic Management Plan - Condition 56 of consent DA 195-8-2004

Your email has been forwarded to the Traffic engineer for comment

Grant Meredith
Group Manager City Development
Sent from my iPhone

Shellharbour CITY COUNCIL

Grant Meredith | Group Manager City Development

76 Cygnet Avenue, Shellharbour City Centre
Locked Bag 155, Shellharbour City Centre, NSW 2529
p. (02) 4221 6137 **m.** 0401 240 551
www.shellharbour.nsw.gov.au

COLLABORATION | ACCOUNTABILITY | INTEGRITY | RESPECT | SUSTAINABILITY

On 1 Jun 2021, at 7:19 pm, Adnan Voloder <adnan.voloder@boral.com.au> wrote:

Hi Grant,

Hope all is well.

Can you please confirm receipt of this email from last week?

Thanks.

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

<image001.jpg>

Boral Land & Property Group
PO Box 6041
North Ryde NSW 2113
www.boral.com.au

<image003.png>

<image004.png>

From: Adnan Voloder
Sent: Monday, 24 May 2021 4:16 PM
To: Grant Meredith (grant.meredith@shellharbour.nsw.gov.au) <grant.meredith@shellharbour.nsw.gov.au>; council@shellharbour.nsw.gov.au (council@shellharbour.nsw.gov.au) <council@shellharbour.nsw.gov.au>
Cc: Ben Williams <Ben.Williams@boral.com.au>; Baqir Husain <bhusain@emmconsulting.com.au>
Subject: Traffic Management Plan - Condition 56 of consent DA 195-8-2004

Dear Grant,

I hope this email finds you well.

As part of the modification consent issued in November 2020, we are required to consult with Council, following Condition 56 of consent DA 195-8-2004 , for the preparation of the Traffic Management Plan. A copy of the consent is attached for your reference.

Please find attached a copy of the Traffic Management Plan, prepared in accordance with the requirements of condiction 56 of the consent.

It would be most appreciated if you could send through any comments on the TMP by COB 4 June 2021.

Any questions or concerns, please get in touch.

Kind regards,

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

<image001.jpg>

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PO Box 6041
North Ryde NSW 2113
www.boral.com.au

<image005.png>

<image004.png>

STH11/00218
SF2021/018673

23/06/2021

Mr A Voloder
Dunmore Sand & Soil
PO Box 6041, North Ryde NSW 2113

WAD Dunmore Lakes Sands Quarry, Construction of pipeline, STH11 00218
Traffic Management Plan Review Comments 001

I refer to the email on 24/05/2021 regarding a review of the traffic management plan in order to fulfil clause 56 of the development consent for the construction and operation of a pipeline and other roadworks.

Transport for NSW (TfNSW) would like to enquire on various items within the traffic management plan. After reviewing the document TfNSW would like a response to/edits to the following:

1) There may be an increased risk to experience damage to the asphalt pavement during the increased movement of heavy loads, specifically on Riverside Drive. Has the local council been consulted and/or stated any concerns regarding this?

2) Were there any discussions regarding speed reductions for Riverside Dr? Being that trucks will be entering and exiting the site, was it considered to provide ample room for the labelled manoeuvres for truck drivers? Was a 60km/h zone considered?

3) The traffic committee of TfNSW recommends that once truck movement first increases, that VMS' be installed temporarily to inform motorists about the increase in turning trucks/vehicles in the area and changed traffic conditions approaching the entrance on Riverside Drive.

If you have any questions in relation to this letter please contact me on (02) 4221 2521.

Yours sincerely

Daniel Bojkovic

TfNSW Authorised Representative

Baqir Husain

From: Daniel Bojkovic <daniel.bojkovic@transport.nsw.gov.au>
Sent: Friday, 25 June 2021 12:30 PM
To: Adnan Voloder
Cc: Ben Williams; Baqir Husain
Subject: RE: Traffic Management Plan - Condition 56 of consent DA 195-8-2004
Attachments: J210315_1_Dunmore Quarry_TMP_v1.pdf; WAD Dunmore Lakes Sands Quarry, Construction of pipeline, STH11 00218 - ....pdf

Hi Adnan,

TfNSW has provided the attached letter requesting responses to a list of items found during the review of the TMP.

Please review and send through the responses to queries.

Regards,

Daniel Bojkovic
A/Project Officer
Development Services
Community & Place
Transport for NSW

T 02 4221 2521 | **M** 0447 541 579
Level 4 Crown Street Wollongong NSW 2500

From: Adnan Voloder [mailto:adnan.voloder@boral.com.au]
Sent: Wednesday, 2 June 2021 3:46 PM
To: Daniel Bojkovic <daniel.bojkovic@transport.nsw.gov.au>
Cc: Ben Williams <Ben.Williams@boral.com.au>; Baqir Husain <bhusain@emmconsulting.com.au>
Subject: RE: Traffic Management Plan - Condition 56 of consent DA 195-8-2004

Hi Daniel,

Thanks for that – I don't believe we will be affecting the road reserve, however we will check and confirm.

Concerning the WAD, would it be possible to get the word version please? WE noticed a couple of errors that we would like rectified before finalising and executing (thought it best to include as track changes for ease of reference).

Questions/concerns, please feel free to get in touch.

Thanks

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

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Boral Land & Property Group
PO Box 6041
North Ryde NSW 2113
www.boral.com.au

From: Daniel Bojkovic <daniel.bojkovic@transport.nsw.gov.au>
Sent: Wednesday, 2 June 2021 3:10 PM
To: Adnan Voloder <adnan.voloder@boral.com.au>
Cc: Ben Williams <Ben.Williams@boral.com.au>; Baqir Husain <bhusain@emmconsulting.com.au>
Subject: RE: Traffic Management Plan - Condition 56 of consent DA 195-8-2004

Hi Adnan,

TfNSW confirms that the Traffic Management Plan (TMP) was submitted.

In the meantime I have had to forward this to our Traffic Management Committee (TMC) in order to properly evaluate and review the item. They will get back to me if they require you to contact them in regards to aspects in the TMP. Please note that this email is not an acceptance to the submitted TMP.

When affecting the road reserve monitored by TfNSW such as the Princes Motorway in this case, you will need to enquire with TMC in order for them to analyse and determine if the action on main roads would need to adherence to certain laws, require an application for a road occupancy licence, or something else.

You can contact our Traffic Management Committee on 1300 656 371 from Monday to Friday 8:30am to 4:30pm. They are directly tasked with assessing these events and traffic management controls to determine whether controls, ROL's, etc. are required.

Regards,

Daniel Bojkovic
A/Project Officer
Development Services
Community & Place
Transport for NSW

T 02 4221 2521 | **M** 0447 541 579
Level 4 Crown Street Wollongong NSW 2500

From: Adnan Voloder [mailto:adnan.voloder@boral.com.au]
Sent: Monday, 24 May 2021 4:17 PM
To: Daniel Bojkovic <daniel.bojkovic@transport.nsw.gov.au>
Cc: Ben Williams <Ben.Williams@boral.com.au>; Baqir Husain <bhusain@emmconsulting.com.au>
Subject: Traffic Management Plan - Condition 56 of consent DA 195-8-2004

Dear Daniel,

As part of the modification consent issued in November 2020, we are required to consult with Council, following Condition 56 of consent DA 195-8-2004 , for the preparation of the Traffic Management Plan. A copy of the consent is attached for your reference.

Please find attached a copy of the Traffic Management Plan, prepared in accordance with the requirements of condiction 56 of the consent.

It would be most appreciated if you could send through any comments on the TMP by COB 4 June 2021.

Any questions or concerns, please get in touch.

Kind regards,

ADNAN VOLODER
Planning & Development Manager (NSW & ACT)
Telephone: 02 9033 5535
Mobile: 0401 897 486

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Boral Land & Property Group
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Consider the environment. Please don't print this e-mail unless really necessary.

Consider the environment. Please don't print this e-mail unless really necessary.


Attachment C

Dilapidation Report




Pre-Operational Pavement Assessment

Riverside Drive, Dunmore, NSW

Prepared for:
EMM Consulting
20 Chandos Street, St Leonards NSW 2065

Prepared by:
Durkin Construction Pty Ltd

Report ID: D19537-PDR001-D

Revision: D

Date Issued: 01/06/2021

Table of Contents

Attachments

Appendix A – FWD Reports

Appendix B – CIRCLY Data

Document Control

REPORT ID	REV NO.	DATE	AUTHOR	REVIEWER	VERSION
D19537-PDR001	A	19/05/2021	J Zhang	J Loney	For Review
D19537-PDR001	B	27/05/2021	J Loney		Added estimated impact of the additional traffic loading.
D19537-PDR001	C	28/05/2021	J Loney		Updated the additional traffic loading and further analysis
D19537-PDR001	D	01/06/2021	J Loney		Updated material tonnage to be imported.

Design Reference Documents

Austroads Guide to Pavement Technology Part 2: Pavement Structural Design, 2017, Austroads, NSW (AGPT02-17)

Austroads Guide to Pavement Technology Part 5: Pavement Evaluation and Treatment Design, 2019, Austroads, NSW (AGPT05-19)

Australian Trucking Association, Truck Impact Chart, 16 March 2018, Non-Modular (ATA 2018).

Roads and Maritime Supplement to Austroads Guide to Pavement Technology Part 2: Pavement Structural Design, Document No: RMS 11.050 Version 3.0, August 2018 (RMS 2018).

1.0 Introduction

At the request of ***EMM Consulting*** *(**EMM**)*, a project-level pavement dilapidation was conducted by ***Durkin Construction*** *(**DC**)* for Riverside Drive, Dunmore. The scope covers the section of pavement between Princes Highway Off-Ramp and Kiama Community Recycling Centre, which is approximately 500m in length. The pavement condition has not been assessed further to the west as it is a bridge over Princes Highway. As such the scope of work is between the southbound off-ramp and the site access

The purpose of this report is to investigate the existing pavement condition by visual assessment and Falling Weight Deflectometer (FWD) testing. ***DC*** was informed that additional heavy vehicle movements will occur during stage 5 of Dunmore Lakes Sand Project. A post-dilapidation assessment will be carried out by ***DC*** within 1-month from completion of the additional heavy vehicle movements. This report is intended to satisfy development approval conditions 53B (a) & (b):

(a) Undertake a pre-construction road pavement survey for the section of Riverside Drive that would be subjected to heavy vehicle movements associated with the development.

(b) Identify the likely risk of road pavement failure on Riverside Drive associated with the development.

The section of pavement under investigation is highlighted in Figure 1.1.

Figure 1.1 – Scope of Works (Overview)

2.0 Visual Assessment

A visual inspection was carried out on 6th May 2021 during the day in wet weather. Pavement inspection is ideal during the wet weather as the worst condition of the pavement e.g., any water ponding, flooding etc can be assessed.

The existing pavement has minor visual defects throughout the section under investigation. The most common pavement defects are:

- Rutting
- Diagonal Cracking
- Joint Cracking
- Meandering Cracking
- Corrugation
- Patching

Figure 2.0.1 – Diagonal Cracking near Princes Highway Off-Ramp

Figure 2.0.2 – Minor Longitudinal Cracking

Figure 2.0.3 – Slight Rutting

Figure 2.0.4 – Sealed Longitudinal Cracking

Figure 2.0.5 – Patching and Minor Deformation

Figure 2.0.6 – Minor Rutting

Figure 2.0.7 – Minor Rutting

Figure 2.0.8 – Meandering Cracking

Figure 2.0.9 – Minor Rutting (Entrance of Kiama Community Recycling Centre)

3.0 Falling Weight Deflectometer Testing

Falling Weight Deflectometer (FWD) testing was carried out on 3rd May 2021 during night shift to investigate the existing structural condition of the pavement. All Eastbound and Westbound lanes were tested along outer wheel paths (OWP) at 20m intervals. The inner wheel path (IWP) of Eastbound was tested as an additional run at the same intervals.

Testing was conducted with a 40kN load as per Austroads Guide to Pavement Technology Part 5 (AGPT05-19). 50kN data was collected also on-site but has not been used further for this investigation. The location of each test point was recorded by site chainage and GPS coordinates. The full deflection bowls were measured at 0, 200, 300, 450, 600, 750, 900, 1200, and 1500mm offsets from the load plate.

The pavement surface and air temperature were recorded at each test point.

The maximum deflection results are summarised in Figure 3.0.1.

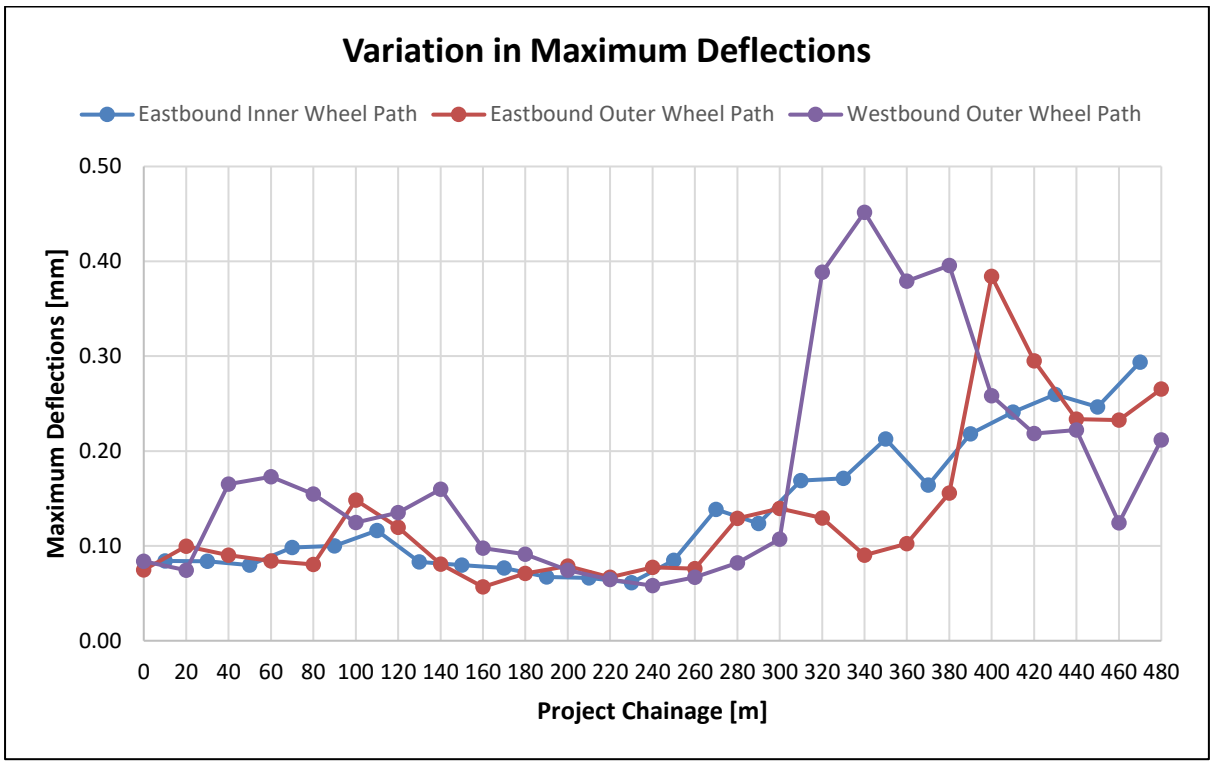


Figure 3.0.1 – Variation in Maximum Deflection

As seen in Figure 3.0.1, the maximum deflections are generally consistent between the wheel paths along the length of the scope. The deflection data indicates a good pavement condition from Chainage 0 to Chainage 300. From chainage 300 to chainage 480 the pavement is less stiff which could indicate some issues in the underlying pavement structure in this area. It could also indicate a change in the pavement structure. If the structure changes from one with a lean-mix concrete subbase to a granular construction the deflections from chainage 300 onwards would indicate a very good condition.

Detailed estimation of pavement remaining life can be undertaken if the existing pavement structure data is available.

4.0 Traffic Loading Analysis

The current traffic loading on Riverside Drive has been provided by EMM as the following (using the Westbound lane data).

Traffic Parameter	Value
Analysis Period	3
Annual Average Seven Day Traffic (AADT)	3,122
Average Percentage of Heavily Vehicles (HV%)	5.9
Growth Rate (%)	2.0
Direction Factor (DF)	1.0
Lane Distribution Factor (LDF)	1.0
Average Number of Axle Groups Per Heavy Vehicle (H_{HVAG})	2.8
Cumulative Heavy Vehicle Axle Groups Over 3-year period (N_{DT})	0.576×10^6
Average Number of Equivalent Standard Axles Per Heavy Vehicle Axle Group (ESA/HVAG) – RMS Rural	1.068
Number of Equivalent Standard Axles of Traffic Loading over 3-year period (ESA)	0.615×10^6

Figure 4.0.1 – Traffic Loading Parameters

The proposed VENM imported material requirement has been provided by EMM and we have estimated the traffic loading based on this and the assumptions that B-Doubles will be used. The ESA for the trucks has been based on half fully loaded and half unloaded (ATA 2018). The assumptions are detailed in Table 4.0.2. The development period for imported material is expected to be 3-years.

Traffic Parameter	Value
Total material to be imported over 3 years (tonnes)	325,000
Total material to be imported per year (tonnes)	108,333
Average truck load (material only) per year (tonnes)	38
Number of loaded truck movements per year	2,850
Number of unloaded truck movements per year	2,850
Total truck movements per year	5,700
Total truck movements over 3-years	17,100
Loaded + unloaded ESA per B-Double vehicle (ESA)	(6.91 + 1.69)/2 = 4.3
Additional traffic loading per year (ESA)	0.025×10^6
Additional traffic loading per year (N_{DT})	0.023×10^6
Additional traffic loading over 3-years (ESA)	0.074×10^6
Additional traffic loading over 3-years (N_{DT})	0.069×10^6

Figure 4.0.2 – Calculation of Additional Vehicle Loading.

5.0 Pavement Structure Impact Analysis

The pavement structure, layer thicknesses, and subgrade strength are not confirmed but we have used an assumed pavement structure based on the minimum pavement layer thickness for a *thick asphalt over lean-mix concrete* from RMS Pavement Structural Design Supplement (RMS 2018). We have assumed this pavement structure based on the low FWD deflections and the longitudinal cracking defects noted on site.

The subgrade CBR is not known but we have assumed a conservative CBR of 4.0% for analysis. The assumed pavement structure is shown in Table 5.1.

Estimated Pavement Structure	
Wearing	55mm AC14-A15E
Base	120mm AC28-AR450
Subbase	150mm Lean-mix Concrete
Fill	300mm Select Material Zone (SMZ)
Subgrade	CBR 4.0%

Table 5.1 – Estimated Pavement Structure

A CIRCLY 7.0 analysis has been carried out on this pavement structure to determine load capacity. The modulus values recommended by RMS have been used for each layer. A 95% project reliability and 40km/hr design speed have been used.

	Existing Traffic Capacity	With the addition of development additional traffic loading.
Estimated Remaining Life (ESA)	6.0×10^6	6.0×10^6
Additional Traffic Loading (ESA)	-	7.4×10^4
Estimated Remaining Life (Years)	23.5	23.1

Figure 5.2 – Traffic Impact Analysis

The CIRCLY analysis indicates that the additional traffic loading due to the development works has a low impact on the existing pavement structural service life. The additional traffic loading is estimated to reduce the structural life of the pavement by 5 months. This reduction will be the same for any pavement structure type as the additional traffic loading represents the equivalent of 5 months of the existing traffic volume.

6.0 Conclusions and Recommendations

Based on the visual assessment and FWD investigation by ***DC***, the existing pavement is in good structural condition. Sealed longitudinal cracking within the scope was noted which is likely reflective cracking or shrinkage cracks in the underlying cemented base.

The section from chainage 0 to 300 is not expected to be impacted by the additional heavy vehicle traffic. The section from chainage 300 to 480 has a lower pavement stiffness but this may be due to a structural change in the pavement after that point. No longitudinal cracking was observed in this pavement section so it may have a different pavement structure.

The additional traffic loading on the pavement due to the development is estimated to be 7.4 x 10^4 ESA. This represents the equivalent of approximately 5 months' worth of the existing traffic loading on Riverside Drive. This will result in no significant reduction of the estimated remaining structural life of the road pavement on Riverside Drive from the development traffic loading.

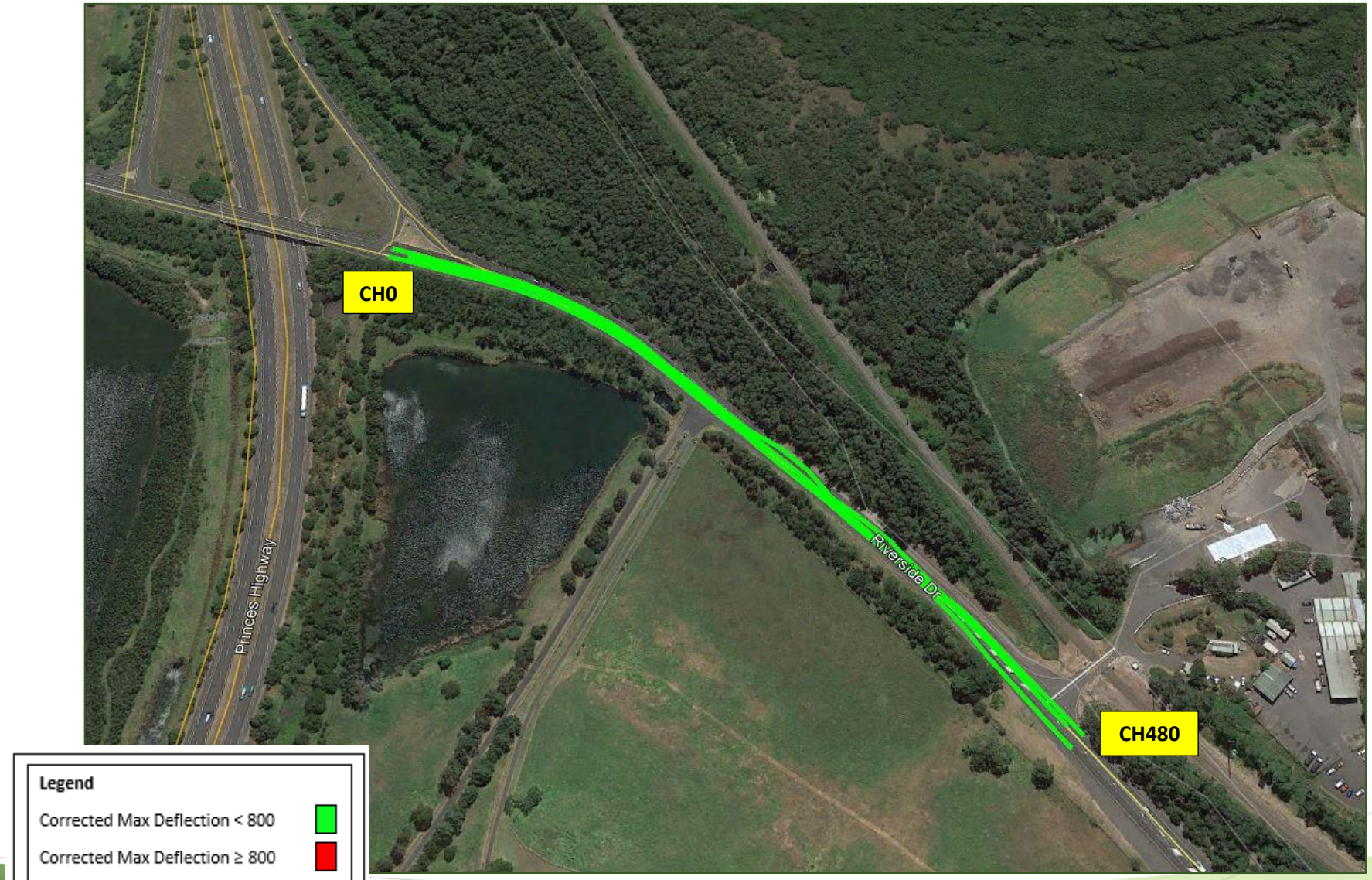
A post-dilapidation assessment will be carried by ***DC*** within 1-month from completion of the additional heavy vehicle movements - Condition 53B (c).

DURKIN

APPENDIX A

FWD Test Reports

RIVERSIDE DRIVE, DUNMORE



FWD/HWD Report

Durkin Construction Pty Ltd
Silverwater Laboratory
Unit 3, 50-52 Derby Street Silverwater NSW 1811
Phone: (02) 9712 0308
Fax: (02) 9647 1984
Email: info@durkinconstruction.com.au

Job Number: D19537 **Report Number:** D19537-Riverside
Project Name: Riverside Drive, Dunmore

Date Tested: 3/05/2021 **Client:** EMM Consulting **Filters Applied:** None
Time Tested: 22:18-23:46 **Contact:** Abdullah Uddin **Operator:** S. Copetti
Target Load: 40kN / 566kPa **GPS Model / Datum:** BX982 / GDA **Test Equipment:** HWD-175

Chainage	Lane	Wheel Path	GPS Location		Peak Load [kPa]	FWD Deflection Results [µm] Offset from Load [mm]									Normalised Deflection Results [µm] Offset from Load [mm]									Temperature [°C]		FWD/HWD [mm]			Pavement Condition
			Lat	Long		0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Surface	Air	D_{MAX}	D_{max} Corrected	CF	
10	EB	IWP	-34.61656	150.83884	547	67	60	57	53	50	47	41	35	28	69	62	59	55	51	49	43	36	29	19.4	18.1	0.07	0.08	0.01	CL
30	EB	IWP	-34.61661	150.83905	550	67	61	59	55	53	51	44	38	32	69	63	60	56	54	52	45	39	33	19.0	18.3	0.07	0.08	0.01	CL
50	EB	IWP	-34.61666	150.83926	566	66	58	56	54	51	48	44	38	32	66	58	56	54	51	48	44	38	32	19.0	18.3	0.07	0.08	0.01	CL
70	EB	IWP	-34.61671	150.83947	553	79	72	69	64	61	59	53	45	38	81	73	70	66	62	60	54	46	39	18.8	18.4	0.08	0.10	0.01	CL
90	EB	IWP	-34.61677	150.83968	548	80	71	70	65	62	57	52	43	36	83	74	72	67	64	59	54	45	37	18.1	18.3	0.08	0.10	0.01	CL
110	EB	IWP	-34.61684	150.83987	552	94	86	82	78	74	70	64	54	44	96	88	84	80	76	72	66	55	45	17.6	18.3	0.10	0.12	0.01	CL
130	EB	IWP	-34.61693	150.84006	549	67	62	59	56	54	52	47	40	34	69	64	61	58	55	53	48	41	35	18.4	18.1	0.07	0.08	0.00	CL
150	EB	IWP	-34.61703	150.84024	550	64	56	54	51	48	45	41	34	29	66	58	55	52	49	46	42	35	30	18.5	18.3	0.07	0.08	0.01	
170	EB	IWP	-34.61713	150.84041	557	63	53	51	48	45	42	38	32	27	64	54	52	49	46	43	39	33	27	18.8	18.3	0.06	0.08	0.01	
190	EB	IWP	-34.61725	150.84058	560	55	48	46	42	39	36	32	25	19	55	48	46	42	40	37	32	25	20	17.3	18.3	0.06	0.07	0.01	
210	EB	IWP	-34.61737	150.84075	559	54	46	44	41	39	36	32	27	23	55	47	45	41	39	37	32	27	24	17.8	18.3	0.05	0.07	0.01	
230	EB	IWP	-34.61748	150.84091	565	51	45	43	41	39	37	34	31	27	51	45	43	41	39	37	34	31	27	18.1	18.2	0.05	0.06	0.01	
250	EB	IWP	-34.61759	150.84108	560	69	62	60	57	54	51	47	41	35	70	63	61	57	54	52	47	41	35	17.5	18.2	0.07	0.08	0.01	
270	EB	IWP	-34.61771	150.84124	564	114	101	95	85	76	70	61	49	39	114	102	95	85	77	70	61	49	39	18.1	18.1	0.11	0.14	0.01	
290	EB	IWP	-34.61783	150.84141	562	101	84	77	68	61	56	48	39	32	102	85	77	68	61	56	48	39	32	18.1	18.1	0.10	0.12	0.02	Minor SP
310	EB	IWP	-34.61794	150.84157	566	140	114	101	81	70	62	52	40	33	140	114	101	81	70	62	52	40	33	17.5	18.1	0.14	0.17	0.03	Minor SP
330	EB	IWP	-34.61807	150.84173	558	140	114	99	82	70	62	51	40	34	142	115	100	83	71	63	51	41	34	17.4	18.2	0.14	0.17	0.03	Minor SP
350	EB	IWP	-34.61819	150.84189	556	173	143	126	104	88	76	63	49	39	176	145	128	106	89	78	64	50	40	17.1	18.1	0.18	0.21	0.03	
370	EB	IWP	-34.61832	150.84205	561	134	114	100	82	69	61	52	41	34	135	115	101	83	70	62	52	41	34	18.1	18.0	0.14	0.16	0.02	
390	EB	IWP	-34.61844	150.84220	557	177	138	114	87	69	58	48	37	35	180	140	116	89	70	59	49	37	36	18.5	18.1	0.18	0.22	0.04	
410	EB	IWP	-34.61857	150.84234	562	198	159	136	105	85	71	56	40	33	199	160	137	106	85	72	56	40	34	19.0	18.2	0.20	0.24	0.04	
430	EB	IWP	-34.61871	150.84249	558	212	176	157	127	107	93	74	52	41	215	178	159	129	109	94	75	53	41	19.0	18.5	0.21	0.26	0.04	
450	EB	IWP	-34.61885	150.84263	557	201	168	144	112	89	76	58	40	32	204	170	147	114	91	77	59	41	33	18.5	18.7	0.20	0.25	0.03	

470	EB	IWP	-34.61898	150.84277	558	239	189	155	121	97	82	63	45	34	243	191	158	122	98	83	64	45	35	18.9	18.5	0.24	0.29	0.05	
0	EB	OWP	-34.61652	150.83874	557	61	55	52	49	45	42	38	31	25	62	56	52	49	46	42	38	32	25	19.3	17.5	0.06	0.07	0.01	CL
20	EB	OWP	-34.61656	150.83895	560	82	73	71	65	60	56	49	40	32	82	74	71	66	61	56	50	40	32	18.8	17.0	0.08	0.10	0.01	CL
40	EB	OWP	-34.61661	150.83915	564	74	66	64	59	56	52	48	41	33	75	66	64	59	56	52	48	41	33	18.9	16.3	0.07	0.09	0.01	CL
60	EB	OWP	-34.61666	150.83936	560	69	63	60	56	53	50	45	37	31	69	64	61	57	54	51	45	38	32	18.5	15.9	0.07	0.08	0.01	CL
80	EB	OWP	-34.61672	150.83957	561	66	59	57	53	50	47	43	36	30	66	60	58	54	51	48	43	36	30	16.9	15.5	0.07	0.08	0.01	CL
100	EB	OWP	-34.61679	150.83977	549	119	104	96	90	84	80	71	60	49	123	107	99	93	86	82	74	62	50	16.7	15.4	0.12	0.15	0.02	CL
120	EB	OWP	-34.61686	150.83997	553	97	93	89	85	82	77	71	61	50	99	95	92	87	84	79	73	62	52	16.8	15.4	0.10	0.12	0.00	CL
140	EB	OWP	-34.61695	150.84015	557	66	56	54	50	47	44	39	32	27	67	57	55	51	48	45	40	32	27	17.0	15.6	0.07	0.08	0.01	
160	EB	OWP	-34.61706	150.84033	546	45	38	36	34	32	30	27	22	19	47	39	38	35	33	31	28	23	20	17.8	15.6	0.05	0.06	0.01	Minor SP
180	EB	OWP	-34.61717	150.84049	553	57	46	42	39	36	34	31	26	23	59	47	43	40	37	35	32	27	23	18.1	15.2	0.06	0.07	0.01	Minor SP
200	EB	OWP	-34.61728	150.84067	562	65	57	53	49	46	44	39	34	28	65	57	54	49	46	44	39	34	28	16.6	15.3	0.07	0.08	0.01	Minor SP
220	EB	OWP	-34.61741	150.84084	567	55	48	45	42	41	39	35	31	27	55	48	45	41	41	39	35	31	27	16.5	15.8	0.06	0.07	0.01	Minor SP
240	EB	OWP	-34.61752	150.84101	567	64	56	53	50	48	45	41	36	30	64	56	53	50	47	45	41	36	30	17.0	15.6	0.06	0.08	0.01	Minor SP
260	EB	OWP	-34.61761	150.84119	569	63	55	51	47	43	40	36	31	27	63	55	51	47	43	40	36	31	26	16.0	15.6	0.06	0.08	0.01	Minor SP
280	EB	OWP	-34.61773	150.84135	566	107	90	81	69	61	54	46	37	30	107	90	81	69	61	54	46	37	30	16.5	15.9	0.11	0.13	0.02	Minor SP
300	EB	OWP	-34.61787	150.84149	557	113	94	85	74	67	62	46	40	33	115	95	86	75	68	63	46	41	34	16.9	15.8	0.12	0.14	0.02	Minor SP
320	EB	OWP	-34.61798	150.84166	566	107	91	82	69	64	59	51	40	32	107	91	82	69	64	59	51	40	32	16.5	15.5	0.11	0.13	0.02	Minor SP
340	EB	OWP	-34.61809	150.84183	565	74	66	61	56	54	51	44	38	33	74	66	61	56	54	51	44	38	33	16.8	15.4	0.07	0.09	0.01	Minor SP
360	EB	OWP	-34.61823	150.84198	560	84	76	73	64	59	56	48	41	35	85	77	73	65	60	56	49	41	35	16.4	15.7	0.08	0.10	0.01	
380	EB	OWP	-34.61836	150.84212	568	129	114	103	90	79	71	60	48	39	129	113	103	90	79	71	59	47	38	17.2	15.5	0.13	0.16	0.02	
400	EB	OWP	-34.61848	150.84228	553	310	226	177	123	91	76	61	47	40	318	231	181	126	93	78	62	48	40	17.3	15.6	0.32	0.38	0.09	
420	EB	OWP	-34.61862	150.84242	561	242	184	150	112	90	77	60	45	37	244	185	152	113	90	77	61	46	37	18.5	15.5	0.24	0.30	0.06	
440	EB	OWP	-34.61876	150.84257	562	192	153	134	105	87	75	58	44	34	193	154	135	105	87	75	59	44	34	18.5	15.8	0.19	0.23	0.04	
460	EB	OWP	-34.61889	150.84272	561	191	168	155	135	114	99	78	57	43	192	170	156	136	115	99	79	58	43	18.0	15.4	0.19	0.23	0.02	
480	EB	OWP	-34.61902	150.84285	563	218	186	169	142	123	108	88	65	49	219	187	169	143	124	108	88	65	49	18.0	15.3	0.22	0.27	0.03	
0	WB	OWP	-34.61656	150.83872	557	68	63	59	57	53	49	44	38	29	69	64	60	58	54	50	45	38	30	18.8	17.6	0.07	0.08	0.01	
20	WB	OWP	-34.61661	150.83892	563	61	54	53	49	46	43	40	32	28	61	54	53	49	46	43	40	32	28	19.0	17.4	0.06	0.07	0.01	Minor SP
40	WB	OWP	-34.61666	150.83913	568	137	129	123	113	105	98	86	70	41	136	129	123	112	104	97	86	69	41	18.8	17.2	0.14	0.17	0.01	Minor SP
60	WB	OWP	-34.61670	150.83934	565	143	138	133	125	118	112	100	83	69	143	138	133	125	118	112	100	83	69	19.0	17.0	0.14	0.17	0.00	Minor SP
80	WB	OWP	-34.61676	150.83954	565	128	118	114	106	100	95	86	71	58	128	118	114	106	100	95	86	71	58	18.7	17.0	0.13	0.15	0.01	Minor SP
100	WB	OWP	-34.61682	150.83974	549	100	91	87	83	79	74	66	56	46	103	94	89	86	81	77	68	57	47	18.1	17.1	0.10	0.12	0.01	CL
120	WB	OWP	-34.61690	150.83994	559	110	102	98	95	90	85	77	65	53	112	103	100	96	91	86	78	66	53	18.4	16.8	0.11	0.14	0.01	CL
140	WB	OWP	-34.61699	150.84013	556	130	121	116	107	100	94	84	69	56	132	123	118	109	102	96	86	70	57	18.1	16.3	0.13	0.16	0.01	CL
160	WB	OWP	-34.61709	150.84031	557	79	71	67	64	60	57	51	42	34	81	72	68	65	61	58	52	42	35	19.4	15.9	0.08	0.10	0.01	CL
180	WB	OWP	-34.61720	150.84047	571	76	62	57	52	48	44	39	31	25	75	61	57	51	47	44	38	31	25	17.7	15.3	0.08	0.09	0.01	CL
200	WB	OWP	-34.61731	150.84064	570	62	51	49	46	43	40	36	30	23	62	51	48	45	42	40	35	29	23	17.7	14.9	0.06	0.07	0.01	SR
220	WB	OWP	-34.61743	150.84081	571	54	48	45	42	40	37	34	28	24	53	48	45	41	39	37	33	28	24	18.0	15.1	0.05	0.06	0.01	Minor SP

240	WB	OWP	-34.61754	150.84097	569	48	41	39	37	35	32	30	25	22	48	41	39	37	35	32	30	25	21	18.1	15.2	0.05	0.06	0.01	Minor SP
260	WB	OWP	-34.61766	150.84113	555	54	47	45	42	40	37	35	30	26	55	48	46	42	40	38	35	31	27	18.1	15.5	0.06	0.07	0.01	Minor SP
280	WB	OWP	-34.61778	150.84129	571	68	60	58	54	52	48	46	38	33	68	59	57	53	51	48	46	38	33	18.1	15.8	0.07	0.08	0.01	Minor SP
300	WB	OWP	-34.61789	150.84146	561	88	81	79	74	71	66	61	54	44	89	82	80	74	71	67	62	54	44	17.7	16.1	0.09	0.11	0.01	Minor SP
320	WB	OWP	-34.61801	150.84162	552	313	271	231	175	139	115	88	63	49	321	277	237	180	142	118	90	64	50	17.2	16.0	0.32	0.39	0.04	Minor SP
340	WB	OWP	-34.61814	150.84179	552	364	290	239	178	136	111	85	62	49	373	297	245	182	140	114	87	63	51	17.3	16.0	0.37	0.45	0.08	Minor SP
360	WB	OWP	-34.61826	150.84194	551	305	240	198	148	116	97	76	60	49	313	246	203	152	119	100	78	62	50	17.8	15.9	0.31	0.38	0.07	Minor SP
380	WB	OWP	-34.61839	150.84209	543	314	247	203	151	118	98	71	50	41	327	257	212	158	123	102	74	53	43	18.7	15.6	0.33	0.40	0.07	Minor SP
400	WB	OWP	-34.61853	150.84224	552	208	183	169	146	128	113	93	67	52	213	187	173	150	131	115	95	69	53	17.9	15.0	0.21	0.26	0.03	
420	WB	OWP	-34.61867	150.84236	565	180	160	149	128	116	107	91	70	53	181	160	149	128	117	107	91	70	53	19.2	15.2	0.18	0.22	0.02	
440	WB	OWP	-34.61881	150.84251	550	178	160	146	128	112	99	81	60	45	184	165	151	132	115	102	84	62	46	17.4	14.8	0.18	0.22	0.02	
460	WB	OWP	-34.61894	150.84264	554	101	90	83	77	71	67	59	50	42	103	92	85	78	73	68	61	51	43	17.9	16.3	0.10	0.12	0.01	
480	WB	OWP	-34.61908	150.84278	559	173	146	134	114	103	93	79	62	50	175	148	136	116	104	94	80	63	50	17.7	16.2	0.18	0.21	0.03	
																				Average			18.0	16.6	0.12	0.15	0.02	
																				Standard Deviation			0.8	1.3	0.08	0.09	0.02	
																				CV			0.05	0.08	0.63	0.63	0.99	

Seasonal Correction Factor	Temperature Deflection Correction Factor	Deflection Standardisation Factor	Design Traffic
1.0	1.10	1.1	4.24E+06

Corrected Characteristic Deflection [mm]	0.27

Notes:

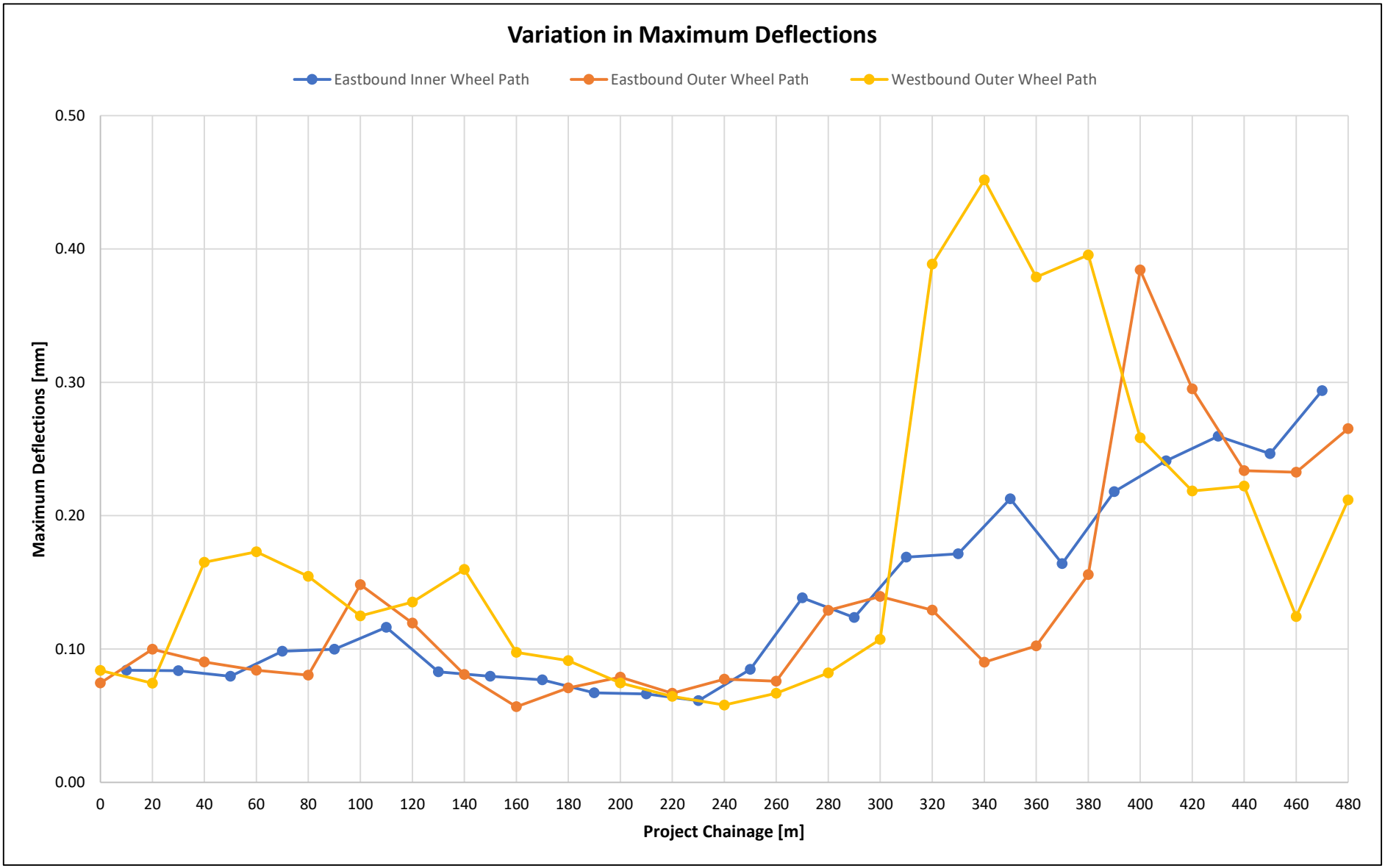
COL - Centre of Lane, IWP - Inner Wheelpath, OWP - Outer Wheelpath, NB - North Bound, SB - South Bound, EB - East Bound, WB - West Bound, PL - Left Parking Lane, PR - Right Parking Lane, TL - Left Traffic Lane, TR - Right Traffic Lane, OS - Outer Shoulder, IS - Inner Shoulder, FL - Fast Lane, SL - Slow Lane, CR - Crocodile Cracking, CB - Block Cracking, CT - Transverse Cracking, CM - Meandering Cracking, CL - Longitudinal Cracking, SR - Ravelling, SS - Stripping, DR - Rutting, DS - Shoving, DC - Corrugation, PA - Patching, HO - Pothole, SP - Polishing

Chainage 0 is taken from Princes Highway Off Ramp

The estimated remaining life is only applicable to granular pavements with thin bituminous surfacing [AGPT05-19]

Report By: **Jack Zhang**
Pavement Engineer

Approved By: **James Loney**
Pavement Technology Manager / Senior Pavement Engineer


Variation in Maximum Deflections
Eastbound Inner Wheel Path
Eastbound Outer Wheel Path
Westbound Outer Wheel Path
Maximum Deflections [mm]
0.50
0.40
0.30
0.20
0.10
0.00
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420
440
460
480
Project Chainage [m]

APPENDIX B

CIRCLY Data

CIRCLY - Version 7.0 (16 July 2020)

Job Title: D19537 Dunmore Lakes Sand Project

Design Method: Austroads 2017

NDT (cumulative heavy vehicle axle groups over design period): 5.60E+06

Traffic Load Distribution:

ID: NSWPresumeRural
Name: NSW RMS Aug 2018 - Rural Presumptive (Table 18)
ESA/HVAG: 1.068

Details of Load Groups:

Load No.	Load ID	Load Category	Load Type	Radius	Pressure/ Ref. stress	Exponent
1	ESA750-Full	ESA750-Full	Vertical Force	92.1	0.75	0.00
2	SAST53	SAST53	Vertical Force	102.4	0.80	0.00

Load Locations:

Location No.	Load ID	Gear No.	X	Y	Scaling Factor	Theta
1	ESA750-Full	1	-165.0	0.0	1.00E+00	0.00
2	ESA750-Full	1	165.0	0.0	1.00E+00	0.00
3	ESA750-Full	1	1635.0	0.0	1.00E+00	0.00
4	ESA750-Full	1	1965.0	0.0	1.00E+00	0.00
1	SAST53	1	0.0	0.0	1.00E+00	0.00
2	SAST53	1	2130.0	0.0	1.00E+00	0.00

Details of Layered System:

ID: D19537-Existing Title: Riverside Drive - Pavement Review

Layer No.	Lower i/face	Material ID	Isotropy	Modulus (or Ev)	P.Ratio (or vvh)	F	Eh	vh
1	rough	AC14 A15E 40 SYD	Iso.	2.00E+03	0.40			
2	rough	AC20 C450 40 SYD	Iso.	2.90E+03	0.40			
3	rough	Cemen10000	Iso.	1.00E+04	0.20			
4	rough	Gran_150	Aniso.	1.50E+02	0.35	1.11E+02	7.50E+01	0.35
5	rough	Sub_CBR4	Aniso.	4.00E+01	0.45	2.76E+01	2.00E+01	0.45

Performance Relationships:

Layer No.	Location	Material ID	Component	Perform. Constant	Perform. Exponent	Shift Factor
1	bottom	AC14 A15E 40 SYD	ETH	0.004667	5.000	6.0
2	bottom	AC20 C450 40 SYD	ETH	0.003882	5.000	6.0
3	bottom	Cemen10000	ETH	0.000223	12.000	
5	top	Sub_CBR4	EZZ	0.009150	7.000	

Reliability Factors:
Project Reliability: Austroads 95%

Layer No.	Reliability Factor	Material Type
1	6.00	Asphalt
2	6.00	Asphalt
3	1.00	Cement Stabilised
5	1.00	Subgrade (Austroads 2017)

Details of Layers to be sublayered:
Layer no. 4: Austroads (2004) sublayering

Strains:

Layer No.	Thickness	Material ID	Axle	Unitless Strain
1	55.00	AC14 A15E 40 SYD		
			SADT(80):	2.718E-05
			SAST(53):	3.011E-05
2	120.00	AC20 C450 40 SYD		
			SADT(80):	4.119E-06
			SAST(53):	2.515E-06
3	150.00	Cemen10000		
			SADT(80):	5.844E-05
			SAST(53):	4.292E-05
5	0.00	Sub_CBR4		
			SADT(80):	2.013E-04

Results:

Layer No.	Thickness	Material ID	Axle Group	CDF

1	55.00	AC14 A15E 40 SYD	Total:	5.970E-05
			SAST:	3.793E-05
			SADT:	1.966E-06
			TAST:	2.111E-06
			TADT:	1.440E-05
			TRDT:	3.261E-06
			QADT:	3.759E-08
2	120.00	AC20 C450 40 SYD	Total:	4.356E-09
			SAST:	3.871E-10
			SADT:	3.947E-10
			TAST:	2.154E-11
			TADT:	2.890E-09
			TRDT:	6.547E-10
			QADT:	7.547E-12
3	150.00	Cemen10000	Total:	9.973E-01
			SAST:	5.557E-02
			SADT:	3.470E-01
			TAST:	2.139E-03
			TADT:	5.647E-01
			TRDT:	2.765E-02
			QADT:	2.619E-04
4	300.00	Gran_150		n/a
5	0.00	Sub_CBR4	Total:	1.491E-05


Turbot St
EXIT